



REPORT TO:

Ministry of Education

Alternative Site Selection Assessment

Redcliffs School, Christchurch

Date August 2016

CONFIDENTIAL

The Property Group Limited



Quality Control



Title	Alternative Site Selection Assessment for Redcliffs School, Christchurch City
Client	Ministry of Education
Job No.	713237
Version	1
Dated	16/09/2016
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1. Executive Summary

The Property Group Limited (TPG) has been commissioned by the Ministry of Education (the Ministry) to prepare a site identification and evaluation assessment for potential alternative sites for Redcliffs School. At the instruction of the Ministry no assessment of the existing Redcliffs School Main Road site has been undertaken as part of this report.

This report contributes to fulfilling the Minister of Education's (the Minister) request for "a feasibility analysis on whether relocation within a suitable timeframe to another site within the Redcliffs community, most likely Barnett Park, is likely to be a realistic option."¹

A total of 38 sites were initially identified within the search area. This was defined as the Redcliff's School zone, enlarged by a 500 metre buffer zone beyond its boundary in all landward directions. The 38 sites were assessed against the criteria set out in the Ministry's Methodology for New School Site Evaluation Version 6B May 2016 (the Methodology). The Methodology is a two stage assessment process aimed at identifying the most suitable site, or sites, on which a potential school facility could be located and on which detailed due diligence should be completed.

Stage 1 of the Methodology requires the sites identified within the search area to be evaluated at a desk top level as to their suitability for the location of a school against the four broad criteria of locality, size and shape, current land use and access. Following completion of the evaluation process, and consultation with the Ministry, three sites were identified to progress to Stage 2 of the evaluation. The sites identified to progress to Stage 2 of the evaluation process were McCormacks Bay Reserve, Redcliffs Park and Barnett Park.

Stage 2 of the Methodology requires the three selected sites be evaluated in more detail against 20 specifically identified criteria as discussed in Section 4 of this report. The sites are awarded a score between 0 and 5, five being the highest where a site meets or exceeds the criterion and 0 the lowest.

Following a familiarisation visit to the sites, two alternative building location options were considered appropriate for Redcliffs Park. This was due to the site being on two different elevations. During the process, the Redcliffs School Board of Trustees requested that two additional locations on Barnett Park be considered. This resulted in a total of three separate locations being assessed on Barnett Park (locations A, B and C). The relatively large size of Barnett Park allowed a number of discrete options to be considered. A total of six building location options over three sites were evaluated against the Stage 2 criteria and this is detailed in Section 6 of this report.

In order to complete assessment of the Stage 2 criteria against the six locations, high level expert advice was obtained in the areas of geotechnical, flooding, contamination, traffic and transportation, infrastructure, school design, cultural significance, heritage and valuation.

¹ Document IM60/104/52/3 – 1 July 2016

On completion of the Stage 2 evaluation, scores achieved by the six locations were as follows:

McCormacks Bay Reserve	57.5
Redcliffs Park (Location A)	62.4
Redcliffs Park (Location B)	70.4
Barnett Park (Location A)	62.6
Barnett Park (Location B)	64.5
Barnett Park (Location C)	64.7

2. Recommendation

In considering the scores achieved across the three sites and six individual building locations identified we make the following recommendations:

- a. No further evaluation or due diligence be undertaken with respect to the McCormacks Bay Reserve site. This is the lowest scoring site when reviewed against the Methodology criteria indicating the site has significant issues with respect to District Plan zoning, geotechnical, flooding, contamination, cultural and ecological criteria.
- b. Redcliffs Park Location A scores similarly to the Barnett Park locations. As such, we do not recommend it is further assessed given that Location B at Redcliffs Park is clearly the higher scoring location on the site.
- c. Of the three sites Redcliffs Park Location B has the highest score using the Methodology criteria. We recommend that it be considered as a preferred site and taken forward for a detailed due diligence assessment.
- d. Assessment of the three Barnett Park locations showed them to have very comparable scores, ranging from 62.6 to 64.7. While the scores are similar, the risk profile for each of the three locations is quite different. While we would suggest that Barnett Park is still carried forward as a preferred option we recommend that the Ministry consider undertaking a weighted evaluation of the three locations as provided for in the Methodology. This will require the Ministry to determine their priority criteria. Following the weighted evaluation, a preferred single location should be able to be identified.

3. Background

Since February 2011, following the Canterbury earthquakes and consequent cliff collapse and debris inundation on and about parts of the school property, Redcliffs School has been operating from co-located and shared facilities at Van Asch Deaf Education Centre in Sumner. This site sits outside both the Redcliffs School zone and the 500 meter buffer adopted in this report.

On 25 November 2015, following consideration of expert geotechnical advice and concern at potential disruption to education, the Minister made an interim decision that Redcliffs School should close.

In the 1 July 2016 “Education Report: Next steps for Redcliffs School”² the Ministry recommended a number of further actions to the Minister. A specific action recommended in respect to the site of the Redcliffs School was *“the Ministry will undertake... a feasibility analysis on whether relocation within a suitable timeframe to another site within the Redcliffs community, most likely Barnett Park, is likely to be a realistic option.”*

On 7 July 2016 the Minister decided not to confirm her interim decision to close the school and instead sought more information which is to include the feasibility analysis as set out in the previous paragraph.

TPG has been commissioned by the Ministry to prepare a ‘site identification and evaluation assessment’ for an alternative site for Redcliffs School to contribute to the feasibility analysis referred to above. Recent population projections support a roll of 300; in order to accommodate future growth a maximum roll of 400 is to be assumed.

In preparing this report, TPG has been supported by high level expert advice in the areas of geotechnical, flooding, contamination, traffic and transportation, infrastructure, architectural design, cultural significance, heritage and valuation.

At the instruction of the Ministry no assessment of the existing Redcliffs School Main Road site has been undertaken as part of this report.

² Document IM60/104/52/3 – 1 July 2016

4. Methodology

The Ministry has developed a robust selection methodology for the identification and evaluation of potential new school sites. The 'Ministry of Education Methodology for New School Site Evaluation' version 6B (May 2016) has been utilised in this report to identify and assess potential alternative sites. The methodology has been included as Appendix 1.

This methodology comprises a two stage evaluation process. The first stage involves identifying all potential sites within an identified catchment and then assessing them at a high level to identify each site's suitability as a potential school site.

The second stage involves a more thorough process of evaluating those sites that progress from Stage 1.

The two stages are summarised below.

4.1 Stage 1

In the Stage 1 process, a geographic area is determined based on the proposed or existing school zone. Sites which meet or exceed the minimum size requirements for the proposed school are assessed against four broad criteria, as described by specific guidelines set out in the Methodology. The four criteria reflect the fundamental requirements for a suitable school site. They are;

1. Locality
2. Size/Shape
3. Current land use; and
4. Access

Each of the identified sites are analysed against the criteria using a 'traffic light' system to determine the suitability of each site. Attributes which achieve a 'Green Light' are considered most suitable, attributes that achieve an 'Amber Light' present some risk but are manageable, while attributes that are given a 'Red Light' fail that criterion and do not progress to the next stage. The 'traffic light' analysis for all 38 sites which were identified through the Stage 1 evaluation is included as Appendix 2.

Consultation then occurs with the Ministry and a decision is made about which sites are considered the most suitable for further evaluation against the Stage 2 criteria.

4.2 Stage 2

The sites considered most suitable from the Stage 1 evaluation are then evaluated against the following criteria:

1. Site acquisition costs
2. Perceived ease of acquisition
3. Site size
4. Topography
5. School design potential
6. Position of site / growth
7. District Plan Zone
8. Location within student catchment
9. Existing site constraints
10. Road frontage
11. Transport network
12. Infrastructure services
13. Geotechnical
14. Flooding
15. Contamination
16. Noise effects
17. Ecological impacts
18. Cultural or other significance
19. Opportunities of co-location
20. Social impacts

The criteria³ are scored on the basis of awarding a score of between zero and five, (five being the highest where a site meets or exceeds the criterion and zero being the lowest). Some criteria have guided scoring while others are more subjective. It is possible for a site which scores a 'Green light' or 'Amber light' in Stage 1 to score a zero for one or more criteria at Stage 2.

The awarded scores are totalled to ascertain the most suitable site. The highest scoring site/s may then be considered for further detailed due diligence.

³ With the exception of the infrastructure criterion, which as set out in the Methodology is scored slightly differently. In that criterion eight different infrastructure items are scored up to 0.5 each. Instead of a holistic assessment being made, the sums are totalled to a maximum of four. If all infrastructure is available to a site it scores an extra 1.0 to a maximum of five in total.

5. Stage 1 Evaluation

5.1 Overview

The Stage 1 search area included all land within the existing Redcliffs School Zone, plus a 500 metre buffer beyond its boundary in all landward directions.

Since February 2011, Redcliffs School has been operating from co-located and shared facilities at Van Asch Deaf Education Centre in Sumner. This sits outside the Stage 1 search area.

The Ministry guidelines indicate that a primary school of 400 students requires approximately 1.7 hectares to two hectares of usable land, which includes provision of an additional 1,500 square metres to accommodate an early childhood education centre (ECE), if required, in the future.

Any property with a minimum land area of 1.5 hectares was identified and allocated a unique numerical identifier. This could be a single parcel greater than 1.5 hectares; multiple parcels in common ownership that together would exceed 1.5 hectares; or parcels which could rely on the use of adjacent reserve land to meet the 1.5 hectare minimum.

A total of 38 sites were identified and then evaluated against the four criteria using the traffic light system. The sites and their evaluation (Green Light, Amber Light, Red Light) are recorded in Appendix 2.

5.2 Locality

The Methodology sets out the following guidelines for evaluating Locality at a desktop level of analysis.

Evaluation Guidelines

“Does the site fall within a logical catchment as identified in the demographic report/area review or strategy (to be provided) in relation to both the population growth and the school roll growth areas?”

The area of review was identified as being the existing Redcliffs School Zone with a buffer of 500 metres on its landward boundaries. The school roll and any growth was forecast to come from within that catchment.

Redcliffs is an established built up coastal residential settlement. The initial search area also captured parts of Mount Pleasant, Sumner, Heathcote, and Lyttelton. Mount Pleasant and Sumner are adjacent to residential neighbourhoods. The capture of Heathcote and Lyttelton was due to the 500m buffer extending over and across the Port Hills into these areas.

As the specific action, agreed to by the Minister, referred to *“another site within the Redcliffs community”*, sites within the Redcliffs School Zone were preferred and any site within the existing school zone received a Green light.

Those sites which sat within the buffer zone, or extended outside the buffer zone, were given either an Amber or Red Light, respectively.

5.3 Size and Shape

The Methodology sets out the following guidelines for evaluating size and shape.

Evaluation Guidelines

- Is the size (in hectares) adequate for the intended school?
- Could a suitable site be created via the provisions available to the Crown?
- Does the shape of the site permit good use of the available land?
- Is the site of such steep and varied topography to make construction unviable in comparison to other sites identified?
- Are there existing buildings or other developments on the site (e.g. large sealed areas) that could be retrofitted? Provide high quality educational facilities?

The Ministry guidelines provide the following calculation⁴ for assessing school site size for a maximum roll of 400 students;

- 1 hectare, plus
- 14m² per child, plus
- Optional 1,500m² for an ECE (Early Childhood Education Centre)

Based on this calculation a site of approximately 1.7 to 2 hectares is considered optimal for an alternative site to accommodate Redcliffs School. Any site larger than this was awarded a Green Light with any smaller sites being awarded a Red or Amber Light.

Consideration was given to the contour and gradient of any identified site. While a site may theoretically be large enough, the shape did not always work in terms of configuration or usable space for playing fields and/or hard court areas. Issues such as narrow parcels and steep topography (a common constraint within the catchment area) resulted in the majority of sites, such as 7 and 8 or 30 and 31, being assessed as red. Plan B: Contours and Topography attached at Appendix 3 shows the topography of the search area with contour lines at 10 metre separation.

⁴ Ministry of Education School Property Calculator

Consideration was given to acquiring multiple properties in private ownership however this option was discounted based on the high likelihood of a prolonged period to complete acquisition and the high cost of purchasing individual sites. Negotiating with multiple private land owners to acquire and create a suitably sized site is likely to be a lengthy process, even with the provisions of the Public Works Act 1981 being invoked. Strong negative public perception associated with the Crown acquiring multiple sites in private ownership also makes acquisition of land in this manner problematic.

Preliminary desktop valuation advice received from Telfer Young indicates the cost of acquiring multiple flat land properties from various owners is likely to be in the vicinity of \$20,000,000 - \$26,000,000. The average flat section size in Redcliffs is 650m² with the average market value being \$684,000. In Sumner the average section size is 582m² and an average market value of \$724,000. Approximately 31 – 35 properties would be required in order to acquire and create a two hectare site.

While acquiring large numbers of multiple sites is unrealistic, acquisition of a small number (2-3) of sites which adjoin a single larger site, so as to meet the minimum land area requirements, is a more viable option. One such possibility that was explored was the Redcliffs Bowling Club. However, in order for it to meet minimum land area requirements it would still require between 9 – 12 adjoining sites, in multiple ownership, to be acquired.

One site which would be enhanced by the acquisition of an adjoining vacant residential section is Redcliffs Park. While meeting minimum site requirements, the acquisition of 19 Main Road would improve the workability of the Main Road frontage and building platform.

5.4 Current Land Use

The Methodology sets out the following evaluation guidelines for assessing Current Land Use.

Evaluation Guidelines

- Are there any transmission lines/cell phone sites etc on the site?
- Are there any historic buildings (registered with NZHPT) on the site? Is the site itself a registered historic place or site?
- Does the site have significant cultural, spiritual or other significance?
- Is the site predominantly covered in vegetation or contain ecologically important items? Does the site have a water course running through it? Is the site susceptible to flooding?
- Is the site currently serviced or do plans exist (structure plans etc) to provide services in the near future?
- Does the site have a major geotechnical hazard that would impact significantly on the feasibility of constructing a school?
- Is there any history of contamination from previous activities on the site; pesticides from agricultural use, asbestos from the previous farm use, illegal dumping/fill etc?
- Are there any NES⁵ consents on the land?

⁵ National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health

A range of issues such as transmission lines, cell phone sites, high environmental or ecological values, historic sites or settings, watercourses, geotechnical hazards and the like exist across a number of the Stage 1 sites.

On a district wide level, Redcliffs – Te Rae Kura – is an area known to be rich in cultural heritage with significant past archaeological finds and important natural features. This affects a number of the Stage 1 sites and contributed to an Amber Light.

Infrastructure is generally readily available to the boundary as all the sites are within an established residential area.

The area comprises a mix of flat residential and commercial land, and hillside residential or rural slopes. Where the land is flat, some of it is liquefaction prone, flood prone, low lying, and/or in proximity to the coast. The residential hillside land, and steep rural hillside land, come with a range of slope instability and other geotechnical issues. Plan C: CERA Residential Redzone Land attached at Appendix 3 depicts the Canterbury Earthquake Recovery Authority Residential Redzone categories as at 4 December 2013. The zoning and proximity to red zoned land was considered as part of the Stage 1 evaluation. Any red zoned land was awarded a Red Light.

Some of the 38 sites which were assessed in Stage 1 are on Environment Canterbury's Listed Land Use Register (LLUR). This indicates a past or present Hazardous Activities and Industries List (HAIL)⁶ use that may have contaminated the land. Land that was listed on the LLUR was assessed as Amber and if it proceeded to Stage 2 was subject to a more detailed desktop contamination assessment.

5.5 Access

The Methodology sets out the following evaluation guidelines for assessing access.

Evaluation Guidelines

- Does the site have legal access/road frontage?
- Is there sufficient frontage to provide for adequate parking/drop off areas?
- Are there other public areas/services in the immediate vicinity which could provide mitigation to the provision of onsite car parking?

There is one established main arterial road, Main Road, which runs along the base of the search area. From this road a number of collector and local roads thread up into the residential hills. Many of these hillside roads are narrow and steep.

⁶ <http://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail#hail-web>

Consideration was given to the distance which would have to be travelled to each site by the majority of the catchment area which is located on the flat and lower slopes of the surrounding hills. A number of sites located on the hill, such as 11 or 29, were awarded a Red or Amber Light, in part reflecting the distance which would have to be travelled by students within the identified catchment.

The widths and gradients of the access or adjoining roads were also a strong consideration as part of the evaluation of this criterion. Roads which were steep, narrow and winding, for example the section of Clifton Terrace leading to site 35, resulted in an Amber or Red Light. The street frontage of each site was considered and evaluated as to whether sufficient parking/drop off areas, possible shared parking and ease of access could be achieved.

5.6 Stage 1 Conclusion

A total of 38 potential alternative sites were identified in the search area. This included land on Glendever Terrace and McCormacks Bay Reserve which the Redcliffs School Board of Trustees asked to be included. It should be noted that McCormacks Bay Reserve had been identified as a site by the Stage 1 identification methodology. A total of 35 sites achieved a 'Red Light' in one or more of the criteria and are not recommended to advance to Stage 2 evaluation. Of these 35 sites, 25 had two or more "Red Lights".

A total of three sites did not achieve a 'Red Light' in any of the four criteria and, with reference to the Methodology, are considered to be the most suitable alternatives to proceed to Stage 2. A more detailed summary of the Stage 1 evaluation and awarded scoring for each of the three sites has been included as Appendix 4.

The three sites which were recommended to the Ministry to proceed for a Stage 2 evaluation are:

- Site 1: McCormacks Bay Reserve
- Site 37: Redcliffs Park
- Site 38: Barnett Park

Site Number	Site Name	Locality	Size and Shape	Land Use	Access
1	McCormacks Bay Reserve				
37	Redcliffs Park				
38	Barnett Park				

Table 1 Traffic light scores of the three selected sites.

The Ministry accepted this recommendation and these three sites proceeded to a Stage 2 evaluation.

6. Stage 2 Evaluation

6.1 Overview

Stage 2 evaluates each of the three preferred sites as shown on Plan D: Stage 2 Selected Sites (Appendix 3) against the 20 criteria as defined by the Methodology. A detailed summary of the Stage 2 evaluation and awarded scoring for each of the three sites and the optional locations has been included as Appendix 5. TPG advice has been supplemented by a number of consultants and experts as required. These consultant reports have been summarised in this report. The full consultant reports are attached as follows:

Appendix 6 – Tonkin and Taylor

Appendix 7 – Abley Transportation Consultants (Abley)

Appendix 8 – Stephenson & Turner

Appendix 9 – Telfer Young

Appendix 10 – Mahaanui Kurataiao Limited

Following a site familiarisation visit, a decision was made to evaluate two alternative locations at Redcliffs Park. The Redcliff School Board of Trustees (BoT) requested that an additional two alternative locations be considered on Barnett Park. This enabled a more thorough evaluation of the differing aspects of each site.

The Ministry commissioned Stephenson & Turner to produce notional bulk and location plans for each of the different locations evaluated for Stage 2. The use of notional bulk and location plans demonstrates whether school buildings can be accommodated on each site and provides the Ministry with an indication of whether the whole site, or one part of the site, needs to be acquired. This enables matters such as co-location or shared facilities with the community, such as sports fields, playgrounds, car parks and buildings for community purposes to be considered.

The aerial images below identify the three sites and the alternative locations.

Site 1 McCormacks Bay Reserve



Figure 1 McCormacks Bay Reserve

McCormacks Bay Reserve has a total area of 20.7097 hectares. The parcel of land located on the eastern boundary of the reserve has been identified for Stage 2 evaluation. This parcel of land has an approximate area of 3.4000 hectares and the potential building platform is located on the McCormacks Bay Road frontage.

Site 37 Redcliffs Park



Figure 2 Redcliffs Park

Redcliffs Park has a total area of 1.9071 hectares. The whole park has been considered as a potential alternative site. Two building platforms have been identified. Location A is located on the eastern boundary fronting Celia Street. Location B fronts Main Road and provides an elevated platform. The adjacent residential site to the south of approximately 900m² is at present vacant and presents a potential acquisition opportunity for the Ministry.

Site 38 Barnett Park



Figure 3 Barnett Park

Barnett Park has a total area of 40.2525 hectares. The selected site comprises the flat portion of the park running from Main Road to just south of Bay View Road. We estimate this area to be approximately 7-8 hectares.

Location A comprises the area of the site fronting Main Road, Location B comprises part of the central portion of the site, and Location C comprises the area of land at the end of Bay View Road.

6.2 Stage 2 Scoring Table

A summary of the scores awarded to each site is recorded in Table 2. Section 6.3 includes a comparative analysis of how the three sites and six locations scored against the criteria. More detailed individual assessments for each of the three sites and alternative locations are included at Appendix 5.

Criteria	MCCORMACKS BAY RESERVE Site 1	REDCLIFFS PARK Site 37		BARNETT PARK Site 38		
		Location		Location		
		A	B	A	B	C
Site acquisition costs	4	3	2	2	2	3
Perceived ease of acquisition	0	0	0	0	0	0
Site Size	5	5	5	3	5	5
Topography	5	5	5	5	5	5
School design potential	5	5	4	2	3	4
Position of site/growth	5	5	5	5	5	5
District Plan Zone	0	1	3	4	3	2
Location within catchment	3	5	5	5	5	5
Existing site constraints	4	3	2	1	2	2
Road Frontage	2	3	4	1	1	1
Transport network	4	4	4	3	3	2
Infrastructure services	2.5	2.4	2.4	2.6	1.5	1.7
Geotechnical	1	2	4	3	3	4
Flooding	1	1	3	1	2	3
Contamination	1	2	4	3	3	3
Noise effects	5	5	5	5	5	5
Ecological impacts	1	2	3	4	4	3
Cultural or other significance	1	2	2	4	3	3
Opportunities of co-location	3	2	3	4	4	3
Social Impact	5	5	5	5	5	5
TOTAL	57.5	62.4	70.4	62.6	64.5	64.7
RANK	6	5	1	4	3	2

Table 2 Stage 2 scores

6.3 Stage 2 Detailed Evaluation

6.3.1 Site Acquisition Costs

Preliminary desktop valuation advice⁷ was obtained from Telfer Young for all three properties. In the case of Redcliffs Park and Barnett Park the individual locations identified as potential building sites were assessed separately.

All three properties identified are currently utilised as parks and reserves and as such determining a definitive land value is difficult with a number of variables affecting the assessment of market value. Variables which were allowed for, with appropriate adjustments made to reflect the risk associated with acquiring the sites on the open market, included;

- Current zoning
- Sites of ecological significance overlay
- Significant feature or landscape overlay
- Cultural consideration
- Coastal environmental overlay
- Revocation of the Reserve status and Council disposal processes.

Valuation was completed on the basis of the three sites being available for residential development, residential zoning being the underlying zoning of the land neighbouring the subject sites. For valuation purposes this is considered to be the “highest and best use” of the land.

Individual site value and the potential acquisition cost was assessed on two scenarios. The first was the acquisition of a two hectare block⁸ of land which would accommodate the full school and its facilities, and would be held in Crown ownership for the purposes of the school. The second was the assessment of an indicative 2,500 square metre site on which the school building footprint would be accommodated with the intention that facilities such as hard court, playing fields and car parking would be provided via a co-location and joint provision of facilities between Christchurch City Council (CCC) and the Ministry.

The below summary table provides the preliminary site valuers assessed by Telfer Young.

⁷ Site Acquisition costs were prepared by Telfer Young – see Appendix 9.

⁸ Redcliffs Park is a 1.9071ha block and has been valued on this basis.



The valuation figures were completed using a combination of sales comparison and hypothetical subdivision analysis.

Review of the above preliminary valuation figures provided by Telfer Young identifies the McCormacks Bay Reserve land as significantly cheaper than the sites of Redcliffs Park and Barnett Park. This is due to the significant risk associated with the site in respect of the variables noted above. The value of land associated with Redcliffs Park and Barnett Park is within a reasonably tight band, although the land at the south of Barnett Park represents a cheaper option than the front and middle of the property. The elevated land of Redcliffs Park by Main Road is seen as being of better quality.

6.3.2 Ease of Acquisition

All three sites identified for further evaluation at Stage 2 represent park and playing field spaces servicing Redcliffs and neighbouring residential suburbs. Computer Freehold Register (CFR) titles are attached at Appendix 11.

⁹ Full description of Value A and Value B is described at p7 of the Telfer Young report at Appendix 9

¹⁰ The cost of acquiring all or any land on Redcliffs Park excludes the cost of acquiring the adjoining residential site at 19 Main Road.

McCormacks Bay Reserve

This land is held by CCC for the purpose of a Recreation Reserve. The land is subject to the Reserves Act 1977. We note the land was reclaimed from the sea, and was a Crown asset prior to being vested in the Corporation of the Borough of Sumner as reserve. The vesting was completed via a special Act which was the means of providing title to reclaimed land under the Harbours Act 1923 which was in force at the time. We believe that the reserve is not 'Crown derived', on the basis the vesting was a transfer process under the Harbours Act as opposed to a Reserves Act 1977 function. This is consistent with how the Department of Conservation (DOC) has viewed other parcels as being not "Crown derived" when the vesting was not in pursuit of a core Reserves Act 1977 matter.

Redcliffs Park

This site is held in three separate titles. The parcel fronting Beachville Road and Celia Street is held, in trust, by the CCC as a Recreation Reserve. This parcel of land is a Crown derived reserve and subject to the Reserves Act 1977.

The remaining two parcels of land making up this property, fronting Main Road, are held by CCC under the Land Transfer Act 1952. These sites are not subject to the Reserves Act 1977. Neither do the titles have a stated purpose for which they are held. This indicates that this land is general land of Council and able to be dealt with under the Local Government Act 2002 (LGA 02). We note that section 138 LGA 02 requires Council carry out public consultation before it disposes of any part of a park (which is not subject to the Reserves Act 1977). This is likely to apply to the two non-reserve titles.

Barnett Park

Barnett Park is made up of six underlying parcels, two of which form the main central core of the park. The three identified locations are predominantly contained within these two parcels. There are three additional smaller parcels of land located at the Main Road frontage of the park which are affected by proposed Location A only.

The main parcel of land fronting Main Road is vested in trust in by CCC, as recreation reserve. This parcel of land is a Crown derived reserve and is subject to the Reserves Act 1977.

The second main parcel of land adjoining the southern boundary of the above site (frontage to Bay View Road) is also vested in trust in CCC as recreation reserve. The land is a Crown derived reserve and is subject to the Reserves Act 1977.

Of the three small sites located at the front eastern boundary of the property, required for Location A only, two are held for local purpose reserve/recreation purposes which are Crown derived and subject to the Reserves Act 1977. This land is vested in trust in CCC. The third parcel of land is held by CCC under the LGA 02 (ex-drainage board land). We note that the land is likely to have been acquired and remains held for a public work, as the title remains in the name of the Christchurch Drainage Board. We do note that the Board has been disestablished and its functions and assets vested in CCC, however the registered proprietor has not been updated on the title. There are no section 40 Public Works Act 1981 offer back impediments as the land was Crown land prior to being transferred to the Drainage Board in 1959 and is required for another public work. Public consultation pursuant to Section 138 LGA 02 may still be required as noted for Redcliffs Park.

Statutory Provisions

The statutory provisions of the Reserves Act 1977 and potentially the LGA 02 will have to be adhered to should the Ministry wish to acquire any of the three properties identified.

Acquisition of land holding a reserve status under the Reserves Act 1977 will generally require revocation of the reserve status pursuant to Section 24 of that Act. We note advice received from DOC that potentially the Reserves Act process may be dispensed with, if the land is set apart under Section 52 Public Works Act (PWA) as this may be completed as an alternative process subject to obtaining the consent of the Minister. However we caution that despite the empowering wording of s52 PWA, here the land is vested in an administering body (Council). Section 52 PWA also provides that in such cases, consultation with the administering body is required. In our experience the requested consultation is achieved by means of carrying out the Reserves Act revocation process. We recommend DOC be approached to provide examples of where the streamlined approach has been adopted previously, prior to relying on this process being available.

Assuming the revocation process is required, the administering body of the land, in this case the Council, will complete this revocation process with final sign off being completed by DOC. This revocation process includes the requirement for public notification. Potential does exist to exchange the reserve land for alternative land as provided for in Section 15 of the Reserves Act 1977, and this process also requires public notification and Council approval. An exchange may be a means of providing the community with replacement reserve or park land.

The statutory provisions of the LGA 02 would have to be allowed for with respect to any land that is not held under the Reserves Act 1977. As we have noted above, Section 138 of the LGA 02 requires Council carry out public consultation before it disposes of any part of a park (which is not subject to the Reserves Act 1977). Requirements under the LGA 02 relate specifically to land associated with Redcliffs Park Location A and B and a small area of land on Location A of Barnett Park. If the land is held as a 'Strategic Asset' of Council there are further specific processes prior to disposal. This is considered unlikely, however, actual disposal protocols would have to be worked through with Council.

The statutory provisions pertaining to the sites will affect the ease of acquisition. There is potential for a considerable period of time to be involved with public notification/consultation, consideration of possible objections and registration of documents required to change the status of the land. The CCC's internal processes for considering and approving the transfer of its assets, in particular parks and reserves, also has the potential to extend the time period associated with acquisition of the land.

On inspection of the Redcliffs Park site it was noted that a vacant section adjoins it on its southern boundary, the Main Road frontage. Possible purchase of this site could be advantageous when considering the overall development of the school platform on the Location B site. If this option is pursued, allowance should be made for time associated with negotiation/consultation associated with purchase of the land.

Acquisition Process

We would envisage that any acquisition/transfer of the potential sites would be facilitated via the PWA. Transfer of the Crown derived reserve land will not be subject to the Right of First Refusal (RFR) obligations under the Ngāi Tahu Claims Settlement Act 1998 as this will constitute a Crown to Crown transaction. An acquisition of the land held by CCC under the LGA 02 is also unaffected by the Ngāi Tahu Claims Settlement Act, as that Act's reach does not extend to land outside of Crown ownership. Notification is, however, required to be given to Ngāi Tahu of the exempted transfer in respect of any Crown parcels.

In the case of a land exchange being completed between one of the potential identified sites and the existing school site on Main Road, RFR obligations will need to be considered with Ngai Tahu for what will constitute a disposal of the existing school site. We note the Ngāi Tahu Claims Settlement Act 1998 exempts land disposed of under section 15 Reserves Act 1977, but we understand this exemption to only relate to the reserve land to be exchanged.

Where the school land would become Crown owned reserve, the transfer is exempt as it constitutes a Crown to Crown transition, ie Crown school land would become Crown reserve land. This being the case here, notice of the exemption would need to be given for land on both sides of the transaction. Complication would exist, however, if land held by CCC under the LGA 02 was to be included in the exchange. This land is not Crown (reserve) owned land and exchange with the current school site would constitute a disposal, should it become fee simple CCC land providing the equivalent title. This would trigger Ngai Tahu RFR obligations in respect of the disposal of the school site.

This potentially affects the two parcels of land making up Redcliffs Park (referred to above fronting Main Road) and the small area of ex-drainage board land at Barnett Park. If an exchange of land involving CCC LGA 02 land is likely, we recommend that consultation with Ngai Tahu is entered into at the earliest opportunity.

All three sites have a number of complexities associated with them which are outside the norm of land acquisitions completed by the Crown. It is our opinion that there is no clear differentiation between the sites with respect to their ease of acquisition and all sites offer a very similar level of complexity and potential time frame within which purchase could be expected to be completed.

6.3.3 Site Size

Stephenson & Turner have advised¹¹ on site size and school design potential for each of the three Stage 2 sites and the six notional bulk and location plans.

McCormacks Bay Reserve

McCormacks Bay provides enough space for a long “L” shaped single storey building with space for an additional single storey extension. There is sufficient useable space on the site to meet all the Ministry’s requirements.

Redcliffs Park

Location A will cater for an “L” shaped building which comprises a two storey and a single storey wing, with space for a single storey extension. This site would have sufficient useable space to meet the Ministry’s requirements.

Location B provides sufficient space for two, two storey buildings and a smaller additional two storey addition. The playground will be part of the existing reserve and playing fields will utilise the existing Council reserve.

Barnett Park

The park is large enough to accommodate all the facilities a school would require. For the purposes of this assessment, the three separate locations have each been considered as discrete spaces.

Location A is situated closest to the Main Road frontage. The space available for buildings is restricted due to easements. Access to the grassed fields is also challenging due to the location of the existing car park. There may be a need to remove, reposition or repurpose some of the existing car park in a final building design for this site.

Location B and Location C are large enough to provide sufficient space to meet all the Ministry’s needs. Preliminary designs indicate that while both locations also contain several significant easements, there is still enough room for a school to be accommodated.

6.3.4 Topography

All of the Stage 2 sites are flat with no variations to contour sufficient enough to make building construction difficult.

Redcliffs Park has two distinct building platforms at differing heights. The platform close to Main Road (Location B) is elevated, and capable of accommodating school buildings, with playing fields being located at a lower level on the site.

¹¹ Stephenson & Turner– Appendix 8

6.3.5 School Design Potential

In looking at school design potential, Stephenson & Turner has evaluated¹² matters such as good street frontage, clear building entrance and an entrance courtyard (drop off zone). They have tested things such as accessibility between the car park, street access, bike stands, buildings entrance and school security. Factors including orientation for wind protection and daylight maximisation, good flow to grassed areas and opportunities for paved outdoor play have also been taken into account.

McCormacks Bay Reserve

Stephenson & Turner advise that McCormacks Bay provides sufficient space to provide for good urban design and layout opportunities. An “L”-shaped single storey building will provide protection from the prevailing north east wind. There is good frontage and flow, existing car parking will be retained, and they note that there is good access to a wetlands area for outdoor learning.

Redcliffs Park

Locations A and B both score well, with Location A scoring slightly higher as it has the potential to create sheltered spaces out of the prevailing wind. On the other hand, Location B is more visibly and physically accessible to Main Road and provides greater playing space on the playground area below. Stephenson & Turner note that Location B could be a great urban feature for the area.

Barnett Park

Of the three possible locations on Barnett Park Location A is the most constrained in its design potential as it is currently limited by the existing car park, easement and existing building locations. Stephenson & Turner comment that if the car park were relocated the relationship between the school, the Main Road and the playing fields would be improved. The location of the existing car park is considered to be a significant disadvantage. The car park causes a disconnect between the playing fields and the balance of the school site and could result in an increased need for supervision.

Location B is slightly superior to Location A in its current form. It is however quite a distance to walk from the road to the proposed school location and it has no street frontage. There is sufficient space for one two storey building, one single storey wing and one single storey extension which could be arranged to create a paved courtyard.

Location C would be accessed off Bay View Road. There is no formal vehicle access at the moment, with Bay View Road operating as a dead end street and it is set back a long way from Main Road. There is however, sufficient space to put all facilities on this location. The car park design opportunities may be limited.

¹² Stephenson & Turner – Appendix 8

A number of significant easements and infrastructure are located within all three sites and would have to be avoided, relocated or designed around.

6.3.6 Position of Site in Relation to any Growth Strategy or Residential Plan

The sites are all within the established urban area of Redcliffs. There are no relevant growth strategies or residential plans which need to be considered. Opportunities for intensification through subdivision within the catchment are likely to be within the existing school zone and within the lower slopes of the surrounding hills.

6.3.7 District Plan Zone

There are presently two District Plans to consider in Christchurch at the moment, the operative Christchurch City District Plan (Operative Plan) and the proposed Replacement Christchurch District Plan (Proposed Plan).

Looking at the above two plans, the three alternative sites are all zoned some form of Open Space, excepting that Redcliffs Park Location B also has a small area of Residential Suburban zoned land on its north western boundary at 7 Main Road. The adjacent vacant section at 19 Main Road is also zoned Residential Suburban.

Each site has a range of overlays as set out in the following table. On the instructions of the Ministry, the Barnett Park building and playing fields footprints on the flat portion of the site have been used for the purposes of this evaluation. This excludes the slopes.

The overlays result in McCormacks Bay Reserve having significant issues from a planning perspective which are not all shared by the other two sites.

	Operative Plan	Proposed Plan
McCormacks Bay Reserve	Zone: Open Space 2 (District Recreation and Open Space) Notations: Esplanade Reserve or strip required at the boundary with Mean High Water Springs	Zone: Open Space Community Parks Overlays: Coastal environment Liquefaction Assessment Area 1 Fixed Minimum Floor Overlay within Floor Level and Fill Management Area Sites of Ecological Significance Significant Feature or Landscape
Redcliffs Park (A)	Zone: Open Space 2 (District Recreation and Open Space) Notations: Flood management area	Zone: Open Space Community Parks Overlays: Coastal environment Liquefaction Assessment Area 1 Fixed Minimum Floor Overlay within Floor Level and Fill Management Area High Flood Hazard Management Area

	Operative Plan	Proposed Plan
Redcliffs Park (B)	Zone: Open Space 2 (District Recreation and Open Space) Notations: Flood management area (affects a portion of the Main Road frontage and the lower part of the site)	Zones: Open Space Community Parks Residential Suburban Overlays: Coastal environment Liquefaction Assessment Area 1 Fixed Minimum Floor Overlay within Floor Level and Fill Management Area High Flood Hazard Management Area ¹³ Cliff Hazard Management Area 2
Barnett Park (A)	Zone: Open Space 2 (District Recreation and Open Space)	Zone: Open Space Community Parks Overlays: Coastal environment Liquefaction Assessment Area 1 Fixed Minimum Floor Overlay within Floor Level and Fill Management Area High Flood Hazard Management Area ¹⁴
Barnett Park (B)	Zone: Open Space 2 (District Recreation and Open Space)	Zone: Open Space Community Parks Overlays: Coastal environment Liquefaction Assessment Area 1 Fixed Minimum Floor Overlay within Floor Level and Fill Management Area
Barnett Park (C)	Zone: Open Space 2 (District Recreation and Open Space)	Zone: Open Space Natural Overlays: Liquefaction Assessment Area 1 Environmental Asset waterway (20 metre setback)

Table 4: District Plan Zones and Overlays

The Ministry's Stage 2 Methodology is limited to consideration of the District Plan Zones, or proposed zonings in a relevant structure plan.

¹³ The building footprint is likely to be outside the High Flood Hazard Management Area, but the playing fields and car parks will remain within it.

¹⁴ Runs along the Main Road frontage.

That notwithstanding, the due diligence assessment for the preferred site will need to carefully consider other planning instruments¹⁵ as set out in section 171(1)(a) RMA. This is particularly pertinent in light of the complex post-earthquake planning environment in Christchurch. This Stage 2 evaluation has not considered whether a designation for educational purposes could successfully be achieved over any of the sites.

The Proposed Plan includes a Coastal Environment overlay on the planning maps that affects five of the six locations (Barnett Park C is not affected).

Designation

A designation is an exception to the district plan, usually with its own suite of conditions. When considering a NoR, the territorial authority considers the effects on the environment of that public work, having particular regard to national and regional planning policies and plans and relevant provisions of any plan/proposed plan. In certain circumstances, the territorial authority also has to consider whether adequate consideration has been given to alternative sites (s171 of RMA).

On receipt of a NoR, the territorial authority is required to consider whether to process the NoR on a non-notified, limited notified or fully notified basis (s169(1) of RMA). Notification is determined under s95–95G of the RMA, with matters considered including any potential adverse effects on the environment, the effects on any potentially affected persons and any written approvals from such potentially affected persons that have been obtained.

Any alternative site acquired for the purposes of the relocation of Redcliffs School will be subject to this designation process under the RMA. Given the high level of public interest in Redcliffs School, the probability of full public notification and a period for public submissions on the NoR is high. A public hearing enables the community to submit on the designation, either in support or opposition. Statutory timeframes are set out in the Act, together with appeal processes. The risk of an Environment Court appeal/challenge to the Minister's decision could therefore be high and planning/development of the NoR must assume this will be the case.

The six alternative locations considered in this report are all subject to specific assessment of a number of RMA and policy planning matters. Although not considered insurmountable at this stage, it is recommended that the preparation of the NoR be supported with in-depth analysis and detail of the proposal, a high level of consultation, and that all Assessment of Environmental Effects reporting be comprehensive and technically robust with the view that the experts preparing the reports may need to provide evidence at the hearing(s) for the designation and any attendant Court appeals.

¹⁵ Other planning instruments include: a national policy statement, a New Zealand Coastal Policy Statement, a regional policy statement or proposed regional policy statement, a plan or proposed plan.

6.3.8 Location Within the Proposed Student Catchment

The sites all sit within the existing Redcliffs School Zone. McCormacks Bay Reserve is located at the western edge of the catchment, towards Mt Pleasant. Redcliffs Park and Barnett Park offer more centrally located positions within the Redcliffs School catchment.

6.3.9 Existing Site Constraints

There are a number of buildings and improvements located on all three of the sites. These improvements largely consist of toilet and changing room facilities, storage sheds, sports fields, playgrounds and car parking. These improvements are not considered to provide any considerable constraint to the development of most of the sites, with the majority offering a potential opportunity for co-location and shared facilities. Location A at Barnett Park is the site which is most affected by existing constraints which includes the location of the onsite play centre.

There are a number of registered easements and encumbrances over all three of the sites which have been identified for Stage 2 evaluation. These easements and encumbrances may constrain potential development on Redcliffs Park and Barnett Park, although we note that preliminary bulk and location plans completed by Stephenson & Turner indicate that the relevant easements can be accommodated. A number of the easements have building restrictions associated with them and this will need to be taken into account when completing final building design on any of the sites. This final design may include consultation with the easement holders around possible relocation of the easements and infrastructure involved.

McCormacks Bay Reserve

There is an easement running to the north of the on-site toilet and storage shed. We do not envisage that this easement would restrict development of the site.

Redcliffs Park

Redcliffs Park has several drainage and sewerage easements in favour of the Christchurch Drainage Board (CCC) associated with it. One of these easements runs from the Main Road frontage through the middle of the park to Celia Street and affects the building footprint for Location B.

The balance of the easements are more peripheral and move around the approximate boundary of Celia Street and Beachville Road.

Barnett Park

A large drainage easement in favour of the CCC runs down the eastern boundary of Barnett Park which will need to be considered with regards to any development of Locations A and B.

A large public walkway runs through the park from Main Road to the slopes at the rear of the park. This walkway has been taken into account in completion of the initial building designs.

The CCC Management Plan for Barnett Park (Appendix 12) records that an underground cable was installed in 1986 from near Bay View Road to Main Road, and notes that the exact location of this cable was not recorded and an easement was not registered. As part of this evaluation, Orion was approached to confirm the location of their infrastructure throughout the park.

Orion has advised that this cable is now protected via easements registered on the title in 2009. This is a major easement that runs the length of the park, to the east of the centre line, and has a material effect on development of all three potential building locations. Orion also have a large easement area associated with their substation, pylon and building infrastructure located at the south of the park off Bay View road. We note that from our approach to Orion there would appear to be two small areas of infrastructure around Location A and Location C which are not protected or recorded by an easement but are protected by the Electricity Act 1992. Further confirmation on the location of this infrastructure will be required.

We note there are proposed easements over Part Reserves 4979 for the right to convey water (in gross) and the right to convey electricity (in gross) as depicted on LT 498413 which will affect CFR 328620.

Appendix 13 includes a description of the easements recorded on the respective titles for the three sites which may require further consideration in respect to the development of the individual building locations that have been identified. This description also includes the small areas containing infrastructure associated with Orion that are not recorded as formal easements. A map identifying easement locations is also included.

The site is also constrained by areas of rock fall risk. Initial building designs have taken those into account and avoided them. Detailed design will also need to address the exact location of the Environmental Asset Waterway.

6.3.10 Road Frontage

All identified sites have frontage to existing roads. The Abley report¹⁶ addresses whether the site/s have appropriate legal access to the boundary and concentrates on whether there are opportunities for vehicle access to more than one boundary.

McCormacks Bay Reserve

While McCormacks Bay Reserve only has frontage to McCormacks Bay Road this frontage is wide and does have flexibility as to where access could be located.

Redcliffs Park

Redcliffs Park has road frontage to Main Road, Celia Street and Beachville Road.

¹⁶ Abley Transportation Consultants - Appendix 7

The Main Road frontage is assumed not to provide direct vehicle access to the car park at Location A due to the site having two quite separate platforms at differing heights. It will however offer pedestrian access to the school.

Location B will have the opportunity for some limited vehicle access from Main Road for service/emergency/ability vehicles but general vehicle access from Main Road to the school car park is unlikely to be feasible.

For that reason, Location B scores slightly better than Location A.

Barnett Park

Location A at Barnett Park has frontage to Main Road from which vehicle access would be achieved. Location B would be accessed via the existing Main Road driveway, with potential for this to be extended if required. Location C has legal access from Bay View Road however vehicle access is not yet formed there and would need to be created. Due to its remoteness from the Main Road frontage, vehicle access from Bay View Road is assumed. The various locations are evaluated as being comparable from a road frontage perspective.

6.3.11 Transport Network

Abley report¹⁷ that all the sites are suitable from a transport perspective, however, infrastructure works may be required at each site to address some network capacity and access issues.

McCormacks Bay Reserve

McCormacks Bay Reserve can be serviced well by all modes of transport via McCormacks Bay Road. This is a two way, two lane road which has parallel parking, a bus stop and footpath on the eastern side of the road as well as a bus turn-around bay and footpath on the western side of the road. Crossing facilities for pedestrians need to be considered including construction of infrastructure to support this. Crime Prevention Through Environmental Design (CPTED) considerations mean some vegetation on site would need to be removed. Traffic calming and speed reduction outside the school would be appropriate. Further investigation needs to be done of the McCormacks Bay Road intersection at the eastern end of Main Road as congestion may occur.

Redcliffs Park

Like McCormacks Bay Reserve, Redcliffs Park can be well served by all modes of transport. Both sites on the park perform equally well.

¹⁷ ibid

For Location A, consideration should be given to providing a crossing facility to enable safe passage across Main Road. Walking access from the on-street car parks to the school site would need to be provided. The key issue for this location is potential effects on the intersection of Main Road and Beachville Road, which would require careful management.

With regard to Location B, Abley comments that along with the above issues there are two additional matters on Main Road, namely managing parking/drop-off activity before and after school, and considering whether a reduced speed limit at those times is appropriate.

Barnett Park

Abley scores Barnett Park the lowest with respect to this criterion. Issues common to all three locations on Barnett Park include the potential need to provide additional infrastructure on Main Road for both vehicle and other modes of transport, e.g. medians to facilitate turning and passing. Suitable crossing points will need to be considered, particularly given the anticipated use by students walking and cycling to school on the constructed Coastal Pathway, which will be on the opposite side of Main Road to the potential school site. Managing vehicle access at Main Road will be important to ensure that congestion and delays do not occur on the wider roading network. As there is potential for parents to use Bay View Road for an alternative vehicle access, there may need to be further consideration of potential effects on that road.

Location A would require some amendments to the layout of the existing car park, both for car parking and to provide manoeuvrability for school charter buses.

Location B has similar issues to those noted for Location A above.

Location C is assumed to have primary access off Bay View Road and as this is currently a low volume residential street the overall impacts on it would require further consideration. Abley anticipates pick ups and drop offs would still occur in the Main Road car park, and therefore a suitable walking connection to the school site would need to be provided. A shared path would need to be considered to accommodate those students who cycle to school along Main Road.

6.3.12 Infrastructure Services

Infrastructure analysis was undertaken by Tonkin and Taylor¹⁸ (potable water, fire protection water supply, sanitary drainage, stormwater) and Stephenson & Turner¹⁹ (electricity, gas, telephone/communications, and refuse collection)

Water, refuse collection and sanitary services to the street front are available to each of the three sites. All have good access to potable water. Water supply capacity for firefighting has yet to be tested but according to Tonkin and Taylor from their previous experience supply may be constrained to all sites.

¹⁸ Tonkin and Taylor - Appendix 6

¹⁹ Stephenson & Turner - Appendix 8

All sites would need on-site stormwater detention, such as rain gardens, swales or storm filters.

All sites will be able to achieve access to utilities (telephone, electricity, fibre, waste collection); gas is not reticulated in the Redcliffs area.

Costs of providing infrastructure to Barnett Park Location B are likely to be higher than to the other sites given the distance from Main Road or Bay View Road.

6.3.13 Geotechnical

Tonkin and Taylor advise that all of the sites have geotechnical issues.

McCormacks Bay Reserve

This site is known to have been subject to sand ejecta, fissuring, lateral spread and related ground settlement during the Canterbury Earthquake Sequence (CES). Tonkin and Taylor suggest the land is likely to perform to TC3 standards. Although part of an old rock quarry is across the road from the site, Tonkin and Taylor advise the site will be outside the “lives risk line”.

Redcliffs Park

Location A is likely to perform in a similar but slightly better way to McCormacks Bay Reserve with respect to sand ejecta, fissuring, lateral spread and ground settlement. The site has no slope hazards or hazard runout zones.

On Location B, the Proposed Plan shows Cliff Hazard Management Area 2 running approximately four metres into the boundary of the proposed site. This line was derived from the 10^{-6} Lives Risk Line from the GNS studies, and is marked on the Stephenson & Turner preliminary designs. It currently coincides with a 31° “flyrock” line. Remediation works are currently being undertaken on the cliff face opposite Location B. This is expected to have the effect of reducing the actual risk of rock fall, and hence the 10^{-6} Lives Risk Line and the 31° “flyrock” are reduced away from the (ex) residential properties within Location B. We understand, however, the remediation works are unlikely to result in a reduction of the Cliff Hazard Management Area 2 in the Operative Plan.

Barnett Park

This site performed better than McCormacks Bay Reserve during the CES. It had minor cracking damage, no ejecta, but did experience some cracking and spreading towards the estuary. Tonkin and Taylor anticipate a high potential for liquefaction and TC2-like future performance, with ground settlements of about 100mm and minor to moderate land damage possible in future SLS (Serviceability Limit State)²⁰ to ULS (Ultimate Limit State)²¹ scale earth quake events.

The slope of Moncks Spur to the west of the site presents a modest landslip hazard. Runout of debris from shallow, small to moderate volume landslips may extend onto the existing access way to the west of Location A. There is no rock fall hazard in this area.

There is a rock fall hazard line in Location B, which Tonkin and Taylor recommend be adopted as a “no-build” line. The Stephenson & Turner designs conform with that line.

There is a further rock fall landslip hazard on the slopes to the west of Location C, and Tonkin and Taylor recommend the GNS²⁰ rock fall risk lines be adopted as a ‘no-build’ line. The Stephenson & Turner designs conform with that line.

6.3.14 Flooding

Advice²¹ from Tonkin and Taylor is as follows:

McCormacks Bay Reserve

This is the lowest lying of the three sites, and has an estuarine boundary. As such it is most likely to be affected by inundation. The site is low lying and would require approximately 1.5 metres of fill to bring it to the minimum finished floor level required by Council. This would put it above the surface of the road.

Redcliffs Park

Location A is at a similar level to McCormacks Bay Reserve, and is also subject to coastal inundation but scores better as it does not have an estuarine boundary.

While the building platform for Location B is likely to be outside the area subject to flooding or coastal inundation, the playing fields and access roads would still be susceptible to flooding. It scores better than Location A.

Barnett Park

Location A is the lowest of the three Barnett Park building platforms. It is known to experience surface flooding due to run off from the hill catchment on the wider site’s western and southern boundaries.

Location B also floods due to storm flows overtopping the large swale drain that runs along the eastern boundary of the site.

Both Locations A and B would require 1 to 1.5 metres of fill to meet the finished floor levels and are subject to risk of future coastal inundation.

²⁰ Institute of Geological and Nuclear Science

²¹ Tonkin and Taylor - Appendix 6

While higher, Location C is backed by a rough cut drain that feeds storm flows from the hill slopes into the swale which runs along the wider site's eastern boundary with a bund cutting across the middle of the valley to divert flows. Tonkin and Taylor note there is potential for flood water and high energy debris floods to move through the proposed development site. They note these will need to be addressed by appropriate design and reconstruction of diversion bunds and channels to convey flows past the site and into the existing swale.

6.3.15 Contamination

Tonkin and Taylor advise²² that all the sites are on Ecan's Listed Land Use Register (LLUR). As district parks, all are possibly subject to pesticide contamination. McCormacks Bay Reserve and Redcliffs Park are both also closed landfills. The area of filling is more significant on McCormacks Bay Reserve than on Redcliffs Park.

McCormacks Bay Reserve

The site is an area of reclaimed land formed by quarry spoil fill and landfill, identified as closed landfill #45 on the CCC landfill map. Tonkin and Taylor have assessed a moderate potential for landfill gas (LFG) and/or soil contamination issues, and low to moderate potential for pesticide contamination of sports field soils.

Redcliffs Park

The site is listed as closed landfill #43 on the CCC landfill map. The known landfill activity affected the western portion of the site and was used as a landfill for less time than McCormacks Bay Reserve. Tonkin and Taylor have assessed a low to moderate potential LFG and/or soil contamination issues, and low to moderate potential for pesticide contamination of sports field soils. Location A is affected by this to a much greater extent than Location B, which largely sits above the closed landfill. Tonkin and Taylor notes that like all residential sections, some minor contamination of a residential nature (e.g. domestic asbestos) is possible on Location B.

Barnett Park

This is a verified HAIL site as it is a district sports park, and was used as a military base and rifle range for the first half of the 20th century. There is an assessed low to moderate potential for pesticide contamination of sports field soils. Potential also exists for lead contamination and possible contamination from building demolition and storage of military supplies.

6.3.16 Noise Effects on any Proposed School

There are no land uses, existing or anticipated, within the vicinity of any of the three sites that produce significant noise.

²² Tonkin and Taylor - Appendix 6

6.3.17 Ecological Impact

Development on McCormacks Bay Reserve has the potential to significantly adversely affect Te Ihutai/Avon-Heathcote Estuary, which is a Site of Ecological Significance. Removal of vegetation would need to occur for CPTED reasons. McCormacks Bay Reserve is a former landfill and so any construction works would need to be carefully controlled to avoid effects on the estuarine environment.

While Redcliffs Park is further away from Te Ihutai/Avon-Heathcote Estuary, run-off and sedimentation during development would still need to be carefully managed to avoid effects on the estuarine environment, particularly as the site is registered as a former landfill. The building platform for Location B is further away from the Te Ihutai/Avon-Heathcote Estuary and is preferred from that perspective.

Ecological impacts at the Barnett Park sites would be limited to any effects on the Environmental Asset Waterway.

6.3.18 Cultural or other significance

For this part of the evaluation, expert advice has been sought from Mahaanui Kurataiao Limited (MKT)²³ from a cultural perspective. Preliminary discussions have also been held with Heritage New Zealand.

In summary, cultural and heritage issues are known to be high throughout the Redcliffs district and development of any of the sites will need careful consideration of these factors.

MKT advise that the Māori name for Redcliffs is Te Rae Kura meaning red, glowing headlands. Large groups of Māori settled here during the 14th century. A kāika (settlement) was located at Te Rae Kura that was occupied by the early Waitaha people and then, later, by the Ngāti Māmoe tribe. Ngāi Tahu displaced Ngāti Māmoe in the 17th century and were still living in the area when the first Europeans began to arrive.

Te Tai o Mahaanui (the Ōtautahi/Christchurch coastline) as well as Te Ihutai/Avon-Heathcote Estuary and the surrounding catchment have been areas of abundant mahinga kai (food and other resources, and the areas from which they are sourced) for generations of Māori. MKT comment that Ihutai is taonga (treasure) to Ngāi Tahu and Te Tai o Mahaanui is a statutory acknowledgement area pursuant to Section 101 Ngāi Tahu Claims Settlement Act 1998.

Heritage New Zealand have confirmed that there are no heritage listings on the three sites, although there are significant sites nearby as addressed later in this section.

²³ Mahaanui Kurataiao - Appendix 10

McCormacks Bay Reserve

MKT advises that of the three sites, development at McCormacks Bay Reserve has the potential to have the greatest adverse effect from a cultural perspective. MKT note the site as being very high risk for Wāhi Tapu (sacred) issues. They state that there is evidence to suggest that urupā (burial grounds) may be located in the immediate vicinity of the site.

As part of Te Ihutai/Avon-Heathcote Estuary the site is highly esteemed as Ngā Tutohu Whenua (cultural landscapes). The site is rated highly as Wāhi Taonga (a treasured place).

Heritage New Zealand views McCormacks Bay Reserve as “probably the least risky of the three” as much of the site appears to be later reclamation. “Archaeological sites have only been found immediately along McCormacks Bay Road, and between the road and the cliffs. The sites that are there are significant, with several caves in the cliff face and evidence of midden and cooking areas on the flat immediately in front of the cliffs, but based on our current knowledge these do not appear to extend very far into the reserve itself.”²⁴

Redcliffs Park

MKT scores Redcliffs Park similarly for issues relating to Mahinga Kai and Wāhi Taonga, but it does not score as highly for Ngā Tutohu Whenua or Wāhi Tapu.

Regarding Redcliffs Park, Heritage New Zealand advise “There is another cave at the bottom of ‘the rock’, in the western end of the park, where taonga (treasures) have been found in the past. The nationally significant Redcliffs moa hunter site is located to the south, on the higher ground in front of Moa Bone Cave, between 1 and 55 Main Road, and extending into the current [Main Road] school site (covering some 4 ha). Traditionally it was always assumed little archaeology would be present in this low lying area, since the assumption was this was a tidal flat at the time of Māori occupation, but earthworks associated with earthquake repairs and rebuilds have uncovered archaeological sites along Beachville Road, both Māori and European.”

Barnett Park

While MKT suggests that Barnett Park may be preferred over the other two sites, it is important to note that archaeological discoveries have been made on Barnett Park in the past, with known middens being marked on the maps provided in the MKT report.

²⁴ Email Frank van der Heijden 5/8/2016

Discussions have been held separately with Heritage New Zealand who advise “There are no other formally recognised (i.e. listed) sites in the area apart from Moa Bone Point Cave and Moncks Cave. There are, however, numerous recorded archaeological sites in the wider area. There are two recorded archaeological midden sites in Barnett Park, associated with Māori occupation of the area. There are a number of caves in the cliff faces up the valley, many with archaeological remains when they were first recorded. The midden sites in the park are probably associated with them. However, to date little archaeological work has been done in this part of Redcliffs.”

In summary, McCormacks Bay Reserve has the highest cultural significance, whereas Barnett Park is the lowest.

From a heritage perspective, further research during the due diligence stage will be required to determine the likelihood of archaeological sites being present and affected by the proposed works.

6.3.19 Opportunities for Co-Location or Shared Facilities

All three sites offer potential opportunities for co-location and/or use of shared facilities. With all of the preferred sites currently being utilised as community parks the most obvious opportunities are with respect to playing fields and playgrounds which could be used by both the school and wider community. This would need further discussion with CCC.

Potential also exists for car parking to be shared with Council with all sites having some current car parking provision.

Location A and B at Barnett Park potentially provide the best opportunity for co-location or shared facilities with car parking, play grounds and playing field already well catered for. A modern play centre is also already provided for at Barnett Park.

6.3.20 Social Impacts

The Methodology requires an assessment of how well the nature of the proposed school fits the demographic profile of the proposed catchment. This is to be a full primary with a forecast roll of a maximum of 400, and is to continue to provide an existing service to an existing catchment.

7. Stage 2 Conclusion

Three sites, containing six alternative building locations, were assessed against the 20 Stage 2 criteria provided for in the Ministry's Methodology. Each criterion was awarded a score of between 0 – 5 in line with the Methodology.

Application of the score methodology has resulted in a range in total scores across the six sites of between 57.5 and 70.4. McCormacks Bay Reserve was the lowest scoring of the six alternatives, with Redcliffs Park Location B scoring the highest. Scores for the remaining four locations were 62.4 (Redcliffs Park Location A), 62.6 (Barnett Park Location A), 64.5 (Barnett Park Location B) and 64.7 (Barnett Park Location C).

In reviewing the scores achieved by each of the sites and individual locations we make the following comments;

McCormacks Bay Reserve

McCormacks Bay Reserve scored strongly for;

- site size
- school design potential
- access to infrastructure services
- access to transportation networks and
- potentially the lowest acquisition cost of the three potential sites.

Countering this, the site scored particularly poorly for;

- District Plan Zone
- geotechnical
- flooding
- contamination
- cultural and
- ecological impact

The site is also the least well located of the three Stage 2 sites within the identified catchment.

Redcliffs Park

Redcliffs Park as an overall site performs well when assessed against the criteria of;

- location within the identified catchment
- access to infrastructure services

- site size
- school design potential (Location A slightly preferred)

Both location A and B are identified as having issues with respect to cultural considerations.

Location B scores much higher than Location A, having significantly better results for;

- geotechnical
- flooding
- contamination
- co-location

Barnett Park

Barnett Park scored strongly with respect to;

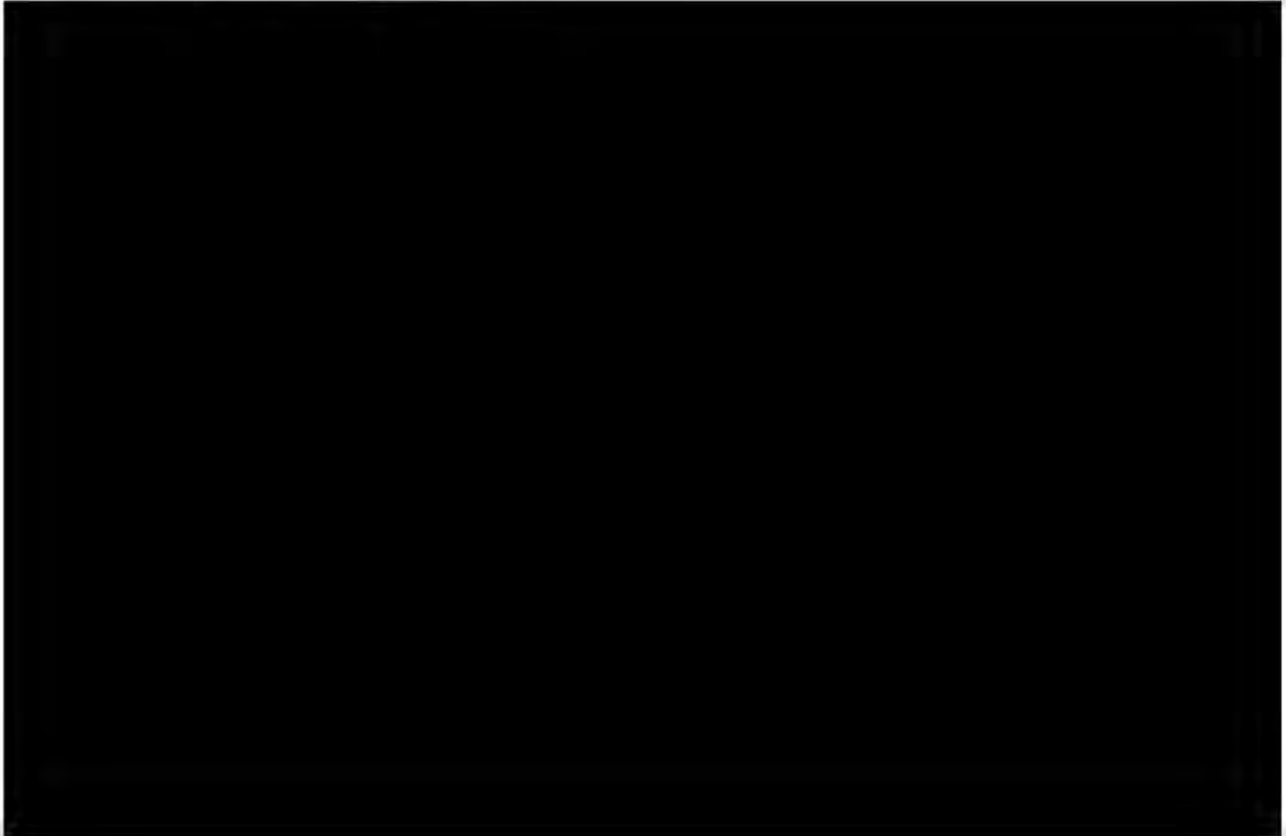
- location within the identified catchment and
- ecological impacts

Of the three sites Barnett Park scored the most poorly with regards to street frontage and transportation network considerations.

A notable feature of the Barnett Park locations is that while the overall scores appear close, each location had a different set of positives and negatives.

For example;

- Site size – strong for Location B and C
- School design potential – strong for Location C
- Infrastructure Services - Location A scores better than Locations B and C
- Flooding - Location A received the lowest score, Location C the highest
- Co-location – Location A and B score well.



²⁵ The cost of acquiring all or any land on Redcliffs Park excludes the cost of acquiring the adjoining residential site at 19 Main Road.

²⁶ This estimate relates to an anticipated school roll of 300 students.

8. Risk Register / Commentary

In accordance with the Ministry's Methodology, any risks identified for the preferred sites (in this case locations) are to be identified, with commentary around how these can be managed/mitigated through the relevant legislation/other works.

A risk register for the site is to be prepared and maintained.

In line with recommendation in Section 2 of this report, Table 6 identifies the known risks of the two sites identified for due diligence analysis – Redcliffs Park Location B and Barnett Park, the full site.

Risk	Redcliffs Park Location B	Barnett Park - full site
Reserves Act 1977 notification	Mandatory Notification under Reserves Act 1977 for transfer/disposal of reserve status portion of the Park.	Mandatory Notification under Reserves Act 1977 for transfer/disposal of reserve status portion of the Park.
Mitigation measures	Confirm all notification/consultation processes and develop strategy to maximise efficiency.	Confirm all notification/consultation processes and develop strategy to maximise efficiency.
Local Government Act 2002 Consultation	Mandatory consultation is required under the Local Government Act 2002 for transfer/disposal of the portion of the park which is not held as reserve. This process is not prescribed and has the potential to add time and cost.	Mandatory consultation is required under the Local Government Act 2002 for transfer/disposal of the portion of the park which is not held as reserve. This process is not prescribed and has the potential to add time and cost.
Mitigation measures	Confirm all notification/consultation processes and develop strategy to maximise efficiency.	Confirm all notification/consultation processes and develop strategy to maximise efficiency.
Reserve Management Plan	No Reserve Management Plan exists for Redcliffs Park.	There is an existing Reserve Management Plan which has not been updated since 1992. Council may require an updated Reserve Management Plan. Potential to add time and cost.
Mitigation measures		Discuss with CCC to confirm requirements
Resource Management Act 1991	A designation process will need to be undertaken in accordance with the Ministry's practice.	A designation process will need to be undertaken in accordance with the Ministry's practice.
Mitigation measures	Due diligence should extend to matters relevant to the designation.	Due diligence should extend to matters relevant to the designation.

Risk	Redcliffs Park Location B	Barnett Park - full site
Other tenants	None known.	There are existing lessees occupying the community buildings on site. The terms of their leases are unknown as are lessees views on the establishment of a school on the site.
Mitigation measures		Confirm all notification/consultation processes and develop strategy to maximise efficiency.
Acquisition of adjacent residential property	Potential exists for the need to acquire a neighbouring privately owned property.	Not applicable to this site
Mitigation measures	Explore acquisition and engagement options with private owner.	
Contamination	Redcliffs Park is a confirmed HAIL site. A portion of the Park was used as a landfill during the late 1940s and early 1950s. Construction of the building platform for Location B is unlikely to disturb land used for landfill.	Barnett Park is a confirmed HAIL site, with district sports field and a rifle range being recorded on the site.
Mitigation measures	Contamination matters are investigated further during subsequent due diligence work.	Contamination matters are investigated further during subsequent due diligence work.
Flooding	Flooding is a risk on the lower fields, and on the roads surrounding the school.	Flooding is known to occur on the site, especially on Location A and B.
Mitigation measures	School buildings could be confined to the upper part of the site. Buildings should conform to the finished floor level requirements.	Buildings should conform to the finished floor level requirements.
Ecological	Risk of run off from contaminated site into estuary during construction phase	Risk of sedimentation to Ecological Asset Waterway.
Mitigation measures	Site decontamination and construction management plan. Discussions with Environment Canterbury. Confirm appropriate consenting measures.	Confirm appropriate consenting measures.
Cultural	Culturally significant site(s) in proximity.	Culturally significant site(s) in proximity.
Mitigation measures	Iwi consultation plan developed with MKT. A cultural impact assessment report may be required as part of subsequent due diligence work.	Iwi consultation plan developed with MKT. A cultural impact assessment report may be required as part of subsequent due diligence work.

Risk	Redcliffs Park Location B	Barnett Park - full site
Heritage	Accidental discovery is possible on this site.	Accidental discovery is possible on this site.
Mitigation measures	Obtain Archaeological Authority from Heritage New Zealand. Accidental discovery protocol to be put in place.	Obtain Archaeological Authority from Heritage New Zealand. Accidental discovery protocol to be put in place.
Constraints (easements)	Wastewater easement location may impact on optimal building footprint layout.	A major stormwater swale and easement runs the length of the eastern boundary of the site. In addition to the other easements identified, it is known that there are additional underground electricity lines not currently protected by an easement.
Mitigation measures	Design is able to avoid the easement. Discuss with Council any alternative solutions.	Detailed on site investigations to confirm existing underground infrastructure. Design can avoid storm water swale.
Site availability	Council willingness to sell is unconfirmed.	Council willingness to sell is unconfirmed.
Mitigation measures	Preliminary discussions with CCC have occurred; formal discussions yet to take place.	Preliminary discussions with CCC have occurred; formal discussions yet to take place.
Community support	While community support for the continuation of primary school provision in Redcliffs is accepted, this specific site has not been tested with the community.	While community support for the continuation of primary school provision in Redcliffs is accepted, this specific site has not been tested with the community
Mitigation measures	Work with Council on all notification/consultation processes and develop a strategy to maximise efficiency.	Work with Council on all notification/consultation processes and develop a strategy to maximise efficiency.

Table 6: Risk Register

Appendix 1: Ministry of Education Methodology Version 6b (May 2016)

MINISTRY OF EDUCATION

METHODOLOGY FOR NEW SCHOOL SITE EVALUATION



1. INTRODUCTION

The site evaluation methodology document is a tool to assist in the identification and assessment of future school sites.

The evaluation methodology is broken down into two stages.

The first stage is the identification of all potential sites for assessment. This range of potential sites is filtered through the use of four broad criteria;

1. Locality,
2. Size/Shape,
3. Current land use and
4. Access

These criteria reflect not only the fundamental requirements for an appropriate school site, but also some critical aspects that contribute to the “consentability” of a site in terms of the Resource Management Act 1991. Any sites that fail one or more of these categories should be discarded if there are suitable alternatives.

The second stage subjects the sites to further detailed evaluation using prescribed criteria. The outcome of the second stage will be a recommendation to the Ministry of Education (Ministry) on which site is deemed the most appropriate.

The recommendation stemming from the second stage process should identify any risks associated with the site and how these can be managed or mitigated through the relevant legislation or other works. A risk register for the site should be prepared and maintained. Any risk mitigation measures necessary (e.g. further specialist reporting) should be undertaken as a third stage of the process, following approval from the Ministry of the second stage recommendation.

Process under the Resource Management Act 1991

Before a site can be used for the construction of a new school, the Ministry will lodge a suitable notice of requirement for designation to reflect the site’s use within the Territorial Authority's district plan.

The site evaluation report in part fulfills requirements that are relevant to any eventual designation of the site under Section 168 of the Resource Management Act 1991 ('the Act'). This is achieved through a Notice of Requirement lodged with the relevant Territorial Authority. When considering a requirement, under Section 171 of the Act, a Territorial Local Authority must have regard to:

Whether the designation is reasonably necessary for achieving the objectives of the public work or project or work for which the designation is sought; and

Whether adequate consideration has been given to alternative sites, routes, or methods of achieving the public work or project or work for which the designation is sought;

The first of the two tests set out above centres around consideration of the objectives for the project. As well as being a statutory test of the Act, the project objectives also play an important role by providing context to the project. The project objectives must be well defined and available at the outset of the process set out in this methodology, and should be referred to throughout.

It is noted that by the time the process has reached the "new site selection phase" to which this methodology relates, the Ministry will have already considered other methods of achieving the project objectives such as redeveloping an existing school(s). For Notice of Requirement documentation purposes, it can be assumed that the new site evaluation report produced by this methodology will be complimented by evidence and background needs analysis produced by the Ministry.

2. CONSULTATION

The service provider will develop and submit a consultation plan for approval. Consultation with other organisations may be undertaken to obtain a broader picture of factors beyond or having potential effect to the evaluation criteria. Consultation may occur in two formats, external and internal. The service provider will only be required to consider external consultation to complete the site evaluation report. The

service provider may be required to attend meetings with Ministry staff to discuss the report to assist in internal consultations.

External Consultation

It is useful for the Ministry to include key stakeholders in the site evaluation process. Through consultation, developments may come to light which will need to be considered in selecting the preferred site for the new school.

Organisation	Issue of Interest	When
Regional Councils	Growth, location, Regional consents required with designations	Start of evaluation and 1st draft of completion of evaluation
Territorial Authorities	Growth, location, council opinions in relation to a designation, joint projects	Start of evaluation and 1st draft of completion of evaluation
Tangata whenua (iwi organisations, mandated hapu), recognised mana whenua	Cultural significance, historic knowledge and ownership	Start of evaluation and as necessary
Transport Authorities (Council), Infrastructure agencies e.g. water, wastewater	Location, TA initiatives, potential objections to designation, integrated infrastructure provision, growth	Start of evaluation and 1st draft of completion of evaluation
Major land developers	Growth, location, land for sale, joint projects	Dependent on specific site circumstances. Ministry staff will advise
Other Crown departments including NZTA, Housing	Location, surplus land, land swaps, joint projects, co-location	Dependent on specific site circumstances. Ministry staff will advise

Minutes of these external consultations should be attached as an appendix to the final report as evidence for inclusion in any Notices of Requirement documentation. Any issues, considerations, preferences raised by the consulted organisation should be summarized in the appendix.

Local Schools

Consultation with local schools is not a requirement of this analysis. The Ministry is required to consult with local schools through the provisions of the Education Act 1989 when a new school is planned for establishment. If the service provider is approached by a local school for information questions should be referred directly to the Ministry.

3. CRITERIA FOR STAGE ONE SITE EVALUATION

All sites identified in the first stage evaluation process should be shown and numbered on a colour map. The map should provide sufficient detail for the reader to identify major roads and landmarks. The sites should be listed at the bottom of the map providing detail of their address, size and lot numbers.

The service provider is not required to score the individual sites for stage one evaluation. Comparative analysis using the four broad criteria set out below should be undertaken and results recorded. This analysis will result in a “traffic light” indication of the suitability of each site. Sites that achieve a “Red Light” are unlikely to be evaluated further. Sites that achieve an “Amber Light” have attributes that present some risk as being suitable and sites that achieve a “Green Light” are considered the most suitable for further evaluation. The service provider shall share these results with the Ministry and minutes of the meeting to determine the short list of sites shall be recorded as an appendix to the final report.

Criteria	Evaluate	Guide
Locality	<ul style="list-style-type: none"> Does the site fall within a logical catchment as identified in the demographic report/area review or strategy (to be provided) in relation to both the population growth and the school roll growth areas? 	<ul style="list-style-type: none"> A map showing a suggested boundary for the site evaluation will be provided. The location of the sites in relation to established schools. A site outside the identified area will be given a red light, a site inside will be given a green light. Those on the border of the area will achieve amber.
Size and Shape	<ul style="list-style-type: none"> Is the size (in hectares) adequate for the intended school? Could a suitable site be created via the provisions available to the Crown? Does the shape of the site permit good use of the available land? Is the site of such steep and varied topography to make construction unviable in comparison to other sites identified? Are there existing buildings or other developments on the site (e.g. large sealed areas) that could be retrofitted? Provide high quality educational facilities? 	<ul style="list-style-type: none"> A secondary school of 1500 students requires approximately 8 hectares of useable land, an intermediate school of 800 students requires approximately five (5) hectares and a primary school of 500 students approximately three (3) hectares of useable land. These site sizes are indicative only and should not exclude consideration of sites larger or smaller, or concurrent sites that could be amalgamated for example. Sites also need to be capable of accommodating an early childhood education centre which would require approximately 1500m². Sites which are smaller (by up to half) than stated above but are adjacent, or in close proximity to recreational reserve land should be considered. Schools may be constructed on multiple levels thereby reducing the quantum of land required. Attachment 2 contains guidance on the size and quantity of playing fields and courts, which should be considered in assessing site size and shape

Criteria	Evaluate	Guide
Current land use/form	<ul style="list-style-type: none"> • Are there any transmission lines/ cell phone sites etc on the site? • Are there any historic buildings (registered with NZHPT) on the site? Is the site itself a registered historic place or site? • Does the site have significant cultural, spiritual or other significance? • Is the site predominantly covered in vegetation or contain ecologically important items? Does the site have a water course running through it? Is the site susceptible to flooding? • Is the site currently serviced or do plans exist (structure plans etc) to provide services in the near future? • Does the site have a major geotechnical hazard that would impact significantly on the feasibility of constructing a school? • Is there any history of contamination from previous activities on the site; pesticides from agricultural use, asbestos from the previous farm use, illegal dumping/fill etc? • Are there any NES consents on the land? 	<ul style="list-style-type: none"> • Providers should review the relevant District Plan heritage schedule and the Heritage New Zealand Register of buildings, sites and areas. • In the absence of a site visit, District Plan maps should be examined to ascertain the presence of any high voltage electricity transmission lines, and/or Transpower should be contacted directly. • Desktop evaluation via council records should highlight sites that contain or adjoin Significant Natural Areas (SNA's) or habitats or are known by other means to be ecologically significant in some way. A site on which the construction and operation of a school has the potential to have a significant effect on the ecological environment will score a fail. • The relevant District Plan should show any relevant structure plans, however review of the growth related provisions of the relevant Regional Policy Statement would be also be prudent. • Relevant Council records such as hazard registers should be consulted for this first stage review of geotechnical hazards. Other knowledge within the assessment team of geotechnical constraints should also be utilised. • Desktop evaluation via council records (e.g. Hazards Registers, HAIL lists) should highlight sites with any history of these risks, and whether the risk has been mitigated or remediated (e.g. the site may once have flooded but now is protected by a flood control scheme, or some contaminated soil on the site has been removed and the site now complies with relevant human health guidelines). Sites that show history of these risks and no subsequent mitigation or remediation such that the safe and efficient construction or operation of a school will be questionable will score a fail. However, if a site has been successfully protected or remediated to a level suitable for the establishment and operation of a school then it may score a pass.

Criteria	Evaluate	Guide
Access	<ul style="list-style-type: none"> Does the site have legal access/road frontage? Is there sufficient frontage to provide for adequate parking/drop off areas? Are there other public areas/services in the immediate vicinity which could provide mitigation to the provision of onsite car parking? 	<ul style="list-style-type: none"> Comment on the timing for development of formed access (e.g. structure plans for green-field subdivision etc.). What the provider should consider in general terms how accessible the site is to the catchment identified in the demographic study/area review/strategy. Could access be economically? Secured/created? What is the classification of the adjacent roads?

4. Criteria for Stage Two Site Evaluation

The sites that have been considered for further detailed evaluation should be shown on a second colour map. Each site should be numbered and this number should be used for each reference in the report. The sites should be listed at the bottom of the map providing detail on their address, size and lot numbers.

The assessment criteria have been designed to avoid "double counting" and aid with transparency of the methodology. In most cases the criteria will require the service provider to consider one factor affecting the site at a time. In cases where a criteria includes more than one factor all factors listed should be considered to be of equal importance. Where applicable a specialist consultant may be required to provide advice on the criteria. Each specialist report should detail the assumptions upon which the comparative assessment of options is based and be included as an Appendix to the main report.

Evaluation of the criteria shall be undertaken using Multi-Criteria Analysis (MCA) methodology. Each of the criteria set out in the Table below should be weighted equally unless the objectives of the project determine that differing weightings be applied.

For example, a wider area within which several school sites are being considered may be known to have elevated cultural or historical values but is known to be very low risk in a natural hazard and ground conditions sense. In such a circumstance it may be appropriate to give cultural and historical criteria greater weighting than hazard and geotechnical criteria.

The reasons why any decisions to alter weightings are made should be recorded. Scoring tables should be kept in an electronic format (e.g. spreadsheet) that allows scores and weightings to subsequently be revisited should the need arise. Scoring should be done by awarding a score of between 0 and 5, (5 being the highest where a site meets or exceeds the criterion and 0 being the lowest where a site fails the criterion). Some criteria, where stated, will be scored with either a 0 or 5. The scores for each site should be recorded and totalled on a table allowing quick and easy comparison.

A detailed description of each site including colour photos and aerial views should follow the scoring table. A brief explanation (e.g. bullet points) in the MCA spreadsheet of why the site has been allocated its criteria score will also be provided.

No	Criteria	Evaluate	Guide
1	Site acquisition costs	What are the land values within the locality? A general assessment based on a per hectare or per m ² rate using the underlying zone or recent sales evidence is adequate.	Sites with a lower projected land acquisition cost will score higher.
2	Perceived ease of acquisition	Is the site owned by the Ministry, other Crown department or currently being marketed for sale either by the owner or an agent? No contact should be made with private land owners/developers unless specifically instructed to do so.	Vacant sites or those with short term leases on them owned by the Ministry will score 5 . Other Crown department land that has been declared surplus or been suggested by that department for swap will score 4 . Sites on the open market for sale will score 3 . Other Crown land not currently declared surplus will score 2 . Sites where the owner has previously expressed they would sell if approached by the Ministry will score 1 . All other sites will score 0 .
3	Site size	Is the site of a size capable of providing for all the educational requirements of the proposed school and projected future growth? For this criteria the "site" should be regarded as the overall area/buildings available for potential school development, which may incorporate multiple titles/parcels (including Unit Titles).	Sites providing or exceeding the stated useable land requirement will score 5 on the scale. Sites smaller than the stated useable requirement will score progressively and comparatively less.
4	Topography	Is the site of such steep or undulating topography so as to make construction very difficult?	Gradients greater than 1 in 10 for the main building platform would be considered inappropriate. The flattest site should score the highest.
5	School design potential	Does the site present good urban design and architectural opportunities that would promote good learning outcomes? Are there existing buildings or other developments on the site (e.g. large sealed areas) that could be retrofitted to provide high quality educational facilities?	An architect with experience of modern NZ school design should provide a comparative analysis of the shortlisted sites, scoring 5 down to 0 .
6	Position of site in relation to any relevant growth strategy or residential plan change	Is the site inside or outside any relevant growth strategy area (or relevant township/new structure plan area)?	Sites within growth strategy / residential plan change areas are less likely to attract opposition during a designation process from the relevant planning

No	Criteria	Evaluate	Guide
			authority. A site inside the growth strategy area will score 5 a site outside will score 0 .
7	District Plan zone	Are the district plan zonings (or proposed zonings in a relevant structure plan) suitable for this school?	Schools are typically located in predominantly residential areas. The majority of sites acquired in recent years have an underlying residential zone, however other zones such as open space, business, mixed use and recreation can also be considered. Sites that are zoned for educational purposes will score the highest. Then in order of suitability: residential, open space, mixed use, business and reserve.
8	Location within the proposed student catchment	Is the site well located within the proposed school's likely zone?	A site located near the edge of the proposed student catchment and in an already well established population area will not score as high as a site located centrally in the likely school zone or towards the area of future growth.
9	Existing site constraints	Does the site contain immovable structures such as transmission line towers, large buildings or communication masts?	Sites with the fewest number of restrictions to building platforms/recreation space will score the highest.
10	Road frontage	Does the site have appropriate legal road access to its boundaries? Does the site have road frontage to all its boundaries?	A site with roads (or planned roads) on all boundaries will score higher than a site with no roads as this provides access flexibility and can mitigate urban design constraints.
11	Transport network	In the opinion of qualified traffic engineers, is the site well serviced by a transport network that is safe and has sufficient capacity for the proposed school?	A site that is considered more accessible via alternative means of transport will score higher than one that is remote of these services.
12	Infrastructure services	Does the site have immediate availability or connection to: Water supply (potable and fire fighting), sanitary drainage, storm water, electricity, gas, telephone, refuse. Distance from the headworks of these services should also be considered	A site with adequate connection to all infrastructure services for the proposed school will score the highest. 0.5 point for each service plus an extra 1 point for all services.

No	Criteria	Evaluate	Guide
13	Geotechnical	Does the site have any history or demonstrate any evidence of instability or poor ground conditions.	Desktop evaluation via council records may highlight sites with known geotechnical issues. If no information is available on any sites then all should score equal. Sites that may require greater construction costs as a result of ground conditions (e.g. deep peat) will be scored lower than others. This criteria should not be conflated with criteria 4 in this stage, which is solely focused on topography. Preferred sites will be subject to additional due diligence post site evaluation.
14	Flooding	Does the site have any history or demonstrate evidence of flooding?	Desktop evaluation via council records and site visits to confirm any watercourses should highlight issues. Low lying sites identified as flood plains with watercourses will score lowest together with those located in 'red' tsunami threat zones. Preferred sites will be subject to additional due diligence post site evaluation.
15	Contamination	Does the site have any history of uses that may result in contamination of the land?	Council records and site visits will assist in a determination of potential contamination. Activities that would result in difficult or costly remediation of the site will score lowest. Preferred sites will be subject to additional due diligence post site evaluation.
16	Noise effects on any proposed school	Do land uses (or potential land uses identified in a structure plan) in the vicinity of the site produce significant noise? E.g. airports, train network, state highway noise corridors.	A common sense approach is required as the Ministry may commission specialist acoustic reports on the preferred site if required and engage with relevant agencies/stakeholders responsible Sites that are located in quiet areas (during school hours) will score higher than those in potentially noisy areas. It is accepted that this is a

No	Criteria	Evaluate	Guide
			subjective criterion.
17	Ecological impact	How will the construction and operation of a school on the site effect animal and plant ecology; loss of habitat, disruption of territorial domains, and interruption of ecological corridors? Are there existing ecological studies or reports available on the site?	Desktop evaluation via council records should highlight sites that contain or adjoin Significant Natural Areas (SNA's) or habitats or are known by other means (such as local knowledge; relevant experience) to be ecologically significant in some way. A site on which the construction and operation of a school has the potential to have adverse effects on the ecological environment will score lower than a site where ecological effects are avoided or are very minor.
18	Cultural or other significance	Is the site of cultural, spiritual or other significance?	Research based on the relevant available planning documents into the site to establish cultural, spiritual and historic significance. Sites with strong attributes should score lower than those without where they could pose significant challenges to the successful designation of the site or construction of the school. Where it is apparent from the Stage 1 assessment that a general area within which several potential school sites are being considered has elevated cultural or other significance, the Ministry expects that an expert in the relevant field will lead the scoring on this criteria.
19	Opportunities for co-location or shared facilities with other parties	Subject to a separate agreement, could the site make use of council reserve or other land for the sharing of sports fields/other facilities?	Sites adjoining active council reserve (or public car parking that could be used by the school) will score the highest. Sites with no potential access to (or very remote from) shared facilities will score the lowest.
20	Social Impacts	What is the nature of the new school (e.g. kura kaupapa)? How relevant	It can be expected that any new school site will have a

No	Criteria	Evaluate	Guide
		<p>will the school be to the ethnic make up and age composition of its catchment? What are levels of deprivation in the relevant community? Statistics New Zealand and relevant Council data should be reviewed for each site option.</p>	<p>positive social effect. Some sites may however have greater positive social effects than others. The generally used RMA practice definition of 'significant' should be used as a guide. It is accepted this is a subjective criteria.</p>

5. Recommendations

Service providers will identify preferred site/s based on the assessment process set out above. The recommendation should identify the reasons and rationale behind why the site was preferred, and be structured in such a way that it can be used in subsequent consultation phases to concisely answer questions from affected and interested parties as to why the site was selected.

Any risks associated with the preferred site should be clearly identified, and a Risk Mitigation Plan included along with an initial Risk Register.

6. Reports

A draft version of the report should be submitted to the Ministry for comment prior to production of a final report. The Ministry will require two (2) copies of the site evaluation report for internal use. The report, or extracts from it, may be used to support a Notice of Requirement to designate land or for the purposes of public consultation.

CURRENT SCHOOL TRANSPORT POLICY DAILY SERVICES

General Description

1. The school transport policy essentially provides assistance daily for primary and secondary pupils. It does not provide a 'door to door' service. Assistance is provided on the basis of the sharing of responsibility between the Government and parent.

Criteria

2. Accordingly, assistance is provided for state pupils less than 10 years of age who live more than 3.2 kilometres from the nearest state school; or 10 years and over and live more than 4.8 kilometres from the nearest state school.
3. Pupils are expected to make their own way or be conveyed by parents up to 1.6 kilometres to a school bus service.

Public Transport Services

4. Pupils with access to suitable public passenger services to their nearest school will not receive school transport assistance. To be unsuitable, a public transport service must:
 - be more than 2.4 kilometres from the pupil's home
 - travel no closer than 2.4 kilometres from the pupil's nearest school
 - have a timetable that prevents the pupil arriving at school by the school commencing time, or leaving soon after the school day officially closes, e.g. closing time 2.30pm - leaving time 3.15pm require the pupils to change buses more than once on one journey

Integrated Pupils

5. Students under 10 years of age who live more than 3.2 kilometres from the nearest integrated school having the same special character with which the

parent identifies, and students 10 years of age and over who live more than 4.8 kilometres, are eligible for transport assistance to that nearest school

Forms of Assistance

6. Assistance can be in the form of a school bus service, a private transport allowance to enable parents to convey children by private car to school or school bus service, a public transport allowance to use public transport services. The Ministry will provide the most economic and appropriate form of assistance.

Bus Services

7. A five (5) kilometre gap will be maintained between school bus services operating to two or more schools e.g. two state primary schools.

Nearest School

8. The majority of pupils assisted are conveyed on school buses. School bus services should only be provided to the pupil's nearest school. The amount of the private or public transport allowances paid should be for the same distance as if the pupil is travelling to the nearest school or school bus service to the nearest school. Pupils who choose to attend a more distant school may have to meet additional transport costs.

Ineligible Pupils on School Buses

9. Pupils who do not meet the eligibility criteria, may be charged a fare by school bus operators. Ineligible pupils should not be carried if space is required for eligible pupils.

Per Capita Limits

10. School bus services and transport allowances will be provided in accordance with per capita limits. Where a school bus service exceeds the per capita limit because of falling numbers, or contractual adjustments to the bus operator's rate etc the service will be cut back, otherwise reorganised, or completely withdrawn.
11. Similarly, if numbers of eligible passengers increase, the service may be reviewed for extension.

Extensions of Bus Services

12. The Ministry or its agent may consider the extension of a service providing the cost of the extension is within the per capita limit, the cost of the total services remains within the per capita limit, and there is no significant impact on the timetable for other pupils using the service.

Extensions in Other Circumstances

13. The Ministry or its agent will also arrange, where appropriate, the extension of bus services to avoid temporary road hazards on an existing route.

Parent Paid Extensions

14. Parents of eligible pupils may, with the approval of the Ministry of Education or its agent, arrange with the operator a parent-paid extension of an existing service so that these buses may travel closer to the pupils' homes. The payment will be a matter of arrangement between parents and the operator.

Road Danger

15. Assistance may be provided on the grounds of exceptional road danger after the Ministry or its agent has received reports from the Ministry of Transport, New Zealand Police Traffic Safety Branch and the local district council that exceptional road danger exists. Assistance will be in the form of the extension of an existing school bus service for eligible pupils exposed to the danger.

Pre-School Pupils

16. Only pre-school children with special needs attending recognised special classes for pre-school children are eligible to receive school transport assistance. In some cases other pre-school children may use existing school bus services in accordance with the usual rules applying to ineligible pupils and providing there is sufficient room for adult escorts. All pre-school pupils carried on school buses must be accompanied by an adult escort in the ratio of one adult escort for every four pre-school children.

Special Needs Transport

17. 'Special needs transport' covers the transport assistance requirements of the following groups:

- pupils with serious permanent or temporary locomotive disabilities attending ordinary classes at primary or secondary schools;
- pupils enrolled at recognised special clinics, special schools, or special classes; pre-school children attending recognised special classes for pre-school children; pupils who because of educational, psychological, emotional or social development are required to travel away from their nearest school to attend an alternative one more suited to their needs;
- pupils enrolled at activity centres who require activity centre placement and who live more than 4.8 kilometres from the centre;
- pupils who require attendance at speech clinics which are not on site or within reasonable walking distance of the school they attend or their home.

Attachment 2: School Playing Field Sizes

PLEASE NOTE: The following data is a guide only and is based on an old code. Therefore all information in this section is indicative only.
Playing Fields and Facilities

DIMENSIONS OF PLAYING FIELDS

Type of Area	Minimum Play Area in metres	Minimum Surround in metres	Minimum Area in metres	Total Area in square metres
Rugby	100 x 69	10 x 5	120 x 79	9480
Rugby (Medium)	69 x 50	10 x 5	89 x 60	5340
Rugby (Small)	60 x 41	10 x 5	80 x 51	4080
Soccer	120 x 90	10 x 5	140 x 100	14000
Soccer (Medium)	69 x 50	10 x 5	89 x 60	5340
Soccer (Small)	64 x 50	5 x 5	74 x 60	4440
Hockey	92 x 55	2 x 2	96 x 59	5664
(Boys & Girls)	75 x 45	2 x 2	79 x 49	3871
Hockey (Medium)				
Netball	30.5 x 15.25	1.5 x 1.5	33.5 x 18.25	609.75
Netball (Small)	23.77 x 10.97	1.5 x 1.5	26.77 x 13.97	373.87
Tennis	23.77 x 10.97	6.4 x 3.66	36.57 x 18.29	667.86
Tennis (Medium)	23.77 x 10.97	6.4 x 3.66	36.57 x 18.29	667.86
Cricket	22.86 x 22.86		22.86 x 22.86	522.57
(Wicket Area)				
Softball	18.3 x 18.3	8 x 8	34.3 x 34.3	1176.49
Softball (Medium)	15.24 x 15.24	8 x 8	31.24 x 31.24	975.93
Volleyball	18 x 9	2 x 2	22 x 13	286.00
Volleyball (Medium)	12.19 x 6.09	2 x 2	16.19 x 10.09	163.35

Where the site does not permit the provision of full sized playing fields in every case, or where such provision would entail expensive groundwork's, only the first ground supplied need be of full size.

Useful references under this heading are:

- Sports Instruction series published by the Government Printer
- Sports Dimensions in Metric by Curriculum Development Unit, Department of Education

SUFACES OF PAVED AREAS

The surface of the paved area shall consist of tarmacadam, asphalt, concrete or other approved material. The area shall be laid on a suitable foundation and properly drained. The gradient shall be such as to satisfactorily drain the area e.g. between 1:120 and 1:60.

1. Primary Schools

Paved Areas

a) The following area shall be provided:

Number of Class Spaces	Paved Area Courts	Total Area Square metres
1	1 Medium	325
2	1 Medium	325
3	2 Small, 1 Medium	615
4	2 Small, 1 Medium	615
5	2 Small, 2 Medium	900
6	2 Small, 2 Medium	900
7	2 Small, 2 Medium	900
8	2 Small, 2 Medium	900
9	2 Small, 2 Medium	900
10	2 Small, 3 Medium	1200
11	2 Small, 3 Medium	1200
12	2 Small, 3 Medium	1200
13	2 Small, 3 Medium	1200
14	2 Small, 3 Medium. 1 Large	1675

Small	6m x 12m
Medium	12m x 24m
Large	32m x 16m

b) The court areas need not be provided in a single area. The total area also provides for some paving immediately adjacent to the classrooms and the need for a special area for younger children should not be overlooked.

c) Areas of paths and internal roads are not included.

GRASSED AREAS

a) The following grassed areas shall be provided where sufficient area exists:

Number of Class Spaces	Playing Fields
1	1 Small
2	2 Small
3	2 Small
4	2 Small
5	2 Small
6	2 Small
7	2 Small, 1 Medium
8	2 Small, 1 Medium
9	2 Small, 1 Medium
10	2 Small, 1 Medium
11	2 Small, 1 Medium
12	2 Small, 1 Medium
13	2 Small, 1 Medium
14	2 Small, 1 Medium

b) If the site does not permit the provision of the proposed grassed areas, application should be made to the Department for an increase in the paved area.

c) The actual areas provided will depend on the size, shape and contours of the individual site.

d) The requirement is not a large adult playing field but for playing spaces more in keeping with the needs of the children they serve. The remainder of the site is to be left as far as possible with a rolling contour.

2. Intermediate Schools

Playing Fields

The following grassed fields shall be provided where sufficient area exists. Where it is not possible the equivalent number of smaller fields shall be provided.

Planned Capacity for roll	Fields (Rugby/Hockey/Soccer)
270	2 Medium
305	2 Medium
340	3 Medium
375	3 Medium
410	4 Medium
445 and above	4 Medium

Paved Areas

a) The following paved areas are to be provided:

- I. Paved apron of approximately 10 square metres per class space.
- II. Paved area for courts as follows:

Roll	Netball/ Tennis Court	Area (sq.m.)	P.E Court (sq.m.)	Total Area (sq.m)
270	1/-	420	420	840
305	2/1	840	420	1260
375	3/2	1255	420	1675
410 and over	4/3	1675	420	2095

* Physical education court to be adjacent to hall.

b) If the site is such that the approved grass areas cannot be provided, approval should be sought to increase the paved areas.

3. District High Schools or Area Schools

Roll Primary & Secondary	Suggested Grassed Playing Fields		Paved Areas		
	Rugby or Soccer	Hockey	Tennis/ Netball	Physical Education Areas	
Up to total roll 200	2	2	2/1	2 small	Total area 900m ²
Over total roll 200	3	2	4/3	2 medium 2 small 2 medium plus PE Court 35m x 18m	Total area 1530m ²

4. Forms 1 to 7 Schools

Type A – Roll not expected to exceed 400

Type B – Roll will probably exceed 400

Type	Suggested Grassed Playing Fields		Paved Areas	
	Rugby or Soccer	Hockey	Tennis/Netball	Physical Education Area
A	2	2	4/3	35m x 18m
B	3	2	6/4	35m x 18m

5. Secondary Schools

Roll		Paved Areas:	Suggested grassed playing fields:			
Co-ed or	Girls	*Paved areas of 35m x 18m	Type	Roll	Rugby or Soccer	Hockey
300		5	Co-ed	300	2	1
400		5		400	2	2
				600	3	2
				850+	4	2
600		7	Boys	300	2	1
850		9		400	3	1
				600+	4	2
950	600	9	Girls	300	-	2
1150	850	10		400	-	2
1400	950	11		600+	-	3

* This total minimum area is suitable for netball, tennis courts, or volley ball courts at the discretion of the school.

Appendix 2: Table of Identified Sites

REDCLIFFS SCHOOL - STAGE 1 SITE SELECTION										
SITE NO.	COMPUTER FREEHOLD REGISTER	OWNERS	GRAPHICAL AREA (HA)	ADDRESS	LOCALITY	SIZE & SHAPE	LAND USE	ACCESS	PASS/FAIL	COMMENTS
1	CB29K/1222, CB4B/1500	The Christchurch City Council	20.7656	McCormacks Bay Reserve					Pass	<ul style="list-style-type: none"> Parts are Recreation Reserve. Parts are high erosion risk area. Potential landfill.
2	398642, 398641, 417602, 417602, CB30F/58, CB12K/660, 3256, 3257, CB34A/618, CB10K/683, CB12F/983, CB30F/56, CB30F/60, CB12K/659, CB30F/59, CB10K/679, CB30F/57, CB30F/61, CB30F/62, CB10K/684, CB34A/617, CB27B/1271, 213132, CB34A/619, CB34A/616	Her Majesty The Queen	3.3800	30, 30A, 34, 36, 38, 44 Roekura Place; 116 Main Road; 116A Main Road; 8E Balmoral Lane; 42 Balmoral Lane; 46 Balmoral Lane; 31 Glendeverre Terrace; 32 Glendeverre Terrace; 34 Glendeverre Terrace; 48 Balmoral Lane; 38 Glendeverre Terrace; 30 Glendeverre Terrace; 28 Glendeverre Terrace; 38 Balmoral Lane; 88 Balmoral Lane; 8A Balmoral Lane; 26 Balmoral Lane; 8F Balmoral Lane; 8D Balmoral Lane					Fail	<ul style="list-style-type: none"> Redzoned land. May not provide enough flat land for building platform and playing fields (land includes cliff face and top). Very limited street frontage.
3	13588	Steven Richard Young	2.0411	124 Main Road					Fail	<ul style="list-style-type: none"> Redzoned land. May not provide enough land for building platform and playing fields (majority of land directly below cliff face). Very limited street frontage.
4	19339	Her Majesty The Queen	2.4500	12 Defender Lane; 26 Taupata Street; 16 Egnot Heights; 8 Defender Lane; 30C Taupata Street; 30B Taupata Street; 24B Taupata Street; 24 Taupata Street; 22C Taupata Street; 18 Egnot Heights; 24 Egnot Heights; 6 Defender Lane; 24A Taupata Street; 22A Taupata Street; 10 Defender Lane; 30D Taupata Street; 4 Defender Lane; 22 Egnot Heights; 20 Egnot Heights; 20A Taupata Street; 30A Taupata Street; 32B Taupata Street					Fail	<ul style="list-style-type: none"> Redzoned land. May not provide enough flat land for building platform and playing fields. Limited street frontage.
5	CB24B/999, CB34C/1061	The Christchurch City Council	1.7100	54 Glenstrae Road					Fail	<ul style="list-style-type: none"> Could be amalgamated with site 6. High erosion risk area. Steep land. Good street frontage but road is steep/narrow.
6	102902	Gaba Holdings Limited	1.9531	26 Glenstrae Road					Fail	<ul style="list-style-type: none"> Could be amalgamated with site 5. High erosion risk area. Steep land. Very limited street frontage.
7	CB34D/202, CB34D/205	Celia Teresa Foster, Peter John Foster	2.7800	20 Selleck Street; 25 Drayton Drive					Fail	<ul style="list-style-type: none"> High erosion risk area. Steep land. Very limited street frontage.
8	250457	The Christchurch City Council	8.4900	22 Glenstrae Road; 93 Drayton Drive; 50 Selleck Street; 10 Virginia Lane; 9 Omeo Crescent; 14 Avery Place; 267 Mt Pleasant Road					Fail	<ul style="list-style-type: none"> Parts are Recreation Reserve 10 Virginia Lane on LLUR persistent pesticide. SIT 25134 - Not Investigated. High erosion risk area. Land is steep and narrow. Very limited street frontage.
9	627497, 512248, 627497	Serendipity Resort Limited	2.7100	189 Glenstrae Road; 109 Glenstrae Road					Fail	<ul style="list-style-type: none"> 9,10 & adjoining council land may have adequate platform however land is still quite steep. Street frontage is very limited.
10	627496	Nicola Jane MacLachlan, Rostock Trustees Limited, Sharon Eunice McKay	2.2224	199 Glenstrae Road					Fail	<ul style="list-style-type: none"> 9,10 & adjoining council land may have adequate platform however land is still quite steep. Street frontage is limited.
11	165606, 165605	Nigel Charles Harrison Babbage, Philippa Anne Babbage	1.9900	327 Mt Pleasant Road - 329 Mt Pleasant Road					Fail	<ul style="list-style-type: none"> Part is high erosion risk area. Contour and size of land unlikely to provide adequate flat land for playing fields and building platform.
12	368291	Peter Harvey Croft	2.9100	178 Monks Spur Road					Fail	<ul style="list-style-type: none"> High erosion risk area. Contour unlikely to provide adequate flat land for playing fields and building platform. Adjoining road is narrow and limiting to access.
13	CB369/194, CB25B/467	Andrew Richard Turner	3.1900	311 Mt Pleasant Road - 315 Mt Pleasant Road					Fail	<ul style="list-style-type: none"> High erosion risk area. Contour unlikely to provide adequate flat land for playing fields and building platform. Adjoining road is narrow and limiting to access.
14	651489	The Christchurch City Council	1.5700	172 Major Hornbrook Road					Fail	<ul style="list-style-type: none"> Recreation Reserve. Outside catchment area.
15	176468, 176469, 176470, 176471, 176472, 176473, 176474, 176475, 176476, 176494, 176493, 176495, 176496, 176500, 176499, 176497, 176498, 176501, 176502, 176503, 176532, 176466, 176467, 15909, 176537, 176477	Her Majesty The Queen	21.6100	29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 79, 77, 81, 83, 53, 56, 58, 60, 62, 64, 66, 85, 87 Morgans Valley; 70A Bridle Path Road					Fail	<ul style="list-style-type: none"> Redzoned land. High erosion risk area. Contour unlikely to provide adequate flat land for playing fields and building platform. Limited street frontage.
16	CB47D/58, 176533, 176534, 176531, CB39B/50, CB35B/671, CB48C/724, CB48C/611, CB48C/723, CB42D/43, CB45C/1174	The Christchurch City Council	161.5200	164 Bridle Path Road; 54 Morgans Valley; 2 Morgans Valley; 27 Morgans Valley; 386 Major Hornbrook Road; 40 Rockview Place; 380 Mt Pleasant Road; 298 Major Hornbrook Road; 290 Major Hornbrook					Fail	<ul style="list-style-type: none"> Parts are Recreation Reserve. Adjoins redzone land. Part is high erosion risk area. Top of hill, long distance for majority of potential students to travel. Contour unlikely to provide adequate flat land for playing fields and building platform.
17	CB3C/349, CB459/270, CB486/86, 143082, CB459/270, CB21F/260, CB353/66, 143081	Carlin John Rutherford, Damon John Rutherford	59.6100	2 Crest Lane; 347 Mt Pleasant Road					Fail	<ul style="list-style-type: none"> Part is high erosion risk area. Contour unlikely to provide adequate flat land for playing fields and building platform. Multiple street frontages across property, however the road is quite narrow.
18	CB478/137	Theodoros Investments Limited	9.6768	575 Summit Road					Fail	<ul style="list-style-type: none"> Part is high erosion risk area. Contour unlikely to provide adequate flat land for playing fields and building platform. Street frontages however at top of hill, long distance for majority of potential students to travel.
19	CB478/137	Theodoros Investments Limited	4.5960	575 Summit Road					Fail	<ul style="list-style-type: none"> Designation ONL - Lyttelton Contour unlikely to provide adequate flat land for playing fields and building platform. Street frontage however top of hill, long distance for majority of potential students to travel.
20	86031, 86032	Angus Martin Chambers, Jonathon Hinton Peter Chambers	2.6700	16 Broadleaf Lane; 18 Broadleaf Lane					Fail	<ul style="list-style-type: none"> Designation ONL - Lyttelton Contour unlikely to provide adequate flat land for playing fields and building platform. Street frontage however top of hill, long distance for majority of potential students to travel.
21	86033	The Christchurch City Council	7.5014	645 Summit Road					Fail	<ul style="list-style-type: none"> Contour unlikely to provide adequate flat land for playing fields and building platform. Street frontages however top of hill, long distance for majority of potential students to travel.
22	Mt Pleasant Scenic Reserve New Zealand Gazette 1984 p 5671	Her Majesty The Queen	5.2625	52A Broadleaf Lane					Fail	<ul style="list-style-type: none"> Reserve Contour unlikely to provide adequate flat land for playing fields and building platform. Partially formed track provides access, long distance for majority of potential students to travel.
23	CB33F/720	Chorus New Zealand Limited	8.3900	20 Broadleaf Lane					Fail	<ul style="list-style-type: none"> Contour unlikely to provide adequate flat land for playing fields and building platform. Partially formed track provides access, long distance for majority of potential students to travel.
24	Tauhinu-Korokio Scenic Reserve New Zealand Gazette 1994 p 2481	Her Majesty The Queen	5.2519	Broadleaf Lane					Fail	<ul style="list-style-type: none"> Reserve. Contour unlikely to provide adequate flat land for playing fields and building platform. No formed access, long distance for majority of potential students to travel.

[illegible]

Appendix 3: Stage 1 Analysis Maps

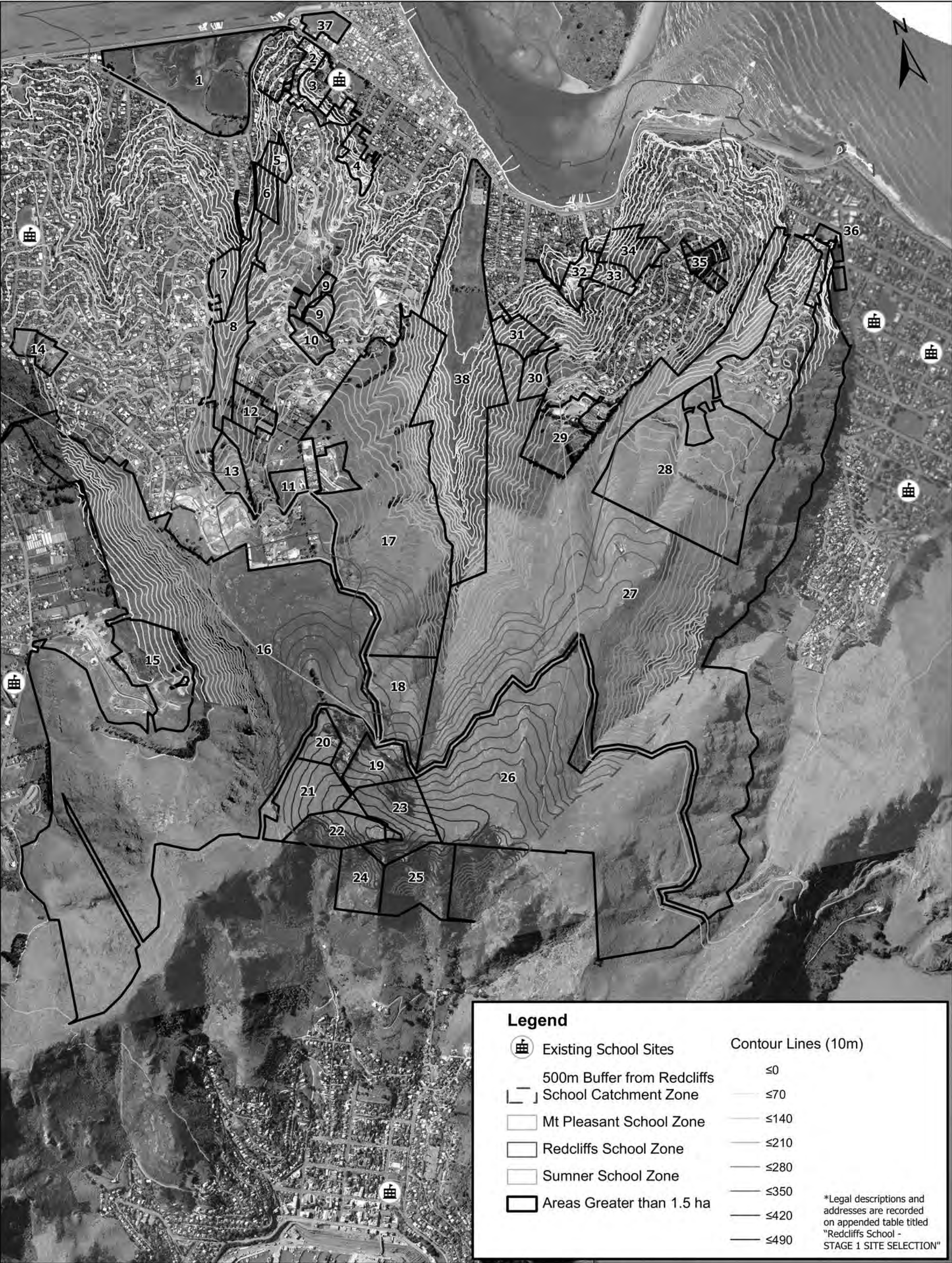
Plan A: Stage 1 Identified Sites

Plan B: Contours and Topography

Plan C: CERA Residential Redzone land

Plan D: Stage 2 Selected Sites





Legend

- Existing School Sites
- 500m Buffer from Redcliffs
- School Catchment Zone
- Mt Pleasant School Zone
- Redcliffs School Zone
- Sumner School Zone
- Areas Greater than 1.5 ha
- Contour Lines (10m)

≤0

≤70

≤140

≤210

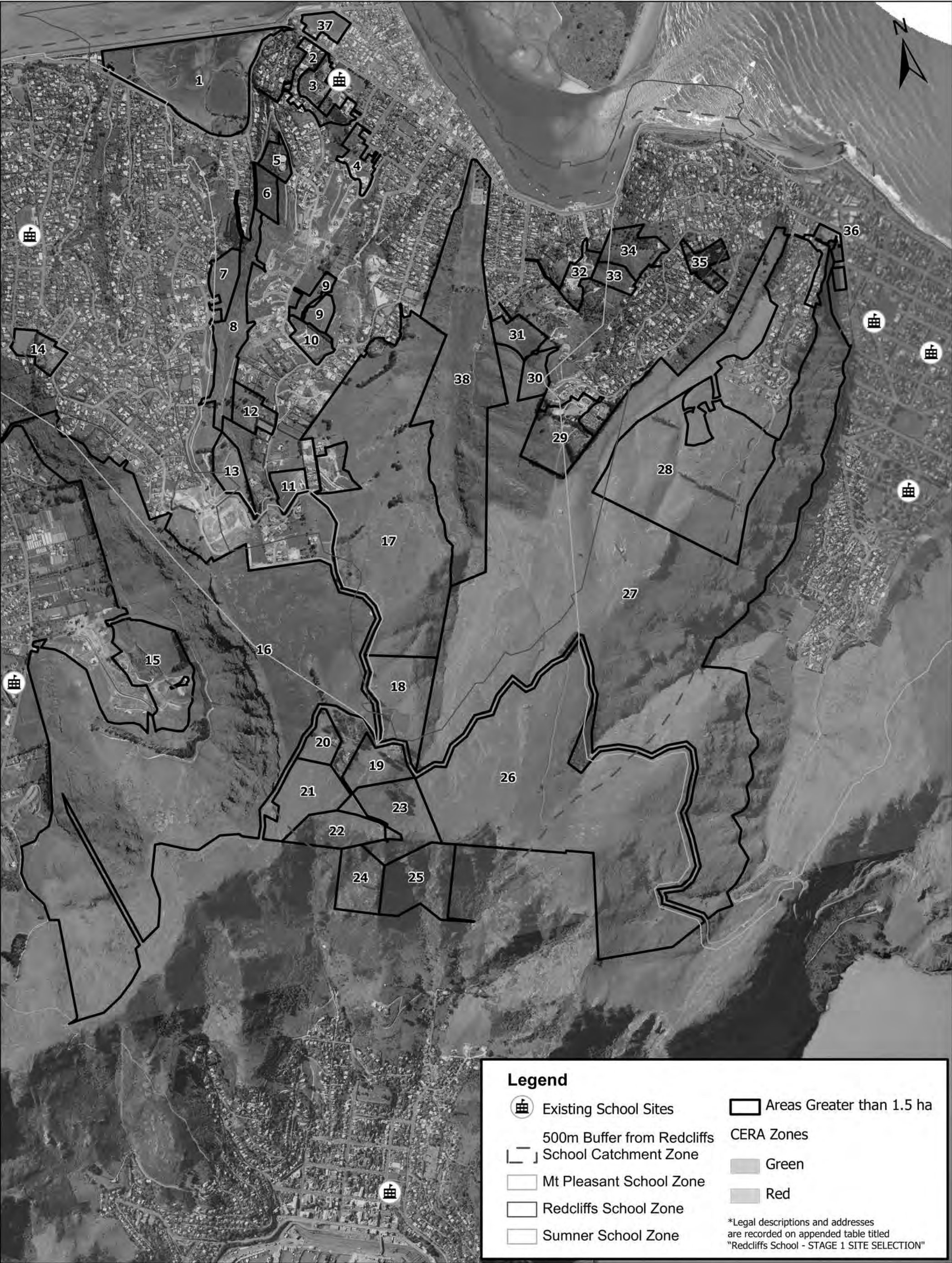
≤280

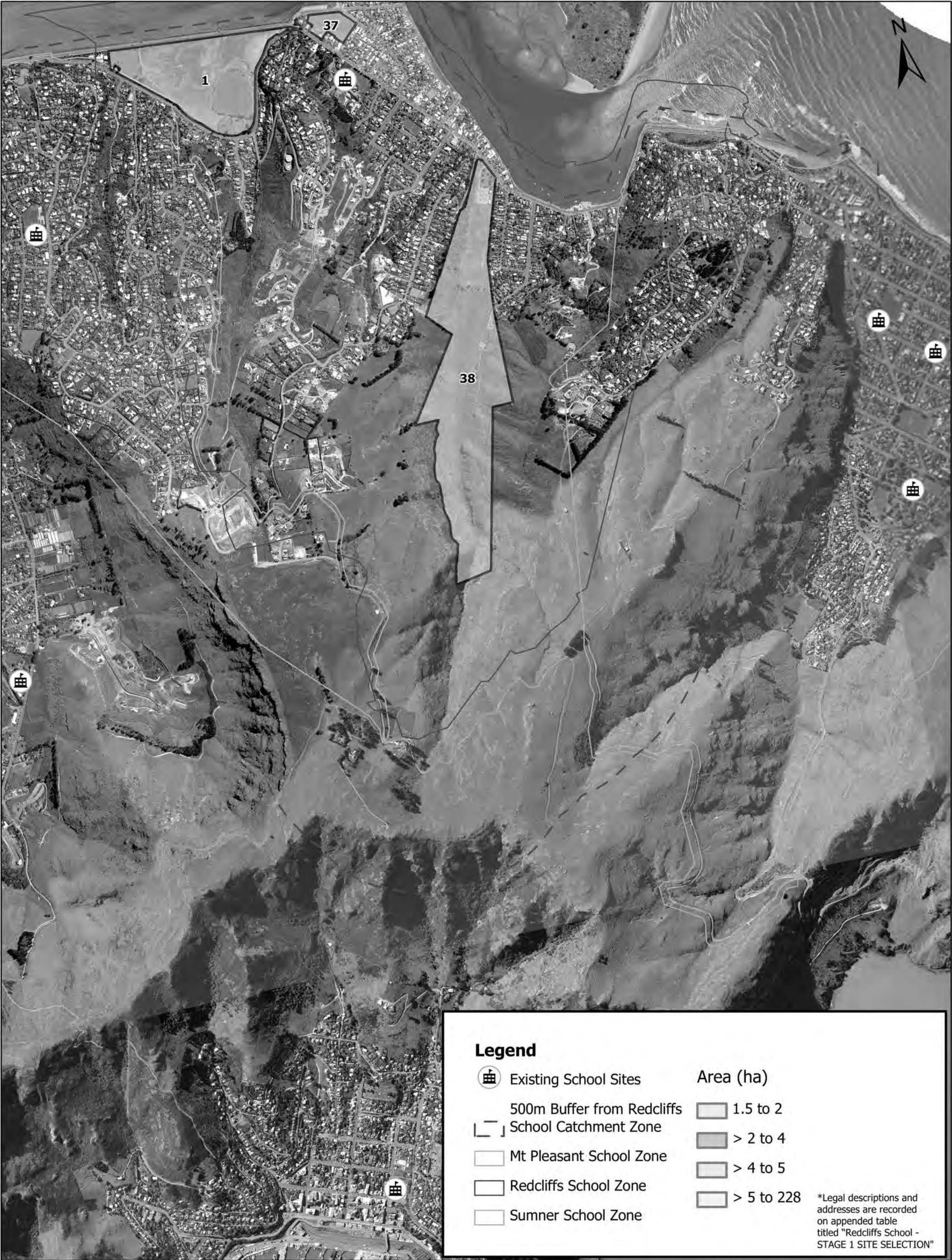
≤350

≤420

≤490

*Legal descriptions and addresses are recorded on appended table titled "Redcliffs School - STAGE 1 SITE SELECTION"





Legend

- Existing School Sites
- 500m Buffer from Redcliffs School Catchment Zone
- Mt Pleasant School Zone
- Redcliffs School Zone
- Sumner School Zone
- Area (ha)

 1.5 to 2
- > 2 to 4
- > 4 to 5
- > 5 to 228

*Legal descriptions and addresses are recorded on appended table titled "Redcliffs School - STAGE 1 SITE SELECTION"

Appendix 4: Detailed Stage 1 Analysis of the Three Sites

Detailed Stage 1 Analysis of the Three Sites

Stage 1: Site 1 McCormacks Bay Reserve

Area

McCormacks Bay Reserve has a total area of 20.7656 hectares. It is important to note that the title is part cancelled and approximately 559 square metres, shown as Lot 1 DP 25301, has been transferred to the Christchurch Drainage Board, making the total area 20.7097 hectares.

The potential alternative site has an approximate area of 3.4000 hectares (subject to survey).

Legal Description

Part Reserve 4324 and Part Reserve 4325 having an area of 20.7656 hectares more or less and being all of the land comprised in Computer Freehold Register CB4B/1500 (part cancelled). The land is held by the Christchurch City Council for a Recreational Reserve.



Figure 4 Site 1: McCormacks Bay Reserve

Locality	McCormacks Bay Reserve is located within the existing Redcliffs School zone. The site is towards the north western boundary of the zone.
Size and Shape	The site is flat in contour and almost rectangular in shape. The majority of the site is covered by a tidal water body. An area of land on the eastern boundary is considered the most likely potential site.

		The approximate area of this site is 3.4000 hectares (subject to survey).
Current Land Use / Form		<p>The land is currently used for playing fields.</p> <p>The site is on Environment Canterbury's LLUR as having contained HAIL activities.</p> <p>The site is currently zoned Open Space 2/Open Space Community Parks.</p> <p>The land is very low lying, and is bounded by the estuary which is of cultural and ecological significance.</p>
Access		The site has a long single frontage to McCormacks Bay Road along its eastern boundary.

Stage 1: Site 37 Redcliffs Park

Area

Redcliffs Park has a total area of 1.9071 hectares. The entire park has been identified as a potential alternative site.

Legal Description

The legal description of the park is as follows;

- Reserve 4601 having an area of 1.0304 hectares more or less and being all of the land comprised in Computer Freehold Register CB616/39. The land is held by the Christchurch City Council as a Reserve for Recreation purposes.
- Lot 3 Deposited Plan 47479, having an area of 7,692 square metres more or less, and being all of the land comprised in Computer Freehold Register CB27F/184. The land is held by the Christchurch City Council.
- Lot 2 Deposited Plan 47479, having an area of 1,075 square metres more or less, and being all of the land comprised in Computer Freehold Register CB27F/183. The land is held by Christchurch City Council.



Figure 5 Site 31 Redcliffs Park

Locality	Redcliffs Park is located within the existing Redcliffs School Zone. The site is located towards the northern boundary of the zone.
Size and Shape	The subject site is almost rectangular in shape. The park is grassed and predominantly flat in contour however the parcel of land between Main Road and the playground equipment is elevated from the main body of the park. The total area of the site is 1.9071 hectares.
Current Land Use / Form	<p>There do not appear to be any above ground infrastructure facilities on the site (e.g. cell phone sites, power lines). The site is currently zoned Open Space 2/Open Space Community Parks with a small portion adjacent to Main Road being zoned Residential Suburban.</p> <p>The site is on Environment Canterbury's Listed Land Use Register as having contained HAIL activities. This site is across the road from Moa Cave. The Redcliffs Master Plan expresses a desire to promote sight lines across the reserve to the sea</p> <p>The land is low lying.</p>

Access

The site has frontage to Beachville Road, Celia Street and Main Road.

Stage 1: Site 38 Barnett Park

Area

Barnett Park has a total area of 40.2525 hectares. The northern section of flat land has been identified as a potential alternative site. The area of this site is estimated at between 7-8 hectares (subject to survey).

Legal Description

Barnett Park is comprised of four separate titles;

- Rural Section 40504 having an area of 774 square metres more or less and being all of the land comprised in Computer Freehold Register 467115. The land is held by Christchurch City Council for recreation purposes.
- Rural Section 38630 having an area of 1,396 square metres more or less and being all of the land comprised in Computer Freehold Register CB818/15. The land is held by the Christchurch Drainage Board.
- Reserve 4979 having an area of 7.2813 hectares more or less and being all of the land comprised in Computer Freehold Register 328620. The land is held by the Christchurch City Council for a recreation reserve.
- Reserve 4630 having an area of 32.7542 hectares more or less and being all of the land comprised in Computer Freehold Register CB620/38. The land is held by the Christchurch City Council for recreation purposes.



Figure 6 Site 38 Barnett Park

Locality		Barnett Park is located centrally within the existing Redcliffs School Zone.
Size and Shape		Barnett Park has an area of 40.2525 hectares. The selected site can be described as a long, narrow parcel with a steep slope on the western boundary. This part of the park is currently used as district sports fields and houses community buildings. The remainder of the park is relatively steep in contour. The potential site at Barnett Park has an approximate area of 7-8 hectares.
Current Land Use/Form		<p>The site currently operates as district sports fields and has a row of flood lights on the eastern boundary of one of the playing fields.</p> <p>A large stormwater swale runs along the eastern boundary of the site.</p> <p>There is a 66kv pylon on the site at the southern end of the park and Orion power cables.</p> <p>The site is currently zoned Open Space 2/Conservation 1, Open Space Community Parks/Open Space Natural and contains an Environmental Asset Waterway. The site is on Environment Canterbury's Listed Land Use Register as having contained HAIL activities and is known to have some flooding issues at the northern end.</p> <p>Part of the site adjacent to the Main Road includes an existing operational play centre, sports storage, changing room facilities and car park.</p>
Access		The site's main access and frontage is to Main Road. This frontage is narrow in nature and has a potential access issue which will require planning. Access is also available at the south end of the park off Bay View Road, a residential, dead-end street.

Appendix 5: Detailed Stage 2 Analysis of the Three Sites

Detailed Stage 2 Analysis of the Three Sites

Stage 2: Site 1 McCormacks Bay Reserve

McCormacks Bay Reserve is on the Avon-Ihutai estuary. It is bounded by Main Road (the causeway) to the north, with McCormacks Bay Road curving around the site.

There are two principal sections of land in the reserve, one west and one east. The potential alternative site is located on the eastern side of the estuary. The western most area contains community buildings and open space / park areas. The eastern most area contains sports fields and changing facilities.

s 9(2)(i) OIA, s 9(2)(j) OIA

Criteria	Assessment	Score
Ease of Acquisition	The site is held by the Christchurch City Council for a Recreation Reserve, subject to the Reserves Act 1977. Any revocation or alteration of the Reserve status would require public notification.	0
Site Size	The site is capable of providing flat land for a long L shaped single storey building of 2,028m ² with space for an additional single storey extension. There is sufficient area for car parking and playing fields.	5
Topography	The site is generally flat.	5
School Design Potential	The site presents good urban design and architectural opportunities that would promote good learning outcomes.	5
Position of site in relation to any relevant growth strategy or residential plan change	The site is within an established urban area. There are no relevant growth strategies as Redcliffs is an established suburb.	5
District Plan Zone	<p>The site is zoned Open Space 2 (District Recreation and Open Space) in the Operative Plan, and Open Space Community Parks in the proposed Replacement Christchurch District Plan.</p> <p>The site's proximity to the estuary is particularly problematic from a District Plan perspective.</p>	0

Criteria	Assessment	Score
Location within the proposed student catchment	The site is located within the defined catchment area, although positioned at its western end.	3
Existing site constraints	<p>The site accommodates a single story building which provides toilet and changing room facilities for the existing sports fields. Other improvements include goal posts and overhead flood lights.</p> <p>There are a number of easements recorded on the Computer Freehold Register for the wider reserve. Initial investigations conclude that the majority of the easements are remote from the site and will not provide any constraints. There is one easement located across the northern part of the site but due to its location it is not likely to cause any constraints.</p> <p>The site is bounded by a tidal waterbody on three of its four boundaries.</p>	4
Road Frontage	Only one road frontage; some flexibility on where access can be located.	2
Transport Network	Can be serviced by all modes, activity spread along frontage of low volume road.	4
Infrastructure services	<p>Potable Water Supply is proximate. Capacity is expected to be adequate but has not yet been quantified.</p> <p>Fire Supply While the water supply is proximate, the capacity of the existing water supply has not been tested. Supply may be constrained.</p> <p>Sanitary Sewer Supply is proximate. Capacity is expected to be adequate but has not yet been quantified.</p> <p>Stormwater Supply is proximate, and capacity expected to be adequate but has yet to be quantified. On site stormwater detention is likely to be required, and allowance should be made for treatment such as rain gardens, swales or storm filters.</p> <p>Electricity There is existing supply to the land parcel but a new site supply would be required for the proposed development. It is a potential major constraint/cost given the existing land use. Further investigation is required including engaging with distribution network provider Orion.</p>	2.5

Criteria	Assessment	Score
	<p>Gas</p> <p>There is no known reticulation, but vehicle delivery operates nearby.</p> <p>Telephone/Broadband</p> <p>There is no known connection to the land parcel, and new site connections would be required for the proposed development. McCormacks Bay Road is the nearest cable route and fibre is expected in 2017.</p> <p>Refuse</p> <p>Waste collection services operate nearby.</p>	
Geotechnical	<p>This site was subject to sand ejecta, fissuring, lateral spread and related ground settlement during the Canterbury Earthquake Sequence (CES). Tonkin & Taylor suggest the land is likely to perform to TC3 standards. Although part of an old rock quarry is across the road from the site, Tonkin and Taylor advise the Lives Risk Line 10^{-6} will not fall within the site.</p>	1
Flooding	<p>Tonkin and Taylor advise that this site is within the CCC Flood Management Area (FMA) and has an IFL of 3.32m LVD. The proposed school building site would require approximately 1 to 1.5 m of fill to achieve a satisfactory Finished Floor Level for the school buildings as the ground surface elevation of the site ranges from approx. 2-2.5m LVD. The adjacent McCormacks Bay Road is at 2.5m LVD.</p>	1
Contamination	<p>The site is an area of reclaimed land formed by quarry spoil fill and landfill overlying naturally deposited estuary sediments. It is identified as closed landfill #45 on the CCC landfill map. Tonkin and Taylor have assessed a moderate potential for landfill gas (LFG) and/or soil contamination issues.</p> <p>There is an assessed low to moderate potential for pesticide contamination of sports field soils.</p>	1
Noise effects on any proposed school	<p>It is unlikely (given the current and proposed District Plans) that there will be land uses in the vicinity of the site that would produce significant noise at a level to have significant adverse effect on a school activity.</p>	5
Ecological impact	<p>This is a Site of Ecological Significance (SES LP/14) in the proposed Replacement Christchurch District Plan - Te Ihutai/Avon-Heathcote Estuary and environs. Any building on the site would need to take into consideration effects on the estuary, having particular regard to sedimentation and effects on water quality.</p>	1

Criteria	Assessment	Score
Cultural or other significance	Mahaanui Kurataiao Limited (MKT) have identified the site as being at very high risk for issues of Ngā Tutohu Whenua and Wāhi Tapu, with evidence to suggest that urupa may be located in the immediate vicinity of the site. They note also that the site is high risk regarding issues of Mahinga Kai and Wāhi Taonga, as Ihutai is taonga to Ngāi Tahu and Te Tai o Mahaanui is a statutory acknowledgement area.	1
Opportunities for co-location or shared facilities with other parties	Community facilities and buildings have recently been constructed on the western portion of the reserve. These improvements are too distant to form part of a “campus”, however continued shared use of playing fields may be achievable.	3
Social Impacts	The school is to be a full primary facility with a forecast roll of a maximum of 400 students, and is to continue to provide an existing service to an existing catchment.	5
TOTAL		57.5

Stage 2: Site 37 Redcliffs Park

Redcliffs Park is located at 113 Beachville Road and 7-9 Main Road, Redcliffs.

Location A provides a building platform towards the north eastern corner of the park. This area of land is currently utilised as sports fields.

Location B comprises the Main Road frontage of the park. This location could be supplemented by the possible acquisition of an adjoining privately owned property which is currently vacant. This additional land would provide a building platform for a two storey building. This option may enable shared use of the remainder of the site for playing fields for the school and community.

s 9(2)(i) OIA, s 9(2)(j) OIA

Criteria	Assessment	Score A	Score B
Ease of Acquisition	Part of the land is held in trust by the Christchurch City Council but is a Crown derived reserve subject to the Reserves Act 1977. The Crown derived land is Recreation Reserve vested in trust in the Christchurch City Council. Any revocation or alteration of the Reserve status would require	0	0

public notification.

With regards to the part of Redcliffs Park which is not subject to the Reserves Act 1977, CCC is required to carry out public consultation under S138 LGA 02 before it disposes of any part of a park.

Neighbouring land, for possible consideration of purchase, is held in private ownership.

Site Size	Locations A and B can both accommodate buildings and parking of suitable size.	5	5
Topography	Both Locations A and B provide for a flat building platform.	5	5
School Design Potential	<p>Location A presents good urban design and architectural opportunities that would promote good learning outcomes.</p> <p>Location B's designated outdoor space is open to the prevailing north-east wind.</p>	5	4
Position of site in relation to any growth	The site is within an established urban area. There are no relevant growth strategies as Redcliffs is an established urban area.	5	5
District Plan zone	<p>Obtaining a designation would require consideration of the New Zealand Coastal Policy Statement among other statutory instruments.</p> <p>Location A is zoned Open Space 2, and Open Space Community Parks. It is within the Coastal Environment and located in a High Flood Management Area.</p> <p>Location B has residential medium density properties to the west and east along Main Road. It may be possible to avoid siting buildings in the High Flood Management Area. Building in the Cliff Collapse Hazard Management Area 2 would require a site specific risk assessment report, peer review and agreement by CCC.</p>	1	3
Location within the proposed student catchment	The site is located centrally within the defined catchment area and located centrally within it.	5	5
Existing site constraints	The site accommodates a single story building which provides public toilet facilities towards the Main Road boundary. Other improvements include	3	2

	goal posts and two playground areas.		
	There are a number of easements recorded on the Computer Freehold Registers for the site. Initial investigations conclude that the easements may constrain potential development on Location B but are not likely to constrain development on Location A.		
Road Frontage	<p>The site has the benefit of multiple road frontages. Location A has full access from Beachville Road and Celia Street and is likely to have pedestrian access from Main Road.</p> <p>Location B has greater frontage to Main Road. Due to the topography the frontage is unlikely to provide full vehicle access from Main Road into the carpark area. The Beachville Road and Celia Street frontages also provide potential access to location B.</p>	3	4
Transport Network	Can be serviced well by all modes, activity spread across network, Two low and one high volume road frontages.	4	4
Infrastructure services	<p>Potable Water Supply is proximate. Capacity is expected to be adequate but has not yet been quantified.</p> <p>Fire Supply While the water supply is proximate, the capacity of the existing water supply has not been tested. Supply may be constrained.</p> <p>Sanitary Sewer Supply is proximate. Capacity is expected to be adequate but has not yet been quantified. Location B has a wastewater rising main running through the middle which would affect the school's configuration unless relocated. Located A is not currently impacted but the wastewater rising main could constrain future expansion.</p> <p>Stormwater Supply is proximate, and capacity expected to be adequate but has yet to be quantified. On site stormwater detention is likely to be required, and allowance should be made for treatment such as rain gardens, swales or storm filters.</p>	2.4	2.4

Electricity

There is existing supply to the land parcel but a new site supply would be required for the proposed development. It is a potential major constraint/cost given the existing land use. Further investigation is required including engaging with distribution network provider Orion.

Gas

There is no known reticulation, but vehicle delivery operates nearby.

Telephone/Broadband

There is no known connection to the land parcel, and new site connections would be required for the proposed development. Main Road is the nearest cable route and fibre is expected in 2017.

Refuse

Waste collection services operate nearby.

Geotechnical

Location A

2

4

Tonkin and Taylor state the site has a high potential for liquefaction and TC2 to TC3-like land performance under future moderate to strong earthquake shaking with ground settlements in the order of 100 mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.

There are no slope hazards, or hazard runout zones within range of Location A.

Location B

The 31⁰ flyrock line encroaches approximately 4 metres into part of Location B.

Tonkin and Taylor advise that remediation work is currently being undertaken by NZTA to make the hill safe enough to allow long term use of the road without container protection.

Tonkin and Taylor's assessment is that the works currently underway will have the effect of moving the position of the existing 10⁻⁶ lives risk line across the road to the south-west away from the residential properties within Location B.

Flooding	<p>Location A</p> <p>The ground surface elevation of Redcliffs Park averages about 1.8m Lyttelton Vertical Datum (LVD). The site is within the CCC Flood Management Area with an interim floor level (IFL) of 3.32 mLVD.</p> <p>The floor level is based on the modelled 200 year return period flood plus 0.4 m height allowance for freeboard. Coastal inundation and erosion models indicate future inundation by a 50 year return period tide in the next 50 years and impacts due to coastal erosion within the next 100 years.</p> <p>Location B</p> <p>The building footprint of Location B is approximately 4.5m LVD. It is on the margin of the coastal inundation erosion models, however the playing fields still fall within those lines. While freeboard is provided against modelled future flooding and coastal inundation, the school will not be accessible during any future flood as local roads will be under 0.5 to 1m of water.</p>	1	3
Contamination	<p>Location A</p> <p>The site is identified as closed landfill #43 on the CCC landfill map. Tonkin & Taylor have assessed a low to moderate potential Landfill gas and/or soil contamination issues. There is an assessed low to moderate potential for pesticide contamination of sports field soils.</p> <p>Location B</p> <p>The building footprint largely avoids the former landfill site. There is an assessed low potential for LFG issues, pesticide and asbestos contamination on the part historically used for residential purposes.</p>	2	4
Noise effects on any proposed school	It is unlikely given the Operative and Proposed District Plans and the established nature of the area that there will be land uses in the vicinity of the site that would produce noise likely to have a significant adverse effect on a school activity.	5	5
Ecological Impact	The site is located in a coastal environment, proximate to the Te Ihutai-Avon Estuary, and its	2	3

	low lying nature has the potential to generate run-off or sedimentary impact. Location B is likely to have less impact than Location A.		
Cultural or other significance	Mahaanui Kurataiao Limited (MKT) have identified the site as being at high risk for issues of Ngā Tutohu Whenua and Wāhi Tapu, with evidence to suggest that urupa may be located in the immediate vicinity of the site. They also note that the site is at high risk regarding issues of Mahinga Kai and Wāhi Taonga, as Ihutai is taonga to Ngā i Tahu and Te Tai o Mahaanui is a statutory acknowledgement area. The site is across the road from Moa Cave, which is of high significance. Location A would have less effect on view shafts from Moa Cave Ihutai but Location B is further from the water.	2	2
Opportunities for co-location	While there are opportunities for co-location of community facilities such as playgrounds and playing space, they are greater with Location B than Location A.	2	3
Social Impacts	The school is to be a full primary facility with a forecast roll of a maximum of 400 students, and is to continue to provide an existing service to an existing catchment.	5	5
TOTAL		62.4	70.4

Stage 2: Site 38 Barnett Park

Barnett Park is located at 200A Main Road, Redcliffs. The selected site extends from Main Road to the Southern end of Bay View Road. The balance of the site is not considered appropriate and has not been included in the stage 2 evaluation.

Location A comprises the Main Road frontage of the site, Location B comprises the central core of the site and Location C comprises the flat southern portion of the site at the frontage with Bay View Road.

s 9(2)(i) OIA, s 9(2)(j) OIA

Criteria	Assessment	Score A	Score B	Score C

Ease of Acquisition	The majority of the land is held as Local Purpose Reserve and Recreation Reserve subject to the Reserves Act 1977. A portion of the land is held by CCC under the LGA 02 and the title remains in the name of the Christchurch Drainage Board. Any revocation or alteration of the Reserve status would require public notification. Public consultation would also be required under S138 of the LGA 02.	0	0	0
Site Size	<p>Location A has some issues, such as the carpark which will require further consideration. The outdoor paved area fits a basketball court but it is tight and the outdoor paved space is restricted. Accessibility and flow are poor.</p> <p>Locations B and C are able to cater for a building platform and all required spaces.</p>	3	5	5
Topography	Each of Locations A, B and C are flat in contour.	5	5	5
School Design Potential	<p>Location A has been assessed using the existing carpark. This carpark will separate the new school from the grassed field area and restrict the outdoor paving area. This has the potential to create a situation where the teachers are unable to easily monitor any children playing on the field.</p> <p>Location B has no street frontage due to the carpark being located between the building and the street, and there is a long distance from the school to the street for pedestrian accessibility meaning students will have to walk either side of the existing carpark.</p> <p>Location C has limited frontage to Bay View Road, and its location at the end of a dead end street has the potential to cause congestion issues at peak hours.</p>	2	3	4

Position of site in relation to any growth	The site is within an established urban area. There are no relevant growth strategies.	5	5	5
District Plan Zones	<p>Locations A, B and C are zoned Open Space 2 in the Operative District Plan.</p> <p>Locations A and B are zoned Open Space Community Parks in the proposed Replacement Christchurch District Plan (pRCDP) while Location C is zoned Open Space Natural.</p> <p>Locations A and B are in the Coastal Environment overlay and a very small portion at the front of Location A is within a High Flood Hazard Management Area.</p> <p>All the locations are in the Liquefaction 1 overlay.</p> <p>The entire site is bounded to the west and south by an area noted as Outstanding Natural Landscape in the Proposed Plan. It has geotechnical issues. To the east the site is adjoined by Living 1 or Residential Suburban (low density) housing.</p> <p>The housing adjacent to Locations A and B is in a Flood Management Area in the Operative Plan.</p> <p>Location C contains an environmental asset waterway and land to the rear of Location C contains power pylons.</p>	4	3	2
Location within the proposed student catchment	The site is located centrally within the defined catchment area.	5	5	5
Existing site constraints	<p>The site accommodates a single storey building which provides toilet and changing room facilities for the existing sports fields. A large car parking area and two playground areas are located on the northern part of the site. Other improvements include goal posts and overhead flood lights.</p> <p>A large swale is located along the eastern boundary of the site.</p> <p>There are a number of easements and</p>	1	2	2

encumbrances registered against the titles for the site which may constrain development on the site. There may also be an unregistered easement for an underground cable.

A substation, pylon and overhead power lines are located along or just beyond the southern boundary of the site (wider part of Barnett Park).

Road Frontage	The site has frontage to Main Road and Bay View Road, however, frontage is limited.	1	1	1
Transport Network	Location A and B can be serviced well by all modes, however activity will be concentrated along what is a short frontage of busy road. Location C, as the furthest site back from the Main Road, has an increased walk and cycle distance to the school. Vehicle activity may also be concentrated along a local residential street, Bay View Road.	3	3	2
Infrastructure services	<p>Potable Water</p> <p>Supply is proximate to Location A. Capacity is expected to be adequate but has not yet been quantified. Supply to Locations B and C is remote from the site, but capacity is expected to be adequate. Services may need to run 200 metres to reach Location B and 100 metres to reach Location C.</p> <p>Fire Supply</p> <p>While the water supply is proximate to Location A, it is remote for Locations B and C. The capacity of the existing water supply has not been tested. Supply may be constrained.</p> <p>Sanitary Sewer</p> <p>Supply is proximate to Location A. Capacity is expected to be adequate but has not yet been quantified. Supply to Locations B and C is remote from the site, but capacity is expected to be adequate. Services may need to run 200 metres to reach Location B and 100 metres to reach Location C.</p> <p>Stormwater</p> <p>A major stormwater easement runs along the eastern boundary. Supply is proximate to Location A and B, and capacity is expected to</p>	2.6	1.5	1.7

be adequate but has yet to be quantified. Supply to Location C is remote, but capacity is expected to be adequate. Services may need to run 100 metres to reach Location C.

On site stormwater detention is likely to be required, and allowance should be made for treatment such as rain gardens, swales or storm filters.

Electricity

Location A, there is existing supply to the land parcel but a new site supply would be required for the proposed development. It is a potential major constraint/cost given the existing land use. Further investigation is required including engaging with distribution network provider Orion, which has significant infrastructure and an easement running through the site.

Location B is remote from the street which adds additional cost.

Location C is close to existing supply at Bay View Road but the nature of the infrastructure warrants further discussion with Orion. This is the location which is closest to nearby substation and overhead transmission lines and the distance from those to the school should be maximised.

Gas

There is no reticulation, but vehicle delivery operates nearby.

Telephone/Broadband

There is an existing connection to Location A, but new site connections would be required for the proposed development. The nearest cable route is Main Road and there is fibre in the street.

Location B is remote from the street which would add additional infrastructure cost.

Location C may require a long service run from Main Road if the existing Bay View Road services are inadequate. Fibre is expected in 2017.

Refuse
Waste collection services operate nearby.

Geotechnical

Location A

3 3 4

Tonkin and Taylor comment that there was relatively minor damage during the CES, with cracking observed around the existing car park. There was no sand ejecta observed on the site, negligible settlement and surface damage but some cracking and spreading towards the estuary. They anticipate a high potential for liquefaction and TC2-like future performance, with ground settlements of about 100mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.

The slope of Moncks Spur to the west of site presents a modest landslip hazard. Runout of debris from shallow, small to moderate volume landslips may extend onto the existing access way to the west of Location A. There is no rock fall hazard in this area.

Location B

In addition to the comments on Location A, Tonkin and Taylor comment that runout of debris from small to large volume landslips may extend out onto the sports fields. The debris from pre-historic landslides has formed a colluvial wedge and subdued debris fans extending about 15 to 20 metres out from the toe of the over steepened slope. Tonkin and Taylor recommend that the 10^{-6} individual life rock fall risk line reported by GNS Science is adopted as a "no build" limit for the purposes of this evaluation.

Location C

The slope of Moncks Spur to the west of the site presents a rock fall landslip hazard due to the steep soil covered valley side slopes with two identifiable rock cliffs outcropping on the slope. Runout of debris from small to large volume landslips has formed debris fans that extend about 30 to 50 metres eastward, out onto the valley

floor.

Tonkin and Taylor advise that the 10^{-6} individual life rock fall risk lines reported by GNS Science along the west side of Barnett Park and across the east slope uphill of the existing substation provide a practical “no build” limit for the purposes of this report. The suggested building layout within about 10 to 15 m of the 10^{-6} line conforms with that advice.

Flooding

Location A

1 2 3

Surface flooding is known to occur at the north end of the park and across Main Road due to storm flows from the Port Hills catchment upslope of Barnett Park.

1 to 1.5m of fill would be required to meet the finished floor level requirements as the ground surface elevation is approximately 2m LVD. The site is within the CCC FMA with an IFL of 3.32 m LVD.

Coastal inundation and erosion models indicate future inundation by a 50 year return period tide in the next 50 years and impacts due to coastal erosion within the next 100 years.

Location B

Floor level requirements, erosion and inundation models are as per Location A. Surface flooding is known to occur due to storm flows overtopping the large swale drain that runs along the eastern boundary of the site.

Location C

The site is unlikely to be subject to coastal inundation within the next 100 years, is outside of the Flood Management Area and the ground surface elevation of Barnett Park Location C is about 4.5m LVD meaning no fill is required.

Tonkin and Taylor comment that a rough cut drain along the east side of the valley feeds

	storm flows from the Port Hills catchment into the swale that runs beside the sports fields. The potential for flood water and high energy debris floods to move through the proposed development site will need to be addressed.			
Contamination	<p>Barnett Park is a verified HAIL site and was used as a military base and rifle range for the first half of the 20th century.</p> <p>There is an assessed low to moderate potential for pesticide contamination of sports field soils.</p> <p>Potential exists for lead contamination from rifle range activities and possible contamination from building demolition and storage of military supplies.</p>	3	3	3
Noise effects on any proposed school	It is unlikely given the Operative and Proposed District Plans and the established nature of the area that there will be land uses in the vicinity of the site that would produce noise likely to have a significant adverse effect on a school activity.	5	5	5
Ecological Impact	The site contains slopes which are part of a large Outstanding Natural Landscape. None of the three locations seeks to build on or adjacent to those slopes. There are no identified Significant Natural Areas. There is an Environmental Asset Waterway on Location C which results in a lower score.	4	4	3
Cultural or other significance	<p>Mahaanui Kurataiao Limited (MKT) have identified Barnett Park as being High Risk for issues of Wāhi Taonga, noting the proximity to the statutory acknowledgement area of Te Tai o Mahaanui. Middens and ovens are shown in the region of this site, with the potential for further discoveries.</p> <p>This site is average risk for issues of Mahinga Kai, Kaitakitanga, Wāhi Tapu, Rangatiratanga and Ngā Tutohu Whenua. It is low risk for issues of Mauri.</p> <p>While Location A is the lowest risk of the three locations as it has already been extensively excavated, construction may require deeper earthworks than have</p>	4	3	3

	previously occurred.			
Opportunities for co-location	There are existing community buildings, for example the play centre on the front of the site which provide opportunities for co-location of community resources. Location C is the most distant from those facilities.	4	4	3
Social Impacts	The school is to be a full primary facility with a forecast roll of a maximum of 400 students, and is to continue to provide an existing service to an existing catchment.	5	5	5
Total		62.6	64.5	64.7

Appendix 6: Tonkin and Taylor Report



Redcliffs School

Site Options Study

Prepared for
Ministry of Education

Prepared by
Tonkin & Taylor Ltd

Date
September 2016

Job Number
53062.3000.v3



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Document Control

Date	Issue No	Description	Prepared by:	Reviewed by:
19/08/16	1	Draft for Comment	Barry McDowell	Gordon Ashby
25/08/16	2	Draft for Comment	Barry McDowell	Gordon Ashby
13/09/16	3	Final Report	Barry McDowell	Gordon Ashby

1 Introduction

The Ministry of Education (MoE) is undertaking a review of potential alternative sites for Redcliffs School (refer Figure 1, Appendix A). Tonkin & Taylor Ltd (T+T) has been engaged by the MoE to support this work by undertaking desktop-based assessments of the subject sites in relation to ground contamination, geotechnical conditions, natural hazards and three waters infrastructure. This assessment follows the Stage 2 criteria in the MOE Methodology for New School Site Evaluation.

1.1 Scope of work

This desktop evaluation for each of the subject sites generally comprised:

- Review of Environment Canterbury (ECan) Listed Land Use Register (LLUR report) to confirm the current LLUR classification of the sites and the basis for that classification.
- Review of historical aerial photographs to identify potential land contaminating activities including but not limited to ground disturbance and filling, previous industrial activities, and the demolition/removal of site buildings and structures.
- Review of the readily available data from the Canterbury Geotechnical Database (CGD) and T+T files, including information from LiDAR¹ surveys, groundwater monitoring, borehole (BH) investigations and Cone Penetration Test (CPT) investigations.
- Review of published information on slope hazards related to earthquake shaking (rockfall, cliff collapse and mass movement).
- Review of readily available information relating to potential flooding hazards covering Christchurch City Council (CCC) interim floor levels (IFL), 200 year return period flood events, storm tide levels and potential coastal inundation and coastal erosion hazards. This information potentially influences floor elevations and foundation costs for new buildings.
- Preliminary review of existing services infrastructure for potable water, waste water (sewer) and stormwater, which are collectively referred to as three waters.
- Assessment of subsurface ground conditions and land performance during the Canterbury Earthquake Sequence (CES).
- Preliminary liquefaction analysis using readily available existing data to identify the potential extent and consequences of earthquake induced liquefaction beneath the sites and in particular, potential ground surface settlement and lateral spread.
- Assessment of the potential influence that the identified inundation and earthquake-related geotechnical hazards are expected to have on the proposed development.

1.2 Sites of interest

The sites assessed for the purposes of this report, along with selected descriptive information, are listed in Table 1 (below) and are shown on Figure 1 (refer Appendix A). For reference, Figure 1 also shows the locations of existing schools in the Mt Pleasant to Sumner area.

¹ LiDAR stands for Light Detection and Ranging, which uses aerial laser equipment to generate digital elevation models (DEMs) of the ground surface.

Table 1: General site information

Site	General description	General range in surface elevation ² across the site (m LVD)
McCormacks Bay Reserve (Site 1)	Area of sports fields to the west of McCormacks Bay Road. The land was 'reclaimed' from the bay between about 1955 and 1975 (refer Figure 2b, Appendix A) using quarry waste rock, soil, demolition waste, and possible municipal refuse.	2.0 – 2.5
Redcliffs Park (Site 37, Location A)	Area bounded by Celia Street, Beachville Road and properties along Main Road. Part of the site was operated as landfill in the 1940's and 1950's.	1.8
Redcliffs Park (Site 37, Location B)	Potential area for school buildings on properties bordering Main Road. This location is approximately 2.5m higher elevation than Location A on the park.	4.5
Barnett Park (Site 38, Location A)	The existing playground fronting onto Main Road and bounded to the west by the access way to sports field and play centre parking.	2.0
Barnett Park (Site 38 Location B)	An area approximated by the northern most Soccer field on Barnett Park.	2.5 - 3.5
Barnett Park (Site 38, Location C)	A nominal area at the southern end of Barnett Park that straddles across sports fields and un-developed grassland, with access from Bay View Road.	4.0 - 5.0

1.3 Proposed development

It is understood that the proposed development on the subject sites will include typical educational facilities such as single and two storey lightweight timber-framed buildings, outdoor paved areas and car parks. We understand that preliminary layouts are being considered to provide an overall floor area of 2028 m² with the potential to increase the floor area to 2592 m².

2 General site characteristics

A range of general characteristics have been examined to describe and characterise the typical conditions at the various sites and to provide input for our assessments. General comments on these aspects are provided in the following sections. Attributes specific to each of the sites, as well as a summary of the assessments, is provided in Table B1 (refer Appendix B).

2.1 Potential soil contamination

ECan maintains a LLUR of sites where current or previous land uses potentially include one or more of those activities listed on the Hazardous Activities and Industries List (HAIL) issued by the Ministry

² Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved on 16 August 2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>. Elevations provided are in terms of Lyttelton Vertical Datum (LVD).

for the Environment (MfE). The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

HAIL activities have been identified within all overall subject sites (refer Figures 2a, 3a, 4a, Appendix A) although, Location B on Redcliffs Park and Locations A and C on Barnett Park appear to be outside of the specific HAIL areas. Those areas mapped as being a HAIL site will need further detailed investigation to understand whether any special provisions are required to enable future development (if any). In the first instance, further desktop assessment to identify historical land uses (e.g. Council records on land fill activities) and any associated contamination potential is recommended. If the potential for contamination is identified from the desktop study then potential response measures, depending on the degree of contamination by a specific contaminant and the land use, may include:

- Targeted soil sampling and analysis to understand contaminant levels and spatial distribution and assess potential costs for development (such as remediation works and consenting costs);
- Covering contaminated soil;
- Re-location on site in a manner that significantly reduces potential access to the soil;
- In situ stabilisation; and/or
- Removal off site and disposal at an approved facility.

The assessment of potential soil contamination is a specific aspect of the MOE's evaluation methodology for new school sites.

2.2 Geology

Published geological information³ indicates that the sites are generally underlain by sandy soils of the Christchurch Formation, most likely deposited in a sand beach environment in the past 1,000 to 3,000 years.

The McCormacks Bay Reserve is underlain by quarry waste fill and landfill overlying estuary sediments. Part of Redcliffs Park has also been subject to landfilling. Location C on Barnett Park is underlain by colluvial silt and sand deposited into the valley as a result of naturally occurring erosional processes from the slopes of the Port Hills.

2.3 Seismic shaking hazard

The seismic shaking hazard for the subject sites and how this influences potential primary school site development is discussed with respect to a range of aspects, as follows:

- The magnitude of ground shaking experienced at the sites during the CES
- Land performance of the sites during the CES in terms of:
 - Liquefaction related ground surface settlement
 - Lateral ground movement
 - Sand ejecta observed on the ground surface
- Soil classification for structural engineering design
- Potential liquefaction triggering and reconsolidation settlement under future design earthquake scenarios

³ Brown, L.J. & Weeber, J.H. (1992). Geology of the Christchurch urban area. Scale 1:25000. Institute of Geological and Nuclear Sciences geological map 1. One sheet. Institute of Geological and Nuclear Sciences Limited, Lower Hutt, New Zealand.

The assessment of the various aspects of seismic shaking hazard for each site informs the geotechnical element of the MOE's evaluation methodology for new school sites.

2.3.1 Peak ground accelerations during the CES

T+T has undertaken comparisons of the Peak Horizontal Ground Acceleration (PGA_H) values measured around the subject sites due to the main events during the CES with the design PGA_H values for typical residential design criteria⁴ for the Canterbury region as specified in the MBIE Guidelines⁵. This information has been sourced from the CGD⁶. Based on our review of that information it is concluded that the February 2011 earthquake event typically generated the highest seismic accelerations at the sites, which when scaled to take into account earthquake magnitude, correspond to approximately 500 to 540 % of SLS and 185 to 200 % of ULS design levels.

2.3.2 Land performance observations from the CES

Information from the CGD is available on the performance of land across much of Christchurch during the CES. This includes aerial photographs taken following the main earthquakes and aftershocks plus observations of ground cracking and liquefaction recorded on residential land by personnel employed by the Earthquake Commission (EQC). Further explanation on various aspects of land performance are provided in the following sections and a summary of the information extracted from a review of the CGD for this report is provided in Table B1 (refer Appendix B).

2.3.2.1 Ground surface settlement

The change in vertical elevation caused by densification and/or liquefaction induced ground settlement is available on the CGD⁷, which provides maps of vertical change in elevation estimated by comparison of digital elevation models (DEMs) developed from LiDAR data flown before, during and after the CES. Differences between the DEMs are adjusted for tectonic changes. The margin of error associated with LiDAR surveys is of the order of +/- 100 mm.

Significant differences indicating larger area-wide ground surface settlement are generally associated with areas of wide spread sand ejecta and/or lateral spreading. The results are discussed for each site in Section 3 following.

2.3.2.2 Lateral ground movement

Lateral spreading is generally defined as the horizontal displacement of surficial blocks of soil towards an open slope face as a result of liquefaction of the underlying soils. The occurrence of lateral spreading generally requires the presence of a relatively continuous liquefiable layer extending to an open slope face such as a riverbank or open channel. Displacements can range from a few centimetres to a metre or more. Lateral spreading is not necessarily damaging to robust shallow founded structures but is usually problematic for deep foundations such as piles. The subject sites have been compared against maps available on the CGD showing areas of lateral spreading observed during the CES. The results are discussed for each site in Section 3, following.

⁴ Further detail on design earthquake scenarios is provided in Section 2.3.4.

⁵ Ministry of Business, Innovation and Employment (MBIE) (2012). Guidance on repairing and rebuilding houses affected by the Canterbury earthquake sequence, Version 3. Wellington: Ministry of Building, Innovation and employment, ISBN: 978-0-478-39908-0.

⁶ Canterbury Geotechnical Database (2015) "Conditional PGA for Liquefaction Assessment", Map Layer CGD5110 - 20 July 2015, retrieved on 16 August 2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>.

⁷ Canterbury Geotechnical Database (2012) "Vertical Ground Surface Movements", Map Layer CGD0600 - 23 July 2012, retrieved on 16 August 2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>.

2.3.2.3 Sand ejecta

Sand boils occur when liquefied soils at depth break through to the ground surface through fissures, cracking and/or weak crustal soils. This phenomenon results in significant differential settlement of the ground surface, can lead to bearing capacity failure and the creation of voids in subsoil zones beneath foundations, slabs, roads, etc.

The effect of the ejected material is to cover the ground surface surrounding the exit point with sand and water. Experience during the CES indicates that the material can readily be removed from roads, driveways and lawns within a relatively short time frame. However, where ejected sand is left beneath floors or against external walls then it can be a source of ongoing dampness and lead to the development of mould. Sand ejecta associated with liquefaction can also enter broken services and block trenches and pipelines and can occur under asphalt causing localised “blisters”.

For this report we have reviewed the aerial photos taken shortly after the February event⁸ to identify sites that experienced moderate to large quantities of ejected material. The results of this qualitative assessment are tabulated in Table B1 (refer Appendix B) and discussed for each site below in Section 3, following.

2.3.3 Soil classification for seismic design of structures

For assessing structural design actions in accordance with NZS 1170.5⁹, it is recommended that all sites be classified as Class C – shallow soils, due to the estimated depth to bedrock of 10 to 50m for sites close to the foot of the Port Hills. This recommendation is based on published geological information (as referenced above) and existing investigation data near the sites.

2.3.4 Liquefaction triggering

To comply with the MBIE Guidance the following PGA_H values for an earthquake with moment magnitude (M_w) of 7.5 should be used when undertaking liquefaction triggering analysis for residential type structures:

- i Serviceability Limit State (SLS¹⁰) $PGA_H = 0.13 \text{ g}$
- ii Ultimate Limit State (ULS¹¹) $PGA_H = 0.35 \text{ g}$

It should be noted that the above interim PGA_H values are for liquefaction triggering analysis only and correspond with seismic events that have annual exceedance probabilities of 1/25 and 1/500 for SLS and ULS level earthquake shaking, respectively. These values also correspond to importance level (IL) 2 structures with a 50 year structure design life. Unless stated otherwise, any liquefaction analysis carried out for this study has assumed IL2 structures with 50 year design life, which is the categorisation that enables like-for-like comparison with the MBIE residential foundation technical categories and corresponding foundation systems. It should be noted that for IL3 structures (assuming a 50 year design life) the corresponding PGA_H values for liquefaction triggering are 0.13g and 0.45g, for SLS and ULS levels of shaking, respectively.

We note that liquefaction of susceptible soils in Christchurch generally occurs at a ground acceleration of approximately 0.15g to 0.24g, which corresponds to an average return period of 150

⁸ Publicly available from koordinates.com.

⁹ Standards New Zealand (2004). Structural Design Actions, Part 5: Earthquake Actions – New Zealand (NZS 1170.5: 2004).

¹⁰ A typical definition of SLS is that this level of loading on the structure should avoid damage that would prevent the structure from being used as originally intended, without major repair.

¹¹ A typical definition of ULS is that this level of loading on the structure should avoid collapse of the structural system, prevent collapse or loss of support of parts of the structure representing hazard to human life or parts required for life safety systems and avoid damage to non-structural systems necessary for the buildings evacuation procedures that renders them inoperative.

to 200 years. This indicates that significant seismically induced liquefaction is likely to occur at shaking levels below the ULS design level. For the purposes of this report we have limited the liquefaction assessment to one SLS earthquake scenario (0.13g for Mw 7.5 event) and assumed IL2 buildings. Generally there is only a modest incremental increase in settlement for ULS level shaking when considering IL3 buildings compared with IL2 buildings. In general, settlements for a second SLS earthquake scenario (0.19g for Mw 6.0 event) are of a similar level. Therefore whether IL2 or IL3 buildings are assumed or whether SLSa and/or SLSb design earthquake scenarios are used, is not expected to influence the assessment of the sites in accordance with the MOE evaluation methodology.

2.3.5 Liquefaction assessment

Preliminary liquefaction analysis has been carried out for each of the subject sites to provide an indication of the potential ground performance due to future earthquake shaking and the potential implications for development. This involves understanding the susceptibility of the soil beneath the site to liquefaction and then what the consequences of liquefaction might be. Liquefaction consequences may be discussed in terms of ground surface settlement, lateral ground movement and sand ejecta.

The liquefaction susceptibility of the soils beneath the subject sites has been assessed using the results from CPT investigation data currently available on the CGD, which are located adjacent to the sites. Due to the site locations near the foot of the Port Hills, ground conditions can vary rapidly from site to site and hence the analysis have been used as a preliminary guide only.

The susceptibility of various soil layers has been considered for both the ULS and the SLS seismic loadings discussed previously (refer Section 2.3.4). The susceptibility of layers has been analysed using the CPT-based analysis method presented by Idriss & Boulanger¹² and depends on the fines content of the soil, which has been calculated from the CPT data using correlations published by Robertson & Wride¹³. This method calculates a factor of safety (FoS) against liquefaction for each CPT data point where a calculated FoS less than 1.0 indicates that the soil at that particular depth is susceptible to liquefaction for the given earthquake scenario. The groundwater depth adopted for these preliminary analyses was 1.0 m, which for the purposes of this report we have adopted for all subject sites.

The potential consequences of different levels of earthquake shaking are estimated based on the volumetric densification of the liquefaction susceptible soil layers. The results of this settlement calculation are presented in Table B2 (and summarised in Table B1, Appendix B) for layers within the upper 10 m of the soil column and where the investigation was continued to a greater depth, for up to 20 m.

The potential consequences have also been estimated using the Liquefaction Severity Number (LSN) methodology, which calculates a depth weighted measure of the volumetric densification strain. The LSN provides an indicator value reflecting the more damaging effects that shallow liquefaction has on residential land and building foundations, compared with liquefaction at depth.

An additional component of building settlement may also occur due to yield of the soils under seismic loading of a foundation. This is often demonstrated by “punching” of shallow foundations (which is typically the case for more heavy-weight buildings). This component of settlement is very difficult to predict and depends on the interaction of the building and the soil it is founded on. For the purposes of this report we have not included this component in our assessment of ground

¹² Boulanger, R.W. & Idriss, I.M (2014) “CPT and SPT Based Liquefaction Triggering Procedures” UCD/CGM-14/01

¹³ Robertson, P.K. and Wride, C.E. (1998). *Evaluating cyclic liquefaction potential using the cone penetration test*. Canadian Geotechnical Journal. Vol 35, 442-459.

disruption, which we expect to be relatively minor for the soils typically encountered at the subject sites.

The liquefaction assessment informs the land categorisation as guided by MBIE Guidance for residential properties, which in turn informs the geotechnical element of the MOE's evaluation methodology for new school sites.

2.4 Slope (landslide) hazards

The subject sites within Redcliffs are located along the foot of the Port Hills where slopes have been undercut by wave action in the past several thousand years to produce over steepened soil slopes and rock cliffs up to 70 m high. The slopes and cliffs have been protected from ongoing wave action and removal of debris from the toe in relatively recent times by the build-up of the New Brighton Spit and development of the present day estuary.

The seismic shaking experienced during the CES has resulted in several areas of major cliff collapse and rockfall associated with over steepened slopes at the foot of the Port Hills. The scale of the cliff collapse and rockfall highlights the existence of such hazards and the potential consequences of occupying sites close to the foot of these steep slopes. These events have also provided a unique opportunity to map and analyse the hazard, and to quantify the future risk to life. GNS Science has carried out a large body of work investigating and analysing the future risk of the Port Hills slope hazards, which has been used by CERA in the establishment of the Port Hills red zones, based on life risk criteria.

The relevant reports by GNS Science relating to rockfall¹⁴ (GNS, 2013) and cliff collapse¹⁵ (GNS, 2014) have been reviewed and the information applied to the subject sites, along with our direct observations of the local slope conditions. The findings of our assessment are summarised in Table B1 (refer Appendix B) and discussed for each site, as appropriate, in Section 3.

It is noted that the rockfall risk contours discussed in these reports have been developed by GNS Science in response to a brief provided to them by their client (the CCC) for the specific situation in and around the Port Hills. We have used these risk contours to inform the geotechnical assessment of the subject sites in the context of the Ministry's evaluation methodology for new school sites. This in no way implies or suggests that the Ministry considers the 10^{-6} AIFR to represent a particular risk tolerability or acceptability criteria.

2.5 Topography and groundwater

The topography (slope and elevation) of the sites has been assessed from LiDAR elevation contours¹⁶ available on the CGD and summarised in Table B1 (refer Appendix B).

The assessment of topography, in particular the slope of the ground surface at the sites, is a specific aspect considered in the MOE's evaluation methodology for new school sites.

Information on the groundwater level beneath the sites is available from the CGD¹⁷. The groundwater level used in this report, including the liquefaction analyses, is the median water table

¹⁴ Canterbury Earthquakes 2010/2011 Port Hills Slope Stability: Life safety risk from rock falls (boulder rolls) in the Port Hills. GNS Science Consultancy Report 2012/123, May 2013 Final Issue 2. Map C: Risk Model year 5 2016.

¹⁵ Canterbury Earthquakes 2010/2011 Port Hills Slope Stability: Risk Assessment for Redcliffs. GNS Science Consultancy Report 2014/78, August 2014 Final

¹⁶ Canterbury Geotechnical Database (2014) "EQC LiDAR and digital elevation models", retrieved 16 August 2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

¹⁷ Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014, retrieved 16 August 2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

elevation derived using historical groundwater monitoring data and surrogate medians (which uses data from nearby monitoring wells to augment the measured water level data). The estimated median groundwater depth, recorded as depth below the ground surface, for each of the sites is listed in Table B1 (refer Appendix B).

Note that depth to groundwater does not directly influence the MOE site evaluation criteria, but is used to inform aspects of the study that are reflected in the evaluation methodology.

2.6 Flooding

For the subject sites under consideration we have reviewed the applicable flood levels according to the Christchurch City Council (CCC) District Plan, which are provided via the CCC Floor Levels Map website (CCC, 2016). While the final floor level (FFL) would usually be defined in conjunction with a Building Consent application, the information provided typically shows the anticipated interim floor level (IFL) taking into account the 2% annual exceedance probability (AEP) flood event plus 0.4 m additional height to account for freeboard i.e. a 50 year event + 0.4 m (CCC 50 yr flood zone). If the subject site is within the CCC defined Flood Management Area (FMA) then the IFL also takes in to account the 0.5% AEP event plus 0.4 m freeboard i.e. a 200 year event + 0.4 m.

Based on the available information the estimated IFL for potential future buildings on each site is listed in Table B1 (refer Appendix B). We also note that Building Code requirements with respect to ground clearance between the floor level, external wall cladding and adjoining paved or unpaved ground surface must also be considered when establishing the FFL.

Coastal Inundation Hazard Zones (CIHZs) and Coastal Erosion Hazard Zones (CEHZs) are referred to in a report¹⁸ produced for CCC. The zone maps are presented in Figures 5 to 7 (Appendix A) and the predicted future effects summarised in Table B1 (Appendix B).

2.7 Services infrastructure

Preliminary assessments have been made for each site relating to the existing provision of three waters infrastructure (potable water, sewer, stormwater) based on a review of readily available public information from CCC, the SCIRT GIS database and limited discussion with CCC engineers. In general, the sites are similar in terms of services, except that the distance that might be required to connect from the existing supply to the proposed building locations varies depending on the proximity of the site to the main urban roadways. The subject sites are parks/sports fields with, in general, 'natural' stormwater infiltration and run off. New development on any of the sites is expected to require on-site stormwater detention. An allowance should be made when planning site layout and costs associated with stormwater treatment, which may include features such as rain gardens, swales, detention tanks and storm filters. The degree to which the site is serviced by three waters infrastructure informs the services element. Our assessment of the three waters status for each site is summarised in Table B1 (Appendix B) and our assessment has been provided to Stephenson & Turner as an input into their overall evaluation and scoring of the Services provision, in accordance with the Ministry's evaluation methodology for school site. Discussion on the three waters provision for each site is provided in Section 3 following.

3 Site specific conditions

Table B1 (refer Appendix B) summarises the main desk top review observations relating to land contamination, earthquake induced land damage, post-earthquake geotechnical hazards and zoning for the sites. This section provides amplified narrative for each of the subject sites.

¹⁸ Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001

3.1 McCormacks Bay Reserve

The site is an area of reclaimed land formed by quarry spoil fill and landfill overlying naturally deposited estuary sediments. It is currently occupied by sports fields and an ablutions block (refer Figure 2a and 2b, Appendix A) and is identified as closed landfill #45 on the CCC landfill map. We have assessed a moderate potential for landfill gas (LFG) and/or soil contamination issues. There is an assessed low to moderate potential for pesticide contamination of sports field soils. Further site specific field investigations would be required to better understand the potential hazards for the development and quantify the potential financial impacts. At this stage, if LFG is present beneath building footprints then appropriately designed building protection measures are likely to be required, such as (for example) passive gas drainage and venting arrangements and possibly an impermeable gas migration barrier beneath concrete slabs for occupied buildings.

Land damage from the CES is significant (refer Figure 5a and 5b, Appendix A). Sand ejecta, fissuring, lateral spread and related ground settlement were observed. The damage is indicative of movement of the crust of reclaimed (man-made) fill over the top of the estuary sediments, with ejection of estuary sediments from fissures and cracks formed by movement of the fill.

Nearby CPT data is limited with valley fill sediments encountered south of the site and fill used to construct the causeway over estuary sediments encountered to the north. Our assessment of CPT analysis combined with the CES observations is for TC3-like future land performance, with ground settlements >100 mm and moderate to severe land damage possible in future events ranging from SLS to ULS level shaking.

Part of an old rock quarry across the road from the site that was developed for housing in the 1980's has been red zoned due to rockfall risk from adjacent fractured quarry faces. The GNS Science rockfall assessment does not cover this local quarry face situation, so there is no risk to life 'contours' in this area. Based on the local topography, future rockfall from this area, comprising individual boulders or groups of boulders will largely be contained on the bench to the east of the road, with a very low probability that rocks could come to rest on the road itself. Shadow angles¹⁹ from the cliffs and quarry faces to the proposed school area vary from about 14 to 17°. This is less than the 21° shadow angle used to limit the 10⁻⁶ life risk 'contour' lines²⁰ developed for the GNS studies, and places the proposed school area outside of the 10⁻⁶ line. In other words, we expect that the lives risk due to rockfall and/or cliff collapse is <10⁻⁶.

The ground surface elevation of McCormacks Bay Reserve ranges from approximately 2 to 2.5 m LVD. The site is within the CCC FMA with an IFL of 3.32 m LVD. The floor level is based on the modelled 200 year return period flood plus 0.4 m height allowance for freeboard. Coastal inundation and erosion models (refer Figure 5d, Appendix A) indicate future inundation by a 50 year return period tide in the next 50 years and impacts due to coastal erosion within the next 100 years.

The site is similar to the others in this study in that it is likely to be inundated in a large Tsunami (500 to 2,500 year return period models) to a depth of several metres. The modelling is for Tsunamis generated in South America and therefore evacuation procedures could be adopted to deal with the associated life risk.

The three waters services are present in McCormacks Bay Road, which runs along the site boundary. There was significant settlement and lateral spreading damage to the road during the CES and we understand that the waste water and water supply mains have been replaced along this section.

¹⁹ The "shadow angle" is similar to the fahrboeschung angle referred to in the GNS studies and the Eliot Sinclair report on rockfall risk associated with the slopes above the existing Redcliffs School site.

²⁰ The GNS 10⁻⁶ life risk line is based on the quantitative analysis of life risk for occupancy of residential dwellings, which in turn is based on a complex set of assessments and assumptions. While not strictly transferable to a school situation it allows a comparison with the 10⁻⁶ life risk line which crosses the rear of the existing Redcliffs School site.

Stormwater for the proposed school site would likely be detained and/or treated on site before discharge to the McCormacks Bay.

The CCC IFL, flooding and coastal inundation modelling suggest that the proposed school building site would require approximately 1 to 1.5 m of fill to achieve a satisfactory FFL for the school buildings. Aside from economic aspects associated with filling earthworks there are potential positive and negative impacts of 1 to 1.5 m of site filling, including:

- **Positive**
 - Significantly reduced risk of sand ejecta and liquefaction induced settlement disrupting the ground surface during earthquakes.
 - Freeboard is provided against modelled future flooding and coastal inundation, however the school will not be accessible during any future flood as local roads could be under 0.5 to 1 m of water.
- **Negative**
 - Increased lateral spreading hazard in future earthquakes, which will likely require mitigation by edge treatment/slope retention.
 - Issues with tying in levels between and carparks and paved areas, and to the existing McCormacks Bay Road (2.5 m LVD). This would likely require disabled access considerations.
 - Erosion protection may be required around the edge of the site to protect against future coastal erosion.

3.2 Redcliffs Park Location A

The site is located at the corner of Beachville Road and Celia Street (refer Figure 6a, Appendix A) on geologically recent sandy beach and estuary deposits. Location A is at the south-east end of the Park.

Part of the site (refer Figure 3a and 3b, Appendix A) is identified as closed landfill #43 on the CCC landfill map. We have assessed a low to moderate potential LFG and/or soil contamination issues. There is an assessed low to moderate potential for pesticide contamination of sports field soils. Further site specific field investigations would be required to better understand the potential hazards for the development and quantify the potential financial impacts. At this stage, if LFG is present beneath building footprints then appropriately designed building protection measures are likely to be required, such as (for example) passive gas drainage and venting arrangements and possibly an impermeable gas migration barrier beneath concrete slabs for occupied buildings.

Land damage from the CES is relatively minor with isolated sand ejecta and visible differential settlement along the northern boundary of the Park on Location A (refer Figure 6a and 6b, Appendix A). LiDAR vertical ground movements indicate negligible settlement. The land damage is indicative of cracking and spreading towards the estuary along Beachville Road, but negligible surface damage across the Park.

Our analysis of nearby CPT data combined with the CES observations indicates a high potential for liquefaction and TC2 to TC3-like land performance under future moderate to strong earthquake shaking with ground settlements in the order of 100 mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.

There are no slope hazards, or hazard runout zones within range of Redcliffs Park.

The ground surface elevation of Redcliffs Park averages about 1.8 m LVD (ranging 1.5 to 2.0 m LVD). The site is within the CCC FMA with an IFL of 3.32 m LVD. The floor level is based on the modelled 200 year return period flood plus 0.4 m height allowance for freeboard. Coastal inundation and

erosion models (refer Figure 6d, Appendix A) indicates future inundation by a 50 year return period tide in the next 50 years and impacts due to coastal erosion within the next 100 years.

The site is similar to the others in this study in that it is likely to be inundated in a large Tsunami (500 to 2,500 year return period models) to a depth of several metres. The modelling is for Tsunamis generated in South America and therefore evacuation procedures could be adopted to deal with the associated life risk.

The three waters services are present in Celia Street and Main Road beside the site boundary. A waste water riser main that runs across the Park from Beachville Road to Main Road was replaced due to damage during the CES. Stormwater for the proposed school site would likely be detained and or/treated on site before discharge to the estuary.

The CCC IFL, flooding and coastal inundation modelling suggest that the proposed development site would require approximately 1 to 1.5 m of fill to achieve a satisfactory FFL for the school buildings. Aside from economic aspects associated with filling earthworks there are potential positive and negative impacts of 1 to 1.5 m of site filling, including:

- **Positive**
 - Significantly reduced risk of sand ejecta and liquefaction induced settlement disrupting the ground surface during earthquakes.
 - Freeboard is provided against modelled future flooding and coastal inundation, however the school will not be accessible during any future flood as local roads will be under 0.5 to 1 m of water.
- **Negative**
 - Increased lateral spreading hazard in future earthquakes, which will likely require mitigation by edge treatment/slope retention.
 - Issues with tying in levels between and carparks and paved areas, and to the existing Celia Street (1.5 m LVD). This would likely require disabled access considerations.
 - Erosion protection may be required around the edge of the site to protect against future coastal erosion.

3.3 Redcliffs Park Location B

The proposed building sites for location B are on elevated ground beside Main Road. School parking and paved areas are located on the north section of Redcliffs Park.

Part of the site (refer Figure 3a and 3b, Appendix A) is identified as closed landfill #43 on the CCC landfill map. We have assessed a low to moderate potential for LFG and/or soil contamination issues. There is an assessed low to moderate potential for pesticide contamination of sports field soils. The proposed Location B paved areas and carpark are located over landfill. Location B building sites are located on residential properties south-west of the old landfill area. There is an assessed low potential for LFG issues, pesticide and asbestos contamination (at possible very low levels due to demolition activities) on the residential properties.

Land damage from the CES is relatively minor with isolated sand ejecta and visible differential settlement along the northern boundary of the Park on Location B (refer Figure 6a and 6b, Appendix A). LiDAR vertical ground movements indicate negligible settlement. The damage is indicative of cracking and spreading towards the estuary along Beachville Road, but negligible surface damage along the residential properties on Main Road. There may have been some lateral stretch across the residential properties due to the slope between Main Road and Redcliffs Park.

Our analysis of nearby CPT data combined with the CES observations indicates a high potential for liquefaction and TC2 to TC3-like land performance under future moderate to strong earthquake shaking with ground settlements in the order of 100 mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events. Location B is 2.5m higher elevation than Location A and hence future performance is expected to be relatively better than the undeveloped Location A.

The GNS report on cliff collapse (GNS, 2014) includes maps showing bands (or contours) of individual life risk for residential occupation. The risk bands for cliff collapse are limited by a 31° fly rock line (fahrboeschung angle), which is similar to 10⁻⁶ lines shown on rockfall risk maps in other GNS reports. The 31° fly rock/ 10⁻⁶ line for cliff collapse runs along Main Road and encroaches approximately 4 m onto residential properties on Location B (refer Figure 6a, Appendix A).

The risk line shown on Figure 6a (Appendix A) is coincident with the eastern limit of the Cliff Collapse Hazard Management Area 2 shown on Christchurch District Plan Map 48. The hazard management area reflects the location of the change of risk to life from 10⁻⁴ to 10⁻⁶ AIFR, as calculated by GNS. District Plan rules (District Plan Section 5.5) for this management area list new development as a non-complying activity. A site specific risk assessment report must be submitted to CCC to accompany an application for an AIFR Certificate²¹, which then allows 2 years to apply for a restricted discretionary consent for the development. The risk assessment report must be peer reviewed by a CCC approved engineer. Development at Location B is expected to require the above process, which will likely involve costs associated with the reporting. This will require appropriate time allowance in any development programme as well as the need to obtain resource consent (with associated consenting uncertainty).

The scaling of loose boulders and towers of separated rock from the cliff face opposite Location B is currently being undertaken by NZTA in order to secure the Lyttelton to Woolston Evans Pass route and allow removal of containers alongside the road. A New Jersey concrete barrier (1m high) will also be installed along the road edge to create a rock catch area in front of the cliff. Brief discussions with the project engineers indicate that scaling work is intended to ameliorate small to medium scale cliff collapse, which is expected to reduce the overall lives risk to a level acceptable to NZTA and CCC for long term use of the road without container protection. Our assessment is that the scaling works currently underway will have the effect of moving the position of the existing 10⁻⁶ lives risk line on to the road to the south-west away from the residential properties within Location B. The impacts of this scaling work would need to be taken into account in any risk assessment required to support consenting any potential site development.

The ground surface elevation of Redcliffs Park Location B building area is approximately 4.5 m LVD. The proposed building sites are not within the CCC FMA Coastal inundation and erosion models (refer Figure 6d, Appendix A) indicate no future inundation by a 100 year return period tide in the next 100 years, but impacts due to coastal erosion within the next 100 years.

The site is similar to the others in this study in that it is likely to be inundated in a large Tsunami (500 to 2,500 year return period models) to a depth of several metres. The modelling is for Tsunamis generated in South America and therefore evacuation procedures could be adopted to deal with the associated life risk.

The three water services are present in Celia Street and Main Road beside the site boundary. A waste water riser main that runs across the Park from Beachville Road to Main Road was replaced

²¹ AIFR is annualised individual fatality risk, which is a measure of the lives risk for individual persons associated with cliff hazards such as rockfall and cliff collapse.

due to damage during the CES. Stormwater for the proposed school site would likely be detained and or/treated on site before discharge to the estuary.

The proposed location of the school buildings does not appear to require any significant fill to create building platforms. There may be some potential for lateral stretch/spreading along the slope down to Redcliffs Park, which will need to be considered during the design of foundations, although measures typically used for foundations on TC2-like land are likely to be sufficient measures.

3.4 Barnett Park Location A

The site is located on Main Road to the east of Moncks Spur (refer Figure 7a, Appendix A) on geologically recent sandy beach and estuary deposits.

The site (refer Figure 4a and 4b, Appendix A) is a verified HAIL site and was used as a military base and rifle range for the first half of the 20th century. There is an assessed low to moderate potential for pesticide contamination of sports field soils. Potential exists for low levels of lead contamination from bullets fired on the rifle range and possible contamination from building demolition and storage of military supplies.

Land damage from the CES is relatively minor, with cracking observed around the existing car park. There was no sand ejecta observed on the site (refer Figure 7b, 7c, 7d, Appendix A). LiDAR vertical ground movements indicate negligible settlement. The damage is indicative of cracking and spreading towards the estuary but negligible surface damage across the Park.

Our analysis of nearby CPT data combined with the CES observations indicates a high potential for liquefaction and TC2-like future land performance, with ground settlements of about 100mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.

The slope of Moncks Spur to the west of site presents a modest landslip hazard due to the over steepened nature of the slope (undercut by wave action in the recent geological past). Runout of debris from shallow, small to moderate volume landslips may extend onto the existing access way to the west of Location A. A 10^{-6} individual life rockfall risk line reported by GNS Science is shown on Figure 7a along the west side of Barnett Park. The line does not extend to the north beside Location A because there are no rock cliffs or outcrops to provide source for rockfall.

The ground surface elevation of Barnett Park Location A is approximately 2 m LVD. The site is within the CCC FMA with an IFL of 3.32 m LVD. The floor level is based on the modelled 200 year return period flood plus 0.4 m height allowance for freeboard. Coastal inundation and erosion models (refer Figure 7f, Appendix A) indicate future inundation by a 50 year return period tide in the next 50 years and impacts due to coastal erosion within the next 100 years. Surface flooding is known to occur (e.g. March 2014) at the north end of the park and across Main Road due to storm flows from the Port Hills catchment upslope of Barnett Park.

The site is similar to the others in this study in that it is likely to be inundated in a large Tsunami (500 to 2,500 year return period models) to a depth of several metres. The modelling is for Tsunamis generated in South America and therefore evacuation procedures could be adopted to deal with the associated life risk.

The three waters services are present in Main Road which runs along the site boundary. There was significant settlement and lateral spreading damage to the road during the CES and we understand that the waste water and water supply mains have been replaced along this section. Multiple easements for power and waste water cross Location A. Stormwater for the proposed school site would likely be detained and/or treated on site before discharge to Main Road or estuary.

The CCC IFL, flooding and coastal inundation modelling suggest that the proposed school building site would require approximately 1 to 1.5 m of fill to achieve a satisfactory FFL for the school buildings. Aside from economic aspects associated with filling earthworks there are potential positive and negative impacts of 1 to 1.5 m of site filling, including:

- **Positive**
 - Significantly reduced risk of sand ejecta and liquefaction induced settlement disrupting the ground surface during earthquakes.
 - Freeboard is provided against modelled future flooding and coastal inundation, however the school will not be accessible during any future flood as local roads will be under 0.5 to 1 m of water.
- **Negative**
 - Increased lateral spreading hazard in future earthquakes, which will likely require mitigation by edge treatment/slope retention.
 - Issues with tying in levels between and carparks and paved areas, and to the existing Main Road (2.0 m LVD). This would likely require disabled access considerations.
 - Erosion protection may be required around the edge of the site to protect against future coastal erosion.

3.5 Barnett Park Location B

The site is located on Barnett Park to the south of the existing car park (refer Figure 7a, Appendix A) on geologically recent sandy beach and estuary deposits.

The site (refer Figure 4a and 4b, Appendix A) is a verified HAIL site and was a military base and rifle range for the first half of the 20th century. There is an assessed low to moderate potential for pesticide contamination of sports field soils. Potential exists for low levels of lead contamination from bullets fired on the rifle range and possible contamination from building demolition and storage of military supplies. Location and extent unknown.

Land damage from the CES is relatively minor, with cracking observed around the existing car park. There was no sand ejecta on the site (refer Figure 7b, 7c, 7d, Appendix A). LiDAR vertical ground movements indicate negligible settlement. The damage is indicative of cracking and spreading towards the estuary but negligible surface damage across the park.

Our analysis of nearby CPT data combined with the CES observations indicates some potential for liquefaction and TC2-like future land performance is expected, with ground settlements of less than 100 mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.

The slope of Moncks Spur to the west of the site presents a potential landslip hazard due to the over steepened nature of the slope (undercut by wave action in the recent past). Runout of debris from small to large volume landslips may extend out onto the existing sports fields. The debris from pre-historic landslides has formed a colluvial wedge and subdued debris fans extending about 15 to 20 m out from the toe of the over steepened slope. The 10^{-6} individual life risk line for rockfall reported by GNS Science is shown on Figure 7a along the west side of Barnett Park. The extent of potential rockfall and landslide debris runout is similar and we recommend that this line be adopted as a “no build” limit for the purposes of this report.

The ground surface elevation of Barnett Park Location B averages 3 m LVD (range of 2.5 to 3.5 m). The north-east half of the site is within the CCC flood management area (FMA) with an interim floor level (IFL) of 3.32 m LVD. The floor level is based on the modelled 200 year return period flood plus 0.4 m depth to allow for freeboard. Surface flooding is known to occur (e.g. March 2014) at the

north end of the Park and across Main Road due to storm flows overtopping the large swale drain that runs along the eastern boundary of the Site. Based on this information the proposed buildings may require from 0 to 0.8m of site filling. The filling could exacerbate surface flooding in the surrounding area, requiring either a flood storage pond to offset the fill volume, or consideration of buildings with suspended timber floors on poles.

Coastal inundation and erosion models (refer Figure 7f, Appendix A) suggest inundation by a 100 year return period tide and an impact by coastal erosion within the next 100 years.

The site is similar to others in the options study in that it is likely to be inundated by water up to several metres depth in a large Tsunami (500 to 2,500 year return period models). The modelling is for Tsunamis generated in South America and therefore evacuation procedures are expected to address the potential life risk.

The three waters services are present in Main Road and may need to be extended 100 to 200 m to reach the site. Two power easements and the swale drainage easement cross Location B. Stormwater for the proposed school site would likely be detained and/or treated on site before discharge to the existing swale.

The proposed school building site could require approximately 0 to 0.8 m of fill across the north-east half of the site. The potential impacts of site filling include:

- Reduced potential for sand ejecta and liquefaction induced settlement from future earthquakes.
- Freeboard is provided against modelled future flooding and coastal inundation, however the school will not be accessible during any future flood as local roads could be under 0.5 to 1 m of water.

3.6 Barnett Park Location C

The site is located at the south end of the Barnett Park sports fields with access from Bay View Road (refer Figure 7a, Appendix A). Inter-fingering of valley debris fan deposits (silt and sand) with beach and dune deposits occurs across the site resulting in variable, although not necessarily unfavourable underlying soil conditions.

The site (refer Figure 4a and 4b, Appendix A) is a verified HAIL site and was a military base and rifle range for the first half of the 20th century. There is an assessed low to moderate potential for pesticide contamination of sports field soils. Potential exists for low levels of lead contamination from bullets fired on the rifle range and possible contamination from building demolition and storage of military supplies.

Land damage from the CES is not observed. There was no sand ejecta or cracking recorded on the site (refer Figure 7b, 7c, 7d, Appendix A). LiDAR vertical ground movements indicate negligible settlement.

There is no nearby data to allow an assessment of liquefaction settlement. However, based on experience in the general area we expect TC2-like future land performance, with ground settlements of less than 100 mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.

The slope of Moncks Spur to the west of the site presents a rockfall and landslip hazard due to the steep soil covered valley side slopes with two identifiable rock cliffs outcropping on the slope. Runout of debris from small to large volume landslips has formed debris fans that extend about 30 to 50 m eastward, out onto the valley floor. A 10⁻⁶ individual life rockfall risk line reported by GNS Science is shown on Figure 7a along the west side of Barnett Park and across the east slope uphill of

the existing substation. The 10^{-6} lines plot along the toe of the existing debris fans and provide a practical “no build” limit for the purposes of this report. The currently postulated building layout is within about 10 to 15 m of the 10^{-6} line i.e. in the direction of reducing risk.

The ground surface elevation of Barnett Park Location C is about 4.5 m LVD. The site is outside of the FMA. A rough cut drain along the east side of the valley feeds storm flows from the Port Hills catchment into the swale that runs beside the sports fields. A bund cuts across the middle of the valley to divert flows over to the eastern drain. The potential for flood water and high energy debris floods to move through the proposed development site will need to be addressed by appropriate design and reconstruction of diversion bunds and channels to convey flows past the site and into the existing swale.

Coastal inundation and erosion models (refer Figure 7f, Appendix A) suggest the site is not subject to coastal inundation within the next 100 years.

The site is similar to others in the options study in that it is likely to be inundated up to several metres of water in a large Tsunami (500 to 2,500 year return period models), although the extent of inundation is less than for the other sites at Barnett Park, Redcliffs Park and McCormacks Bay Reserve. The modelling is for Tsunamis generated in South America and therefore evacuation procedures could be adopted to deal with the potential life risk from inundation.

The three water services are present in Bay View Road beside the site. Power and drainage easements lie along the east side of the proposed site. Stormwater for the proposed school site would likely be detained and/or treated on site before discharge to the existing swale.

4 Discussion of development issues

4.1 Building foundations

The requirement to place fill up to 1 to 1.5 m thick on McCormacks Bay Reserve, Redcliffs Park Location A and Barnett Park Location A reduces the potential post development liquefaction settlement damage at those locations to a similar level expected at Redcliffs Park Location B and Barnett Park Locations B and C. TC2-like foundations are likely to be appropriate for single storey buildings and may be acceptable in a modified state for 2 storey buildings following specific engineering design.

Additional allowance will be required at McCormacks Bay Reserve and possibly to a lesser extent at Redcliffs Park and Barnett Park Location A to account for potential lateral spreading (or stretch) across building footprints. This could be in the form of modified and strengthened building foundations, the reinforcement and stiffening of fills with geogrids, or edge treatment by stone columns or similar to cut off lateral spreading failure zones.

Relatively light-weight building construction is recommended and appropriately designed shallow footings founded in medium dense to dense shallow soils are expected to be suitable for single or two storey developments.

Depending on the depth of non-liquefiable soils beneath the footing level, shallow footings for heavy 2 storey buildings are not likely to be suitable due to the potential for unacceptable foundation deformations that may occur due to footings punching into shallow liquefied soil. However, some form of ground improvement (e.g. geogrid reinforced gravel raft or stone columns) could be designed to mitigate the potential liquefaction hazards if heavier loaded shallow foundations are desired. This could add of the order of \$200 - \$400/m² onto the cost of typical shallow foundations such as ground beams, pads, strip footings or reinforced concrete rafts/slabs.

Deep piled foundations are unlikely to be an economically viable solution for 1 and 2 storey school buildings given that suitable pile founding soil layers are generally expected to be absent within the upper 20 m of the soil profile.

4.2 Flood and erosion protection

McCormacks Bay Reserve, Redcliffs Park Location A and Barnett Park Location A require considerable filling (1 to 1.5 m thick) to achieve acceptable finished floor levels. While fill at these sites improves liquefaction settlement performance, stabilisation or geogrid reinforcement may be required to assist in the mitigation of lateral spreading. The north eastern half of Barnett Park Location B will likely require up to 0.8m of filling or raised floor levels to reach acceptable FFLs.

Erosion protection by rock rip rap covering of fill batters may be required to counter future coastal erosion. However this might not be required for decades ahead, and future community scale coastal erosion protection may negate the need for more site-specific works.

4.3 Slope hazards

Slope Hazards are identified adjacent to McCormacks Bay Reserve, Redcliffs Park Location B, Barnett Park Locations B and C. Based on the information available and preliminary on-site observations we are of the opinion that the associated lives risk for McCormacks Bay Reserve and Redcliffs Park sites would be tolerable with no, or at worst relatively modest, risk treatment measures i.e. further detailed risk quantification and reporting, or possibly some form of simple debris diversion and/or rockfall barrier. For Redcliffs Park Location B our assessment of the risk is based on remedial work underway that includes removal of loose and fractured rocks from the face and placement of a concrete barrier along the western side of the road.

Barnett Park Location B and C are expected to be acceptable from a slope hazard perspective provided the 10^{-6} rockfall individual life risk line is used as the eastern limit of a “no build” zone.

5 Applicability

This report has been prepared for the exclusive use of our client Ministry of Education, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions in this report are based on investigation data and information available on the ECan Canterbury Maps, Canterbury Geotechnical Database and the CCC website. The nature and continuity of subsoil away from data points are inferred and it must be appreciated that actual conditions could vary from the assumed model.

Tonkin & Taylor Ltd

Report prepared by:



Senior Engineering Geologist
Barry McDowell

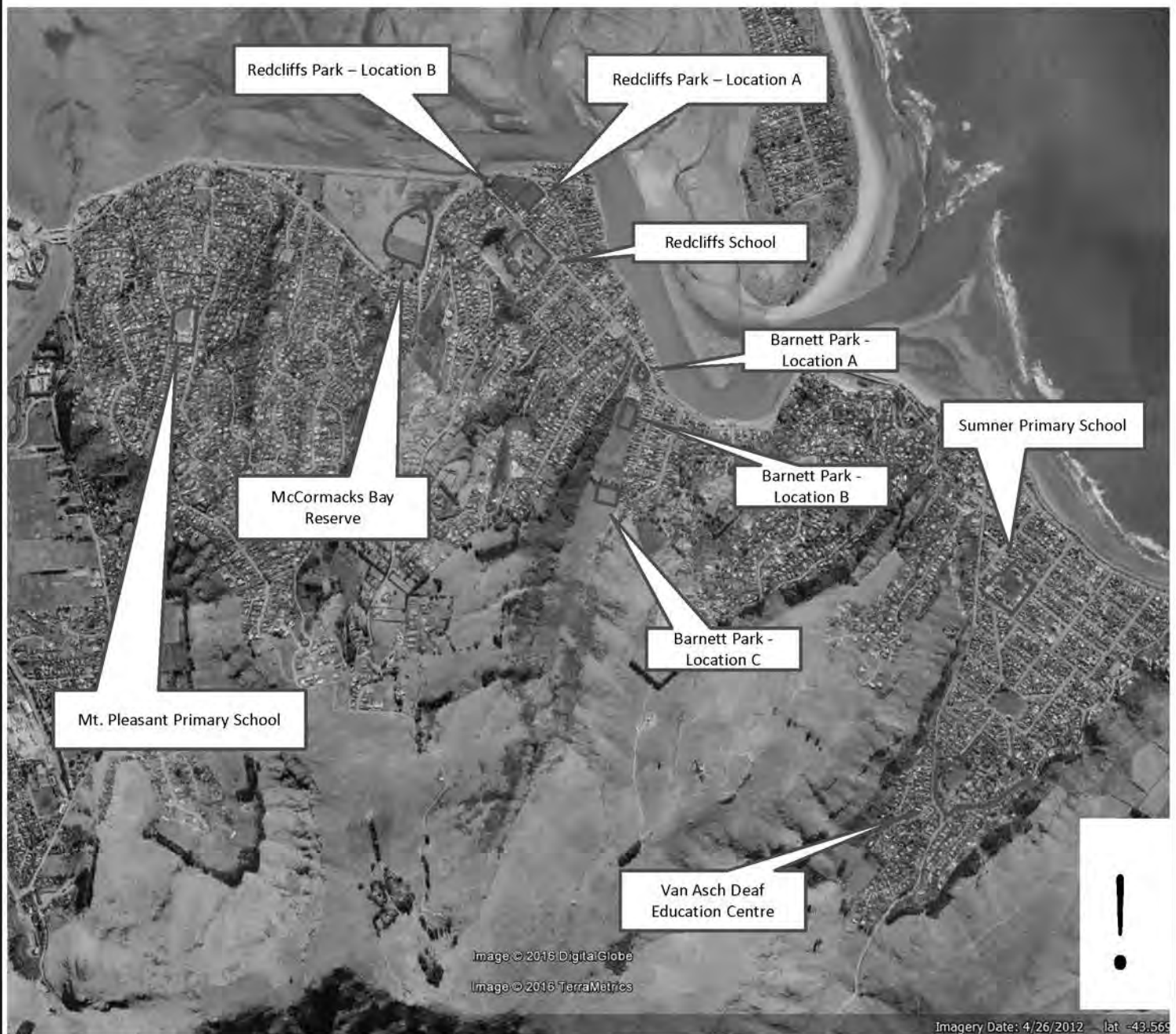
Authorised for Tonkin & Taylor Ltd by:



Gordon Ashby
Project Director

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Appendix A: Figures



Panel A: Aerial photograph.

Reference: Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1 June 2012, retrieved 15/08/2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

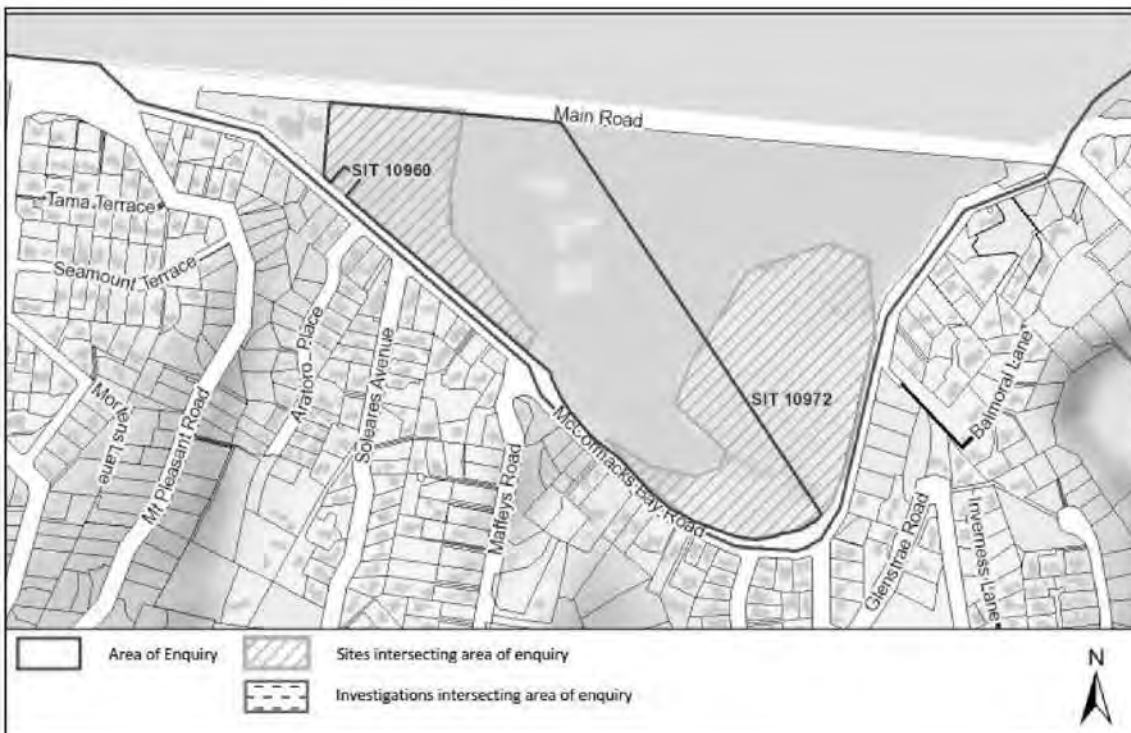


Panel A: Aerial photograph.

Reference: *Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1* June 2012, retrieved 28/07/2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

Note: Site Boundary is an approximate boundary for preliminary environmental assessment.

See Figures 5 to 7 for specific site and location boundaries.



Panel B: LLUR areas of enquiry.

Reference: *Listed Land Use Register (2016) "Property Statement from the Listed Land Use Register".*

Note: Area of Enquiry is a specific land parcel which does not always align with the school option site boundary.



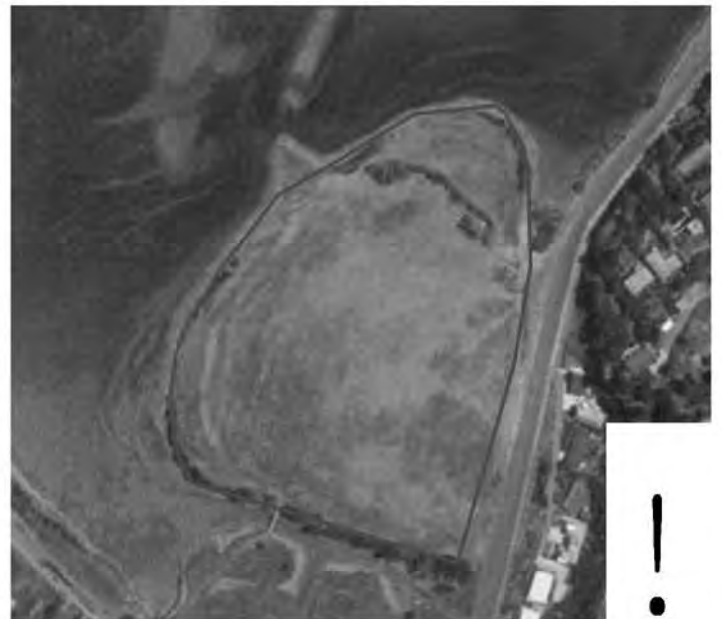
1941



1955



1973



1994

Panel C: Historic aerial photographs.

Reference: *Canterbury Maps* (2016) "Christchurch Imagery" retrieved 28/07/2016 from <http://canterburymaps.govt.nz/AdvancedViewer/>

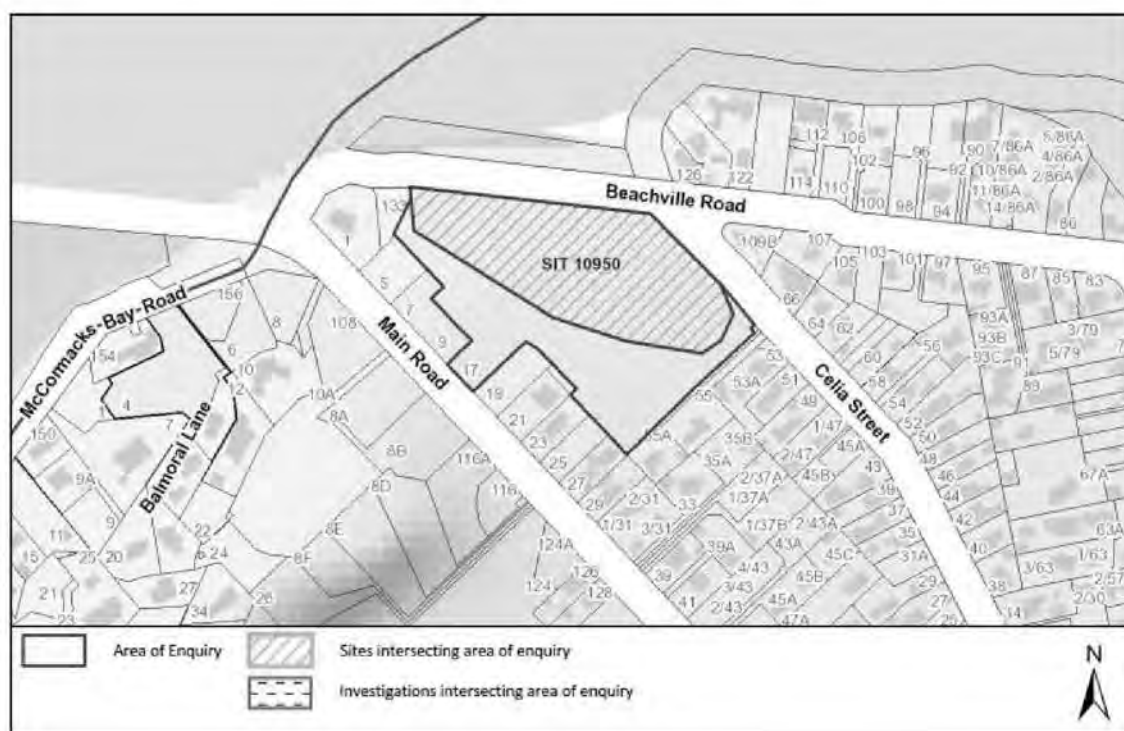


Panel A: Aerial photograph.

Reference: *Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1*
 June 2012, retrieved 28/07/2016
 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

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Panel B: LLUR areas of enquiry.

Reference: *Listed Land Use Register (2016) "Property Statement from the Listed Land Use Register"*.

Note: Area of Enquiry is a specific land parcel which does not always align with the school option site boundary.



1941



1956



1973



2004

Panel C: Historic aerial photographs.

Reference: *Canterbury Maps* (2016) "Christchurch Imagery" retrieved 28/07/2016 from <http://canterburymaps.govt.nz/AdvancedViewer/>

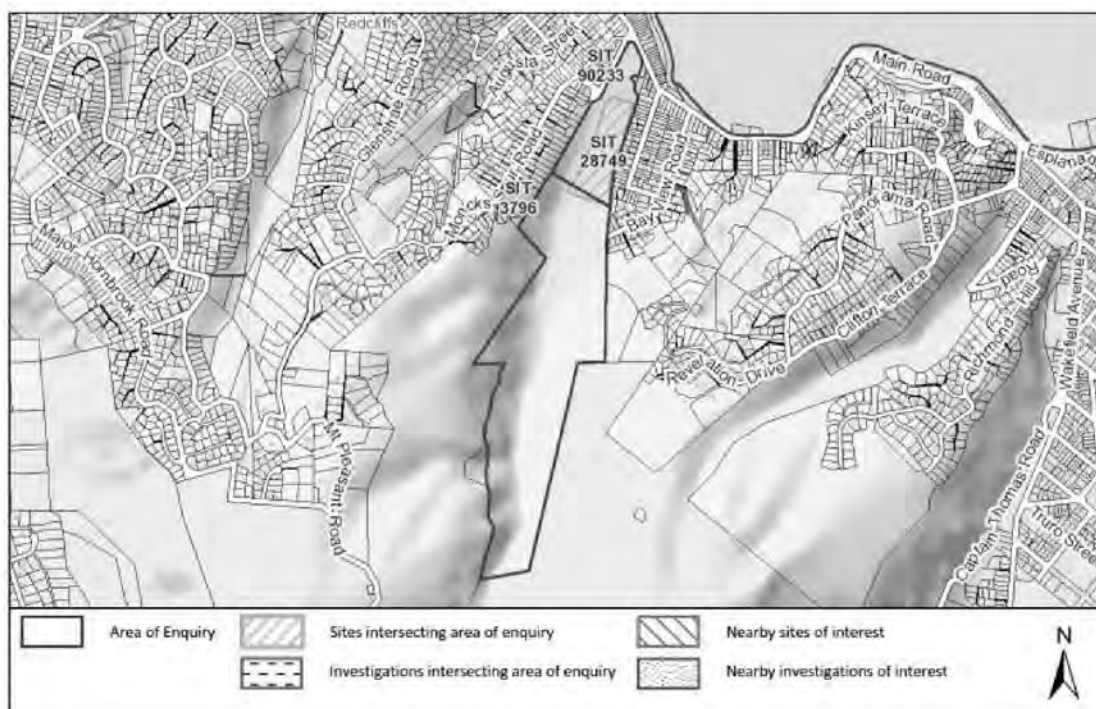


Panel A: Aerial photograph.

Reference: *Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1 June 2012, retrieved 28/07/2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*

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Panel B: LLUR areas of enquiry.

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1941



1956



1973



2004

Panel C: Historic aerial photographs.

Reference: Canterbury Maps (2016) "Christchurch Imagery" retrieved 28/07/2016 from <http://canterburymaps.govt.nz/AdvancedViewer/>



Panel A: February 2011 post – earthquake aerial photograph.

Reference: *Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1 June 2012, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectororbit.com/>*



Panel B: MBIE Residential Technical Category Zoning.

Reference: *The 'Residential Foundation Technical Categories', first published by the Ministry of Business, Innovation and Employment on 28 October 2011 and updated 5 December 2013. Canterbury Geotechnical Database - Map Layer CGD5020 - 18 Mar 2014, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectororbit.com/>*



Panel C: Observed ground cracking locations post February 2011 earthquake.

Reference: *Canterbury Geotechnical Database (2012) "Observed Ground Crack Locations", Map Layer CGD0400 - 23 July 2012, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectororbit.com/>*



Panel D: Geotechnical investigation locations -surrounding CPT locations and borehole drilling (approximately 500m radius).

Reference: Canterbury Geotechnical Database (2012) "CPT" and "BH", retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

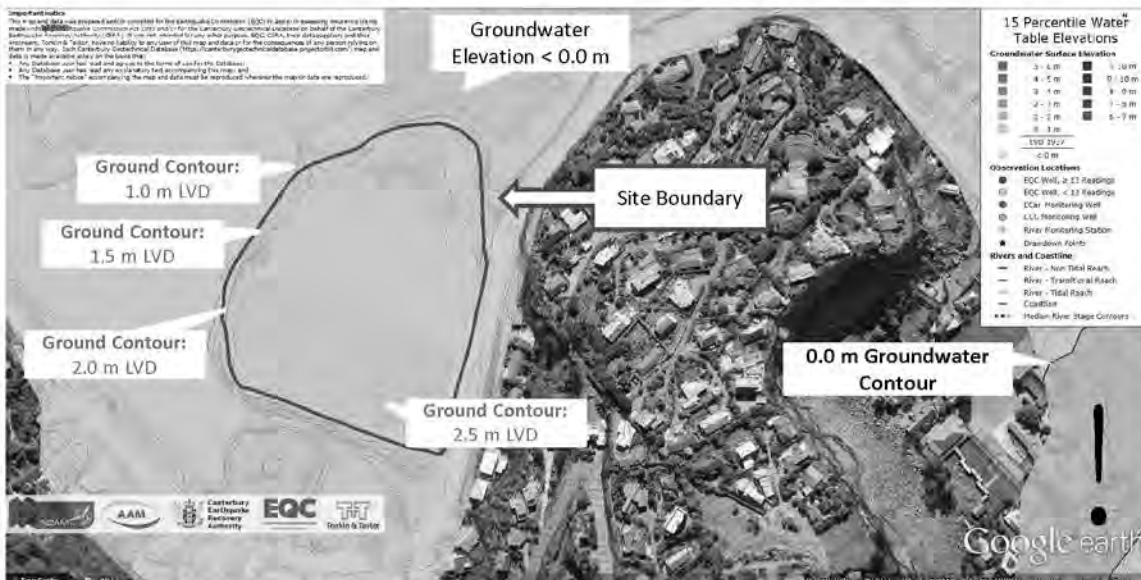
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Panel E: Change in ground surface elevation without tectonic component - 4 September to 13 June.

Reference: Canterbury Geotechnical Database (2012) "Vertical Ground Surface Movements", Map Layer CGD0600 - 23 July 2012, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel F: 15th percentile water table elevation including ground surface elevation.

Reference: Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

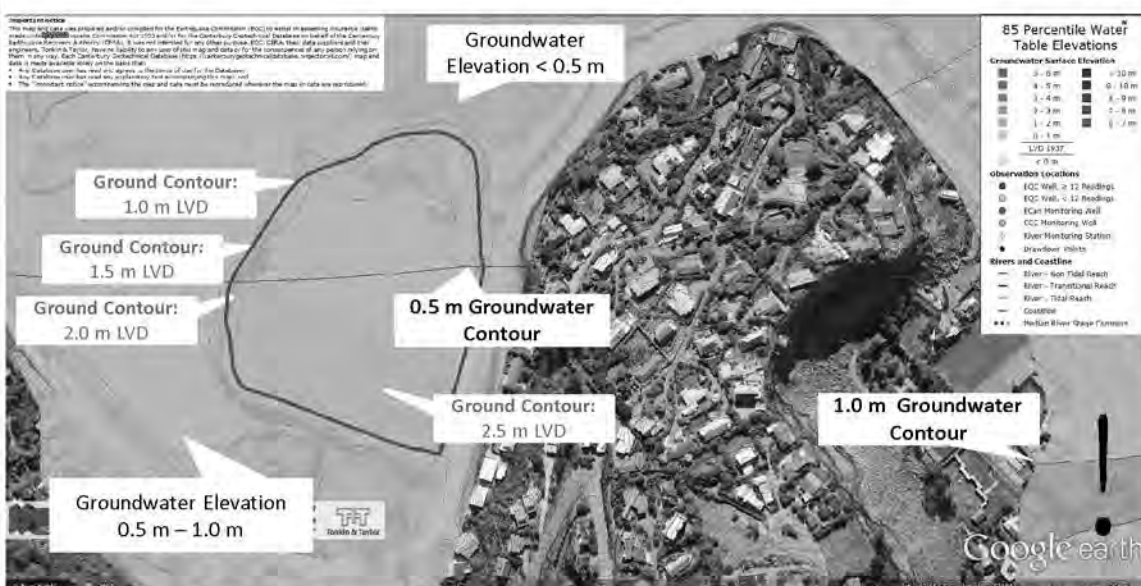
Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel G: Median water table elevation including ground surface elevation.

Reference: Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel H: 85th percentile water table elevation including ground surface elevation.

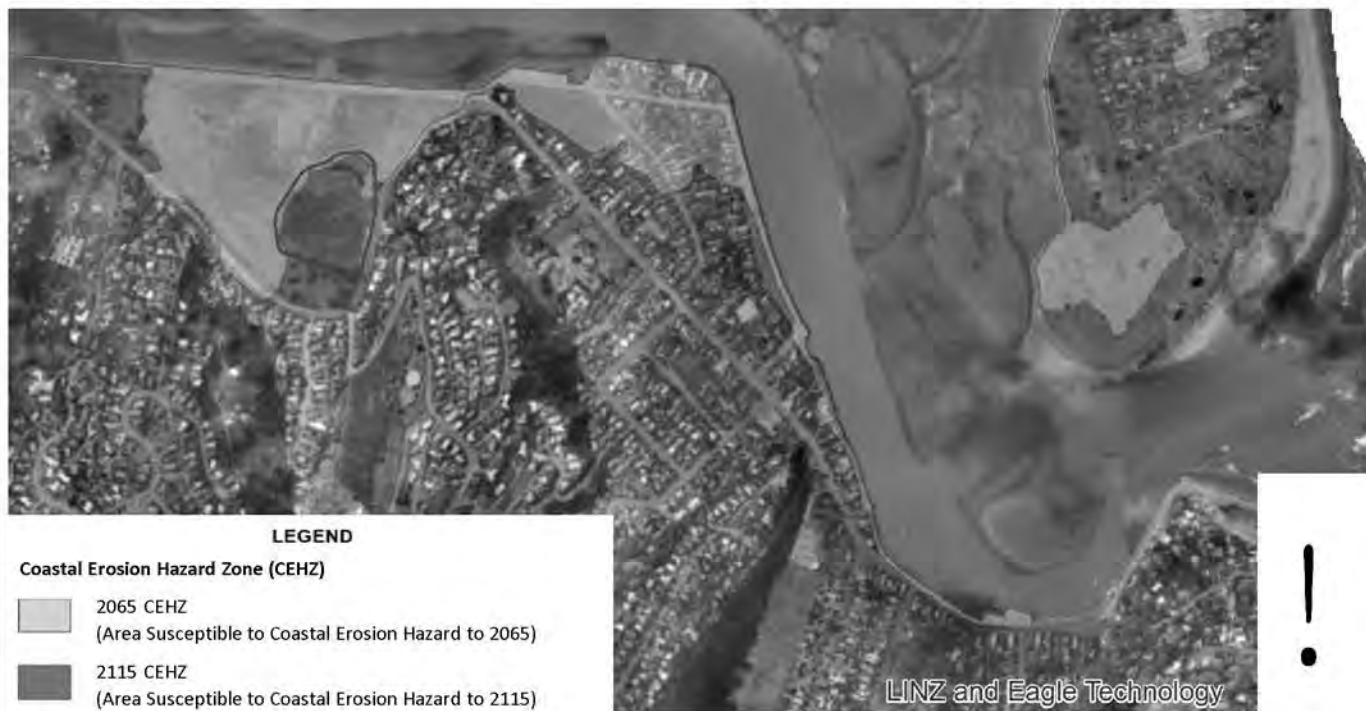
Reference: Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 28/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel I: Coastal Inundation Hazard Zone.

Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.



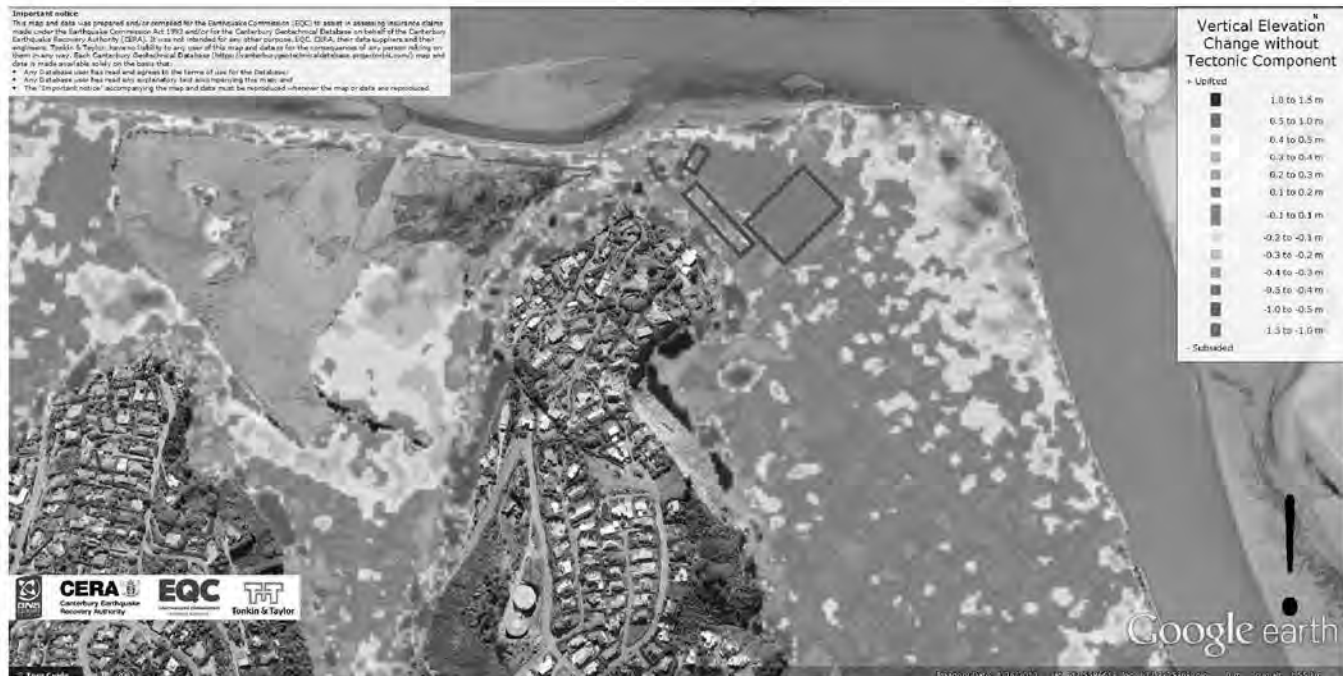
Panel J: Coastal Erosion Hazard Zone.

Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.



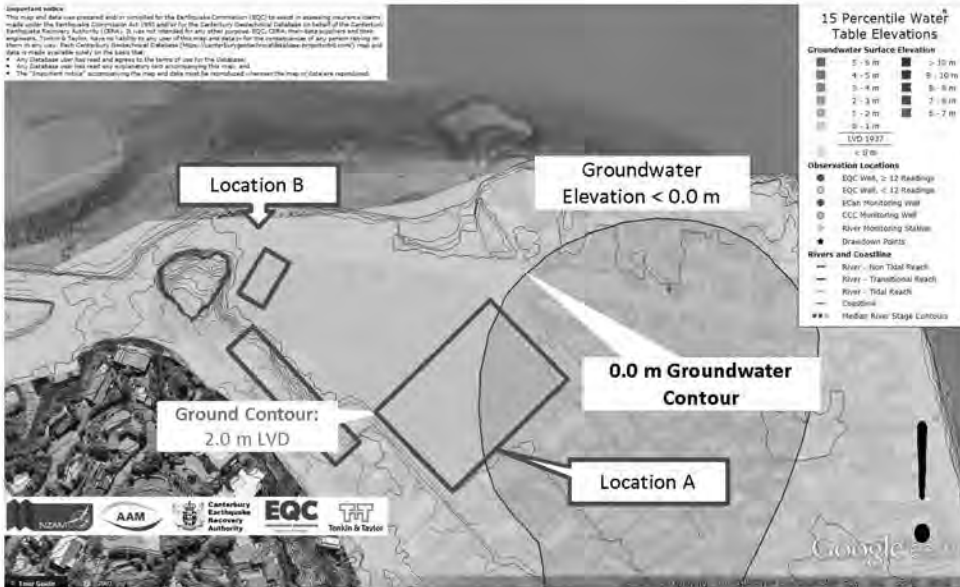
Panel D: Geotechnical investigation locations -surrounding CPT locations (approximately 20m depth) and borehole drilling.

Reference: Canterbury Geotechnical Database (2012) "CPT" and "BH", retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel E: Change in ground surface elevation without tectonic component – 4 September to 13 June.

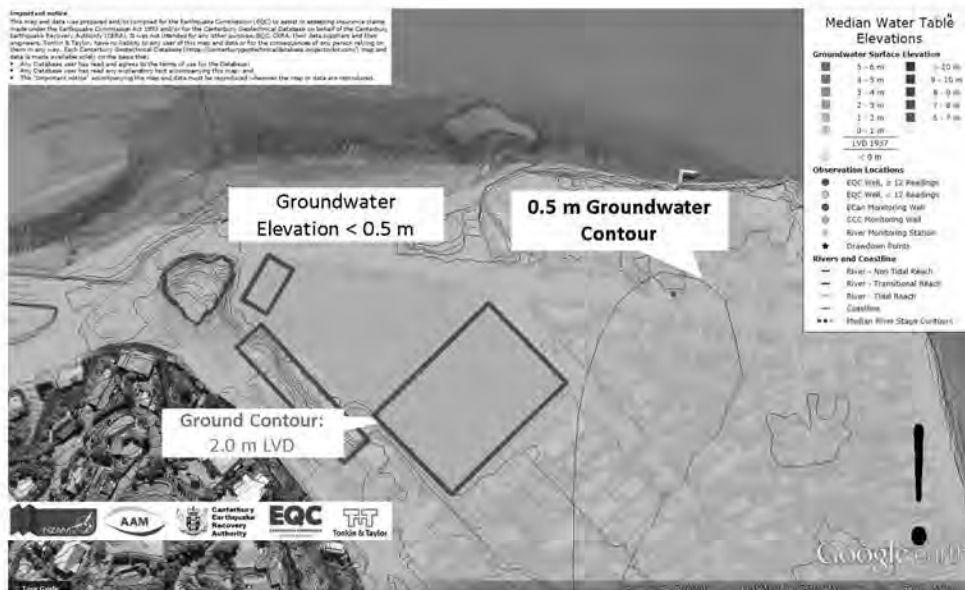
Reference: Canterbury Geotechnical Database (2012) "Vertical Ground Surface Movements", Map Layer CGD0600 - 23 July 2012, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel F: 15th percentile water table elevation including ground surface elevation.

Reference: *Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014*, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

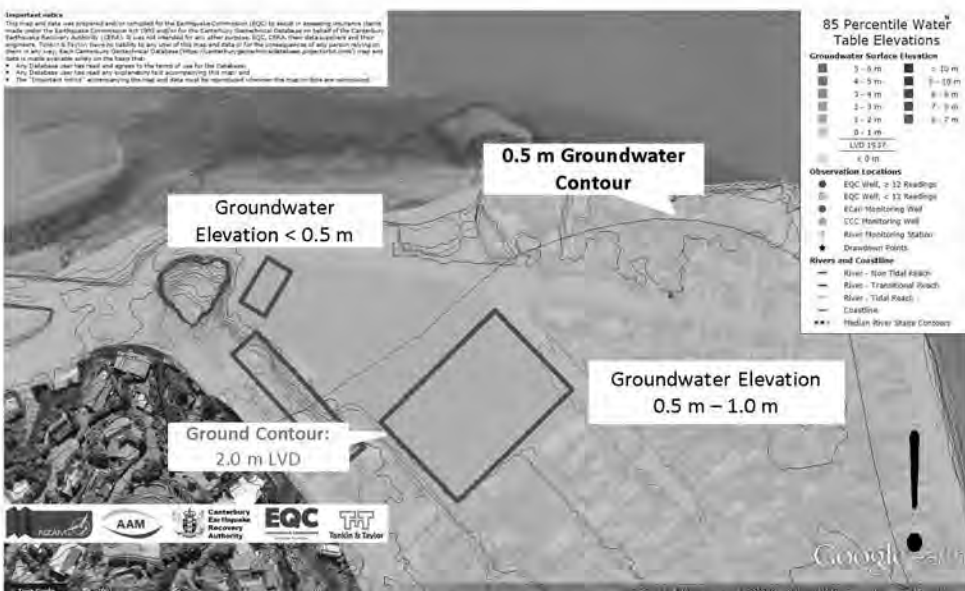
Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel G: Median water table elevation including ground surface elevation.

Reference: *Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014*, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel H: 85th percentile water table elevation including ground surface elevation.

Reference: *Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014*, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 20/07/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel I: Coastal Inundation Hazard Zone.

Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.



Panel J: Coastal Erosion Hazard Zone.

Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.



Panel A, B, C: Locations A, B and C relative to the appropriate "rock fall lives risk line" (10^{-6} / year).

Reference: *Canterbury Earthquakes 2010/2011 Port Hills Slope Stability: Life-safety risk from rock falls (boulder rolls) in the Port Hills. GNS Science Consultancy Report 2012/123, May 2013 Final Issue 2.*

Map C: Risk Model year 5 2016.

Note: The risk line is not present adjacent to Location A as there is no rock source on the slope. Soil landslides from the slope are not expected to run out beyond the access way beside Location A.



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Panel D, E, F: February 2011 post – earthquake aerial photograph.

Reference: *Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1 June 2012, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*

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Panel G: MBIE Residential Technical Category Zoning.

Reference: *The 'Residential Foundation Technical Categories', first published by the Ministry of Business, Innovation and Employment on 28 October 2011 and updated 5 December 2013. Canterbury Geotechnical Database - Map Layer CGD5020 - 18 Mar 2014, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*



Panel H: Change in ground surface elevation without tectonic component – 4 September to 13 June.

Reference: *Canterbury Geotechnical Database (2012) "Vertical Ground Surface Movements", Map Layer CGD0600 - 23 July 2012, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*

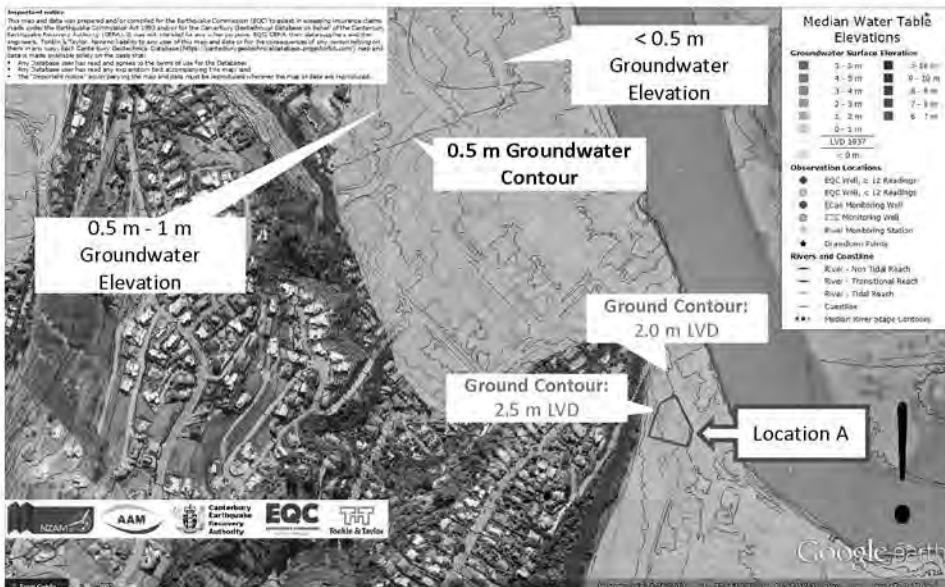


Panel I, J, K: Observed ground cracking locations post February 2011 earthquake.

Reference: *Canterbury Geotechnical Database (2012) "Observed Ground Crack Locations", Map Layer CGD0400 - 23 July 2012, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*



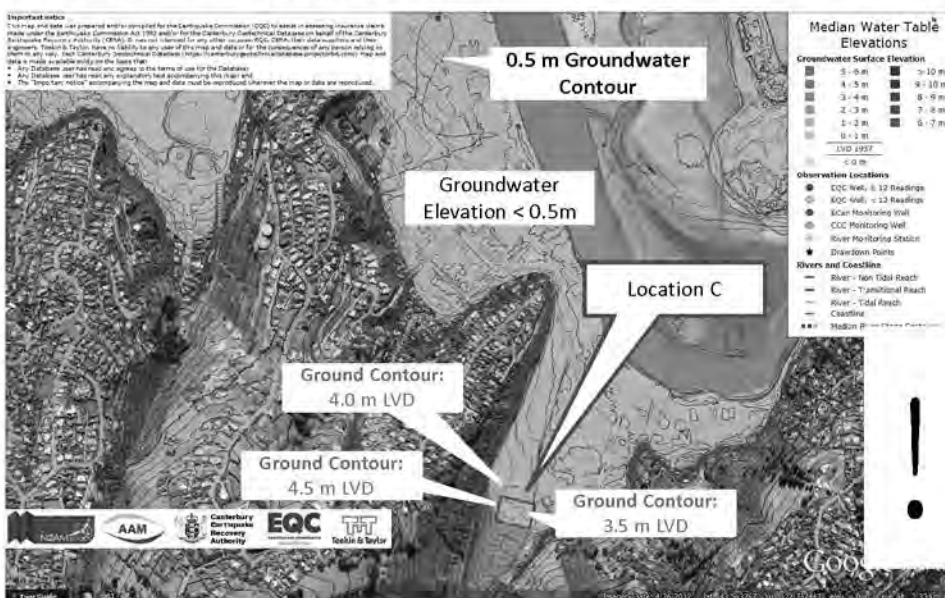
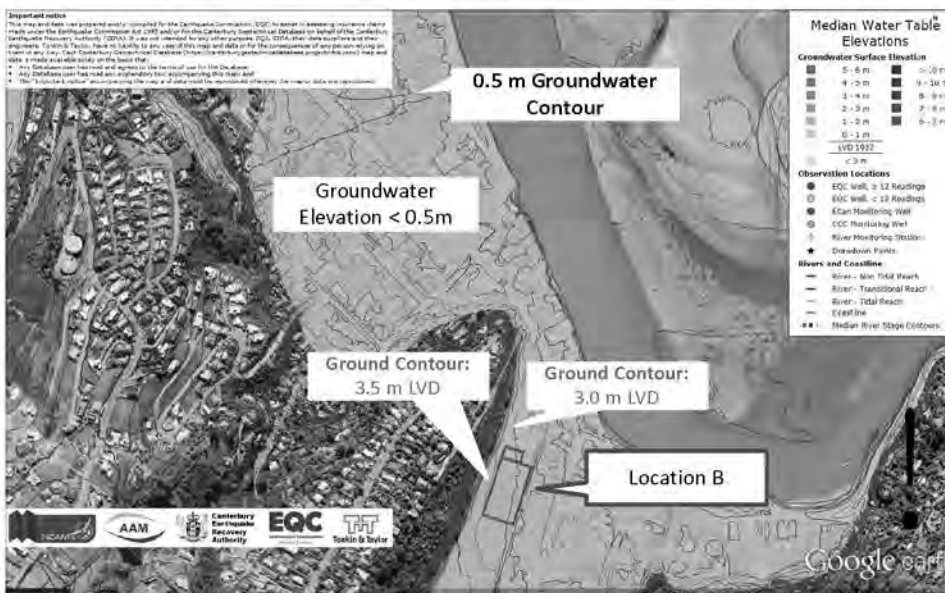
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Panel L, M, N: Median water table elevation including ground surface elevation.

Reference: *Canterbury Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 - 10 June 2014, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*

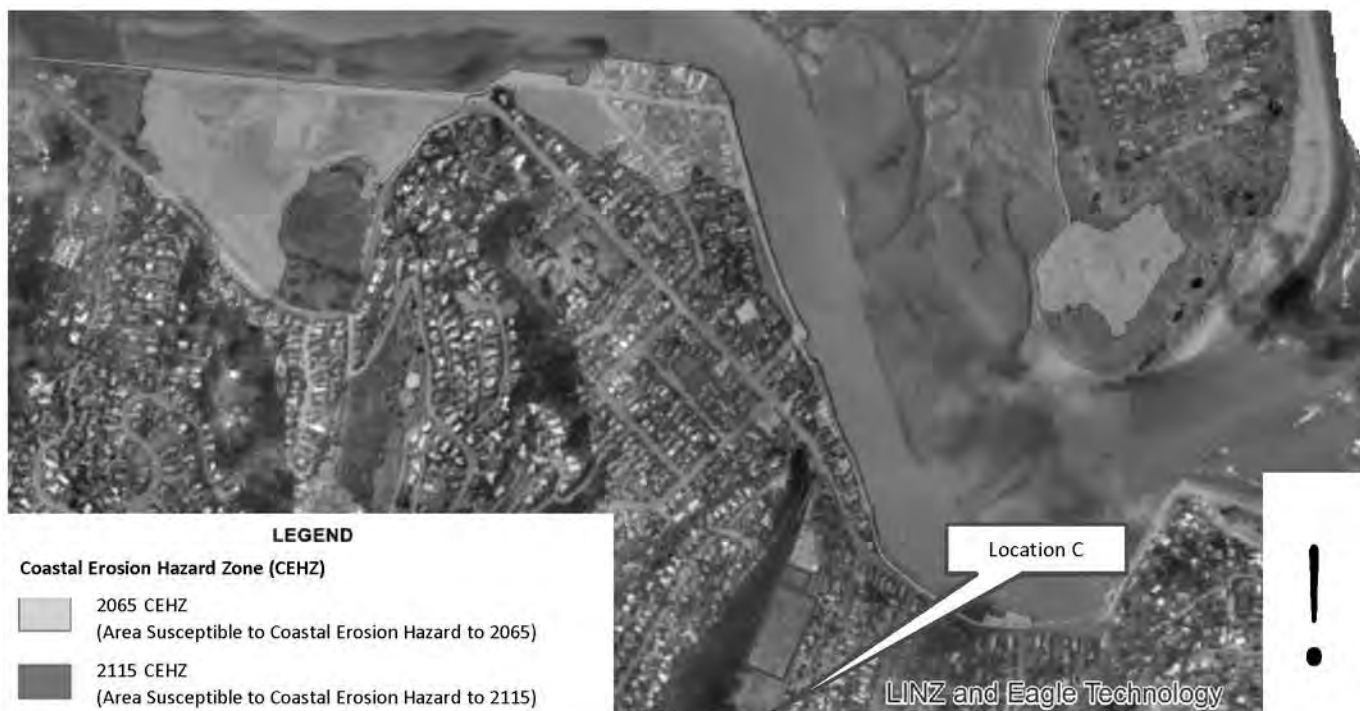
Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 08/08/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>





Panel O: Coastal Inundation Hazard Zone.

Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.



Panel P: Coastal Erosion Hazard Zone.

Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.

Appendix B: Summary Tables

Table B1: Summary Site Information

Summary Environmental information

Attribute	McCormacks Bay Reserve (site 1)	Redcliffs Park (site 37) Location A	Redcliffs Park (site 37) Location B	Barnett Park (site 38) Location A	Barnett Park (site 38) Location B	Barnett Park (site 38) Location C
Contamination Score	1	2	4	3	3	3
Legal description	Part Res 4324, part Res 4325	Res 4601, Lot 3 DP 47479		Play Ground by Main Road Part Res 4979	Main Soccer field. Part Res 4979	Up valley, part soccer field and part "wild" reserve Part Res 4979, Res 4630
ECan LLUR	<ul style="list-style-type: none"> Verified HAIL site (with activities G3 and A10). Area identified as a closed landfill #45 on CCC Landfill map. <ul style="list-style-type: none"> Moderate potential for landfill gas Moderate potential for soil contamination issues, particularly associated with domestic rubbish e.g. ash. Appears that rubbish (likely domestic) was placed on quarry waste. No records of any previous investigations at the site. Duration/volume of waste disposal at site is unknown (probably <20 years). LLUR notes indicate potential use of persistent pesticides associated with use as a sports field. <ul style="list-style-type: none"> Low to moderate potential for pesticide contamination to be present. If present likely to be found in low concentrations and in near surface soils. 	<ul style="list-style-type: none"> Verified HAIL site. Area identified as landfill #43 on CCC Landfill map. <ul style="list-style-type: none"> Low to moderate potential for landfill gas issues. Low to moderate potential for soil contamination issues, particularly associated with domestic rubbish e.g. ash. Reportedly operated between late 1940s to early 1950s and received domestic rubbish. No detailed site investigation information. Though not included on LLUR, the site is a sports field. ECan typically included school sports fields on the LLUR due to the potential for the use of persistent pesticides. <ul style="list-style-type: none"> Low to moderate potential for pesticide contamination to be present. If present likely to be found in low concentrations and in near surface soils. 	<ul style="list-style-type: none"> Not a HAIL site Not included on LLUR Although soil contamination is not expected at this site given the above, there still remains the potential for some contamination associated with residential-type land use. 	<ul style="list-style-type: none"> Verified HAIL site. Area defined from aerial photographs as a sports turf with cricket pitch and soccer field. Assigned activity A10 based on the potential for persistent pesticide use. <ul style="list-style-type: none"> Low to moderate potential for pesticide contamination to be present. If present likely to be found in low concentrations and in near surface soils. 		
Items of note from review of historical aerial photographs	<ul style="list-style-type: none"> The earliest aerial photograph shows the site to be an undeveloped part of the McCormacks Bay estuary. A rock bund/road bisects the bay and the site from north-west to south-east. By 1955 the road bisecting the site has been widened and there is evidence of filling/reclamation on the eastern side of the site. By 1965, this area of filling has increased substantially and covers approximately 1/3 of the site. By 1973, filling/earthworks are evident across the entire site footprint and by 1984 the filling appears to have been completed and the surface is now grassed. 	<ul style="list-style-type: none"> The site appears to have largely always comprised open, undeveloped land – with the exception of the south-eastern corner which appears to have inserted the gardens of residential properties. Boundary adjustment occurred by the early 1950s. Ground disturbance is apparent in the eastern half of the site in the 1946 photograph but is absent in the 1951 photograph. This ground disturbance corresponds to the period in which a landfill is reported to have operated at the site. 	<ul style="list-style-type: none"> Buildings are evident on the site since the 1941 aerial photograph. No significant building demolition noted. 	<ul style="list-style-type: none"> The earliest aerial photograph (1941) shows that the site is largely undeveloped although believed to have been used as a rifle range since at least 1926 (possibly as early as 1901). Potential for lead contamination. Presence and extent unknown. A track runs through the middle of the site from north-south. Small linear structures are present in the centre of the site. Additional small buildings are present on the site in the 1946 photograph, presumably associated with war-time activities. Evidence of ground disturbance in the south of the site. Small buildings in the north of the site have been removed by the time of the 1951 photograph although 2 larger buildings remain. South of the site is used for sheep grazing. All structures appear to have been removed by the time of the 1965 photograph. Sports fields have been formed. Stormwater drain constructed along eastern edge of site. In the 1973 photograph, a large square area appears to have been sealed, though this has been removed by the time of the 1984 photograph. 		

Table B1: Summary Site Information

	<ul style="list-style-type: none"> A small building (in the location of the present-day toilet block) has been constructed in the north-east of the site by 1994 and the site appears to be used as a sports field/reserve. Nature of fill material cannot be ascertained from photographs but it is possible that waste may be present beneath the entire site. Nature and extent of filling will impact on building foundations and will require more extensive investigations than other sites. 	<ul style="list-style-type: none"> The site remained relatedly unchanged from 1951 onwards until the development of a play area by the time of the 2004 photograph. 		<ul style="list-style-type: none"> By the 1984 photograph a parking area has been constructed in the north of the site. Cricket wickets are evident in the centre and south. There is no apparent change to the site layout by the 2009 photograph. The 2011 photograph shows that a building has been constructed adjacent to the north eastern corner of the site car park.
Other sources of information				Nearby caves have been the source of archaeological artefacts – potential for similar to be present on site although most of the surface area has now been disturbed.

Table B1: Summary Site Information

Summary Geotechnical/Flooding

Attribute	McCormacks Bay Reserve (Site 1)	Redcliffs Park (site 37) Location A	Redcliffs Park (site 37) Location B	Barnett Park (site 38) Location A	Barnett Park (site 38) Location B	Barnett Park (site 38) Location C	Comments
Geotechnical Score	1	2	4	3	3	4	
Indicative liquefaction-related index settlements (mm)	30 – 150 at SLS 100 – 200 at ULS	20 – 40 at SLS 80 – 110 at ULS	< 50 at SLS < 100 at ULS	10 – 20 at SLS 80 – 100 (ULS)	10 – 20 at SLS 80 – 100 (ULS)	No data available (up valley location transition between sand and silt soils)	<p>McCormacks Bay Reserve has the highest potential for liquefaction-related ground impacts. Significant liquefaction ejecta and lateral spread cracking noted in Feb 2011. Will likely require specific engineering input into foundation design, which is also impacted by the flood level and the need to raise the floor elevation well above existing ground level. Could treble cost of foundations (or more).</p> <p>Redcliffs Park Location A and has a high potential for liquefaction-related ground impacts. Will likely require specific engineering input into foundation design, which is also impacted by the flood level and the need to raise the floor elevation well above existing ground level. Could treble cost of foundations (or more).</p> <p>Barnett Park Location A Moderate liquefaction potential, elevation similar to Redcliffs Park, some lateral spread potential closer to estuary.</p> <p>Redcliffs Park Location B, Barnett Park locations B & C have relatively straight forward foundation requirements.</p>
Indicative liquefaction-related free field reconsolidation settlements for full investigation depth	60 -250 at SLS 130 - >400 at ULS	20 -90 at SLS 160 - >300 at ULS	20 – 60 at SLS 120 – 140 at ULS	80 – 110 at SLS 150 – 200 at ULS	80 – 110 at SLS 150 – 200 at ULS	No data available	
Equivalent MBIE residential foundation technical categorisation	TC3-like (mainly due to potential for lateral spread/stretch)	More TC3-like	More TC2-like	More TC3-like (lower elevation and some potential for lateral spread)	More TC2-like	TC2-like	
Typical LSN ranges	10 – 50 at SLS 40 – 80 at ULS	5 – 15 at SLS 25 – 30 at ULS	< 5 at SLS < 20 at ULS	< 5 at SLS ~ 25 at ULS	< 5 at SLS ~ 25 at ULS	< 5 at SLS < 20 at ULS Thicker crust and silt soils	<p>LSN < 5: negligible ground damage expected</p> <p>LSN between 6 – 20: minor to moderate land damage expected</p> <p>LSN between 21 – 35: moderate land damage expected</p> <p>LSN > 35: moderate to severe land damage expected</p>
Rockfall hazard	n/a	n/a	10 ⁻⁶	n/a	minor	n/a	<p>Barnett Park Location B has minor rockfall/debris flow hazard. Individual lives risk line identified at 1 x 10⁻⁶, which represents "no build" zone for current planning purposes.</p> <p>Redcliffs Park Location B has the continuation of the Redcliffs School 1 x 10⁻⁶ Individual lives risk line encroaching about 4m onto the properties along Main Road. Cliff remediation (scaling) works underway for the transport corridor are expected to reduce risk and 'move' the 10⁻⁶ line to the SW away from the property boundary. Christchurch District Plan Cliff Collapse Management Area 2 is coincident with the 10⁻⁶ risk line. To complying with District Plan rules and obtain a consent to build in this area will require a site specific risk assessment report, peer review and agreement by CCC. This process will add significant time (months) to schedule and additional uncertainty in gaining the necessary consents.</p> <p>The sites are not within identified CCC/GNS slope mass movement instability zones.</p>
Cliff collapse/debris flow hazard	none	none	10 ⁻⁶	none	minor	none	

Table B1: Summary Site Information

Topography Score	5	5	5	5	5	5	All sites relatively flat. No implications for foundation cost.
Average/indicative site slope (%) (note that 1 in 10 = 10%)	0.75	0.5	1.2	0.5	1.4	1 to 2	
Median groundwater elevation (mLVD)	0.4	0.4	0.4	0.5	1.0	2.0	
Median depth to groundwater below ground level	1.6	1.4	4.1	1.5	2.0	2.0	Groundwater not expected to be encountered for "typical" service trench construction.
Flooding Score	1	1	3	1	2	3	Surface flooding reduces score for Barnett Park location B and C
Average ground surface elevation (mLVD)	2.0 (SW quadrant at 2.5)	1.8	4.5	2.0	3.0	4.0 to 5.0	
Flooding: Interim Floor Level (mLVD), modelled 200 year flood level plus 0.4m	3.277 (12.32 mCDD)	3.317 (12.36 mCDD)	3.317 (12.36 mCDD)	3.317 (12.36 mCDD)	3.317 (12.36 mCDD)	3.317 (12.36 mCDD)	<p>Redcliffs Park site requires floor level to be ~1500 mm above current ground surface elevation.</p> <p>McCormacks Bay Reserve requires floor level to be ~1500 mm (in the north) to 1000mm (in the south) above current ground surface elevation.</p>
CCC Flood Management Area (FMA)	Yes	Yes	No	Yes	Yes	No	<p>Barnett Park Location A requires floor level to be ~1500 mm above current ground surface elevation.</p> <p>Barnett Park Location B and C have a history of surface flooding from the upslope valley. Potential upgrade required of existing open swale and bunding.</p>
Storm tide level	1.8 mLVD for 50 yr 1.85 mLVD for 100 yr		1.8 mLVD for 50 yr 1.85 mLVD for 100 yr				Redcliffs Park Location A, McCormacks Bay Reserve and Barnett Park Location A ground surface elevations are close to storm tide water level so may be exposed to minor impacts from severe storm tide/surge.
Coastal inundation and erosion hazard¹	i = to 2065 e = to 2065	i = to 2065 ¹ e = to 2065 ¹	i = n/a e = 2115	i = to 2065 e = to 2065	i = to 2115 e = n/a	n/a	<p>Redcliffs Park Location A, McCormacks Bay Reserve and Barnett Park Location A potentially affected in next 50 years.</p> <p>Coastal inundation levels to 2065 and 2115 is similar to the 1 in 100 yr and 1 in 200yr flood levels, respectively.</p>
Indicative tsunami inundation	4 – 5 m at 500 yr 6 – 7 m at 1,000 yr 7 – 8 m at 2,500 yr	4 – 5 m at 500 yr 6 – 7 m at 1,000 yr 7 – 8 m at 2,500 yr	1 – 2 m at 500 yr 3 – 4 m at 1,000 yr 4 – 5 m at 2,500 yr	4 – 5 m at 500 yr 6 – 7 m at 1,000 yr 7 – 8 m at 2,500 yr	3 – 4 m at 500 yr 5 – 6 m at 1,000 yr 6 – 7 m at 2,500 yr	1 – 2 m at 500 yr 3 – 4 m at 1,000 yr 4 – 5 m at 2,500 yr	Redcliffs School site and Barnett Park Location C are the highest elevation and therefore least exposure to tsunami hazard.

Note 1. Coastal inundation and erosion hazards: i = inundation, e = erosion

'to 2065' is land potentially affected by inundation or erosion from 2015 to 2065 (land below 2.6 mLVD)

'to 2115' is land potentially affected by inundation or erosion from 2065 to 2115 (land below 3.3 mLVD)

Table B1: Summary Site Information

Summary Services Infrastructure

Attribute	McCormacks Bay Reserve (Site 1)	Redcliffs Park (site 37) Location A	Redcliffs Park (site 37) Location B	Barnett Park (site 38) Location A	Barnett Park (site 38) Location B	Barnett Park (site 38) Location C	Comments
Potable water supply (proximity and capacity)	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply remote from site, capacity expected to be adequate	Supply remote from site, capacity expected to be adequate	Barnett Park Location B may need to run services 200 m. Barnett Park Location C may need to run services 100 m.
Score	0.4	0.4	0.4	0.4	0.1	0.2	
Sewer network (proximity and capacity)	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply remote from site, capacity expected to be adequate	Supply remote from site, capacity expected to be adequate	Redcliffs Park Location B has wastewater rising main (and presumably easement) running through middle of the park, which may constrain development. Redcliffs Park Location A not currently impacted, but wastewater rising main could constrain future expansion.
Score	0.4	0.4	0.4	0.4	0.2	0.2	
Stormwater (proximity and capacity)	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Easement is proximate to site, capacity expected to be adequate	Easement is proximate to site, capacity expected to be adequate	Barnett Park locations have a major stormwater easement along eastern site boundary. Barnett Park Location B has an additional Orion easement identified running through proposed building footprint area. All sites will likely require on-site stormwater detention – suggest some sort of allowance for treatment such as rain garden, swale, storm filter.
Score	0.4	0.4	0.4	0.4	0.4	0.4	
Fire water supply (proximity and capacity)	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply proximate, capacity expected to be adequate but not yet quantified.	Supply remote from site, capacity expected to be adequate	Supply remote from site, capacity expected to be adequate	Capacity of existing water supply not tested. Experience tends to suggest that supply may be constrained for all sites.
Score	0.4	0.4	0.4	0.4	0.1	0.2	
Total	1.6	1.6	1.6	1.6	0.8	1.0	

Table B1: Summary Site Information

Summary of 1 to 5 Scores

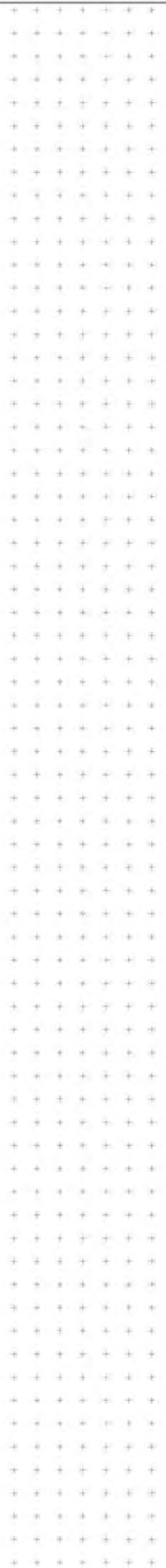
Site	McCormacks Bay Reserve	Redcliffs Park Location A	Redcliffs Park Location B	Barnett Park Location A	Barnett Park Location B	Barnett Park Location C	Comments
Contamination Score	1	2	4	3	3	3	No contamination issues expected at Redcliffs Park Location B, so scores highest.
Geotechnical Score	1	2	4	3	3	4	No sites are TC1, so none score 5.
Topography Score	5	5	5	5	5	5	All flat sites so score high.
Flooding Score	1	1	3	1	2	3	Surface flooding reduces score for Barnett Park Location B and C.
Services (3 waters) Score	1.6	1.6	1.6	1.6	0.8	1	Barnett Park Location B and C score reduced due to >100m distance to run new services.

Table B2: Summary of liquefaction analysis results from existing investigation data

	Settlement (mm) - 15th percentile; top 10m index			
	CPT (CGD ID)	SLS A	SLS B	ULS
Redcliffs Park Location A	5458	17 (84)	37 (95)	114 (360)
Redcliffs Park Location B	55961	11 (15)	17 (19)	85 (162)
Barnett Park Location A	33480	24 (83)	39 (98)	109 (197)
Barnett Park Location B	11154	9 (28)	14 (33)	84 (149)
Barnett Park Location C	No relevant data nearby	-	-	-
McCormacks Bay Reserve	5420	103 (204)	162 (256)	222 (498)
	44183	27 (28)	57 (58)	122 (129)

	LSN – 15th percentile; top 10m index			
	CPT (CGD ID)	SLS A	SLS B	ULS
Redcliffs Park Location A	5458	5 (9)	16 (19)	31 (45)
Redcliffs Park Location B	55961	2 (2)	4 (4)	25 (31)
Barnett Park Location A	33480	4 (7)	7 (11)	19 (24)
Barnett Park Location B	11154	2 (3)	3 (4)	22 (26)
Barnett Park Location C	No relevant data nearby	-	-	-
McCormacks Bay Reserve	5420	24 (30)	44 (50)	61 (76)
	44183	8 (8)	20 (20)	38 (39)

() – value for full depth.



Appendix 7: Abley Transportation Consultants Report

*Redcliffs School – Alternative Sites
Transportation Assessment
Ministry of Education*

Redcliffs School – Alternative Sites Transportation Assessment Ministry of Education

Quality Assurance Information

Prepared for: Ministry of Education
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Date issued	Status	Approved by
10 August 2016	Draft	Jeanette Ward
17 August 2016	Final Draft	Jeanette Ward
12 September 2016	FINAL	Jeanette Ward

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Executive Summary

The Ministry of Education commissioned Abley Transportation Consultants Ltd to investigate alternative primary school sites in the suburb of Redcliffs, Christchurch. A number of sites have been assessed from a transportation perspective, these being:

- Site 1 – McCormacks Bay Reserve
- Site 37 – Redcliffs Park
 - Location A – Redcliffs Park - on the park
 - Location B – Redcliffs Park – between Main Road and park
- Site 38 – Barnett Park
 - Location A – Barnett Park – adjacent to Main Road
 - Location B – Barnett Park - south of the car park
 - Location C – Barnett Park – south of the park

The assessment takes into account access by walking, cycling, bus and car. The assumed level of private motor vehicle use is considered in the transport network assessment whereas the other modes are assessed to determine how well they are catered for in the current transport environment in terms of existing infrastructure and safety. Assumptions regarding the direction of travel of the motor vehicle trips, plus those already on the network (where no intersection count data is available), have been made to allow intersection assessments to be undertaken where considered appropriate. The intersection assessments are purely indicative but help inform the overall assessment with respect to potential transport network infrastructure changes that may be needed to support a school on the sites.

The transport assessment is based on a maximum school roll of 400 students. The existing Redcliffs School zone is used as the catchment for school trips. It is acknowledged that student enrolments may come from 'out of zone' students however this is assumed to be a small proportion of the roll and therefore will not impact the assessment greatly. The breakdown of how student trips to and from the sites would occur is difficult to quantify with any accuracy without travel survey results specific to the Redcliffs School. On this basis New Zealand Household Travel Survey data (2003 to 2010) has been used to assume a travel mode split, and equates to 68% of school trips made by private motor vehicle and the remainder by either walking, cycling or public transport. This doesn't seem unreasonable given the catchment is a mix of flat and hilly residential areas.

The assessment takes into account that the existing transport environment is not necessarily indicative of the future as since the 2010 and 2011 earthquakes traffic patterns have been disrupted. For example, with the closure of the Evans Pass Road route, which was also an over dimension vehicle route, there is no traffic using Main Road through Redcliffs as a through route to Lyttelton. The current traffic volume on Main Road is approximately 16,500 vehicles per day, whereas prior to the earthquakes it was approximately 18,000 vehicles per day.

Main Road in the vicinity of the Barnett Park and Redcliffs Park sites is part of the Main Road Master Plan (CCC, 2014) which is in various stages of implementation. The Coastal Pathway route (an off road shared path for walking and cycling) is near two of the sites - it is constructed in the vicinity of Redcliffs Park but not in the vicinity of Barnett Park.

There are two transport related criteria in the Ministry of Education Stage Two Site Evaluation; road frontage and transport network. The scores assigned to each option are shown in Table E1 below. The scores are based on 5 being the highest where a site meets or exceeds the criterion and 0 being the lowest where a site fails the criterion.

The Redcliffs Park sites scored the highest based on the evaluation criterion. The Barnett Park sites scored the lowest based on the evaluation criterion, with Location C the overall lowest scoring. None of the sites score a 0 however there are likely to be infrastructure works required to address some capacity and access issues raised in the assessment. These issues and any potential changes to infrastructure would need to be discussed with the road controlling authority (the Christchurch City Council). The findings of the assessment for each option is summarised below in **Table E1**.

Table E1

Site Option	Road frontage (Access flexibility)	Transport Network (Level of servicing)
Site 1 – McCormacks Bay Reserve	Score=2 Only one road frontage and some flexibility on where access can be located	Score=4 Can be serviced by all modes, activity spread along frontage of low volume road
Site 37 - Redcliffs Park Location A - on park	Score=3 Two road frontages and flexibility over where the access can be located	Score=4 Can be serviced well by all modes, activity spread across network and low volume frontage roads
Site 37- Redcliffs Park Location B - between Main Road and park	Score=4 Three road frontages, however car park vehicle access from Main Road unlikely to be feasible due to level difference	Score=4 Can be serviced well by all modes, activity spread across network and two low volume roads, and one high volume frontage road
Site 38 - Barnett Park Location A – adjacent to Main Road	Score =1 Only one legal road frontage and limited options on where access can be located	Score=3 Can be serviced by all modes however activity concentrated along short frontage of busy road
Site 38 - Barnett Park Location B - south of the car park	Score =1 Only one legal road frontage and limited options on where access can be located	Score=3 Can be serviced by all modes however activity concentrated along short frontage of busy road
Site 38 - Barnett Park Location C - south end of park	Score =1 Only one legal road frontage and limited options on where access can be located	Score=2 Can be serviced by all modes however increased walk/cycle distance from Main Road, vehicle activity concentrated along local residential street.

Site 1 – McCormacks Bay Reserve

The reserve currently features a large greenspace with rugby fields and a toilet block with changing rooms. The site has one long road frontage that could facilitate vehicle access.

The site can be reached by motor vehicle via McCormacks Bay Road from both directions. Pedestrian access to the site is available along the road frontage and also via pedestrian tracks off McCormacks Bay Road at the south and north ends of the reserve. There are no crossing facilities on McCormacks Bay Road for pedestrians, cyclists and bus passengers in the vicinity of the site.

McCormacks Bay Road in the vicinity of the site is a two-way, two-lane road with parallel parking, bus stop and footpath on the east side and angle parking bays, a bus turn-around bay and footpath on the west side of the road.

The 140 Russley/Mt Pleasant public bus service operates on McCormacks Bay Road, starting and finishing at the north end of the site. There is an indented bus turn-around area on the west side of the road at the north end of the site to facilitate bus access to the bus stop on the east side of the road. It is likely that buses layover in the bus stop on the east side of the road until the city-bound service is due to commence. There is a formed vehicle access for ambulances located between the angle parking and bus turnaround area.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety. These are:

- Students walking and cycling from the west side of the Redcliffs School zone would be on the south/east side of McCormacks Bay Road and therefore would require crossing facilities to access the school on the opposite side of the road. Suitable crossing locations and types of facility would need to be determined.
- Students walking and cycling from the east side of the Redcliffs School zone will also require consideration in terms of crossing facilities. For example, children using the footpath on the west side of Main Road will be able to walk to the site via the footpath on the east of McCormacks Bay Road but would need to cross the road to access the site.
- Access from the Coastal Pathway on the north side of Main Road, which is accessed from the Beachville Road section of the pathway into McCormacks Bay Road would need to be carefully considered given the traffic volumes on Main Road.
- If the two pedestrian tracks off McCormacks Bay Road, at the south and north ends of the reserve, were to be formalised as school pedestrian accesses a CPTED¹ friendly route would need to be established given the vegetation present alongside both routes.
- Any charter buses used for school trips could either drop-off and pick-up from adjacent road frontage, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.
- The road along the frontage of site is wide and unmarked, is likely to encourage higher vehicle speeds than desirable past a school, and would require consideration in terms of appropriate traffic calming and/or a reduced speed limit at school start and finish times.
- The intersection of Main Road with McCormacks Bay Road (east end) would require further investigation from an efficiency and safety perspective as vehicles leaving the school to return to

¹ Crime Prevention Through Environmental Design

Redcliffs east experience delays and potentially block the exit for left turning vehicles as the traffic lane is 6m wide at this location. A crossing facility for walking and cycling access between McCormacks Bay Road and Beachville Road would most likely be required at this location.

- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up, therefore the provision of appropriate walking access between these on-street parking zones and the school site would be required.
- The location of the access to the school car park will require consideration in terms of its impact on the bus turning bay, existing car parking and access for ambulances if rugby games continue to be held on the reserve at weekends.

Site 37 - Redcliffs Park

Redcliffs Park is located to the north east of Main Road at the north end of Redcliffs. The park currently features a large greenspace with two football fields, a playground and a toilet block. The park has two road frontages that could facilitate vehicle access.

The park can be reached by motor vehicle via Beachville Road (east and west) and Celia Street (south). Pedestrian access to the site is available from Beachville Road and Celia Street park frontages. There is also a formed pedestrian access off Main Road but no vehicle access from Main Road.

Beachville Road in the vicinity of the park is currently being reconstructed and the design is consistent with the proposal in the Main Road Master Plan. The design includes eight on-street parallel park spaces along the site frontage. Beachville Road provides access for boats to launch at the ramp on the opposite side of the road to the park therefore a recessed boat trailer parking area on the north side of the street has been created.

Celia Street is a quiet residential street with an unsealed area of 90 degree angle parking along the park frontage. The Main Road Master Plan shows this area as being formalised with line marking so it is assumed that this area will be sealed and marked in the future.

Main Road adjacent to the pedestrian access comprises of a traffic lane in each direction, no parking and a footpath on the east side of the road. The west side of the road still features post-earthquake concrete barriers and shipping containers. It is assumed that eventually the road will be reconstructed as per the Main Road Master Plan.

The Metro Purple Line public bus service operates on Main Road with the bus stops located to the north and south of the park's pedestrian access on Main Road.

Site 37 - Location A - Redcliffs Park (on the park)

This option involves a school being located on the park (east side). Vehicle access could be from either Celia Street or Beachville Road.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety. These are:

- A crossing facility for pedestrians and cyclists on the west side of Main Road accessing the current pedestrian access into Redcliff Park would need to be considered as it is likely that some students in the adjacent residential areas to the west of Main Road would walk and cycle to use this access.
- Any charter buses used for school trips would need to either drop-off and pick-up from adjacent road frontages, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.

- Ensuring that vehicle access into and out of Beachville Road (north end) from Main Road is managed, in particular the right turns into Beachville Road as any queuing will mean the City-bound Main Road traffic will use the on-road cycle lane to pass the right turning traffic.
- Vehicle access onto Main Road from Beachville Road (north end) is likely to result in some queuing as the right turners out of Beachville Road waiting for sufficient gaps in the traffic will block the exit for left turners out of the road. This could be addressed by widening Beachville Road at Main Road to accommodate left and right turns out of the access but this needs to be balanced with the impact on pedestrians and cyclists crossing the Beachville Road intersection. Traffic signals would be another way to manage the exiting vehicles and would also facilitate a priority crossing for walking and cycling access between McCormacks Bay Road and Beachville Road, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.
- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up, therefore the provision of appropriate walking access between these on-street parking zones and the school site would be required.

Site 37 – Location B – Redcliffs Park (between Main Road and park)

This option involves the school buildings being located on land between Main Road and the park. The school car park would be located on the park which would be at a lower elevation to the buildings. Vehicle access could be from either Celia Street or Beachville Road. Vehicle access from Main Road to the car park is not likely to be feasible due to the elevation difference however access for servicing (waste collection etc.) and emergency vehicles may be possible from Main Road.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are:

- A crossing facility for pedestrians and cyclists on the west side of Main Road accessing the school on the east side of the road would need to be considered as it is likely that some students in the adjacent residential areas to the west of Main Road would walk and cycle to the school.
- Any charter buses used for school trips would need to either drop-off and pick-up from adjacent road frontages, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.
- Ensuring that vehicle access into and out of Beachville Road (north end) from Main Road is managed, in particular the right turns into Beachville Road as any queuing will result in City-bound Main Road traffic encroaching on the on-road cycle lane to pass the right turning traffic.
- As with Location A vehicle access between Main Road and Beachville Road (north end), and Main Road and McCormacks Bay Road may require consideration.
- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up. Therefore, the provision of appropriate walking access between these on-street parking zones and the school site would be required.
- Any parking on Main Road along the school frontage could be allocated as a time restricted drop-off and pick-up zone but the safety implications would need to be assessed before implementing this parking arrangement.
- Given the nature of Main Road directly adjacent to the school location a reduced speed limit at school start and finish times should be considered.

Site 38 -Barnett Park

Barnett Park is located to the south-west side of Main Road just south of the Redcliffs local shopping area. The park currently features football fields, a Scout Den/club house, an early learning centre, walking tracks, a playground and a car park area.

The existing vehicle access to Barnett Park is off Main Road. There is also a separate pedestrian access from Main Road and an informal pedestrian access from the end of Bay View Road. The existing vehicle access is 5m wide and operates as a two-way access. The existing car park has 93 spaces. The highest demand for the Barnett Park car park is currently likely to be a Saturday during the winter sports season.

Main Road along the frontage of the site comprises of a traffic lane in each direction, an on-road cycle lane in each direction, parallel parking on both sides of the street and a footpath on each side of the street. There is no flush median or right turn facility.

The Metro Purple Line public bus service operates on Main Road with the bus stops located to the north and south of the park frontage, there are no stops directly outside the park.

Site 38 - Location A - School located directly adjacent to Main Road

This option involves a school located on Barnett Park directly adjacent to Main Road. The vehicle access would be from Main Road.

This option can be serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are:

- Students walking and cycling from the flat residential areas east of Main Road would need to cross Main Road to access the school therefore suitable crossing locations and facilities will need to be considered. The future Coastal Pathway that will eventually be formed on the east side of Main Road will enhance cycle and walking access from the eastern areas.
- The pedestrian access from the end of Bay View Road would need consideration as it is likely that students in the adjacent residential area will walk and cycle to use this access. Likewise, parents may choose to drop-off and pick-up from this location, particularly if they experience issues accessing the school from Main Road. This would need to be considered carefully in terms of impacts on Bay View Road, a low volume residential street.
- Any charter buses used for school trips would need to either drop-off and pick-up from Main Road or the access and car park reconfigured to allow access.
- Ensuring that vehicle access from Main Road is managed, in particular right turning vehicles into the site, as this will potentially result in the Sumner-bound Main Road traffic using the on-road cycle lane to pass the right turning traffic. A continuation of the flush median across the adjacent Cave Terrace Intersection or a right turn bay would address this however would require road space reallocation in the vicinity of the site. Initial modelling indicates that the volumes of right turners into the site and opposing through movements in the school traffic peaks should not result in any queuing across the adjacent Cave Terrace intersection.
- Ensuring the vehicle access onto Main Road from Barnett Park is managed to avoid large queues back onto the park. This will occur if the right turners out of the access cannot find sufficient gaps in the traffic and therefore block the access for left turning vehicles. This could be addressed by widening the access near Main Road to accommodate left and right turning lanes, however this would need to be balanced with the impact on pedestrians and cyclists along the frontage of the park who are exposed to in and out traffic. Traffic signals would be another way to manage the exiting vehicles

and would also facilitate a priority crossing for walking and cycling access, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.

- The school site would include some car parking for staff and visitors however the on-street car parking (assuming this remains as it may need to be removed to accommodate other aspects discussed above) and the existing Barnett Park car park would be utilised for student drop-off and pick-up. The Barnett Park car park is laid out with rows of right angle car park spaces meaning that reversing would be taking place. A revised layout in the direct vicinity to the school grounds would be required to minimise the risk to children walking from parked cars to the school.
- Given the nature of the frontage road a reduced speed limit at school start and finish times should be considered.

Site 38 – Location B – School located south of existing car park

This option involves a school located on Barnett Park directly south of the existing car park. The vehicle access would be from Main Road.

This option can be serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are the same as outlined in Location A above.

Site 38 – Location C – School located at south end of the park

This option involves a school being located on Barnett Park south of the existing playing fields. The vehicle access to the school car park is assumed to be from Bay View Road as vehicle access from Main Road would require formation of a long vehicle access to the school site passing through sports fields and therefore is unlikely to be feasible.

The site can be serviced by the transport network however there are transport matters to consider for this site that would improve access and safety outlined below. Note that the key difference between this option and Location A and B is that the vehicle access is from Bay View Road. Key issues are as follows:

- Students walking and cycling from the flat residential areas east of Main Road would need to cross Main Road to access the school (via Bay View Road or the Barnett Park entrance) therefore suitable crossing locations and facilities will need to be considered. The future Coastal Pathway that will eventually be formed on the east side of Main Road will enhance cycle and walking access from the eastern areas.
- It is expected that drop-off and picks-ups would still take place in the existing Barnett Park car park therefore a suitable walking connection to the school site would need to be provided for these students and those who walked from Main Road. This would need to be a shared path to accommodate the students cycling to the school from the Main Road frontage.
- The road configuration at the end of Bay View Road would need consideration as vehicles undertaking drop-off and pick-up activities will need to turn around at the end of the street. There will also be more on-street parking occurring at the school peaks, requiring a review of the street layout at the south end of the street.
- The overall impact of more traffic on Bay View Road assuming the school car park is to be accessed from this road would need to be considered carefully in terms of impacts given this is currently a low volume residential street.
- Ensuring that vehicle access from Main Road is managed, in particular the right turns into Bay View Road, as this will potentially result in the Sumner-bound Main Road traffic using the on-road cycle lane to pass the right turning traffic. A continuation of the flush median, which currently terminates

just east of Cave Terrace, or a right turn bay would address this however would require road space reallocation in the vicinity of the treatment.

- Any charter buses used for school trips would need to either drop-off and pick-up from Main Road or the school access and car park designed to allow access, however this generally requires ample space for manoeuvring and may not be practical.

The reserve currently features a large greenspace with rugby fields and a toilet block with changing rooms. The site has one long road frontage that could facilitate vehicle access.

The site can be reached by motor vehicle via McCormacks Bay Road from both directions. Pedestrian access to the site is available along the road frontage and also via pedestrian tracks off McCormacks Bay Road at the south and north ends of the reserve. There are no crossing facilities on McCormacks Bay Road for pedestrians, cyclists and bus passengers in the vicinity of the site.

McCormacks Bay Road in the vicinity of the site is a two-way, two-lane road with parallel parking, bus stop and footpath on the east side and angle parking bays, a bus turn-around bay and footpath on the west side of the road.

The 140 Russley/Mt Pleasant public bus service operates on McCormacks Bay Road, starting and finishing at the north end of the site. There is an indented bus turn-around area on the west side of the road at the north end of the site to facilitate bus access to the bus stop on the east side of the road. It is likely that buses layover in the bus stop on the east side of the road until the city-bound service is due to commence. There is a formed vehicle access for ambulances located between the angle parking and bus turnaround area.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are:

- Students walking and cycling from the west side of the Redcliffs School zone would be on the south/east side of McCormacks Bay Road and therefore would require crossing facilities to access the school on the opposite road of the road, suitable locations and types of facility would need to be determined.
- Students walking and cycling from the east side of the Redcliffs School zone will also require consideration in terms of crossing facilities. For example, children using the footpath on the west side of Main Road will be able to walk to the site via the footpath on the east of McCormacks Bay Road but would need to cross the road to access the site.
- Access from the Coastal Pathway on the north side of Main Road, which is accessed from the Beachville Road section of the pathway, into McCormacks Bay Road would need to be carefully considered given the traffic volumes on Main Road.
- If the two pedestrian tracks off McCormacks Bay Road, at the south and north ends of the reserve, were to be formalised as school pedestrian accesses a CPTED² friendly route would need to be established given the vegetation present alongside both routes.
- Any charter buses used for school trips could either drop-off and pick-up from adjacent road frontage, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and this may not be practical.

² Crime Prevention Through Environmental Design

- The road along the frontage of site is wide and unmarked, this is likely to encourage higher vehicle speeds than desirable past a school, this would require consideration in terms of appropriate traffic calming and/or a reduced speed limit at school start and finish times.
- The intersection of Main Road with McCormacks Bay Road (east end) would require further investigation from an efficiency and safety perspective as vehicles leaving the school to return to Redcliffs east may experience some delay potentially block the exit for left turners out of the road as the traffic lane is 6m wide at this location. It is also where a crossing facility for walking and cycling access between McCormacks Bay Road and Beachville Road would most likely be required.
- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up, therefore the provision of appropriate walking access between these on-street parking zones and the school site would be required.
- The location of the access to the school car park will require consideration in terms of its impact on the bus turning bay, existing car parking and access for ambulances if rugby games continue to be held on the reserve at weekends.

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1. Introduction

1.1 Background

The Ministry of Education commissioned Abley Transportation Consultants Ltd to investigate alternative primary school sites in the suburb of Redcliffs, Christchurch. A number of sites have been assessed from a transportation perspective, these being:

- Site 1 – McCormacks Bay Reserve
- Site 37 – Redcliffs Park
 - Location A – Redcliffs Park - on the park
 - Location B – Redcliffs Park – between Main Road and park
- Site 38 – Barnett Park
 - Location A – Barnett Park – adjacent to Main Road
 - Location B – Barnett Park - south of the car park
 - Location C – Barnett Park – south of the park

The transport assessment is based on a maximum school roll of 400 students and is broadly aligned with the transport associated elements of the Ministry of Education's 'Methodology for New School Site Evaluation'^[3].

1.2 Reference material

Site visits were undertaken on 15 June 2016 and 8 August 2016 to inform the assessment.

The following documents were reviewed and referenced in the assessment:

- Christchurch Replacement District Plan – Chapter 7 Transport
- Main Road Master Plan (Christchurch City Council, 2014)
- Christchurch Transport Strategic Plan June 2012 – 2042 (Christchurch City Council, 2012)
- Proposed Closure of Redcliffs School – Independent Review of Transport-Related Submission (Carriageway Consulting, 2015)
- Joint Statement of Transport Planning Witness (Fidler and Carr, 2016)
- Safer Journey for Schools (NZTA et al, 2014)

Canterbury Maps aerials (Environment Canterbury) were used to illustrate the sites.

^[3] Methodology for New School Site Evaluation (Metho.doc Ver 6b May16 Ministry of Education)

2. Site Assessments

2.1 Introduction

There are two transport related criteria in the Ministry of Education Stage Two Site Evaluation; **road frontage** and **transport network**.

- 'Road frontage' is related to the number of road frontages and the level of flexibility on where the access can be located.
- 'Transport network' is based on the level of servicing for the various modes that need to access the school.

The scoring is based on 5 being the highest where a site meets or exceeds the criterion and 0 being the lowest where a site fails the criterion. There is no detailed guidance on allocation of the transport related scores therefore the scoring has been based on professional judgement following consideration of the site assessments.

The assessment of the sites and school locations on the sites considered safety from a Safer Journeys approach. Specifically, the common site issues identified in the 'Safer journeys for schools -Guidelines for school communities' are considered. Where an issue can be mitigated through provision of measures, such as infrastructure works, this is discussed within the assessment. The relevant safety issues that were considered throughout the assessment are outlined below.

The road environment:

- Speed of traffic
- Traffic overtaking near schools
- Parking allowed on opposite side of road (mainly related to rural schools)
- Link with school entrances and exits
- Unsafe crossing facilities
- Road safety issues on the route to school
- Unsafe intersections

The school environment:

- School hidden from drivers view
- Inadequate or poorly designed drop-off/parking leading to conflicts between vehicles and pedestrians
- Lack of cycleways and footpaths
- Inadequate use of adjoining facilities such as community hall car parks

Section 3 examines any issues raised in the site assessments and includes a coarse evaluation of intersection performance based on most recently available traffic data and should be treated as indicative only. A detailed assessment would be required at designation stage and would involve collection of updated intersection surveys with queue length observations to produce a validated intersection model, and consideration of future growth in traffic.

This section outlines the following aspects for each site and school location option on the sites:

- Site location descriptions
- Land use
- Vehicle access
- Walk and cycle access
- Public transport access
- Parking and school bus access

2.2 Site locations

McCormacks Bay Reserve is located to the south of Main Road Causeway in McCormacks Bay, Redcliffs Park is located to the north east of Main Road at the north end of Redcliffs, and Barnett Park is located to the south-west side of Main Road just to the south of the Redcliffs local shopping area.

The three sites are shown in Figure 2.1.

Figure 2.1
Alternative site
locations



2.3 Land use

Option 3 - McCormacks Bay Reserve

The reserve currently features a large greenspace with rugby fields and a toilet block with changing rooms as shown in Figure 2.2 and Figure 2.3.

The McCormacks Bay Reserve site is situated adjacent to a Coastal Zone, McCormacks Bay Reserve itself is zoned as Open Space Community Parks and is adjacent to Residential Hills (RH) and Residential Suburban (RS) zones.

Figure 2.2
McCormacks Bay
Reserve overview



Figure 2.3
View of
McCormacks Bay
Reserve looking
west



Site 37 - Redcliffs Park

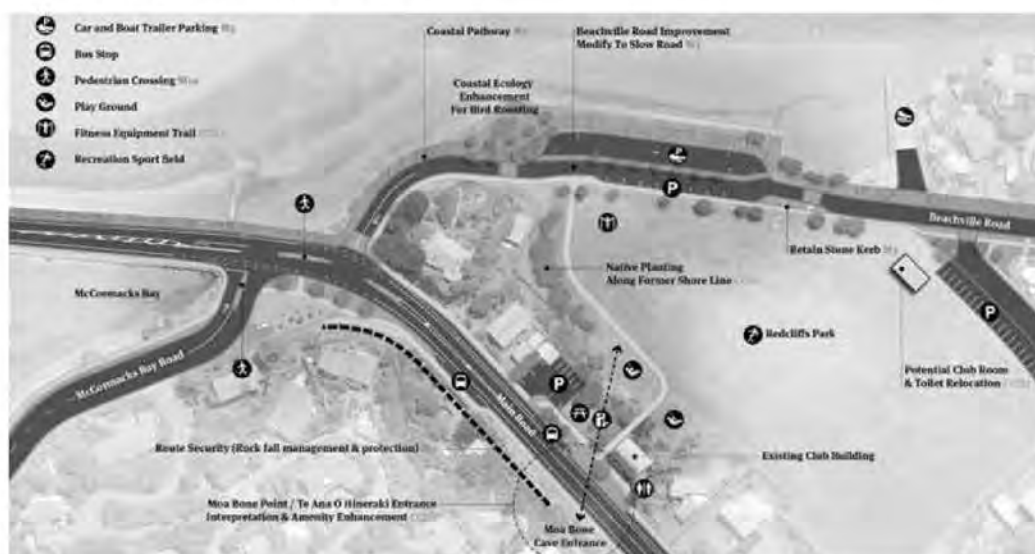
The park currently features a large greenspace with two football fields, a playground and a toilet block as shown in Figure 2.4. The Redcliffs Park site is situated adjacent to a Coastal Zone, Redcliffs Park itself is zoned as Open Space Community Parks and is adjacent to Residential Hills (RH) and Residential Suburban (RS) zones.

Figure 2.4
Redcliffs Park
Overview



Christchurch City Council's Main Road Master Plan in this area is shown in Figure 2.5. The redevelopment plans include the completion of a section of Coastal Pathway, a boat trailer parking area, road narrowing and parking provision.

Figure 2.5 Extract
from Main Road
Master Plan near
Redcliffs Park



Site 37 - Location A - School located on the park

This option involves a school being located on the park (east side) as shown in Figure 2.6 and Figure 2.7. Initial concept plans indicate the school being located along the Celia Street frontage

Figure 2.6
Location A on
Redcliffs Park



Figure 2.7
Location A - view
from Celia Street



Site 37 - Location B - School located between Main Road and the park

This option involves the school buildings being located on land between Main Road and the park as shown in Figure 2.8 and Figure 2.9. The school car park would be located on the park at a lower elevation to the buildings.

Figure 2.8
Location B on
Redcliffs Park



Figure 2.9
Location B - view
from north side of
the park



Site 38 - Barnett Park

Barnett Park currently features football fields, a Scout Den/club house, an early learning centre, walking tracks, a playground and a car park area as shown in Figure 2.10.

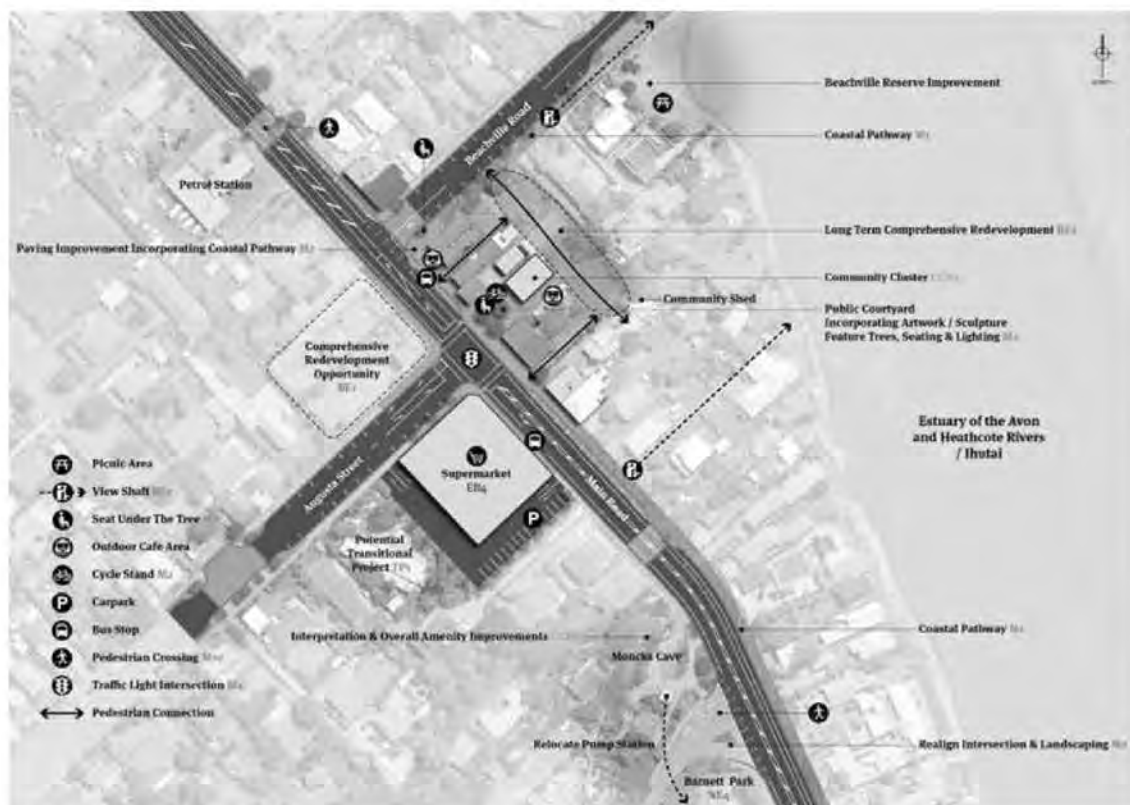
The Barnett Park site is located in both an open space community park (OCP) zone and Open Space Natural (OSN) zone and is adjacent to Residential Hills, Rural Port Hills and Residential Suburban zones.

Figure 2.10
Barnett Park site
overview



The Christchurch City Council's Main Road Master Plan for this area is shown in Figure 2.11. The road improvements on Main Road have been completed. The plan does not extend south to the Barnett Park frontage.

Figure 2.11
Extract from the
Main Road Master
Plan near Barnett
Park



Three option locations on Barnett Park have been assessed as outlined below.

Site 38 - Location A - School located directly adjacent to Main Road

This option involves the school being located directly adjacent to Main Road as shown in Figure 2.12 and Figure 2.13.

Figure 2.12
Location A on
Barnett Park



Figure 2.13
Location A - view
from the south



Site 38 – Location B -School located at south end of the car park

This option involves the school being located south of the existing car park as shown in Figure 2.14 and Figure 2.15.

*Figure 2.14
Location B on
Barnett Park*



*Figure 2.15
Location B – view
looking south*



Site 38 -Location C - School located at south end of the park

This option involves the school being located at the south end of the park with access from Bay View Road as shown in Figure 2.16 and Figure 2.17. There is an electricity substation located to the south east of the school location that is also accessed from the end of Bay View Road.

Figure 2.16
Location C on
Barnett Park



Figure 2.17
Location C - view
from the end of
Bay View Road



2.4 Vehicle access

The roads in the vicinity of the sites are presented in Table 2.1 including their movement (road hierarchy classification), place and traffic volumes (where known). Their locations are shown in Figure 2.18. All the roads are subject a 50km/h speed limit.

Table 2.1
Road details

District Plan Classifications				
Relevant Site Option	Road name	Movement	Place	Volume
All	Main Road	Minor Arterial	Urban residential	16,500 (surveyed 2012)
Site 38	Beachville Road	Local road		500 – 1,000 (estimated)
	Celia Street	Local road		200 (surveyed 2013)
Site 1 and Site 38	McCormacks Bay Rd	Local road		3,400 (surveyed 2001)
Site 37	Cave Terrace	Local road		2,000 -3,000 (estimated)
	Wakatu Avenue	Local road		200 -400 (estimated)
	Bay View Road	Local road		500 -1,000 (estimated)

Figure 2.18
Key roads in the local network



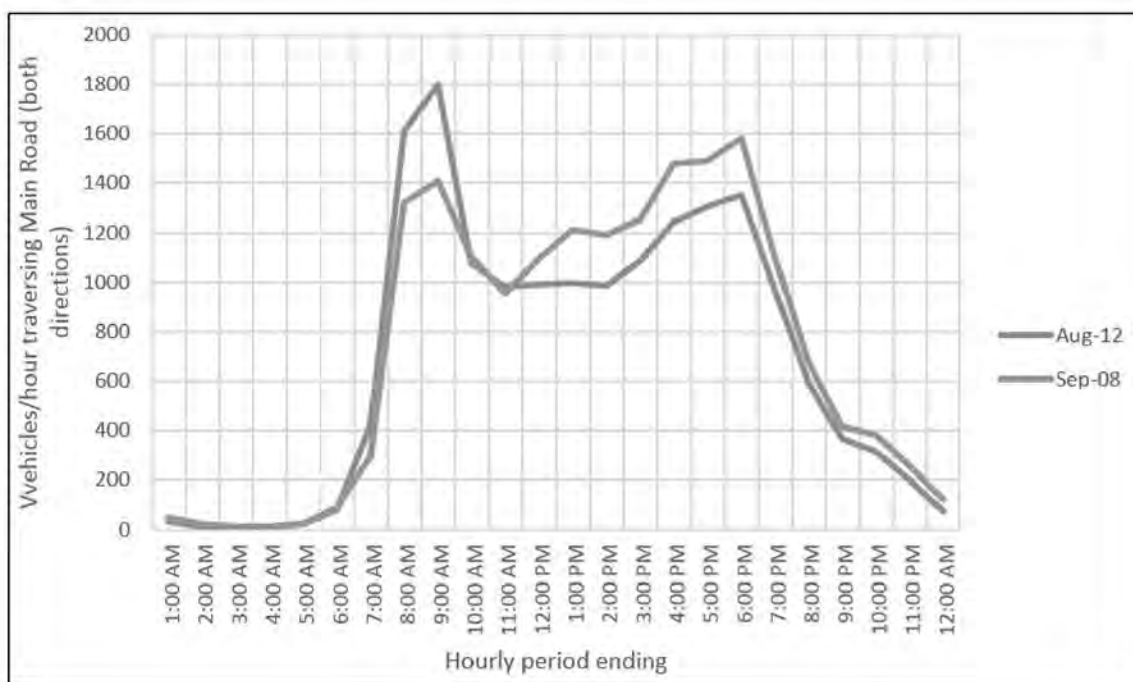
The Replacement Christchurch District Plan definitions for the road hierarchy classifications are:

Minor arterials - "Roads that provide connections between major arterial roads and the major rural, suburban and industrial areas and commercial centres. Generally, these roads cater for trips of intermediate length. They will generally connect to other minor and major arterial roads and to collector roads. Arterial roads provide the most important movement function and as such require the highest degree of movement function protection. They may also define the boundaries of neighbourhood areas."

Local roads "All other roads in Christchurch District. These roads function almost entirely for access purposes and are not intended to act as through routes for motor vehicles."

Figure 2.19 shows the daily traffic profile for Main Road on the McCormacks Bay causeway before and after the Canterbury Earthquake Sequence (CES). This shows the morning (AM) peak has increased since the CES and is greater now than the afternoon (PM) peak, whereas previously the PM was the highest peak of the day. The AM peak has subsequently been used as the worst case scenario for assessment purposes. It is noted that the AM volumes are 50% higher at the school drop-off time than pick-up time.

Figure 2.19
Main Road daily
traffic volume
profile 2008 and
2012



Main Road through to Lyttelton is also noted as a Freight-supporting route for further investigation in the Christchurch Transport Strategic Plan⁽⁴⁾, and is also an over-dimension route.

Each of the sites and school location options are discussed below with respect to vehicle access. The capacity related issues that are raised for school access roads and any adjacent intersections are examined in more detail in **Section 3 – Network Assessment**, purely to highlight any potential interventions that might be required.

⁽⁴⁾ Christchurch City Council 2012, Christchurch Transport Strategic Plan June 2012 – 2042, ISBN 978-0-9922462-0-4

Site 1 - McCormacks Bay Reserve

The McCormacks Bay Reserve site is fronted by McCormacks Bay Road; this is the only road frontage that could facilitate vehicle access. There is currently a formed access for ambulances located between the angle parking and a bus turnaround area with a locked post and wire gate arrangement.

The hillside roads on the west side of the Redcliffs School zone will access McCormacks Bay Road to then access the school site. Main Road into McCormacks Bay Road will be the access route for the parents driving from east side of the Redcliffs School zone.

McCormacks Bay Road in the vicinity of the site is a two-way, two-lane road with parallel parking, bus stop and footpath on the east side and angle parking bays, and a bus turn-around bay and footpath on the west side of the road as shown in Figure 2.20. There is a centre line marked on the bend at the north end of the site and no centreline or parking lanes marked along the straight section of the frontage road as shown in Figure 2.21.

*Figure 2.20
McCormacks Bay
Road along
frontage of the site*



*Figure 2.21
Looking south
along McCormacks
Bay Road*



The intersection of Main Road with McCormacks Bay Road would require further investigation from an efficiency and safety perspective as vehicles leaving the school to return to Redcliffs east may experience delays and potentially block left turning vehicles as the traffic lane is only 6m wide at this location.

Site 37 - Redcliffs Park

Redcliffs Park is fronted by Beachville Road to the north, Main Road to the south and Celia Street to the east. The park has two road frontages that could facilitate vehicle access.

Main Road in the vicinity of Redcliffs Park is a two-way, two-lane road with on road cycle lanes in both directions, an off road shared path (coastal path) on the north/west side of the road and a footpath on the south/east side of the road as shown in Figure 2.22.

A staggered-tee intersection arrangement with raised median and right turn lane is located where Main Road intersects McCormacks Bay Road and Beachville Road. There is no right turn bay present for vehicles turning right into Beachville Road.

Figure 2.22 View of Main Road and Beachville Rd Southbound



There is no on-street parking on Main Road from Mount Pleasant until approximately 200m south of Beachville Road where on-street parking is then permitted on both sides of Main Road. From the Beachville Road intersection with Main Road (shown in Figure 2.23), there is a footpath on the east side of the road only. Repairs to this area since the earthquakes are still being undertaken as of August 2016.

Figure 2.23 View from Beachville Road looking west along Main Road



It is understood that a footpath will not be reconstructed on the west side of Main Road opposite the Redcliffs Park pedestrian access.

There is a pedestrian zebra crossing outside the existing Redcliffs School, shown in Figure 2.24. This is located 230m from the Main Road pedestrian access to Redcliffs Park. The Main Road Master Plan does not appear to show any future plans for the crossing, therefore it has been assumed that this will remain in place. A flush median is provided on Main Road commencing in advance of the zebra crossing facility and continuing along Main Road through Redcliffs to Cave Terrace.

Figure 2.24 View of existing zebra crossing on Main Road looking East



Beachville Road is accessed via a priority intersection from Main Road and runs adjacent to the Redcliffs Park site. The north end of Beachville Road is currently closed to traffic to allow completion of the street works that include the Coastal Pathway, creation of a boat trailer parking area, road narrowing and parallel parking provision. Beachville Road continues along the line of the coast re-joining Main Road with a priority intersection between the Augusta Street and Taupata Street intersections. The intersection of Beachville Road (north end) with Main Road is located on the outside of a bend and there appears to be adequate visibility to the intersection from both the east and west bound approaches.

Issues relating to motor vehicle access for each of the Redcliffs Park school location options are discussed below.

Site 37 – Location A – School located on the park

Vehicle access to the school could be from either Celia Street or Beachville Road, however initial layout plans indicate the school being located along the Celia Street frontage.

Main Road will be the main route for the majority of parents driving to the Redcliffs Park site before taking local road access to the school entrance.

Vehicle access into and out of Beachville Road (north end) from Main Road may need to be managed, in particular the right turns into Beachville Road as any queuing will mean the City-bound Main Road traffic will use the on-road cycle lane to move around the right turning traffic.

Vehicle access onto Main Road from Beachville Road (north end) is likely to result in some queuing as the right turners out of Beachville Road waiting for sufficient gaps in the traffic will block the exit for left turners out of the road. This could be addressed by widening Beachville Road at Main Road to accommodate left and right turns out of the access but this needs to be balanced with the impact on pedestrians and cyclists crossing the Beachville Road intersection. Traffic signals would be another way to manage the exiting

vehicles and would also facilitate a priority crossing for walking and cycling access between McCormacks Bay Road and Beachville Road, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.

Celia Street would also facilitate vehicle access to Redcliffs Park for vehicles travelling from the east of the school zone. The street is located within a residential area and has traffic calming measures present in the form of landscaped central median islands. There are footpaths on both sides of the street. Celia Street links to Beachville Road at an unmarked intersection at Redcliffs Park.

Site 37 - Location B – School located between Main Road and park

Vehicle access to the school car park could be from either Celia Street or Beachville Road. Vehicle access from Main Road to the car park is not likely to be feasible due to the difference in elevation however access for servicing (waste collection etc.) and emergency vehicles may be possible from Main Road.

As with Location A vehicle access between Main Road and Beachville Road (north end), and Main Road and McCormacks Bay Road may require consideration.

Site 38 - Barnett Park

The existing vehicle access to Barnett Park is off Main Road. There is a further vehicle access at the east end of the park frontage which provides access to a pump station.

Main Road along the frontage of the site has recently been reconstructed and comprises of a traffic lane in each direction, an on-road cycle lane in each direction, parallel parking on both sides of the street and a footpath on each side of the street as shown in Figure 2.25. A flush median terminates prior to the Barnett Park access, to the south of the Cave Terrace intersection. It is noted that a flush median did extend past Barnett Park prior to the earthquakes. There appears to be good visibility of the Barnett Park access for approaching drivers, however visibility when egressing from Barnett Park may be reduced when vehicles are parked along the Barnett Park frontage.

Figure 2.25
Main Road looking
towards the
Barnett Park
access



The existing vehicle access is 5m wide and operates as a two-way access shown in Figure 2.26. There is no widening where the access intersects with Main Road to accommodate both left and right turning vehicles exiting the park. The access road is 100m long and features two speed humps (judder bar style). There is a post-and-wire fence along side of the access and parking in the access road is not permitted.

Figure 2.26
Barnett Park
access



Issues relating to motor vehicle access for each of the Barnett Park school location options are discussed below.

Site 38 – Location A – School located directly adjacent to Main Road

Vehicle access for this option would be via the existing vehicle access from Main Road. Right turns into the site from Main Road will potentially result in the Sumner-bound Main Road traffic using the on-road cycle lane to move around the right turning traffic. A continuation of the flush median across the adjacent Cave Terrace intersection or a right turn bay would address this however would require road space reallocation in the vicinity of the site.

Vehicle access onto Main Road from Barnett Park may need to be managed to avoid large queues back onto the park. This will occur if the right turners out of the access cannot find sufficient gaps in the traffic and therefore block the access for left turners out of the access. This could be addressed by widening the access near Main Road to accommodate left and right turning vehicles however this would need to be balanced with the impact on pedestrians and cyclists along the frontage of the park who are exposed to turning vehicles. Traffic signals would be another way to manage the exiting vehicles and would also facilitate a controlled crossing for walk and cycle access, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.

Drop-off and pick-up is likely to occur at the end of Bay View Road where children can walk to the school, particularly if drivers experience issues accessing the school from Main Road. This would need to be considered carefully in terms of impacts on Bay View Road, a low volume residential street.

Site 38 – Location B – School located south of car park

This option involves a school located on Barnett Park directly south of the existing car park. The vehicle access would be from Main Road and therefore the same matters related to the access for Location A apply.

Site 38 – Location C – School located at south end of the park

This option involves a school being located on Barnett Park south of the existing sports fields. The vehicle access to the school car park is assumed to be from Bay View Road as vehicle access from Main Road

would require formation of a long vehicle access to the school site passing through sports fields and therefore unlikely to be feasible. Figure 2.27 shows Bay View Road looking towards the site.

*Figure 2.27
Bay View Road
looking towards
Location C*



The road configuration at the end of Bay View Road would need consideration as there will be vehicles undertaking drop-off and pick-up activities that will need to turn around at the end of the street. There will also be more on-street parking occurring at the school peaks. This will require a review of the street layout and parking management at the south end of the street. There is an existing access to an electricity sub-station as shown in Figure 2.28.

*Figure 2.28 End of
Bay View Road*



The overall impact of more traffic on Bay View Road, assuming the school car park is to be accessed from this road, would need to be considered carefully in terms of impacts given this is currently a low volume residential street.

Vehicle access from Main Road may need to be managed, in particular the right turns into Bay View Road, as this will potentially result in the Sumner-bound Main Road traffic using the on-road cycle lane to move around the right turning traffic. A continuation of the flush median, which currently terminates just east of Cave Terrace, or a right turn bay would address this however would require road space reallocation in the vicinity of the treatment.

Given that some vehicle access from Main Road to the existing Barnett Park car park is likely, this will need to be managed as outlined for Locations A and B.

2.5 Walk and cycle access

Each of the sites and school location options are discussed below with respect to walking and cycling.

Site 1 - McCormacks Bay Reserve

Walking access is provided with footpaths on both sides of McCormacks Bay Road except where the angle parking spaces are located. The footpath on the east side is continuous and links to Main Road. There is a pedestrian access off McCormacks Bay Road into the reserve that crosses a stream and passes through a vegetated area at the southern boundary of the site as shown in **Figure 2.29**. If this was to be formalised as a school pedestrian access a CPTED^[9] friendly route would need to be established.

Figure 2.29

*Pedestrian access
at south end of the
reserve*



There is also a sealed pedestrian access off McCormacks Bay Road into the reserve that passes through a vegetated area at the northern boundary of the site as shown in **Figure 2.30**. If this was to be formalised as a school pedestrian access a CPTED friendly route would need to be established.

Figure 2.30

*Pedestrian access
at the north of the
reserve*



^[9] Crime Prevention Through Environmental Design

There are no crossing facilities for pedestrians, cyclists and bus passengers in the vicinity of the site. Students walking and cycling from the west side of the Redcliff's School zone would approach the site on the south/east side of McCormacks Bay Road and therefore require crossing facilities to access the site on the opposite road of the road. One or more suitable locations and types of facility would need to be determined.

Students walking and cycling from the east side of the Redcliffs School zone will also require crossing facilities. Children using the footpath on the west side of Main Road will be able to walk to the site via the footpath on the east of McCormacks Bay Road but would need to cross the road to access the site. Access from the Coastal Pathway on the north side of Main Road, accessed from the Beachville Road section of the pathway, into McCormacks Bay Road would need to be well catered for given the traffic volumes on Main Road. The Main Road Master Plan indicates a pedestrian crossing island will be located on Main Road between the Beachville Road and McCormacks Bay Road however as shown in Figure 2.31 a solid median island is currently constructed rather than a pedestrian island.

Figure 2.31
Main Road at
McCormacks Bay
Road



Site 37 – Redcliffs Park

Issues relating to walking and cycling for each of the two Redcliffs Park school location options are discussed below.

Site 37 – Location A - School located on the park

Walking access to the site is provided by footpaths on both sides of Beachville Road and Celia Street. There is also a formed pedestrian access off Main Road to Redcliffs Park as shown in Figure 2.32. A crossing facility for pedestrians, cyclists and bus passengers on the west side of Main Road accessing the pedestrian access would need to be considered. There is a pedestrian zebra crossing outside the existing Redcliffs School (shown in Figure 2.24) located 230m south of the Main Road pedestrian access to Redcliffs Park.

Figure 2.32

View of Main Road showing pedestrian access



Students walking and cycling from McCormacks Bay could also use the existing pedestrian access to the park. It is understood that a footpath will not be reconstructed on the west side of Main Road opposite the Redcliffs Park pedestrian access so a road crossing would need to be located at the intersection. Opportunities to provide crossing facilities across Main Road at the McCormacks Bay Road-Beachville Road intersections with Main Road should be considered.

Redcliffs Park is ideally located for access from the Coastal Pathway on the north side of Beachville Road. The Main Road Master Plan shows two crossing points between the pathway and the Redcliffs Park frontage. The pathway would service the Beachville Road students.

Celia Street is a low volume traffic calmed street that would facilitate good walking and cycle access.

Site 37 -Location B – School located between Main Road and park

Cycle and pedestrian access matters are consistent with Option 2a above. The key difference with this option for Redcliffs Park is that there may be more pedestrians accessing the school from the Main Road frontage via walking and cycling as this is the main entrance. Given the nature of Main Road directly adjacent to the school entrance a reduced speed limit at school start and finish times should be considered to enhance the safety of children on Main Road. This would also support the drop-off and pick-up activity that may occur on Main Road.

Site 38 - Barnett Park

Walking access to Barnett Park is provided with footpaths on both sides of Main Road and an unsealed pedestrian access from Main Road into the park separated from the vehicle access by approximately 50m. The pedestrian access connects to the playground and the car park as shown in Figure 2.33. There is also an unformed pedestrian access via a gate at the end of Bay View Road.

Figure 2.33
Barnett Park
pedestrian access



Main Road in the vicinity of the Barnett Park features on-road cycle lanes, and it is considered unlikely that primary school students will use these lanes unsupervised.

The Coastal Pathway route from Ferrymead to Sumner is a major planned walking and cycle route which will pass through Redcliffs, generally running parallel to Main Road (west side), parallel with Beachville Road before continuing parallel with Main Road again opposite the park frontage. This will enhance cycle access to the site from the eastern areas. Given the width of the vehicle access road, a separate cycle access reducing the level of conflict between vehicles and students cycling would be desirable.

Students walking and cycling from the residential areas west along Main Road need to cross two relatively busy side street intersections; Augusta Street has a signalised crossing and Cave Terrace has a pedestrian refuge island. There is also a supermarket access on Main Road between these two intersections, where pedestrians have the right of way over this access.

Issues relating to walking and cycling for each of the three Barnett Park school location options are discussed below.

Site 38 – Location A – School located directly adjacent to Main Road

Students walking and cycling from the flat residential areas east of Main Road would need to cross Main Road to access the school therefore suitable crossing locations and facilities will need to be considered. The nearest pedestrian crossing is the signalised cross walk at the Augusta Street traffic signals, 220m north of Barnett Park.

The current access from the end of Bay View Road would need consideration as it is likely that students in the adjacent residential area will walk and cycle to use this access. Likewise, parents may choose to drop-off and pick-up from this location, particularly if they experience issues accessing the school from Main Road. This would need to be considered carefully in terms of impacts on Bay View Road, a low volume residential street.

Given the nature of the frontage road a reduced speed limit at school start and finish times should be considered to enhance safety for children using Main Road.

Site 38 – Location B – School located south of existing car park

This option involves the same considerations as outlined in Location A above.

Site 38 -Location C – School located at south end of the park

Students walking and cycling from the flat residential areas east of Main Road would still need to cross Main Road to access the school (via Bay View Road or the Barnett Park entrance) therefore suitable crossing locations and facilities will need to be considered. The future Coastal Pathway that will eventually be formed on the east side of Main Road will enhance cycle and walking access from the eastern areas.

It is expected that drop-off and picks-ups would still take place in the existing Barnett Park car park therefore a suitable walking connection to the school site would need to be provided for these students and those who walked from Main Road. This would need to be a shared path to also accommodate the students cycling to the school from the Main Road frontage.

2.6 Public transport access

Issues relating to public transport for each school site and location option are discussed below.

Site 1- McCormacks Bay Reserve

The 140 Russley/Mt Pleasant public bus service operates on McCormacks Bay Road, starting and finishing at the north end of the site, as shown in Figure 2.34. There is an indented bus turn-around area on the west side of the road at the north end of the site, as shown Figure 2.35, facilitating bus access to the bus stop on the east side of the road where it is likely that buses layover until the city-bound service is due to commence. The service is operated at 30 minute frequencies on weekdays.

Figure 2.34
Bus stops on
McCormacks Bay
Road



Figure 2.35
Bus turn around
are McCormacks
Bay Road



Site 37 - Redcliffs Park

The Metro Purple Line public bus service operates on Main Road. Bus stops are located on both sides of the road as shown in Figure 2.36. The service is operated at 15 minute frequencies on weekdays. Location A will be directly adjacent to the service, and Location B can be accessed by this service via a 150m walk.

The improvement of the bus stops closest to the park is planned as part of the Main Road Master Plan, and the plan shows that indented bus bays are proposed. Given it is unlikely that a footpath will be reinstated on the west side of Main Road, the proposed Master Plan arrangement for the bus stop on west side of the road will need to be reviewed.

Figure 2.36
Bus stops on Main
Road near
Redcliffs Park



Site 37 - Barnett Park

The Metro Purple Line public bus service operates on Main Road with the bus stops located to the north and south of the park frontage as shown in Figure 2.37, there are no bus stops directly outside the park. The service is operated at 15 minute frequencies on weekdays. Locations A and B are located within close proximity to the service. Location C will require a 550m walk from Main Road.

Figure 2.37

Bus stops on Main Road near Barnett Park



2.7 Parking and school bus access

A new school will require some level of car parking on site. This section discusses the likely on-site provision requirements, how this might be accommodated and the surrounding car parking supply that is likely to be used for drop off and pick up activities.

The Proposed Christchurch Replacement District Plan sets out the minimum amount of car and cycle parking spaces to be provided on a site. An assessment of the parking demand for a school with a maximum of 400 students from year 0 to year 8 is shown below in **Table 2.2**. The staff numbers are based on an assumed teacher-to-student ratio of 1:15. The District Plan parking requirements are used as the basis for the assessment however it is acknowledged that any new school will be subject to a traffic assessment at the time of site design.

Table 2.2
District Plan
parking
requirements

Rule	Plan requirement	Assessment	Parking numbers
Minimum number of car parks required	Residents/ Visitors/ Students 1 space/ 25 pupils (year 8 and below) 0.5 spaces/ 25 pupils (year 9 and above) Staff 0.5 space per FTE staff	Assume 400 students Y0 to Y8. $(400/25) * 1 = 16$ spaces Staff = $0.5 * 26 = 13$	29 spaces required (13 to be marked for Staff use)
Minimum number of mobility parking spaces	For 21-50 parking spaces min. 2 mobility spaces required	2 min. mobility spaces required	2 min. mobility spaces required Mobility parking spaces shall be provided at the closest possible point to the accessible entrance
Minimum number of cycle parking spaces	Visitors: 1 space/ 30 students (year 8 and below) and 1 space/ 100 students (year 9 and above) Staff/ residents/ students cycle parks 1 space/ 7 students (year 8 and below) and 1 space/ 5 students (year 9 and above)	$(400/30)*1 = 13.3$ cycle spaces $(400/7)*1 = 57.1$ Total cycle parking = 70.4 cycle spaces	Total cycle parking = 70 cycle spaces Staff/ residents/ tertiary students' cycle parking facilities shall be located in: a covered area; and a secure area, unless located in an area where access by the general public is generally excluded.

Site 1 – McCormacks Bay Reserve

The school site would include some car parking for staff and visitors however the on-street car parking would be utilised for student drop-off and pick-up. Along the frontage of the site there are 30 formed angle parking spaces on the west side of McCormacks Bay Road shown in Figure 2.38, and space for approximately 20 parallel parked cars on the east side of the road. The provision of appropriate walking access between these on-street parking zones and the school site would be required. At the north end of the angle parking there is one accessible space and a path connection into the toilet block shown in Figure 2.39.

Figure 2.38

Angle parking on west side of McCormacks Bay Road



Figure 2.39

North end of the angle parking area



Any charter buses used for school trips would need to either drop-off and pick-up from the road frontage, alternatively the site could be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.

Site 37 – Redcliffs Park

Issues relating to parking for the two Redcliffs Park school location options are discussed below.

Site 37 -Location A – School located on the park

The school site would include some car parking for staff and visitors however the on-street car parking would be utilised for student drop-off and pick-up. There are nine parallel parking spaces on Beachville Road and approximately 22 angle parking spaces on Celia Street as shown on the Master Plan. The angle parking zone is currently unsealed as shown in **Figure 2.40**. The provision of appropriate walking access between these on-street parking zones and the school site would be required.

Figure 2.40
Unsealed angle parking on Celia Street frontage



Any charter buses used for school trips would need to either drop-off and pick-up from adjacent road frontages, alternatively the site could be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.

The Main Road Master Plan also shows a small car park area located off Main Road in the vicinity of the current pedestrian access on Main Road. If this was to be formed, it is likely that parents will use this area for pick-ups and drop-offs allowing students to walk through the Redcliffs Park to access the school.

Site 37 – Location B -School located between Main Road and park

The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up, therefore the provision of appropriate walking access between these on-street parking zones and the school site would be required.

Any parking on Main Road along the school frontage could be allocated as a time restricted drop-off and pick-up zone but the safety implications would need to be assessed before implementing this parking arrangement.

Site 38 – Barnett Park

Issues relating to parking for the three Barnett Park school location options are discussed below.

Site 38 – Location A – School located directly adjacent to Main Road

This option involves a school located on Barnett Park north of the existing car park with the vehicle access from Main Road. The school site would not be large enough to accommodate on-site car parking for staff and visitors however it is assumed that part of the existing Barnett Park car park could be utilised for school purposes and replacement parking could be constructed to the south of the car park to mitigate the loss of public car parking.

Any charter buses used for school trips would need to either drop-off and pick-up from Main Road or the access and car park reconfigured to allow access.

Site 38 – Location B – School located to the south of the car park

The school site could accommodate some school car parking for staff and visitors however the on-street car parking and the existing Barnett Park car park would be utilised for student drop-off and pick-up. The Barnett Park car park has 93 spaces and is laid out with rows of right angle car park spaces (see Figure 2.41) meaning that reversing would be taking place. A revised layout in the direct vicinity of the school grounds would be required to minimise the risk to children walking between parked cars and the school.

The highest demand for the Barnett Park car park is currently likely to be a Saturday during the winter sports session.

Figure 2.41
Barnett Park car
park



Parents may choose to drop-off and pick-up from the pedestrian access at the end of Bay View Road, particularly if they experience issues accessing the school from Main Road. This would need to be considered carefully in terms of impacts on Bay View Road, a low volume residential street.

Any charter buses used for school trips would need to either drop-off and pick-up from Main Road or the access and car park reconfigured to allow access.

Site 38 – Location C – School located at south end of the park

The school site could accommodate some school car parking for staff and visitors and would be accessed from Bay View Road. It is expected that drop-off and picks-ups would still take place in the existing Barnett Park car park therefore a suitable walking connection to the school site would need to be provided for these students and those who walked from Main Road. This would need to be a shared path to accommodate students cycling to the school from the Main Road frontage.

The road configuration at the end of Bay View Road would require consideration as there will be vehicles undertaking drop-off and pick-up activities that will need to turn around at the end of the street. There will also be more on-street parking occurring at the school peaks requiring a review of the street layout and parking management at the south end of the street.

3. *Transport network impacts*

3.1 *Introduction*

The re-opening of a school in Redcliffs has the potential to cause travel patterns in the area to change. Rather than generating additional trips on the road network, trip re-distribution is likely to occur as students migrate back to Redcliffs School from the Van Asch Deaf Education Centre, from which Redcliffs School has been operating since 2011, or other schools around Christchurch. Therefore, the overall number of trips in the area is unlikely to increase. By having a site within the school zone, trips will be shorter and it is expected more walking and cycling trips will occur, potentially reducing the number of vehicle trips currently being made.

The transport network assessment focuses on the impacts of increased vehicle movements on adjacent intersections or site accesses. The existing Redcliffs School zone is used as the catchment for school trips. It is acknowledged that student enrolments may come from 'out of zone' students however this is assumed to be a small proportion of the roll and will not impact the assessment significantly. The breakdown of how student trips to and from the sites would occur is difficult to quantify with any accuracy without travel survey results specific to the Redcliffs School. On this basis New Zealand Household Travel Survey data (2003 to 2010) has been used to assume a travel mode split.

The assessment takes into account that the existing transport environment is not necessarily indicative of the future as since the 2010 and 2011 earthquakes traffic patterns have been disrupted. For example, with the closure of the Evans Pass Road route (was also an over dimension vehicle route) and Summit Road to Dyers Pass Road, there is no traffic using Main Road through Redcliffs as a through route to Lyttelton or Dyers Pass Road. The current traffic volume on Main Road is approximately 16,500 vehicles per day, but prior to the earthquakes it was approximately 18,000 vehicles per day (refer to Figure 2.19 in Section 2.4).

This section examines any issues raised in the site assessments and includes a coarse evaluation of intersection performance based on most recently available traffic data and should be treated as indicative only. A detailed assessment will be required at resource consent stage and would involve collection of updated intersection surveys with queue length observations to produce a validated intersection model, and consideration of future growth in traffic.

3.2 *Trip generation*

The Redcliffs School roll is assumed to be a maximum of 400 students. It is noted that the roll at the time of the earthquakes was 221. In lieu of any other information the New Zealand Household Travel Survey NZHTS School Travel Model⁶ was used to estimate the likely modal split of a Canterbury urban primary school of 400 students.

The model equates to 68% of school trips made by private motor vehicle and the remainder by either walking, cycling or public transport as shown in Table 3.1, which also shows the total number of trips by private motor vehicle.

The total number of student trips as vehicle passengers is slightly higher than the number of students travelling by vehicle because students are sometimes picked up and then dropped off during the day for a variety of reasons such as appointments, field trips or other circumstances. The overall number of private

⁶ Milne, A, S Rendall and S Abley (2011) National travel profiles part B: Trips, trends and travel predictions. NZ Transport Agency research report 467, 94pp.

vehicles arriving in the peak hour is lower than the number of arrival trips taken by vehicle because not all students are dropped off between 8am and 9am and some parents drop off more than one child.

Table 3.1
Mode of travel and associated vehicle trips

Mode	Walk	Cycle	Public Transport	Vehicular Passenger
Share (%)	25%	2%	4%	68%
All day student drop off trips				281
All day staff and service vehicle trips				22
AM peak hour private motor vehicles (8-9am)				218

3.3 Analysis method

The assessment focuses on the impact of the school traffic on the road adjoining the main school access, and adjacent intersections that could be impacted by changes in traffic volumes. No network analysis has been undertaken.

Any potential measures to mitigate capacity issues discussed in the site assessments are purely to determine if any infrastructure changes may be necessary to support the site location. These would require a more detailed analysis if a new school site is established.

Assumptions regarding the direction of travel of the motor vehicle trips, plus those already on the network (where no intersection count data is available), have been made to allow intersection assessments to be undertaken. The intersections have been analysed using the intersection modelling software, SIDRA Intersection version 7. The results are reported by Level of Service^[7] (LOS) and where LoS worsens, this is discussed also noting any safety issues or implications of potential interventions.

The indicative modelling assumes the school will operate at maximum capacity. Impacts such as vehicle delays are unlikely to be as pronounced as the modelling results suggest with a lower school roll. The majority of school drop offs tend to occur in a very short window of time therefore any delays will generally be short in duration.

It is important to note that this is a coarse evaluation of intersection performance based on most recently available traffic data and should be treated as indicative only. A detailed assessment will be required at resource consent stage and would involve collection of updated intersection surveys with queue length observations to produce a validated intersection model, and consideration of future growth in traffic.

^[7] Level of Service (LOS) is a measure of performance that consider traffic delay and vehicle queue length, A is the highest LOS and F is the lowest (worst)

3.4 Site 1 - McCormacks Bay Reserve

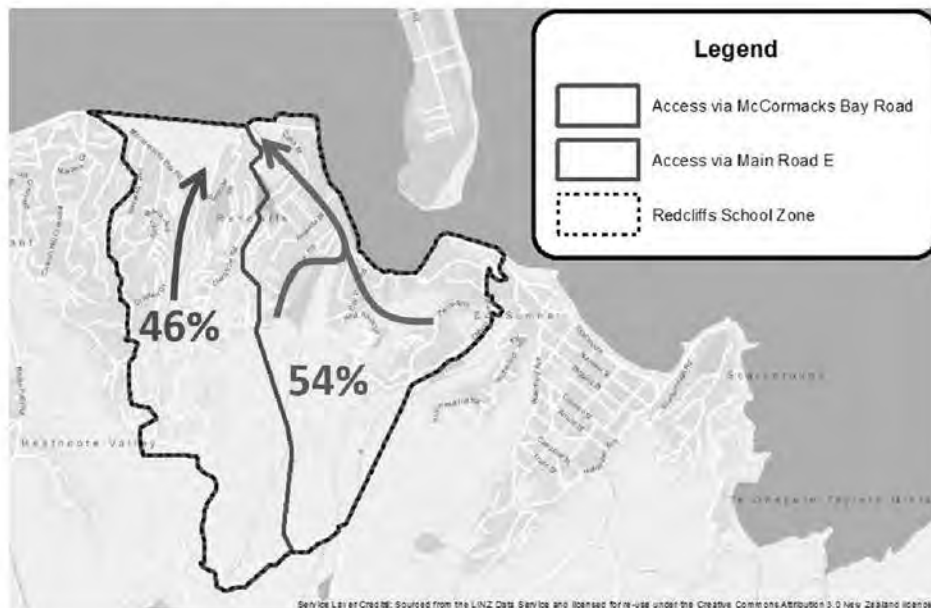
Figure 3.1 shows the intersection of McCormacks Bay Road/Main Road which has been analysed to assess the effects of establishing a school at McCormacks Bay Reserve.

Figure 3.1
Location of
intersection
assessed



Figure 3.2 shows the percentage of households which are expected to access the school from each direction if the school were to be located at McCormacks Bay Reserve, and provides a proxy for estimating the proportion of students in each traffic catchment.

Figure 3.2
Traffic catchments
and traffic
proportions



The intersection was assessed using SIDRA Intersection software. Table 3.2 shows a summary of key LoS results for the weekday morning peak hour 8-9am.

Table 3.2
Key results at
intersections
impacted by
McCormacks Bay
Reserve site
development

	Approach	Turn type	Level of Service (LOS) (before → after)
Beachville North/McCormacks Bay/Main	Beachville Road	Left	A → A
		Through	C → C
		Right	C → C
	Main Road - South East approach	Left	A → A
		Through	A → A
		Right	A → A
	McCormacks Bay Road	Left	B → B
		Through	C → D
		Right	C → D
	Main Road - West approach	Left	A → A
		Through	A → A
		Right	A → A

The results show that the Main Road traffic will not experience any reduction in LoS as it is assumed that the Main Road traffic can move around the right turning vehicles. A turning bay exists for Main Road traffic turning right into McCormacks Bay Road.

Turning movements out of McCormacks Bay Road East were somewhat sensitive to increased traffic volumes. For example, a moderate increase to traffic on Main Road or vehicles turning right resulted in moderate delay increases for turning traffic.

The intersection of Main Road with McCormacks Bay Road would require further investigation from an efficiency and safety perspective as vehicles leaving the school to return to Redcliffs east may experience delays and potentially block left turning vehicles as the traffic lane is only 6m wide at this location. A crossing facility for walking and cycling access between McCormacks Bay Road and Beachville Road would most likely be required.

3.5 Site 37 -- Redcliffs Park

Site 37 - Location A and B

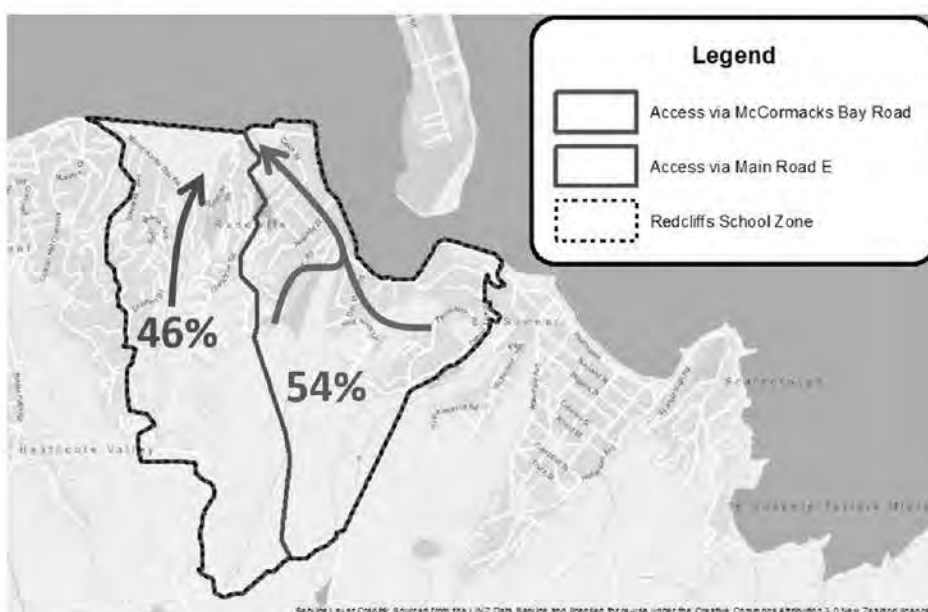
Figure 3.3 shows the intersections of Beachville Road North/McCormacks Bay Road/Main Road and Celia Street/Main Road which were analysed to assess the effects of establishing a school at Redcliffs Park.

Figure 3.3
Location of
intersections
assessed



Figure 3.4 shows the percentage of households which are expected to access the school from each direction if the school were to be located at Redcliffs Park, providing a proxy for estimating the proportion of students in each traffic catchment.

Figure 3.4
Traffic catchments
and associated
traffic proportions



The intersection was assessed using SIDRA Intersection software. Table 3.3 shows a summary of key LoS results for the weekday morning peak hour 8-9am.

Table 3.3

Key results at intersections impacted by Redcliffs Park site development

Approach		Turn type	Level of Service (LOS) (before → after)
Beachville North/McCormacks Bay/Main	Beachville Road	Left	A → D
		Through	C → E
		Right	C → E
	Main Road – South east approach	Left	A → A
		Through	A → A
		Right	A → A
	McCormacks Bay Road	Left	B → C
		Through	C → D
		Right	C → D
	Main Road - West approach	Left	A → A
		Through	A → A
		Right	A → A

The results show that the Main Road traffic will not experience any reduction in LoS as it is assumed that the Main Road traffic can move around the right turning vehicles. A right turn bay exists for Main Road traffic into McCormacks Bay Road, and there is space available (although not marked as a right turn bay) for Main Road traffic into Beachville Road.

Turning movements out of Beachville Road North and Celia Street were sensitive to increased traffic volumes. Small increases to either traffic turning from these streets or through traffic on Main Road resulted in large delay increases for traffic turning out of Beachville Road North and Celia Street.

Vehicle access onto Main Road from Beachville Road (north end) is likely to result in some queuing as the right turners out of Beachville Road waiting for sufficient gaps in the traffic will block the exit for left turners out of the road. This could be addressed by widening Beachville Road at Main Road to accommodate left and right turns out of the access but this needs to be balanced with the impact on pedestrians and cyclists crossing the Beachville Road intersection. Traffic signals would be another way to manage the exiting vehicles and would also facilitate a controlled crossing for walking and cycling access between McCormacks Bay Road and Beachville Road, however this level of intervention would require detailed analysis and discussion with the road controlling authority.

3.6 Site 38 -- Barnett Park

Site 38 - Locations A and B

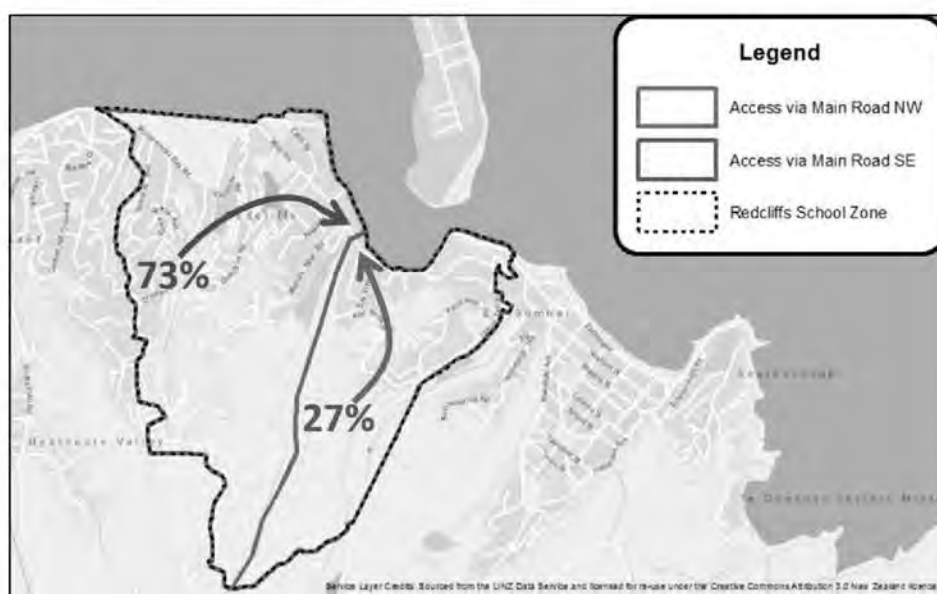
Figure 3.5 shows the intersection of the Barnett Park accessway with Main Road which was analysed to assess the effects of establishing a school at Barnett Park.

Figure 3.5
Location of
intersection
assessed



Figure 3.6 shows the percentage of households which are expected to access the school from each direction if the school were to be located at Barnett Park, providing a proxy for estimating the proportion of students in each traffic catchment.

Figure 3.6
Traffic catchments
and associated
traffic proportions



The intersection was assessed using SIDRA Intersection software. Table 3.4 shows a summary of key LoS results for the weekday morning peak hour 8-9am.

Table 3.4 Key results at intersection affected by Barnett Park site development

	Approach	Turn type	Level of Service (LOS) (before → after)
Barnett Park accessway/Main Road	Main Road – South east approach	Left	A → A
		Through	A → A
	Barnett Park accessway SW	Left	A → C
		Right	C → E
	Main Road – North west approach	Through	A → A
		Right	A → A

The results show that the Main Road traffic will not experience any reduction in LoS as it is assumed that the Sumner-bound Main Road traffic can move around the right turning vehicles. This requires the Main Road traffic to encroach onto the on-road cycle lane. This impacts upon the safety of cyclists therefore the continuation of the flush median across the adjacent Cave Terrace intersection or provision of a right turn bay would be necessary, requiring road space reallocation in the vicinity of the site.

Turning movements out of the Barnett Park access were sensitive to increased traffic volumes. For example, a moderate increase in traffic on Main Road or vehicles turning right resulted in large increases in delay for turning traffic. The results indicate that vehicle access onto Main Road from Barnett Park will result in a lower LoS as right turners out will block the access for left turners out. This could be addressed by widening the access near Main Road to accommodate both left and right turning lanes, however this would need to be balanced with the impact on pedestrians and cyclists along the frontage of the park. Traffic signals would be another way to manage the exiting vehicles and would also facilitate a priority crossing for walking and cycling access, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.

Initial modelling also indicates that the volumes of right turners into the site and opposing through movements in the school traffic peaks should not result in any queuing across the adjacent Cave Terrace intersection.

Site 38 – Location C

Assuming the same level of traffic is turning right into Bay View Road the same issue occurs where the Sumner-bound Main Road traffic are using the on-road cycle lane to move around the right turning traffic. A continuation of the flush median, which currently terminates just east of Cave Terrace, or a right turn bay would address this however would require road space reallocation in the vicinity of the treatment.

Given that some vehicle access from Main Road to the existing Barnett Park car park is likely, albeit of a lower magnitude this will need to be managed as outlined in Locations A and B above.

4. District Plan - Transport Rules

The requirements of the transport related elements of the Christchurch Proposed Replacement District Plan have been considered in **Table 4.1**. This does not constitute an assessment of each of the sites in accordance with the District Plan, but considers each option in relation to the transport-related District Plan requirements. There appear to be no transport-related rules that would deem any of the options unfeasible.

Table 4.1
Rule assessment

Rule	Comparison comments
7.2.3.1 Minimum number and dimensions of car parks required	All options have adequate space to accommodate the required number of car parking spaces except for Barnett Park, Location A, however this can be mitigated by swapping existing Barnett Park car park spaces for newly constructed public car parking spaces.
7.2.3.2 Minimum number of cycle parking	All options will have the same requirement for covered secure cycle parking, it is anticipated that there will be adequate space to incorporate this within the space available at both sites.
7.2.3.3 Minimum number of loading spaces	All options will have the same requirement for one loading space. It is anticipated that this will be able to be achieved for all options.
7.2.3.4 Manoeuvring for parking and loading areas	All options will have the same requirement for manoeuvring space. It is anticipated that this will be able to be achieved for all options.
7.2.3.5 Gradient of Parking and Loading areas	All options are considered equal in this element. The levels would be required to be measured on site and would be the same on both sites. All sites are generally considered to be located on level ground.
7.2.3.6 Design of Parking and loading areas	Consideration of lighting for the parking areas would be required for all options.
7.2.3.7 Access design	The Barnett Park Location A and B already have an access from Main Road and this can be improved to ensure suitability for a school access. All other options require new accesses to be formed.
7.2.3.8 Vehicle crossings	The Barnett Park Location A and B already have a vehicle crossing on Main Road. All other options require new accesses to be formed.
High Trip Generators Rule 7.2.3.10	The school would trigger the high trip generator Rule (7.2.3.10) since there are likely to be more than 150 students, therefore this would require an Integrated Transport Assessment (basic) to be prepared. This applies to all sites currently being considered.

5. Option summary

This section of the report summarises the conclusions of the review of traffic and transport elements for each of the options.

5.1 Site 1 - McCormacks Bay Reserve

The reserve currently features a large greenspace with rugby fields and a toilet block with changing rooms. The site has one long road frontage that could facilitate vehicle access.

The site can be reached by motor vehicle via McCormacks Bay Road from both directions. Pedestrian access to the site is available along the road frontage and also via pedestrian tracks off McCormacks Bay Road at the south and north ends of the reserve. There are no crossing facilities on McCormacks Bay Road for pedestrians, cyclists and bus passengers in the vicinity of the site.

McCormacks Bay Road in the vicinity of the site is a two-way, two-lane road with parallel parking, bus stop and footpath on the east side and angle parking bays, a bus turn-around bay and footpath on the west side of the road.

The 140 Russley/Mt Pleasant public bus service operates on McCormacks Bay Road, starting and finishing at the north end of the site. There is an indented bus turn-around area on the west side of the road at the north end of the site to facilitate bus access to the bus stop on the east side of the road. It is likely that buses layover in the bus stop on the east side of the road until the city-bound service is due to commence. There is a formed vehicle access for ambulances located between the angle parking and bus turnaround area.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety. These are:

- Students walking and cycling from the west side of the Redcliffs School zone would be on the south/east side of McCormacks Bay Road and therefore would require crossing facilities to access the school on the opposite side of the road. Suitable crossing locations and types of facility would need to be determined.
- Students walking and cycling from the east side of the Redcliffs School zone will also require consideration in terms of crossing facilities. For example, children using the footpath on the west side of Main Road will be able to walk to the site via the footpath on the east of McCormacks Bay Road but would need to cross the road to access the site.
- Access from the Coastal Pathway on the north side of Main Road, which is accessed from the Beachville Road section of the pathway into McCormacks Bay Road would need to be carefully considered given the traffic volumes on Main Road.
- If the two pedestrian tracks off McCormacks Bay Road, at the south and north ends of the reserve, were to be formalised as school pedestrian accesses a CPTED⁸ friendly route would need to be established given the vegetation present alongside both routes.
- Any charter buses used for school trips could either drop-off and pick-up from adjacent road frontage, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.

⁸ Crime Prevention Through Environmental Design

- The road along the frontage of site is wide and unmarked, is likely to encourage higher vehicle speeds than desirable past a school, and would require consideration in terms of appropriate traffic calming and/or a reduced speed limit at school start and finish times.
- The intersection of Main Road with McCormacks Bay Road (east end) would require further investigation from an efficiency and safety perspective as vehicles leaving the school to return to Redcliffs east experience delays and potentially block the exit for left turning vehicles as the traffic lane is 6m wide at this location. A crossing facility for walking and cycling access between McCormacks Bay Road and Beachville Road would most likely be required at this location.
- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up, therefore the provision of appropriate walking access between these on-street parking zones and the school site would be required.
- The location of the access to the school car park will require consideration in terms of its impact on the bus turning bay, existing car parking and access for ambulances if rugby games continue to be held on the reserve at weekends.

5.2 Site 37 - Redcliffs Park

Redcliffs Park is located to the north east of Main Road at the north end of Redcliffs. The park currently features a large greenspace with two football fields, a playground and a toilet block. The park has two road frontages that could facilitate vehicle access.

The park can be reached by motor vehicle via Beachville Road (east and west) and Celia Street (south). Pedestrian access to the site is available from Beachville Road and Celia Street park frontages. There is also a formed pedestrian access off Main Road but no vehicle access from Main Road.

Beachville Road in the vicinity of the park is currently being reconstructed and the design is consistent with the proposal in the Main Road Master Plan. The design includes eight on-street parallel park spaces along the site frontage. Beachville Road provides access for boats to launch at the ramp on the opposite side of the road to the park therefore a recessed boat trailer parking area on the north side of the street has been created.

Celia Street is a quiet residential street with an unsealed area of 90 degree angle parking along the park frontage. The Main Road Master Plan shows this area as being formalised with line marking so it is assumed that this area will be sealed and marked in the future.

Main Road adjacent to the pedestrian access comprises of a traffic lane in each direction, no parking and a footpath on the east side of the road. The west side of the road still features post-earthquake concrete barriers and shipping containers. It is assumed that eventually the road will be reconstructed as per the Main Road Master Plan.

The Metro Purple Line public bus service operates on Main Road with the bus stops located to the north and south of the park's pedestrian access on Main Road.

Site 37 – Location A – Redcliffs Park (on the park)

This option involves a school being located on the park (east side). Vehicle access could be from either Celia Street or Beachville Road.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety. These are:

- A crossing facility for pedestrians and cyclists on the west side of Main Road accessing the current pedestrian access into Redcliff Park would need to be considered as it is likely that some students in the adjacent residential areas to the west of Main Road would walk and cycle to use this access.
- Any charter buses used for school trips would need to either drop-off and pick-up from adjacent road frontages, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.
- Ensuring that vehicle access into and out of Beachville Road (north end) from Main Road is managed, in particular the right turns into Beachville Road as any queuing will mean the City-bound Main Road traffic will use the on-road cycle lane to pass the right turning traffic.
- Vehicle access onto Main Road from Beachville Road (north end) is likely to result in some queuing as the right turners out of Beachville Road waiting for sufficient gaps in the traffic will block the exit for left turners out of the road. This could be addressed by widening Beachville Road at Main Road to accommodate left and right turns out of the access but this needs to be balanced with the impact on pedestrians and cyclists crossing the Beachville Road intersection. Traffic signals would be another way to manage the exiting vehicles and would also facilitate a priority crossing for walking and cycling access between McCormacks Bay Road and Beachville Road, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.
- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up, therefore the provision of appropriate walking access between these on-street parking zones and the school site would be required.

Site 37 – Location B – Redcliffs Park (between Main Road and park)

This option involves the school buildings being located on land between Main Road and the park. The school car park would be located on the park which would be at a lower elevation to the buildings. Vehicle access could be from either Celia Street or Beachville Road. Vehicle access from Main Road to the car park is not likely to be feasible due to the elevation difference however access for servicing (waste collection etc.) and emergency vehicles may be possible from Main Road.

The site is considered to be well serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are:

- A crossing facility for pedestrians and cyclists on the west side of Main Road accessing the school on the east side of the road would need to be considered as it is likely that some students in the adjacent residential areas to the west of Main Road would walk and cycle to the school.
- Any charter buses used for school trips would need to either drop-off and pick-up from adjacent road frontages, alternatively the site could need to be designed to cater for buses, however this generally requires ample space for manoeuvring and may not be practical.
- Ensuring that vehicle access into and out of Beachville Road (north end) from Main Road is managed, in particular the right turns into Beachville Road as any queuing will result in City-bound Main Road traffic encroaching on the on-road cycle lane to pass the right turning traffic.

- As with Location A vehicle access between Main Road and Beachville Road (north end), and Main Road and McCormacks Bay Road may require consideration.
- The school site would include some car parking for staff and visitors however the adjacent on-street car parking would be utilised for student drop-off and pick-up. Therefore, the provision of appropriate walking access between these on-street parking zones and the school site would be required.
- Any parking on Main Road along the school frontage could be allocated as a time restricted drop-off and pick-up zone but the safety implications would need to be assessed before implementing this parking arrangement.
- Given the nature of Main Road directly adjacent to the school location a reduced speed limit at school start and finish times should be considered.

5.3 Site 38 -Barnett Park

Barnett Park is located to the south-west side of Main Road just south of the Redcliffs local shopping area. The park currently features football fields, a Scout Den/club house, an early learning centre, walking tracks, a playground and a car park area.

The existing vehicle access to Barnett Park is off Main Road. There is also a separate pedestrian access from Main Road and an informal pedestrian access from the end of Bay View Road. The existing vehicle access is 5m wide and operates as a two-way access. The existing car park has 93 spaces. The highest demand for the Barnett Park car park is currently likely to be a Saturday during the winter sports season.

Main Road along the frontage of the site comprises of a traffic lane in each direction, an on-road cycle lane in each direction, parallel parking on both sides of the street and a footpath on each side of the street. There is no flush median or right turn facility.

The Metro Purple Line public bus service operates on Main Road with the bus stops located to the north and south of the park frontage, there are no stops directly outside the park.

Site 38 – Location A – School located directly adjacent to Main Road

This option involves a school located on Barnett Park directly adjacent to Main Road. The vehicle access would be from Main Road.

This option can be serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are:

- Students walking and cycling from the flat residential areas east of Main Road would need to cross Main Road to access the school therefore suitable crossing locations and facilities will need to be considered. The future Coastal Pathway that will eventually be formed on the east side of Main Road will enhance cycle and walking access from the eastern areas.
- The pedestrian access from the end of Bay View Road would need consideration as it is likely that students in the adjacent residential area will walk and cycle to use this access. Likewise, parents may choose to drop-off and pick-up from this location, particularly if they experience issues accessing the school from Main Road. This would need to be considered carefully in terms of impacts on Bay View Road, a low volume residential street.
- Any charter buses used for school trips would need to either drop-off and pick-up from Main Road or the access and car park reconfigured to allow access.
- Ensuring that vehicle access from Main Road is managed, in particular right turning vehicles into the site, as this will potentially result in the Sumner-bound Main Road traffic using the on-road cycle lane

to pass the right turning traffic. A continuation of the flush median across the adjacent Cave Terrace intersection or a right turn bay would address this however would require road space reallocation in the vicinity of the site. Initial modelling indicates that the volumes of right turners into the site and opposing through movements in the school traffic peaks should not result in any queuing across the adjacent Cave Terrace intersection.

- Ensuring the vehicle access onto Main Road from Barnett Park is managed to avoid large queues back onto the park. This will occur if the right turners out of the access cannot find sufficient gaps in the traffic and therefore block the access for left turning vehicles. This could be addressed by widening the access near Main Road to accommodate left and right turning lanes, however this would need to be balanced with the impact on pedestrians and cyclists along the frontage of the park who are exposed to in and out traffic. Traffic signals would be another way to manage the exiting vehicles and would also facilitate a priority crossing for walking and cycling access, however this level of intervention would require detailed analysis and discussion with the CCC as road controlling authority.
- The school site would include some car parking for staff and visitors however the on-street car parking (assuming this remains as it may need to be removed to accommodate other aspects discussed above) and the existing Barnett Park car park would be utilised for student drop-off and pick-up. The Barnett Park car park is laid out with rows of right angle car park spaces meaning that reversing would be taking place. A revised layout in the direct vicinity to the school grounds would be required to minimise the risk to children walking from parked cars to the school.
- Given the nature of the frontage road a reduced speed limit at school start and finish times should be considered.

Site 38 – Location B – School located south of existing car park

This option involves a school located on Barnett Park directly south of the existing car park. The vehicle access would be from Main Road.

This option can be serviced by the transport network however there are transport matters to consider for this site that would improve access and safety, these are the same as outlined in Location A above.

Site 38 – Location C – School located at south end of the park

This option involves a school being located on Barnett Park south of the existing playing fields. The vehicle access to the school car park is assumed to be from Bay View Road as vehicle access from Main Road would require formation of a long vehicle access to the school site passing through sports fields and therefore is unlikely to be feasible.

The site can be serviced by the transport network however there are transport matters to consider for this site that would improve access and safety outlined below. Note that the key difference between this option and Location A and B is that the vehicle access is from Bay View Road. Key issues are as follows:

- Students walking and cycling from the flat residential areas east of Main Road would need to cross Main Road to access the school (via Bay View Road or the Barnett Park entrance) therefore suitable crossing locations and facilities will need to be considered. The future Coastal Pathway that will eventually be formed on the east side of Main Road will enhance cycle and walking access from the eastern areas.
- It is expected that drop-off and pick-ups would still take place in the existing Barnett Park car park therefore a suitable walking connection to the school site would need to be provided for these students and those who walked from Main Road. This would need to be a shared path to accommodate the students cycling to the school from the Main Road frontage.

- The road configuration at the end of Bay View Road would need consideration as vehicles undertaking drop-off and pick-up activities will need to turn around at the end of the street. There will also be more on-street parking occurring at the school peaks, requiring a review of the street layout at the south end of the street.
- The overall impact of more traffic on Bay View Road assuming the school car park is to be accessed from this road would need to be considered carefully in terms of impacts given this is currently a low volume residential street.
- Ensuring that vehicle access from Main Road is managed, in particular the right turns into Bay View Road, as this will potentially result in the Sumner-bound Main Road traffic using the on-road cycle lane to pass the right turning traffic. A continuation of the flush median, which currently terminates just east of Cave Terrace, or a right turn bay would address this however would require road space reallocation in the vicinity of the treatment.
- Any charter buses used for school trips would need to either drop-off and pick-up from Main Road or the school access and car park designed to allow access, however this generally requires ample space for manoeuvring and may not be practical.

5.4 Option comparison

There are two transport related criteria in the Ministry of Education Stage Two Site Evaluation; road frontage and transport network. The scores assigned to each site option are shown in **Table 5.5**. The scores are based on 5 being the highest where a site meets or exceeds the criterion and 0 being the lowest where a site fails the criterion.

The two Redcliffs Park sites score the highest based on the evaluation criterion. The Barnett Park sites score the lowest based on the evaluation criterion, with Location C the overall lowest scoring. None of the sites score a 0 however there are likely to be infrastructure works required to address some capacity and access issues raised in the assessment.

Table 5.5 Option Scoring

Site Option	Road frontage (Access flexibility)	Transport Network (Level of servicing)
Site 1 – McCormacks Bay Reserve	Score=2 Only one road frontage and some flexibility on where access can be located.	Score=4 Can be serviced by all modes, activity spread along frontage of low volume road.
Site 37 - Redcliffs Park Location A - on park	Score=3 Two road frontages and flexibility over where the access can be located	Score=4 Can be serviced well by all modes, activity spread across network and low volume frontage roads
Site 37- Redcliffs Park Location B - between Main Road and park	Score=4 Three road frontages, however car park vehicle access from Main Road unlikely to be feasible due to level difference	Score=4 Can be serviced well by all modes, activity spread across network and two low volume roads, and one high volume frontage road
Site 38 - Barnett Park Location A – adjacent to Main Road	Score =1 Only one legal road frontage and limited options on where access can be located	Score=3 Can be serviced by all modes however activity concentrated along short frontage of busy road
Site 38 - Barnett Park Location B - south of the car park	Score =1 Only one legal road frontage and limited options on where access can be located	Score=3 Can be serviced by all modes however activity concentrated along short frontage of busy road
Site 38 - Barnett Park Location C - south end of park	Score =1 Only one legal road frontage and limited options on where access can be located	Score=2 Can be serviced by all modes however increased walk/cycle distance from Main Road, vehicle activity concentrated along local residential street.

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Appendix 8: Stephenson & Turner Report

Redcliffs School Site Options Studies
Prepared for: Ministry of Education

22326

19th August 2016

Revision No. 0

Document Control

Rev.	Issue	Date	Status/Revision	Prepared by	Reviewed
0	1	16/08/2016	First Issue	EW, RS	DC
0	2	19/08/2016	Second issue – typos fixed and minor amends, repaginated	DC	DC

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Introduction

Scope of Report

Stephenson & Turner were commissioned by the Ministry of Education to work with The Property Group to assess the relative merits of identified site options for Redcliffs School as a part of a larger feasibility study for the Ministry of Education.

Architectural Site Options Study

Architectural Consultant Methodology Rating

The below are ratings of each design for the potential sites based on design criteria needed to create a functioning educational facility for Redcliffs School.

SITE SIZE

Description as provided by 'The Property Group':

Is the site of a size capable of providing for all the educational requirements of the proposed school and projected future growth? For this criteria the "site" should be regarded as the overall area/buildings available for potential school development, which may incorporate multiple titles/parcels (including Unit Titles).

Sites providing or exceeding the stated useable land requirement will score **5** on the scale. Sites smaller than the stated useable requirement will score progressively and comparatively less.

Rating Criteria - School spaces required:

- Carparking for 27 regular carpark spaces and 2 mobility carpark spaces and adequate vehicle circulation through carpark.
- Adequate pedestrian access from street frontage and carpark to and around buildings and all spaces that need to be accessible.
- Adequate paved routes from accessible car parks to the building and to paved outdoor areas.
- Outdoor paved area for at least 1 netball/basketball court and general open paved area for either general play or a playground.
- Outdoor green field area.
- Building with a floor area of 2028m² and an additional area to create a larger building with a total floor area of 2593m².

Site	Design	Score/5	Reasons
McCormacks Bay Reserve – Site 1	Option 1	5	Can fit spaces required.
Redcliffs Park – Site 37 – Location A	Option 1	5	Can fit spaces required.
	Option 2	5	Can fit spaces required.
Redcliffs Park – Site 37 – Location B	Option 1	5	Can fit spaces required.
Barnett Park – Site 38 – Location A	Option 1	3*	Relationship between school and carpark requires further consideration. Space available for building is restricted due to easements. Access to grassed field is challenging due to location of existing carpark. *Rating could improve potentially to a 4 if carpark location can be better resolved.
Barnett Park – Site 38 – Location B	Option 1	5	Can fit spaces required.
Barnett Park – Site 38 – Location C	Option 1	5	Can fit spaces required.

SCHOOL DESIGN POTENTIAL

Description as provided by 'The Property Group':

Does the site present good urban design and architectural opportunities that would promote good learning outcomes? Are there existing buildings or other developments on the site (e.g. large sealed areas) that could be retrofitted to provide high quality educational facilities?

An architect with experience of modern NZ school design should provide a comparative analysis of the shortlisted sites, scoring **5** down to **0**.

Rating Criteria:

- Good street frontage, clear building entrance, and entrance courtyard (drop off zone).
- Good accessibility between carpark, street access, bike stands and buildings entrance.
- Bike/scooter stands to be located close to the building for security.
- Does a building comfortably fit onto the site to block prevailing wind and maximize access to daylight?
- Is there the opportunity to have a paved outdoor space for a basketball/netball court?
- Is there good flow from the school to a grassed field area?

Site	Design	Score/5	Reasons
McCormacks Bay Reserve – Site 1	Option 1	5	Fulfil requirements.
Redcliffs Park – Site 37 – Location A	Option 1	5	Fulfil requirements.
	Option 2	5	Fulfil requirements.
Redcliffs Park – Site 37 – Location B	Option 1	4	The building's designated outdoor space is open to the prevailing North-East Wind.
Barnett Park – Site 38 – Location A	Option 1	2*	Existing carpark separates new school from grassed field area. Restricted outdoor paved area. *Rating could improve with noted improvements below.
Barnett Park – Site 38 – Location B	Option 1	3	No street frontage due to an existing large car park being located between the building and the street. Distanced pedestrian accessibility from the street to the school building – students will have to walk either side of the existing carpark.
Barnett Park – Site 38 – Location C	Option 1	4	Limited vehicular access in and out of the site.

Summary of Architectural Findings

MCCORMACKS BAY RESERVE – SITE 1

- Sufficient space for a long L shaped single storey building with space for an additional single storey extension.
- L shaped building creates a courtyard that blocks the prevailing North-East wind.
- Outdoor paved courtyard flows freely onto the grassed field area.
- Carpark access separate from existing bus turnaround area.
- Bike stand visible from building.
- Sufficient outdoor grassed area.
- Sufficient space for a Basketball court on an outdoor paved area.
- Sufficient space for a playground
- Accessible and welcoming street frontage.
- Keeps existing changing/storage building on site.
- Keeps existing public car parking.
- Good access to wetlands area for outdoor learning.

REDCLIFFS PARK – SITE 37 – LOCATION A (OPTION 1)

- Sufficient space for an L shaped building, with a two storey part and space for an additional single storey extension.
- This concept avoids existing easements.
- L shaped building creates a courtyard that blocks the prevailing North-East wind.
- L shaped building has a two storey part to it which has the ability to create a visual statement seen from the street.
- Outdoor paved courtyard flows freely onto the grassed field area.
- Reduces council on-street parking by approximately 6 carparks.
- The carpark lines the street front and sits between the building and the street. In doing so it creates a less accessible and less visually appealing street frontage for the school buildings.
- Bike stand visible from building.
- Sufficient space for a Basketball court on an outdoor paved area.
- Sufficient space for a playground.
- Can utilise existing Redcliffs Park playground.
- Two main pedestrian access routes. One from Celia Street, the other secondary one from Main Road.

REDCLIFFS PARK – SITE 37 – LOCATION A (OPTION 2)

- Sufficient space for an L shaped building, with a two storey part and space for an additional single storey extension.
- This concept avoids existing easements.
- L shaped building creates a courtyard that blocks the prevailing North-East wind.
- L shaped building has a two storey part to it which has the ability to create a visual statement seen from the street.
- Outdoor paved courtyard flows freely onto the grassed field area.
- Reduces council on-street parking by approximately 4 carparks.
- Different to Option 1, the carpark is located along the south façade of the building away from the street front. This gives the building a better connection to the street; making it more visually and physically accessible.
- Bike stand visible from building.
- Sufficient space for a Basketball court on an outdoor paved area.
- Sufficient space for a playground.
- Can utilise existing Redcliffs Park playground.
- Two main pedestrian access routes. One from Celia Street, the other secondary one from Main Road.

REDCLIFFS PARK – SITE 37 – LOCATION B

- Sufficient space for a two two-storey buildings and a smaller additional two storey building expansion.
- The location of the buildings are restricted by the 10⁻⁶ Lives Risk Line along the South boundary.
- The concept will need to avoid existing easements. An existing easement runs through the middle of the site. This causes the space for school buildings along Main Road to be split in two.
- Due to the shape of the site, this concept has no space for a courtyard, but it does have sufficient space an outdoor paved area by the carpark.
- This concept will have outdoor areas exposed to the prevailing North-East wind.
- In this concept, the proposed carpark is located along Beachville Road. The proposed boat council carparks are shifted to the right to allow in and out access for the school carpark.
- The two-storey buildings along Main Road have good street frontage with the ability to create a great urban feature for the local area.
- Bike stand visible from building.
- Sufficient space for a Basketball court on an outdoor paved area.
- Utilises existing Redcliffs Park playground.
- Multiple access routes. Two from Main Road, the other from the carpark on Beachville Road, and another from across the field from Ceila Street. Accessible from many directions.
- If the additional two storey building is not built, this area could turn into an outdoor paved play area.
- Good security for the buildings and play areas out of hours.

BARNETT PARK – SITE 38 – LOCATION A

- Sufficient space for two two-storey buildings and a single storey building expansion.
- The concept will need to avoid existing easements. There are a number of easements located on this site which restrict the building area.
- As a result of the restricted building area, there is an increased outdoor area which is exposed to the prevailing North-East wind.
- The new school car parking is to be shared with existing car parking. It is likely additional car parking will need to be added to the south of the existing carpark.
- The school in this concept is separate from the grassed field area.
- Access to the grassed field area from the school will need to be improved. This can be achieved by paving a pathway along the east façade from the school to the field area that is private to the school only and kept separate from the pedestrian access along the west boundary. A paved path for the public along the west boundary, could be used to help divert the public away from this route.
- Bike stand is visible from building.
- Sufficient space for a Basketball court on an outdoor paved area.
- The concept keeps the current location of the existing early childhood centre.
- The concept keeps all auxiliary buildings on site.
- Multiple options for entrances along Main Road.
- Recommendation: Subject to detailed traffic studies, relocate the public (non-school) carpark to improve relationship between school and grassed field by either replacing the car park with 'soft' landscaping or re-purposing it as hard paved recreation area. These improvements would significantly improve the relationship of the school's indoor to outdoor learning environments and recreation facilities.

BARNETT PARK – SITE 38 – LOCATION B

- Sufficient space for two two-storey buildings and one single storey extension which are arranged in a way to create a paved courtyard.
- The location of the buildings are restricted by both the 10⁻⁶ Lives Risk Line on the west boundary and two easements which run along the west boundary.
- The school is split into multiple buildings to avoid the easement.
- Due to the restrictions and the locations of the buildings, the outdoor area will be exposed to the prevailing North-East wind.
- The new school car parking will be added to the south of the existing carpark.
- This location has no street frontage.
- There is a distance from the street to the school. These routes will need to be paved and made as accessible as possible.
- Sufficient space for a Basketball court on an outdoor paved area.
- Outdoor paved courtyard flows freely onto the grassed field area.
- Bike stand is visible from building.
- The concept keeps all auxiliary buildings on site.
- Two pedestrian routes from Main Road.

BARNETT PARK – SITE 38 – LOCATION C

- Sufficient space for 2 single storey buildings and one single storey extension which are arranged in a way to create a paved courtyard.
- The location of the buildings are restricted by both the 10⁻⁶ Lives Risk Line on the west boundary and two easements which run along the west boundary.
- The school is split into multiple buildings and arranged in a way to avoid existing easements.
- This concept includes a generous amount of outdoor paved area.
- This school has limited street frontage to Bay View Road.
- Sufficient space for a Basketball court on an outdoor paved area.
- Outdoor paved courtyard flows freely onto the grassed field area.
- Bike stand is visible from building.
- The concept keeps all auxiliary buildings on site. It appears there is a garage located on the site at the end of Bay View Road. There are no plans that show this is private property.
- There are several pedestrian access routes around the Barnett Park Area. The Main access from the closest street is from Bay View Road.
- There is only one vehicular access route to the site from Bay View Road. A roading solution is recommended to create better in/out vehicle access.
- The proposed carpark is only able to have one in and one out due to easement and vehicular access restrictions.

Services Site Options Study

Services Consultant Methodology Rating

The below are ratings of each potential site based on services criteria needed to create a functioning educational facility for Redcliffs School.

INFRASTRUCTURE SERVICES

Description as provided by 'The Property Group':

Does the site have immediate availability or connection to: Water supply (potable and fire fighting), sanitary drainage, storm water, electricity, gas, telephone, refuse. Distance from the headworks of these services should also be considered.

A site with adequate connection to all infrastructure services for the proposed school will score the highest. **0.5** point for each service plus an extra **1** point for all services.

Rating Criteria of the following services:

- Potable water supply (proximity and capacity refer Tonkin & Taylor)
- Sewer network (proximity and capacity refer Tonkin & Taylor)
- Stormwater (proximity and capacity refer Tonkin & Taylor)
- Fire water supply (proximity and capacity refer Tonkin & Taylor)
- Electricity on site
- Gas on site
- Telephone/Communications on site
- Refuse

Site	Design	Score/5	Reasons
McCormacks Bay Reserve – Site 1	Option 1	2.5	New connections required. Electricity further investigation.
Redcliffs Park – Site 37 – Location A	Option 1	2.4	New connections required. Electricity further investigation.
	Option 2	2.4	Similar to Option 1
Redcliffs Park – Site 37 – Location B	Option 1	2.4	New connections required. Electricity further investigation.
Barnett Park – Site 38 – Location A	Option 1	2.6	New connections required. Electricity further investigation.
Barnett Park – Site 38 – Location B	Option 1	1.5	New connections required. Electricity further investigation. May need long service run.
Barnett Park – Site 38 – Location C	Option 1	1.7	New connections required. May need long service run.

Summary of site services infrastructure considerations.

Based on brief desktop study for preliminary site consideration.

Site1: McCormacks Bay Reserve

Water supply: potable	Refer Tonkin & Taylor Civil summary.
Water supply: fire protection	Refer Tonkin & Taylor Civil summary.
Sanitary drainage	Refer Tonkin & Taylor Civil summary.
Stormwater	Refer Tonkin & Taylor Civil summary.
Electricity	Existing supply to land parcel, new site supply required for proposed development. Potential major constraint/cost given existing land use primarily park/reserve, further investigation required including engaging with distribution network provider Orion.
Gas	No known nearby reticulation, vehicle delivery operates nearby.
Telephone/Communications	No known connection to land parcel, new site connections required for proposed development. Nearby cable route is McCormacks Bay Road. Fibre expected 2017.
Refuse	Waste collection services operate nearby.

Site37: Redcliffs Park

Location A

Water supply: potable	Refer Tonkin & Taylor Civil summary.
Water supply: fire protection	Refer Tonkin & Taylor Civil summary.
Sanitary drainage	Refer Tonkin & Taylor Civil summary.
Stormwater	Refer Tonkin & Taylor Civil summary.
Electricity	Existing supply to land parcel, new site supply required for proposed development. Potential major constraint/cost given existing land use primarily park/reserve, further investigation required including engaging with distribution network provider Orion.
Gas	No known nearby reticulation, vehicle delivery operates nearby.
Telephone/Communications	No known connection to land parcel, new site connections required for proposed development. Nearby cable route Main Road or Beachville Road. Fibre expected 2017.
Refuse	Waste collection services operate nearby.

Site37: Redcliffs Park

Location B

Water supply: potable	Refer Tonkin & Taylor Civil summary.
Water supply: fire protection	Refer Tonkin & Taylor Civil summary.
Sanitary drainage	Refer Tonkin & Taylor Civil summary.
Stormwater	Refer Tonkin & Taylor Civil summary.
Electricity	Existing supply to land parcel, new site supply required for proposed development. Potential major constraint/cost given existing land use primarily park/reserve, further investigation required including engaging with distribution network provider Orion.
Gas	No known nearby reticulation, vehicle delivery operates nearby.
Telephone/Communications	No known connection to land parcel, new site connections required for proposed development. Nearby cable route is Main Road. Fibre expected 2017.
Refuse	Waste collection services operate nearby.

Site38: Barnett Park	Location A
Water supply: potable	Refer Tonkin & Taylor Civil summary.
Water supply: fire protection	Refer Tonkin & Taylor Civil summary.
Sanitary drainage	Refer Tonkin & Taylor Civil summary.
Stormwater	Refer Tonkin & Taylor Civil summary. Existing supply to land parcel, new site supply required for proposed development. Potential major constraint/cost given existing land use primarily park/reserve, further investigation required including engaging with distribution network provider Orion. Note underground power easement affects site.
Electricity	
Gas	No known nearby reticulation, vehicle delivery operates nearby. Existing connection to land parcel, new site connections required for proposed development. Nearby cable route is Main Road. Fibre in street.
Telephone/Communications	
Refuse	Waste collection services operate nearby.
Site38: Barnett Park	Location B
Water supply: potable	Refer Tonkin & Taylor Civil summary.
Water supply: fire protection	Refer Tonkin & Taylor Civil summary.
Sanitary drainage	Refer Tonkin & Taylor Civil summary.
Stormwater	Refer Tonkin & Taylor Civil summary. Existing supply to land parcel, new site supply required for proposed development. Potential major constraint/cost given existing land use primarily park/reserve, further investigation required including engaging with distribution network provider Orion. Building location remote from street adds additional infrastructure cost. Note underground power easement affects site.
Electricity	
Gas	No known nearby reticulation, vehicle delivery operates nearby. Existing connection to land parcel, new site connections required for proposed development. Nearby cable route is Main Road. Fibre in street. Building location remote from street adds additional infrastructure cost.
Telephone/Communications	
Refuse	Waste collection services operate nearby.
Site38: Barnett Park	Location C
Water supply: potable	Refer Tonkin & Taylor Civil summary.
Water supply: fire protection	Refer Tonkin & Taylor Civil summary.
Sanitary drainage	Refer Tonkin & Taylor Civil summary.
Stormwater	Refer Tonkin & Taylor Civil summary. Existing supply to land parcel, new site supply required for proposed development. Potential major constraint/cost given existing land use primarily park/reserve, further investigation required including engaging with distribution network provider Orion. Bay view road existing infrastructure may be limited. Note distance from nearby substation and overhead transmission lines should be maximised. Note underground power easement affects site.
Electricity	
Gas	No known nearby reticulation, vehicle delivery operates nearby. Existing connection to land parcel, new site connections required for proposed development. May require long service run from Main road if existing Bay View Road services inadequate. Fibre expected 2017.
Telephone/Communications	
Refuse	Waste collection services operate nearby.

Drawing List	
Sheet Name	Sheet Number
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McCormacks Bay Reserve – Site 1	2
Redcliffs Park - Site 37 - Location A	3
Redcliffs Park - Site 37 - Location A	4
Redcliffs Park –Site 37 – Location B	5
Barnett Park – Site 38 – Location A	6
Barnett Park – Site 38 – Location B	7
Barnet Park - Site 38 - Location C	8



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Redcliffs School
Site Option Studies
for
Ministry of Education

Building Ref:

Project No:

22326



Site 1 - Location Plan
1:2000

SITE INFORMATION

McCormacks Bay Reserve East

Legal Description: Pt RES 4324
Site Area: Approx. 74249 m2
Wind Zone: VH
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Managment Area: Yes
Technical Category: N/A

McCormacks Bay Reserve West

Legal Description: Pt RES 4325
Site Area: Approx. 74249 m2
Wind Zone: H
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Managment Area: Yes
Technical Category: N/A

GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- No-build Zone
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- A Accessible Carpark



Site 1 - Design Option 1
1:500

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McCormacks Bay Reserve – Site 1

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Site 37 - Location A - Location Plan
1 : 2000

SITE INFORMATION

17 Main Road, Redcliffs, Christchurch 8081
Redcliffs Park

Legal Description: Lot 3 DP 47479
Site Area: Approx. 7697 m²
Wind Zone: High
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

113 Beachville Road, Redcliffs, Christchurch 8081
Redcliffs Park

Legal Description: RES 4601
Site Area: Approx. 10304 m²
Wind Zone: High
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- A Accessible Carpark



Site 37 - Location A - Design Option 1
1 : 500

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Redcliffs Park - Site 37 - Location A

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GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- A Accessible Carpark



Site 37 - Location A - Design Option 2
1:500



Site 37 – Location B - Location Plan
1:2000

SITE INFORMATION

9 Main Road, Redcliffs, Christchurch 8081

Legal Description: RES Lot 2 DP 47479
Site Area: Approx. 1075 m²
Wind Zone: High
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

17 Main Road, Redcliffs, Christchurch 8081
Redcliffs Park

Legal Description: Lot 3 DP 47479
Site Area: Approx. 1075 m²
Wind Zone: High
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

19 Main Road, Redcliffs, Christchurch 8081

Legal Description: RES Lot 2 DP 47479
Site Area: Approx. 10304 m²
Wind Zone: High
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- A Accessible Carpark



Site 37 – Location B - Design Option 1
1:500

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Site 38 – Location A – Location Plan
1 : 2000

SITE INFORMATION

200A Main Road, Redcliffs, Christchurch 8081
Barnett Park

Legal Description: RES 4979
Site Area: Approx. 74249 m²
Wind Zone: VH
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- Accessible Carpark



Site 38 – Location A – Design Option 1
1 : 500

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Site 38 – Location B – Location Plan
1 : 2000

SITE INFORMATION

200A Main Road, Redcliffs, Christchurch 8081
Barnett Park

Legal Description: RES 4979
Site Area: Approx. 74249 m2
Wind Zone: VH
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
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Site 38 – Location B – Design Option 1
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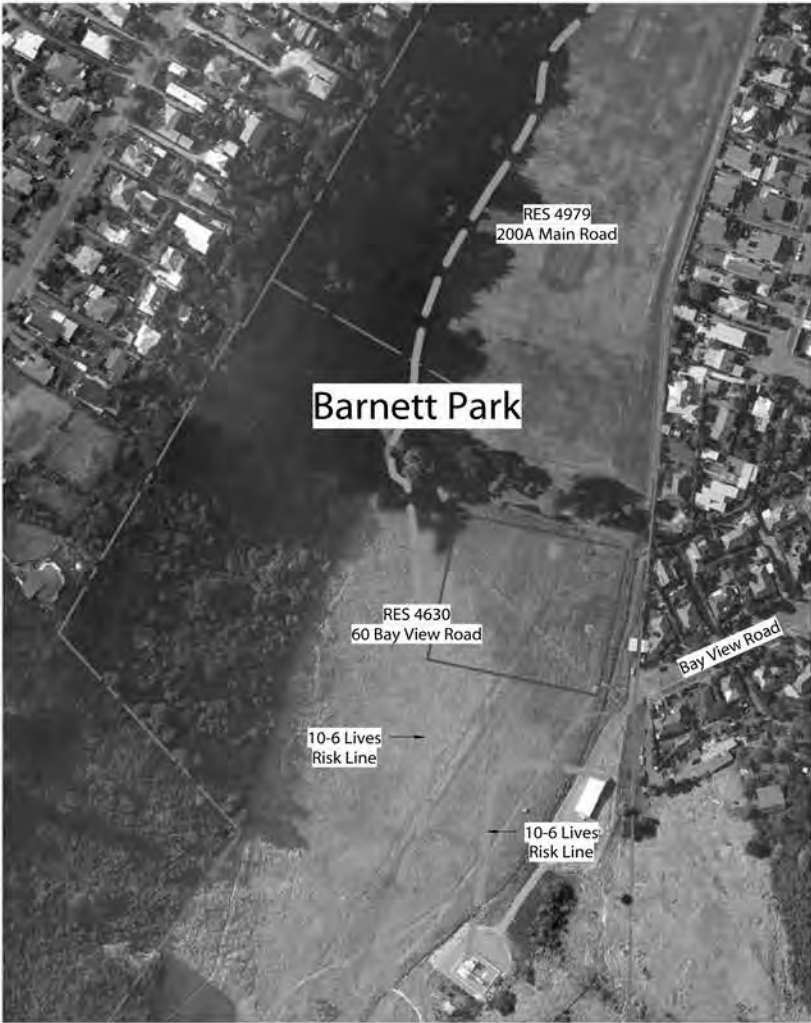
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Site 38 – Location C – Location Plan
1 : 2000

SITE INFORMATION

200A Main Road, Redcliffs, Christchurch 8081
Barnetts Park

Legal Description: RES 4979
Site Area: Approx. 74249 m2
Wind Zone: VH
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: Yes
Technical Category: N/A

60 Bay View Road, Redcliffs, Christchurch 8081
Barnetts Park

Legal Description: RES 4630
Site Area: Total Unknown
Wind Zone: VH
Exposure Zone: Zone D
Earthquake Zone: Zone 2
Snow Loading: N4
Flood Management Area: No
Technical Category: N/A

GENERAL BULK & LOCATION KEY

- School Building
- Larger School Building
- 2 Storey Area
- School Carparks
- On Street Carparks
- Aux Buildings
- Paved Area
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- A Accessible Carpark



Site 38 – Location C – Design Option 1
1 : 500

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Appendix 9: Telfer Young Valuation Advice



REDACTED



REDACTED



REDACTED



REDACTED



REDACTED



REDACTED



REDACTED



REDACTED

Appendix 10: Mahaanui Kurataiao Limited Report



**Mahaanui
Kurataiao Ltd**

Manawhenua Environmental Services

17 Allen Street, Central Christchurch, Telephone: +64 3 377 4374 Website: www.mkt.co.nz

Ministry of Education

Introduction: Ngāi Tahu values are strongly embedded in natural environmental values, spiritual values, whakapapa (genealogical relationships) and historical associations with the environment and some particular locations within this. The relationships were, and continue to be expressed through the occupation, use and naming of areas.

Te Tai o Mahaanui (the Ōtautahi/Christchurch coastline) as well as Te Ihutai / Avon-Heathcote Estuary and the surrounding catchment have been areas of abundant mahinga kai for generations of Māori. The value of this area is evident in the number of nohoanga/ seasonal settlements used by Ngāi Tahu, and their predecessors Ngāti Mamoe and Waitaha for more than 600 years. The nohoanga/ settlements were connected by travel routes that linked whānau and hapū in the area with Tuahiwi in North Canterbury, Whakaraupō/ Lyttleton Harbour, Koukourārata/Port Levy and beyond.

The most well-known wāhi taonga sites within Sumner and the wider area are Moncks Cave and Te Ana O Hineraki / Moa Bone Point Cave. Occupation of these sites is dated as early as the 1300s. Other important landmarks include;

- Rapanui; 'the great stern post.' A prominent landmark named by Waitaha and is one of the oldest landmarks in the area.
- Tuawera¹ / Cave Rock, which in one tradition is attributed to being the carcass of a whale, beached by means of black magic. Such sites and landmarks provide an important contextual history.

The Māori name for Redcliffs is Te Rae Kura meaning red, glowing headlands. Large groups of Māori settled here during the 14th century. A kāika was located at Te Rae Kura that was occupied by the early Waitaha people and then, later, by the Ngāti Māmoe tribe. Ngāi Tahu displaced Ngāti Māmoe in the 17th century and were still living in the area when the first Europeans began to arrive.

The point at the Redcliffs Cutting is named Te Pou o te Tutemaro, in honour of an early Māori explorer.²

Background: Mahaanui Kurataiao Ltd has been requested to provide a risk assessment of three potential School sites in the Sumner/Redcliffs area.

The three sites requiring assessment are located at;

McCormacks Bay

Barnett Park

Redcliffs Park

¹ Te Whakatau Kaupapa – At Ihutai, near Sumner, Ngāi Tahu fisherman avoid an area known as Tuawera because of an incident where a hapū, Ngāti Pohoareare, were killed by māku (witchcraft) ... are examples of areas of water which have, or have had, a rāhui laid over them.

² W.A. Taylor, Lore and History of the South Island Māori, Bascands, Christchurch: NZ, 1952

Our Values

Whanaungatanga

(family)

Manaakitanga

(looking after our people)

Tahungatanga

(expertise)

Kaitiakitanga

(stewardship)

Tikanga

(appropriate action)

Rangatiratanga

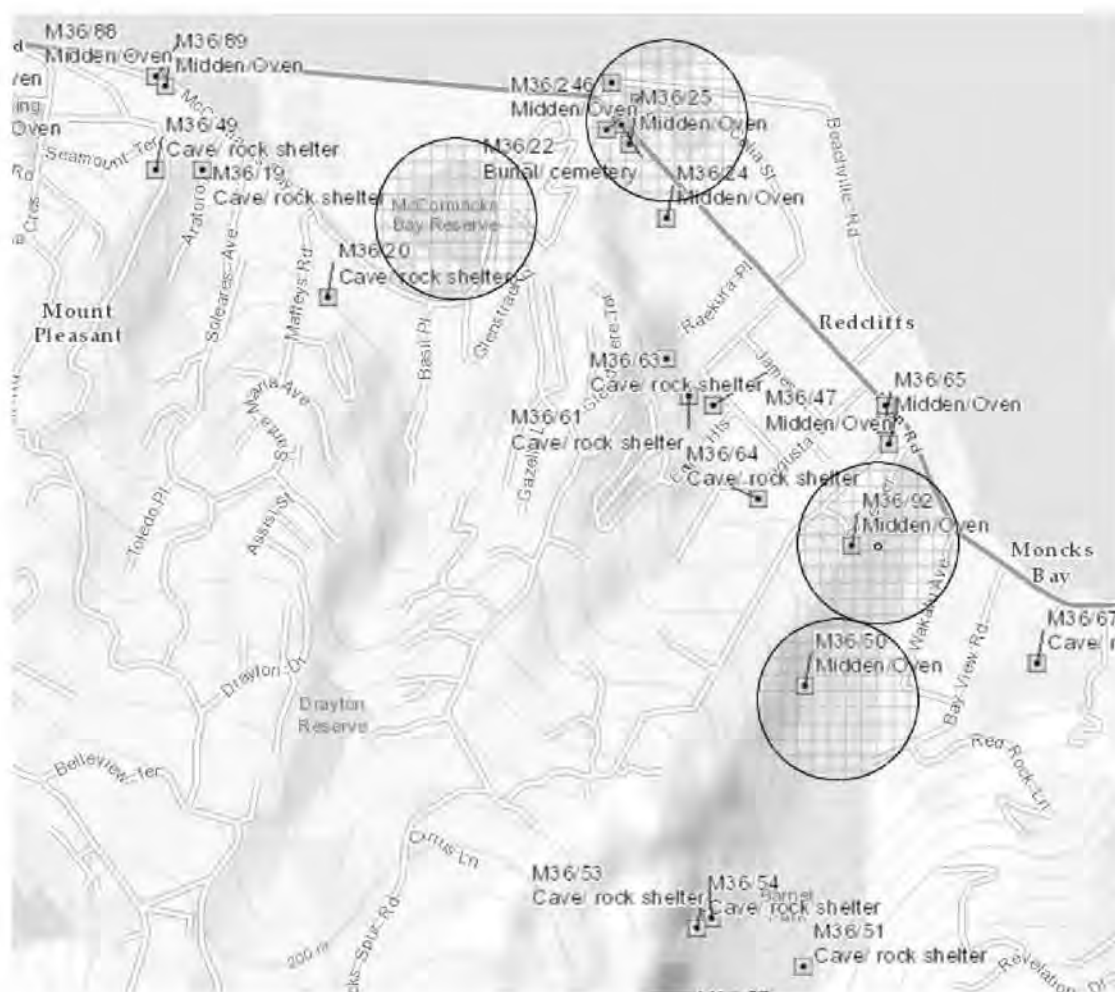
(leadership)

This assessment is in response to the decision by Education Minister Hekia Parata not to confirm her interim decision to close the Redcliffs School. Ms Parata has stated - "However, before a decision is made about whether the school can go back to Main Road, we will explore the possible psychosocial effects of returning the school to its previous site and the possibility of relocating to an alternative site."

Methodology: This is based on a version of 0 to 5 scoring system awarding a score of between 0 and 5, (5 being the highest where a site meets or exceeds the criterion and 0 being the lowest where a site fails the criterion. As no specific example of the Ministry's methodology was available this assessment looks to rank each of the sites on identified Ngāi Tahu cultural values with a 0 to 5 score for each of these and an average score compiled from the total.

Sites: The three sites under assessment are all associated with areas of significance in relation to Ngāi Tahu Cultural values. The site map below shows the three sites under consideration and known Māori archaeological sites in proximity. This however is not the sole test with many other cultural values to be considered and this analysis attempts to address some of the more prominent values of relevance.

Figure 1- Illustrates the location of the three sites under consideration, showing known adjacent archaeological sites.



Ngāi Tahu Cultural Values Criteria	Particular points of issue	Very high(1)	High(2)	Average(3)	Low(4)	Very Low(5)
		RISK FACTOR				
		McCORMACKS BAY				
MAURI the essential life force of all things, spiritual essence	Although most sites will be considerably-degraded, some are of potentially greater significance providing opportunity to restore or prevent further degradation.			X		
MAHINGA KAI food and other resources, and the areas they are sourced from	Ihutai is a taonga to Ngāi Tahu, and was a traditional source of mahinga kai. Its current state and historic reclamation of many areas is a significant issue. Establishment of additional structures within this area would be of significant concern.		X			
KAITIAKITANGA Guardianship and protection	The proximity of the site to Ihutai and that it is on reclaim land works against the responsibility Ngāi Tahu whānui have to restoring the mauri and mahinga kai of this taonga			X		
WAHI TAPU places and things that are sacred	There is evidence to suggest that urupā may be located in the immediate vicinity of this site.	X				
WĀHI TAONGA places and things that are treasured and valued	Ihutai is taonga to Ngāi Tahu and Te Tai o Mahaanui is a statutory acknowledgement area		X			

NGĀ TUTOHU WHENUA cultural landscapes	Ngā tūtohu whenua, or cultural landscapes, is a concept used in the Mahaanui Iwi Management Plan to recognise areas and places of particular importance. As a planning tool, cultural landscapes are a culturally meaningful and effective framework for the identification, protection and management of sites and places of significance, the multiple values associated with those sites and places, and the relationship of tāngata whenua to them.	X				
RANGATIRATANGA chieftainship; self- determination	Upholding the mana of Ngāi Tahu at all times and in all that they do.		X			

Ngāi Tahu Cultural Values Criteria	Particular points of issue	Very high(1)	High(2)	Average(3)	Low(4)	Very Low(5)
		RISK FACTOR				
		REDCLIFFS PARK				
MAURI the essential life force of all things, spiritual essence	Although most sites will be considerably-degraded, some are of potentially greater significance providing opportunity to restore or prevent further degradation.			X		

MAHINGA KAI food and other resources, and the areas they are sourced from	Ihutai is a taonga to Ngāi Tahu, and was a traditional source of mahinga kai. Its current state and historic reclamation of many areas is a significant issue. Establishment of additional structures within this area would be of significant concern.		X			
KAITIAKITANGA Guardianship and protection	The proximity of the site to Ihutai and that it is on reclaim land works against the responsibility Ngāi Tahu whānui have to restoring the mauri and mahinga kai of this taonga			X		
WAHI TAPU places and things that are sacred	There is evidence to suggest that urupā may be located in the immediate vicinity of this site.		X			
WĀHI TAONGA places and things that are treasured and valued	Ihutai is taonga to Ngāi Tahu and Te Tai o Mahaanui is a statutory acknowledgement area		X			
NGĀ TUTOHU WHENUA cultural landscapes	Ngā tūtohu whenua, or cultural landscapes, is a concept used in the Mahaanui Iwi Management Plan to recognise areas and places of particular importance. As a planning tool, cultural landscapes are a culturally meaningful and effective framework for the identification, protection and management of sites and places of significance, the multiple values associated with those sites and places, and the relationship of tāngatawhenua to them.		X			

RANGATIRATANGA chieftainship; self- determination	Upholding the mana of Ngāi Tahu at all times and in all that they do.			X		
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Ngāi Tahu Cultural Values Criteria	Particular points of issue	Very high(1)	High(2)	Average(3)	Low(4)	Very Low(5)
		RISK FACTOR				
		BARNETT PARK				
MAURI the essential life force of all things, spiritual essence	Although most sites will be considerably-degraded, some are of potentially greater significance providing opportunity to restore or prevent further degradation.				X	
MAHINGA KAI food and other resources, and the areas they are sourced from	Te Tai o Mahaanui is a statutory acknowledgement area. Although separated by a road the area is still in close proximity to this area.			X		
KAITIAKITANGA Guardianship and protection	The proximity of the site to Ihutai and that it is on reclaim land works against the responsibility Ngāi Tahu whānui have to restoring the mauri and mahinga kai of this taonga			X		
WAHI TAPU places and things that are sacred	Midden/Oven are shown in the region of this site with the potential for further discoveries depending on the level of any earthworks			X		

WĀHI TAONGA places and things that are treasured and valued	Te Tai o Mahaanui is a statutory acknowledgement area. Although separated by a road the area is still in close proximity to this area.		X			
NGĀ TUTOHU WHENUA cultural landscapes	Ngā tūtohu whenua, or cultural landscapes, is a concept used in the Mahaanui Iwi Management Plan to recognise areas and places of particular importance. As a planning tool, cultural landscapes are a culturally meaningful and effective framework for the identification, protection and management of sites and places of significance, the multiple values associated with those sites and places, and the relationship of tāngata whenua to them.			X		
RANGATIRATANGA chieftainship; self- determination	Upholding the mana of Ngāi Tahu at all times and in all that they do.			X		

Summary Table:

<i>Mō tātou, ā, mō kā uri ā muri ake nei³ – for us and our children after us</i>			
Ngāi Tahu Cultural Values	McCORMACKS BAY	REDCLIFFS PARK	BARNETT PARK
Mauri	3	3	4
Mahinga Kai	2	2	3
Kaitiakitanga	3	3	3
Wāhi Tapu	1	2	3
Wāhi Taonga	2	2	2
Ngā Tutohu Whenua	1	2	3
Rangatiratanga	2	3	3
Total Risk Factor	14	17	21

³ Thinking ahead with the cultural, economic and social well being of future generations in mind is central to recognising kaitiakitanga objectives. *Mō tātou, ā, mō kā uri ā muri ake nei* is a tribal whakataukī translated as 'for us and our children after us'. The policies in this IMP seek to resolve issues of significance by asking the fundamental question: what will the impact of this activity be on those that come after us?

Report Prepared by:

Bryan McGillan
Resource Management Planner
Mahaanui Kurataiao Ltd

Approved for release by:

Tania Wati
Kaihautū
Mahaanui Kurataiao Ltd

Disclaimer: Whilst every effort has been made to ensure the correctness of this assessment Mahaanui Kurataiao Ltd will not be held responsible for errors or omissions in source material, this includes but is not limited to: Mahaanui Iwi Management Plan (2013), Te Whakatau Kaupapa, Ngāi submissions on the proposed replacement Christchurch City Council District Plan, Ngāi Tahu GIS.

This assessment does not constitute consultation with the rūnanga represented by Mahaanui Kurataiao or imply endorsement by any individual rūnanga.

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Appendix 11: Computer Freehold Registers



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R. W. Muir
Registrar-General
of Land

Search Copy

Part-Cancelled

Identifier CB4B/1500
Land Registration District Canterbury
Date Issued 17 March 1965

Prior References
648239

Estate	Fee Simple
Area	20.7656 hectares more or less
Legal Description	Part Reserve 4324 and Part Reserve 4325
Purpose	Recreation Reserve

Proprietors
The Christchurch City Council

Interests

CT CB7B/934 issued for Lot 1 DP 25301

Subject to the Reserves Act 1977

Subject to a stormwater and drainage easement (in gross) over part in favour of the Christchurch City Council created by Transfer 719568 - 5.9.1967 at 11:00 am

Subject to a right (in gross) to drain sewage over Part Reserve 4325 marked A on DP 369982 in favour of the Christchurch City Council created by Easement Instrument 7251120.1 - 27.2.2007 at 9:00 am

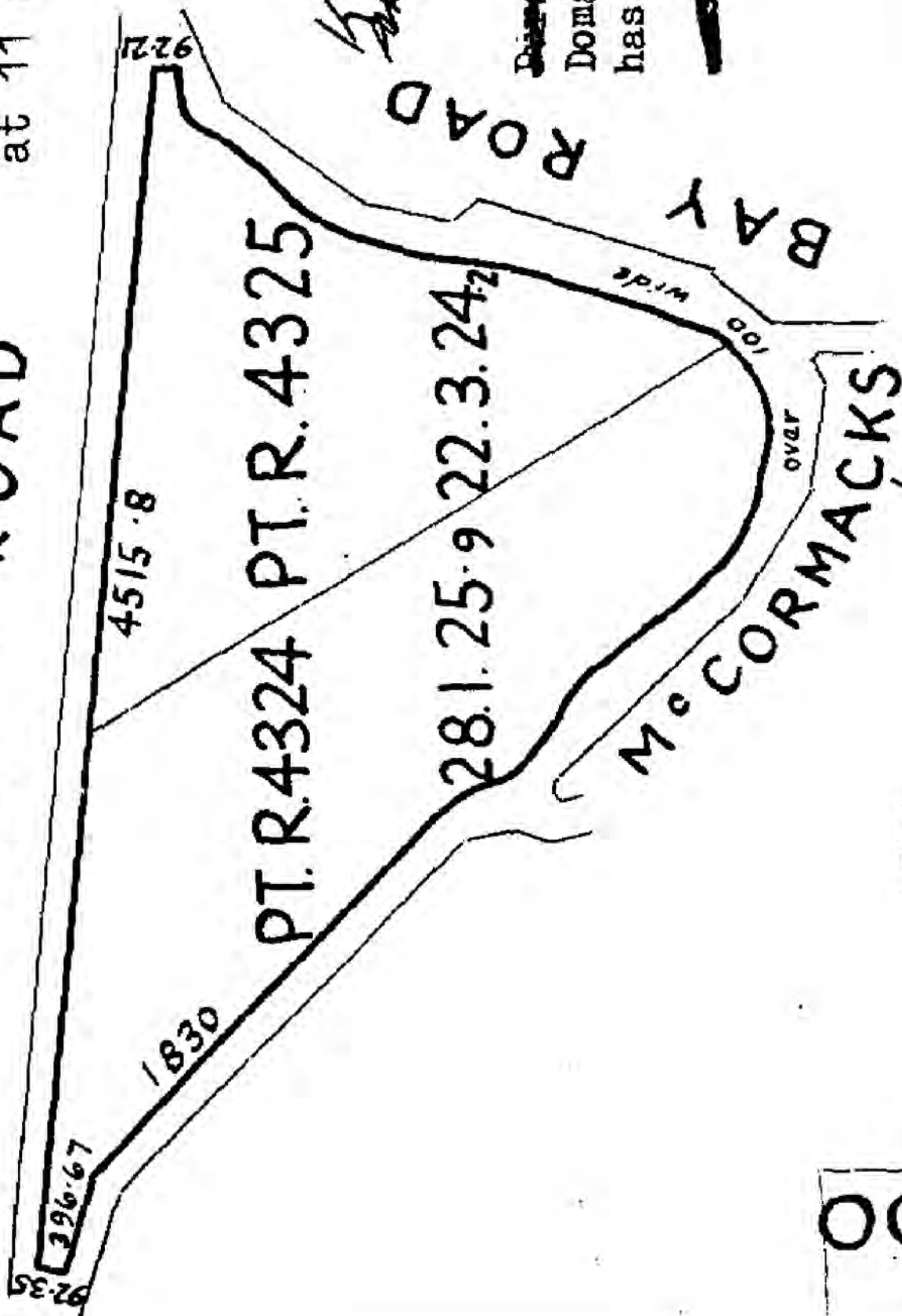
Subject to a right (in gross) to drain sewage over Part Reserve 4324 marked A on DP 474602 in favour of Christchurch City Council created by Easement Instrument 10008479.1 - 23.3.2015 at 11:11 am

Subject to a right (in gross) to drain sewage over Part Reserve 4324 marked A on DP 498092 in favour of Christchurch City Council created by Easement Instrument 10479429.1 - 27.6.2016 at 9:17 am

CB4B/1500

Drainage
Christc
at 11 a

MAIN ROAD



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has 1

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McCormacks Bay Reserve Title Boundaries



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R. W. Muir
Registrar-General
of Land

Search Copy

Identifier CB616/39
Land Registration District Canterbury
Date Issued 29 July 1954

Prior References
OIC 368170

Estate	Fee Simple
Area	1.0304 hectares more or less
Legal Description	Reserve 4601
Purpose	Reserve for recreation purposes

Proprietors
The Christchurch City Council

Interests

Subject to Section 59 Land Act 1948

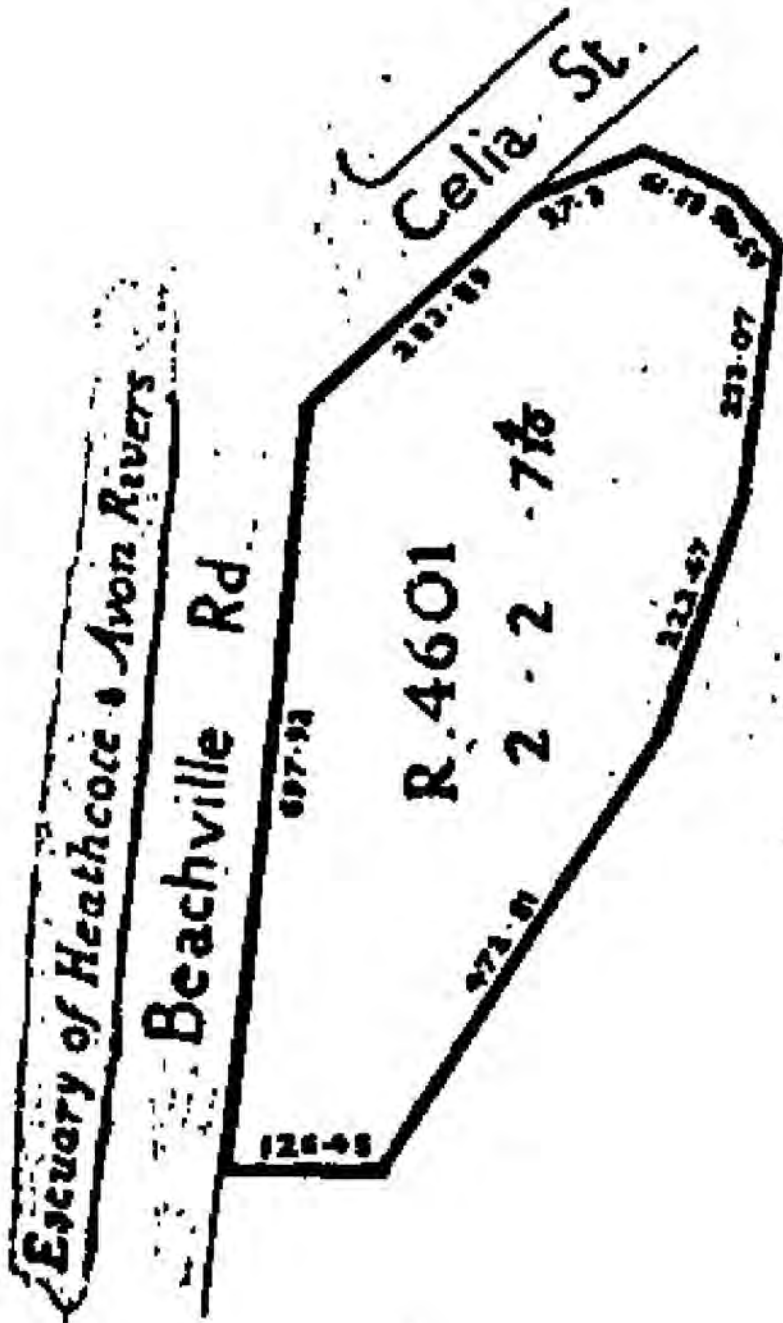
555837.2 Transfer creating the following easements in gross - 12.7.1985 at 10.00 am

Type	Servient Tenement	Easement Area	Grantee	Statutory Restriction
Right to convey and drain water	Reserve 4601 - herein	Part herein	The Christchurch Drainage Board	

555837.3 Transfer creating the following easements in gross - 12.7.1985 at 10.00 am

Type	Servient Tenement	Easement Area	Grantee	Statutory Restriction
Drain sewage	Reserve 4601 - herein	part herein	The Christchurch Drainage Board	

5567473.1 SUBJECT TO PART 9 OF THE NGAI TAHU CLAIMS SETTLEMENT ACT 1998 (WHICH PROVIDES FOR CERTAIN DISPOSALS RELATING TO THE LAND TO WHICH THIS CERTIFICATE OF TITLE RELATES TO BE OFFERED FOR PURCHASE OR LEASE TO TE RUNANGA O NGAI TAHU IN CERTAIN CIRCUMSTANCES) - 30.4.2003 at 9:00 am



Identifier

CB616/39

:



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R. W. Muir
Registrar-General
of Land

Search Copy

Identifier CB27F/184
Land Registration District Canterbury
Date Issued 12 July 1985

Prior References

CB330/271 CB616/34

Estate Fee Simple
Area 7692 square metres more or less
Legal Description Lot 3 Deposited Plan 47479

Proprietors

The Christchurch City Council

Interests

555837.4 Transfer creating the following easement in gross - 12.7.1985 at 10.00 am

Type	Servient Tenement	Easement Area	Grantee	Statutory Restriction
Drain sewage	Lot 3 Deposited Plan 47479 - herein	Part herein	The Christchurch Drainage Board	

The easement granted by Transfer 555837.4 is subject to Section 309(1)(a) Local Government Act 1974

555837.5 Transfer creating the following easement in gross - 12.7.1985 at 10.00 am

Type	Servient Tenement	Easement Area	Grantee	Statutory Restriction
Drain water	Lot 3 Deposited Plan 47479 - herein	Part herein	The Christchurch Drainage Board	

The easement granted by Transfer 555837.5 is subject to Section 309(1)(a) Local Government Act 1974

—



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



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R. W. Muir
Registrar-General
of Land

Identifier CB27F/183
Land Registration District Canterbury
Date Issued 12 July 1985

Prior References
CB330/271 CB616/34

Estate Fee Simple
Area 1075 square metres more or less
Legal Description Lot 2 Deposited Plan 47479

Proprietors
The Christchurch City Council

Interests

—



Redcliffs Park Title Boundaries



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R. W. Muir
Registrar-General
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Identifier 328620
Land Registration District Canterbury
Date Issued 03 January 2007

Prior References
GN 535547

Estate	Fee Simple
Area	7.2813 hectares more or less
Legal Description	Reserve 4979
Purpose	Recreation Reserve

Proprietors
Christchurch City Council

Interests

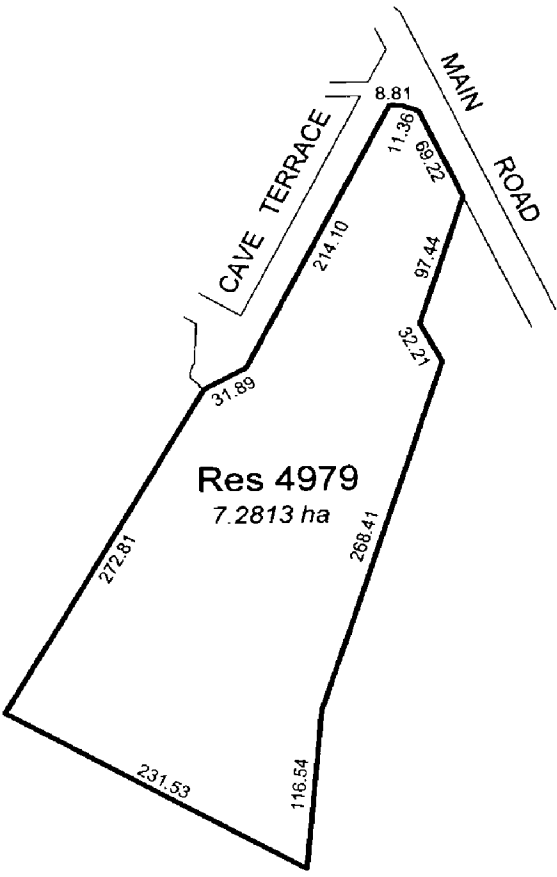
Subject to the Reserves Act 1977

Subject to a right to convey and carry off surface and stormwater created by Deed of Easement contained in CIR
CB806/43 - 27.8.1959 2:10 pm

7246706.1 SUBJECT TO PART 9 OF THE NGAI TAHU CLAIMS SETTLEMENT ACT 1998 (WHICH PROVIDES
FOR CERTAIN DISPOSALS RELATING TO THE LAND TO WHICH THIS CERTIFICATE OF TITLE RELATES
TO BE OFFERED FOR PURCHASE OR LEASE TO TE RUNANGA O NGAI TAHU IN CERTAIN
CIRCUMSTANCES) - 23.2.2007 at 9:00 am


7434874.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS COMPUTER
REGISTER IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS CB818/15) -
26.6.2007 at 9:00 am

Subject to a right (in gross) to convey electric power over part marked B on DP 409023 in favour of Orion New
Zealand Limited created by Easement Instrument 8354853.1 - 22.12.2009 at 10:26 am



Title Diagram 328620

Cpy - 01/01, Pgs - 001, 26/01/07, 14



DocID: 211089843



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



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Registrar-General
of Land

Search Copy

Identifier CB620/38
Land Registration District Canterbury
Date Issued 20 September 1954

Prior References

CB103/278 CB238/181 CB243/242

Estate Fee Simple
Area 32.7542 hectares more or less
Legal Description Reserve 4630
Purpose Recreation

Proprietors

The Christchurch City Council

Interests

407819 Transfer creating the following easements in gross - 5.11.1954 at 12.07 pm

Type	Servient Tenement	Easement Area	Grantee	Statutory Restriction
Drainage	Lot 2 Deposited Plan 17034 - herein	Part herein	The Christchurch Drainage Board	

5567473.1 SUBJECT TO PART 9 OF THE NGAI TAHU CLAIMS SETTLEMENT ACT 1998 (WHICH PROVIDES FOR CERTAIN DISPOSALS RELATING TO THE LAND TO WHICH THIS CERTIFICATE OF TITLE RELATES TO BE OFFERED FOR PURCHASE OR LEASE TO TE RUNANGA O NGAI TAHU IN CERTAIN CIRCUMSTANCES) - 30.4.2003 at 9:00 am

Subject to a right (in gross) to convey electric power over part marked A on DP 409023 in favour of Orion New Zealand Limited created by Easement Instrument 8354853.1 - 22.12.2009 at 10:26 am

Subject to a right (in gross) to convey electric power over part marked A on DP 395396 in favour of Orion New Zealand Limited created by Easement Instrument 8354853.2 - 22.12.2009 at 10:26 am

Land Transfer Office
 Registered:
 Title Ref: ACT 1000, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832,



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952




R. W. Muir
Registrar-General
of Land

Search Copy

Identifier 467115
Land Registration District Canterbury
Date Issued 24 February 2009

Prior References
K946292

Estate	Fee Simple
Area	774 square metres more or less
Legal Description	Rural Section 40504
Purpose	Recreation Purposes

Proprietors
Christchurch City Council

Interests

Subject to the Reserves Act 1977

Subject to a right (in gross) to convey electric power over part marked C on DP 409023 in favour of Orion New Zealand Limited created by Easement Instrument 8354853.3 - 22.12.2009 at 10:26 am

[illegible]



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952




R. W. Muir
Registrar-General
of Land

Search Copy

Identifier CB818/15
Land Registration District Canterbury
Date Issued 11 November 1959

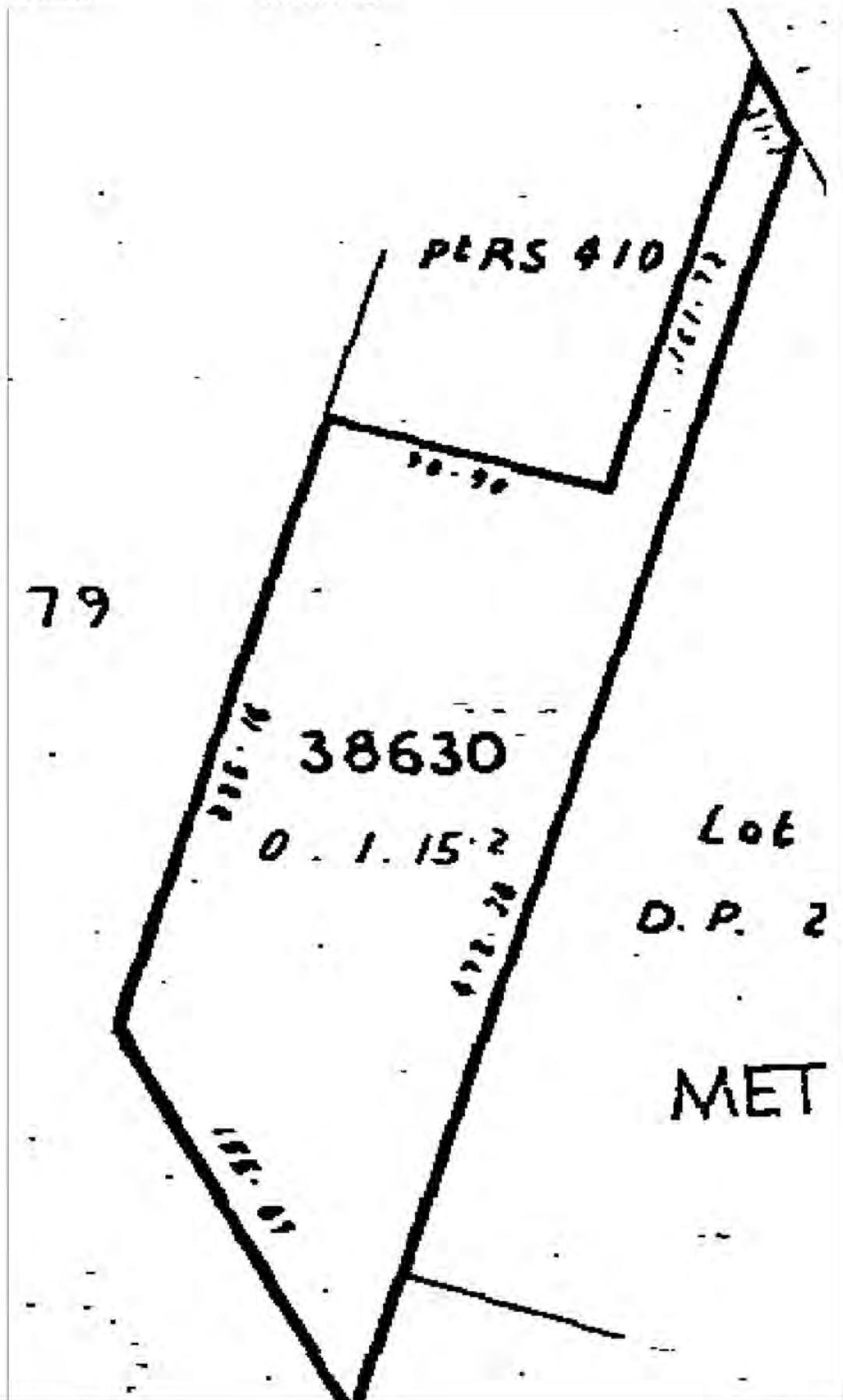
Prior References
CBPR98/85

Estate Fee Simple
Area 1396 square metres more or less
Legal Description Rural Section 38630

Proprietors
The Christchurch Drainage Board

Interests

Subject to Section 59 Land Act 1948
7434874.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS COMPUTER REGISTER IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS 328620) - 26.6.2007 at 9:00 am



Identifier

CB818/15

7

1-1-82



Barnett Park Title Boundaries

Appendix 12: Barnett Park Management Plan



BARNETT PARK

MANAGEMENT PLAN



Christchurch City Council
August 1992

Introduction

Barnett park occupies a unique place in the eastern City's park network by acting as a link between urban Christchurch and the scenic reserves and natural areas of the Port Hills.

The existing value of Barnett park lies in its scenic qualities and potential for active and passive recreation. This plan aims to strengthen these values by assisting native forest regeneration and by providing greater opportunities for passive recreation activities.

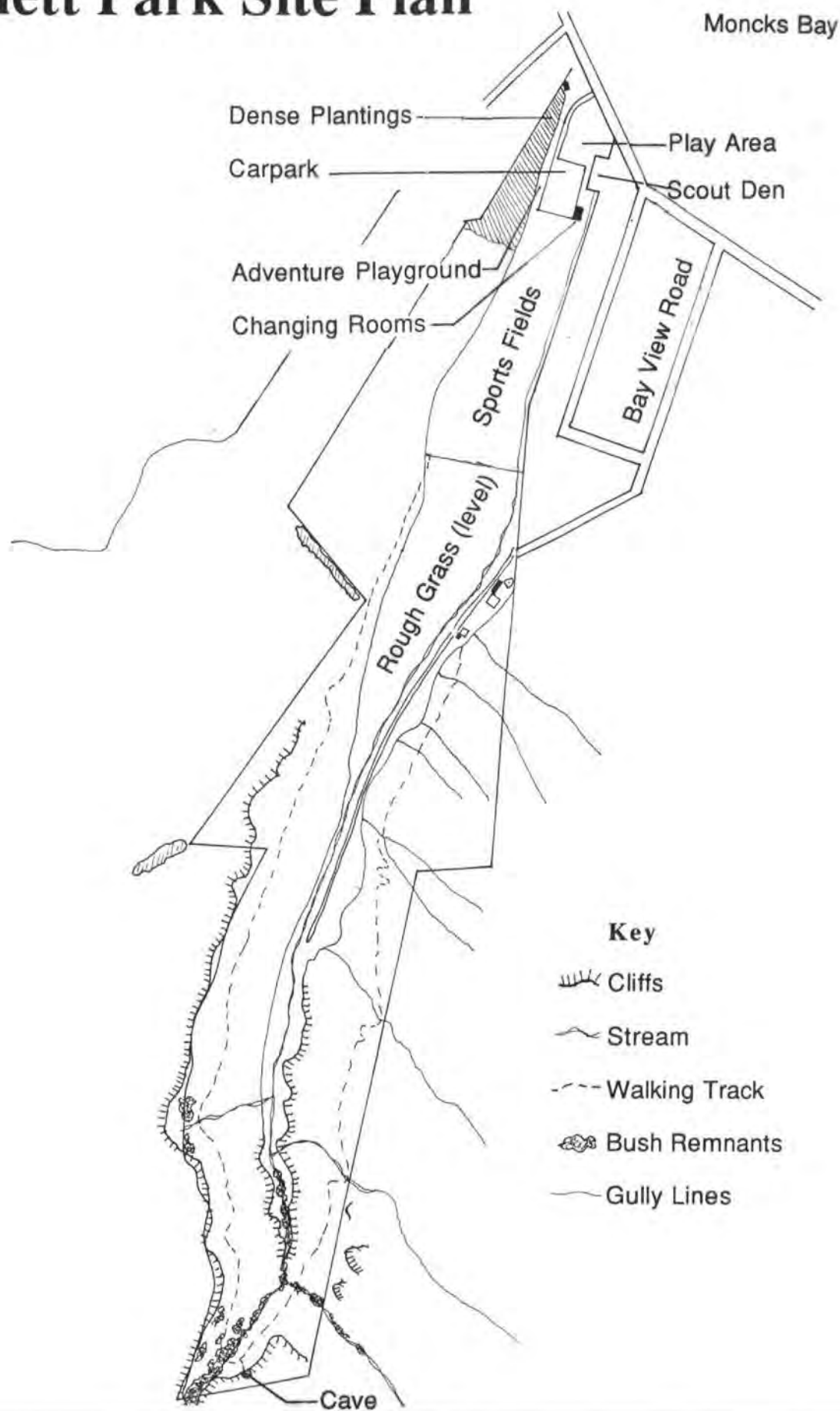
This plan was prepared in conformity with the provisions of Section 41 of the Reserves Act 1977. The draft plan was advertised for public comment on the 14 and 18 March 1992. Submissions closed on 18 May 1992. Thirty-five submissions were received and all respondents were given the opportunity to be heard in support of their submission before a Reserves Hearing Panel. Eight respondents exercised that right. The plan was finally approved by the Reserves Hearing Panel on 13 August 1992.

In addition Council gratefully acknowledges the support and assistance of the Barnett Park 'Adopt A Park' Committee in respect of their contribution to the management plan and park development work generally.

The plan is divided into two parts. In Part 1, 'Background and Resource Information,' the history, development and natural features of Barnett park are examined. This section forms an important basis upon which Barnett park can be assessed and future directions developed. The background information forms the basis for the management goals, objectives and policies in Part 2.

These objectives and policies will provide a clear, logical and consistent management strategy, and through public involvement reflects a consensus of opinion on the future of Barnett Park.

Barnett Park Site Plan



Summary

Barnett Park is one of the most accessible tracts of public land on the eastern Port Hills which provides a diverse and attractive 'natural' aspect for active and passive recreation. The rugged and sometimes dramatic valley topography creates opportunities for a recreation experience with spectacular views which is unavailable in the surrounding urban areas. Barnett Park's sheltered location and seasonal stream has enabled small pockets of native trees and shrubs to survive in spite of years of grazing and fires in the pre European and colonial eras. These small pockets of bush are one of only four remaining natural bush remnants on the City side of the Port Hills between Dyers Pass Road and Godley Head.

The lower valley floor contains one of the few areas of flat land available for organised sporting activities in the Sumner/ Redcliffs area. This area is well used by local sports groups. Opportunities for walkers can be increased by continuing development of the path system to include attractions such as the waterfall and paradise cave.

Management for conservation and natural enhancement of the upper valley is dependant on sheep grazing of grassland, increased goat proof fencing, fire prevention and a management system that encourages native forest regeneration. Vegetation patterns need to complement the underlying landforms, and soil types. In many areas, notably the sheltered upper valley floor, planting of indigenous forest vegetation would enrich the environment with an essential ingredient largely missing at present.

In addition attention needs to be given to upgrading the appearance of the main park entrance area. A landscape concept plan for this area is included in the plan.



Natives in the stream course between rocky cliffs



Gently rising land above the Sports Fields, mown once a year

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Overall Landscape Concept Plan

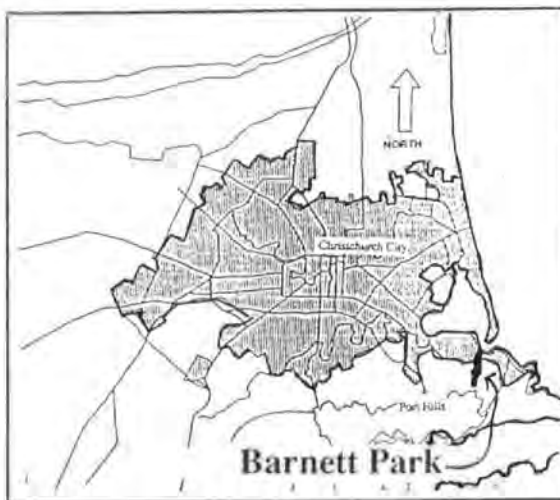
Landscape Concept Plan For the Carpark & Front Entrance

PART 1 BACKGROUND & RESOURCE INFORMATION

1.0 LOCATION, REGIONAL CONTEXT, ACCESS AND PARKING

1.1 Location

Barnett Park is situated in the suburb of Moncks Bay approximately 10km east/south-east of Cathedral Square. It is bordered to the north by the Main Road to Sumner and Cave Terrace, and stretches up the valley between Moncks Spur and Clifton Spur to the south, almost reaching the Summit Road.



1.2 Regional Context

Barnett Park occupies an important position as a 'natural' link between the urban area and the upper Port Hills reserves situated along the Summit Road. Above Barnett Park there are small pockets of bush along the stream which drains the northeast slopes of Mt Pleasant. These remnants are overgrown with *Muehlenbeckia* and *Clematis vitalba* and have been damaged by stock intrusion.

1.3 Access and Parking

There are two pedestrian and vehicle access points:

1. Via the main entranceway off Main Road, where a sealed driveway leads to the main shingle carpark (approximate capacity 200 cars). This carpark services the scout-den, sports fields, childrens' play area and the adventure playground.

2. Via the entranceway off Bay View Road. The entranceway services the walkway as well as providing access to the substation.

2.0 LEGAL DESCRIPTION & RESERVE CLASSIFICATION

Barnett Park is made up of the following land areas:

Rural Section 40504	774 m ²	NZ gazette 1975 p. 1529
Reserve 4979	7.2813 ha	NZ gazette 1960 p. 1472
Reserve 4630	32.7542 ha	NZ gazette 1955 p. 437

TOTAL AREA
40.1129 ha

The reserve is zoned recreation 3 under the Council's District Scheme. It is classified as a recreation reserve pursuant to section 17 of the Reserves Act 1977, Gazette 1992, No. 14, p. 289

3.0 ADMINISTRATION

Barnett Park is administered by the Parks Unit of Christchurch City Council. In 1991 Barnett Park was chosen as a pilot to be adopted by local residents in Council's first 'Adopt a Park Scheme'.

3.1 Leases and Licences

3.1.1 Grazing Lease

There are currently no grazing leases for the park area. However there has been a long standing agreement with an adjoining land property owner who grazes the area free of cost in return for track maintenance and general surveillance of the park.

3.2 Adjoining Council Land

The Council also owns a fenced off block of land (1396m²) which fronts onto the Main Road on the south side of the reserve and is occupied by a sewage pumping station. Also on this block, in an unfenced area which is continuous with the rest of the reserve, is a scout den and community creche.

4.0 HISTORY

Maori people attracted to food resources in the nearby estuary and forest made use of the caves and rock shelters in the area. Habitation declined with the depletion of food resources, particularly moas.

In 1869 Mr J.S. Monck bought two of the four titles covering Barnett Park so he could develop the land for beef and dairy farming. A heightened awareness of empire and corresponding militarism during the 1880's backgrounded Monck's decision to allow volunteers (predecessors to Army Territorials) and School Cadets to use his valley for shooting championships and encampments. In September 1902 the Army officially opened the Redcliffs Rifle Range (RRR) on land leased from Monck.

During World War I RRR was used as a training and camping ground for troops prior to their embarkation (at Lyttelton) for overseas service. In later years parties of School Cadets had shooting practice at the range on weekdays while territorials did so at the weekends.

The advent of World War II saw the RRR turned into a fortress camp to accommodate soldiers. After WWII the camp was dismantled and the range was used for a few more years before the Army vested most of it to the Christchurch City Council in 1954.

The remainder of the land that now makes up the reserve was vested in the Council in 1960 when the first management objectives were laid out. To quote that plan, "no other reserve is comparable with this site for diversity of scenic beauty, physical character, and potential possibilities for landscape effects". Provision was made in the plan for the usual playground equipment as well as a splash pool and a shelter. The western slopes were identified as a site for terraced seating from which to view the games being played on the adjacent sports fields. The two carparks were also planned for at this early stage. A picnic ground was envisaged for the grasslands to the south of the playing fields with a shelter, toilet facilities and open fireplaces. To date the carparks have been formed but none of the other management ideas have been utilised, although the western terraces have since been planted out in native trees and shrubs.

An idea that remains since the initial plan is that of planting out the whole ravine in native trees and shrubs and establishing enough of an area to encourage native avifauna back to the area. The rest of the ravine adjoining the picnic area was to be planted in mixed stands of native and exotic trees and shrubs for the dual purpose of preventing erosion and landscape effect. Arbour day was thought to be an appropriate time for the gradual

realisation of the planting plans outlined above, and groups have regularly gone to the reserve to plant native trees especially at the northern end of the park on this day.



Arbour day planting at the northern end of the Park.

5.0 TOPOGRAPHY, SOILS AND EROSION

5.1 Topography

At its northern end, Barnett Park is a generally flat strip of land bordered on the west by a sloping bank and on the east by a swale running alongside a residential fence line. The contrast between the ends of the park is great. The southern end is formed by steep rocky cliffs bordering a ravine through which a stream flows. The cave on the walkway is a considerable distance above the flat ground of the playing fields.

5.2 Soils

The predominant soil type is Waikuku loamy sand on the level giving way to Takahe hill soils up the valley and beyond. Takahe hill soils are suitable mainly for sheep fattening or semi-intensive grazing. They are low in pH. Waikuku loamy sand, like most sandy soils, has a weak topsoil structure and is prone to wind erosion. Parts of Barnett Park are suffering from erosion due to overgrazing on erosion prone soil types.

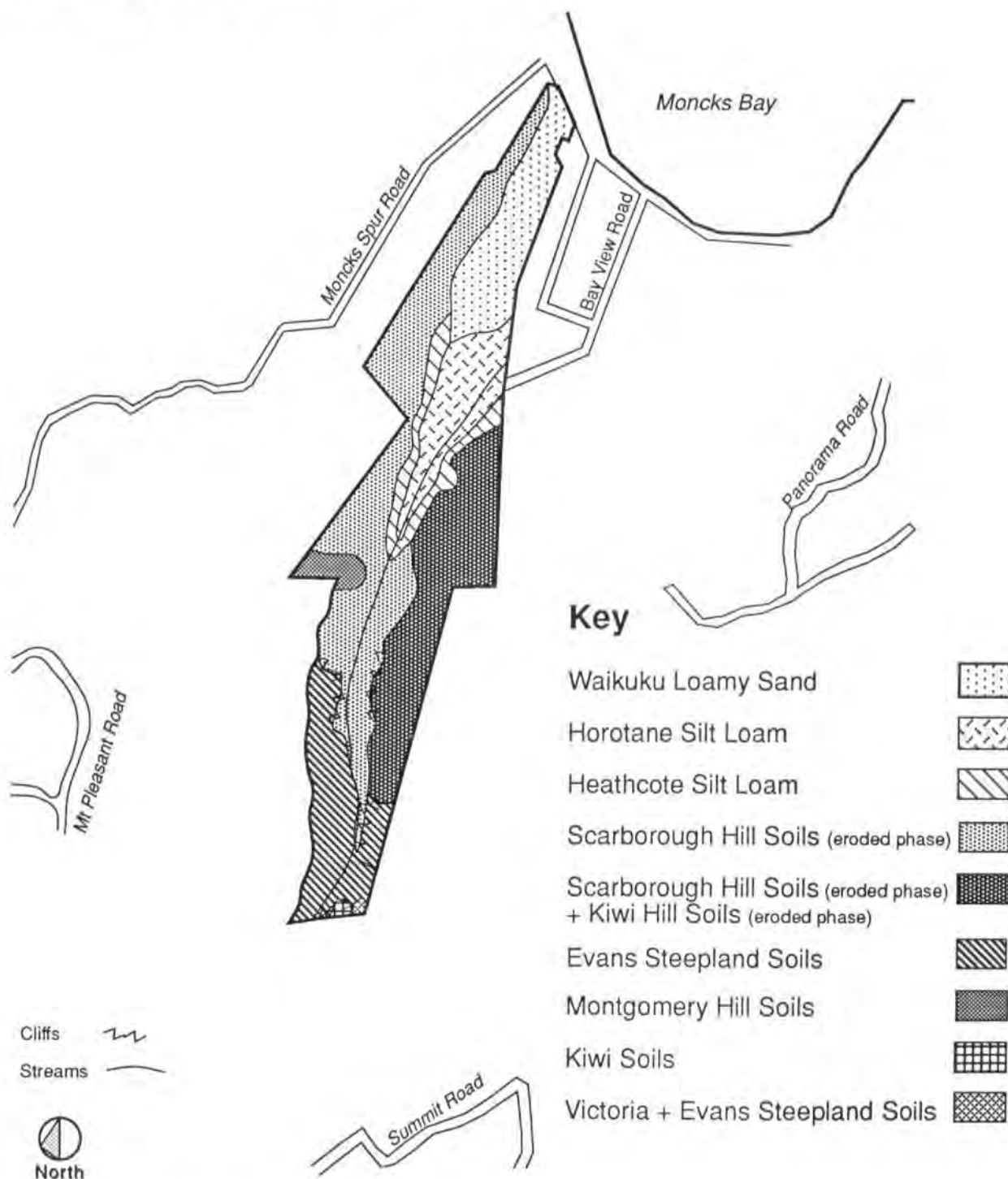
Waikuku Loamy Sand

Waikuku Loamy Sand occupies just over half of the flat land at the eastern end of the Park. It has rapid drainage with little organic matter and is prone to summer drought.

Horotane Silt Loam

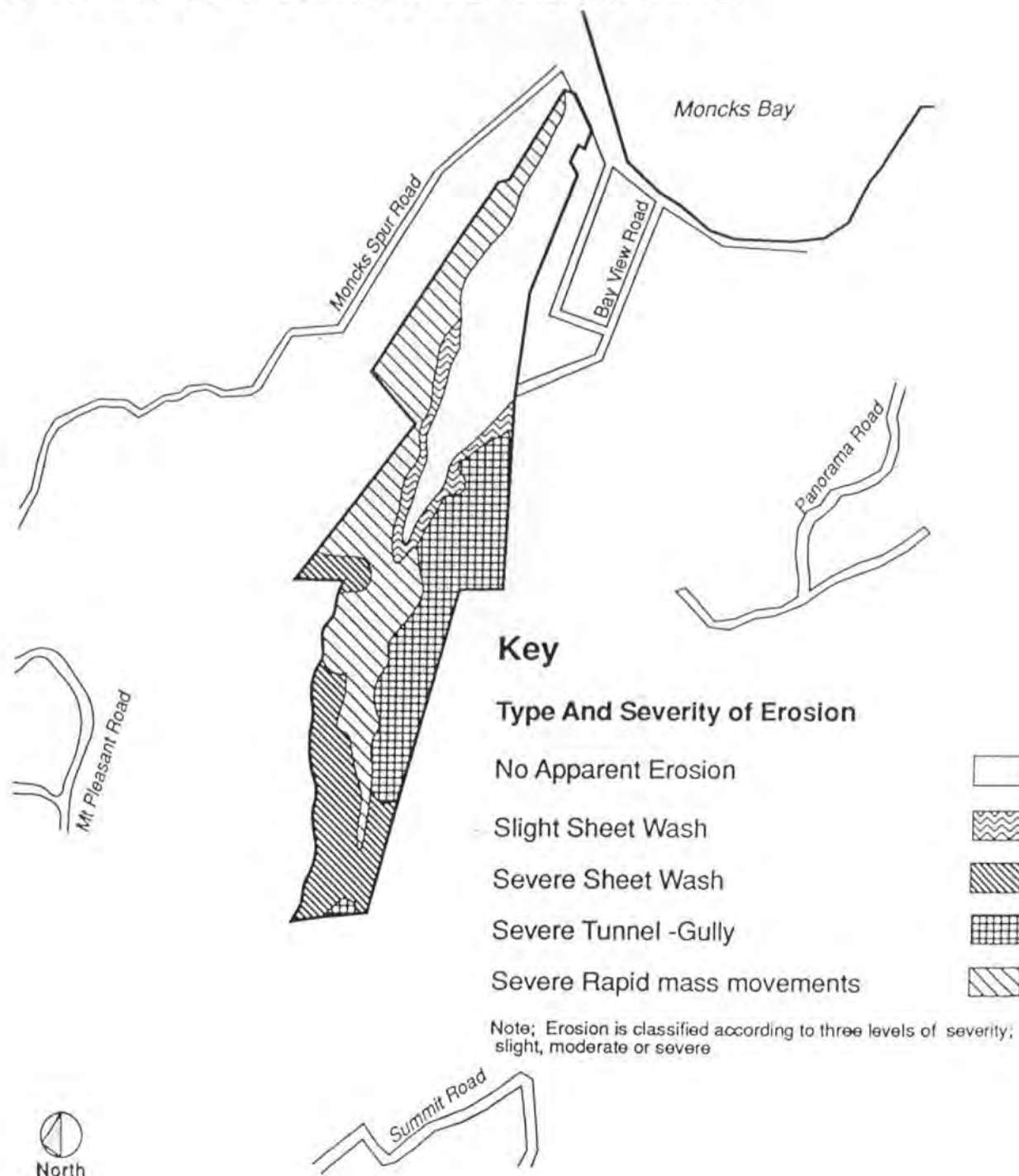
Horotane Silt Loam is an alluvial derived soil of the valley floors derived from loess and volcanic material eroded from the surrounding hills.

Barnett Park Soils



Map After; B B Trangmar, E J B Cutler N Z Soil Survey Report 70

Barnett Park Soil Erosion



Map After; B B Trangmar, E J B Cutler N Z Soil Survey Report 70



The sunny west facing side of the valley with rounded loess spurs and tunnel gully erosion

Drainage tends to be poor with water sometimes lying on the surface in winter. This is a class I soil with high potential for plant growth. Poor drainage is the major limiting factor.

Heathcote Silt Loam

Heathcote silt loam soils form the toe slopes of the of the rolling fans along the valley sides. They are formed from loess colluvium eroded by tunnel gullies and sheet wash from the slopes above. Drainage is moderate though near seepages drainage is slower. Heathcote Silt Loam has been extensively used for horticultural production in other Port Hills valleys. This soil is slightly vulnerable to sheet erosion.

Scarborough Hill Soils (eroded phase)

Scarborough hill (eroded phase) soils occur on the strongly rolling and moderately steep valley sides which are severely eroded by tunnel gully erosion (north-west aspect) or debris flows (south east aspects or seepage points). They are derived from loess colluvium containing up to 10% volcanic rock fragments. The colluvium can be up to 6m thick. The soil of the eroded phase can be very mixed due to the effects of debris flows and tunnel gullies which result in hummocks, terracettes, scars and open gullies. A moderately developed fragipan often impedes drainage.

Kiwi Hill Soils (eroded phase)

Kiwi Hill Soils (eroded phase) have been modified by sheet wash, tunnel gully and debris flow erosion. In some places subsoils are exposed with limited vegetation cover caused by the low nutrient status of the subsoil.

Scarborough Hill Soils (eroded phase) + Kiwi Hill Soils (eroded phase)

These soils occur on the lower back slopes on the north west facing side of the valley. The Kiwi soil component usually occurs beside rock outcrops where the loess colluvium is less than 1.5m thick. Nutrient levels can be low where the subsoil is exposed by sheet wash erosion. Tunnel gully erosion is common and debris flows often occur near seepage points. Drought can be a problem in summer.

Montgomery Hill Soils

Montgomery hill soils originate from a mixture of volcanic colluvium and a small amount of loess colluvium (< 10%). Their depth is extremely variable with a maximum depth to bed-rock of 1.2m. This soil type is very similar to Evans steepeland soil and is mainly differentiated by the degree of slope on which it is formed.

Evans Steepland Soil



The more shaded east facing slopes featuring sheer cliffs and a few natives and broom growth

Evans steepeland soil also originates from a mixture of volcanic colluvium and a small amount of loess colluvium (< 10%). They occur on steep to very steep slopes over volcanic rock. Outcrops occupy 10-15% of their area. Soil depths are extremely variable with maximum depths of 80-100cm.

Victoria Steepeland Soils + Evans Steepeland Soils

Victoria Steepeland Soils also occupy steep slopes near cliffs and outcrops. They are formed from loess colluvium over lying volcanic rock. Outcrops are common with rocks scattered over the surface. In this area Victoria Steepeland Soils are always mapped with Evans Steepeland Soils.

5.3 Erosion

Approximately two thirds of the the park area was classed as having severe erosion when the area was surveyed in 1977. Usually erosion is most evident in wet years. A severe erosion area is classified as having greater than 30% of its area affected. Soil erosion is entirely restricted to the hill slopes which suffer from severe sheet wash, tunnel gully and mass movement depending on slope, aspect, run off, soil type and vegetation cover. Maintenance of uninterrupted vegetation cover and control of any runoff is essential to reduce further erosion. Areas suffering from mass movement should be planted to reduce the possibility of slips occurring.

6.0 CLIMATE

Precipitation

Barnett Park is located at the drier eastern end of the Port Hills. The adjacent Mt Pleasant tends to create a rain shadow effect in this area. Rainfall is estimated to be in the vicinity of 550- 600 mm per annum. The mean annual variation in rainfall ranges from 330-870mm. The Sumner area suffers from a longer period soil water deficiency than the rest of Christchurch due to its lower rainfall and higher evapotranspiration rates. The water deficit period can last from November to April.



Seasonal stream in the upper valley flat.

Wind

The orientation of Barnett Park exposes it to the cool easterly and north easterly winds which are dominant over the summer period. Drier north west winds occur 7-10% of the time and accentuate the affect of low summer rainfall especially on north west facing slopes.

Temperature

Temperatures generally are probably slightly higher than those of Christchurch (ie mean January temperature of 16.8⁰ C and mean July Temperature of 5.9⁰ C). Barnett Park probably receives around 1,984 hours of sunlight each year.

Aspect has a pronounced on soil temperatures in the park. Slopes facing north and north west warm up more quickly and retain their heat longer due to their greater exposure to the sun and the angle at which which sunlight strikes them. South and south east facing slopes are considerably cooler and retain their moisture for longer periods into the dry summer period. Shelter and aspect are dominant factors influencing plant establishment and growth rates on Barnett Park's hill slopes.

7.0 VEGETATION AND WILDLIFE



Native bush remnants, grassland and sports turf in sequence down the valley

7.1 Vegetation

Barnett Park has a range of vegetation that matches the diversity of the landscape.

Little is known of Barnett Park's original vegetation but a map dated 1856 shows the lower valley covered in flax, fern and grass. Farming brought to the valley introduced grasses, broom and gorse, while grazing prevented any worthwhile regeneration of native flora.

Even though the rainfall in the area is lower than other parts of Christchurch it is still able to support native shrub/ forest cover. In pre-Polynesian times the area probably supported large areas of coastal native forest especially in the shaded gullies and higher rainfall areas around Mt Pleasant. Kanuka would have grown on the dry spurs and silver tussock around rocky outcrops and in forest clearings.

A survey was undertaken in 1953 prior to the Council taking control of the area which identified a fire risk in the southern portion of the reserve due to the grass drying out in summer. However the New Zealand Fire Service declared the park free of such a hazard in January 1989.

Several tree planting exercises have been carried out by both Council and interested members of the public. The area to the north in particular has been the subject of Arbour Day native planting expeditions organised by local community groups and schools. As recently as August 1989 the honorary warden organised groups to plant the upper ravine in a systematic and regular way. In the past such efforts have failed and the ravine has once again been overtaken with shrubby weeds.

A botanical survey was undertaken in May 1989 with a view to establishing a regeneration programme by way of cuttings and seedlings. Table 1 shows those species native to the area which may be useful in the re-establishment of native vegetation in the reserve.

TABLE 1 (Courtesy of Hugh Wilson, Port Hills Botanical Survey)

A. Trees and shrubs indigenous to the area, found within close proximity to Barnett Park.

Species	Common Name
<i>Carmichaelia arborea</i>	native broom
<i>Carpodetus serratus</i>	putaputaweta
<i>Clematis afoliata</i>	leafless clematis
<i>Coprosma areolata*</i>	
<i>Coprosma crassifolia</i>	
<i>Coprosma propinqua</i>	mikimiki
<i>Coprosma rhamnoides</i>	

<i>Coprosma robusta</i> *	karamu
<i>Coprosma virescens</i>	
<i>Cordyline australis</i> *	cabbage tree
<i>Corokia cotoneaster</i>	
<i>Discaria toumatou</i>	matagouri
<i>Fuschia x colensoi</i>	shrubby fuschia
<i>Fuschia eccorticata</i>	tree fuschia
<i>Griselinia littoralis</i>	broadleaf
<i>Hebe laudiana</i>	
<i>Hebe salicifolia</i> *	koromiko
<i>Hebe stictissima</i>	
<i>Hedycarya arborea</i>	pigeonwood
<i>Helichrysum aggregatum</i>	
<i>Hoheria angustifolia</i> *	narrow-leaved ribbonwood
<i>Kunzea ericoides</i> *	kanuka
<i>Leptospermum scoparium</i> *	manuka
<i>Lophomyrtus obcordata</i>	rohutu
<i>Macropiper excelsum</i>	kawakawa
<i>Melicope simplex</i>	
<i>Melicytus alpinus</i>	
<i>Melicytus ramiflorus</i>	mahoe
<i>Myoporum laetum</i> *	ngaio
<i>Myrsine australis</i>	mapou
<i>Olearia paniculata</i> *	akiraho
<i>Pennantia corymbosa</i>	kaikomako
<i>Pittosporum eugenioides</i> *	lemonwood, tarata
<i>Pittosporum tenuifolium</i> *	kohuhu
<i>Plagianthis regius</i> *	lowland ribbonwood
<i>Podocarpus totara</i>	lowland totara
<i>Pseudopanax anomalus</i>	
<i>Pseudopanax arboreus</i> *	fivefinger
<i>Pseudopanax crassifolius</i>	lancewood
<i>Solanum laciniatum</i> *	poroporo
<i>Sophora microphylla</i> *	kowhai
<i>Sophora prostrata</i>	dwarf kowhai
<i>Streblus heterophyllus</i>	

B. Large tussocks, indigenous to area:

Species	Common Name
<i>Carex Virgata</i>	
<i>Cortaderia richardii</i> *	toetoe
<i>Phorium tenax</i> *	flax, harakeke
<i>Poa cita</i> *	silver tussock

C. Trees and shrubs, indigenous to wider area, worth considering as species of special interest:

Species	Common Name
<i>Alectryon excelsus</i>	titoki
<i>Carmichaelia kirkii</i>	climbing broom
<i>Dodonaea viscosa</i> *	akeake
<i>Olearia fragrantissima</i>	
<i>Pseudopanax ferox</i>	fierce lancewood
<i>Teucrium parvifolium</i>	

* Of particular usefulness in revegetation work

7.2 'Noxious Weeds'

Gorse (*Ulex Europaeus*)

Gorse is a difficult to eradicate plant of potential threat to agricultural land and short tussock grassland. Where the rainfall is not too low it is an extremely useful pioneer plant which enables native forest to establish more easily. Gorse is classified as noxious under Class B (Widespread Plant). Class B covers plants that are widely distributed and abundant. Control programmes are aimed at preventing the plants from spreading to new areas or into neighbouring properties where control is being carried out. To this end a 10m boundary clearance strip is required.

In this situation allowing the gorse to grow is probably the most effective means of re establishing native forest cover on the park's hill slopes.

Broom, (*Cytisus scoparius*)

Broom is more abundant in the park than gorse. Broom is classified as a Class B widespread plant. Like gorse, broom can have an important role in assisting regeneration of native forest.

Variegated thistle, (*Silybum marianum*)

Gazetted as a Class B Target plant, variegated thistle is regarded as a plant of limited distribution where eradication is considered possible provided a suitable and sustained programme is implemented.

The plant is annual to a short-lived perennial up to 1m or more tall. The rosettes have a distinctive variegated appearance and cover an area up to 1m wide. It often forms dense colonies. Variegated thistle is poisonous to stock especially cattle. Sheep are not affected to the same degree. Generally the plant is not browsed by stock unless grazing is very poor (Connor 1977).

Infestation of areas with variegated thistle is likely to vary with the season and the grassland management. The serious infestation of 1989 was a result of the serious drought conditions of the 1988/89 summer and thus lack of competing grasses which would otherwise have prevented germination of thistle seedlings. Evidence suggests that given a normal rainfall year and freedom from overgrazing, serious thistle infestation will cease to be a problem. Attention may need to be given to reducing stocking rates on the upper sunny grassland slopes.

Variegated thistle can also be hand grubbed or sprayed. Overseeding bare patches created when the thistles die back in late autumn also reduces re-establishment.



Gorse and broom cover in the upper valley offers the potential to act as a nurse crop for establishing native trees and shrubs. The long grass severely inhibits the ability of native plants to reestablish.

Old Mans Beard (*Clematis Vitalba*)

Clematis vitalba is gazetted as a Class B target plant and could potentially be a very serious weed of the plan area especially in the native forest remnants. Currently there is infestation of the native tree and shrub area above the park. Control is usually by cutting the vines down to ground level and treating the stumps with herbicides.

Nassella Tussock, (*Stipa trichotoma*)

Nassella Tussock is a grass that looks very similar to silver tussock. It is categorised as a Class B Target plant in Christchurch. Mature nassella tussocks are dense and grow up to 70cm tall with a leaf spread to 70cm. Young tussocks are more erect. The plants have a strong fibrous matted root system and are difficult to pull out. A mature plant can produce up to 120,000 seeds which can be wind or water borne over large distances. The seed can also be disbursed by stock, vehicles and people. Seed remains viable in the soil for over 20 years. Nassella is extremely competitive and will colonise virtually any situation up to 600m above sea level. Generally it prefers dry sunny sites at an optimum altitude of approximately 100m above sea level. It is expensive to control and eradicate, is unpalatable to livestock and if not controlled, overgrazing of other species and shading caused by its long leaves soon result in a dense cover. Nassella has the ability to replace the silver tussock grassland over most of the Port Hills.

Major areas of nassella infestation on the Port Hills include the Sumner - Godley Head area, above McCormacks Bay, and the Horotane Valley. The most effective means of controlling nassella tussock is hand grubbing. Herbicides can be used for very dense infestation but tend to remove other vegetation as well.

7.3 Wildlife

Barnett Park was once home to a wide range of native birds. Remains of kiwis, wekas, pigeons (keruru), rails, kakas, parakettis (kakariki) and moas have been found in midden heaps that dot the valley. Removal of native forest habitat and hunting probably contributed to the demise of most of these species. Barnett Park however still attracts a number of birds to the area. These include the native harrier (kahu), bellbird (korimako), white faced heron (kotukumoana) as well as the more common introduced songbirds and finches. A variety of native vegetation types would aid in the natural restocking of the area with native bird species. A colony of kingfishers (kotare) nest in the eastern side of the valley and use the pylon wires as perches. Ducks populate the lower slopes of the valley and make use of the ponds which appear during wet weather.

Rabbits have consistently been a problem and shooting has been undertaken in the reserve over the last 15 years to reduce their numbers. In 1989



Natural ponding occurring at the end of the sports field area in winter. The presence of the small stream offers potential to create wildlife ponds in the upper half of the valley.

a poisoning programme was undertaken in Barnett Park using Talon ahead of the more cost-effective 1080 because of the non-availability of an antidote for 1080. The programme proved unsuccessful.

Goat invasion of the park has been a major problem in recent years causing considerable damage to regenerating native plants. An active policy of eradication of stray animals and fencing has gone some way toward solving this problem, however goat damage in the upper part of the park continues to be a problem.

8.0 LANDSCAPE

The landscape of Barnett Park can be divided into three main areas:

1. The first area fronts onto the Main Road and is mostly flat with mown grass and a portion of sloping terrace face planted with native trees and shrubs, amongst which is an adventure play area. It also contains a large unsealed carpark, toilet and changing block and another toilet block near the road. Towards the southern end is a belt of exotic trees planted to provide shelter for the sports fields although they don't adequately fulfil this purpose. Weeds predominate in the north-western portion of this area.

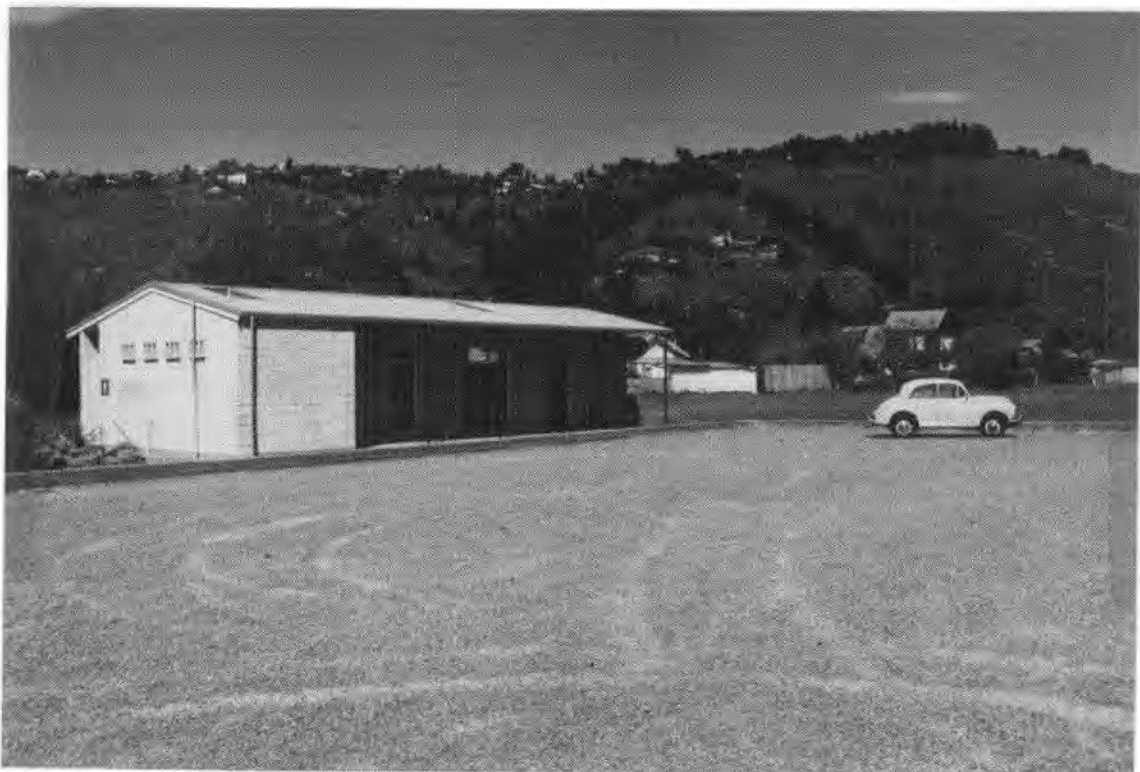
2. Further south up the valley is an area of

comparatively flat land which is also bordered on both sides by a sloping terrace face. The land in this area is mostly grass and is boggy in the winter months. Again, weeds and thistles grow in patches on the flat and predominate on the sloped surface. Trees border the adjoining properties on the west. On the east the border is a mixture of housing and the eastern side of the valley.

3. The southern end of the reserve comprises hilly and steep country broken by a deep rocky gully along which a small creek flows. Here ferns, kotukutuku (fuchsia), puakou (five-finger), mahoe (whiteywood), poroporo, Papauma (broadleaf), and akeake, ti kouka (cabbage tree) can be found. There has even been a titoki tree sited in the reserve, growing at the southern limit of its geographical distribution. Remnant native bush is scattered throughout but gorse, broom, thistles and long grass dominate the area. The regeneration of native plant species has been hampered by the intrusion of grazing animals, notably goats. The long grass presents a possible fire hazard in mid to late summer when the area becomes dry.



Drainage swale on the east side of the valley beside the sports fields



Changing rooms, gravel carpark

9.0 RECREATIONAL OPPORTUNITIES AND FACILITIES

9.1 Sporting Activities

Barnett Park is currently used by the Sumner Cricket Club, Bay's United Soccer Club and the Redcliffs Hockey Club. The Sports field area contains two wicket blocks, two hockey fields and one full sized soccer field. An athletics track has also been marked out on the park by local residents.

The wicket blocks are extensively used by junior and senior teams on Saturdays. The cricket club is responsible for wicket maintenance.

The sports fields are often used for informal gatherings for the playing of Samoan cricket on Sundays.

9.2 Passive and Informal Active Recreation

The area of the park which fronts on to the Main Road has a children's play area with an adventure playground amongst the trees at the foot of the west bank. Equipment provided includes swings, a slide, see-saws, a rocking horse, a roundabout, and a bar-b-que. There is a seating area and windbreak adjacent to the Main Road. The adventure play area has pipes, tyres and wooden structures for more imaginative play opportunities. The park is popular with local joggers and walkers and offers a range of terrain to suit the intensity of the pursuit, from the almost flat expanse at the north to the more rugged terrain encountered on the valley walk.

The walkway was officially opened on Sunday the 24th of February, 1985 by the Canterbury District Walkways Committee, with the Mayor officiating at the ceremony. The opening ceremony, held in the carpark, was followed by the inaugural walk, which took approximately 1.5 hours. The walkway, initiated by the Parks and Recreation Dept, the Canterbury Walkways Committee and the Clifton Neighbourhood Committee, has official status under the New Zealand Walkways Act. The track itself is a comparatively gentle 1-1.5 hour walk beginning at the main carpark and skirting the eastern side of the playing fields. Mown grass gives way to rough pasture as the walkway meets the Bay View Road access stile and continues up the valley. The walkway passes several large rocky outcrops and reaches its zenith at the three tiered staircase leading up to the cave, offering excellent viewing across the estuary to the spit. The track crosses over the small spring fed stream which is seasonally active, and continues on its downward path on the western side of the valley. The track follows the natural incline of the bluffs and passes the bush covered

entrance of Paradise Cave on private land to the west. Initial planning for the track envisaged it reaching the Summit Road to the south, and this is still a possibility as long as a suitable route through private properties can be navigated. There is also the possibility of the walkway linking up with others in the area providing a network of walkways through which to explore the entire Port Hills. The seasonally active waterfall, a short distance to the south of the cave, is attractively set among enclosing rocky cliffs and native trees and shrubs.

The range of recreational activities possible on the other parts of the reserve is limited only by the imagination, as the rolling grassland terrain gradually gives way to sheer rocky bluffs suitable for rock climbing.



Steps to the cave at the top of the park.

10.0 BUILDINGS

Barnett Park contains a toilet block and toilet/changing room and Southpower Substation.

10.1 Southpower Substation

A portion of the reserve near the end of Bay View Road is presently occupied by a Southpower substation, transformers and coolers. In August 1986 a seven line 11kV underground cable was laid from the Southpower site across the reserve to the Main Road. The substation was first planned

for in 1967, and overhead cables were put in from Heathcote Valley to service the growing Sumner/Redcliffs population in 1969/70. Although Council approved the use of the land for Southpower purposes, no easement was ever granted. This is a requirement of the Reserves Act 1977.



North West facing Gully with native shrubs near the Barnett Park Cave

PART 2 MANAGEMENT GOALS, OBJECTIVES AND POLICIES

Management Goals

Barnett Park's location on the Port Hills and potential as a link between the urban area and more natural open spaces of the hills has influenced the following Goals objectives and policies.

Barnett Park is considered to form an important component in an overall Port Hills conservation and recreation strategy as well as having value for more traditional recreational activities such as organised sport.

- | | |
|---------------|---|
| Goal 1 | To conserve and enhance the indigenous characteristics and potential of the park. |
| Goal 2 | To develop and enhance the parks potential for cultural, sporting and outdoor casual recreation activities subject to the constraints imposed by Goal 1. |

Management Objectives & Policies

1.0 Administration

Objective: 1 Administration, management and control of the plan area shall be in accordance with the provisions of section 17 (Recreation Reserves) of the Reserves Act 1977, and the current District Planning Scheme of Christchurch City.

Policy: 1.1 Southpower shall be granted an easement subject to Section 48 of the Reserves Act 1977 for their electricity substation site.

Comment: The above is a requirement of the Reserves Act which to date has not been granted an easement.

1.2 Community, recreational and commercial activities shall be administered under a negotiated lease or licence pursuant to the Reserves Act 1977.

1.3 A key criteria in accessing applications for commercial ventures shall be the degree to which they complement and or enhance the public's enjoyment of the environmental, cultural and landscape qualities of the parks.

Objective: 2 Community groups and individuals shall be encouraged to take an active role in the planning of development proposals.

Policy: 2.1 The Barnett Park Adopt A Park Committee and other Community groups especially interested in the reserves shall be given opportunity to comment on landscape plans or other major development issues. Practical community input in development projects shall be encouraged where appropriate.

2.2 Honorary Rangers shall be appointed (as available) to help assist the public and provide extra security for the Parks.

Objective: 3 Extensions to the park boundaries to include features of natural beauty, ecological or recreational benefit shall be made as practicable.

Policy: 3.1 Extending the park boundary to include Paradise Cave shall be investigated.

Comment: Apparently the adjoining owner has already had the cave area surveyed as a separate block. This would facilitate possible future purchase or possibly a land swap.

- 1.3 Purchase of land along the top of the east facing cliffs in order to provide a stock proof boundary between the park and adjoining private land shall be investigated.

Comment; The current boundary is virtually impossible to fence as it is sited along the face of the cliff in many places.

2.0 Soils

Objective: 1 Park soils shall be managed to minimise soil erosion.

Policy: 1.1 Adequate vegetation cover shall be maintained on all soil types sufficient to reduce further soil erosion. See Section 3 Landscape Patterns & Land Use for the vegetation types required to stabilise the various soil types found in the park.

Comment: Severe soil erosion has been a major feature of the park landscape. In the past it was probably aggravated by burning, removal of tree/shrub cover and overgrazing.

3.0 Landscape Patterns & Land Use

The park can be divided into three interconnected management zones as described in the Landscape section. These zones relate to the existing landscape, recreation and conservation values of each respective area.

The proposed Zones are;

- A. Cultural And Active Recreation Zone
- B. Exotic/ Indigenous Transition Zone
- C. Natural Aspect Zone

See the proposed management zones map for the location of the zones.

A. Cultural And Active Recreation Zone

Objective: 1 To facilitate and encourage use of this zone for a range of local cultural and organised recreation activities.

Policy; 1.1 The existing open space currently used for sports fields shall be maintained.

Policy; 1.2 The **Cultural And Active Recreation Zone** shall be developed according to the landscape concept plan shown at the back of the management plan.

Comment: The front entrance to the park suffers from lack of planting, exposure to wind, lack of car park screening and a profusion of different signs and structures.

The boundary between the sports fields and the more natural area to the south is unnatural and abrupt.

- 1.3 Modifications to improve the safety of the park vehicle entrance way from Main Road shall be investigated.
- 1.4 Barriers, road humps or other means of slowing traffic speed shall be investigated for use within the car park and access road.
- 1.5 Construction of a footpath to link the main road to the changing rooms, (located to the east of the children's play area) and from the main entrance to the start of the sports field to link to the walkway shall be investigated for use

Comment: The front entrance to the park suffers from lack of planting, exposure to wind, lack of carpark screening and a profusion of different signs and structures. The boundary between

B. Exotic/ Indigenous Transition Zone

This zone covers the upper flats above the sports fields and the lower hill slopes below the houses. Its current character is more rural in appearance than the mown grass of the lower flats and it has far greater biological diversity and potential for revegetation. The soils in the valley floor part of this area are probably the most fertile in the park and it contains a 'natural' waterway. This is probably the only part of the park where native conifers indigenous to the area would grow well. The major limitation of the area is its proneness to waterlogging in winter.

Objective: 1 To provide a transition between the highly modified lower valley and the more natural hill slopes capable of accommodating less formal recreation activities appropriate to an informal setting.

Policy; 1.1 The transition zone shall be enhanced with the planting of native trees and shrubs along the stream, around the pond (see policy 1.4 Section 7) and toward the head of the valley, and exotic planting for southerly shelter near the sports fields. Informal activities such as informal picnics, walking, running, nature watching, etc in keeping with the passive nature of this area shall be encouraged.

- 1.2 The old sheep yards at the end of Bay View Road shall be upgraded.

Comment: Parts of the park will need to be grazed in the future to reduce weeds and grass growth. It is more economical to upgrade the existing yards than to build new ones.

C. Natural Aspect Zone

This area includes all of the hill slopes with the exception of the lower slopes immediately between the houses and the valley floor. It contains impressive cliffs, regenerating native plants, tussock, a notable cave and is the part of the park with the greatest Port Hills character. The views up and down Barnett Park valley are one of the park's greatest attributes. The major limitation of the area is its susceptibility to soil erosion. All of the park hill soils suffer from severe soil erosion which is most active in wet years. The most effective means of controlling soil erosion is by planting shrubs and trees. The existing gorse and broom cover plays an important part in controlling the soil erosion in the park

Objective: 1 Council shall revegetate and or allow natural regeneration in the Natural Aspect Zone with native forest and shrub flora and grassland types historically typical of the area.

Policy: 1.1 Planting in the Natural Aspect Zone shall be of plants propagated from seed or stock obtained from the Port Hills ecological district (**from the nearest possible wild source**) or nearest Canterbury source if stock plants no longer grow on the Port Hills. See the list prepared by Hugh Wilson in the Vegetation Section of Part 1.

Comment: Sources of seed or propagation material could include Lyttleton Scenic Reserve and bush remnants in the upper Sumner Valley. The objective is to maintain the genetic uniqueness of the native plant populations of the area. Planting of outside sourced plants can lead to intermixing of the gene pool of the remnant native forest in the area leading to a reduction in overall genetic diversity.

1.2 The Natural Aspect Zone shall be progressively fenced off (see landscape plan) from grazing animals starting from the top fenced block, as part of the Parks Capital Works programme over a number of years.

1.3 The south-east facing side of the valley shall be revegetated with native shrub/tree species ecologically appropriate to each respective site. See the landscape concept plan and species list in the Vegetation Section of Part 1.

1.4 Dryland species such as kanuka, kowhai, narrow leaved ribbonwood, akiraho and ngaio shall be planted in the gullies and seepage points along the exposed north-west facing side of the valley to help control tunnel gully erosion and contribute to the formation of habitats now largely lost from the area in historical times.

Comment: These shrubs and trees are 'naturally' suited to this type of environment. They will improve the botanical value of the park and increase wildlife habitat.

1.5 The main ridge lines on the north- west facing side of the valley shall be grazed by

sheep to preserve some grassland aspect and integrate the park visually with the adjoining rural properties.

- 1.6 Sheep grazing levels shall be kept at a level which ensures a complete grass cover is maintained in all areas.

Comment: **Light sheep grazing** of the grassland areas is essential to reduce the fire risk in summer and to preserve the remaining silver tussock plants in the park. It is essential that new planting boundaries are aligned with the topography to avoid creating an unnatural landscape appearance in the park.

4.0 'Problem' Plants

Barnett Park contains large numbers of plants which have been perceived as a management problem for many years. Gorse and broom are the most obvious of these. Council has been attempting to eradicate these plants with limited success for the last 30 years with large sums of money spent on chemical spraying. However some research and observation in recent years has indicated that these plants which are a threat to grassland farming and short tussock grassland may be beneficial when the management aim is to re-establish native forest (see comment under Objective 1). Gorse mite was introduced into the park several years ago but appears to have died out.

However a number of other plants found in the park or its surrounds are a threat to its recreation values and to the wider area. These include variegated thistle, *Clematis vitalba*, and nassella tussock.

Gorse & Broom

Objective: 1 To investigate the use of gorse and broom as nurse plants to speed native forest regrowth.

Policy: 1.1 Gorse and broom in the fenced off upper valley shall be retained as a nurse crop for native plants.

Comment: Some evidence indicates that gorse and broom may create a favourable environment for the re establishment of native trees and shrubs (in areas which are able to sustain forest, ie average rainfall above 500 mm and suitable site conditions). Gorse has a maximum age of 30-40 years and does not regenerate under its own shade, or shade tolerant natives which given adequate seed sources and freedom from grazing will grow through and overtop the gorse. Succession to native forest can be hastened by disturbance of leaf litter under dense gorse to provide sites for natural establishment, by planting native shrubs and trees into (perhaps thinned stands), or by dense sowing of native seed (and planting) on sites newly cleared.

Broom is similar to gorse but prefers more fertile sites. It tends to grow faster than gorse on the Port Hills and regenerates a little more readily under its own shade.

In the moister Hoonhay Valley, elderberry started to replace broom after 10-15 years, with native seedlings appearing after 10 years. Native trees and shrubs were dominant after 50 years, especially on the shady slopes.

The above changes are likely to be much slower in Barnett Park due to the drier conditions, and human assistance will be required however the natural potential toward afforestation does exist and will continue provided grazing animals are excluded from afforestation sites and the competing exotic grasses are controlled. In fact the mantle of long grass (mostly cocksfoot) enveloping the hillsides is the single most severe site constraint in respect of establishing natives. Most woody species have great difficulty establishing under rank, ungrazed, exotic pasture which, once in place, may persist for a long time. This is the major reason why natural afforestation is so slow in Barnett Park and why planting programmes have often been largely ineffective with high mortality rates.

Gorse and broom are able to overwhelm the grass and thus create a sheltered environment more amenable to native tree establishment and growth than exists under open grassland. Eventually the gorse and broom will be smothered by native trees and shrubs.

(The above comments have been adapted from a discussion on successional processes on the Port Hills contained in an unpublished DSIR report on the Bowenvale Valley by Dr Colin Meurk and Hugh Wilson in 1990)

- 1.2 Regeneration of natives, in areas of gorse or broom retained for revegetation purposes, shall be facilitated by planting dense clusters of native plants on the boundaries and in selected spots amongst the gorse and broom to provide a close seed source. Other methods such as seed sowing, litter disturbance etc mentioned above shall be used as appropriate.
- 1.3 The fenced off upper valley, containing gorse or broom to be retained for the regeneration of natives, shall be monitored with permanent belt transects.

Comment: Permanent belt transects will provide a research basis for establishing rates of change and the characteristics involved in using the above method for native forest establishment on the drier parts of the Port Hills.

- 1.4 Park boundaries for a distance of 10 m inside the boundary, and grassland areas shall be kept clear of gorse and broom.

Comment: This policy is to ensure that these plants do not spread into neighbouring properties where the management aims are different and to maintain the park's upper west facing slopes free of woody shrubs.

Variegated thistle, Clematis vitalba, Nassella tussock & Other Weeds

Objective: 2 To control the extent and spread of weed species in the park.

- 2.1 The most effective means shall be used to control and reduce the spread of these weeds, including chemical means as required.

5.0 Fire

Fire control is an important part of the management of the Barnett Park. In pre-historic and historic times fires had a major influence on the occurrence of vegetation types and patterns on the Port Hills.

The high cost of fighting fires in addition to the loss of vegetation and risk to adjoining residential properties makes fire control imperative. Experience in other areas indicates that most fires are caused by people use of the park and adjoining areas.

The type of vegetation growing along residential/ park margins has a considerable influence on the incidence and rate of spread of fires to or from residential properties.

Objective: 1 To protect Barnett Park from wild fires.

- Policy:**
- 1.1 Fire risk signs shall be placed at all major park entrances during times of fire risk.
- 1.2 All highly flammable vegetation, shall be removed to a minimum distance of 10 m on both sides of the valley adjoining residential properties.

Comment: The 10 m fire barrier zone is derived from the Californian Public Resources Code 4291 (effective in 1988) which required home owners to maintain a fire break around their homes clearing all flammable vegetation within 30 ft (9.1 m) of their dwellings. Flammable refers to all dead vegetation matter and enough live crowns to avoid the direct spread of fire from one tree to the next. In the case of the management area flammable includes long dry grass. Observations of fires on the Port Hills indicate that they establish and spread less quickly in thick native bush than through more open treed areas such as pine and eucalypt covered areas.

The key word when deciding what vegetation to remove is *flammable*.

- 1.3 Fire resistant planting shall be used in the 10 m fire barrier zone to reduce the area of potentially flammable grass, ie
- Natural Aspect Zone - Native shrubs and small trees especially the more succulent leaved natives; such as ngaio, broadleaf, coprosma etc.
 - Cultural And Active Recreation Zone, and B. Exotic/Indigenous Transition Zone
 - succulents - (*Carpobrotus sp.*), *Gazania vars*, *Osteospermum*, ivy geranium, *Santolina* etc.

6.0 Recreation

Barnett Park has a variety of recreation opportunities based on its developed and natural attributes. These include organised sport, (hockey and soccer and cricket), children's play opportunities, a BBQ site and major walkway of city wide importance. Barnett Park is a significant gateway to a wider Port Hills recreational experience. Opportunity exists to develop an informal picnic area in a natural setting in the undeveloped area to the south of the existing sports fields with access from a small carpark off Bay View Road. A horse riding trail and extensions to the walkway system are also proposed. The 1990 Hillary Commission leisure in the life style survey indicated that walking for pleasure is New Zealand's 5th most important leisure activity and New Zealand's 2nd most important form of active recreation activity, after gardening.

Objective: 1 To maintain and improve the provision of public access ways in the park and promote walking links with other hill reserves and public walkways and roads.

- Policy:**
- 1.1 New walkways shall be created in the following areas;
 - From the main loop walkway to the waterfall
 - From the main loop walkway to Paradise Cave (on private land)
 - From Cave Terrace bend along the park boundary to the walkway near the Rutherford/park boundary.
 - From the lower valley along the general line of the creek
 - 1.2 The zig-zag track from Cave Terrace to the base of the hill slope shall be upgraded to provide a better walking surface.
 - 1.3 New walkway signs shall include times and interpretation information as appropriate.

Objective: 2 To maintain and improve the existing sport field area for organised sporting activities.

Objective: 3 To maintain and improve the cultural recreation values of the north eastern end of the park. See Landscape Concept Plan.

- Policy:**
- 3.1 During the 1993/94 financial year a new toddlers play area will be developed which will be protected with a low fence.
 - 3.2 The concrete shelter and changing rooms shall be painted with colours appropriate to the park.

7.0 Wildlife, Domestic & Noxious Animals

Barnett Park contains a limited selection of native birds and probably invertebrate fauna. The lack of native forest in the park area severely restricts available habitat for the native species although bird species that do occur are probably visitors from the larger areas of bush on the south side of Mt Pleasant. Implementation of the Natural Aspect Zone policy and an increase in nectar providing exotics in Zones A and B will increase available habitat.

Exotic mammals in the park are mainly restricted to rabbits and hares. Control of these animals is the responsibility of the Canterbury Regional Council. Goat control is an ongoing problem in the park although it appears to be largely under control at the present time.

Sheep grazing is also an important part of park management in controlling grass growth and thus reducing fire risk. See Section 3, C Natural Aspect Zone, Policy 1.5. The walking of dogs is a popular use of the Zone A area of the park, however problems have arisen with dogs worrying domestic stock and dog faeces being deposited and not being removed by the dog owner. This constitutes a potential public health risk especially on the sports fields and children's play areas.

Objective: 1 To protect native and exotic wildlife and their habitats subject to the requirements of the Wildlife Act 1953, and the management plan vegetation objectives and policies.

- Policy**
- 1.1 The possibility of reintroducing native fauna to the management plan area shall be investigated.
 - 1.2 A survey of existing indigenous fauna shall be undertaken as resources permit.
 - 1.3 Shooting shall not be permitted except for authorised pest control purposes.
 - 1.4 A pond/ wetland area shall be created on the upper valley floor to encourage aquatic wildlife in the park and help slow water velocities in the creek and its tributaries.

Comment: The pond/ wetland area will need technical investigation and detailed design work to determine its ideal location and size and shape.

Objective: 2 Noxious animals and vermin shall be controlled in the management plan area subject to the requirements of the Agricultural Pests Destruction Act 1967 and plan objectives and policies.

- Policy:**
- 2.1 Noxious animals and vermin numbers shall be monitored by Parks Staff and the Canterbury Regional Council sought to implement control methods where the damage to flora and fauna is significant.
 - 2.2 All stray goats found in the park that are not removed immediately by the owner will be exterminated.

- 2.3 Rabbit poisons shall not be used in Barnett Park in any form that is easily accessible to birds, because of potentially detrimental effects on native and exotic birdlife, or likely to pose a danger to dogs.

Objective: 3 To allow the use of the park by domestic animals where these are not detrimental to the environmental qualities of the park and other recreational uses.

Policy 3.1 Dogs shall be under control at all times and shall not be permitted in Zone B, Zone C or the children's play area.

8.0 Buildings & Structures

Barnett Park is unusual in having two public toilets in close vicinity to each other. Unfortunately development of an informal picnic area at the South west may eventually necessitate the building of a further toilet in this position. Generally the appearance of the existing buildings in the park is unsatisfactory.

Objective: 1 To maintain the existing Council buildings and to require the visual upgrading of all buildings in the park.

1.1 See policy 3.2 Recreation.

1.2 The Southpower buildings shall be painted in a recessive colour to blend with the rural back ground.

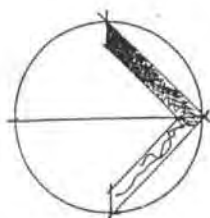
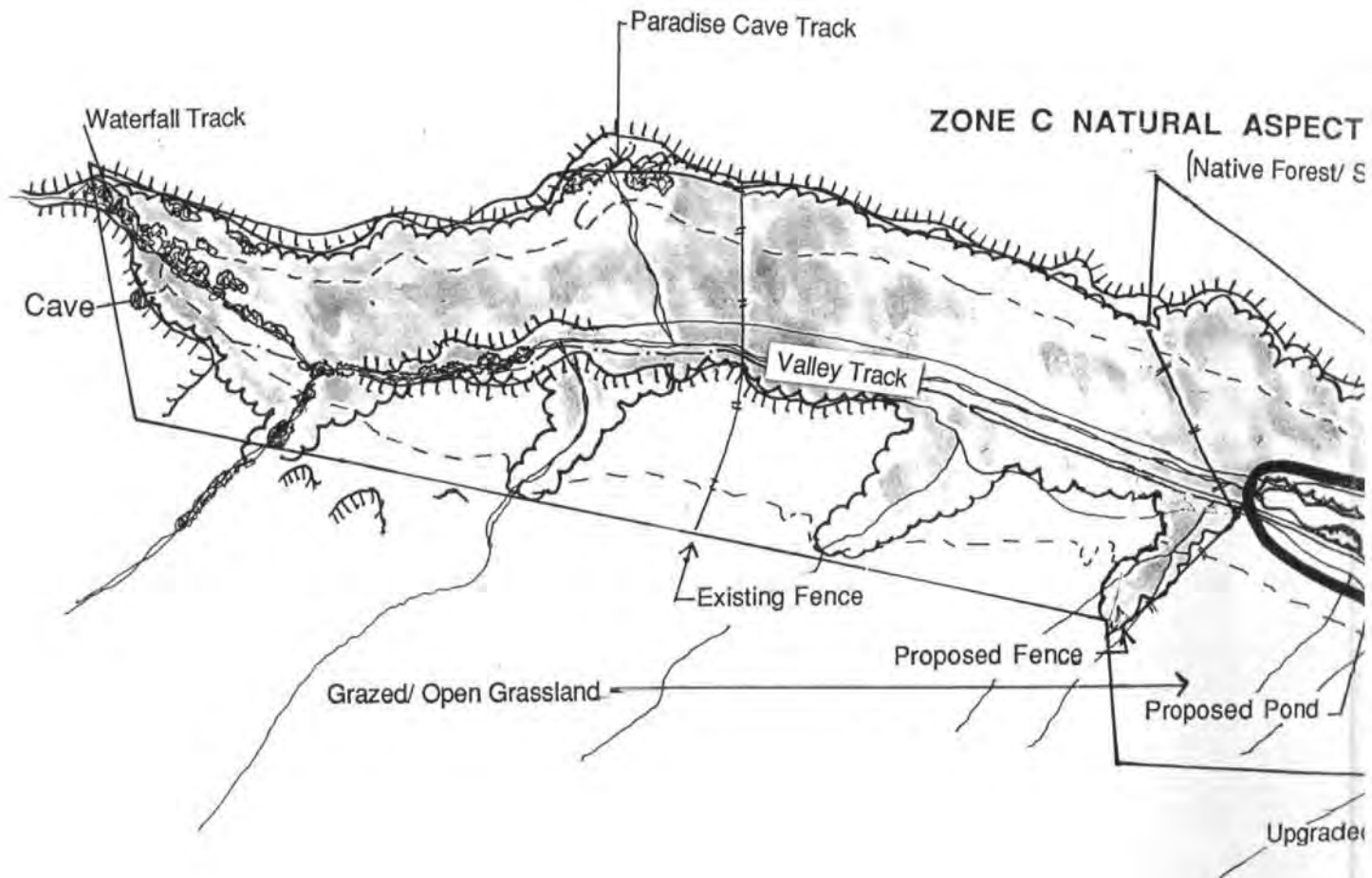
9.0 Implementation Priorities

The following is the general order of priority for implementation of management policies to be followed as circumstances and finance allow.

1. Boundary fencing followed by internal fences .
2. Construction of a toddlers play area.
3. Establishment of a grazing lease.
4. Planting.
5. Development of a pond/wetland.

Barnett Park Landscape Concept Plan

Showing Management Zones Proposed Tracks & Forest Areas

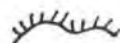


NOT TO SCALE

lan

CT ZONE
(t/ Shrubland)

Key



Cliffs



Stream



Existing Walking Track



Proposed Walking Track



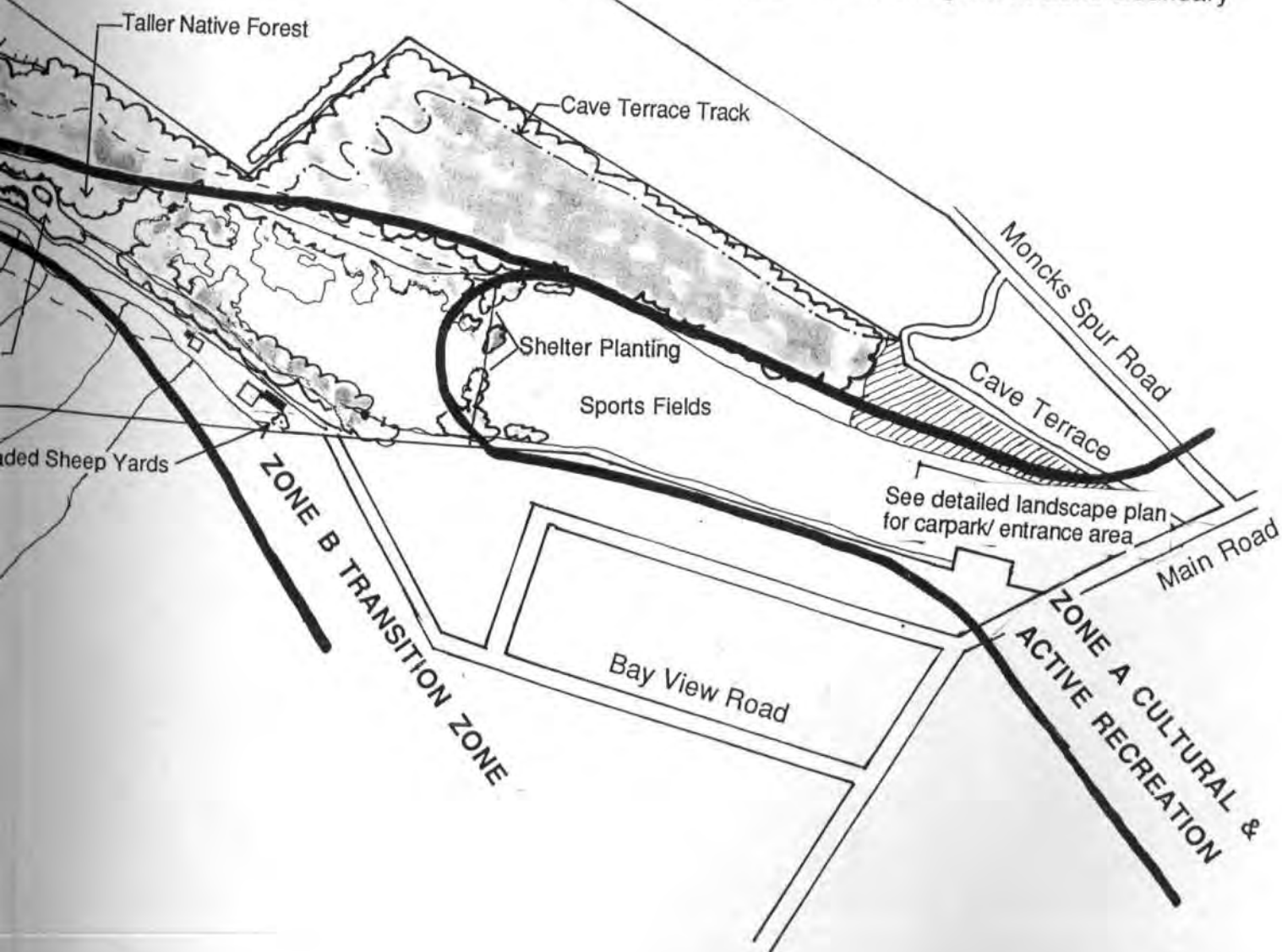
Proposed Forest Margin



Gully Lines

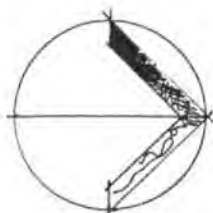
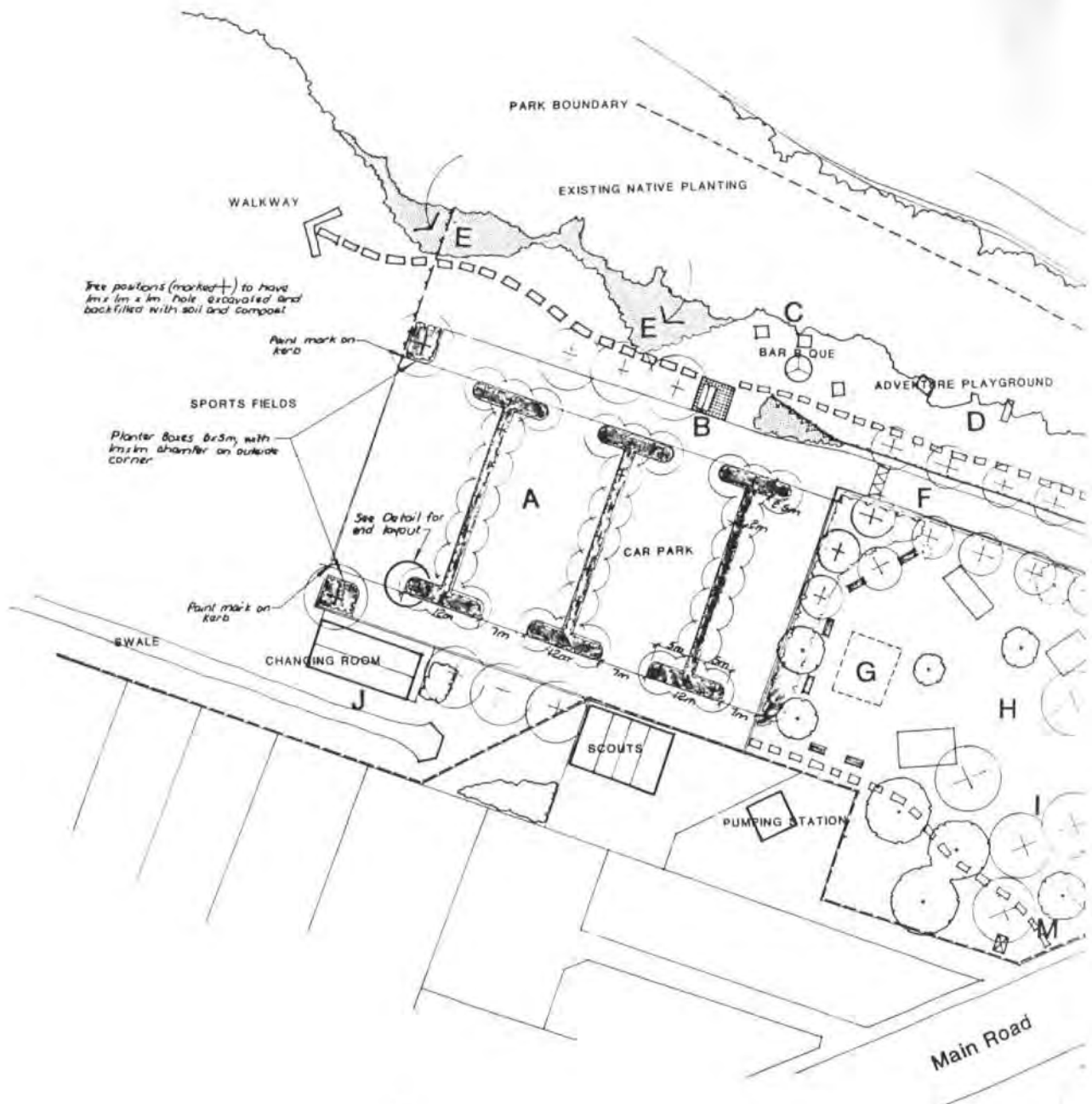


Management Zone Boundary



Original scale of millimetres

100
80
60
40
20
0



DESIGN SERVICES UNIT



CHRISTCHURCH
THE GARDEN CITY

The only place there is

INITIALS	DATE
DESIGNED VCP	24/12/1992
DRAWN	
TRACED	
DRW. CHK.	
DES. CHK.	24/12/1992
INDEXED	

DATUM	BENCH MK.	SURVEY PS.	SURVEY LB.	CONSTR. PS.	CONSTR. LB.

APPROVED

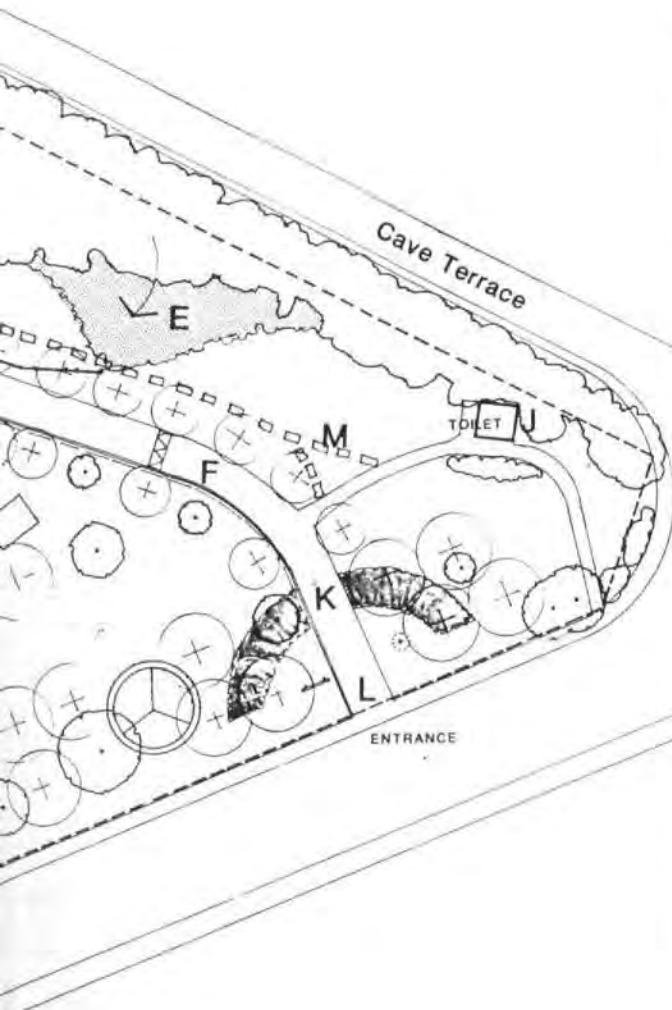
DATE	1/1
DESIGN SERVICES MANAGER	

JOB TITLE

BARNET

NOTES.

- A EXISTING CAR PARK UPGRADED WITH BETTER DEFINITION OF PARKING BAYS AND PLANTING
- B INFORMATION BOARD SHOWING WALKWAY AND LOCAL POINTS OF INTEREST
- C BAR-B-QUE AREA UPGRADED
- D ADVENTURE PLAYGROUND MAINTAINED WITH REPLACEMENT PLANTING AND EXISTING PLANTING PROTECTED WHERE REQUIRED
- E EXISTING NATIVE PLANTING EXTENDED
- F ENTRANCE DRIVE IMPROVED WITH AVENUE PLANTING AND TRAFFIC CALMING STRUCTURES EXTEND POST & RAIL BARRIER
- G TODDLERS PLAY EQUIPMENT WITH LOW PROTECTIVE FENCE
- H EXISTING PLAY EQUIPMENT RETAINED AND REORGANISED WHEN DUE FOR REPLACEMENT. RETAIN EXISTING CIRCULAR SEAT
- I PARK FRONTAGE PLANTING EXTENDED
- J TOILET AND CHANGING ROOMS PAINTED
- K ENTRANCE BETTER DEFINED WITH AMENITY PLANTING AND NEW PARK SIGN
- L IMPROVE THE SAFETY OF VEHICLE ENTRANCEWAY
- M NEW PATHS TO LINK WALKWAY AND CHANGING ROOMS WITH MAIN ROAD



- Existing trees
- Proposed large trees
- Proposed small trees
- Amenity planting
- Native planting
- Trees/shrubs to be removed

ETT PARK

DRAWING TITLE

Entrance Area ——— Concept

SCALES

1:500

C.N.

L2655

SHEET 1 OF 2

SHEET 1 A1
SHEET 2 A2

Appendix 13: Registered Easements

Registered Interests

There are a number of easements and encumbrances registered against the Computer Freehold Registers (CFR) for all three of the sites. These easements and encumbrances may constrain potential development on the sites and may require further investigation.

McCormacks Bay Reserve (site 1)

There are four easements registered against CFR CB4B/1500. Only one of the easements is located within the vicinity of the site and may require further consideration;

- 7251120.1 subject to a right (in gross) to drain sewage over part Reserve 4325 marked A on DP 369982 in favour of the Christchurch City Council.

This easement is located towards the northern boundary of the site.

Redcliffs Park (site 37)

There are four easements registered against CFRs CB27F/184, CB27F/183 and CB616/39. All four easements may require further consideration;

- 555837.4 subject to a right (in gross) to drain sewage over part marked A on DP 47479 in favour of the Christchurch Drainage Board.
- 555837.3 subject to a right (in gross) to drain sewage over part marked B, C and H on DP 47479 in favour of the Christchurch Drainage Board

These two easements extend down the middle of the site from Main Road to Celia Street.

- 555837.2 subject to a right (in gross) to convey and drain water over part marked D, E and H on DP 47479 in favour of the Christchurch Drainage Board.

This easement runs along and adjoins the Celia Street and Beachville Road frontage of the site.

- 555837.5 subject to a right (in gross) to convey and drain water over part marked F and G on DP 47479 in favour of the Christchurch Drainage Board.

This easement runs along and adjoins the Celia Street Road frontage of the site.

Barnett Park (site 38)

There are a number of easements and encumbrances recorded on the Computer Freehold Registers (328620, CB620/38, CB818/15, 467115) for the wider reserve. The following easements are registered over the selected site and may require further consideration;

- Subject to a right (in gross) to convey and carry off surface and stormwater in favour of the Christchurch Drainage Board created by Deed of Easement contained in CIR CB806/43. Shown as areas A, B and C on SO 386405.

- 407819 Subject to a right (in gross) to convey and drain sewage and stormwater over part Lot 2 DP 17034 in favour of the Christchurch Drainage Board.
- Subject to a right (in gross) to convey electric power over part marked A on DP 395396 in favour of Orion New Zealand Limited.

These easements are located and extend along the eastern boundary of the site.

- Certificate pursuant to Section 77 Building Act 2004 that CFR 328620 (Reserve 4979) is subject to the conditions imposed under section 75(2).

CFR 328620 (Reserve 4979) and the land held in CB818/15 must not be transferred or leased except in conjunction with each other.

- 8354853.1 Subject to a right (in gross) to convey electric power over part marked A, B and C on DP 409023 in favour of Orion New Zealand Limited.

This easement is located along the eastern boundary of the site. One arm of the easement also extends across the site from the eastern to the western boundary.

Note: There are proposed easements over Part Reserves 4979 for the right to convey water (in gross) and the right to convey electricity (in gross) as depicted on LT 498413 which will affect CFR 328620.

The plans following show the location of the registered easements over the three sites which may require further consideration during the building design phase.





Legend

- 555837.4, 555837.2 Drain Sewage Easement
- 555837.5, 555837.3 Convey and Drain Water Easement
- Redcliffs Park



Legend

Barnett Park

Easements

SO 386405 Surface and Storm Water Easement

407819 Drain Sewage and stormwater Easement

8354853.1, 83548553.2 - Electricity Easement

Orion Protected Rights

Environmental Asset Water Way

Unregistered Water & Electrical Easement (CCC)

Glossary

Glossary

CCC	Christchurch City Council
CES	Canterbury Earthquake Sequence
CFR	Computer Freehold Register
CPTED	Crime Prevention Through Environmental Design
Ecan	Canterbury Regional Council
ECE	Early Childhood Education Centre
GNS	Institute of Geological and Nuclear Science
HAIL	Hazardous Activities and Industries List
IFL	Interim Floor Level
Kāika	Settlement
LFG	Landfill Gas
LGA 02	Local Government Act 2002
LLUR	Listed Land Use Register
LVD	Lyttelton Vertical Datum
Mahinga kai	Food and other resources and the area from which they are sourced
Methodology	The Ministry's Methodology for New School Site Evaluation version 6b May 2016
MKT	Mahaanui Kurataio Limited
NES	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
Ngā Tutohu Whenua	Cultural landscapes
NoR	Notice of Requirement
Operative Plan	Operative Christchurch City District Plan
Ōtautahi	Christchurch
Proposed Plan	Proposed Replacement Christchurch District Plan
PWA	Public Works Act 1981
RFR	Right of First Refusal
RMA	Resource Management Act 1991
SLS	Serviceability Limit State
Taonga	Treasure
TC2	Technical Category 2
TC3	Technical Category 3
Te Ihutai	the Avon/Heathcote estuary
Te Rae Kura	Redcliffs
Te Tai o Mahaanui	The coastline
TPG	The Property Group Limited
ULS	Ultimate Limit State
Wāhi Tapu	Sacred place
Wāhi Taonga	A place of treasures