



REPORT TO:

Ministry of Education

Alternative Site Selection Assessment Second Report

Redcliffs School, Christchurch

Date September 2016

CONFIDENTIAL

Quality Control



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Table of Contents

1. Executive summary	3
2. Recommendation.....	5
3. Background	6
4. Stage 2 evaluation.....	8
5. Designation	25
6. Conclusion.....	26
7. Indicative Timing.....	29
8. Risk register / commentary.....	36

Figures

Figure 1 Redcliffs Park.....	8
Figure 2 Barnett Park	9

Appendices

1 Additional Sites for Stage 2 process	
2 Tonkin and Taylor Report	
3 Abley Transportation Consultants Report	
4 Stephenson & Turner Report	
5 Detailed Stage 2 Analysis of the Additional Sites	
6 Computer Freehold Registers of the Additional Sites	
7 Easement information for the additional sites	

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. This second report is to be read as an addendum to the Alternative Site Selection Assessment August 2016 Report (August 2016 report) and follows the same Methodology.

The full draft of the August 2016 report was discussed with the Redcliffs School Board of Trustees (BoT) at a Steering Group meeting on 29 August 2016. At that meeting the following requests were made:

- I. That the assessment consider two further alternative building options, at Redcliffs Park, Location C and Barnett Park, Location D;
- II. That the report discuss timeframes and comment on the scope of due diligence work that would have to be carried out;
- III. That Redcliffs Park, Location A be retained as a potential location for consideration;
- IV. That the report outline a “ballpark” timeframe to accommodate the provision of a designated site on Redcliffs Park Locations A or C, or Barnett Park, Location D.

While no further analysis was undertaken on Redcliffs Park, Location A, the information and scores it achieved have been brought forward and considered in forming our recommendations.

Redcliffs Park, Location C, and Barnett Park, Location D were both assessed using the Ministry’s Stage 2 Alternative Site Selection Assessment Methodology as detailed in our August 2016 report. In accordance with Ministry instructions, the existing school site was not assessed.

With respect to Redcliffs Park, Location C a marginal increase in score against the previous site locations was achieved, this score being 71.4 as opposed to 70.4 for Location B in our August 2016 report.

At Barnett Park, a score of 67.1 was achieved for Barnett, Park Location D as compared to 62.6 for Barnett Park, Location A, which is the most comparable of the sites to Barnett Park, Location D. While Barnett Park, Location C scored 64.7 in our original report, it is not on the same area of the park, and has different issues which cannot easily be mitigated (for example more significant rockfall concern and the presence of an environmental asset waterway).

The Ministry’s Methodology does not include an assessment of the Annual Individual Life Risk (AILR) of a potential site, as an elevated AILR is not generally present. However, the unique geography of the Redcliffs School catchment area means that all potential alternative sites may be affected to some degree by an elevated AILR. The original report on the Main Road site by MWH New Zealand Limited (MWH) “Redcliffs School: Cliff Instability and Hazard Mitigation, August 2014” concluded that the acceptable AILR safety threshold for a school site is 1×10^{-6} .

On this basis, and through discussions with the Ministry, preparation of this second assessment has included consideration of the MWH AILR safety threshold for school sites.

The Risk Register has also been updated to reflect feedback on the draft August 2016 report.

As set out in the August 2016 report, the adjacent residential site to the south of Redcliffs Park Location C (approximately 900m²) is at present vacant and presents a potential acquisition opportunity for the Ministry.

In addition to the advice obtained for the evaluation of Redcliffs Park and Barnett Park, further advice was sought in the areas of geotechnical, flooding, contamination, traffic and transportation, infrastructure, and school design as they related specifically to the new Redcliffs Park, Location C and Barnett Park, Location D. These additional reports are appended, as are maps, titles and easement documents specific to the sites in this report. Any unchanged appendices to the August report have not been replicated here, and are referred to as necessary.

On completion of this second Stage 2 evaluation, scores achieved by Redcliffs Park, Location A and the two new sites were as follows:

Redcliffs Park, Location A	62.4
Redcliffs Park, Location C	71.4
Barnett Park, Location D	67.1

2. Recommendation

Having given due consideration to the Ministry Methodology, and the location of the 10^{-6} AILR line as described by MWH, we make the following recommendations:

1. That, of the identified alternative sites for Redcliffs School, Redcliffs Park be considered the preferred alternative.
2. That the Ministry undertake detailed due diligence on Redcliffs Park as a whole without at this stage confirming a specific preferred location for school infrastructure.
3. That as part of that process, specific review and analysis is undertaken as to the optimal location for school and community infrastructure on the site.
4. That no further due diligence investigations be undertaken at Barnett Park at this time.

3. Background

As outlined in the background section of the August 2016 report, 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.

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”¹ 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 shall include the feasibility analysis as set out in the previous paragraph.

TPG was 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. The August 2016 report, with its appendices, should be read in conjunction with this second Report.

On completion of the August 2016 report, two sites were recommended to the Ministry for further due diligence assessment; Redcliffs Park, Location B, and Barnett Park.

A full draft of the August 2016 Report was discussed with the Redcliffs School BoT at a Redcliffs School Steering Group² (Steering Group) meeting on Monday 29 August 2016. At that meeting it was agreed that an assessment would be carried out on two further locations at the preferred sites of Redcliffs Park and Barnett Park using the same Stage 2 methodology. They are:

- Redcliffs Park, Location C which is a variant of the preferred option for the Redcliffs Park, Location B site, and
- Barnett Park, Location D, which was considered by the steering group to represent an enhanced option to any of the initial three identified locations.

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

² The Seering Group comprises members of the Redcliffs School Board of Trustees, CCC, and the Ministry.

In addition, it was also agreed that the Ministry would continue to consider Redcliffs Park, Location A as an option. Our initial recommendation around Redcliffs Park, Location A is contained within the August 2016 report and there has been no need to undertake any further assessment. We note that the Ministry is at liberty to undertake due diligence on any site as it sees fit.

The Ministry's Methodology does not include an assessment of the AILR of a potential site, as an elevated AILR is not generally present. However, the unique geography of the Redcliffs School catchment area means that all potential alternative sites may be affected to some degree by an elevated AILR. The original report on the Main Road site by MWH New Zealand Limited (MWH) "Redcliffs School: Cliff Instability and Hazard Mitigation, August 2014" concluded that the acceptable AILR safety threshold for a school site is 1×10^{-6} .

On this basis and through discussions with the Ministry, preparation of this second assessment has included consideration of the MWH AILR safety threshold for school sites.

In preparing this second assessment, TPG has received additional location specific high level expert advice in the areas of geotechnical, flooding, contamination, traffic and transportation, infrastructure, and school design. Expert advice received for the August 2016 report relating to culture, heritage and valuation already provided sufficient level of detail and no additional advice was needed.

4. Stage 2 evaluation

4.1 Overview

This is a summary of the Stage 2 assessment of two additional locations, against the 20 criteria as defined by the Methodology. The sites are identified as Site 37, Redcliffs Park, and Site 38, Barnett Park, as shown on “Plan E: Stage 2 Selected Sites” at Appendix 1 to this report. A detailed summary of the Stage 1 evaluation and awarded scoring for each of these sites was provided within Appendix 4 to the August 2016 report.

Existing advice prepared for the August 2016 Report has been supplemented by a number of additional reports from consultants and experts as required. Additional expert reports have been summarised in this report and are attached in full as follows:

Appendix 2 – Tonkin and Taylor

Appendix 3 – Abley Transportation Consultants (Abley)

Appendix 4 – Stephenson & Turner

The full Stage 2 assessment is set out at Appendix 5. Title information is provided at Appendix 6, and additional information relating to easements at Appendix 7.

4.1.1 Site 37 Redcliffs Park, Location C



Figure 1: Redcliffs Park, Location C

Redcliffs Park has a total area of 1.9071 hectares. The potential building platform identified as Location C represents an area of land located around approximately the west and north-western boundary of the park. The western boundary of the proposed building platform has been brought forward approximately 20m inside the park boundary with Main Road. This differentiates the site from Location B which was allowed for in the August 2016 report. As set out in that report, the adjacent residential site to the south of approximately 900m² is at present vacant and represents a potential acquisition opportunity for the Ministry to enhance the development potential for the site.

4.1.2 Site 38 Barnett, Park Location D



Figure 2: Barnett Park, Location D

The area of land affected by the potential building platform is made up of four parcels held in three titles which have a total area of 8.1949ha. Location D is situated at the northern end of Barnett Park fronting Main Road. We estimate this identified area to have a total area of approximately 1.4 – 1.6 hectares. Location D was identified with the intention of providing a wider scope for potential site design than that which was allowed for with respect to Location A in our original August 2016 report. Location D is intended to provide a larger site size with the potential to redesign existing site constraints such as the car parking and playground facilities to fit in with an overall school site design. This site would offer better co-location opportunities than Location A.

4.2 Stage 2 Scoring Table

A summary of the scores awarded to each site is recorded in Table 1. Section 4.3 includes a comparative analysis of how the two locations scored against the criteria. More detailed individual assessments for each of the locations are included at Appendix 5.

Criteria	REDCLIFFS PARK	BARNETT PARK
	Location C	Location D
Site acquisition costs	2	2
Perceived ease of acquisition	0	0
Site size	5	5
Topography	5	5
School design potential	5	4.5
Position of site / growth	5	5
District Plan Zone	3	4
Location within catchment	5	5
Existing site constraints	2	1
Road frontage	4	1
Transport network	4	3
Infrastructure services	2.4	2.6
Geotechnical	4	3
Flooding	3	1
Contamination	4	3
Noise effects	5	5
Ecological impacts	3	4
Cultural or other significance	2	4
Opportunities of co-location	3	4
Social impact	5	5
Total	71.4	67.1
Rank	1	2

Table 1: Stage 2 scores

4.3 Stage 2 Detailed Evaluation

4.3.1 Site Acquisition Costs

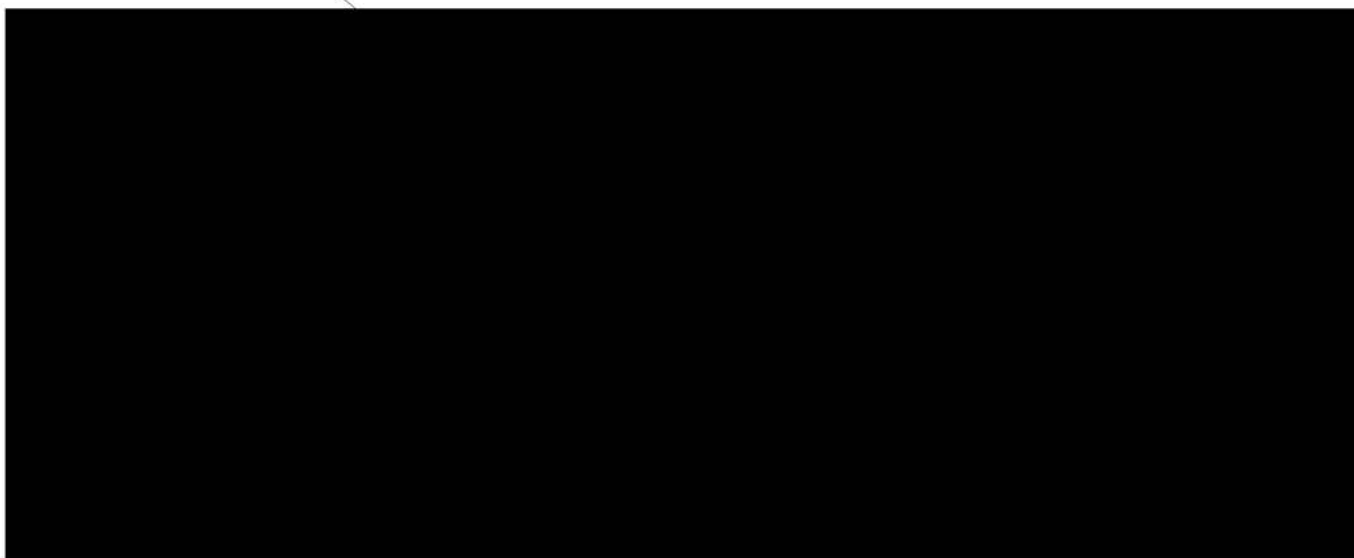
Preliminary desktop valuation advice was obtained from Telfer Young for all three properties identified in our August 2016 Report. This existing valuation advice has also been utilised to provide an indicative indication of the possible purchase price for the further identified sites of Redcliffs Park, Location C and Barnett Park, Location D.

Both properties 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 hypothetical basis of both properties being available for residential development, and 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 assessment of an indicative value to purchase the approximate 1.6ha occupied by Location D at Barnett Park, or, the purchase of the full 1.9017ha making up Redcliffs Park. The second was the assessment of an indicative 2,500m² 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 CCC and the Ministry.



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



4.3.2 Ease of Acquisition

Both properties, and their associated locations identified for further evaluation, represent park and playing field spaces servicing Redcliffs and neighbouring residential suburbs. Computer Freehold Register (CFR) titles for the Redcliffs Park (whole site) and Barnett Park Location D are at Appendix 6.

Redcliffs Park, Location C

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

³ Full description of Value A and Value B is described at p7 of the Telfer Young report at Appendix 9 of the August 2016 report

⁴ This excludes costs relating to the acquisition of the adjoining residential site at 19 Main Road

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, nor 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 to 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, Location D

The area of land identified as Location D at Barnett Park is potentially affected by a total of four underlying parcels of land held in three titles. These four underlying parcels are made up of a main parcel (itself part of a larger parcel) which forms the main frontage of the site with three additional smaller parcels of land located towards the front of the site and along the eastern boundary of the property.

The main parcel of land fronting Main Road is held 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.

Of the three small sites located at the front eastern boundary of the property two are held for local purpose reserve/recreation purposes, 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 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 (PWA) 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 part of any sale.

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 either of the two sites 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 the Department of Conservation (DoC) that potentially the Reserves Act process may be dispensed with, if the land is set apart under Section 52 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 required 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 noted above, Section 138 of the LGA 02 requires Council to 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 C and potentially a small area of land on Location D 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 have the potential to extend the time period associated with acquisition of the land.

Acquisition Process

We would envisage that any land acquisition/transfer of the potential sites would be facilitated via the PWA. Transfer of the Crown derived reserve land will not be subject the Ngāi Tahu Claims Settlement Act 1998 as this will constitute a Crown to Crown transaction. This will also be the case should the Crown and Council agree that the CCC LGA 02 land is purchased for financial consideration by the Crown. Neither of these transactions constitute a disposal of land by the Crown, however, notification is required to be given to Ngāi Tahu of the exempted transfer.

In the case of a land exchange being completed between one of the potential alternative sites and the existing school sites on Main Road, Right of First Refusal obligations will need to be addressed with Ngāi Tahu in the event that the exchange includes CCC LGA 02 land. This 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 the exchange of land was to require that existing school land is transferred into the name of the CCC this will constitute a disposal of land by the Crown to the Council, triggering Right of First Refusal obligation as per the Ngāi Tahu Claims Settlement Act 1998. The transfer of any Crown derived reserve land for land at the existing school site (Section 15 of the Reserves Act 1977) will not be affected as this represents a Crown to Crown transaction. If an exchange of land involving CCC LGA 02 land is likely, we recommend that consultation with Ngāi Tahu is entered into at the earliest opportunity.

We also note that Section 40 PWA would have to be addressed in respect of the MoE land if it is to become CCC general land as part of an exchange. Assuming the current CCC land is not held for a public work or reserve (as it is not on face value) and this status does not change, the only way to avoid considering the requirement to offer the land back to a former owner is if CCC can demonstrate it has a requirement for land to be vested in exchange pursuant to section 105 PWA. As set out at Section 40 PWA, transfers of surplus PWA land required for another public work, or for vesting pursuant to section 105 PWA, take priority to the rights of the former owner.

CCC would have to demonstrate the land was “used by the owner personally for any purpose”⁵, and the exchange land is reasonably equivalent to the land to be sold to MOE to qualify under s105 PWA. We believe it likely these requirements can be evidenced, but this would ultimately have to be accepted by a LINZ delegate. We suggest early consultation to confirm a LINZ view on this point would also be prudent.

Both sites have a number of complexities associated with them which are outside the norm associated with land purchases 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 both sites offer a very similar level of complexity and potential timeframe within which acquisition/transfer could be expected to be completed.

4.3.3 Site Size

Stephenson & Turner have provided advice⁶ on site size and school design potential for each of the locations.

Both are large enough to provide sufficient space to meet all the Ministry’s needs. Preliminary designs indicate that while both locations contain several significant easements, there is still enough room for a conforming school site to be designed.

4.3.4 Topography

Both the sites are flat with no variations to contour sufficient enough to make building construction difficult.

Redcliffs Park has two distinct potential building platforms at differing heights.

⁵ s105 (1) (b) PWA

⁶ Stephenson & Turner report – Appendix 4

4.3.5 School Design Potential

In looking at school design potential, Stephenson & Turner have evaluated⁷ 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 carpark, 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.

Redcliffs Park, Location C

The layout of the school provides for two, two storey buildings and a smaller two storey extension which will create a courtyard area. Unlike previous location B, the location of the buildings are stepped back from the 10⁻⁶ Lives Risk Line along the south boundary. The site uses the balance of Redcliffs Park for playground facilities.

There are multiple accessible routes to the school. Easements through the site result in potential design constraints, although preliminary design indicates that they can be managed.

Barnett Park, Location D

There are a number of easements running through the site which affect the design potential of the school and which will need to be addressed in detailed design. The location shares carparking with existing Council parking. Some outdoor areas are exposed to the prevailing north-easterly wind. There is good connection between the school buildings and the grassed area.

4.3.6 Position of site in relation to any growth strategy or residential plan

The sites are both 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.

4.3.7 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, both sites are zoned a type of Open Space, excepting that Redcliffs Park Location C also has a small area of Residential Suburban zoned land on its north western boundary at 7 Main Road.

Each site has a range of overlays as set out in the following table.

⁷ ibid

	Operative plan	Proposed plan
Redcliffs Park (C)	Zone: Open Space 2 (District Recreation and Open Space) Notations: Flood management area (primarily affects the lower portion of the site).	Zone: 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 Cliff Hazard Management Area 2
Barnett Park (D)	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 ⁸

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

That notwithstanding, the due diligence assessment for the preferred site will have to carefully consider other planning instruments⁹ 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 either of the sites.

The Proposed Plan includes a Coastal Environment overlay on the planning maps which affects both Redcliffs Park and Barnett Park Location D.

⁸ Runs along the Main Road frontage.

⁹ 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.

4.3.8 Location within the proposed student catchment

The sites sit within the existing Redcliffs School Zone and are centrally located within the current catchment.

4.3.9 Existing Site Constraints

There are a number of buildings and improvements located on both the Redcliffs and Barnett Park 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, with the majority offering potential opportunities for co-location and shared facilities. Location D at Barnett Park is more affected than Redcliffs Park C by existing constraints which include several significant easements with Christchurch City Council (drainage), Orion (electricity) and the location of the onsite play centre.

There are a number of registered easements and encumbrances over both Redcliffs and Barnett Parks which may constrain potential development of the sites, although we note that preliminary bulk and location designs 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 either of the locations. This final design may include consultation with the easement holders around possible relocation of the easements and infrastructure involved.

Redcliffs Park, Location C

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

The balance of the easements are more peripheral and move around the approximate boundary of Celia Street and Beachville Road. We expect that these easements would have minimal, if any effect, on potential building design with respect to Location C.

Barnett Park, Location D

A large drainage easement in favour of the Christchurch City Council runs down the eastern boundary of Barnett Park. On reaching the southern end of the existing carpark the easement moves west away from the eastern boundary line and through the central portion of location D.

The CCC Management Plan for Barnett Park 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, slightly to the east of the centre line. On reaching the existing carpark area the easement does move in an arch toward the west around the existing play centre before coming back in an approximately easterly direct to finish at the road frontage. This easement, along with the drainage easement, does materially affect the development of the central portion of the Location D platform.

We note that from our approach to Orion there would potentially appear to be one small area of infrastructure around Location D which is not protected or recorded by an easement but is protected by the Electricity Act 1992. Further confirmation on the location of this infrastructure will be required.

Appendix 7 includes a description of the easements recorded on the respective titles for the two 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 area containing infrastructure associated with Orion that is not recorded as a formal easement. A map identifying easement locations is also included.

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, running down the west of the preliminary bulk and location design for the site.

4.3.10 Road Frontage

Both sites have frontage to existing roads. The Abley report¹⁰ addresses whether the sites have appropriate legal access to the boundary and concentrates on whether there are opportunities for vehicle access to more than one boundary.

Redcliffs Park, Location C

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

The Main Road frontage is assumed not to provide direct vehicle access to the carpark due to the site having two quite separate platforms at differing heights. It will however offer pedestrian access to the school. There will be some limited vehicle access from Main Road for service/emergency/ability vehicles but general vehicle access from Main Road to the school carpark is unlikely to be feasible.

Barnett Park, Location D

Vehicle access for this option would be via the existing vehicle access from Main Road. Vehicle access onto Main Road from Barnett Park may need to be managed to avoid large queues back onto the park. Drop-off and pick-up is also 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.

¹⁰ Abley Transportation Consultants - Appendix 3

4.3.11 Transport Network

Abley report¹¹ that 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.

Redcliffs Park, Location C

Redcliffs Park can be well served by all modes of transport.

Consideration should be given to providing a crossing facility to enable safe passage across Main Road. Walking access across the park from the on-street carpark 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. Additional issues are managing parking/drop-off activity before and after school, and considering whether a reduced speed limit at those times is appropriate.

Barnett Park, Location D

Barnett Park scores the lower of the two sites with respect to this criterion. There is a 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 newly 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.

Some amendments to the layout of the existing carpark, both for car parking and to provide manoeuvrability for school charter buses, would be required.

4.3.12 Infrastructure Services

Infrastructure analysis was undertaken by Tonkin and Taylor¹² (potable water, fire protection water supply, sanitary drainage, stormwater,) and Stephenson & Turner¹³ (electricity, gas, telephone/communications, and refuse collection.)

Water, refuse collection and sanitary services to the street front are available to the sites. Both 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.

¹¹ *ibid*

¹² Tonkin and Taylor Appendix 2

¹³ Stephenson & Turner Appendix 4

All sites would need on-site stormwater detention, such as rain gardens, swales or storm filters. Both 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 D are likely to be higher than to Redcliffs Park given the distance from Main Road.

4.3.13 Geotechnical

Additional advice has been sought from Tonkin and Taylor with regards to Redcliffs Park Location C and Barnett Park Location D

Redcliffs Park, Location C

Redcliffs Park Location C has moderate potential for liquefaction related ground impacts, and is expected to behave as TC2/TC3 type land in the event of another moderate to severe earthquake. It will likely require specific engineering input into building fill platform and foundation design.

The building platform is within approximately 12-15 metres of the individual lives risk line which itself encroaches about 4m onto the properties along Main Road. The building platform is not intended to be within the CCC/GNS slope mass movement instability zones.

Barnett Park, Location D

Tonkin and Taylor anticipate a moderate potential for liquefaction and TC2-like future performance. It will likely require specific engineering input into foundation design which is also impacted by the flood level and the need to raise the foundation above the existing ground level.

The slope of Moncks Spur to the west of the site presents a modest landslip hazard which can be mitigated by locating building footprints to the east of the current carpark accessway. There is no rock fall hazard in this area.

4.3.14 Flooding

Advice¹⁴ from Tonkin and Taylor is as follows:

Redcliffs Park, Location C

Assuming the building platform is raised approximately 2.5 metres to the level of Main Road, Location C sits outside the CCC Flood Management Area. The playground, carpark and lower access roads would still be susceptible to flooding.

¹⁴ Tonkin and Taylor Appendix 2

Barnett Park, Location D

Location D is known to experience surface flooding due to run off from the hill catchment on the wider reserves western and southern boundaries. Storm flows have also overtopped the large swale drain that runs along the eastern boundary of the site. The swale and pipe may need to be upgraded.

Approximately 1 metre of fill will be needed to meet the finished floor levels.

The site is within the CCC Flood Management Area and Tonkin and Taylor note that the 50-100 year coastal inundation and erosion hazard lines cut diagonally across the site.

4.3.15 Contamination

Tonkin and Taylor advise¹⁵ that Redcliffs Park and Barnett Park are both on Ecan's Listed Land Use Register (LLUR). As district parks, both are possibly subject to pesticide contamination.

Redcliffs Park, Location C

Redcliffs Park is listed as closed landfill #43 on the CCC landfill map. The known landfill activity affected the western portion of the site and, according to Tonkin and Taylor, the proposed Location C paved areas and carpark are located over landfill. Location C building sites are located to the south-west of the old landfill area.

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.

Barnett Park, Location D

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 low levels of lead contamination from bullets fired on the rifle range and possible contamination from building demolition and storage of military supplies.

4.3.16 Noise effects on any proposed school

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

4.3.17 Ecological impact

Run-off and sedimentation during development on Redcliffs Park would still need to be carefully managed to avoid effects on the estuarine environment, particularly as the site is registered as a former landfill.

¹⁵ Tonkin and Taylor Appendix 2

No ecological impacts are anticipated on Barnett Park Location D.

4.3.18 Cultural or other significance

Expert advice was sought from Mahaanui Kurataiao Limited (MKT)¹⁶ from a cultural perspective in undertaking the initial Stage 2 assessment on Redcliffs Park, Barnett Park and McCormacks Bay Reserve. 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 either 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 Schedule 101 Ngāi Tahu Claims Settlement Act 1998.

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

Redcliffs Park, Location C

MKT scores Redcliffs Park high risk for issues relating to Mahinga Kai, Wāhi Tapu, Ngā Tutohu Whenua and Wāhi Taonga, and average risk for Mauri, Kaitiakitanga and Rangatiratanga. MKT notes that there is evidence to suggest that urupā (burial grounds) may be located in the immediate vicinity of the site.

Regarding Redcliffs Park, Heritage New Zealand states¹⁷ “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.”

¹⁶ Appendix 10 to August 2016 report

¹⁷ Email Frank van der Heijden 5/8/2016

Barnett Park, Location D

MKT's report indicates that Barnett Park is of lower risk than Redcliffs Park, however, 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.

Heritage New Zealand similarly comment, "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."

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.

4.3.19 Opportunities for Co-Location or Shared Facilities

Both Redcliffs and Barnett Parks offer potential opportunities for co-location and/or use of shared facilities. With the sites currently being utilised as community parks the most obvious opportunities are with respect to playing fields and playgrounds which can be used by both the school and wider community. This would need further discussion with CCC and could well form part of negotiations around acquisition of the land.

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

Location C at Redcliffs Park offers the opportunity for the area which is not utilised for school building construction to be developed into playing fields which are available to meet both school and community needs. There is also the opportunity for development of playground facilities.

Location D at Barnett Park potentially provides excellent opportunity for co-location or shared facilities with car parking, play grounds and playing fields already well catered for, although we note that there is likely to be the requirement for redesign and positioning of these facilities within the wider use of the proposed location. A modern play centre is also already provided for in this area of Barnett Park.

4.3.20 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 students, and is to continue to provide an existing service to an existing catchment.

5. Designation

As set out in the August 2016 Report, a designation is an exception to the district plan, usually with its own suite of conditions. Any alternative site acquired for the purposes of the relocation of Redcliffs School will be subject to this designation process under the RMA.

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).

On receipt of a NoR from a Requiring Authority, the territorial authority is required to consider whether the application is complete. Once it has satisfied itself that it has the necessary information it then makes a decision whether to process the NoR on a non-notified, limited notified or fully notified basis (s169(1)).

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. The Ministry also has the ability to request that the NoR is fully publicly notified and has advised that in this case such a request would be made.

Upon public notification there is a submission process, followed by a public hearing which enables the community to submit on the designation, either in support or opposition.

Statutory timeframes are set out in the Act, and are the same as those for a notified resource consent (130 working days/26 weeks). The appeal processes are also set out, but there is no statutory timeframe around those. Given the complex nature of the sites and the potential level of community interest, the risk of an Environment Court appeal/challenge to the Minister's decision could be high.

The locations considered in this report and the previous report of August 2016 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.

A general timeframe for the NoR process has been provided at Section 7.3 of this report.

6. Conclusion

Two further sites, 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 Redcliffs Park, Location C scoring 71.4, and Barnett Park, Location D scoring 67.1. This means that Redcliffs Park, Location C is the highest scoring of all the locations evaluated in the August 2016 Report and in this assessment.

For Redcliffs Park this shows a marginal increase in the scoring against previous locations on the site. This is a result of enhanced school design potential identified by Stephenson & Turner.

At Barnett Park, Location D scored better than the previous three options, where the best option, Location C, had scored 64.7. Location D incorporated the Location A site which scored 62.6, but took a broader view and addressed some of the constraints on the original design. This enabled an holistic redesign over a larger site. Taking this approach resulted in significantly improved scores for site size and school design potential as compared with Location A.

As set out in Section 3 of this report, it was also agreed that Redcliffs Park, Location A would remain as an option. This is because there was a preference for the school design potential offered by Location A as opposed to that offered by Location B.

Our initial recommendation around Redcliffs Park, Location A, which has been undertaken in accordance with the Ministry Methodology, is contained within the August 2016 report. Our score for Redcliffs Park, Location A was 62.4.

In order to better address the MWH 10^{-6} AILR issue, a new risk has been included in the Risk Register at Section 8.

At Barnett Park, the potential school buildings are not affected by the 10^{-6} AILR Line, however the playing fields are. Any engineering mitigation required to address the 10^{-6} AILR Line for the school playing fields may directly impact on the public open space, especially the public walkway and uses of the community sports fields. This may result in an engineering solution (e.g. bunding) not being appropriate to mitigate the schools risk with respect to the matter. Barnett Park is therefore not a preferred option to carry forward for further due diligence at this time, as any mitigation of the AILR Line may result in significant impediments to other users of the park.

As the line crosses public open space which is used for sports fields and contains a public walkway, mitigating the school's risk cannot easily be avoided through engineering solutions (eg bunding). Barnett Park is therefore not a preferred option for further detailed due diligence as any engineering solutions which might result in the mitigation of the AILR would also result in significant impediments to other users of the park.

At Redcliffs Park the Main Road boundary is currently affected by the 10^{-6} AILR. As advised by Tonkin & Taylor, rockfall mitigation which is currently being undertaken by New Zealand Transport Agency (NZTA) and CCC is expected to move the 10^{-6} Lives Risk Line to the approximate mid-line of Main Road. Preliminary advice from Tonkin and Taylor indicates that the hill side work is complete, but further work will need to occur to replace the kerbs and road surface and add the concrete barrier. The timing of that is not yet certain, however Tonkin and Taylor's current view is that it may occur within the next year to 18 months.¹⁸

This would result in the 10^{-6} Lives Risk Line moving outside the boundary of Redcliffs Park. This would mitigate the risk identified in the Risk Register, and in our opinion makes Redcliffs Park the preferred option over Barnett Park.

While current scoring places Redcliffs Park, Location A significantly below Location C, preliminary advice from both Tonkin and Taylor and Barnes Beagley Doherty, is that poor scoring criteria such as geotechnical, contamination and flooding issues could be addressed through engineering solutions. This is reflected in the increased cost, and further due diligence would need to confirm that this is in fact a viable option for designation.


In conclusion, we recommend that the Ministry undertake detailed due diligence on Redcliffs Park as a whole, without at this stage confirming a specific location for school infrastructure. Once the detailed due diligence process has been completed we would recommend that detailed analysis is then undertaken to ascertain the optimal location of the school and potential co-located of community infrastructure on the site.

6.1 Summary

Table 3 records the scores achieved by each of the three individual locations and the preliminary acquisition cost for either a full site (1.6ha - Barnett Park or 1.9ha - Redcliffs Park), or a 2,500m² building platform. Barnes Beagley Doherty have provided a rough order cost of construction based on a school roll of 300 students.

¹⁸ Email Barry McDowell 20 September 2016

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



¹⁹ Land acquisition costs for the Redcliffs Park site do not include any costs relating to acquiring privately owned land.

7. Indicative Timing

As requested by the Steering Group, we have prepared an indicative timeframe to complete the land purchase on either of the identified sites of Redcliffs Park or Barnett Park as discussed below.

This timeframe is subject to a number of variables. The first is the date of the Minister's decision and subsequent announcement of her preferred course of action. Advice from the Ministry is that the earliest possible date when this might occur is October 2016. We have developed this timeframe around that assumption.

We note that any timing around land acquisition and the processes required is highly likely to be affected by local body elections which are to be held in October this year. There is a high possibility that limited progress will be made prior to the Christmas and New Year break to allow for swearing in and formation of the Council and Local Community Boards, establishment of any necessary committees and confirmation/clarification of relevant delegations is completed. This has the potential to add significant time to the completion of any land acquisition.

This indicative timeframe has assessed three main processes, which are

1. Environmental and Geotechnical Due Diligence
2. Land acquisition process
3. Notice of Requirement and Designation

In considering the time associated with completion of environmental and geotechnical due diligence and NoR actions, consideration will need to be given to when these processes commence. It is not unusual for some environmental and geotechnical due diligence work to proceed (with the land owners permission) at the same time as the land acquisition negotiations are progressing. We understand that it is more likely that the formal NoR process would only begin once a Council resolution on any land acquisitions is confirmed.

7.1 Tonkin and Taylor – Environmental and Geotechnical Due Diligence.

Site Location	Environmental Due Diligence	Geotechnical Due Diligence.
Redcliffs Park	Scope of Work	Scope of Work
	<i>Former Landfill</i>	12 Cone Penetration Tests (CPT) and 2 Machine boreholes
	Test pit soil sampling	Liquefaction assessment
	Installation and gas monitoring wells	Evaluation of Foundation options
	LFG Monitoring	Quantitative rock fall analysis
	<i>Sports fields (full site)</i>	
	Sampling of shallow soils and analysis	
	Reporting in line with Contaminated Land Management Guideline # 1.	
	Timeframe	Timeframe
	(from commencement to report delivery)	(from commencement to report delivery)
	6 weeks	8 weeks
Barnett Park	Scope of Work	Scope of Work
	<i>Full site</i>	8 CPTs
	Shallow Soil Sampling analysis for metals and pesticides	Liquefaction assessment
	Reporting in line with Contaminated Land Management Guideline # 1	Evaluation of Foundation options
		Quantitative rock fall analysis
	Timeframe	Timeframe
	(from commencement to report delivery)	(from commencement to report delivery)
	4 weeks	6 weeks

Tasks that comprise the scope of works in the environmental and geotechnical due diligence may be able to be carried out concurrently. However, based on the detail provided by Tonkin and Taylor, and our own previous experience with respect to obtaining this information, we would suggest that a minimum period of two to three months is allocated to allowing for completion of environmental and geotechnical due diligence.

7.2 Christchurch City Council and Site Acquisition.

Preliminary discussions with Christchurch City Council staff have indicated that the following process is likely to be followed to determine whether the Council would proceed with a land exchange/sale for this project.

The following process and timeline assumes that initial decision making rests with the Community Board, rather than with full Council. If the latter is the case, the timeframe will change. This is not something which can be confirmed until after the Council elections are completed and the new committee structures have been confirmed.

This may also change depending on whether RFR processes are triggered by the land transaction which may result in Council rather than the Community Board being the initial decision maker. Establishing the process will depend on the specific nature of the agreed transaction.

This timetable does not allow for any delays as a result of community opposition to the proposal outside of the statutory processes and assumes that all decisions are taken at the first available opportunity.

Actions/Process	Approximate months for action	Comments
Initial discussions between MoE and Council staff to confirm the terms on which potential sale/exchange may occur and to confirm the Council decision making process which needs to be followed	October - November 2016	Commencement of consultation/discussion will follow Ministerial announcement. This assumes an early October announcement.
CCC officers prepare briefing to go to Community Board	December 2016	
Initial Community Board seminar/workshop to discuss and review proposal	December 2016	While a Community Board seminar is scheduled for November, October local body elections are likely to mean that the first available opportunity will not be available until December (or possibly later)
Community Board Decision meeting – proposal placed on formal Board Agenda	February 2017	Assumes favourable recommendation from Board and that no other Council decisions are required.
Proposed land sale/exchange formally advertised in line with legislative requirements	March – April 2017	Public consultation
Hearing of submissions	May 2017	
Hearing Panel deliberation and preparation of recommendations	May – June 2017	
Hearings Panel recommendation	August 2017	Assumes that Hearings Panel

Actions/Process	Approximate months for action	Comments
goes to Council for decision		recommendation and Council decision are both favourable
Council recommendation to DoC/Minister for approval and Ministerial decision	August – September 2017	Assumes that decision to proceed is made before Central Government Elections in 2017.
Sale/exchange of land and formal agreement processed/executed by CCC and Crown	September – November 2017	This timeframe allows for final drafting of transfer documentation, signing by CCC and LINZ and completion of legalisation and titling actions.

Based on preliminary discussions with Christchurch City Council staff, we would suggest the best case scenario for completion of the necessary Council and land transfer processes would be in the order of 12-15 months.

7.3 Designation

A designation process follows the same statutory timeframe as a notified resource consent. The timetable below assumes that

- The application is complete at time of lodgement and able to conform with the necessary statutory requirements.
- No requests for deferral or requests for further information occur.

Actions/Process	Timeframe	Comments
Pre-lodgement:		
Prepare application. Include all necessary consultant information. Pre-application meetings.	4-6 months	Timeframe may be tight depending on variables.
Lodgement:		
Council/s determines whether application is complete.		STATUTORY TIMEFRAME Up to 10 working days.
	Statutory processing clock starts - 6 months	STATUTORY TIMEFRAME 130 working days as detailed below:
Council/s determines whether to process non-notified/limited notified/notified unless applicant	STATUTORY TIMEFRAME Up to 20 working days – likely to be reduced on the basis that the	

Actions/Process	Timeframe	Comments
requests notification. Ministry intends to request full notification.	Ministry requests notification.	
Once notified, the application opens for submissions	STATUTORY TIMEFRAME Up to 20 working days for submissions	
Hearing to be held	STATUTORY TIMEFRAME Hearing completed within 75 working days from close of submissions	
Preparation of written recommendation Consent Authority advises Requiring Authority of recommendation. Requiring Authority writes back to Consent Authority advising that it accepts/rejects recommendation	STATUTORY TIMEFRAME Up to 15 working days post close of hearing. Up to 30 days post receipt of recommendation	
Statutory Appeal process timeframe commences	Submitters/Council have 15-30 days to lodge an appeal on the decision of the Requiring Authority to the Environment Court, depending on whether the District Plan is Operative (15 days) or Proposed (30 days). Currently the Christchurch District Plan is Proposed, but by the time this process has been undertaken it may be that it is Operative.	
Potential end to process – if no appeal, Designation included into District Plan		
Environment Court Appeal process.	Highly variable - 6 – 18 months Unlike the Notice of Requirement process which is prescribed by the RMA there is no statutory timeframe within which an Environment Court appeal must be concluded.	Negotiation with the objecting parties is possible over this time in an attempt to resolve issues. Should a resolution be agreed, the appeal would be withdrawn. It also needs to be noted that the Environment Court hears appeals on a <i>de novo</i> basis. The Court does not review a decision: it hears any evidence and makes its own decision.
Potential end to process – Designation included into District Plan		
High Court Appeal	Highly variable – say 3 months	Limited rights of appeal exist to the High Court, solely on questions of

Actions/Process	Timeframe	Comments
	No statutory timeframes set out in RMA regarding progressing of such appeals in the higher courts	law.
Potential end to process – Designation included into District Plan		
Court of Appeal	No statutory timeframes set out in RMA regarding progressing of such appeals in the higher courts	Decisions of the High Court may be appealed to the Court of Appeal: again, has the High Court erred in its decision making.
Potential end to process – Designation included into District Plan		
Supreme Court Appeal	No statutory timeframes set out in RMA regarding progressing of such appeals in the higher courts	Decisions of the Court of Appeal may be appealed to the Supreme Court: has the Court of Appeal erred in its decision making. This is rare, but has happened with controversial projects e.g. designation of culturally important Maori Land for roading.

Allowing four to six months for pre-lodgement development, the NoR process to the receipt of the first decision is likely to take a minimum of 12 months.

The appeal processes at the conclusion of the project have the possibility of extending the timeframe considerably depending on how far through the judicial system any appeal were to progress.

None of these timeframes can be accurately predicted at this stage.

7.4 Comments on the process overall

There are a number of public processes which will need to occur to facilitate this proposal. At this stage, it is impossible to fully identify all of the elements of each of those processes as some of them are subject to change. Others may emerge as a result of the iterative development of the proposal. It is envisaged that with careful management such other processes could be integrated into the overall consultation plan timeframe as outlined.

There would be merit in developing an integrated process plan in collaboration with the Christchurch City Council particularly as multiple hearings may need to be held on the proposal within a short timeframe. This offers the opportunity for efficiency and also for better public participation processes.

While it would not be possible to completely integrate the designation and Council land processes so as to have one hearing, it would be possible for the Ministry and Council to agree how and when those hearings and submissions phases interconnect prior to consultation commencing.

If all matters are to progress smoothly a realistic timeframe for the earliest possible acquisition and designation of the land is the towards the end of 2017. Because of the variables involved there is a strong possibility that this could extend into 2018.

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.

Risk	Redcliffs Park Location C	Barnett Park - Location D
10 ⁻⁶ AILR line	The original report on the Main Road site by MWH New Zealand Limited (MWH) "Redcliffs School: Cliff Instability and Hazard Mitigation, August 2014" concluded that the acceptable AILR safety threshold for a school site is 1x10 ⁻⁶ . The Main Road frontage of this site is affected by this line.	The original report on the Main Road site by MWH New Zealand Limited (MWH) "Redcliffs School: Cliff Instability and Hazard Mitigation, August 2014" concluded that the suitable AILR safety threshold for a school site is 1x10 ⁻⁶ . The western boundary of this site that would be used for playing fields, is affected by this line.
Mitigation measures	No portion of the building platform, accessways or outdoor area fall within the portion of the site affected by the 10 ⁻⁶ AILR. Mitigation works are occurring on the other side of Main Road adjacent to this site. It is expected that this will move the 10 ⁻⁶ AILR further away from the site. Investigate the most appropriate mitigation strategies for this specific site with specialist consultants.	The building platform does not fall within the portion of the site affected by the 10 ⁻⁶ AILR line. Investigate the most appropriate mitigation strategies for this specific site with specialist consultants.
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.
LGA02 Consultation	Mandatory consultation is required under the LGA02 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 LGA02 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.

Risk	Redcliffs Park Location C	Barnett Park - Location D
Mitigation measures	Confirm all notification/consultation processes and develop strategy to maximise efficiency.	Confirm all notification/consultation processes and develop strategy to maximise efficiency.
First Right of Refusal – Ngāi Tahu	Initial discussions with CCC staff indicate that any transaction would most likely require an exchange of Crown land (the Main Road School site) for Council land held under the LGA02. Exchange of Crown land for Council LGA02 land would trigger Right of First Refusal obligations under the Ngāi Tahu Claims Settlement Act 1998.	Initial discussions with CCC staff indicate that any transaction would most likely require an exchange of Crown land (the Main Road School site) for Council land held under the LGA02. Exchange of Crown land for Council LGA02 land would trigger Right of First Refusal obligations under the Ngāi Tahu Claims Settlement Act 1998.
Mitigation measures	In the event that a land exchange is likely, consultation with Ngāi Tahu should be entered into at the first available opportunity.	In the event that a land exchange is likely, consultation with Ngāi Tahu should be entered into at the first available opportunity. We note that the relevant land on this site is very small and it may be able to design the proposal to avoid the issue.
Reserve Management Plan	No Reserves 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 statutory requirements.	A designation process will need to be undertaken in accordance with statutory requirements.
Mitigation measures	During the due diligence phase, a full evaluation of matters relevant to the site's ability to be designated should be undertaken.	During the due diligence phase, a full evaluation of matters relevant to the site's ability to be designated should be undertaken.
Other tenants	None known.	There are existing lessees occupying the community buildings on site and park users who play club sport on the fields. The terms of any leases and/or licences are unknown as are views on the establishment of a school on the site.
Mitigation measures		Location D would appear to have the least effect on lessees from the options considered on Barnett Park.

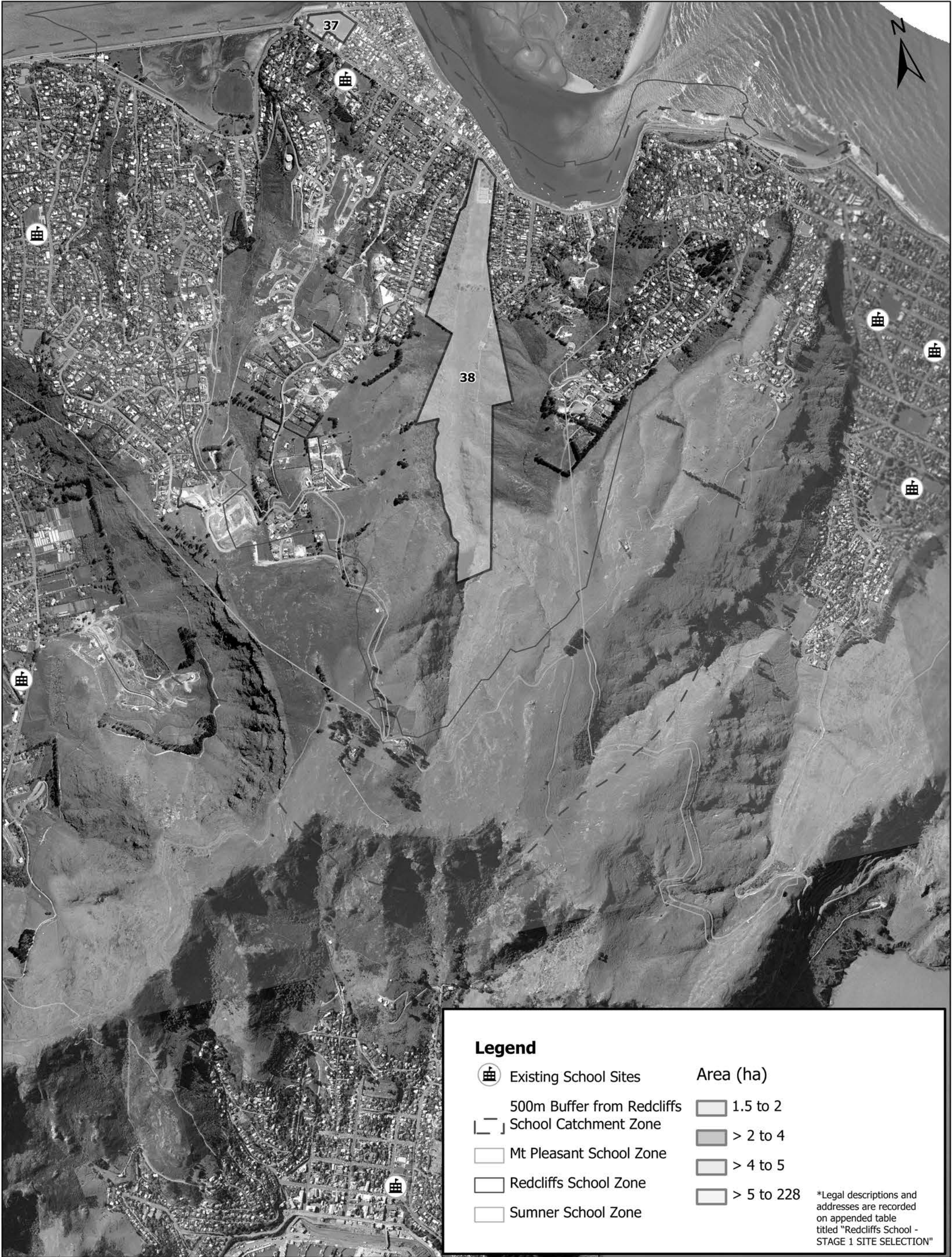
Risk	Redcliffs Park Location C	Barnett Park - Location D
		Review all licence and lease documents and enter preliminary discussions as appropriate. Confirm any necessary notification and/or consultation processes and develop strategy to maximise efficiency.
Geotechnical	Potential liquefaction and lateral spread. Remediation of old landfill. Effects of old landfill on fill platform/foundation bearing capacity.	Potential liquefaction and lateral spread.
Mitigation measures	Carry out due diligence actions in line with Tonkin and Taylor advice (refer to Section 7.1).	Carry out due diligence actions in line with Tonkin and Taylor advice (refer to Section 7.1).
Environmental 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. Potential exposure to soil contaminants and landfill gas. Potential increased development costs due to soil disposal/vapour mitigation.	Barnett Park is a confirmed HAIL site, with district sports field and a rifle range being recorded on the site. Potential exposure to soil contaminants (metals and pesticides). Potential for increased development costs due to soil disposal/management.
Mitigation measures	Contamination matters are investigated further during subsequent due diligence work in line with advice from Tonkin and Taylor.	Contamination matters are investigated further during subsequent due diligence work in line with advice from Tonkin and Taylor.
Flooding	Flooding is a risk on the lower fields, and on the roads surrounding the school.	Flooding is known to occur on the site.
Mitigation measures	Sufficient fill is used to provide elevated building platforms so that the school buildings are constructed to meet minimum floor level requirements. Obtain specialist engineering advice.	Sufficient fill is used to provide elevated building platforms so that the school buildings are constructed to meet minimum floor level requirements. Obtain specialist engineering advice.
Ecological	Risk of run off from contaminated site into estuary during construction phase.	None identified to date.
Mitigation measures	Site decontamination and construction management plan. Discussions with Environment Canterbury. Obtaining all necessary Regional Council consents.	

Risk	Redcliffs Park Location C	Barnett Park - Location D
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.
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. Location C is close to a known cave at the base of "the rock" where taonga have previously been discovered.	Obtain Archaeological Authority from Heritage New Zealand prior to confirming site acquisition.
Constraints (easements)	There are drainage and wastewater easements which 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 assets not currently protected by an easement.
Mitigation measures	Design 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 have been held with Christchurch City Council officers. Discussion with officers to continue to confirm decision making processes post election. Commence formal discussions with elected members as appropriate at the earliest possible opportunity.	Preliminary discussions have been held with Christchurch City Council officers. Discussion with officers to continue to confirm decision making processes post election. Commence formal discussions with elected members as appropriate at the earliest possible opportunity.
Elections	Both Local and Central Government elections are to be held during the timeline outlined in this report. This has the potential to result in some uncertainty and can add delay to the process.	Both Local and Central Government elections are to be held during the timeline outlined in this report. This has the potential to result in some uncertainty and can add delay to the process.

Risk	Redcliffs Park Location C	Barnett Park - Location D
Mitigation measures	Careful project planning and development of consultation processes should factor in timeframes for the election cycle.	Careful project planning and development of consultation processes should factor in timeframes for the election cycle.
Community support	While community support for the continuation of primary school provision in Redcliffs is accepted, this particular site has not been tested with either the community or neighbouring residents.	While community support for the continuation of primary school provision in Redcliffs is accepted, this particular site has not been tested with the community, existing lessees or licence holders, or neighbouring residents.
Mitigation measures	Work with Council on all notification/consultation processes. Develop and implement a comprehensive consultation process.	Work with Council on all notification/consultation processes. Develop and implement a comprehensive consultation process.

Appendix 1: Additional Sites for Stage 2 process

Plan E: Additional Stage 2 Selected Sites



Appendix 2: Tonkin and Taylor Report



Redcliffs School Site Options Study

Redcliffs Park Location C & Barnett Park Location D

Prepared for
Ministry of Education

Prepared by
Tonkin & Taylor Ltd

Date
October 2016

Job Number
53062.3000 Report 2.v4



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Table of contents

1	Introduction	1
1.1	Scope of work	1
1.2	Sites of interest	2
1.3	Proposed development	2
2	General site characteristics	2
2.1	Potential soil contamination	2
2.2	Geology	3
2.3	Seismic shaking hazard	3
2.3.1	Peak ground accelerations during the CES	3
2.3.2	Land performance observations from the CES	4
2.3.3	Soil classification for seismic design of structures	5
2.3.4	Liquefaction triggering	5
2.3.5	Liquefaction assessment	6
2.4	Slope (landslide) hazards	7
2.5	Tsunami hazard	7
2.6	Topography and groundwater	9
2.7	Flooding	9
2.8	Services infrastructure	10
3	Site specific conditions	10
3.1	Redcliffs Park Location C	10
3.2	Barnett Park Location D	12
4	Discussion of development issues	14
4.1	Building foundations	14
4.2	Flood and erosion protection	14
4.3	Slope hazards	14
4.4	Tsunami hazard	15
5	Applicability	16
Appendix A :		Figures
Appendix B :		Summary tables

Document control

Date	Issue No	Description	Prepared by:	Reviewed by:
7/09/16	1	Draft for Comment	Barry McDowell	Gordon Ashby
13/09/16	2	Draft for Comment	Barry McDowell	Gordon Ashby
22/09/16	3	Final Draft for Comment	Barry McDowell	Gordon Ashby
3/10/16	4	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 report provides an assessment of two specific sites, one on each of Redcliffs Park and Barnett Park, and follows on from our report (T+T ref 53062.3000 v2, August 2016) that considers other sites at McCormacks Bay Reserve, Redcliffs Park and Barnett Park. Information, assessments and discussion from our earlier report have been included in this report, where relevant.

The assessment generally follows the Stage 2 criteria as set out 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 LiDAR stands for Light Detection and Ranging, which uses aerial laser equipment to generate digital elevation models (DEMs) of the ground surface.

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.

Table 1: General site information

Site	General description	General range in surface elevation ² across the site (m LVD)
Redcliffs Park (Site 37, Location C)	General area bounded by Celia Street, Beachville Road and Main Road. Part of the site was operated as landfill in the 1940's and 1950's.	1.8 to 4.5
Barnett Park (Site 38, Location D)	The existing car park, access way and playground fronting onto Main Road.	2.0 to 3.0

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 has 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 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 the overall subject sites (refer Figures 2a, 3a, Appendix A), although Location C on Redcliffs Park and Location D 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

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).

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.

Part of Redcliffs Park has also been subject to landfilling.

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.

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

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.

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

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. This information simply demonstrates that the sites have experienced a very significant level of ground shaking during the CES, which provides some useful guidance on the level of ground damage that could be expected under future moderate to strong earthquake shaking. There is no specific criteria for this in the MoE's evaluation criteria for new school sites, but it helps to inform the geotechnical element of the assessment for the purposes of this report.

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 is 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.

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

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/>.

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 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 50 m 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 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

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.

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.

We also note that the above liquefaction triggering methodology is applicable to Class D subsoil conditions (as defined in NZS 1170.5). The subject sites are potentially subsoil Class C, which could influence the earthquake scenarios used for liquefaction triggering. However, a potential modest change in design-level PGA_H is not expected to meaningfully impact on the relative comparison of future liquefaction-related ground performance across the sites.

For the purposes of this report, whether IL2 or IL3 buildings are assumed, or whether SLSa and/or SLSb design earthquake scenarios are used, or whether Class C or D subsoil is assumed, 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 in the vicinity of the sites, although for Redcliffs Park Location C the nearest CPT location that reflects the ground surface elevation at the site is approximately 150 m to the south-east. Also, due to the site locations near the foot of the Port Hills, ground conditions can vary rapidly from site to site, therefore 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.

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.

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 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 Tsunami hazard

For the purposes of this study we have briefly considered tsunami hazard using publically available information with specific regard to the potential inundated depths that might eventuate under

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.

various modelling scenarios. This has informed the *Flooding* aspect of the MoE's site evaluation methodology (also refer to Section 2.7, below).

The most credible significant hazard to the Canterbury coast is from a distant source tsunami originating off the coast of South America or Alaska, with waves expected to take of the order of 10 to 15 hours to reach New Zealand. A 2,500 year return period event could produce an 84th percentile wave height at the coast within Pegasus Bay of the order of 12 m above quiescent sea levels¹⁶. The estimated extent of land inundation for Christchurch has been modelled by NIWA¹⁷ based on the 2,500 year return period distant source tsunami hazard (GNS, 2013) occurring coincident with Mean High Water Spring tide level (MHWS). This inundation modelling indicates that ground up to an elevation of approximately 5 mLVD might be flooded within Redcliffs and up to approximately 6 mLVD in the area of Barnett Park. There is expected to be considerable warning time associated with a significant distant tsunami hazard given the potential wave travel time. Given the expected warning time, which is expected to enable evacuation of potentially affected communities, the level of lives risk associated with a significant distant source tsunami is expected to be very low, and almost certainly lower than 10⁻⁶ (in terms of individual lives risk).

NIWA has also undertaken modelling based on the tsunami that was generated by the 1868 South American earthquake¹⁸, which was experienced at the time in Christchurch. The NIWA (2012) work indicates that wave heights of 3.5 to 4.5 m could be generated at the Christchurch coastline. Their associated inundation modelling indicates that ground up to an elevation of approximately 3.5 mLVD might be flooded within Redcliffs and up to approximately 4.25 mLVD in the area of Barnett Park, if such an event coincided with MHWS.

Distant source tsunamis also dominate the 500 year return period hazard with an estimated 84th percentile wave height of the order of 8 m (GNS, 2013). Based on a comparison of wave height to inundation depth for the above 2,500 year hazard and the 1868 event, it is estimated that ground below an elevation of approximately 4.25 mLVD and 5.0 mLVD may be flooded at Redcliffs and Barnett Park, respectively, if the 500 year event coincided with MHWS.

The potential wave heights¹⁹ from a local source tsunami hazard (such as from an event below Pegasus Bay or off the coast of Kaikoura), or a regional source tsunami hazard (the most likely source is considered to be the Hikurangi subduction zone off the Wairarapa/Hawke's Bay coastline), is likely to be of the order of 1 - 3 m. Actual land inundation depths will likely be less than this wave height and will depend, amongst other things, on the actual tide level at the time of an event. Detailed inundation modelling at the potential school sites has not been undertaken for local or regional source tsunami. However, based on the studies reported by GNS (2013) and NIWA (2012 & 2014), inundation depths would be expected to be no more than those estimated for the 1868 event coincident with MHWS, as discussed above. In lower lying areas this depth of inundation could present some threat to life. Although this hazard would have considerably shorter warning time, risk treatment measures such as short notice community evacuation procedures would be expected to address the lives risk.

¹⁶ Power, W. L. (compiler). 2013. Review of Tsunami Hazard in New Zealand (2013 Update), *GNS Science Consultancy Report 2013/131/222 p.*

¹⁷ National Institute of Water & Atmospheric Research Ltd (NIWA) (2014). *Updated inundation modelling in Canterbury from a South American tsunami*. Report prepared for Environment Canterbury, Environment Canterbury report number R14/78, November.

¹⁸ National Institute of Water & Atmospheric Research Ltd (NIWA) (2012). *Modelling coastal inundation in Christchurch and Kaiapoi from a South American tsunami using topography from after the 2011 February earthquake*. Report prepared for Environment Canterbury, Environment Canterbury report number R12/38, June.

¹⁹ <http://ecan.govt.nz/advice/emergencies-and-hazard/tsunami/pages/tsunami-info-chch.aspx>

Hazard posed to fixed assets such as buildings from distant source Tsunami are potentially significant at Redcliffs Park Location C and higher at Barnett Park Location D.

We also note that the tsunami hazard discussed in our earlier report (*2106.09.13 T+T redcliffs options rpt3 final.pdf*) listed information labelled as “indicative tsunami inundation” in Table B1 (refer Appendix B). The tabulated values reflect the potential tsunami wave heights, which would be expected to over-estimate the potential tsunami-related inundation depths at the various sites, potentially by a factor of 2 to 3.

Table B1 (refer Appendix B) in this report has been modified to provide an indication of modelled (or estimated) tsunami inundation levels at each site.

We also note that the response to the tsunami hazard is somewhat similar to the coastal inundation and coastal erosion hazards in that it is a community-wide issue and not restricted to an individual school site.

2.6 Topography and groundwater

The topography (slope and elevation) of the sites has been assessed from LiDAR elevation contours²⁰ 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 CGD²¹. The groundwater level used in this report, including the liquefaction analyses, is the median water table 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.

2.7 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 year 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.

²⁰ Canterbury Geotechnical Database (2014) “EQC LiDAR and digital elevation models”, retrieved 16 August 2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>.

²¹ 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/>.

Coastal Inundation Hazard Zones (CIHZs) and Coastal Erosion Hazard Zones (CEHZs) are referred to in a report²² produced for CCC. The zone maps are presented in Figure 5d (Appendix A) and the predicted future effects summarised in Table B1 (Appendix B).

2.8 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.

3.1 Redcliffs Park Location C

The proposed building sites for location C straddle a slope between an area of elevated ground (4.5 to 5 mLVD) beside Main Road and the lower level (1.8 mLVD) of Redcliffs Park. We understand that it is proposed to raise the building sites with fill to 4.5 to 5 mLVD. School parking and paved areas are located on the northern section of Redcliffs Park, at the lower ground surface elevation.

Part of the site (refer Figure 2a and 2b, Appendix A) is identified as closed landfill #43 on the CCC landfill map. We have assessed a low to 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. The proposed Location C paved areas and carpark are located over landfill. Location C building sites are located to the 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 proposed Location C building sites.

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 C parking and pavement areas (refer Figure 4a and 4b, 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 elevated land beside Main Road. There may have been some lateral stretch across the residential properties due to the slope between Main Road and Redcliffs Park.

²² Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.

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.

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} lives risk 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 adjacent to Location C (refer Figure 4b, Appendix A). The proposed building sites will be approximately 20 m away from the 10^{-6} risk line (i.e. at lower risk) as shown on Figure 4b.

The risk line shown on Figure 4b (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} AIFR²³, 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 Certificate, 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 C 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). Alternatively MoE could explore the possibility of subdividing the subject properties so that the cliff collapse zoning does not apply to the proposed building areas. Notwithstanding issues with the CCC zoning we recommend that a site specific cliff risk assessment be undertaken as part of any school design process to demonstrate acceptable risk, inform the detailed layout of the school and support development of operational procedures for the school

The scaling of loose boulders and towers of separated rock from the cliff face opposite Location C is currently being undertaken by NZTA and CCC in order to secure the Lyttelton to Woolston Evans Pass route and allow removal of containers alongside the road. A New Jersey concrete barrier (1 m 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. We understand that this work will be completed by 2017. Our opinion 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 and reserve land within Location C. 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 C building area is proposed to be approximately 4.5 mLVD following placement of fill out onto the park. The proposed filled building platform encroaches on the existing CCC FMA and coastal inundation and erosion models (refer Figure 4e, Appendix A). Although not expected, given the scale of the work, the potential filling may need consent from the CCC.

²³ 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.

The proposed location of the school buildings will require approximately 2.5 to 3 m of fill to achieve a level platform adjacent to Main Road. Aside from economic aspects associated with filling earthworks there are potential positive and negative impacts 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 may 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.

The site is similar to Redcliffs Park Location B, potentially subject to less than 1.0 m depth of inundation from a significant distant source tsunami (2,500 year return period models). The modelling is for tsunamis generated in South America with an approximate 10 to 15 hour travel time. Given the expected warning time we expect that evacuation procedures could be adopted to deal with the associated life risk. Note that short notice evacuation procedures for local and regional source tsunami would also be applicable at this site in a similar manner to the surrounding suburb, although the likely depth of inundation is expected to be much less than that from significant distant source events.

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 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.

3.2 Barnett Park Location D

The site is located on Main Road to the east of Moncks Spur (refer Figure 5a, Appendix A) on geologically recent sandy beach and estuary deposits. Building sites are proposed on the existing car park area, with parking and pavements to be established on the existing playground adjacent to Main Road.

The site (refer Figure 3a and 3b, 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 cumulative cracking of about 100 to 200 mm observed around and across the existing car park. There was no sand ejecta observed on the site (refer Figure 5a, 5b, 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 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 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 D. A 10^{-6} individual life rockfall risk line reported by GNS Science is shown on Figure 5a along the west side of Barnett Park. The line does not extend to the north beside Location D because there are no rock cliffs or outcrops to provide source for rockfall.

The ground surface elevation of Barnett Park Location D is approximately 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. 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 Barnett Park Locations A and B, and potentially subject to about 1 - 2 m of inundation from local or regional source tsunamis. Some warning would be expected for these hazards that would form part of short-notice evacuation procedures to address the potential life risk, depending on the depth and velocity of the potential wave surge across the site. Evacuation procedures would be similar to those required for the surrounding suburbs.

Inundation depths from a large distant source tsunami (2,500 year return period models) could be greater than 3 m across the site, which would likely result in severe damage or total loss of structures. Evacuation procedures would be expected to 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 D. 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 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 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 may 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.
 - Erosion protection may be required around the edge of the site to protect against future coastal erosion.

4 Discussion of development issues

4.1 Building foundations

The requirement to place fill up to 1 m thick on Barnett Park Location D and 2.5 to 3 m on Redcliffs Park Location C reduces the potential post development liquefaction settlement damage at those locations. 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 both sites 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

Redcliffs Park Location C and Barnett Park Location D require considerable filling (1 to 3 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. 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.

Figure 6 diagrammatically illustrates the relationships between the elevations of the ground surface at the sites, various inundation levels and building floor levels for the sites. For completeness, elevations associated with the site locations covered in the initial T+T report (T+T ref 53062.3000 v2, August 2016) are also shown.

4.3 Slope hazards

Slope Hazards are identified adjacent to Redcliffs Park Location C and Barnett Park Location D. Based on the information available and preliminary on-site observations we are of the opinion that the associated lives risk for Redcliffs Park Location C would be tolerable with the 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 D is expected to be acceptable from a slope hazard perspective provided development does not occur west of the current access way.

4.4 Tsunami hazard

Site evacuation procedures are considered to be a viable treatment measure for the risk to life presented by future tsunami. Due to modelling uncertainties and similar suburb-wide conditions both sites would likely require similar evacuation procedures.

Damage to structures is possible in 100 to 500 year return period events at Barnett Park Location D but unlikely at Redcliffs Park Location C. Under 2,500 yr modelled events then severe damage or complete loss of structures could occur at Barnett Park Location D with less damage expected at Redcliffs Park Location C.

No location-specific physical risk reduction measures (e.g. barrier structures) associated with tsunami hazard are expected to be feasible, nor necessarily warranted, at either of the subject Locations.

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.

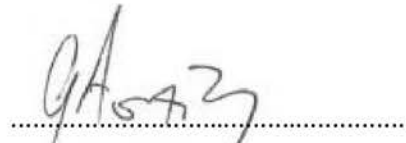
Tonkin & Taylor Ltd

Report prepared by:



Senior Engineering Geologist
Barry McDowell

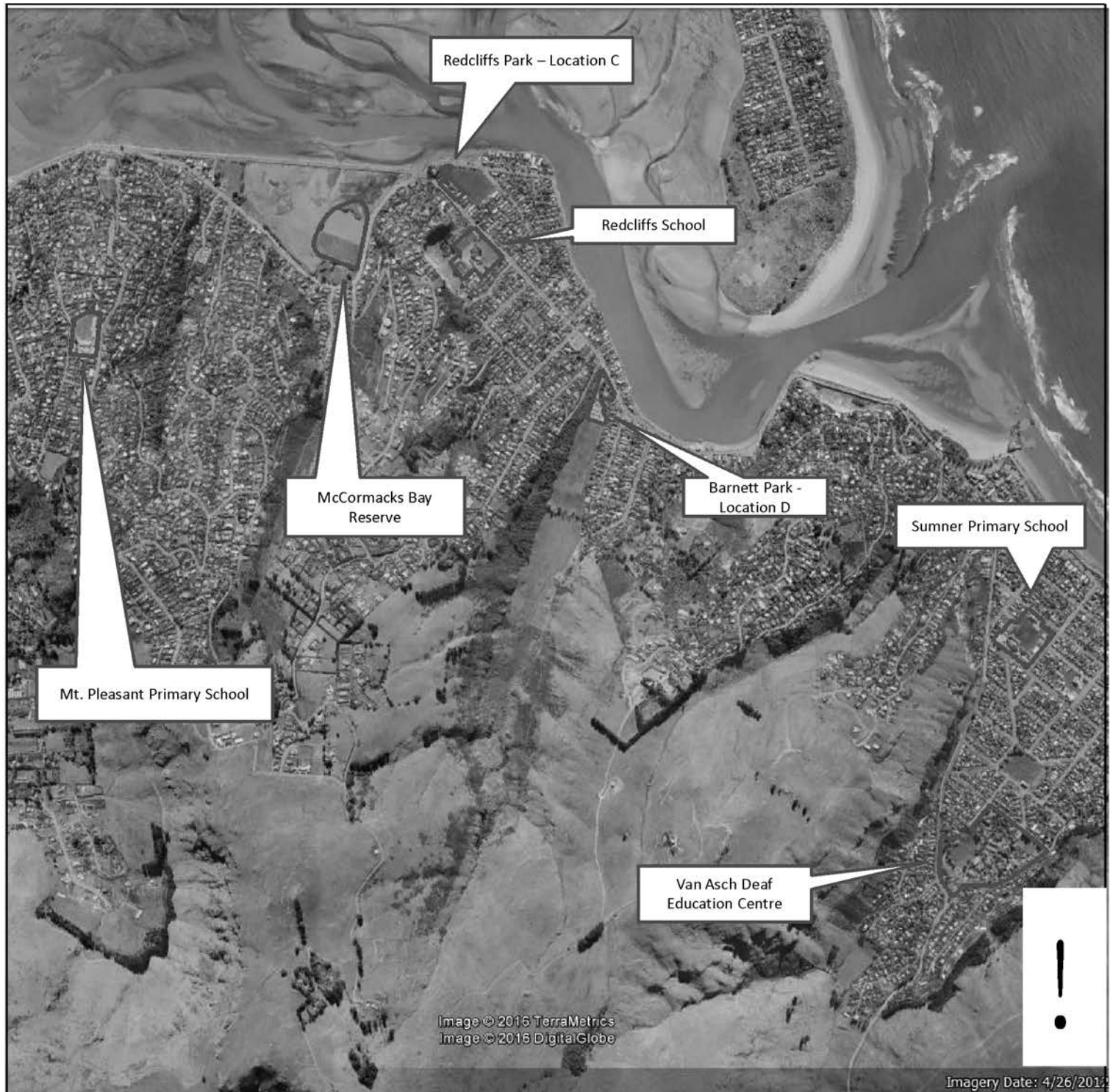
Authorised for Tonkin & Taylor Ltd by:



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 13/09/2016 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*

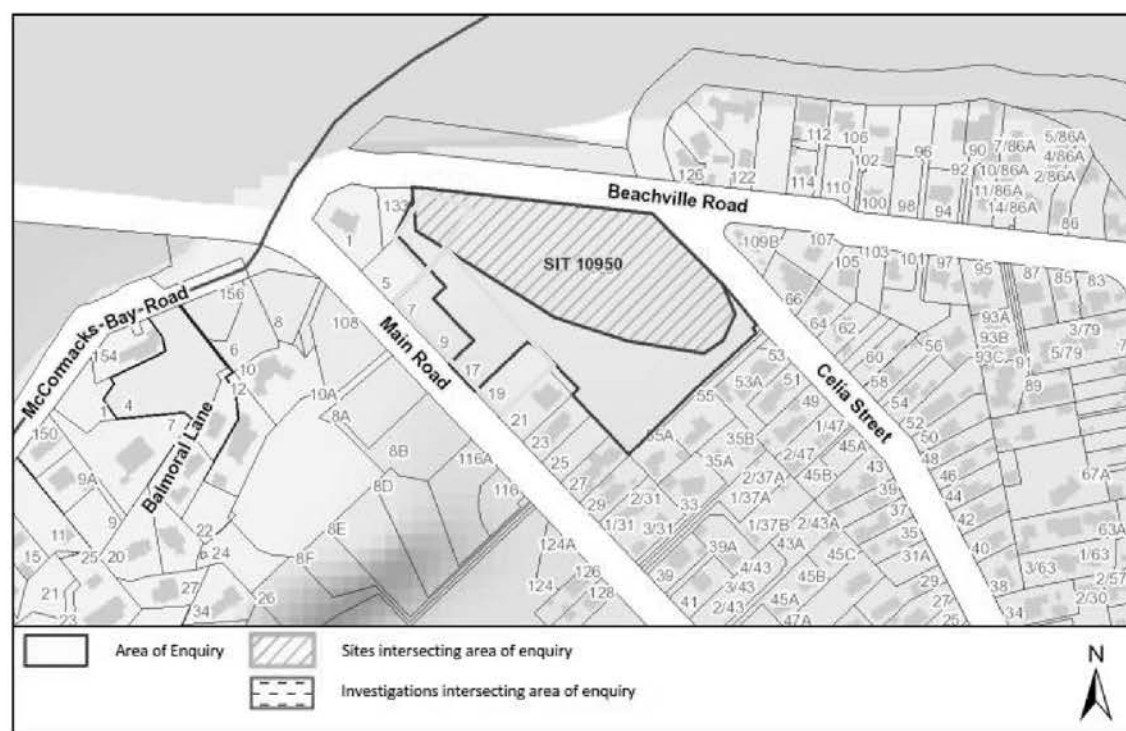


Panel A: Aerial photograph.

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



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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1941



1956



1973



2004

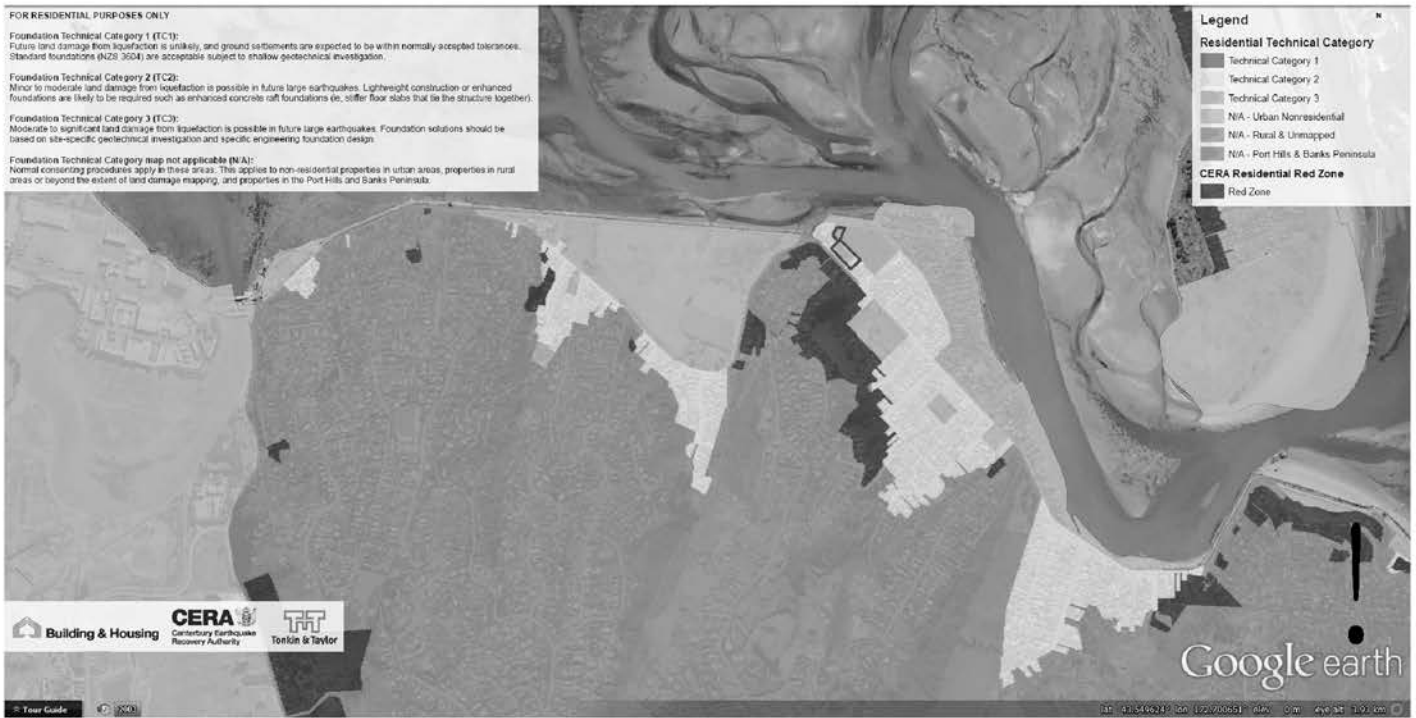
Panel C: Historic aerial photographs.

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

Important notice
This map and data was prepared and/or compiled for the Canterbury Geotechnical Database (CGD) to assist in assessing insurance claims made under the Earthquake Commission Act 1993 and/or for the Canterbury Geotechnical Database on behalf of the Canterbury Earthquake Recovery Authority (CERA). It was not intended for any other purpose. EQC, CERA, their data suppliers and their engineers, Tonkin & Taylor, have no liability to any user of this map and data for the consequences of any person relying on them in any way. Each Canterbury Geotechnical Database (https://canterburygeotechnicaldatabase.projectorbit.com/) map and data is made available solely on the basis that:
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Panel A: February 2011 post – earthquake aerial photograph.
Reference: Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1 June 2012, retrieved 08/09/16 from <https://canterburygeotechnicaldatabase.projectorbit.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 08/09/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Panel C: Observed ground cracking locations post February 2011 earthquake including approximation of "cliff collapse lives risk line" (31° fly rock line, approximately 10⁻⁶ / year)

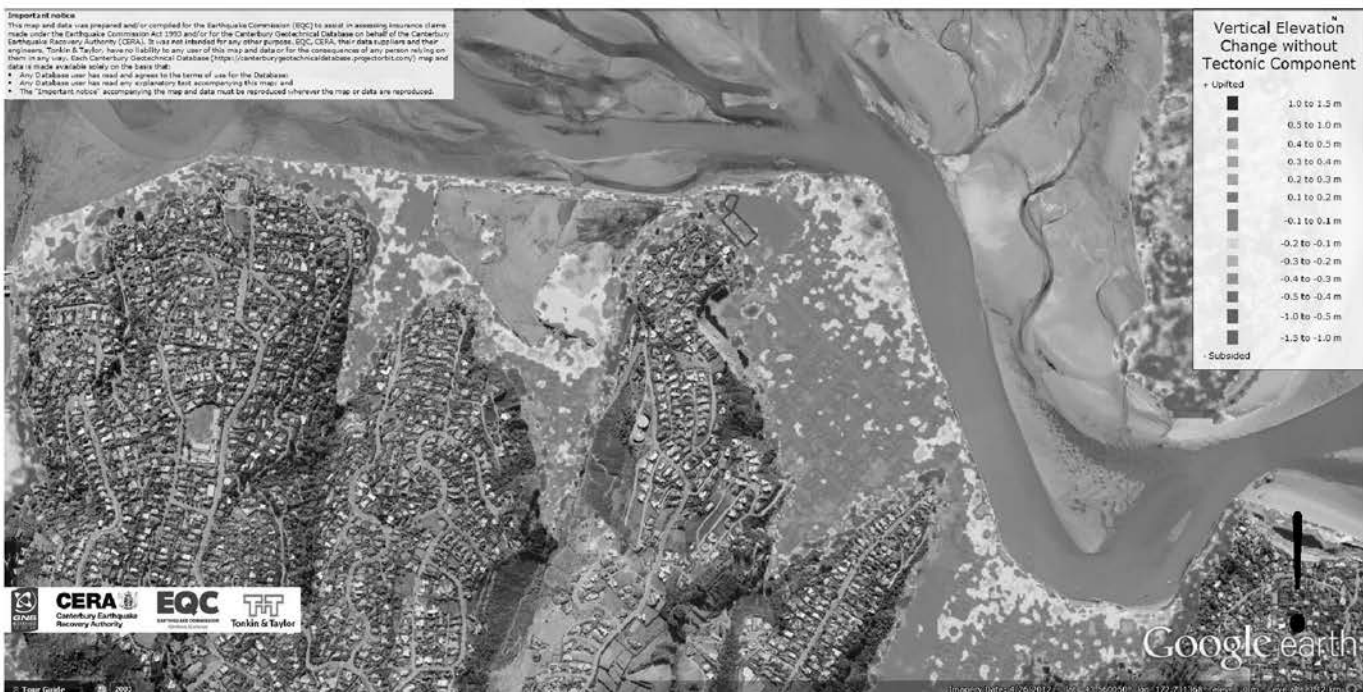
Reference: Canterbury Geotechnical Database (2012) "Observed Ground Crack Locations", Map Layer CGD0400 - 23 July 2012, retrieved 08/09/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>

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



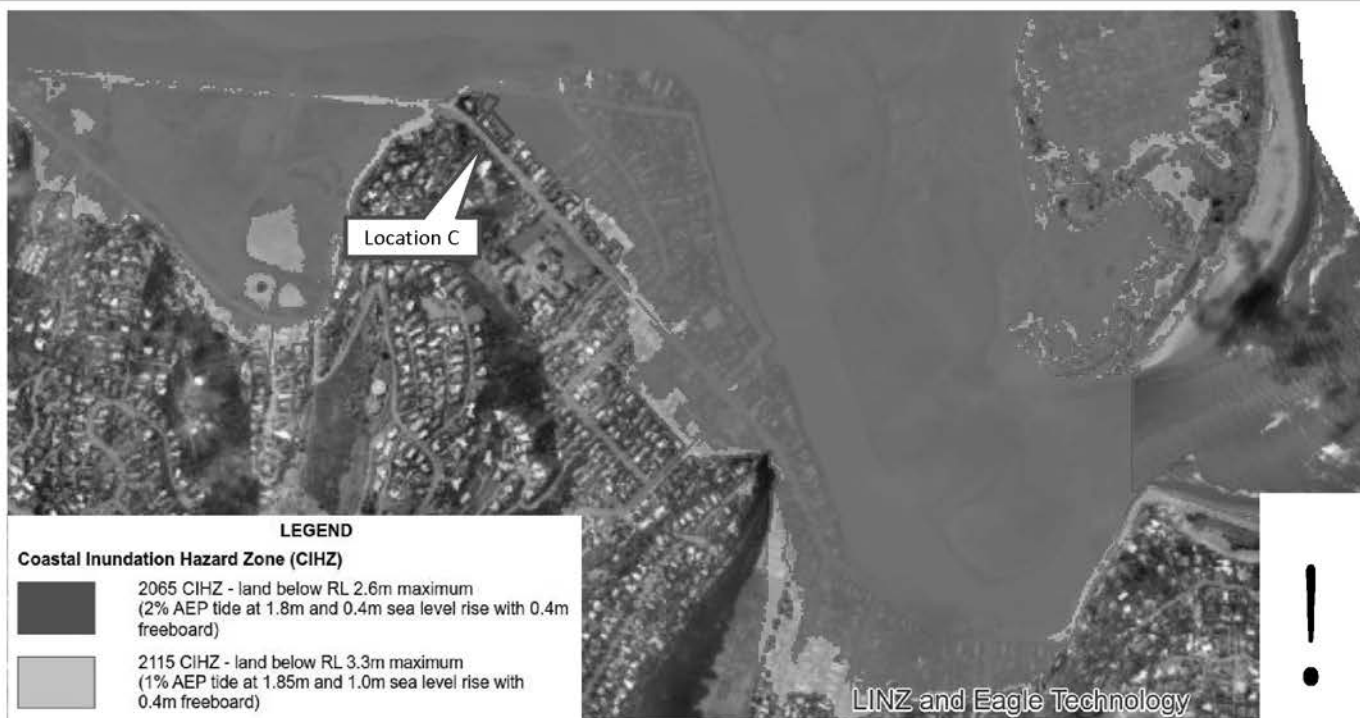
Panel D: Geotechnical investigation locations -surrounding CPT locations (approximately 20m depth) and borehole drilling.

Reference: Canterbury Geotechnical Database (2012) "CPT" and "BH", retrieved 08/09/16 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 08/09/16 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: February 2011 post – earthquake aerial photograph.

Reference: *Canterbury Geotechnical Database (2012) "Aerial Photography", Map Layer CGD0100 - 1 June 2012, retrieved 08/09/16 from <https://canterburygeotechnicaldatabase.projectorbit.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 08/09/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*



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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



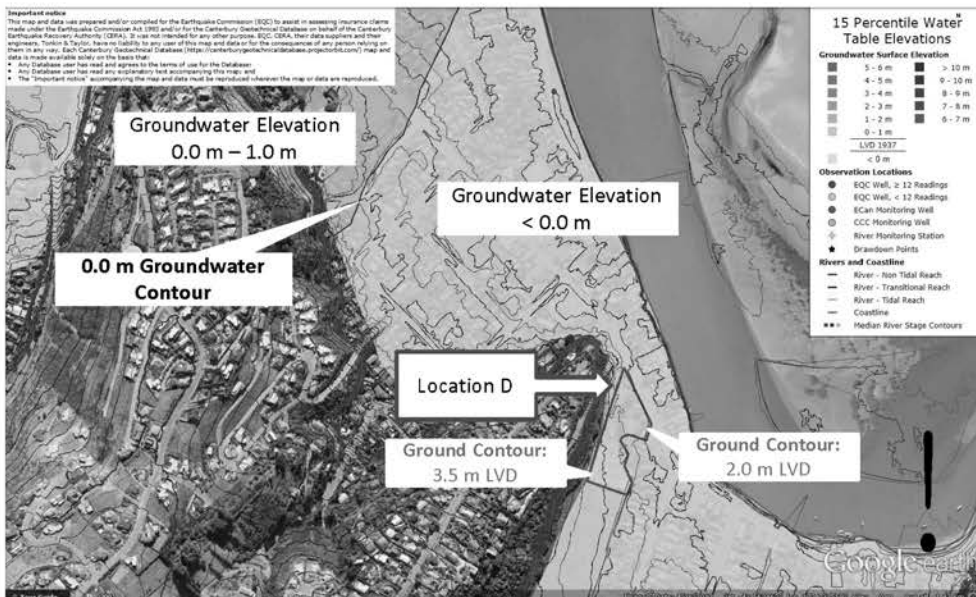
Panel D: Geotechnical investigation locations -surrounding CPT locations (approximately 20m depth) and borehole drilling.

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

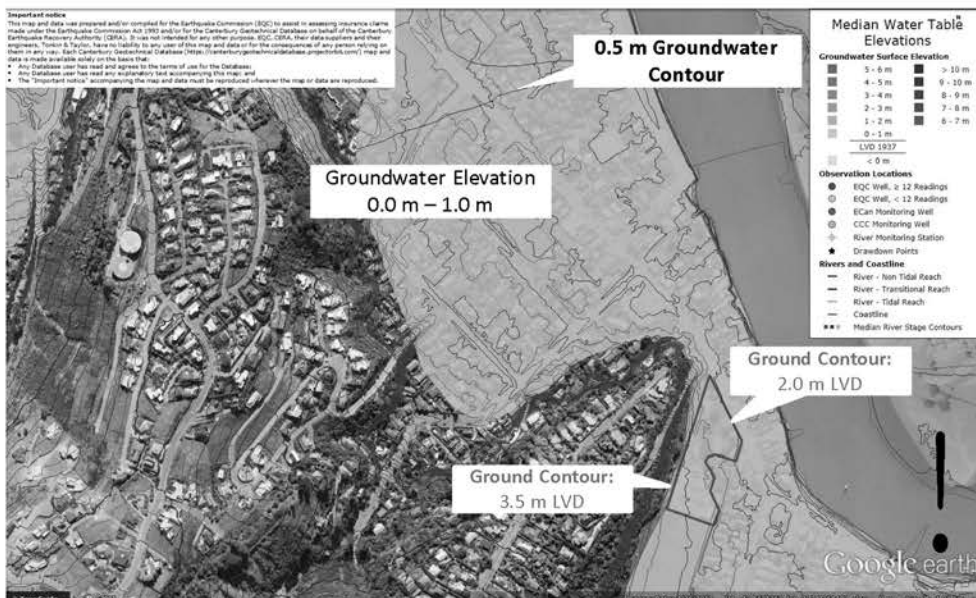
Reference: *Canterbury Geotechnical Database (2012) "Vertical Ground Surface Movements", Map Layer CGD0600 - 23 July 2012, retrieved 08/09/16 from <https://canterburygeotechnicaldatabase.projectorbit.com/>*



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 08/09/16 from <https://canterburygeotechnicaldatabase.org.nz/project/rbit.com/>

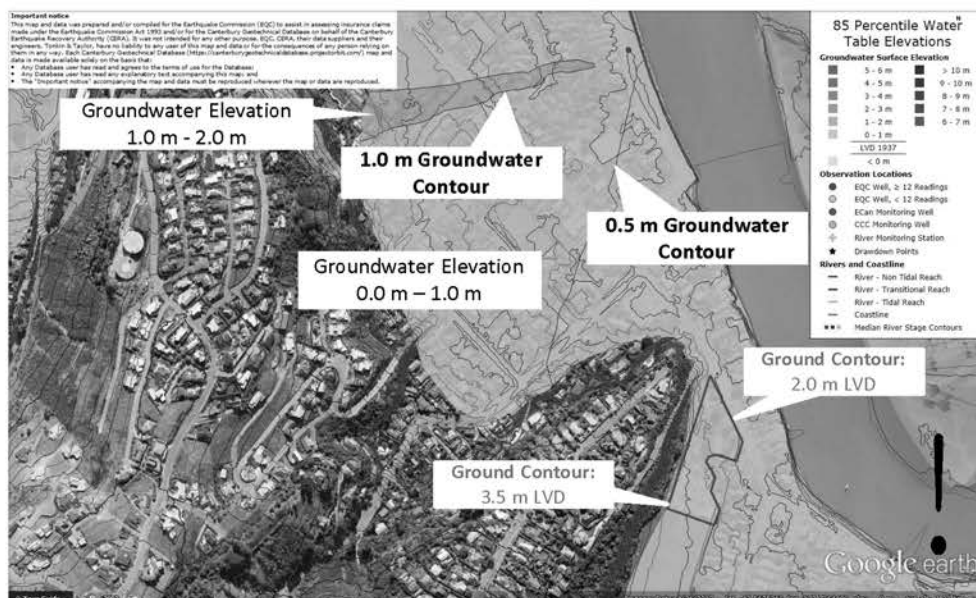
Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 08/09/16 from <https://canterburygeotechnicaldatabase.org.nz/project/rbit.com/>



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 08/09/16 from <https://canterburygeotechnicaldatabase.org.nz/project/rbit.com/>

Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 08/09/16 from <https://canterburygeotechnicaldatabase.org.nz/project/rbit.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 21/07/16 from <https://canterburygeotechnicaldatabase.org.nz/project/rbit.com/>

Canterbury Geotechnical Database (2015) "LiDAR and Digital Elevation Models", Map Layer CGD0500 - 20 July 2015, retrieved 21/07/16 from <https://canterburygeotechnicaldatabase.org.nz/project/rbit.com/>



Panel I: Coastal Inundation Hazard Zone.

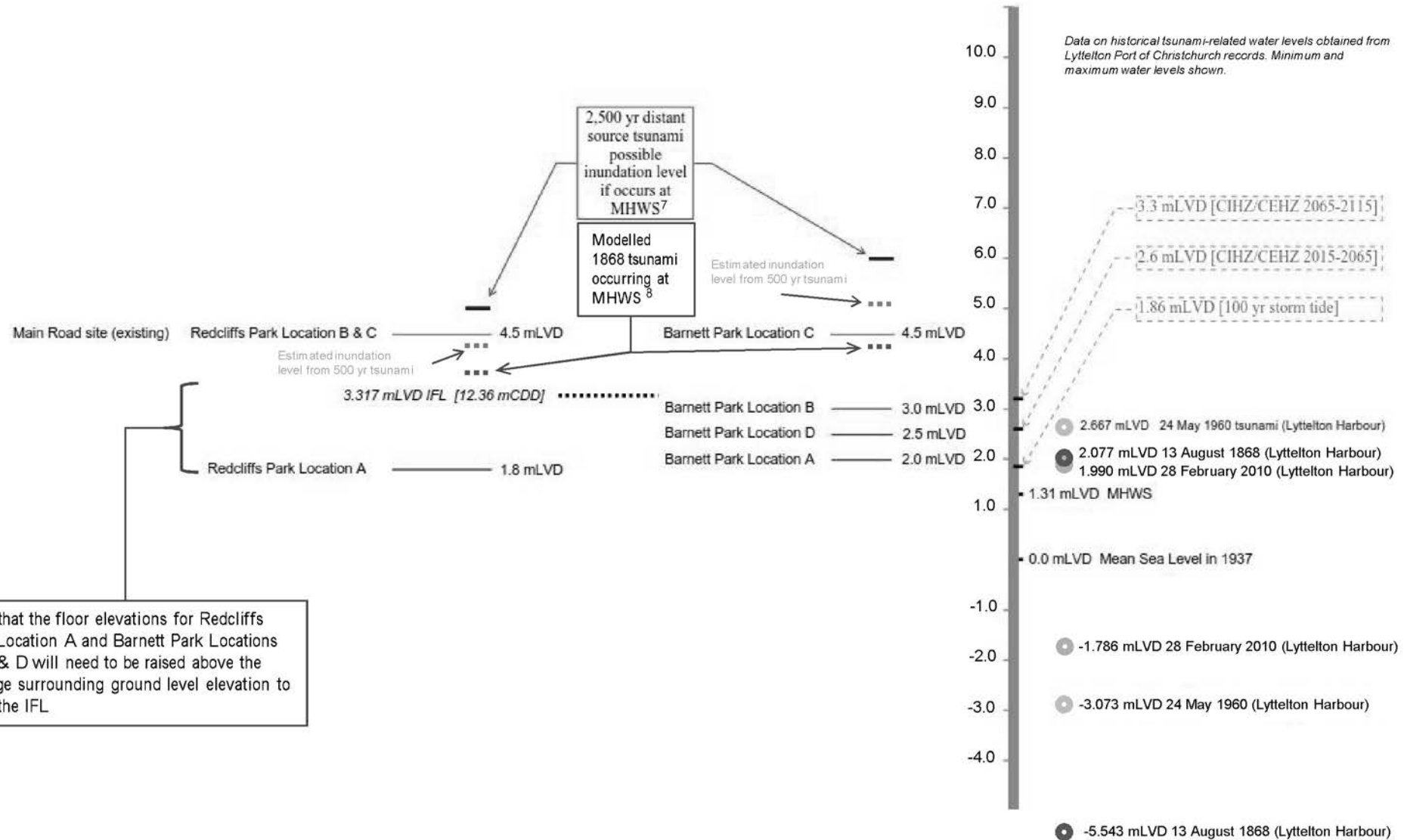
Reference: Tonkin + Taylor (2015) "Coastal Hazard Assessment: Avon – Heathcote Estuary"; project no. 851857.001.



Panel J: Coastal Erosion Hazard Zone.

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

(Elevation mLVD)



Notes:

1. LVD = Lyttelton Vertical Datum 1937
2. MHWS = Mean High Water Spring
3. IFL = Interim Floor Level
4. CDD = Christchurch Drainage Datum = LVD + 9.043 m
5. CIHZ = Coastal Inundation hazard Zone
6. CEHZ = Coastal Erosion Hazard Zone
7. Source: NIWA, 2014
8. Source: NIWA, 2012

Appendix B: Summary tables

Table B1: Summary Site Information

Summary Environmental information

Attribute	Redcliffs Park (Site 37) Location C	Barnett Park (Site 38) Location D
Contamination Score	4	3
Legal description	Part Res 4601, part Lot 3 DP47479, Lot 2 DP47479, Lot52 DP1178	Existing car park and Play Ground by Main Road Part Res 4979
ECan LLUR	<p>Proposed building sites:</p> <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. <p>Car park and pavement area:</p> <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. • 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. • Location D overlaps slightly with the HAIL area. • Low to moderate potential for soil contamination issues related to past land use as noted below in the aerial photograph review.

Table B1: Summary Site Information

<p>Items of note from review of historical aerial photographs</p>	<ul style="list-style-type: none"> • Buildings are evident on the site since the 1941 aerial photograph. • Demolition has occurred on Lot 52 since 2012. 	<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 low levels of lead contamination related to rifle range activities. 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. Small buildings in the north of the site have been removed by the time of the 1951 photograph although 2 larger buildings remain. • All structures appear to have been removed by the time of the 1965 photograph. Sports fields have been formed south of the site. Stormwater drain constructed along eastern edge of site. • By the 1984 photograph the existing car 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 (child care centre) has been constructed adjacent to the north eastern corner of the site car park.
<p>Other sources of information</p>		<p>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.</p>

Table B1: Summary Site Information

Summary Geotechnical/Flooding

Attribute	Redcliffs Park (Site 37) Location C	Barnett Park (Site 38) Location D	Comments
Geotechnical Score	4	3	
Indicative liquefaction-related index settlements (mm)	10 – 20 at SLS 80 – 100 (ULS)	10 – 40 at SLS 80 – 100 (ULS)	<p>Redcliffs Park Location C and has a moderate potential for liquefaction-related ground impacts. Will likely require specific engineering input into building fill platform and foundation design.</p> <p>Barnett Park Location D has a moderate liquefaction potential, with lateral spreading cracks observed across the site following February 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 above existing ground level.</p>
Indicative liquefaction-related free field reconsolidation settlements for full investigation depth (mm)	15 - 20 at SLS 150 – 200 at ULS	30 – 100 at SLS 150 – 200 at ULS	
Equivalent MBIE residential foundation technical categorisation	More TC2-like (some potential for lateral spread)	More TC3-like (lower elevation and some potential for lateral spread)	
Typical LSN ranges	< 5 at SLS < 20 at ULS	< 5 at SLS ~ 25 at ULS	<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	10 ⁻⁶	n/a	<p>Barnett Park Location D has minor landslip debris flow hazard. Concept building footprints should be located east of the current carpark access to avoid this hazard.</p> <p>Redcliffs Park Location C is approximately 20m from the 1 x 10⁻⁶ individual lives risk line, which encroaches about 4m onto the properties along Main Road. Cliff remediation (scaling) works underway for the transport corridor</p>
Cliff collapse/landslip debris flow hazard	10 ⁻⁶	Minor	

Table B1: Summary Site Information

			<p>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 comply with District Plan rules and obtain a consent to build on any of these properties will require a site specific risk assessment report, peer review and agreement by CCC. This process may add significant time (months) to schedule and additional uncertainty in gaining the necessary consents. Alternatively MoE could explore the possibility of subdividing properties so that the cliff collapse zoning does not apply to the building area.</p> <p>The sites are not within identified CCC/GNS slope mass movement instability zones.</p>
Topography Score	5	5	All sites relatively flat. No implications for foundation cost.
Average/indicative site slope (%) (note that 1 in 10 = 10%)	0.5	1.5	
Median groundwater elevation (mLVD)	0.4	0.5	
Median depth to groundwater below ground level	4.1	2.0	Groundwater not expected to be encountered for "typical" service trench construction.
Flooding Score	3	1	Surface flooding reduces score for Barnett Park Location D
Average ground surface elevation (mLVD)	4.5	2.5	Assumes that Redcliffs Park Location C building sites are filled up to 4.5 m LVD, approximately level with Main Road.
Flooding: Interim Floor Level (m LVD), modelled 200 year flood level plus 0.4m	3.317 (12.36 mCDD)	3.317 (12.36 mCDD)	<p>Barnett Park Location D requires floor level to be ~1000 mm above current ground surface elevation.</p> <p>Redcliffs Park Location C building sites require approximately 2.5m of fill to create level building sites adjacent to Main Road.</p>

Table B1: Summary Site Information

CCC Flood Management Area (FMA)	No	Yes	Barnett Park Location D has a history of surface flooding from the upslope valley. Potential upgrade required to existing open swale and pipe.
Storm tide level	1.8 mLVD for 50 yr 1.85 mLVD for 100 yr		Barnett Park Location D ground surface elevations is close to storm tide water level so may be exposed to minor impacts from severe storm tide/surge.
Coastal inundation and erosion hazard ¹	i = n/a e = 2115	i = to 2065 e = to 2065	Barnett Park Location D potentially affected in the next 50 to 100 years. The boundaries between 50 and 100 year affects cut diagonally across the site. Coastal inundation levels to 2065 and 2115 are similar to the 1 in 100 yr and 1 in 200yr flood levels, respectively.
Indicative tsunami inundation	none for 500 yr return period local or regional source <1m for 2,500 yr return period Sth American source	< 2m for local or regional source >3m for 2,500 yr return period Sth American source	Barnett Park Location D inundation depths suggest significant damage to total loss of structures. Lives risk expected to be addressed through community-wide measures such as evacuation procedures. Redcliffs Park Location C inundation depths suggest some modest damage to structures for the 2,500 yr event.

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	Redcliffs Park (site 37) Location C	Barnett Park (site 38) Location D	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.	Barnett Park Location D may need to run services 100 m.
Score	0.4	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.	Redcliffs Park Location C has wastewater rising main (and presumably easement) running through middle of the park, which may constrain development. Barnett Park Location D has several stormwater and power easements across the site which may constrain development and future expansion.
Score	0.4	0.4	
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.	Barnett Park locations have a major stormwater easement along eastern site boundary. Barnett Park Location D has Orion easements identified running through proposed building 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	

Table B1: Summary Site Information

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.	Capacity of existing water supply not tested. Experience tends to suggest that supply may be constrained for all sites.
Score	0.4	0.4	
Total	1.6	1.4	

Summary of 1 to 5 Scores

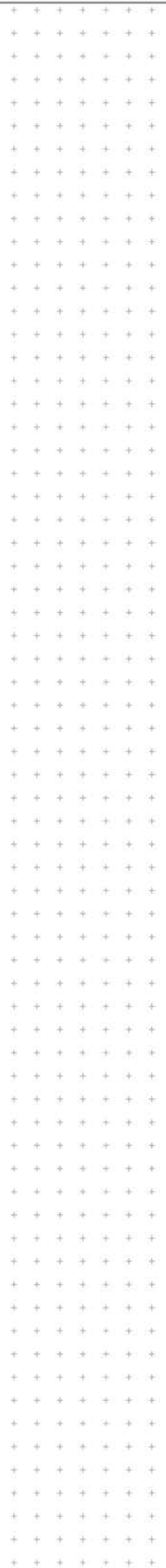
Site	Redcliffs Park Location C	Barnett Park Location D	Comments
Contamination Score	4	3	Less risk of contamination issues expected at Redcliffs Park Location C, so scores highest.
Geotechnical Score	4	3	No sites are TC1, so none score 5.
Topography Score	5	5	All flat sites so score high.
Flooding Score	3	1	Surface flooding reduces score for Barnett Park Location D.
Services (3 waters) Score	1.6	1.4	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 C	55961	11 (15)	17 (19)	85 (162)
Barnett Park Location D	33480	24 (83)	39 (98)	109 (197)
	11154	9 (28)	14 (33)	84 (149)

	LSN – 15th percentile; top 10m index			
	CPT (CGD ID)	SLS A	SLS B	ULS
Redcliffs Park Location C	55961	2 (2)	4 (4)	25 (31)
Barnett Park Location D	33480	4 (7)	7 (11)	19 (24)
	11154	2 (3)	3 (4)	22 (26)

() – value for full depth.



Appendix 3: Abley Transportation Consultants Report

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

Redcliffs School

Additional Alternative Sites

Transportation Assessment

Ministry of Education

Quality Assurance Information

Prepared for: Ministry of Education
Job Number: MED-J007
Prepared by: Jeanette Ward, Associate
Reviewed by: Dave Smith, Associate

Date issued	Status	Approved by
8 September 2016	Draft	Jeanette Ward
16 September 2016	Final draft	Jeanette Ward
3 October 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 are listed below. The sites in bold and underlined are the subject of this report, the others are detailed in an earlier report 'Redcliffs School – Alternative Sites Transport Assessment'.

- 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
 - **Location C – Redcliffs Park - set back from Main Road**
- 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
 - **Location D – Barnett Park – set back from Main Road**

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 site scored the highest based on the evaluation criterion. Neither 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
Stage 2 Scores

Site Option	Road frontage (Access flexibility)	Transport Network (Level of servicing)
Site 37- Redcliffs Park	Score=4	Score=4
Location C – Set back from Main Road	Three road frontages, however car park vehicle access from Main Road unlikely to be feasible due to level difference	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	Score =1	Score=3
Location D – Set back from Main Road	Only one legal road frontage and limited options on where access can be located	Can be serviced by all modes however activity concentrated along short frontage of busy road

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. However it is understood that a footpath will not be constructed on the west side of Main Road in this location.

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 C - School set back from Main Road

This option involves the school buildings being set back approximately 30m from Main Road. The school car park would be located to the north west of the buildings. Vehicle access could be from 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.
- Pedestrian, cycle and vehicle access between the Main Road and Beachville Road (north end), and Main Road and McCormacks Bay Road intersections will 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.
- The setback from Main Road may facilitate a recessed drop off and pick up zone off Main Road. This would also allow access for servicing (waste collection etc.) and emergency vehicles.
- 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 C – School set back from Main Road

This option involves a school located on Barnett Park set back approximately 30m from Main Road with the buildings running north-south parallel with the existing accessway. 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.

- 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) would be utilised for student drop-off and pick-up.
- The car park would be located directly adjacent to the Main Road. Vehicle access for this option could be via the existing vehicle access from Main Road. A one-way loop road system could be considered however this introduces an additional access on Main Road and over the short road frontage is likely to be problematic. Consolidating the access to one location allows better opportunities to manage turning movements. The access and car parking arrangements would require further analysis and consideration.
- Location of replacement public car parking (sports fields and walking tracks) would need to be discussed with the CCC.
- Given the nature of the frontage road a reduced speed limit at school start and finish times should be considered.

Contents

1.	<i>Introduction</i>	<i>1</i>
1.1	<i>Background</i>	<i>1</i>
1.2	<i>Reference material</i>	<i>1</i>
2.	<i>Site Assessments</i>	<i>2</i>
2.1	<i>Introduction</i>	<i>2</i>
2.2	<i>Site locations</i>	<i>3</i>
2.3	<i>Land use</i>	<i>4</i>
2.4	<i>Vehicle access</i>	<i>9</i>
2.5	<i>Walk and cycle access</i>	<i>15</i>
2.6	<i>Public transport access</i>	<i>17</i>
2.7	<i>Parking and school bus access</i>	<i>19</i>
3.	<i>Transport network impacts</i>	<i>21</i>
3.1	<i>Introduction</i>	<i>21</i>
3.2	<i>Trip generation</i>	<i>21</i>
3.3	<i>Analysis method</i>	<i>22</i>
3.4	<i>Site 37 - Redcliffs Park</i>	<i>23</i>
3.5	<i>Site 38 -- Barnett Park</i>	<i>25</i>
4.	<i>District Plan - Transport Rules</i>	<i>27</i>
5.	<i>Option summary</i>	<i>28</i>
5.1	<i>Site 37 - Redcliffs Park</i>	<i>28</i>
5.2	<i>Site 38 -Barnett Park</i>	<i>29</i>
5.3	<i>Option comparison</i>	<i>31</i>

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 are listed below. The sites in bold and underlined are the subject of this report, the others are detailed in an earlier report 'Redcliffs School – Alternative Sites Transport Assessment'.

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 - Location C – Barnett Park – south of the park
 - **Location D – Barnett Park – set back from Main Road**

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'^[1].

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.

^[1] 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

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 sites are shown in Figure 2.1.

Figure 2.1
Alternative site
locations



2.3 Land use

Site 37 - Redcliffs Park

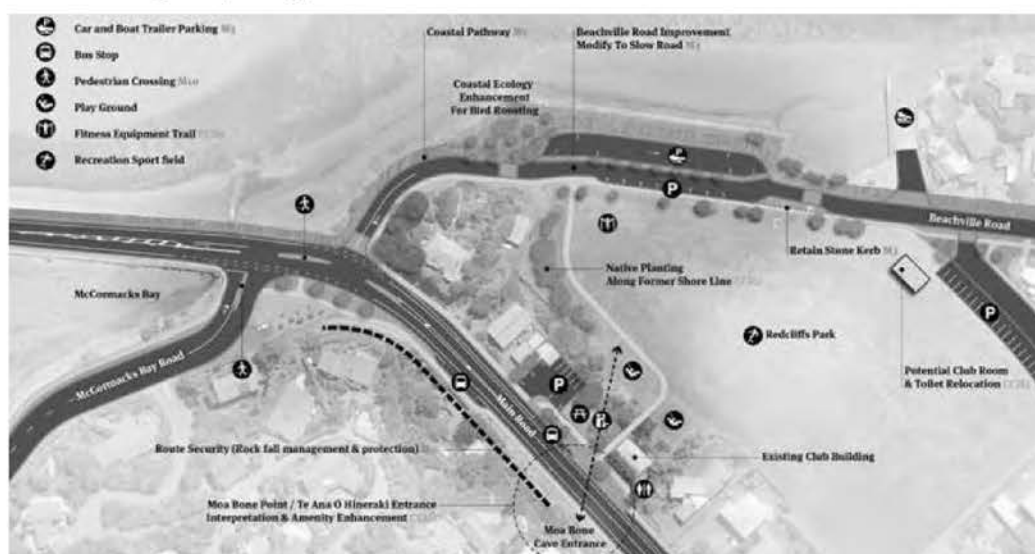
The park currently features a large greenspace with two football fields, a playground and a toilet block as shown in Figure 2.2. The Redcliffs Park site is situated adjacent to a Coastal Zone, Redcliffs Park itself is zoned as Open Space Community Parks and is adjacent to Residential Hills (RH) and Residential Suburban (RS) zones.

Figure 2.2
Redcliffs Park
Overview



Christchurch City Council's Main Road Master Plan in this area is shown in Figure 2.3. The redevelopment plans include the completion of a section of Coastal Pathway, a boat trailer parking area, road narrowing and parking provision.

Figure 2.3 Extract
from Main Road
Master Plan near
Redcliffs Park



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

This option involves the school buildings being set back approximately 23m from Main Road as shown in Figure 2.4 and Figure 2.5. The school car park would be located to the north west of the buildings and accessed from Beachville Road.

Figure 2.4
Location C on
Redcliffs Park



Figure 2.5
Location C - view
from north side of
the park



Site 38 - Barnett Park

Barnett Park currently features football fields, a club house, an early learning centre, walking tracks, a playground and a car park area as shown in Figure 2.6.

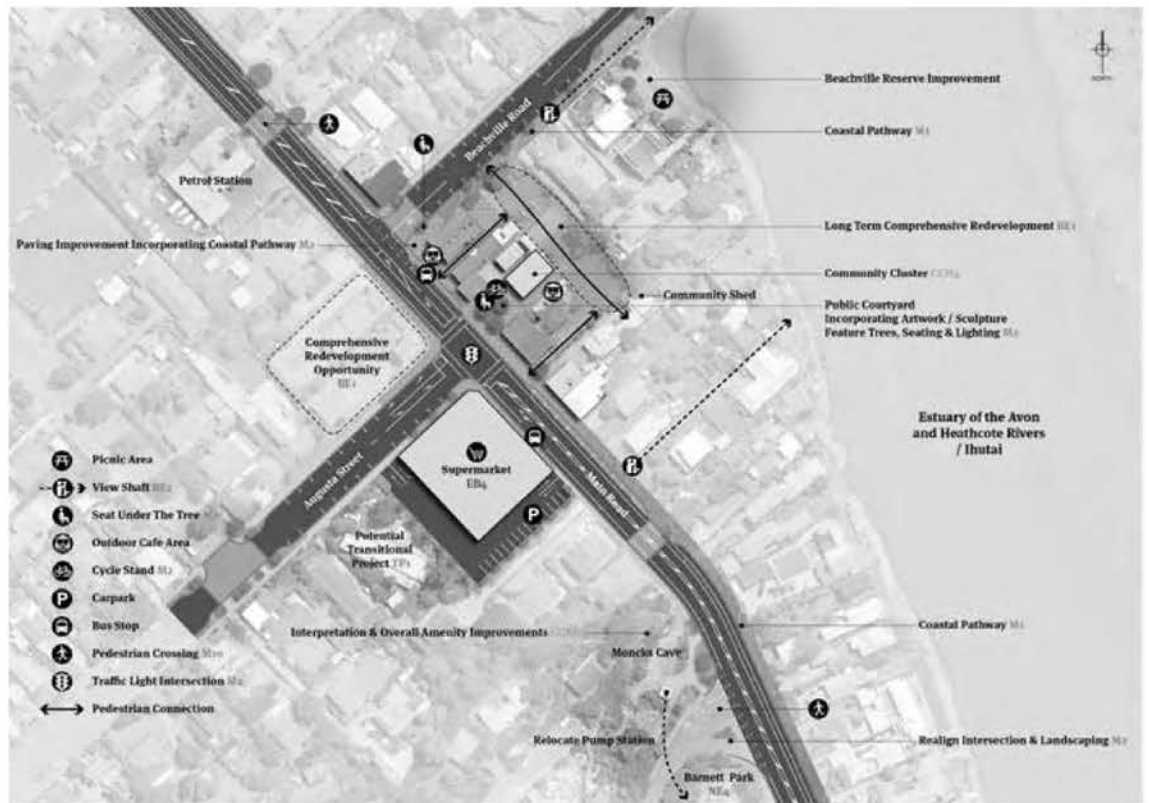
The Barnett Park site is located in both an open space community park (OCP) zone and Open Space Natural (OSN) zone and is adjacent to Residential Hills, Rural Port Hills and Residential Suburban zones.

Figure 2.6
Barnett Park site overview



The Christchurch City Council's Main Road Master Plan for this area is shown in Figure 2.7. The road improvements on Main Road have been completed. The plan does not extend south to the Barnett Park frontage.

Figure 2.7
Extract from the
Main Road Master
Plan near Barnett
Park



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

This option involves a school located on Barnett Park set back approximately 20m from Main Road with the buildings running north-south parallel with the existing accessway as shown in Figure 2.8 and Figure 2.9. The vehicle access would be from Main Road.

*Figure 2.8
Location D on
Barnett Park*



*Figure 2.9
Location D - view
from the south*



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 2.10. All the roads are subject a 50km/h speed limit.

Table 2.1
Road details

Relevant Site Option	District Plan Classifications			
	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 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 2.10
Key roads in the local network



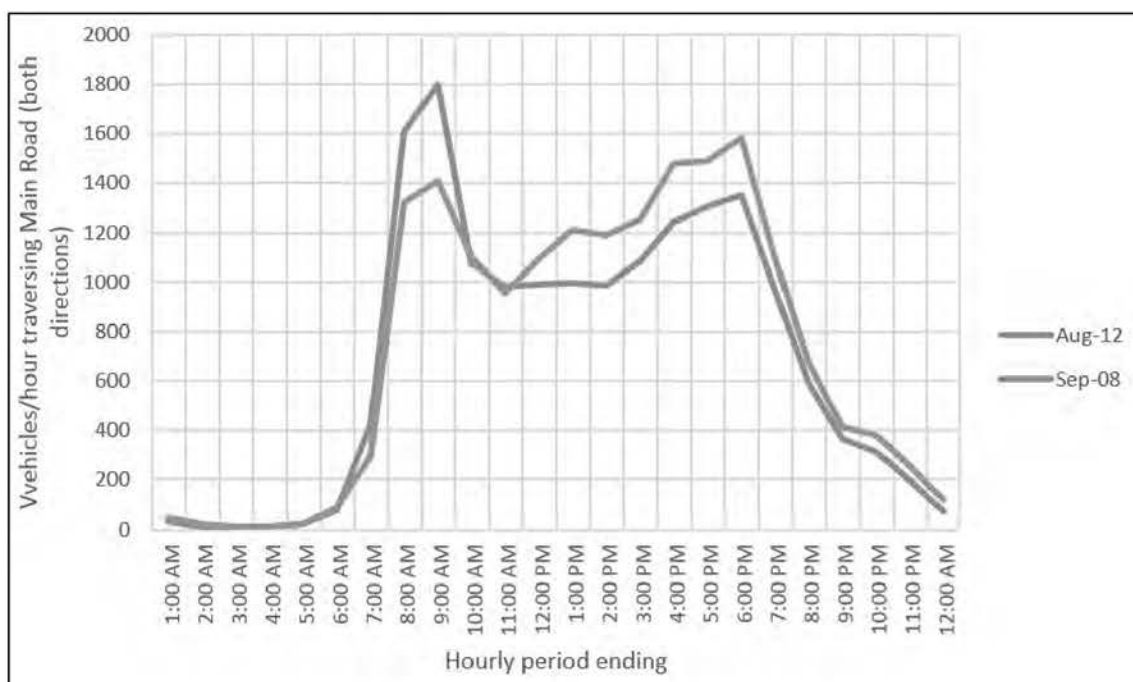
The Replacement Christchurch District Plan definitions for the road hierarchy classifications are:

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 2.11 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 2.11
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^[2], 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.

^[2] Christchurch City Council 2012, Christchurch Transport Strategic Plan June 2012 – 2042, ISBN 978-0-9922462-0-4

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 2.12.

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 2.12 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 permitted on both sides of Main Road. From the Beachville Road intersection with Main Road (shown in Figure 2.13), 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 2.13 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 2.14. 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 2.14 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 vehicle access for the additional Redcliffs Park school location option are discussed below.

Site 37 -Location C – School set back from Main Road

Vehicle access to the school car park could be from Beachville Road. Vehicle access from Main Road to the car park is not likely to be feasible due to the difference in elevation. The setback may facilitate a recessed drop off and pick up zone off Main Road. This would also allow access for servicing (waste collection etc.) and emergency vehicles.

Pedestrian, cycle and vehicle access between the Main Road and Beachville Road (north end), and Main Road and McCormacks Bay Road intersections will require consideration.

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 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 2.15**. 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 2.15
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 2.16**. 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 2.16
*Barnett Park
access*



Issues relating to vehicle access for the additional Barnett Park school location option are discussed below.

Site 38 – Location D – School set back from Main Road

The car park would be located directly adjacent to the Main Road. Vehicle access for this option could be via the existing vehicle access from Main Road. A one-way loop road system could be considered however this introduces an additional access on Main Road and over the short road frontage is likely to be problematic. Consolidating the access to one location allows better opportunities to manage turning movements as discussed below. The access and car parking arrangements would require further analysis and consideration.

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.

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.

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.

2.5 Walk and cycle access

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

Site 37 – Redcliffs Park

Issues relating to walking and cycling for the additional Redcliffs Park school location option are discussed below.

Site 37 – Location C - School set back from Main Road

Walking access to the site is provided by footpaths on both sides of Beachville Road and Celia Street, and the east side of Main Road, as shown in Figure 2.17. 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 2.14) located 230m south of the Main Road pedestrian access to Redcliffs Park.

Figure 2.17
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.

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 2.18. There is also an unformed pedestrian access via a gate at the end of Bay View Road.

Figure 2.18
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.

Site 38 – Location D – School set back from 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.

2.6 Public transport access

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

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 2.19. The service is operated at 15 minute frequencies on weekdays. Location C will be directly adjacent to the service.

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 be need to be reviewed.

Figure 2.19
Bus stops on Main
Road near
Redcliffs Park

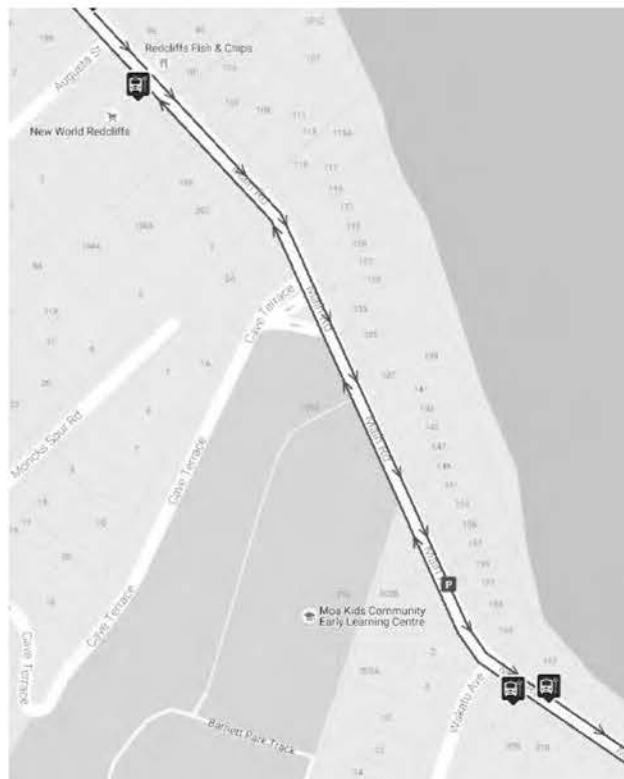


Site 37 - Barnett Park

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 2.20, there are no bus stops directly outside the park. The service is operated at 15 minute frequencies on weekdays. Location D is located within close proximity to the service.

Figure 2.20

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.

Issues relating to parking for the two additional school location options are discussed below.

Site 37 Redcliffs Park - Location C -School set back from Main Road

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 setback from Main Road may facilitate a recessed drop off and pick up zone off Main Road. This would also allow access for servicing (waste collection etc.) and emergency vehicles.

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 - Location D - School set back from Main Road

This option involves a school located on Barnett Park set back from Main Road with the car park directly adjacent to the Main Road. Replacement of the public car parking would require discussion with CCC regarding the most appropriate location.

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.

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.

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 2.11 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 Model³ 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

³ 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^[4] (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.

^[4] 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 37 – Redcliffs Park

Site 37 - Location C - School set back from Main Road

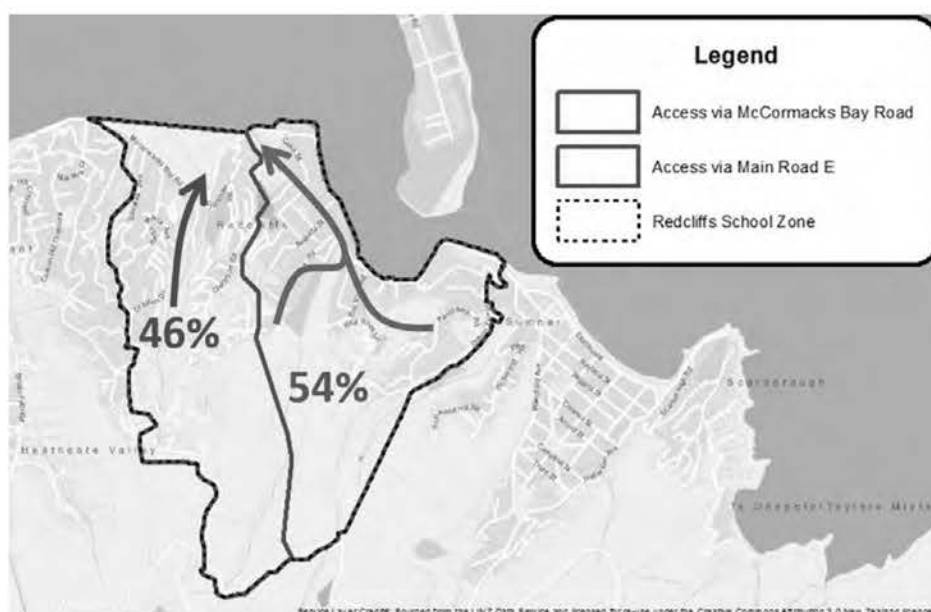
Figure 3.1 shows the intersections of Beachville Road North/McCormacks Bay Road/Main Road and Celia Street/Main Road which were analysed to assess the effects of establishing a school at Redcliffs Park.

Figure 3.1
Location of
intersections
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 Redcliffs Park, providing a proxy for estimating the proportion of students in each traffic catchment.

Figure 3.2
Traffic catchments
and associated
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 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.

3.5 Site 38 -- Barnett Park

Site 38 - Location D - School set back from Main Road

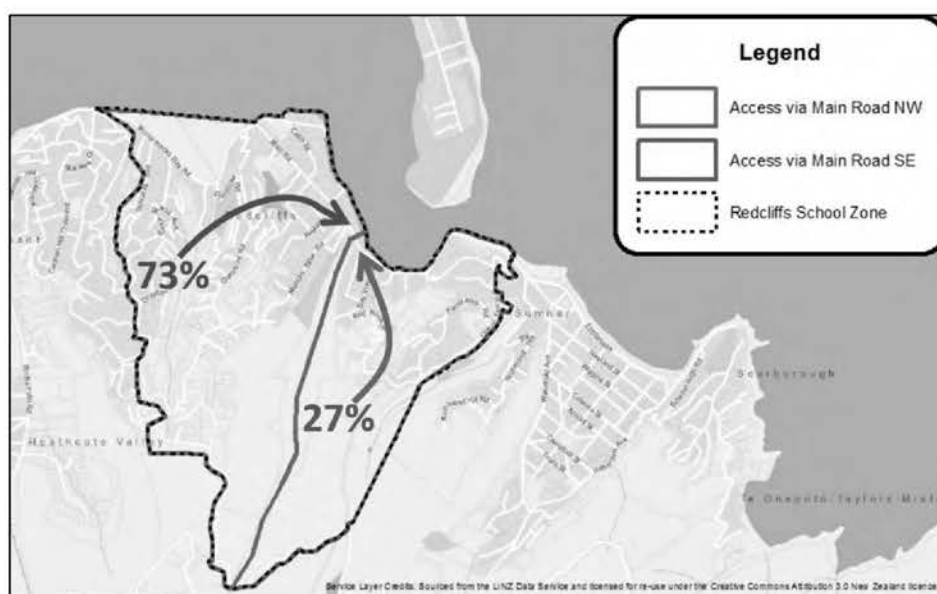
Figure 3.3 shows the intersection of the Barnett Park accessway with Main Road which was analysed to assess the effects of establishing a school at Barnett Park.

Figure 3.3
Location of
intersection
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 Barnett 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 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.

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.
7.2.3.2 Minimum number of cycle parking	Both 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	Both 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	Both 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	Both 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	Redcliffs Park Location C would require a new access to be formed. The Barnett Park Location D already has an access from Main Road and this can be improved to ensure suitability for a school access.
7.2.3.8 Vehicle crossings	Redcliffs Park Location C would require a new vehicle crossing to be formed. The Barnett Park Location D already has a vehicle crossing on Main Road.
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 additional sites locations.

5.1 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. However it is understood that a footpath will not be constructed on the west side of Main Road in this location.

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 C - School set back from Main Road

This option involves the school buildings being set back approximately 30m from Main Road. The school car park would be located to the north west of the buildings. Vehicle access could be from 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.
- Pedestrian, cycle and vehicle access between the Main Road and Beachville Road (north end), and Main Road and McCormacks Bay Road intersections will 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.
- The setback from Main Road may facilitate a recessed drop off and pick up zone off Main Road. This would also allow access for servicing (waste collection etc.) and emergency vehicles.
- 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.

5.2 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 D – School set back from Main Road

This option involves a school located on Barnett Park set back approximately 30m from Main Road with the buildings running north-south parallel with the existing accessway. 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) would be utilised for student drop-off and pick-up. The location of replacement public car parking (sports fields and walking tracks) would need to be discussed with the CCC.
- Given the nature of the frontage road a reduced speed limit at school start and finish times should be considered.

5.3 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 5.4. 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.

Table 5.4 Option Scoring

Site Option	Road frontage (Access flexibility)	Transport Network (Level of servicing)
Site 37- Redcliffs Park Location C – set back from Main Road	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 D – set back from 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

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Appendix 4: Stephenson & Turner Report

Redcliffs School Site Options Studies: Alternative Locations
Prepared for: Ministry of Education

22326

7th September 2016

Revision No. 0

Document Control

Rev.	Issue	Date	Status/Revision	Prepared by	Reviewed
0	1	07/09/2016	First Issue	EW, RS	DC

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Contents

INTRODUCTION	4
SCOPE OF REPORT	4
ARCHITECTURAL SITE OPTIONS STUDY	5
ARCHITECTURAL CONSULTANT METHODOLOGY RATING	5
SUMMARY OF ARCHITECTURAL FINDINGS.....	7
SERVICES SITE OPTIONS STUDY	8
SERVICES CONSULTANT METHODOLOGY RATING	8

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 carparks and 2 mobility carparks 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
Redcliffs Park – Site 37 – Location C	Option 1	5	Can fit spaces required.
Barnett Park – Site 38 – Location D	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 are visible from 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
Redcliffs Park – Site 37 – Location C	Option 1	5	Fulfil requirements.
Barnett Park – Site 38 – Location D	Option 1	4.5	Some outdoor spaces are exposed and some are sheltered to the prevailing North-East Wind.

Summary of Architectural Findings

REDCLIFFS PARK – SITE 37 – LOCATION C

- Sufficient space for a two two-storey buildings and a smaller additional two storey building expansion.
- The location of the buildings are stepped back from 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.
- The layout of the buildings create a courtyard area.
- 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.
- A landscaping barrier will be placed along some of the Main North Road boundary.
- 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 D

- Sufficient space for one two-storey building 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.
- Some outdoor areas are exposed to the prevailing North-East wind and some are not.
- The new school car parking is to be shared with existing car parking. Further Council consultation would be required on car park provision
- Good connection between school and grassed field area.
- 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.

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
Redcliffs Park – Site 37 – Location C	Option 1	2.4	New connections required. Electricity further investigation.
Barnett Park – Site 38 – Location D	Option 1	2.6	New connections required. Electricity further investigation.

Summary of site services infrastructure considerations.

Based on brief desktop study for preliminary site consideration.

Site37: Redcliffs 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.
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 D
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. Note underground power easement affects site.
Gas	No known nearby reticulation, vehicle delivery operates nearby.
Telephone/Communications	Existing connection to land parcel, new site connections required for proposed development. Nearby cable route is Main Road. Fibre in street.
Refuse	Waste collection services operate nearby.



Site 37 – Location C - 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 Managment 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 Managment 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 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
- 10⁻⁶ Lives Risk Line
- Pedestrian Access
- Landscaping
- Property Boundary
- Easement
- A Accessible Carpark



Site 37 – Location C
1 : 500

ISSUE	DATE	PREPARED	REVIEWED
1 Issued For Coordination	07/09/2016	EW	DC

Scale for guidance only. Do not scale these drawings.
Contractors must verify all dimensions on site prior to commencing any work or making any shop drawings. Shop drawings must be submitted for comment prior to manufacture.

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PROJECT
Redcliffs School
Site Option Studies
DRAWING TITLE
Redcliffs Park - Site 37 - Location C

CLIENT
Ministry of Education

SCALE
A1 1:500, 1:2000
A3 1:1000, 1:4000

PROJECT NO	DRAWING NO	ISSUE
22326	0.01	1



Site 38 – Location D - 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
- A Accessible Carpark

Scale for guidance only. Do not scale these drawings.

Contractors must verify all dimensions on site prior to commencing any work or making any shop drawings. Shop drawings must be submitted for comment prior to manufacture.

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ISSUE	DATE	PREPARED	REVIEWED
1 Issued For Coordination	07/09/2016	EW	DC



Site 38 – Location D
1 : 500

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PROJECT
Redcliffs School
Site Option Studies

DRAWING TITLE
Barnett Park - Site 38 - Location D

CLIENT
Ministry of Education

SCALE
A1 1:500, 1:2000
A3 1:1000, 1:4000

PROJECT NO	DRAWING NO	ISSUE
22326	0.02	1

Appendix 5: Detailed Stage 2 Analysis of the Additional Sites

DETAILED STAGE 2 ANALYSIS OF THE SITES

Stage 2: Redcliffs Park, Site 37, Location C

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

Location C is towards the north eastern end of the park. It provides a building platform which is setback from Main Road by approximately 23 metres. For the purposes of this assessment it is assumed that the building platform is filled approximately 2.5m, taking it up to the level of Main Road

Criteria	Assessment	Score
Site Acquisition Costs	Estimated cost for a 1.9071 hectare site: \$2,100,000 – \$2,200,000 plus GST (if any) Estimated cost for a 2,500 square metre site Location C: \$550,000 – \$600,000 plus GST (if any)	2
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 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 any part of a park.	0
Site Size	The site can fit all necessary facilities.	5
Topography	The site is generally flat with two defined building platforms	5
School Design Potential	The site fulfils all requirements.	5
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
District Plan zone	Operative Plan: The site is zoned Open Space 2 (District Recreation and Open Space). The playing fields, additional two storey building and carpark would be within the Flood Management Area although the main two storey building platforms would not. Proposed Plan: The principal building platform on the site is zoned Open Space Community Parks and the Main Road entrance is zoned Residential Suburban. The District Plan overlays which currently relate to the site (including the carpark and playing fields beside Beachville Road) include High Flood Hazard Management area, Liquefaction Assessment Area 1, Cliff Hazard Management Area 2. The current site design footprint shows a 10^{-6} Lives Risk Line encroaching on a landscaping area on the Main Road boundary	3

	<p>but it does not touch the building footprint.</p> <p>The lower part of the site where the carpark and additional building are proposed is within a Fixed Minimum Floor Overlay within Floor Level and Fill Management Area. Land is assumed to be filled so that buildings on this area are to have a FFL sufficient to gain Building Consent.</p> <p>The whole of the site is within the Coastal Environment. The minimum floor level required for buildings on this property is 12.36 m above Christchurch City Council Datum.</p> <p>Neighbouring properties adjacent to the west and east of the site are zoned Residential Suburban.</p>	
Location within the proposed student catchment	The site is located within the defined catchment area and located centrally within it.	5
Existing site constraints	<p>The site accommodates a single story building which provides public toilet facilities towards the Main Road boundary. Other improvements include goal posts and two playground areas.</p> <p>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 C, although, initial bulk and location drawings by Stephenson and Turner have successfully allowed for this constraint.</p>	2
Road Frontage	While the site has three road frontages, car park vehicle access from Main Road is unlikely to be feasible due to level difference.	4
Transport Network	Can be serviced well by all modes, activity spread across network, two low and one high volume frontage roads.	4
Infrastructure services	<p>Potable Water</p> <p>Supply is proximate. Capacity is expected to be adequate but has not yet been quantified.</p> <p>Fire Supply</p> <p>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</p> <p>Supply is proximate. Capacity is expected to be adequate but has not yet been quantified. There is a wastewater rising main running through the middle of the site which may constrain development.</p> <p>Stormwater</p> <p>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

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	<p>Tonkin & Taylor advise that land damage from the CES was relatively minor, with some cracking and spreading along Beachville Road towards the Estuary. For future moderate to strong shaking the land can be expected to perform as TC2/TC3 with ground settlement in the order of 100mm. Filling necessary for foundations may reduce the risk of liquefaction and at the same time increase the risk of lateral spread.</p> <p>The 31° fly rock/10⁻⁶ line for cliff collapse runs along Main Road and encroaches approximately 4 m onto residential properties adjacent to Location C, however the proposed building sites will be approximately 10 m away from the 10⁻⁶ risk line (i.e. at lower risk).</p> <p>Erosion protection may be required around the edge of the site to protect against future coastal erosion.</p>	4
Flooding	At 4.5m LVD (approximately level with Main Road), the building platform sits outside the CCC Flood Management Area.	3
Contamination	While the overall site is identified on Ecan's Listed Land Use Register as a HAIL site, much of Location C appears to be outside the specific HAIL area. A further detailed site investigation would need to be undertaken as part of due diligence.	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

Ecological Impact	Construction works on the site and run off from the carpark and playing fields will require careful management so as not to cause any effects on the estuarine environment. There are no known habitats of ecological significance on Location C.	3
Cultural or other significance	<p>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 Ngāi 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.</p> <p>Heritage New Zealand comments that there is another cave at the bottom of “the rock” at the western end of the park where taonga have been found in the past.</p>	2
Opportunities for co-location	Opportunities exist for co-location of community facilities such as playgrounds and playing space.	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		71.4

Stage 2: Barnett Park, Site 38, Location D

Barnett Park is located at 200A Main Road, Redcliffs. The selected site extends approximately 190 metres from Main Road to the end of the existing formed carpark. It excludes the community buildings occupying the western portion of the site. This site would accommodate the car park, school buildings and hard court areas, while the field space would remain in Council ownership. School access to the fields would need to be agreed with Council.

Criteria	Assessment	Score
Site Acquisition Costs	<p>Estimated cost for a 1.6 hectare site: \$1,700,000 – \$1,800,000 plus GST (if any)</p> <p>Estimated cost for a 2,500 square metre site Site D: \$400,000 – \$425,000 plus GST (if any)</p>	2
Ease of Acquisition	<p>The majority of the land is held as Local Purpose Reserve and Recreation Reserve subject to the Reserves Act 1977. A small 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.</p> <p>Public consultation would also be required under S138; CCC land held under LGA 02</p>	0

Criteria	Assessment	Score
Site Size	The site can fit all necessary facilities	5
Topography	The site is flat in contour.	5
School Design Potential	The site fulfils most requirements, but some outdoor spaces are exposed to the prevailing wind.	4.5
Position of site in relation to any growth	The site is within an established urban area. There are no relevant growth strategies.	5
District Plan Zones	<p>The site is zoned Open Space 2 in the Operative Plan and Open Space Community Parks in the Proposed Plan.</p> <p>A very small portion at the front of the site is within a High Flood Hazard Management Area and the site is identified as being within the Coastal Environment under the Proposed Plan. It is within the Liquefaction 1 overlay.</p> <p>On the western boundary of the site is an area noted as Outstanding Natural Landscape in the Proposed Plan. To the east of the existing early childhood centre the zoning is Living 1 or Residential Suburban (low density) housing which is in a Flood Management Area in the Operative Plan.</p>	4
Location within the proposed student catchment	The site is located towards the centre of the defined catchment area.	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 in the area identified as location D.</p> <p>The existing play centre is centrally located within the proposed location D.</p> <p>A drainage (CCC) and electrical (Orion) easement materially affect the area identified for design of the school, although, initial Stephenson & Turner building designs accommodate these easements successfully.</p>	1
Road Frontage	The site has only one legal road frontage (to Main Road) and there are limited options on where access can be located	1
Transport Network	Location D can be serviced well by all modes, however activity will be concentrated along what is a short frontage of busy road.	3

Criteria	Assessment	Score
Infrastructure services	<p>Potable Water Supply is proximate. Capacity is expected to be adequate but has not yet been quantified. Services may need to run 100m.</p> <p>Fire Supply 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 A major stormwater easement runs along the eastern boundary. Capacity is 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, which has significant infrastructure and an easement running through the site.</p> <p>Gas There is no reticulation, but vehicle delivery operates nearby.</p> <p>Telephone/Broadband There is an existing connection to the site, but new connections would be required for the proposed development. The nearest cable route is Main Road and there is fibre in the street.</p> <p>Refuse Waste collection services operate nearby.</p>	2.6
Geotechnical	Tonkin and Taylor comment that there was relatively minor damage during the Canterbury Earthquake Sequence, 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	3

Criteria	Assessment	Score
	<p>performance, with ground settlements of about 100mm and minor to moderate land damage possible in future SLS to ULS scale earthquake events.</p> <p>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.</p>	
Flooding	<p>There is a history of surface flooding due to storm flows from the Port Hills catchment upslope of Barnett Park. A potential upgrade may be required to the existing open swale and pipe.</p> <p>Approximately 1 m of fill would be required to meet the finished floor level requirements as the ground surface elevation is estimated to be 2.5m LVD. The site is within the CCC Flood Management Area with an Interim Floor Level of 3.32 m LVD.</p> <p>Tonkin & Taylor report that potentially the site will be affected by coastal inundation and erosion within the next 50-100 years.</p>	1
Contamination	<p>As a District Sports Park, 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
Noise effects on any proposed school	<p>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.</p>	5
Ecological Impact	<p>While Barnett Park contains slopes which are part of a large Outstanding Natural Landscape Location C sits outside of this area.</p>	4
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,</p>	4

Criteria	Assessment	Score
	<p>Kaitakitanga, Wāhi Tapu, Rangatiratanga and Ngā Tutohu Whenua. It is low risk for issues of Mauri.</p> <p>While Location C has already been extensively excavated, construction may require deeper earthworks than have previously occurred.</p>	
Opportunities for co-location	There are existing community buildings, for example the play centre, which provide opportunities for co-location of community resources. There is also good opportunity for co-location with respect to playing fields, playground facilities and car parking, although, some redesign will most likely be required.	4
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		67.1

Appendix 6: Computer Freehold Registers of the Additional Sites



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

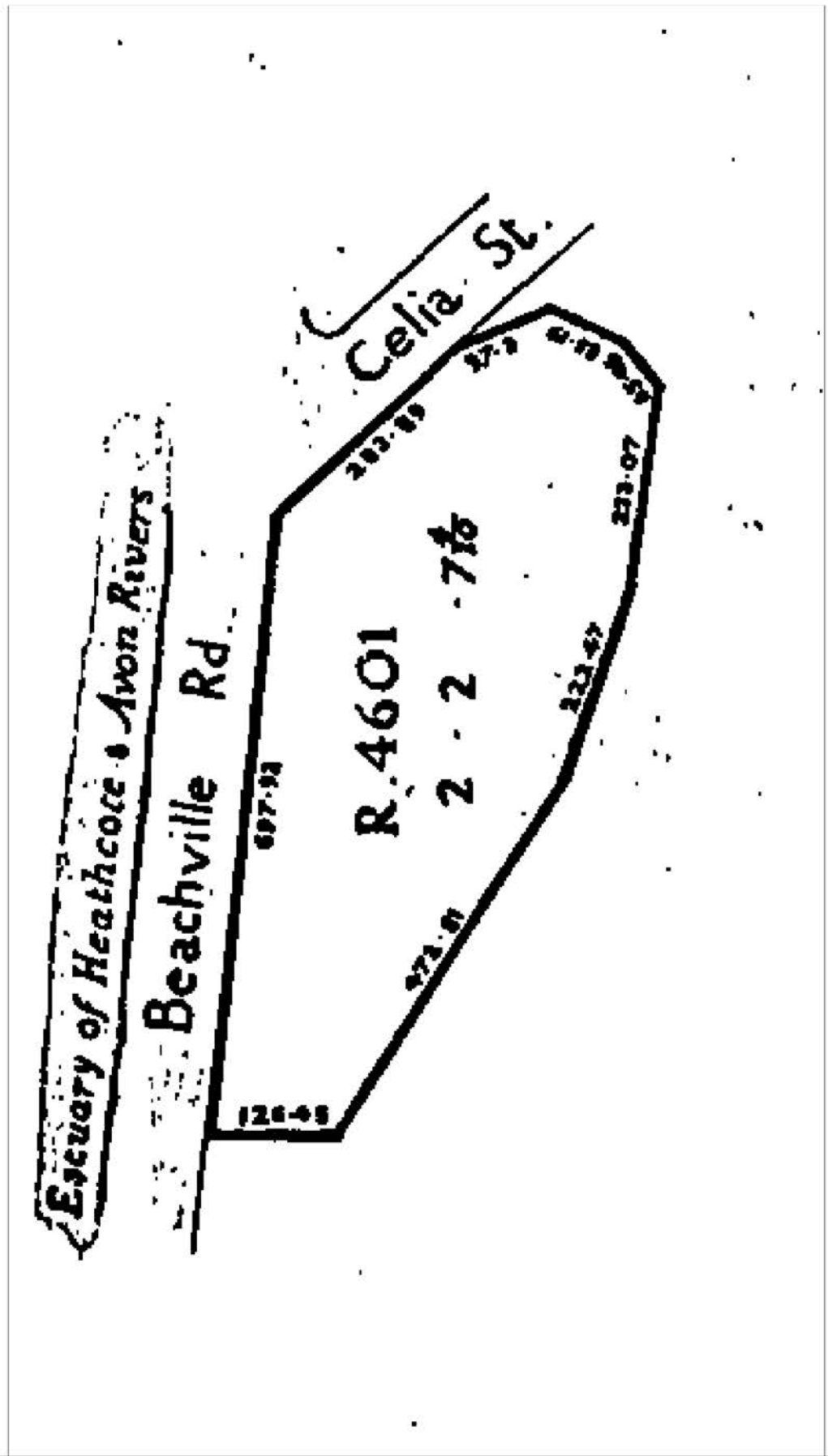
555837.2 Transfer creating the following easements in gross - 12.7.1985 at 10.00 am

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



R. W. Muir
Registrar-General
of Land

Search Copy

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

Search Copy Dated 25/08/16 2:48 pm, Page 2 of 2
Register Only



Redcliffs Park Title Boundaries



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R. W. Muir
Registrar-General
of Land

Search Copy

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

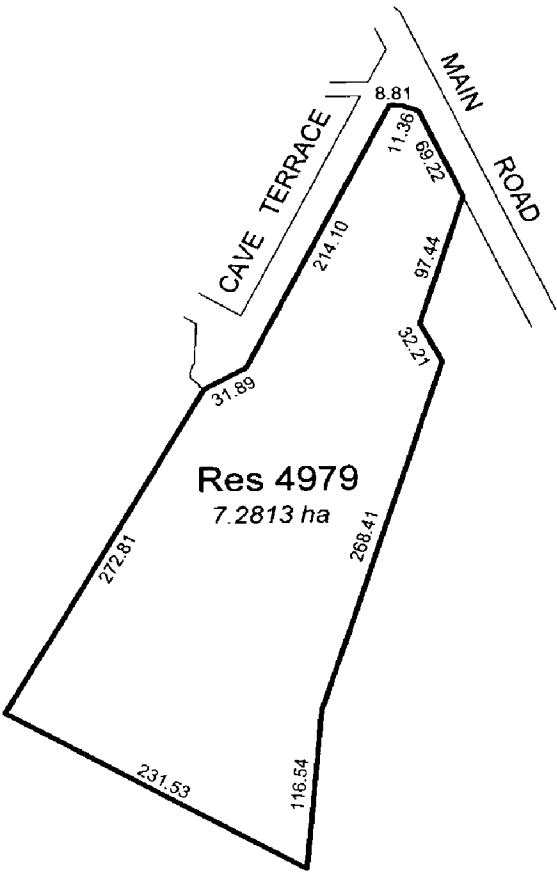
Subject to the Reserves Act 1977

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: 211089643



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

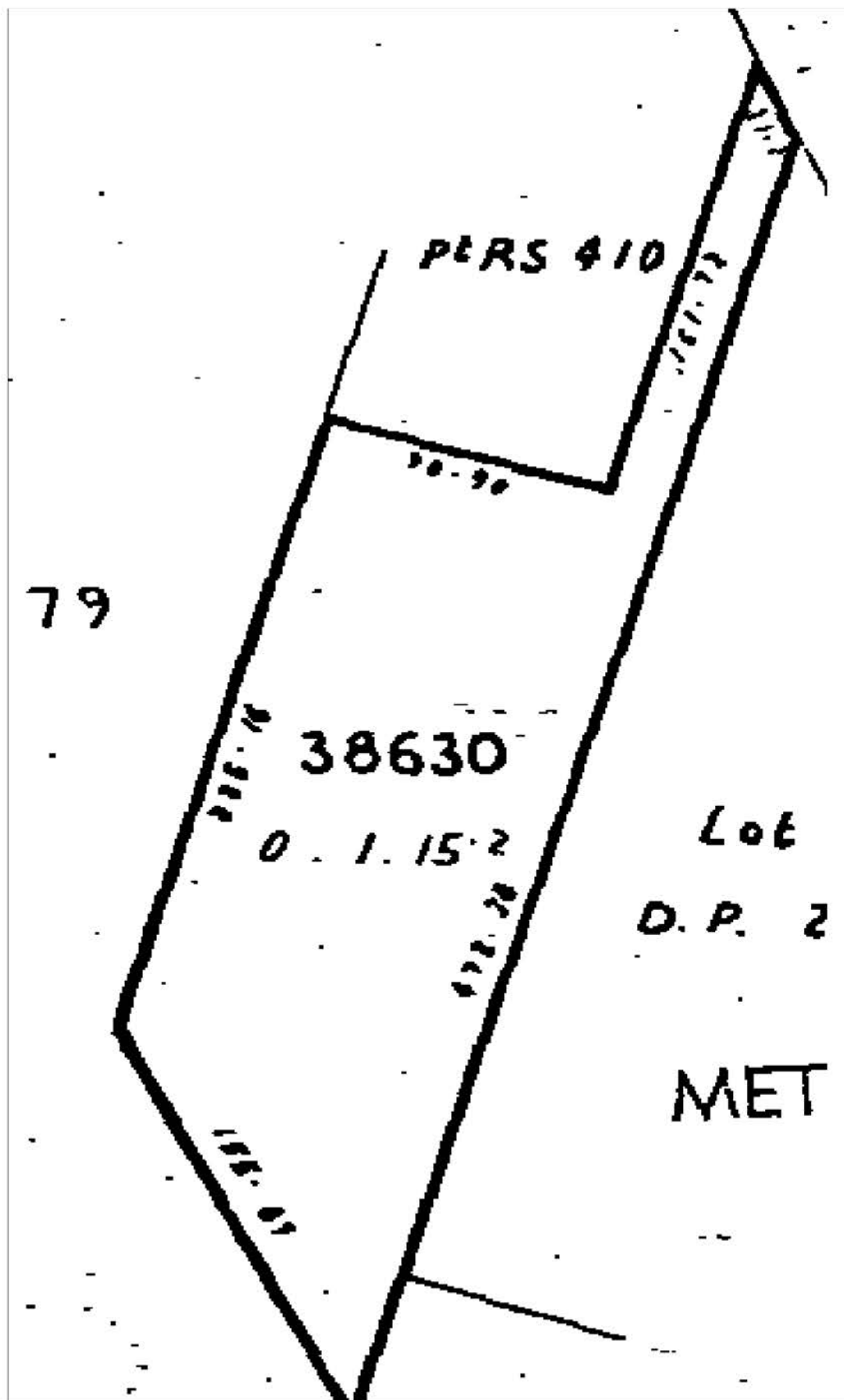
Prior References
CBPR98/85

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

1-1-15



Barnett Park Title Boundaries

Appendix 7: Easement information for the additional sites

Registered Interests

There are a number of easements and encumbrances registered against the Computer Freehold Registers (CFR) for the two sites. These easements and encumbrances may constrain potential development on the sites and may require further investigation.

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, 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.

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 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

8354853.1, 83548553.2 - Electricity Easement

Orion Protected Rights

Unregistered Water & Electrical Easement (CCC)

Glossary

Glossary

AILR	Annual Individual Life Risk
CCC	Christchurch City Council
CES	Canterbury Earthquake Sequence
CFR	Computer Freehold Register
CPT	Cone Penetration Test
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