



Christchurch City Council

South New Brighton Beach Changing Shed

PRK 1351 BLDG 001

Detailed Engineering Evaluation

Quantitative Assessment Report



Christchurch City Council

South New Brighton Beach Changing Shed

Quantitative Assessment Report

Prepared By



.....
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Date: April 2013

Reference: 6-QC116.00

Status: Final

Approved By



.....
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Principal Structural Engineer, CPEng

Summary

South New Brighton Beach Changing Shed
PRK 1351 BLDG 001

Detailed Engineering Evaluation
Quantitative Report - Summary
Final

Background

This is a summary of the quantitative report for the South New Brighton Beach Changing Shed, and is based on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011 and a visual inspection carried out.

Key Damage Observed

The building does not appear to have suffered any structural damage as a result of the recent earthquake events.

Critical Structural Weaknesses

No critical structural weaknesses have been identified for this building.

Indicative Building Strength

The structure has been found to have a structural capacity of 100%, and is therefore not classed as earthquake prone.

Recommendations

The following recommendations have been made:

- a) The non-structural earthquake and impact damage be repaired.
- b) The maintenance issue of the rusted steel connections is considered by CCC in the future.

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1 Introduction

Opus International Consultants Limited has been engaged by the Christchurch City Council to undertake a detailed seismic assessment of the South New Brighton Beach Changing Shed, located at 371 Marine Parade, New Brighton, Christchurch.

The purpose of the assessment is to assess the current seismic capacity of the building and to determine if the building is classed as being earthquake prone in accordance with the Building Act 2004.

The seismic assessment and reporting have been undertaken based on the qualitative and quantitative procedures detailed in the Detailed Engineering Evaluation Procedure (DEEP) document (draft) issued by the Structural Engineering Society (SESOC) [3] [4].

2 Compliance

This section contains a brief summary of the requirements of the various statutes and authorities that control activities in relation to buildings in Christchurch at present.

2.1 Canterbury Earthquake Recovery Authority (CERA)

CERA was established on 28 March 2011 to take control of the recovery of Christchurch using powers established by the Canterbury Earthquake Recovery Act enacted on 18 April 2011. This act gives the Chief Executive Officer of CERA wide powers in relation to building safety, demolition and repair. Two relevant sections are:

Section 38 – Works

This section outlines a process in which the chief executive can give notice that a building is to be demolished and if the owner does not carry out the demolition, the chief executive can commission the demolition and recover the costs from the owner or by placing a charge on the owners' land.

Section 51 – Requiring Structural Survey

This section enables the chief executive to require a building owner, insurer or mortgagee to carry out a full structural survey before the building is re-occupied.

We understand that CERA require a detailed engineering evaluation to be carried out for all buildings (other than those exempt from the Earthquake Prone Building definition in the Building Act). CERA have adopted the Detailed Engineering Evaluation Procedure (DEEP) document (draft) issued by the Structural Engineering Society (SESOC) on 19 July 2011. This document sets out a methodology for both initial qualitative and detailed quantitative assessments.

It is anticipated that a number of factors, including the following, will determine the extent of evaluation and strengthening level required:

1. The importance level and occupancy of the building.

2. The placard status and amount of damage.
3. The age and structural type of the building.
4. Consideration of any critical structural weaknesses.

Christchurch City Council requires any building with a capacity of less than 34% of New Building Standard (including consideration of critical structural weaknesses) to be strengthened to a target of 67% as required under the CCC Earthquake Prone Building Policy.

2.2 Building Act

Several sections of the Building Act are relevant when considering structural requirements:

Section 112 - Alterations

This section requires that an existing building complies with the relevant sections of the Building Code to at least the extent that it did prior to the alteration. This effectively means that a building cannot be weakened as a result of an alteration (including partial demolition).

The Earthquake Prone Building policy for the territorial authority shall apply as outlined in Section 2.3 of this report.

Section 115 – Change of Use

This section requires that the territorial authority is satisfied that the building with a new use complies with the relevant sections of the Building Code ‘as near as is reasonably practicable’.

This is typically interpreted by territorial authorities as being 67% of the strength of an equivalent new building or as near as practicable. This is also the minimum level recommended by the New Zealand Society for Earthquake Engineering (NZSEE).

Section 121 – Dangerous Buildings

This section was extended by the Canterbury Earthquake (Building Act) Order 2010, and defines a building as dangerous if:

1. In the ordinary course of events (excluding the occurrence of an earthquake), the building is likely to cause injury or death or damage to other property; or
2. In the event of fire, injury or death to any persons in the building or on other property is likely because of fire hazard or the occupancy of the building; or
3. There is a risk that the building could collapse or otherwise cause injury or death as a result of earthquake shaking that is less than a ‘moderate earthquake’ (refer to Section 122 below); or
4. There is a risk that other property could collapse or otherwise cause injury or death; or

5. A territorial authority has not been able to undertake an inspection to determine whether the building is dangerous.

Section 122 – Earthquake Prone Buildings

This section defines a building as earthquake prone (EPB) if its ultimate capacity would be exceeded in a ‘moderate earthquake’ and it would be likely to collapse causing injury or death, or damage to other property.

A moderate earthquake is defined by the building regulations as one that would generate loads 33% of those used to design an equivalent new building.

Section 124 – Powers of Territorial Authorities

This section gives the territorial authority the power to require strengthening work within specified timeframes or to close and prevent occupancy to any building defined as dangerous or earthquake prone.

Section 131 – Earthquake Prone Building Policy

This section requires the territorial authority to adopt a specific policy for earthquake prone, dangerous and insanitary buildings.

2.3 Christchurch City Council Policy

Christchurch City Council adopted their Earthquake Prone, Dangerous and Insanitary Building Policy in 2006. This policy was amended immediately following the Darfield Earthquake on 4 September 2010.

The 2010 amendment includes the following:

1. A process for identifying, categorising and prioritising Earthquake Prone Buildings, commencing on 1 July 2012;
2. A strengthening target level of 67% of a new building for buildings that are Earthquake Prone;
3. A timeframe of 15-30 years for Earthquake Prone Buildings to be strengthened; and,
4. Repair works for buildings damaged by earthquakes will be required to comply with the above.

The council has stated their willingness to consider retrofit proposals on a case by case basis, considering the economic impact of such a retrofit.

If strengthening works are undertaken, a building consent will be required. A requirement of the consent will require upgrade of the building to comply ‘as near as is reasonably practicable’ with:

- The accessibility requirements of the Building Code.

- The fire requirements of the Building Code. This is likely to require a fire report to be submitted with the building consent application.

Where an application for a change of use of a building is made to Council, the building will be required to be strengthened to 67% of New Building Standard or as near as is reasonably practicable.

2.4 Building Code

The Building Code outlines performance standards for buildings and the Building Act requires that all new buildings comply with this code. Compliance Documents published by The Department of Building and Housing can be used to demonstrate compliance with the Building Code.

On 19 May 2011, Compliance Document B1: Structure was amended to include increased seismic design requirements for Canterbury as follows:

- increase in the basic seismic design load for the Canterbury earthquake region (Z factor increased to 0.3 equating to an increase of 36 – 47% depending on location within the region);
- Increased serviceability requirements.

2.5 Institution of Professional Engineers New Zealand (IPENZ) Code of Ethics

One of the core ethical values of professional engineers in New Zealand is the protection of life and safeguarding of people. The IPENZ Code of Ethics requires that:

Members shall recognise the need to protect life and to safeguard people, and in their engineering activities shall act to address this need.

- 1.1 *Giving Priority to the safety and well-being of the community and having regard to this principle in assessing obligations to clients, employers and colleagues.*
- 1.2 *Ensuring that responsible steps are taken to minimise the risk of loss of life, injury or suffering which may result from your engineering activities, either directly or indirectly.*

All recommendations on building occupancy and access must be made with these fundamental obligations in mind.

3 Earthquake Resistance Standards

For this assessment, the building's earthquake resistance is compared with the current New Zealand Building Code requirements for a new building constructed on the site. This is expressed as a percentage of new building standard (%NBS). The loadings are in accordance with the current earthquake loading standard NZS1170.5 [1].

A generally accepted classification of earthquake risk for existing buildings in terms of %NBS that has been proposed by the NZSEE 2006 [2] is presented in Figure 1 below.

Description	Grade	Risk	%NBS	Existing Building Structural Performance	Improvement of Structural Performance	
					Legal Requirement	NZSEE Recommendation
Low Risk Building	A or B	Low	Above 67	Acceptable (improvement may be desirable)	The Building Act sets no required level of structural improvement (unless change in use) This is for each TA to decide. Improvement is not limited to 34%NBS.	100%NBS desirable. Improvement should achieve at least 67%NBS
Moderate Risk Building	B or C	Moderate	34 to 66	Acceptable legally. Improvement recommended		Not recommended. Acceptable only in exceptional circumstances
High Risk Building	D or E	High	33 or lower	Unacceptable (Improvement required under Act)	Unacceptable	Unacceptable

Figure 1: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines

Table 1 below compares the percentage NBS to the relative risk of the building failing in a seismic event with a 10% risk of exceedance in 50 years (i.e. 0.2% in the next year).

Table 1: %NBS compared to relative risk of failure

Percentage of New Building Standard (%NBS)	Relative Risk (Approximate)
>100	<1 time
80-100	1-2 times
67-80	2-5 times
33-67	5-10 times
20-33	10-25 times
<20	>25 times

3.1 Minimum and Recommended Standards

Based on governing policy and recent observations, Opus makes the following general recommendations:

3.1.1 Occupancy

The Canterbury Earthquake Order¹ in Council 16 September 2010, modified the meaning of “dangerous building” to include buildings that were identified as being EPB’s. As a result of this, we would expect such a building would be issued with a Section 124 notice, by the Territorial Authority, or CERA acting on their behalf, once they are made aware of our assessment. Based on information received from CERA to date and from the DBH guidance document dated 12 June 2012 [6], this notice is likely to prohibit occupancy of the building (or parts thereof), until its seismic capacity is improved to the point that it is no longer considered an EPB.

3.1.2 Cordoning

Where there is an overhead falling hazard, or potential collapse hazard of the building, the areas of concern should be cordoned off in accordance with current CERA/territorial authority guidelines.

3.1.3 Strengthening

Industry guidelines (NZSEE 2006 [2]) strongly recommend that every effort be made to achieve improvement to at least 67%NBS. A strengthening solution to anything less than 67%NBS would not provide an adequate reduction to the level of risk.

It should be noted that full compliance with the current building code requires building strength of 100%NBS.

3.1.4 Our Ethical Obligation

In accordance with the IPENZ code of ethics, we have a duty of care to the public. This obligation requires us to identify and inform CERA of potentially dangerous buildings; this would include earthquake prone buildings.

¹ This Order only applies to buildings within the Christchurch City, Selwyn District and Waimakariri District Councils authority

4 Background Information

4.1 Building Description

The South New Brighton Beach Changing Shed is located at 371 Marine Parade, New Brighton, Christchurch. The building is a small, single storey reinforced concrete masonry structure with lightweight timber framed roof and concrete strip footings.

The building is approximately 14m long in the east-west direction and 4.4m wide in the north-south direction. The apex of the roof is approximately 3.6m from the ground with a wall height of approximately 2.2m. The building consists of a male bathroom at the western end, a female bathroom at the eastern end, and 2 small family change rooms in the centre of the building.

Lateral restraint of the building is provided by the shear capacity of the reinforced concrete masonry walls. According to the structural drawings found the walls are fully grouted and reinforced with D12 bars at 600mm centres each way. A cover meter survey conducted has confirmed these details.

There is no ceiling diaphragm and the roof is supported by 10 CHS sections bolted to the bond beam of the front and back walls (5 supports each side).

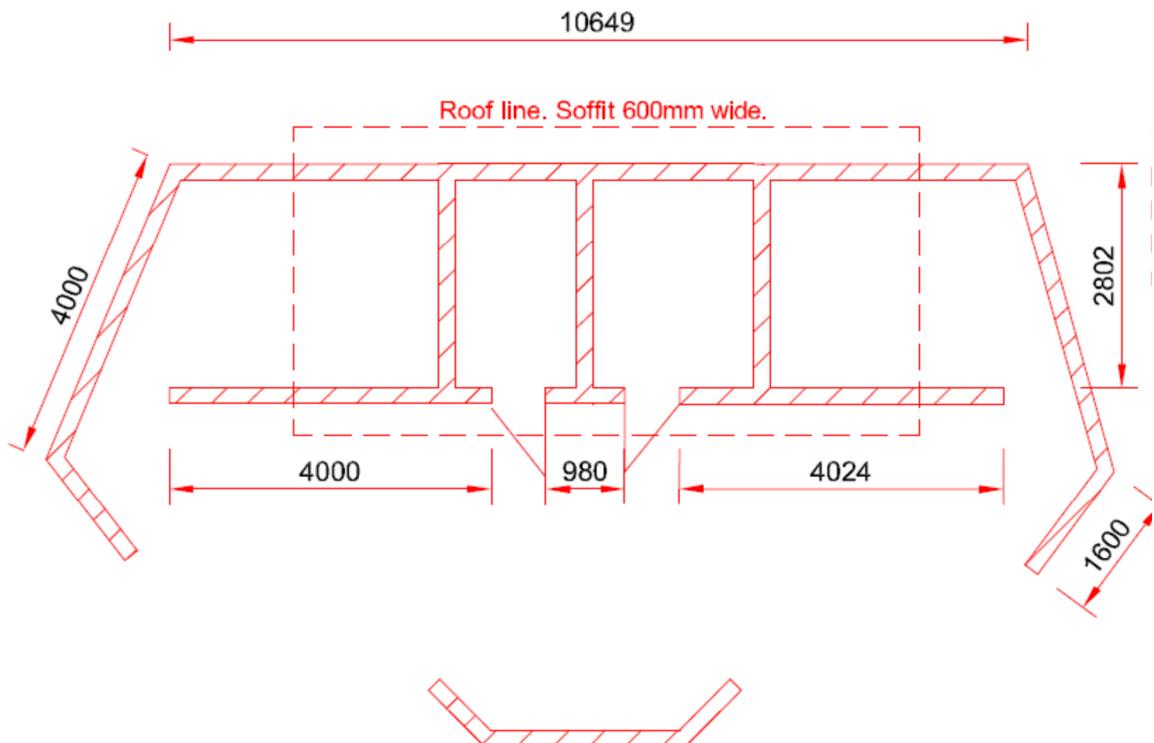


Figure 2: Wall plan of the toilets.

The structural drawings found indicate the building was built in 2000.

4.2 Original Documentation

Copies of the original structural drawings were not provided. However drawings originally produced for North Beach changing shed were found which appear to match the South New Brighton structure, and have likely been used for South New Brighton Changing shed.

The drawings are titled “North Beach Changing Pavilion and Public Toilets for Parks Unit” and are date stamped for consent 20 September 2000.

5 Structural Damage

Cracking along mortar joints between internal walls in the changing area has been noted. There has been cracking of the concrete ground slab throughout the changing shed as well as separation between the masonry wall and concrete strip footing. This damage does not affect the structural capacity of the building.

6 General Observations

Overall the building has performed well under seismic conditions. The building has sustained only minor non-structural seismic damage.

Impact damage to the masonry walls and rusting of steel connections was noted however this is not earthquake related damage.

7 Detailed Seismic Assessment

The detailed seismic assessment has been based on the NZSEE 2006 [2] guidelines for the “Assessment and Improvement of the Structural Performance of Buildings in Earthquakes” together with the “Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury, Part 2 Evaluation Procedure” [3] draft document prepared by the Engineering Advisory Group on 19 July 2011, and the SESOC guidelines “Practice Note – Design of Conventional Structural Systems Following Canterbury Earthquakes” [5] issued on 21 December 2011.

7.1 Critical Structural Weaknesses

The term Critical Structural Weakness (CSW) refers to a component of a building that could contribute to increased levels of damage or cause premature collapse of a building. During the initial qualitative stage of the assessment the following potential CSW’s were identified for each of the buildings and have been considered in the quantitative analysis.

We have not identified any critical structural weaknesses with this building.

7.2 Quantitative Assessment Methodology

The seismic design parameters based on current design requirements from NZS1170.5:2004 and the NZBC clause B1 for this building are:

- Site soil class D, clause 3.1.3 NZS 1170.5:2004
- Site hazard factor, $Z=0.3$, B1/VM1 clause 2.2.14B
- Return period factor $R_u = 1.0$ from Table 3.5, NZS 1170.5:2004, for an Importance Level 2 structure with a 50 year design life.
- $\mu = 1.25$ for reinforced concrete masonry walls.

7.3 Limitations and Assumptions in Results

Onsite observations did not identify any damage deemed severe enough to affect the capacity of the building. Consequently, the analysis and assessment is based on an assessment of the building in its undamaged state. There may have been damage to the building that was unable to be observed during the assessment that could cause the capacity of the building to be reduced; therefore the current capacity of the building maybe lower than that stated.

The results have been reported as a %NBS and the stated value is that obtained from our analysis and assessment. Despite the use of best national and international practice in this analysis and assessment, this value contains uncertainty due to the many assumptions and simplifications which are made during the assessment. These include:

- a. Simplifications made in the analysis, including boundary conditions such as foundation fixity.
- b. Assessments of material strengths based on limited drawings, specifications and site inspections
- c. The normal variation in material properties which change from batch to batch.
- d. Approximations made in the assessment of the capacity of each element, especially when considering the post-yield behaviour.

7.4 Assessment

A summary of the structural performance of the building is shown in the following table. Note that the values given represent the worst performing elements in the building, as these effectively define the building's capacity. Other elements within the building may have significantly greater capacity when compared with the governing elements..

Table 2: Summary of Seismic Performance

Structural Element/System	Failure mode and description of limiting criteria based on elastic capacity of critical element.	% NBS based on calculated capacity
In-plane wall capacity along the building	Capacity of the reinforced concrete masonry walls along the building	100%
In-plane wall capacity across the building	Capacity of the reinforced concrete masonry walls across the building	100%
Out-of-Plane wall capacity	Capacity of the reinforced brick walls	100%
Standalone shower wall	Capacity of the standalone reinforced concrete masonry wall in plane and out of plane	100%
Roof to wall connection capacity	Shear failure of cast in anchor bolts.	100%

7.5 Discussion

The building has a seismic capacity of 100% NBS.

The foundations have not been exposed or inspected. Based upon building performance and details from the North Beach drawings we assume that they are adequate.

8 Geotechnical Appraisal

No geotechnical investigation has been carried out as part of this assessment.

9 Conclusions

- The building has a seismic capacity of 100% NBS and is therefore not classed as earthquake prone.
- The existing foundations have performed satisfactorily, and no geotechnical testing is required.

10 Recommendations

The following recommendations have been made:

- The non-structural earthquake and impact damage be repaired.
- The maintenance issue of the rusted steel connections is considered by CCC in the future.

11 Limitations

- a) This report is based on an inspection of the structure with a focus on the damage sustained from the 22 February 2011 Canterbury Earthquake and aftershocks only. Some non-structural damage is mentioned but this is not intended to be a comprehensive list of non-structural items.
- b) Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at the time.
- c) This report is prepared for the CCC to assist with assessing remedial works required for council buildings and facilities. It is not intended for any other party or purpose.

12 References

- [1] NZS 1170.5: 2004, Structural design actions, Part 5 Earthquake actions, Standards New Zealand.
- [2] NZSEE (2006), Assessment and improvement of the structural performance of buildings in earthquakes, New Zealand Society for Earthquake Engineering.
- [3] Engineering Advisory Group, Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury, Part 2 Evaluation Procedure, Draft Prepared by the Engineering Advisory Group, Revision 5, 19 July 2011.
- [4] Engineering Advisory Group, *Guidance on Detailed Engineering Evaluation of Non-residential buildings, Part 3 Technical Guidance*, Draft Prepared by the Engineering Advisory Group, 13 December 2011.
- [5] SESOC (2011), Practice Note – Design of Conventional Structural Systems Following Canterbury Earthquakes, Structural Engineering Society of New Zealand, 21 December 2011.
- [6] DBH (2012), Guidance for engineers assessing the seismic performance of non-residential and multi-unit residential buildings in greater Christchurch, Department of Building and Housing, June 2012.

Appendix 1 - Photographs

South New Brighton Beach Changing Shed – Detailed Engineering Evaluation

South New Brighton Beach Changing Shed		
No.	Item description	Photo
General		
1.	View of the male toilets	 A photograph showing the exterior of the male toilet facility. It features a long, low blue wall with several doors. One door is open, revealing a red interior. A white bench is positioned against the wall. A white downspout is visible on the right side of the wall. In the background, a red car is parked on a paved area under a blue sky with light clouds.
2.	View of the female toilets	 A photograph showing the exterior of the female toilet facility. It consists of a blue wall with a door and a bench. A red fire alarm pull station is mounted on the wall. The background shows a clear blue sky and some greenery.
3.	View of the standalone shower wall	 A photograph showing a standalone shower wall. The wall is made of blue panels and has a red vertical post on the left side. A white door with a handle is visible. In the background, a white car and a bus are parked on a paved area under a blue sky with light clouds.

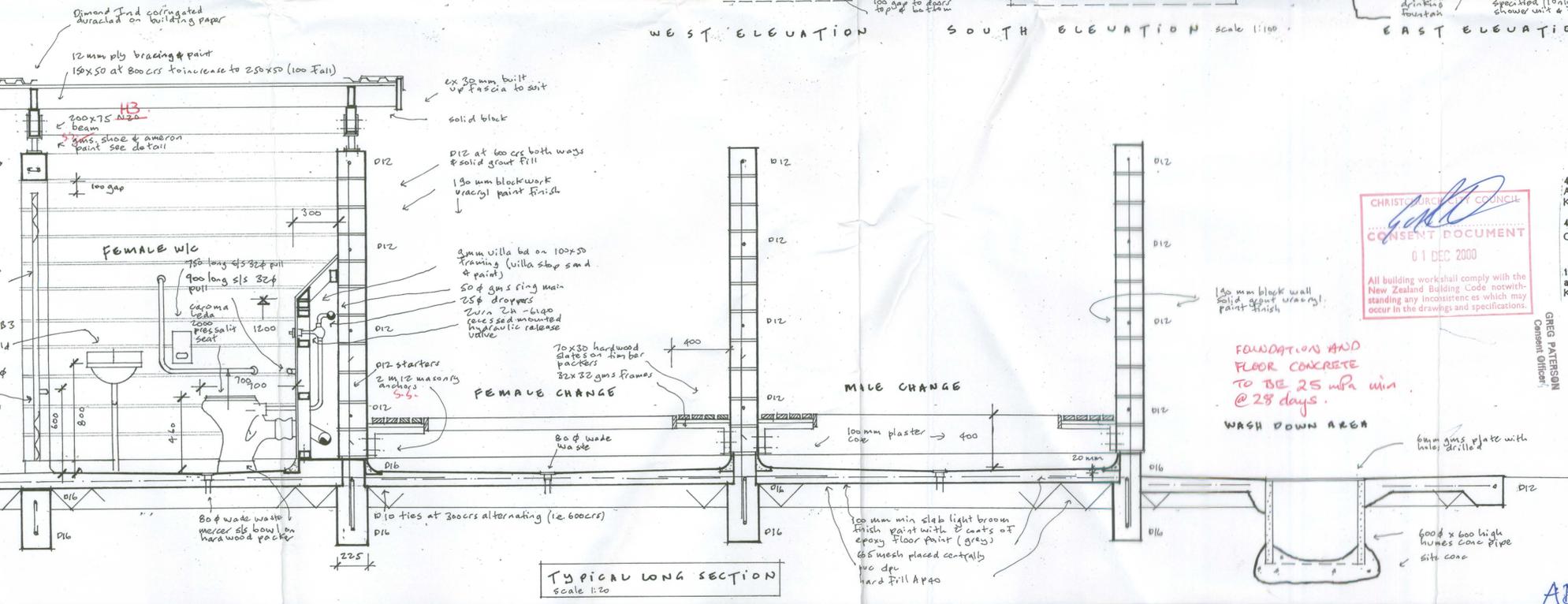
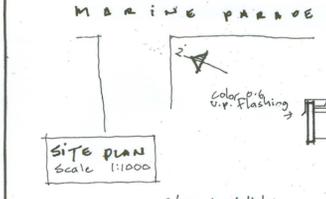
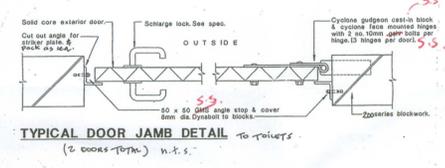
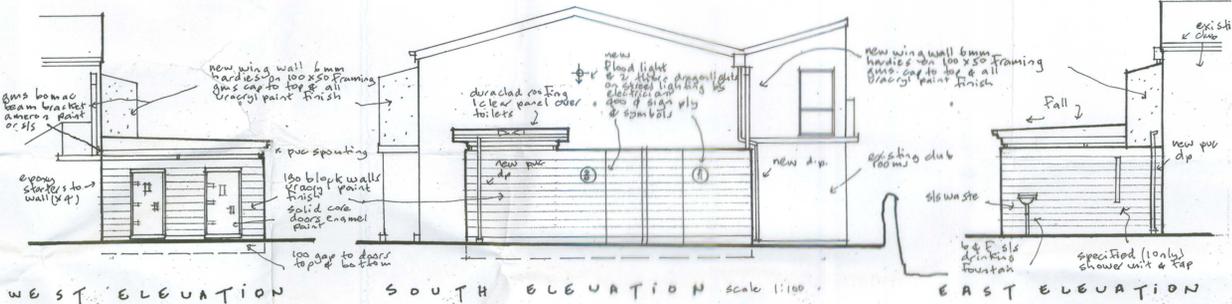
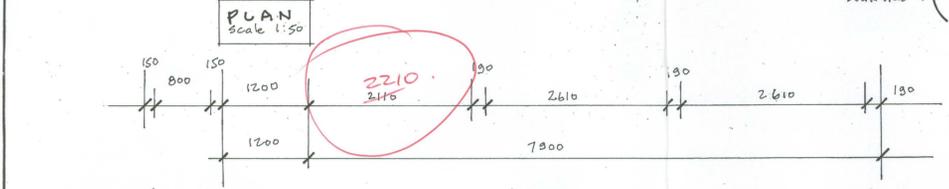
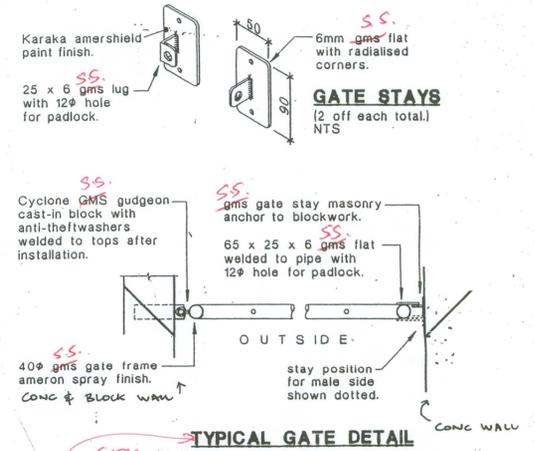
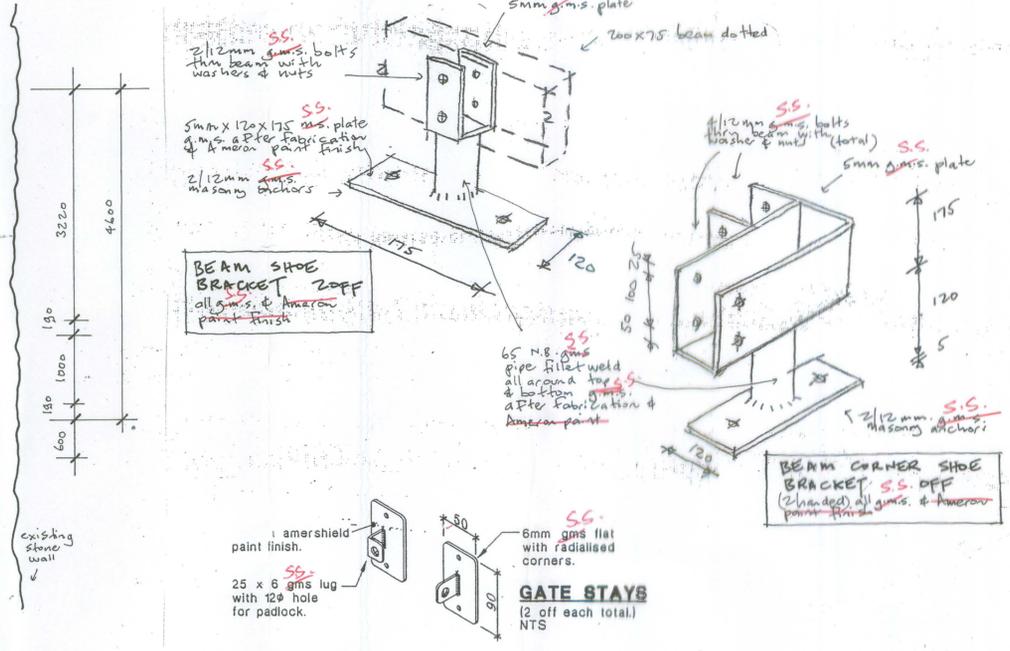
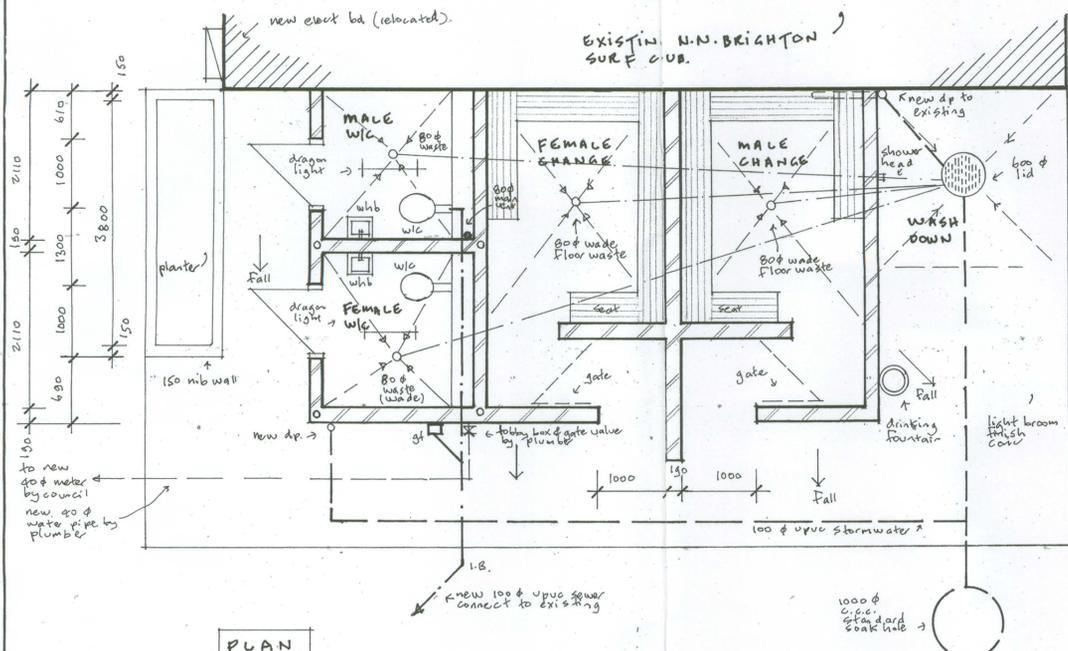
South New Brighton Beach Changing Shed – Detailed Engineering Evaluation

4.	Cracking of timber beam	
5.	View of the roof connection to the walls	
6.	Cracking at entrance	

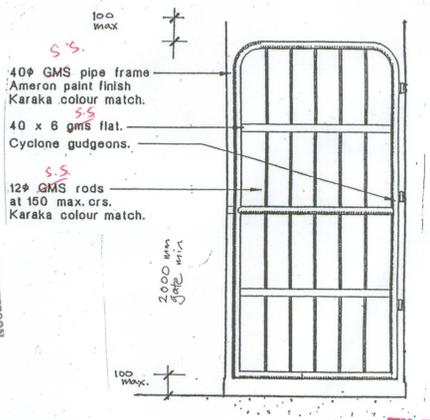
South New Brighton Beach Changing Shed – Detailed Engineering Evaluation

7.	Cracking of concrete ground slab	 A photograph showing a close-up of a concrete ground slab. The slab is light grey and has several distinct, irregular cracks. A metal structure, possibly a door frame or a support, is visible on the left side of the image, with a small circular component at the bottom. The background shows a blue wall and a white door.
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Appendix 2 – Existing Drawings



CHRISTCHURCH CITY COUNCIL
 CONSENT DOCUMENT
 01 DEC 2000
 All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.



CHRISTCHURCH CITY COUNCIL
 PLANNING APPROVED
 Checked by: [Signature]
 Date: 28/11/00

AMENDED PLANS
 Received on 28/11/00

Appendix 3 – CERA DEE Spreadsheet

Location		Building Name: <input type="text" value="South New Brighton Changing Shed"/>	Reviewer: <input type="text" value="John Newall"/>
Building Address: <input type="text" value="317 Marine Parade"/>	Unit No: <input type="text" value=""/>	CPEng No: <input type="text" value="1018146"/>	Company: <input type="text" value="Opus International Consultants"/>
Legal Description: <input type="text" value=""/>		Company project number: <input type="text" value="6-OC116.00"/>	Company phone number: <input type="text" value="3635400"/>
GPS south: <input type="text" value=""/>	Degrees Min Sec	Date of submission: <input type="text" value="11/04/2013"/>	Inspection Date: <input type="text" value=""/>
GPS east: <input type="text" value=""/>		Revision: <input type="text" value="Final"/>	Is there a full report with this summary? <input type="text" value="yes"/>
Building Unique Identifier (CCC): <input type="text" value="PRK_1351_BLDG_001"/>			

Site	Site slope: <input type="text" value="flat"/>	Max retaining height (m): <input type="text" value="0"/>
Soil type: <input type="text" value="silty sand"/>	Soil Profile (if available): <input type="text" value=""/>	
Site Class (to NZS1170.5): <input type="text" value="D"/>		
Proximity to waterway (m, if <100m): <input type="text" value=""/>	If Ground improvement on site, describe: <input type="text" value=""/>	
Proximity to cliff top (m, if < 100m): <input type="text" value=""/>		
Proximity to cliff base (m,if <100m): <input type="text" value=""/>	Approx site elevation (m): <input type="text" value="5.00"/>	

Building	No. of storeys above ground: <input type="text" value="1"/>	single storey = 1	Ground floor elevation (Absolute) (m): <input type="text" value="5.00"/>
Ground floor split?: <input type="text" value="no"/>			Ground floor elevation above ground (m): <input type="text" value="0.10"/>
Storeys below ground: <input type="text" value="0"/>			if Foundation type is other, describe: <input type="text" value=""/>
Foundation type: <input type="text" value="mat slab"/>		height from ground to level of uppermost seismic mass (for IEP only) (m): <input type="text" value=""/>	Date of design: <input type="text" value="1992-2004"/>
Building height (m): <input type="text" value="3.60"/>			
Floor footprint area (approx): <input type="text" value="56"/>			
Age of Building (years): <input type="text" value="13"/>			
Strengthening present?: <input type="text" value="no"/>		If so, when (year)? <input type="text" value=""/>	And what load level (%g)? <input type="text" value=""/>
Use (ground floor): <input type="text" value="public"/>		Brief strengthening description: <input type="text" value=""/>	
Use (upper floors): <input type="text" value=""/>			
Use notes (if required): <input type="text" value=""/>			
Importance level (to NZS1170.5): <input type="text" value="IL2"/>			

Gravity Structure	Gravity System: <input type="text" value="load bearing walls"/>	truss depth, purlin type and cladding: <input type="text" value="Corrugated iron cladding"/>
Roof: <input type="text" value="timber truss"/>		slab thickness (mm): <input type="text" value=""/>
Floors: <input type="text" value="concrete flat slab"/>		overall depth x width (mm x mm): <input type="text" value=""/>
Beams: <input type="text" value="cast-insitu concrete"/>		typical dimensions (mm x mm): <input type="text" value=""/>
Columns: <input type="text" value="brick masonry"/>		#N/A: <input type="text" value=""/>
Walls: <input type="text" value="fully filled concrete masonry"/>		

Lateral load resisting structure	Lateral system along: <input type="text" value="concrete shear wall"/>	Note: Define along and across in detailed report!	note total length of wall at ground (m): <input type="text" value="1m - 10m"/>
Ductility assumed, μ: <input type="text" value="1.25"/>	Period along: <input type="text" value="0.40"/>	##### enter height above at H31	wall thickness (m): <input type="text" value=""/>
Total deflection (ULS) (mm): <input type="text" value=""/>			estimate or calculation? <input type="text" value="estimated"/>
maximum interstorey deflection (ULS) (mm): <input type="text" value=""/>			estimate or calculation? <input type="text" value=""/>
Lateral system across: <input type="text" value="concrete shear wall"/>			note total length of wall at ground (m): <input type="text" value="3"/>
Ductility assumed, μ: <input type="text" value="1.25"/>	Period across: <input type="text" value="0.40"/>	##### enter height above at H31	wall thickness (m): <input type="text" value=""/>
Total deflection (ULS) (mm): <input type="text" value=""/>			estimate or calculation? <input type="text" value="estimated"/>
maximum interstorey deflection (ULS) (mm): <input type="text" value=""/>			estimate or calculation? <input type="text" value=""/>

Separations:	north (mm): <input type="text" value=""/>	leave blank if not relevant
east (mm): <input type="text" value=""/>		
south (mm): <input type="text" value=""/>		
west (mm): <input type="text" value=""/>		

Non-structural elements	Stairs: <input type="text" value=""/>	describe: <input type="text" value=""/>
Wall cladding: <input type="text" value="exposed structure"/>		describe: <input type="text" value="Corrugated Iron"/>
Roof Cladding: <input type="text" value="Metal"/>		
Glazing: <input type="text" value=""/>		
Ceilings: <input type="text" value="none"/>		
Services(list): <input type="text" value=""/>		

Available documentation	Architectural: <input type="text" value=""/>	original designer name/date: <input type="text" value=""/>
Structural: <input type="text" value="full"/>		original designer name/date: <input type="text" value="City Design/1999"/>
Mechanical: <input type="text" value="none"/>		original designer name/date: <input type="text" value=""/>
Electrical: <input type="text" value="none"/>		original designer name/date: <input type="text" value=""/>
Geotech report: <input type="text" value="none"/>		original designer name/date: <input type="text" value=""/>

Damage	Site performance: <input type="text" value=""/>	Describe damage: <input type="text" value=""/>
Site: (refer DEE Table 4-2)	Settlement: <input type="text" value="none observed"/>	notes (if applicable): <input type="text" value=""/>
Differential settlement: <input type="text" value="none observed"/>		notes (if applicable): <input type="text" value=""/>
Liquefaction: <input type="text" value="none apparent"/>		notes (if applicable): <input type="text" value=""/>
Lateral Spread: <input type="text" value="none apparent"/>		notes (if applicable): <input type="text" value=""/>
Differential lateral spread: <input type="text" value="none apparent"/>		notes (if applicable): <input type="text" value=""/>
Ground cracks: <input type="text" value="none apparent"/>		notes (if applicable): <input type="text" value=""/>
Damage to area: <input type="text" value="none apparent"/>		notes (if applicable): <input type="text" value=""/>

Building:	Current Placard Status: <input type="text" value="green"/>	
Along	Damage ratio: <input type="text" value="0%"/>	Describe how damage ratio arrived at: <input type="text" value=""/>
	Describe (summary): <input type="text" value=""/>	
Across	Damage ratio: <input type="text" value="0%"/>	$Damage_Ratio = \frac{(\%NBS\ (before) - \%NBS\ (after))}{\%NBS\ (before)}$
	Describe (summary): <input type="text" value=""/>	
Diaphragms	Damage?: <input type="text" value="no"/>	Describe: <input type="text" value=""/>
CSWs:	Damage?: <input type="text" value="yes"/>	Describe: <input type="text" value="Lack of subfloor bracing"/>
Pounding:	Damage?: <input type="text" value="no"/>	Describe: <input type="text" value=""/>
Non-structural:	Damage?: <input type="text" value="no"/>	Describe: <input type="text" value=""/>

Recommendations	Level of repair/strengthening required: <input type="text" value="none"/>	Describe: <input type="text" value=""/>
Building Consent required: <input type="text" value="no"/>		Describe: <input type="text" value=""/>
Interim occupancy recommendations: <input type="text" value="full occupancy"/>		Describe: <input type="text" value=""/>
Along	Assessed %NBS before: <input type="text" value="100%"/>	##### %NBS from IEP below
	Assessed %NBS after: <input type="text" value="100%"/>	If IEP not used, please detail assessment methodology: <input type="text" value="Quantitative"/>
Across	Assessed %NBS before: <input type="text" value="100%"/>	##### %NBS from IEP below
	Assessed %NBS after: <input type="text" value="100%"/>	



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