CLIENTS | PEOPLE | PERFORMANCE

Halswell Domain Toilets
PRK 1691 BLDG 007
Detailed Engineering Evaluation
Qualitative Report
Version Final

301 Halswell Road

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Halswell Domain Toilets
PRK 1691 BLDG 007

Detailed Engineering Evaluation
Qualitative Report
Version Final

301 Halswell Road

Christchurch City Council

Prepared By
Paul Clarke

Reviewed By
Stephen Lee

Date
20th May 2013

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Halswell Domain Toilets

PRK 1691 BLDG 007

Detailed Engineering Evaluation

Qualitative Report - SUMMARY

Version Final

301 Halswell Road

Background

This is a summary of the Qualitative report for the building structure, and is based in part on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011, visual inspections on 20 September 2012 and available construction drawings.

Building Description

The curved metal clad roof is supported upon a steel tube frame with steel tube columns continuing to isolated pad foundations. Timber frame walls consisting of corrugated sheet cladding with an internal hardie-flex board lining form a ceiling-less enclosure beneath the roof. Metal tubes extending down from the roof frame connect to the top of the walls.

Key Damage Observed

No damage was observed in the structure.

Critical Structural Weaknesses

No critical structural weaknesses have been identified in the structure.

Indicative Building Strength (from IEP and CSW assessment)

Based on the information available, and using the NZSEE Initial Evaluation Procedure, the original capacity of the building has been assessed to be in the order of 85% NBS and post-earthquake capacity also in the order of 85% NBS. The buildings post-earthquake capacity excluding critical structural weaknesses was also in the order of 85% NBS, as none were identified.

The building has been assessed to have a seismic capacity in the order of 85% NBS and is therefore neither potentially Earthquake Risk nor potentially Earthquake Prone.

Recommendations

No further action is necessary as the building is not potentially Earthquake Risk

1. Background

GHD has been engaged by the Christchurch City Council (CCC) to undertake a detailed engineering evaluation of the Halswell Domain Toilet.

This report is a Qualitative Assessment of the building structure, and is based in part on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011.

A qualitative assessment involves inspections of the building and a desktop review of existing structural and geotechnical information, including existing drawings and calculations, if available.

The purpose of the assessment is to determine the likely building performance and damage patterns, to identify any potential critical structural weaknesses or collapse hazards, and to make an initial assessment of the likely building strength in terms of percentage of new building standard (%NBS).

At the time of this report, no intrusive site investigation, detailed analysis, or modelling of the building structure had been carried out. Construction drawings were made available, and these have been considered in our evaluation of the building. The building description below is based on a review of the drawings and our visual inspections.

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 carry out a full structural survey before the building is re-occupied.

We understand that CERA will 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). It is anticipated that CERA will adopt the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011. This document sets out a methodology for both qualitative and quantitative assessments.

The qualitative assessment is a desk-top and site inspection assessment. It is based on a thorough visual inspection of the building coupled with a review of available documentation such as drawings and specifications. The quantitative assessment involves analytical calculation of the buildings strength and may require non-destructive or destructive material testing, geotechnical testing and intrusive investigation.

It is anticipated that factors determining the extent of evaluation and strengthening level required will include:

- The importance level and occupancy of the building
- The placard status and amount of damage
- The age and structural type of the building
- Consideration of any critical structural weaknesses
- The extent of any earthquake damage

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 any alteration. This effectively means that a building cannot be weakened as a result of an alteration (including partial demolition).

Section 115 – Change of Use

This section requires that the territorial authority (in this case Christchurch City Council (CCC)) be satisfied that the building with a new use complies with the relevant sections of the Building Code 'as near as is reasonably practicable'. Regarding seismic capacity 'as near as reasonably practicable' has previously been interpreted by CCC as achieving a minimum of 67% NBS however where practical achieving 100% NBS is desirable. The New Zealand Society for Earthquake Engineering (NZSEE) recommend a minimum of 67% NBS.

2.2.1 Section 121 – Dangerous Buildings

The definition of dangerous building in the Act was extended by the Canterbury Earthquake (Building Act) Order 2010, and it now defines a building as dangerous if:

- 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
- 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
- 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
- There is a risk that that other property could collapse or otherwise cause injury or death; or
- 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 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 ground shaking 33% of the shaking 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 of the 4th September 2010.

The 2010 amendment includes the following:

- A process for identifying, categorising and prioritising Earthquake Prone Buildings, commencing on 1 July 2012;
- A strengthening target level of 67% of a new building for buildings that are Earthquake Prone;
- A timeframe of 15-30 years for Earthquake Prone Buildings to be strengthened; and,
- 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.

We anticipate that any building with a capacity of less than 33% NBS (including consideration of critical structural weaknesses) will need to be strengthened to a target of 67% NBS of new building standard as recommended by the Policy.

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.

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.

After the February Earthquake, on 19 May 2011, Compliance Document B1: Structure was amended to include increased seismic design requirements for Canterbury as follows:

- Hazard Factor increased from 0.22 to 0.3 (36% increase in the basic seismic design load)
- Serviceability Return Period Factor increased from 0.25 to 0.33 (80% increase in the serviceability design loads when combined with the Hazard Factor increase)

The increase in the above factors has resulted in a reduction in the level of compliance of an existing building relative to a new building despite the capacity of the existing building not changing.

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 new building standard load requirements have been determined in accordance with the current earthquake loading standard (NZS 1170.5:2004 Structural design actions - Earthquake actions - New Zealand).

The likely capacity of this building has been derived in accordance with the New Zealand Society for Earthquake Engineering (NZSEE) guidelines 'Assessment and Improvement of the Structural Performance of Buildings in Earthquakes' (AISPBE), 2006. These guidelines provide an Initial Evaluation Procedure that assesses a buildings capacity based on a comparison of loading codes from when the building was designed and currently. It is a quick high-level procedure that can be used when undertaking a Qualitative analysis of a building. The guidelines also provide guidance on calculating a modified Ultimate Limit State capacity of the building which is much more accurate and can be used when undertaking a Quantitative analysis.

The New Zealand Society for Earthquake Engineering has proposed a way for classifying earthquake risk for existing buildings in terms of %NBS and this is shown 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	Unacceptable	Unacceptable

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

Table 1 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). It is noted that the current seismic risk in Christchurch results in a 6% risk of exceedance in the next year.

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

Table 1 %NBS compared to relative risk of failure

4. Building Description

4.1 General

The building is located in Halswell Domain at 301 Halswell Road. The building was constructed in 2005 according to available architectural plans. The building's sole use is as a public toilet.

The curved metal clad roof is supported upon a steel tube frame with steel tube columns continuing to isolated pad foundations or the timber frame walls. The timber frame walls, consisting of corrugated sheet cladding and an internal hardie-flex board lining, form ceiling-less enclosures beneath the roof. The floor is formed by the concrete foundation slab on grade.

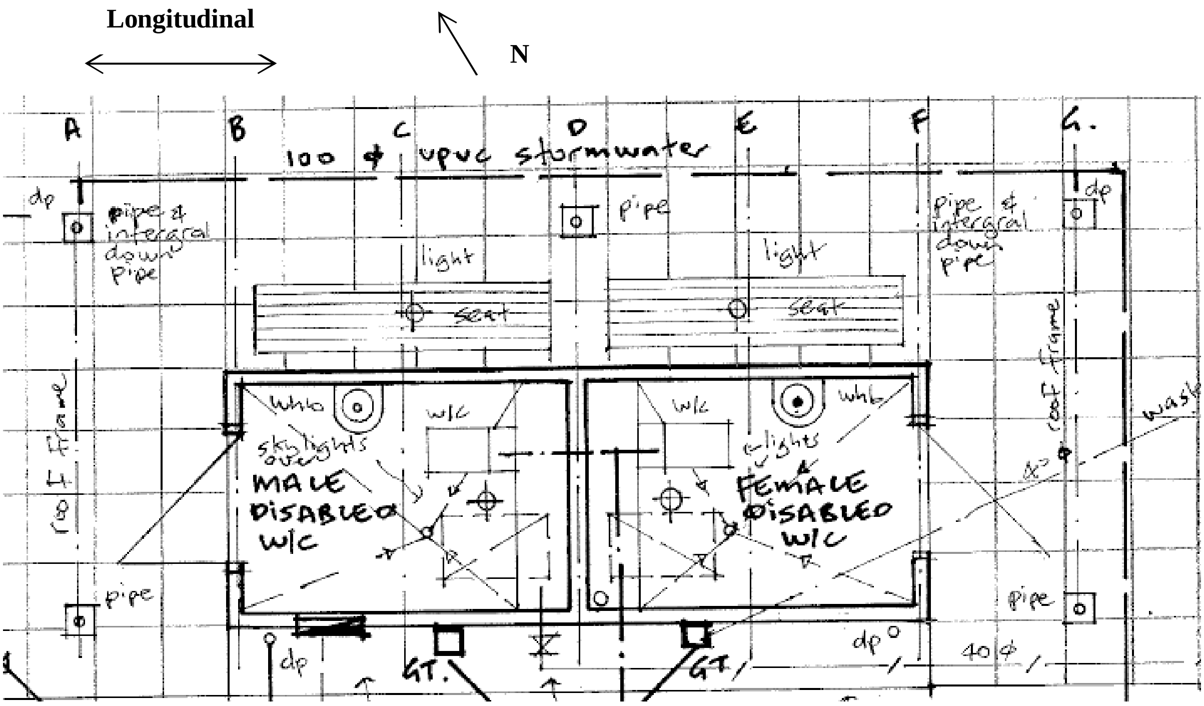


Figure 2 Architectural Plan

The building is approximately 6.6m in length by 2.8m in width with a height of 2.4m. The building has an approximate footprint of $19m^2$. The nearest building, associated with the park's model railway, is located over 65m to the west. The flat site contains a small lake approximately 10m from the building.

Architectural plans were available for the structure. See Appendices B.

4.2 Gravity Load Resisting System

The gravity roof loads are supported by the metal roof cladding and the steel tube roof frame beneath. These roof loads are transferred by the roof frame to steel tube posts. The posts support the roof structure from either the pad foundations at ground level or from the top of the load bearing timber frame walls. The timber frame walls transfer the gravity loads downwards to the foundation slab on grade where they distribute into the ground.

4.3 Lateral Load Resisting System

The main lateral resistance in the longitudinal direction is the panel action of walls. The rigid connections of roof steel tubes form a frame which transfers lateral roof loads to the walls. Composite panel action of hardie-flex board with timber framing provide resistance to lateral loads in the wall plane, which in turn transfer the lateral loads to the ground slab. The moment frame, formed by the rigid roof and column connections of the steel tube, also provide some lateral stability, transferring the lateral loads to the pad foundations.

In the transverse direction, identical mechanisms to the longitudinal direction transfer the lateral loads to the foundations, however in a different manner. There is only one timber frame wall in the transverse direction to resist lateral loads by panel action. The centrally located wall resists the seismic demand but is unable to prevent torsion of the building. The moment frame of the rigidly connected steel tube frame will provide some resistance to lateral loads while also preventing torsion in the structure.

5. Assessment

An inspection of the building was undertaken on the 20 September 2012 Both the interior and exterior of the building were inspected. The main structural components of the roof of the building were all able to be viewed.

The inspection consisted of scrutinising the building to determine the structural systems and likely behaviour of the building during an earthquake. The site was assessed for damage, including examination of the ground conditions, checking for damage in areas where damage would be expected for the type of structure and noting general damage observed throughout the building in both structural and non-structural elements.

The %NBS score determined for this building has been based on the IEP procedure described by the NZSEE and based on the information obtained from visual observation of the building and available drawings.

5.1 Damage Assessment

5.1.1 Surrounding Buildings

There was no damage identified in nearby buildings.

5.1.2 Residual Displacements and General Observations

No residual displacements of the structure were noticed during our inspection of the building.

The building was in a good condition and was well maintained. No damage was identified in the structure.

5.1.3 Floor Level Survey

No level or verticality surveys have been undertaken for this building at this stage as indicated by Christchurch City Council guidelines.

5.1.4 Ground Damage

There was no evidence of ground damage on the property or surrounding neighbours land.

5.2 Geotechnical Assessment

A desktop report was not undertaken because no evidence of liquefaction or lateral spreading was clearly visible in the aerial photography taken following the September 2010, February 2011, June 2011 or December 2011 earthquakes.

A soil class of D (in accordance with NZS 1170.5:2004) should be adopted for the site due to the following reasons:

- No evidence of liquefaction following earthquakes;
- Anticipated depth to bedrock in excess of 100m.

6. Critical Structural Weakness

6.1 Short Columns

No significant short columns are present in the structure.

6.2 Lift Shaft

The building does not contain a lift shaft.

6.3 Roof

The roof formation of a steel tube grid provides a rigid roof structure and an adequate frame for roof stability.

6.4 Staircases

The building does not contain a staircase.

6.5 Site Characteristics

The site characteristic has been assessed as an ‘insignificant’ potential given the absence of liquefaction or lateral spread in aerial photography taken following the September 2010, February 2011, June 2011 or December 2011 earthquakes.

6.6 Plan Irregularity

The plan irregularity of a stiffness offset has been given an ‘insignificant’ potential in both the longitudinal and transverse direction. In the longitudinal direction, the lightweight structure won’t be affected adversely as the offset is minimal and the moment frame will minimise torsional effects. In the transverse direction, the single primary lateral load resisting element is located centrally in the structure, hence no stiffness offset exists. The rigid moments frames located at both ends of the structure will resist any accidental torsional effects if they occur.

7. Initial Capacity Assessment

7.1 % NBS Assessment

The building has had its capacity assessed using the Initial Evaluation Procedure based on the information available. The buildings capacity excluding the reduction for critical structural weaknesses are expressed as a percentage of new building standard (%NBS) and are in the order of that shown below in Table 2. These capacities are subject to confirmation by a more detailed quantitative analysis.

Item	%NBS
Building excluding CSW's	85%

Table 2 Indicative Building and Critical Structural Weaknesses Capacities based on the NZSEE Initial Evaluation Procedure

Following an IEP assessment, the building has been assessed as achieving 85% New Building Standard (NBS). Under the New Zealand Society for Earthquake Engineering (NZSEE) guidelines the building is considered neither potentially Earthquake Risk nor potentially Earthquake Prone as it achieves greater than 67% NBS. This score has not been adjusted when considering damage to the structure as none was observed.

7.2 Seismic Parameters

The seismic design parameters based on current design requirements from NZS 1170:2002 and the NZBC clause B1 for this building are:

- Site soil class: D, NZS 1170.5:2004, Clause 3.1.3, Soft Soil
- Site hazard factor, Z = 0.3, NZBC, Clause B1 Structure, Amendment 11 effective from 1 August 2011
- Return period factor R_u = 1.0, NZS 1170.5:2004, Table 3.5, Importance level 2 structure with a 50 year design life.

An increased Z factor of 0.3 for Christchurch has been used in line with requirements from the Department of Building and Housing resulting in a reduced % NBS score.

7.3 Expected Structural Ductility Factor

A structural ductility factor of 3.0 has been assumed based on the structural system observed and the date of construction. The structure is a modern lightweight timber frame construction which will have a ductile behaviour in a seismic event.

7.4 Discussion of Results

The results obtained from the initial IEP assessment are consistent with those expected for a building of this age and construction type. The building was constructed in 2005 and was likely designed to the loading standard, NZS 4203:1992. The design loads used in this standard are likely to have been less than those required by the current loading standard. When combined with the increase in the hazard factor for Christchurch to 0.3, it would be expected that the building would not achieve 100% NBS. However, due to the lack of any significant Critical Structural Weaknesses and the presence of bracing it is reasonable to expect the building to be classified as neither potentially Earthquake Prone nor potentially Earthquake Risk.

8. Conclusions & Recommendations

The building has been assessed to have a seismic capacity in the order of 85% NBS and is therefore not potentially Earthquake Prone nor potentially Earthquake Risk.

The recent seismic activity in Christchurch has caused no identifiable damage to the building. As the building suffered no damage that would compromise the load resisting capacity of the existing structural systems and has achieved greater than 67% NBS following an initial IEP assessment of the building, no further assessment is required by Christchurch City Council to comply with the building act.

9. Limitations

9.1 General

This report has been prepared subject to the following limitations:

- No intrusive structural investigations have been undertaken.
- No intrusive geotechnical investigations have been undertaken.
- Visual inspections of the foundations could not be undertaken.
- No level or verticality surveys have been undertaken.
- No material testing has been undertaken.
- No calculations, other than those included as part of the IEP in the CERA Building Evaluation Report, have been undertaken. No modelling of the building for structural analysis purposes has been performed.

It is noted that this report has been prepared at the request of Christchurch City Council and is intended to be used for their purposes only. GHD accepts no responsibility for any other party or person who relies on the information contained in this reportrite a specific limitations section.

9.2 Geotechnical Limitations

This report presents the results of a geotechnical appraisal prepared for the purpose of this commission, and for prepared solely for the use of Christchurch City Council and their advisors. The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent geotechnical engineer before being used for any other purpose. GHD Limited (GHD) accepts no responsibility for other use of the data.

The advice tendered in this report is based on a visual geotechnical appraisal. No subsurface investigations have been conducted. An assessment of the topographical land features have been made based on this information. It is emphasised that Geotechnical conditions may vary substantially across the site from where observations have been made. Subsurface conditions, including groundwater levels can change in a limited distance or time. In evaluation of this report cognisance should be taken of the limitations of this type of investigation.

An understanding of the geotechnical site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experienced based. Hence this report should not be altered, amended or abbreviated, issued in part and issued incomplete in any way without prior checking and approval by GHD. GHD accepts no responsibility for any circumstances, which arise from the issue of the report, which have been modified in any way as outlined above.

Appendix A

Photographs

Photograph 1 Northeast elevation.

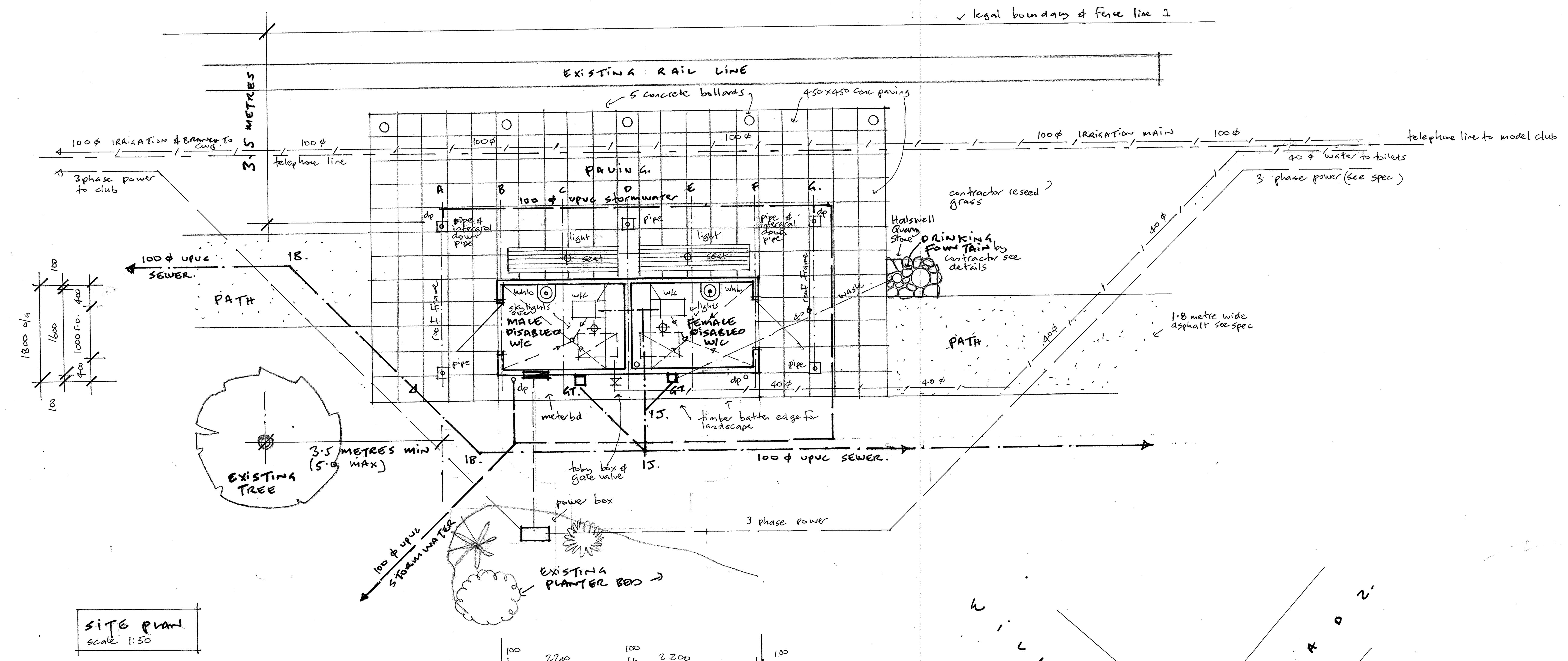
Photograph 2 View of the toilet form the northwest.

Photograph 3 Roof frame structure formed by steel tube rigidly connected.

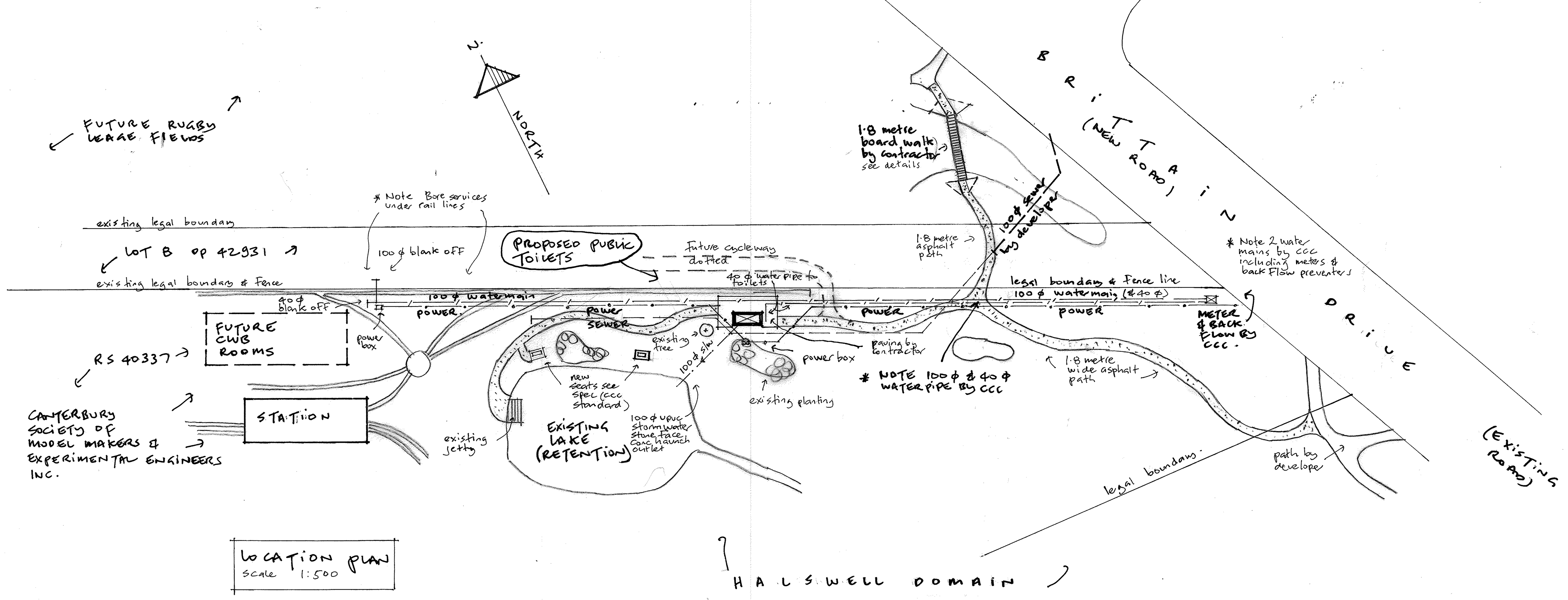
Photograph 4 Additional rigidity at steel tube connection provided by architectural stiffener.

Appendix B

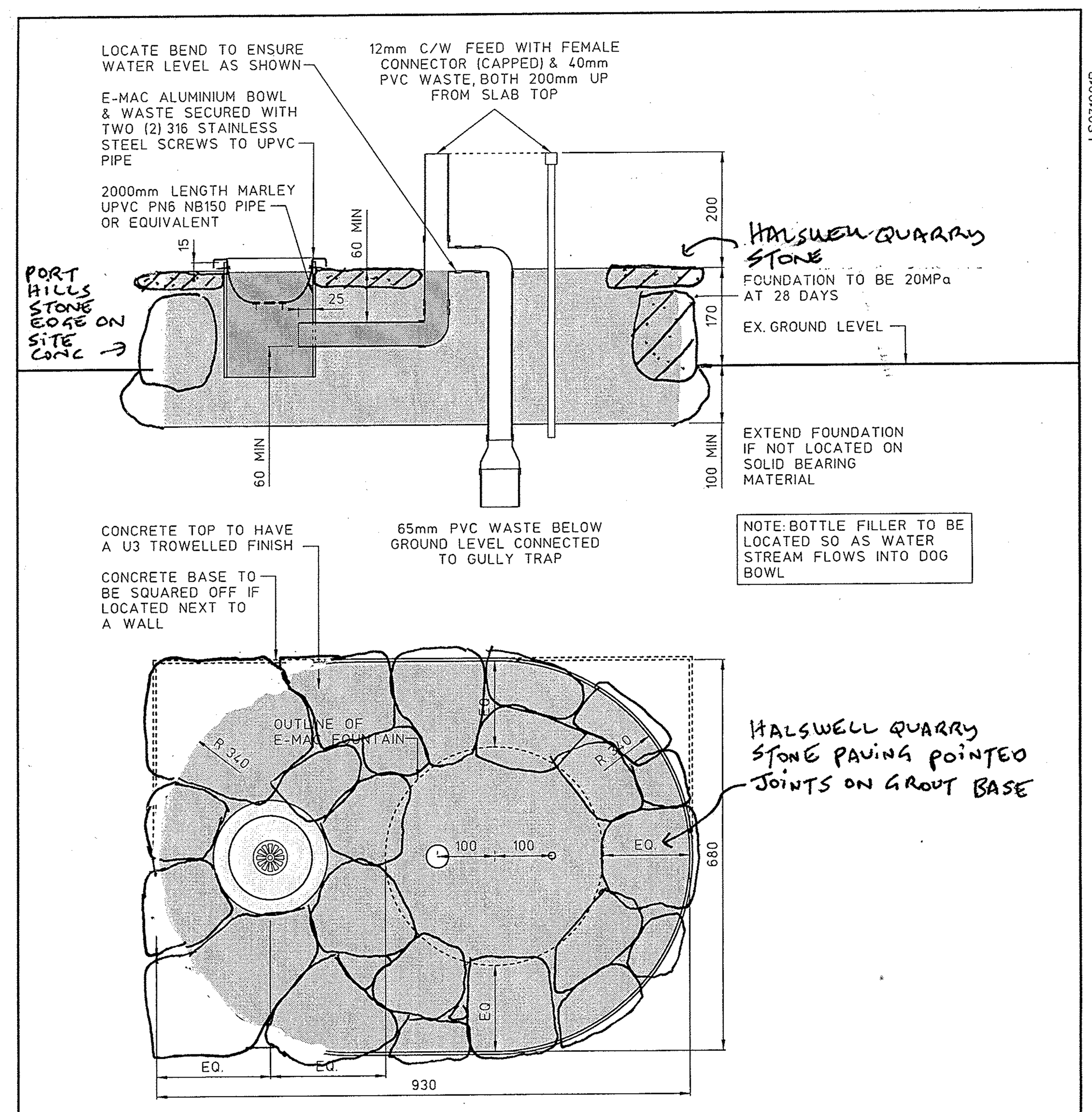
Existing Drawings



SITE PLAN
scale 1:50



LOCATION PLAN
scale 1:500



VISIBLE SURFACES OF E-MAC DRINKING FOUNTAIN CONCRETE SURROUND TO BE PAINTED TO THE FOLLOWING SPECIFICATION:

SURFACE PREPARATION - CEMENTITIOUS SURFACES (RESENE DATA SHEET D83)
1ST COAT - ARMOURCOTE 510 (RESENE DATA SHEET RA40)
2ND COAT - *PIGMENTED URACRYL 403 (RESENE DATA SHEET RA56)
3RD COAT - *PIGMENTED URACRYL 403 (RESENE DATA SHEET RA56)
4TH COAT - CLEAR URACRYL 403 (RESENE DATA SHEET RA56)

*COLOUR TO MATCH ROOFING UNLESS OTHERWISE SPECIFIED.

VISIBLE STEEL FORM WORK SURFACES TO BE PAINTED TO THE FOLLOWING SPECIFICATION:

SURFACE PREPARATION - NON-FERROUS METALS (RESENE DATA SHEET D89)
1ST COAT - ARMOURCOTE 510 (RESENE DATA SHEET RA40)
2ND COAT - VINYL ETCH (RESENE DATA SHEET RA31)
3RD COAT - *PIGMENTED URACRYL 403 (RESENE DATA SHEET RA56)
4TH COAT - *PIGMENTED URACRYL 403 (RESENE DATA SHEET RA56)
5TH COAT - CLEAR URACRYL 403 (RESENE DATA SHEET RA56)

*COLOUR TO BE RESENE KARAKA 1G015 UNLESS OTHERWISE SPECIFIED.

ALL PAINTING TO BE CARRIED OUT TO ENSURE NO PAINT SPLASHES & OVER RUNS OCCUR ON OTHER SURFACES.

* ALLOW FOR SUPPLY & INSTALL OF DRINKING FOUNTAIN EQUIPMENT $1636.00 + GST BY E-MAC ENTERPRISES LTD IAN MCCORMACK PH 377 3897. BUILDER TO PROVIDE SITE CONC BASE, STONEWORK & PLUMBING TO FOUNTAIN ETC.

CHRISTCHURCH CITY COUNCIL · YOUR PEOPLE · YOUR CITY	DOG BOWL BASE WITH E-MAC DRINKING FOUNTAIN & BOTTLE FILLER	ISSUE DATE MAY 2004 / SD 719 / SHEET 1

ISSUE	AMENDMENTS	SIGNED	DATE
0	TENDER ISSUE	[signature]	18/7/05

CITYSOLUTIONS

			NAME	SIGNED	DATE
DATUM					
BENCH MK.		DESIGNED	D.GREENSLADE	[signature]	Apr 05
SURVEY FB		DES. REVIEW	SO. SMITH & SEABAND	[signature]	5.05
SURVEY LB		DRAWN	D.GREENSLADE	[signature]	May 05
CONSTN.EB		DRW. CHECK	SO. SMITH	[signature]	18/7/05
CONSTN.LB					
SDR FILE					

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AERIAL PHOTOGRAPHY TERRALINK INTERNATIONAL LIMITED

APPROVED
DATE 18/7/05

CLIENT: CHRISTCHURCH CITY COUNCIL · YOUR PEOPLE · YOUR CITY

PROJECT TITLE: NEW PUBLIC TOILETS AT HALSWELL DOMAIN.

DRAWING TITLE: WORKING DWGS

FILE NUMBER	ORIGINAL SHEET SIZE	SCALES
562/1255	A1	as shown
CONTRACT NUMBER 04/05-305		
DRAWING & PROJECT NUMBER ALSO -50-0300-01 S01 -50-0299-01 S01&2	A1	SHEETS ARCHITECTURAL 1 OF 2.

Appendix C

CERA Building Evaluation Form

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name:	Halswell Domain Toilet			Reviewer:	Stephen Lee
	Unit	No:	Street	CPEng No:	1006840
Building Address:		301	Halswell Road	Company:	GHD
Legal Description:	Rural Section 40337			Company project number:	513090263
				Company phone number:	04 472 0799
	Degrees	Min	Sec		
GPS south:	43	34	43.20	Date of submission:	20/05/2013
GPS east:	172	34	24.62	Inspection Date:	20/10/2012
				Revision:	Final
Building Unique Identifier (CCC):	PRK 1691 BLDG 007			Is there a full report with this summary?	yes

Site

Site slope:	flat	Max retaining height (m):	
Soil type:	mixed	Soil Profile (if available):	
Site Class (to NZS1170.5):	D		
Proximity to waterway (m, if <100m):	10	If Ground improvement on site, describe:	
Proximity to clifftop (m, if < 100m):			
Proximity to cliff base (m,if <100m):		Approx site elevation (m):	

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	isolated pads, no tie beams		if Foundation type is other, describe:	Raft foundation also.
Building height (m):	2.40		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):	19			
Age of Building (years):	7		Date of design:	1992-2004
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	public		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Public Toilet			
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	frame system		
Roof:	steel framed	rafter type, purlin type and cladding	Load bearing walls also
Floors:	other (note)	describe sytem	slab on grade
Beams:			
Columns:	structural steel	typical dimensions (mm x mm)	60mm tube
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls	**Note: Define along and across**		
Ductility assumed, μ:	3.00	**in detailed report!**	note typical wall length (m)	

Period along:	0.40	0.00	estimate or calculation?	
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	
Lateral system across:	lightweight timber framed walls			
Ductility assumed, μ:	3.00		note typical wall length (m)	
Period across:	0.40	0.00	estimate or calculation?	
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	

Separations:

north (mm):		leave blank if not relevant	
east (mm):			
south (mm):			
west (mm):			

Non-structural elements

Stairs:			
Wall cladding:	profiled metal	describe	
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:			
Services(list):			

Available documentation

Architectural	full	original designer name/date	
Structural	none	original designer name/date	
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	none observed	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	none apparent	notes (if applicable):	
Lateral Spread:	none apparent	notes (if applicable):	
Differential lateral spread:	none apparent	notes (if applicable):	
Ground cracks:	none apparent	notes (if applicable):	
Damage to area:	none apparent	notes (if applicable):	

Building:

	Current Placard Status:			
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%		
	Describe (summary):			

$$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$$

Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	no	Describe:	

Recommendations

	Level of repair/strengthening required:	none	Describe:	
	Building Consent required:	no	Describe:	
	Interim occupancy recommendations:	full occupancy	Describe:	
Along	Assessed %NBS before e'quakes:	85%	85% %NBS from IEP below	If IEP not used, please detail assessment methodology:
	Assessed %NBS after e'quakes:	85%		
Across	Assessed %NBS before e'quakes:	85%	85% %NBS from IEP below	
	Assessed %NBS after e'quakes:	85%		

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1992-2004

h_n from above: m

Seismic Zone, if designed between 1965 and 1992: B

not required for this age of building: D soft soil

Design Soil type from NZS4203:1992, cl 4.6.2.2:

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:	22.3%	22.3%

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0	1.00
Note 2: for RC buildings designed between 1976-1984, use 1.2	1.0
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)	1.0

	along	across
Final $(\%NBS)_{nom}$:	**22%**	**22%**

2.2 Near Fault Scaling Factor

Near Fault scaling factor, from NZS1170.5, cl 3.1.6: 1.00

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	1	1

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:	0.30
Z_{1992}, from NZS4203:1992	0.8
Hazard scaling factor, **Factor B:**	2.666666667

2.4 Return Period Scaling Factor

Building Importance level (from above):	2
Return Period Scaling factor from Table 3.1, **Factor C**:	1.00

		along	across
2.5 Ductility Scaling Factor	Assessed ductility (less than max in Table 3.2)	3.00	3.00
	Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:	1.00	1.00
	Ductiity Scaling Factor, **Factor D**:	1.00	1.00
2.6 Structural Performance Scaling Factor:	Sp:	0.700	0.700
	Structural Performance Scaling Factor **Factor E**:	1.428571429	1.428571429
2.7 Baseline %NBS, $(NBS\%)_b = (\%NBS)_{nom}$ x A x B x C x D x E	**$\%NBS_b$:**	**85%**	**85%**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A:	insignificant	1
3.2. Vertical irregularity, Factor B:	insignificant	1
3.3. Short columns, Factor C:	insignificant	1
3.4. Pounding potential	Pounding effect D1, from Table to right	1.0
	Height Difference effect D2, from Table to right	1.0
	Therefore, Factor D:	1
3.5. Site Characteristics	insignificant	1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

		Along	Across
3.6. Other factors, Factor F	For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum	1.0	1.0
	Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)		**1.00**	**1.00**
4.3 PAR x (%NBS)b:	PAR x Baselline %NBS:	**85%**	**85%**
4.4 Percentage New Building Standard (%NBS), (before)			**85%**

Official Use only:

Accepted By

Date:

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