SEISMIC RISK BUILDINGS - SURVEY

GENERAL

Date Inspected: 17th December 1992
Address of Building: 309 Durham St File No:
Legal Description of Site:
Name of Owner:
Address of Owner:
Principal Tenants: Methodist Mission Church
Occupancy: (please tick) 8 hours ☑ 24 hours ☐ 5 days ☐ 7 days ☑
Use (eg. Office, Workroom, Factory, Commercial, Storage, (Other)): CHURCH

STRUCTURE

Date of Construction: PRE-1920
Building Dimensions: Width: Length: Height:

Number of Storeys: 1

Mezzanine ☑
Basement ☐

Floor:
RC ☐
Wood ☑
Eff Diaph ☐
Non Eff ☑

Roof:
Pitched ☑
Flat ☐

Foundation Type:
Strip Footing: ☑
Raft ☐
Piles ☐

Roof Coverings:
Concrete ☐
Asphalt ☐
Galv Iron ☐
Corr Asbestos ☐
Tiles ☑

Chimneys: 2
Brick ☑
Other ☐

Structural System:
Frame ☐
Shear Wall ☐
LBM B&C ☑

Number of Stairs: 2
Type:
Wood ☐
Steel ☐
RC ☐

Roof, Diaphragm:
Effective ☐
Non Effective ☑

Building:
Original Form ☑
Minor Alterations ☐
Substantial Alterations ☐

Ground Conditions:
Rock ☐
Gravel ☐
Sand ☐
Clay ☐
Fil ☐

Number of Lifts:
Open ☐
Enclosed ☐

Bearing Walls: STONE
Street Walls: not directly on street - approx 2.5m back Wall Bands: Yes/No
Parapets: on front entrance ~700mm Column Continuity: Yes/No
Verandahs:
Appendages: Spikes at regular intervals along roof-line
Wheelchair Access: Yes

NON STRUCTURAL

Partitions: OPEN SPACE-INSIDE
Ceilings:

DAMAGE

Cracked Walls ☐ Lateral Displacement ☐ Settlement ☐
Remarks:

STRUCTURAL

Poor ☐ Fair ☐ Good ☑
Hazards:

GENERAL

NUMERICAL RATING

Maintenance	0
Storeys	1
Appendages	2
Public Access	1
Wall Continuity	1
Time Occupied	1
Internal Walls	2
Persons Occupied	2
Foundations	1
Date Built	2
Total	13

B

HAZARDOUS APPENDAGE SURVEY.

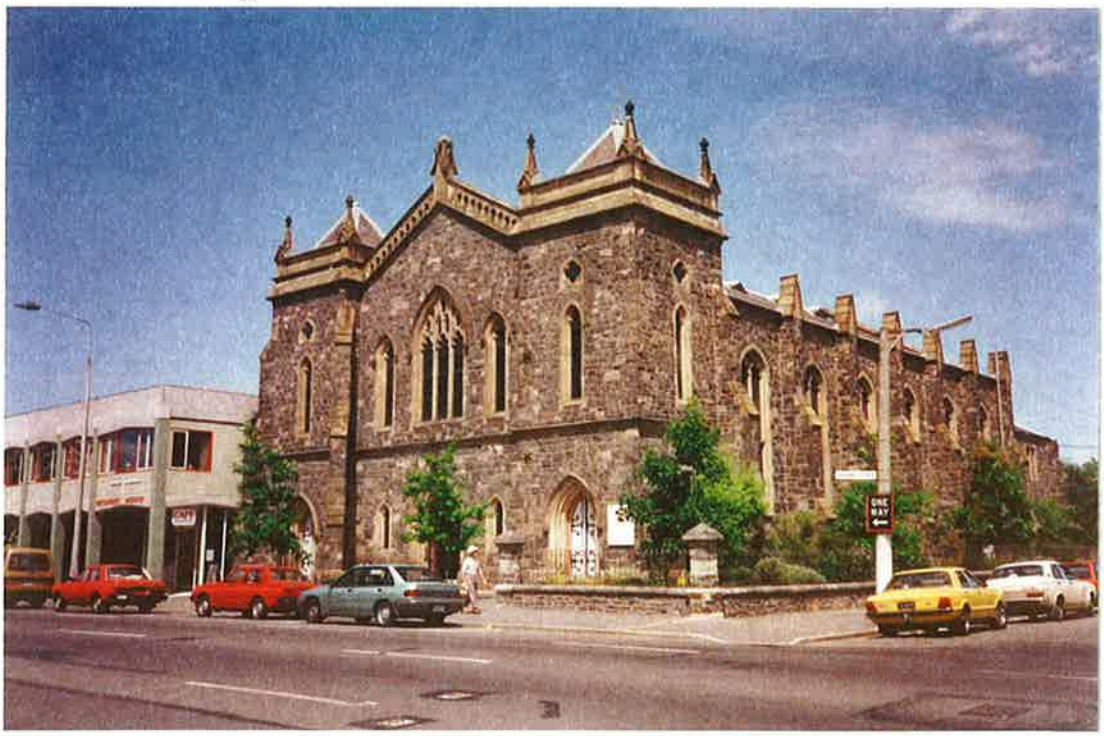
Address: 309 Durham St (Methodist Misson Church)
Legal Desc.: .....
Owner: .....
Date: 17/12/92 Date Building Built: .....
BU/40/

Parapet: None Front ~ 700mm.
Chimney: Hazardous, Lowered (non-haz)
Cornice: N.A - Spikes at regular intervals

Loose Masonry: Significant / Noticeable / Minor.
Mortar Deterioration: Significant / Noticeable / Minor.
Cracking: Significant / Noticeable / Minor.

Photo Reference: .....

Comments: 2 Storey. There are lots of "spikes" (see photo below.



E 22 2 E

Christchurch Eq. RAPID Assessment Form - LEVEL 1

Inspector Initials	LJF.	Date of Inspection	05/09/10	Exterior Only	✓
Territorial Authority	Christchurch City	Time	11:30	Exterior and Interior	

Building Name Durham Street church.
Short Name
Address 309 Durham Corner durham/ chester st west.
GPS Co-ordinates S° E°
Contact Name
Contact Phone

Storeys at and above ground level: 2 | Below ground level: 0
Total gross floor area (m²): 1200 | Year built: 1864
No of residential Units: —

Photo Taken: Yes (No)

Type of Construction

- ☑ Timber frame
- ☑ Steel frame
- ☐ Tilt-up concrete
- ☑ Concrete frame
- ☑ RC frame with masonry infill
- ☐ Concrete shear wall
- ☐ Unreinforced masonry
- ☐ Reinforced masonry
- ☐ Confined masonry
- ☑ Other: Stone Masonry

Primary Occupancy

- ☐ Dwelling
- ☑ Other residential
- ☐ Public assembly
- ☐ School
- ☑ Religious
- ☐ Commercial/ Offices
- ☐ Industrial
- ☐ Government
- ☑ Heritage Listed
- ☐ Other

Investigate the building for the conditions listed below:

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	☐	☐	☑	
Building or storey leaning	☐	☑	☐	
Wall or other structural damage	☐	☐	☑	
Overhead falling hazard	☐	☐	☑	
Ground movement, settlement, slips	☑	☐	☐	
Neighbouring building hazard	☑	☐	☐	
Other	☐	☐	☐	

Choose a posting based on the evaluation and team judgement. Severe conditions affecting the whole building are grounds for an UNSAFE posting. Localised Severe and overall Moderate conditions may require a RESTRICTED USE. Place INSPECTED placard at main entrance. Post all other placards at every significant entrance.

INSPECTED	RESTRICTED USE	UNSAFE
GREEN ☐	*YELLOW* ☐	*RED* ☑

Record any restriction on use or entry:

Further Action Recommended:

Tick the boxes below only if further actions are recommended

- ☐ Barricades are needed (state location):
- ☑ Level 2 or detailed engineering evaluation recommended
  - ☐ Structural ☐ Geotechnical ☐ Other:
- ☑ Other recommendations: Fall cordon recommended.

Estimated Overall Building Damage (Exclude Contents)

None	☐		
0-1 %	☐	31-60 %	☐
2-10 %	☐	61-99 %	☑
11-30 %	☐	100 %	☐

Sign here on completion: LJF.
Date & Time: 5/9/10 Am
ID: LJF

Inspection ID _____ *(Office Use Only)*

LJF522

BUI.DUR309.0013.5

2 John Hare - engineer - heritage 03 5094380

23

Christchurch Eq RAPID Assessment Form - LEVEL 2

Inspector Initials: JH.
Territorial Authority: Christchurch City
Date
Time

Final Posting (e.g. UNSAFE): Unsafe

Building Name: Methodist Mission
Short Name: Durham st Church
Address: 309 Durham st

GPS Co-ordinates: S° E°
Contact Name: Rev. Mary Caygill
Contact Phone: 366 5030 / 027 251 8611

Storeys at and above ground level: 1/2
Below ground level:
Total gross floor area (m²):
Year built: 1864
No of residential Units:
Photo Taken: Yes No

Type of Construction

- ☐ Timber frame
- ☐ Steel frame
- ☐ Tilt-up concrete
- ☐ Concrete frame
- ☐ RC frame with masonry infill
- ☐ Concrete shear wall
- ☒ Unreinforced masonry
- ☐ Reinforced masonry
- ☐ Confined masonry
- ☐ Other:

Primary Occupancy

- ☐ Dwelling
- ☐ Other residential
- ☐ Public assembly
- ☐ School
- ☐ Religious
- ☐ Commercial/ Offices
- ☐ Industrial
- ☐ Government
- ☐ Heritage Listed
- ☐ Other

Investigate the building for the conditions listed on page 1 and 2, and check the appropriate column. A sketch may be added on page 3

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	☒	☐	☐	
Building or storey leaning	☐	☐	☒	north & west walls leaning
Wall or other structural damage	☐	☐	☒	Significant stone falling
Overhead falling hazard	☐	☐	☒	North east corner & east entry
Ground movement, settlement, slips	☒	☐	☐	entrance hazard
Neighbouring building hazard	☒	☐	☐	
Electrical, gas, sewerage, water, hazmats	☒	☐	☐	

Record any existing placard on this building:

Existing Placard Type (e.g. UNSAFE)

Choose a new posting based on the new evaluation and team judgement. Severe conditions affecting the whole building are grounds for an UNSAFE posting. Localised Severe and overall Moderate conditions may require a RESTRICTED USE. Place INSPECTED placard at main entrance. Post all other placards at every significant entrance. Transfer the chosen posting to the top of this page.

INSPECTED GREEN G1 G2 — **RESTRICTED USE YELLOW** Y1 Y2 — **UNSAFE RED** (R1) R2 R3

Record any restriction on use or entry:

Further Action Recommended:

Tick the boxes below only if further actions are recommended

- ☐ Barricades are needed (state location):
- ☐ Detailed engineering evaluation recommended
  - ☐ Structural ☐ Geotechnical ☐ Other:
- ☐ Other recommendations:

Estimated Overall Building Damage (Exclude Contents)

None	☐		
0-1 %	☐	31-60 %	☒
2-10 %	☐	61-99 %	☐
11-30 %	☐	100 %	☐

Sign here on completion
Date & Time: 5/9/10
ID

Inspection ID: ______ *(Office Use Only)*

JHS28

Propi ~~504832~~ 868130

Lot 1 DP 51328

Structural Hazards/ Damage	Minor/None	Moderate	Severe	Comments
Foundations	☒	☐	☐	
Roofs, floors (vertical load)	☐	☐	☐	not seen - no internal inspection
Columns, pilasters, corbels	☐	☐	☐	"
Diaphragms, horizontal bracing	☐	☐	☐	"
Pre-cast connections	☐	☐	☐	NA
Beam	☐	☐	☐	NA
Non-structural Hazards / Damage				
Parapets, ornamentation	☐	☐	☒	
Cladding, glazing	☐	☐	☒	
Ceilings, light fixtures	☐	☐	☐	not seen
Interior walls, partitions	☐	☐	☐	"
Elevators	☐	☐	☐	NA
Stairs/ Exits	☐	☐	☐	not seen
Utilities (eg. gas, electricity, water)	☐	☐	☐	"
Other	☐	☐	☐	"
Geotechnical Hazards / Damage				
Slope failure, debris	☒	☐	☐	
Ground movement, fissures	☒	☐	☐	
Soil bulging, liquefaction	☒	☐	☐	

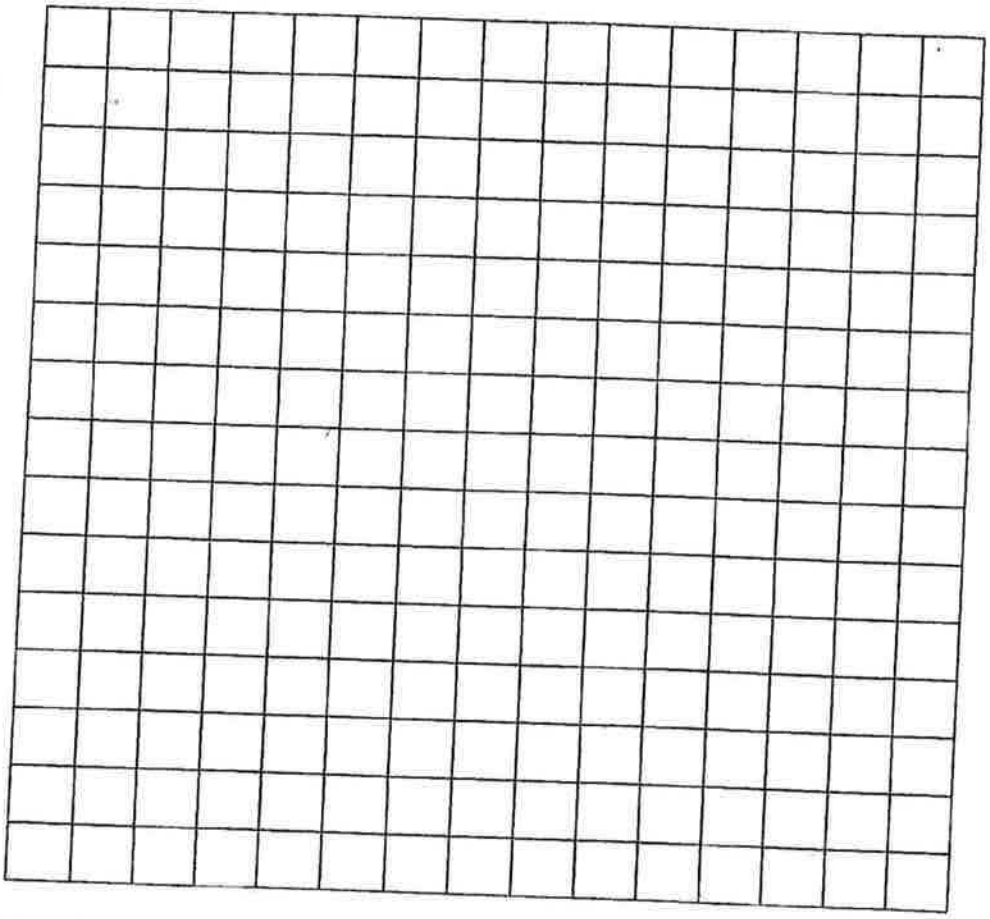
General Comment North west wall bowed outwards. North east corner severely cracked & moved approx 50mm out at top Parapet over main entry exist severe topping hazard. One brick chimney toppled on west face. 2nd chimney severe topping hazard. Severe horizontal cracking in South west corner

Usability Category

Damage Intensity	Posting	Usability Category	Remarks
Light damage *Low risk*	Inspected (Green)	G1. Occupiable, no immediate further investigation required	
		G2. Occupiable, repairs required	
Medium damage *Medium risk*	Restricted Use (Yellow)	Y1. Short term entry	
		Y2. No entry to parts until repaired or demolished	
Heavy damage *High risk*	Unsafe (Red)	R1. Significant damage: repairs, strengthening possible	* to be investigated
		R2. Severe damage: demolition likely	
		R3. At risk from adjacent premises or from ground failure	

 Inspection ID: _____ *(Office Use Only)*

Sketch (optional)
Provide a sketch of the entire building or damage points. Indicate damage points.



Recommendations for Repair and Reconstruction or Demolition (Optional)

North east corner may need to be reconstructed
detailed evaluation required

 Inspection ID: _____ *(Office Use Only)*

R D SULLIVAN
Consulting Engineer
Civil & structural
ACENZ

Level 1 64 Manchester St
PO Box 21185
CHRISTCHURCH 8011

Ph 03 365 3644
Fax 03 365 5096
Email rdsull@xtra.co.nz

15 September 2010

Our Ref: *5123-003*

Methodist Church of New Zealand
PO Box 931
Christchurch 8140

Attention: Greg Wright

Re: Earthquake Damage Inspection for Durham Street Methodist Church

Inspection Request By:	Graham Ellis
Building Address:	309 Durham Street
Inspection Date:	9.09.10

This complex has 4 areas of concern – these are:

- Church
- West 2 storey wing
- Hall
- Aldersgate

Findings and Recommendations:

1. Church:

The Church construction is from stonework, rubble fill and a coat of plaster on the inside. Openings are framed up with brickwork and plastered.

The Church has undergone very extensive cracking at the east end and exposed construction in the cracks and plaster which has fallen off. The North wall also has extensive cracking and the support corbels for the mezzanine have come away and in some cases fallen off the walls.

East Wall:

The front of the church has a high gable wall between the corner box type construction. The gable front is close to collapse and a temporary tie at the top of the parapet provides nominal restraint for the gable wall.

Recommendations:

Temporary Work

Steel frames to be designed and installed to provide external bracing support for the east wall and the corner walls.

Restoration Work

Remove the inside of the first floor and stairs. Pour new foundations and build structural concrete walls on the inside to provide support for the stone walls.

North and South Walls

These walls provide the transverse stability for the church and are buttressed at 3m centres. The buttresses are constructed from unreinforced brick and have provided some restraint against collapse of the walls. There is however extensive cracking in the walls between the buttress

Recommendations:

Temporary Work

Steel frames to be designed and installed to provide external bracing support for the north wall and ties through to the South wall.

Restoration Work

Remove the timber floor and provide a concrete foundation tie across the Church at every buttress location.

Pour concrete columns up the inside of the piers up to the location of the timber trusses. Spray concrete over reinforcing on the walls between the pier supports.

West Wall

This wall is located between the Church and the West 2 storey wing. Alongside this wall is the organ which requires protection and provides restricted access to the wall.

The wall has some cracks at the outer edge but overall is in a fair condition. This wall requires stabilising and will also be required to provide restraint for the organ.

Recommendations:

Temporary Work

A steel frame to be located either side of the organ and this be tied at the top to the existing roof beams and braced down to the Church floor.

Additional steel work is required at the top to allow temporary support and covering of the organ.

Restoration Work

This wall is very high and it is proposed to incorporate support for the wall with work in the structure for the West 2 storey wing.

Church Ceiling

The ceiling of the building is lath and plaster. This will have to be removed and replaced with a new diaphragm ceiling of 13mm braceline Gib

Organ

The Organ will have to be removed to storage while the work in the church is undertaken The organ will require covering and the support of the covers is expected to be provided by the structural bracing frames.

2. West 2 Storey Wing

This block is adjacent to the west end of the Church and is a two storey building with slate roof and timber first floor.

The roof is supported on the west wall of the Church and the stone west wall.

The first floor is supported by the stone walls and internal partitions. These partitions have contributed towards the support and bracing of this section.

Recommendations:

Temporary Work

The west side of this building is adjacent to an access way and the namse. It is proposed to run a new power cable up the driveway to supply Aldersgate.

The temporary work proposed is to move the fence of the Manse over 1m and to build steel bracing frames to support the wall. This frame is to be anchored down to large concrete blocks or the Manse side of the driveway and against the wall.

It is proposed to install three bracing frames and to place horizontal beams between the frames to support the wall at the floor and roof levels.

Restoration Work

To support the roof and first floor it is proposed to install two storey steel portals inside the masonry walls and to fix the masonry walls with bolts through the stonework to diaphragms at the roof and first floor levels.

New foundations will be required under the frames.

3. Hall

The hall construction has a slate roof supported on tied timber arches at 3m centres. The building has moved transversely and leans to the west by approximately 200mm. This movement has dislodged masonry and the east side has cracked stonework on the west side.

Recommendations:

Temporary Work

Currently the west wall of the hall has been marked with cones and tape to keep persons away from a possible collapse of the wall.

There has been debate about the retention of the hall structure. If the structure is to be retained then the west wall will require bracing at each pier location and the east side of the building propped to hold up the trusses should there be further collapse of the masonry.

Restoration Work

If the hall is to be retained then the walls will require strengthening with internal concrete piers which cantlilever from a foundation beam under the floor.

Conclusion.

I From my inspection of the Church it will require a lot of commitment and money to get the church back to what it has been and with sufficient strength to be approximately 67% of the NBS . The retention of the look of the building

The report prepared on the likely ground under the Church showed that the site is prone to liquefaction.

After consideration of the above I believe that it will be practical and more efficient if some of the elements of the church(proportions, stone façade, windows and timber mezzanine floor). and ancillary building are incorporated into a modern day church.

R D Sullivan
R D Sullivan & Associates Ltd

Selection of photos showing some of the earthquake damage noted during our inspection.

From Durham St

Inside Church

Gable cracked

Damage in the East tower

Damage in the East tower

Damage in the East tower

West wall of hall

East wall of hall

Mezzanine floor support and cracked North Wall

Judith Becker

From: Richard Sullivan [rdsull@xtra.co.nz]
Sent: Thursday, 23 September 2010 9:44 p.m.
To: Tim Fahy
Subject: Re: Durham St Methodist Church

Tim

Thanks for the sketch.

This is what we discussed and I approve you arranging this work. The apex removal should be the first priority.

Regards

Dick Sullivan

--- On **Thu, 23/9/10, Tim Fahy** ***<tim.fahy@arrowinternational.co.nz>*** wrote:

> From: Tim Fahy <tim.fahy@arrowinternational.co.nz>
> Subject: Durham St Methodist Church
> To: rdsull@xtra.co.nz
> Date: Thursday, 23, September, 2010, 5:12 PM
>
> Hi Dick,
>
> Here are the notes and my quick sketch from our discussions this morning (to save you time) relating to the scope of removal of loose/dislodged portion of the East Gable Durham St.
>
> Please would you sign them off and return them asap so we can proceed as soon as we can arrange contractors.
>
> If you have any queries please contact me on mobile 0275 303 800
>
> Kind regards
>
> Tim

BUI.DUR309.0013.15

MEMORANDUM

To:	Dick Sullivan RD Sullivan Engineers
From:	Tim Fahy
Copy to:	
Date:	23 September 2010
Subject:	**DURHAM ST METHODIST CHURCH 309 DURHAM ST**

Dear Dick,

I have captured the salient points in brief from our discussions this morning relating to the removal of the visibly displaced top part of the Durham St frontage gable and associated parapet and the temporary ties to be installed to restrain and stabilize the tops of both flanking square towers.

Gable Wall

1 The intention is to remove the gable key stone along with several visibly loose/ displaced face blocks, cap stones and decorative parapet blocks.

See attached sketch Detail A

2 This will require a crane to support and lower individual blocks to the ground and a separate man cage to protect workmen.

3 We will avoid any situation which will result in workmen needing to be on the roof.

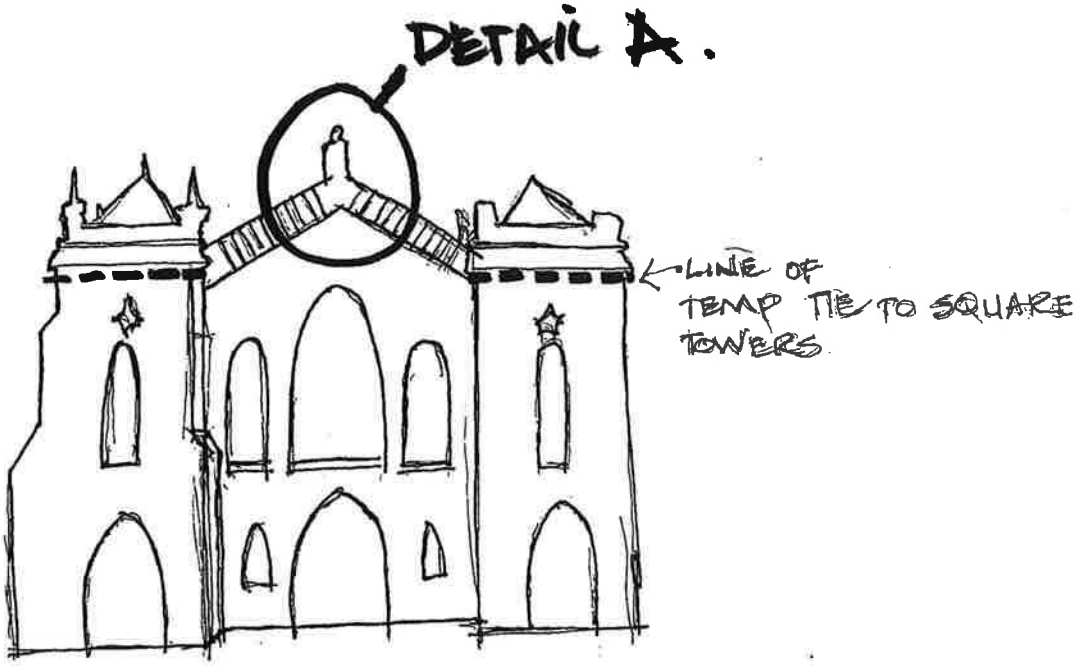
4 We will be careful to ensure the removal operation does not induce any additional lateral load on the gable.

Square Towers either side of gable

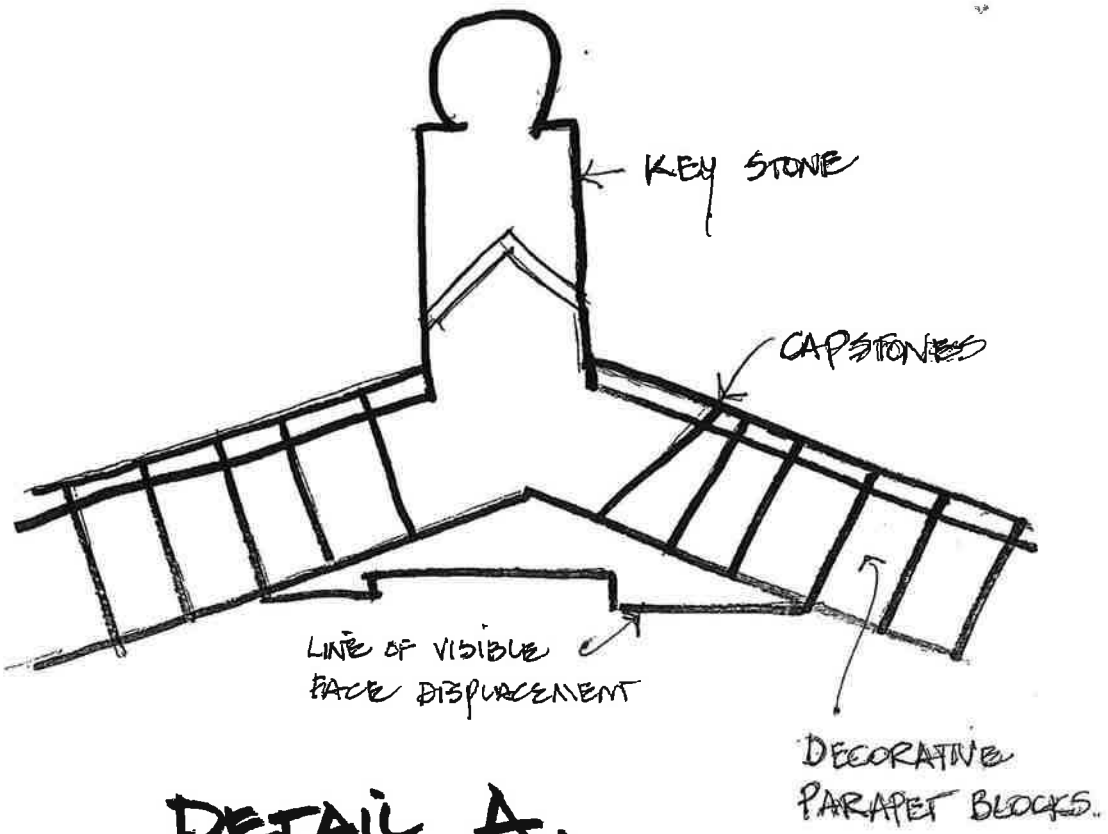
1 The intention is to install a 'tie down' type load strop horizontally around the exterior of the tower just under the decorative cornice line.

2 The ties to pass thru existing holes in the decorative gable blocks as discussed.

See attached sketch for indicative location



DURHAM ST ELEVATION



DETAIL A.

DURHAM ST METHODIST CHURCH
309 DURHAM ST.

Judith Becker

From: R D Sullivan [rdsull@xtra.co.nz]
Sent: Friday, 1 October 2010 4:15 p.m.
To: Judith Becker; Tim Fahy
Subject: DURHAM STREET METHODIST CHURCH
Attachments: 5123.003 SP.01 SITE PLAN.pdf; 5123.003 D.01 DETAILS.pdf; 5123.003 D.02 DETAILS.pdf; 5123.003 S.01 SECTION.pdf; 5123.003 S.02 SECTION.pdf

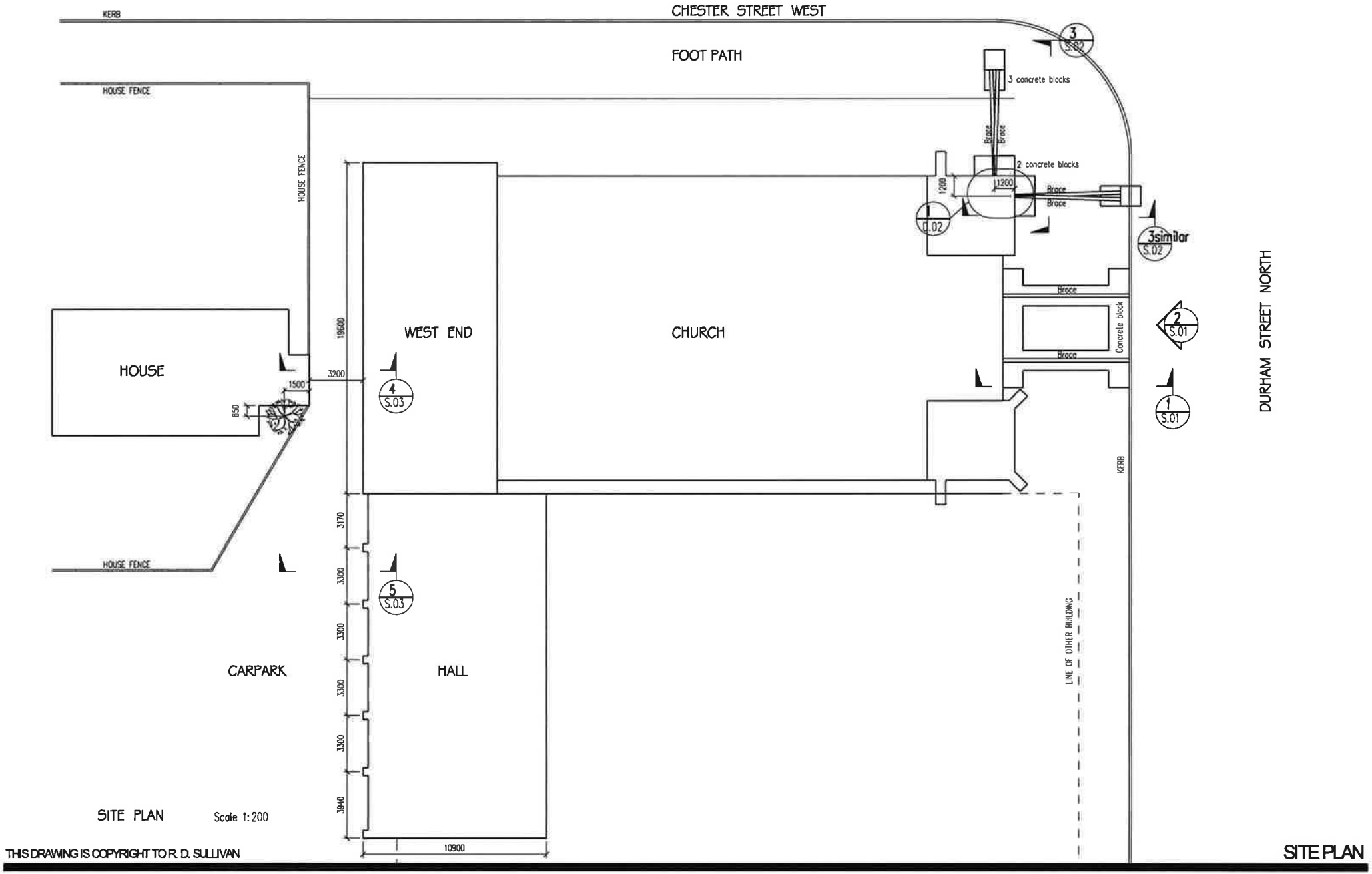
Judith

Please find attached a copy of the drawings. The drawing S.03 showing bracing to the West End has not been completed at this stage so will follow later on when Dick has done the design work.

Regards

Tina Taylor

BUI.DUR309.0013.19



SITE PLAN

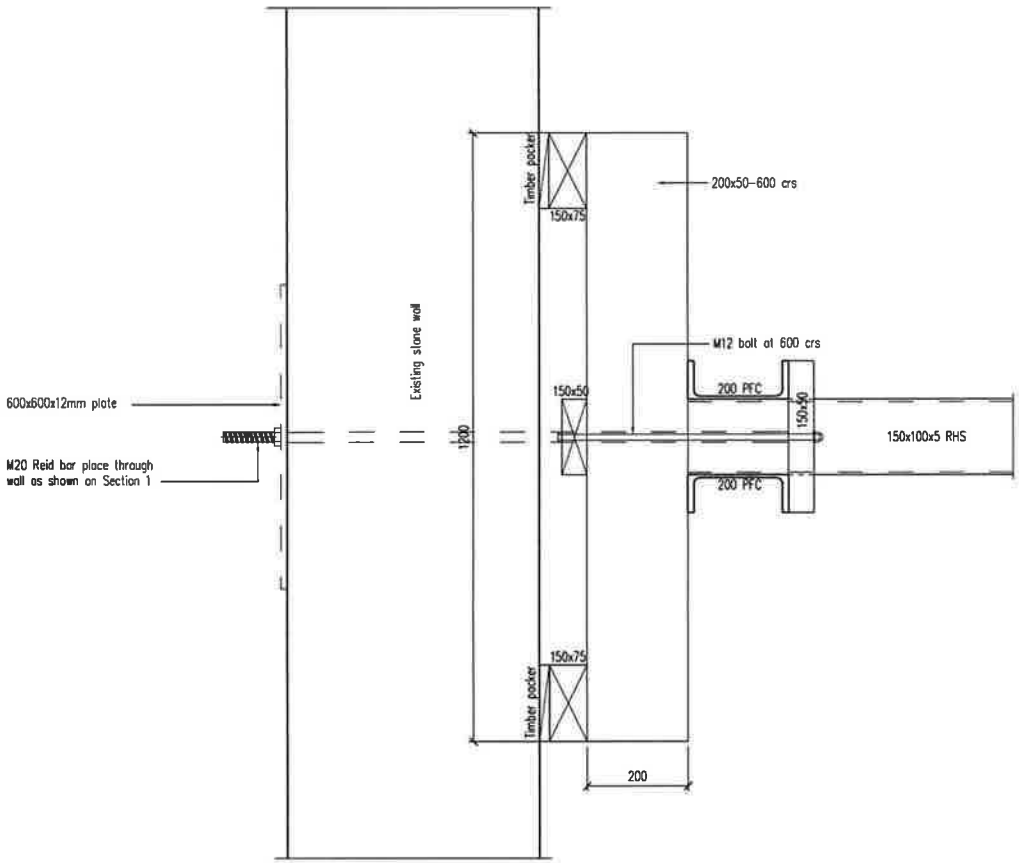
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

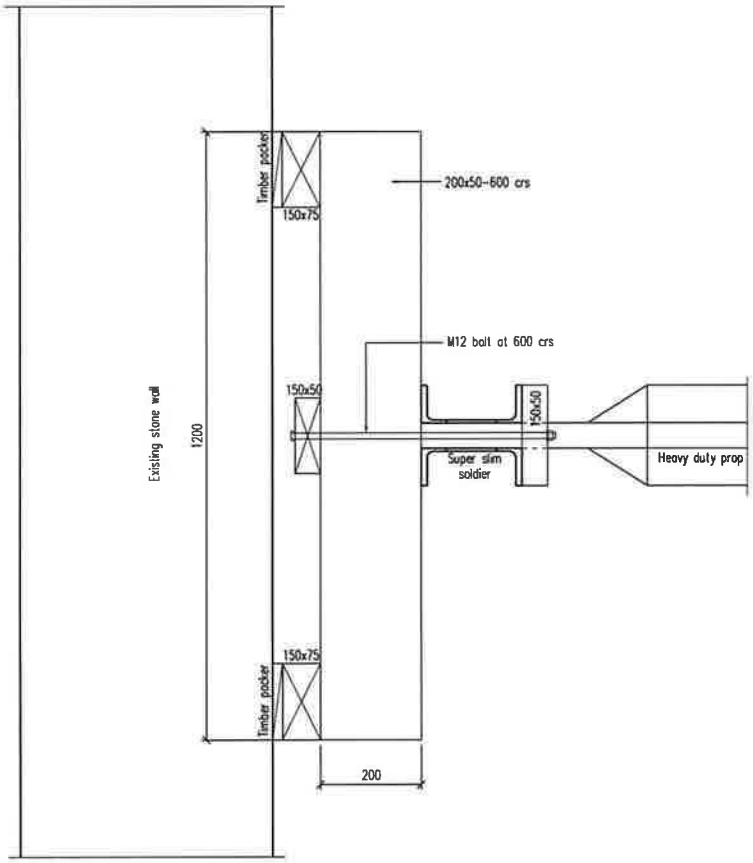
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	SNTT
Date	01.10.10
Scale	@A3

Job No. 5123.003
Sheet No. SP.01



PLAN 1/5.02 Scale 1:10



PLAN 2/5.03 Scale 1:10

DETAILS

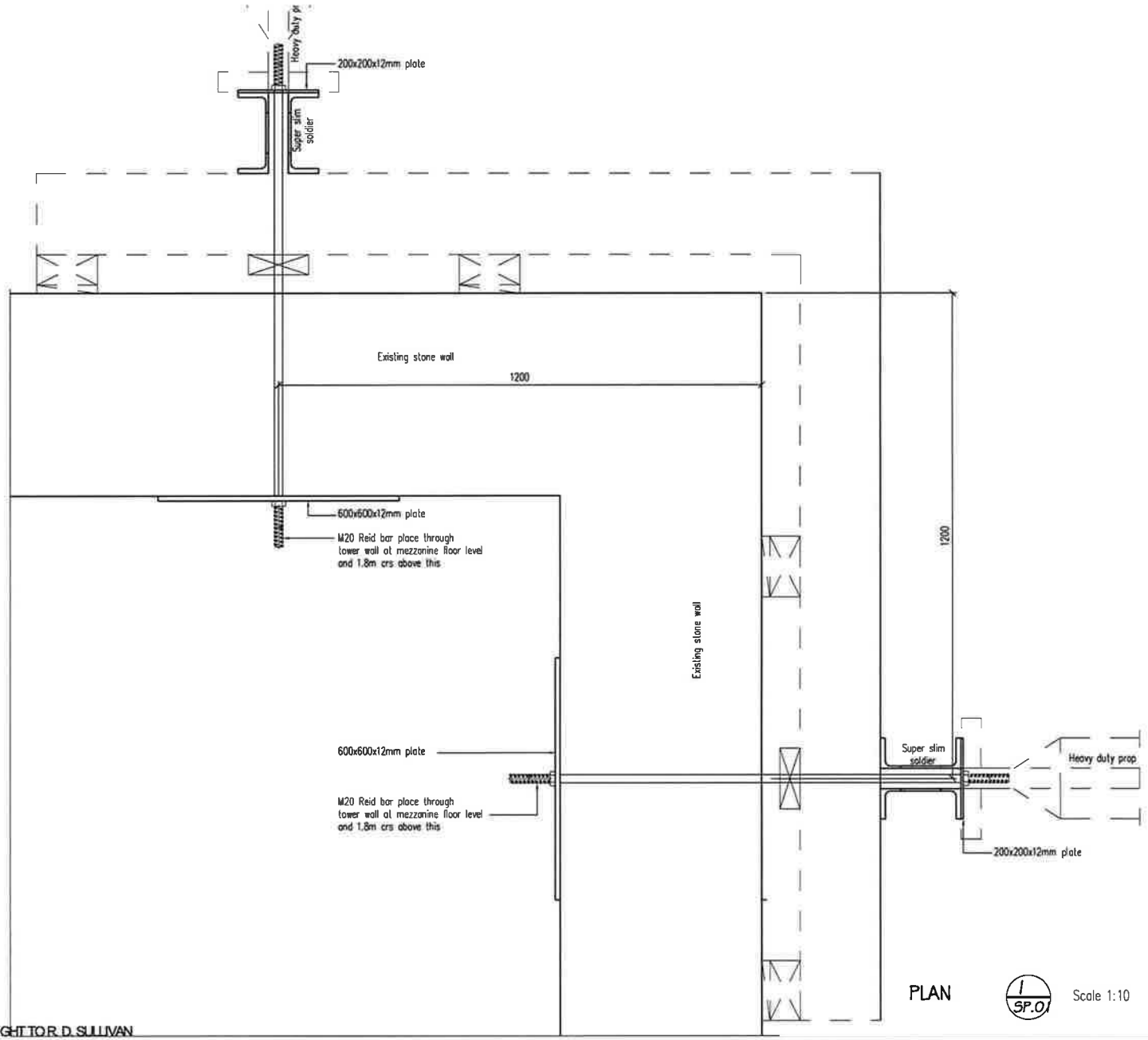
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

R OF DURHAM ST & CHESTER ST WEST, CHRISTCHURC

Design	RDS
Drawn	TT
Date	01.10.10
Scale	1.10@A3

Job No. 5123.003
Sheet No. D.01



PLAN 1/SP.01 Scale 1:10

DETAILS

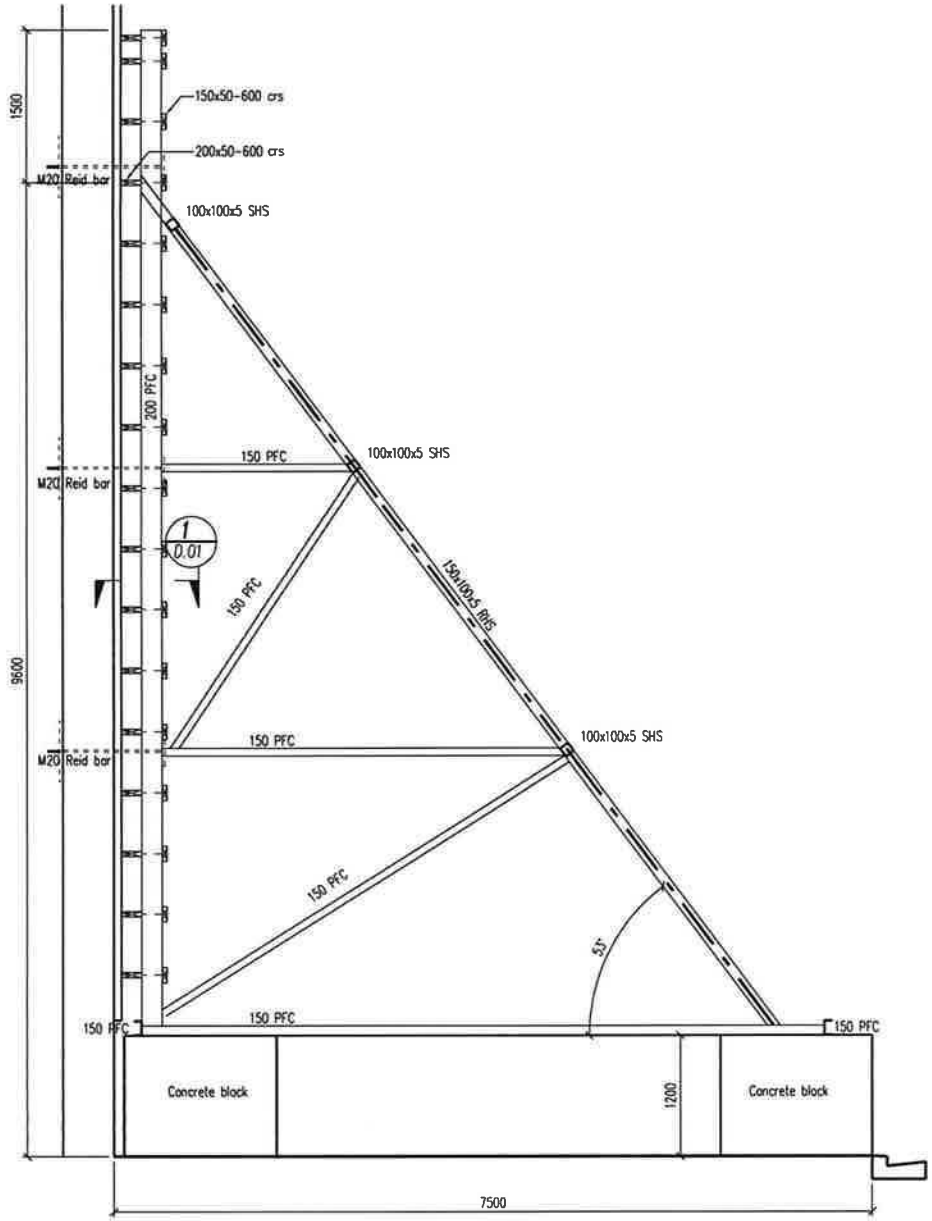
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

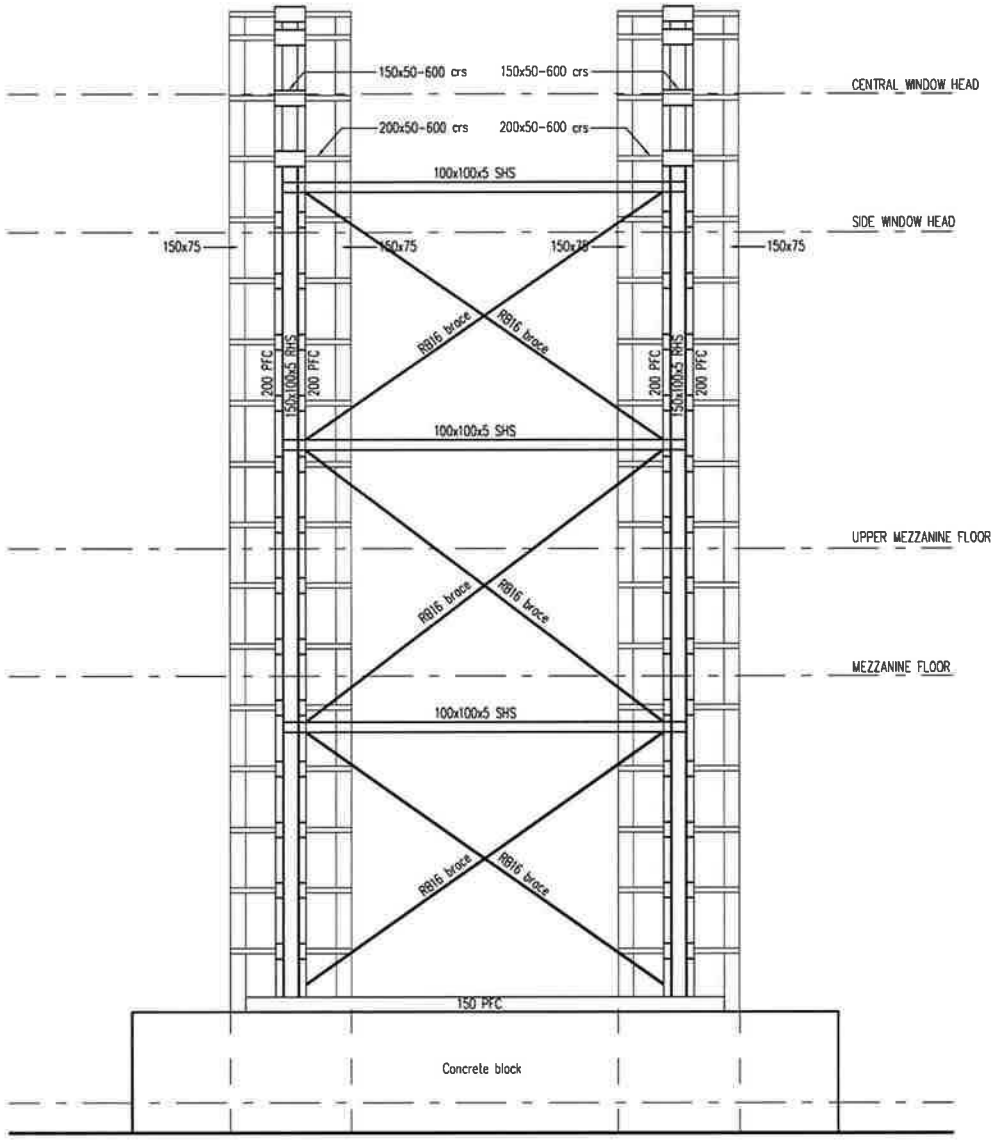
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	01.10.10
Scale	1.10@A3

Job No. 5123.003
Sheet No. D.02



BRACE SECTION 1 SP.01 Scale 1:50



BRACE ELEVATION 2 SP.01 Scale 1:50

SECTIONS

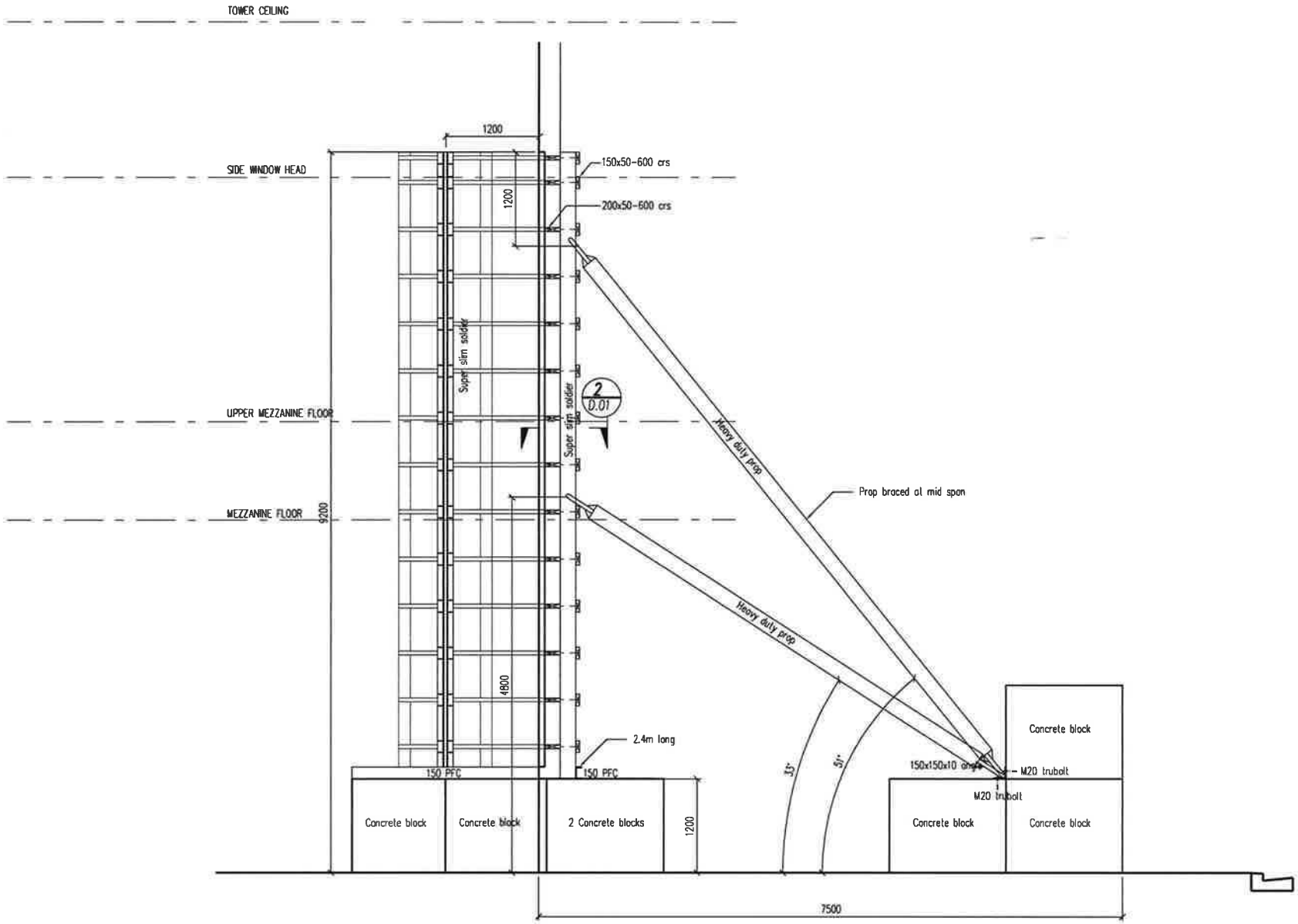
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	01.10.10
Scale	1:50@A3

Job No. 5123.003
Sheet No. S.01



BRACE SECTION 3/SP.01 Scale 1:50

SECTIONS

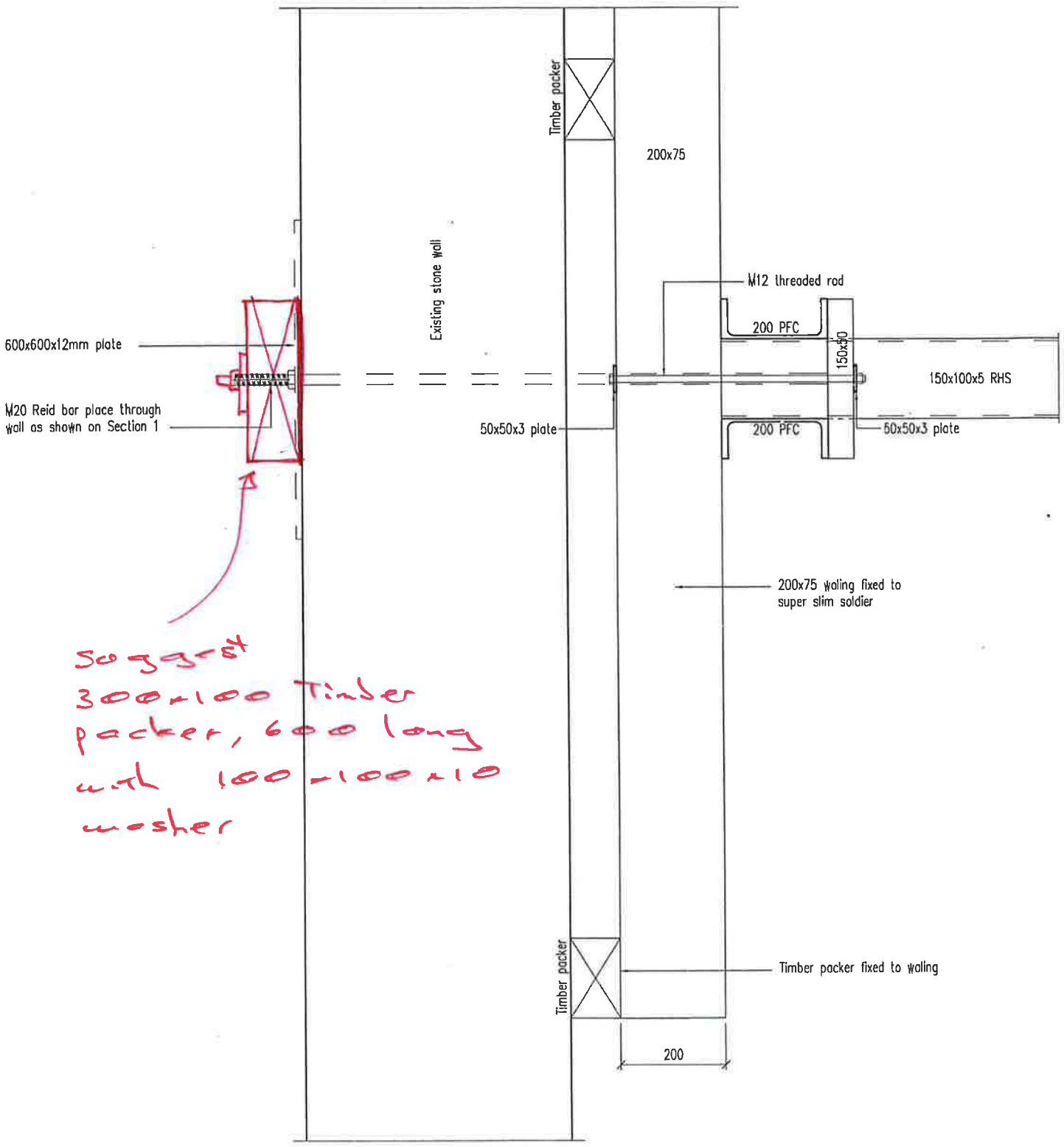
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	01.10.10
Scale	1:50@A3

Job No. 5123.003
Sheet No. S.02



PLAN (1/S.01) Scale 1:10

R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METH

CNR OF DURHAM ST & CHESTER

structex

Project 10499/5 – 4 October 2010

Methodist Church
Durham Street, Christchurch
Structural Assessment Report

for

Arrow International Ltd

Contents

structex

structex metro ltd
level 7, lumley centre
138 victoria street
p box 25438
christchurch 8140
new zealand

tel:+64 3 968 4925
fax:+64 3 968 4927
metro@structex.co.nz
www.structex.co.nz

4 October 2010

Judith Becker
Arrow International Ltd
PO Box 42
Christchurch 8140

Dear Judith

Re: Methodist Church, Durham Street, Christchurch - Structural Assessment Report



Introduction

Structex Metro Limited has been engaged to complete a structural assessment report of the Methodist Church in Durham Street, Christchurch.

The purpose of this assessment is to identify and comment on earthquake damage to the building, and possible strengthening options.

Limitations of Report

Findings presented as part of this report are for the sole use of Arrow International Ltd and their client, the Methodist Church. The findings are not intended for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses.

The structural assessment comprises a walkover survey of the property and does not include a detailed review of drawings or a detailed inspection/investigation of structure that is hidden behind or beneath wall, ceiling and floor finishes. A search of Christchurch city Council records has *not* been undertaken. The assessment provides a structural overview of the main structural elements that are visible, as well as comments on issues associated with the foundations and soil conditions. Strengthening options are based on experience and judgement only, and detailed calculations have not been carried out as part of this assessment.

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 this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

Executive Summary

A summary of the structural assessment is as follows:

(a) The Hall has suffered significant damage as a result of the recent earthquake on 4 September 2010. Extensive reconstruction to a significant portion of the hall will be required, if this part of the building is to be retained.

(b) The Annex has suffered limited damage, mainly to the west wall. This part of the building could be retained with moderate repair work and some additional work to strengthen to 67% of current code.

(c) The Church auditorium has had significant damage at the east end and will require reconstruction of the towers and east wall. It is expected that the remainder of the building can be retained, repaired and strengthened up to 67% of current code.

Building Location & Description

The Church is located in Durham Street, in the Central Business District of Christchurch city and was constructed in 1864.

The complex consists of three main areas, the main Church auditorium, the Annex located at the western end of the auditorium and the Hall located in the south west corner of the site.

The buildings are generally constructed with stone walls, consisting of a natural stone exterior, a plaster brick and stone interior and a combination of rubble and stone fill to the cavity.

The slate roof is likely to be supported on battens with timber sarking on purlins and main supporting exposed timber trusses. A ceiling is constructed with lathe and plaster. The ground floor is timber and is likely to consist of timber flooring boards on joists supported on timber bearers on concrete or timber piles.

A gallery floor has been constructed in the auditorium which extends around the perimeter of this area. Access to the gallery is by two stairs at the front of the church facing Durham Street which incorporate two stone towers.

The building has been damaged by the recent 7.1 magnitude earthquake on 4 September which was located about 30km from Christchurch. Ongoing aftershocks continue to cause further damage.

Hall east wall damage

Hall Assessment

The hall measures around 20 x 11m in plan.

Significant damage has occurred to the upper section of the east wall where part of this wall at roof level has collapsed out.

The ceilings in this area have also been damaged, with damage ranging from cracked lathe and plaster to partial collapse.

damage at truss locations in Hall

Damage has also occurred between the timber roof truss and the side walls with varying degrees of cracking, including spalling of the stone around the truss support.

west wall of Hall leans out

The western side of the Hall wall has two continuous, almost full length horizontal cracks, one located about 1200mm from the floor and the other located near the top of the wall. The wall is leaning out significantly between these two cracks. It is estimated that the wall has an outward lean of about 200-250mm.

The lathe and plaster ceiling is cracked, primarily at the cove lines and at the junction to the stone walls, where significant damage has occurred.

Cracks to the infill stone walls in Hall

A number of cracks are present in the infill stone walls between the side wall columns.

A crack has occurred in the wall in the south west corner where the gable and side wall have started to separate.

The mortar used to construct the hall is a weak lime mortar and can be easily scraped away with a metal object.

The hall is significantly damaged from the earthquake and will require reconstruction of the entire west wall, reconstruction of the upper section of the east wall, reconstruction of the junctions between the trusses and east side wall, and repairs to the ceiling. Some areas of the ceiling will require replacement.

In addition to this an earthquake assessment will be required and strengthening to 67% of current code is likely. This will require additional structural work.

Annex Assessment

The Annex measures approximately 18 x 8m in plan and is located on the west side of the main Auditorium. It includes a timber first floor with offices located below on a timber ground floor.

The roof is generally clad with slate tiles to the perimeter with a flatter metal roof to the central area that adjoins the west wall of the Auditorium.

Annex west wall displaced from Truss

A panelled ceiling prevented viewing the roof structure and did not show signs of significant cracking, however the nature of this ceiling will assist in concealing cracks.

Minor cracking was observed in the east wall, which is a common wall with the west end of the Auditorium.

The west wall of the annex has displaced from the roof trusses as well as from the north gable wall and has formed a crack in the north west corner near the ceiling level.

Crack formed in north wall corner of Annex

The ground floor walls to the annex were viewed and had only a few minor cracks. Very little damage was visible in this area.

The main area of damage to the annex appears to be on the west wall where the top of the wall has displaced from the roof structure and at the north wall junction.

The displacement does not appear to be excessive and could be repaired by grouting up the existing cracks and re-fixing the roof structure to the western exterior wall.

Additional work required to strengthen this building to 67% code is likely to include the following:

(a) Tie external walls to first floor structure.

(b) Tie gable and side walls to roof structure.

(c) Possible roof bracing installation.

damage to auditorium stair walls, east end

Auditorium Assessment

The auditorium measures approximately 28 x 18m in plan. The main area of damage has occurred in the eastern towers where the stairs are located. Significant damage has occurred in this area with cracks clearly visible on the exterior face, generally in the stone mortar joints. The plaster has spalled significantly on the interior face with significant damage visible to the brick interior face and to the core of the wall.

Significant cracking has occurred to the eastern wall of the auditorium facing Durham Street.

east wall damage

Stone work around the window frames has dislodged and damage has occurred primarily at the mortar joints. The leadlight glazing appears to have suffered little damage.

The side walls to the auditorium are still in relatively good condition with some cracking on the inside plaster face above the windows.

The buttresses to the outside side walls are generally cracked along the mortar joints between the stone.

The towers facing Durham Street are significantly and extensively cracked.

Some spalling of stone work has occurred where the timber gallery beams are housed into the stone walls.

The timber ground floor appears to have bulged in the middle and could be the result of some foundation settlement below the exterior heavy stone walls, or heaving of the light timber floor, or a combination of both. This has also resulted in some displacement and residual lean of the southern timber posts support the gallery floor.

The lathe and plaster ceiling is also significantly cracked through the entire ceiling.

Cracked ceiling in auditorium

In our opinion the Auditorium could be retained with the following work likely to be required:

(a) Remove the towers and east wall of the auditorium and retain all stone work. Reconstruct the towers and east wall in reinforced concrete and place stone on the exterior face to retain the same visual appearance both internally and externally.

Cracks to mortar joints in Auditorium buttresses

Side walls of Auditorium in good condition with some cracking above windows

Spalling of stone around gallery beams in Auditorium

(b) Inject cracks to the side walls and buttresses with grout injection to re-establish strength.

(c) Secure roof trusses into side walls at buttress locations.

(d) Possibly install concrete insitu column within the side wall buttresses, and flush with inside face to enhance side wall strength to 67% code.

(e) Remove lathe and plaster ceiling and reline with bracing installed behind ceiling to enhance strength to 67% code.

(f) Tie end wall west gable, and new east wall gable into roof structure.

(g) Remove loose stonework around side wall windows and re-fix in place with steel pins or grouted joints to enhance strength.

(h) Re-fix gallery beams and associated spalled stone work in place.

(i) Re-level ground floor and realign posts supporting gallery floor.

It is possible some foundation enhancement work may be required, depending on the existing ground conditions. Further detailed geotechnical information will be required.

If you have any queries regarding the above Structural Assessment Report, please do not hesitate to contact the undersigned.

Yours sincerely
Structex Metro Limited

Gary Haverland B.Eng (Hons)(Civil)
Senior Structural Engineer &
Director
MIPENZ CPEng # 209540

Judith Becker

From: Richard Sullivan [rdsull@xtra.co.nz]
Sent: Thursday, 7 October 2010 2:57 p.m.
To: Tim Fahy
Subject: Re: FW:
Attachments: 5123.003.pdf

Tim
I have changed the detail from discussions yesterday. Hope these are ok.
Please find attached sketches for the annex for strengthening at Durham Street.

Regards

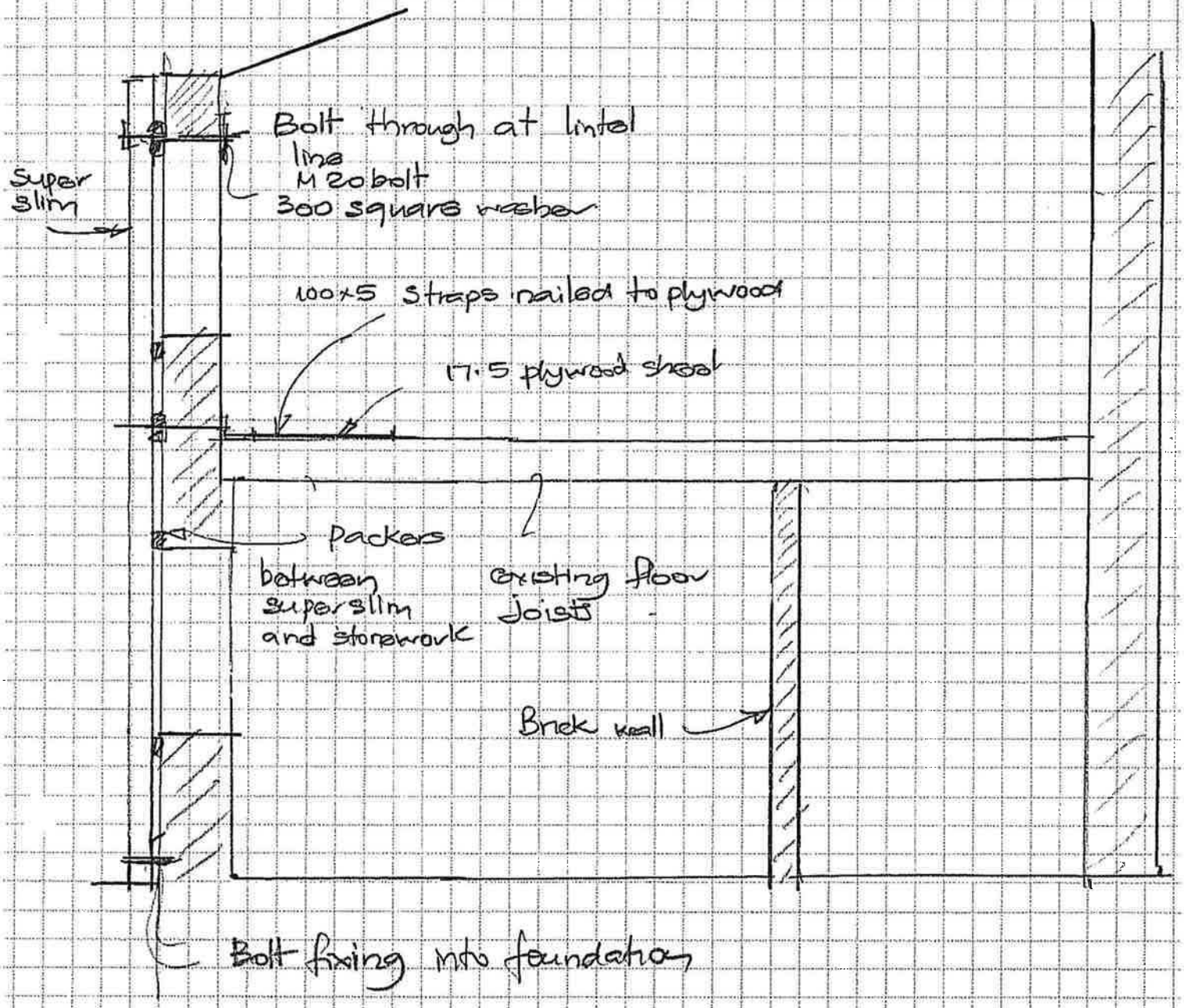
Dick

--- On **Tue, 5/10/10, Tim Fahy** ***<tim.fahy@arrowinternational.co.nz>*** wrote:

> From: Tim Fahy <tim.fahy@arrowinternational.co..nz>
> Subject: FW:
> To: "R D Sullivan" <rdsull@xtra.co.nz>
> Date: Tuesday, 5, October, 2010, 2:10 PM
>
> Hi Dick,
> I had the boys on site take the gable dimensions for me - please see attached sketch
>
> And confirming our meeting at 1.00pm tomorrow at Arrow,
>
> Cheers TIM
>
> ---
>
> **From:** ricoh@arrowinternational.co.nz [mailto:ricoh@arrowinternational.co.nz]
> **Sent:** Tuesday, 5 October 2010 3:05 p.m.
> **To:** Tim Fahy
> **Subject:**
>
> This E-mail was sent from "RNPE21C17" (Aficio MP 5000).
>
> Scan Date: 05.10.2010 14:04:54 (+1200)
> Queries to: ricoh@arrowinternational.co.nz
>
> ---
>
>
>
> ---

R.D. SULLIVAN CPEng IntPE **Consulting Engineer - Civil & Structural**
239 Armagh Street • P.O. Box 21185 • Christchurch 8143 • Tel. 365 3644 • Fax 365 5096

BY RDS
JOB TITLE Durham st
JOB No 5123-003
SHEET USE Annexe West Wall Support
SHEET No 1
DATE 7/10/10

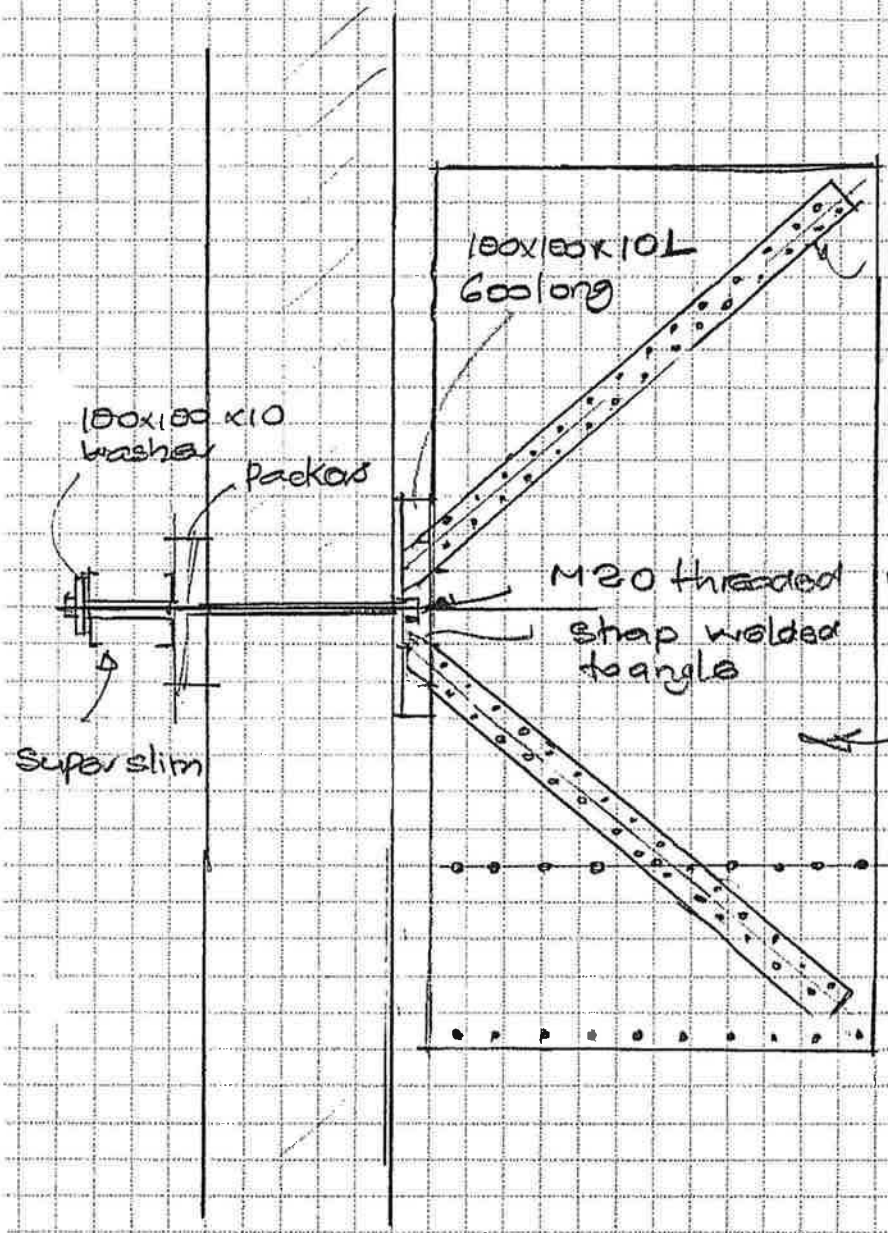


Detail of Connection of West stone wall to the first floor

Allow for 6 support locations

R.D. SULLIVAN CPEng IntPE **Consulting Engineer - Civil & Structural**
239 Armagh Street • P.O. Box 21185 • Christchurch 8143 • Tel. 365 3644 • Fax 365 5096

BY RDS
JOB TITLE Durham St
JOB No 5123-003
SHEET USE Annexe West Wall Support
SHEET No 2
DATE 7/10/19



100x5 Shap fixed to plywood with 2 rows of 3.55dia nails, 30 per side

17.5 plywood nailed with 10-90x3.55 nails to each joist
Joists assumed at 460 cc

Plan Detail of Connection of Superslim beam to the timber first floor.

Note Engineer to confirm details when flooring is exposed.

RD Sullivan

SOUTH ISLAND ORGAN COMPANY LIMITED

23 Holmglen St., PO Box 2036, Washdyke, Timaru 7941. Phone 64-3-688-2536. Fax 64-3-688-2516. Email office@sioc.co.nz

NEW INSTRUMENTS • RESTORATIONS • TUNING AND MAINTENANCE

8 October 2010

Tim Fahy
Arrow International Ltd
Project Manager
Durham St Methodist Church
Christchurch

Dear Tim

Re: Church Organ Earthquake Damage report

Our Christchurch tuner Christopher Templeton inspected Durham St Methodist organ on 22 September and reports as follows:

"The pipe organ in Durham Street seems to have survived the earthquake with little major damage – although half the organ (Swell and Choir) could not be accessed to make a final determination. The support for the large wooden pipes on the left side of the organ (Bass end) has been wrenched from the wall and the side of the Swell Box, so the pipes are relying on a secondary support lower down to remain vertical. A visual inspection of the parts of the organ that could be accessed revealed little direct debris damage to the pipework.

The organ will have to be taken down in two stages. The first stage will be to remove the Pedal and reed chests from the Bass end of the organ and the Choir Box and Pedal pipes from the Treble end of the organ, and the console from in front of the organ. The second stage will be possible once the side wings of the organ are removed and steel framing has been placed vertically and horizontally across the rear wall and supported back to the main floor of the building. Also it is understood that once the building is secured, the furnishing and fittings are going to be stripped out. To remove the organ will probably require erection of a scaffolding stage to facilitate getting the larger components out (this to be arranged and planned in conjunction with Arrow International and the consulting engineers and is not included in the estimate). The second stage will be dismantling the Swell pipework, Swell boxes, Swell and Great Soundboards, Great pipework and building frame and removing all parts of the organ from the building.

With the core of the organ dating from 1907 (being the last surviving Ingram organ in New Zealand) and the additions being Hill, Norman & Beard of 1947 – both in a rather fragile state, it is expected that removing the organ will have a detrimental effect on the cotton covered DC electrical wiring in the organ. Removing the organ will almost inevitably result in breaks and short circuits in the wiring, so that the organ cannot just be reinstalled without replacing the electrical wiring and switching mechanisms to make it playable and reliable".

Quotations:

1. **Stage One Schedule of Work:**
    - Document the bass and treble ends of the organ.
    - Remove the Pedal and Reed Unit windchests, reservoirs, building frame, windtrunks and DC wiring from the bass end of the organ.
    - Remove the Pedal and Choir windchests, Choir box, reservoirs, building frame, windtrunks and DC wiring from the treble end of the organ.
    - Remove the console and associated DC wiring from the front of the organ.
    - Pack the above removed parts for transport to secure storage in Timaru.

Our quotation to document, pack and remove the bass and treble ends of the organ including the console as described above and place all parts into secure storage in Timaru is

2. **Stage Two Schedule of Work:**
    - Document the Centre part of the organ.
    - Remove the facade pipes and casework from the front of the organ.
    - Remove the Great and Swell windchests, Swell box, reservoirs, building frame, windtrunks and DC wiring from the centre of the organ.
    - Remove the DC switch gear and electric blower from under the organ.
    - Pack the above removed parts for transport to secure storage in Timaru.

Our quotation to document, pack and remove the main section of the organ as described above and place all parts into secure storage in Timaru is

3. **The cost of the inspection and report is**

Stage One (cost breakdown)
Removal of the side wings of the organ, console.
Five days for four men (including travel)
Dismantling Labour
Travel Time
Meals & accommodation
Van
Container Hire
Packaging materials

Repacking organ into secure long term container storage
Labour

Stage Two (cost breakdown)
Removal of the Swell and Great, Blower and Switch units under the gallery.
Five days for four men (including travel)
Dismantling Labour
Travel Time
Meals & accommodation
Van
Container
Packaging materials

Repacking organ into secure long term container storage
Labour

Total cost of both stages

Total storage costs of per week including GST. (for 2 years)
AA Secure storage Laughton Street, Washdyke 0800 150240.

Terms of Business:

- The quotations submitted are valid for 3 months from the date of this letter.
- The work will be completed within 6 months of acceptance (or as agreed with the client) and will take approximately 2 weeks on-site for 4 persons to complete.
- The prices quoted are firm for the work as detailed but there is an unavoidable possibility that opening up the work will reveal as yet undetected damage in which case we will report further before committing more expenditure.
- The completed work will be guaranteed for 5 years against faulty workmanship and materials providing the organ is regularly maintained by the Company or persons approved by it.
- Scaffolding and hoisting equipment (if required) to facilitate the scheduled work is excluded.
- Any structural work on the building (if required) to facilitate the scheduled work is excluded.
- Any mains electrical work (if required) to facilitate the scheduled work is excluded.
- Electric power for lighting and tools, toilet and washing facilities, and tea making facilities are to be provided by the Church.

Yours sincerely

John Hargraves MNZM
South Island Organ Co Ltd

E-mail Message

From:	Tim Fahy [SMTP:tim.fahy@arrowinternational.co.nz]
To:	Ohs, Amanda [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=AMANDA.ROSS]
Cc:	Judith Becker [SMTP:judith.becker@arrowinternational.co.nz]
Sent:	11/10/2010 at 3:17 pm
Received:	11/10/2010 at 3:17 pm
Subject:	Durham St Methodist Church - Temp Propping Details
Attachments:	Arrow Logo.jpg Durham St Temp Propping 3 (2).pdf Durham St Temp Propping 1 (2).pdf Durham St Temp Propping 2 (2).pdf

Hi Amanda,

Please see attached Temporary Propping Details for the Durham St Methodist Church.

Tenders for this work close today and given the circumstances we are keen to award the contract and get contractors mobilised asap
If you have any queries please contact me,

Kind regards

Tim Fahy
Project Manager

Arrow International Limited

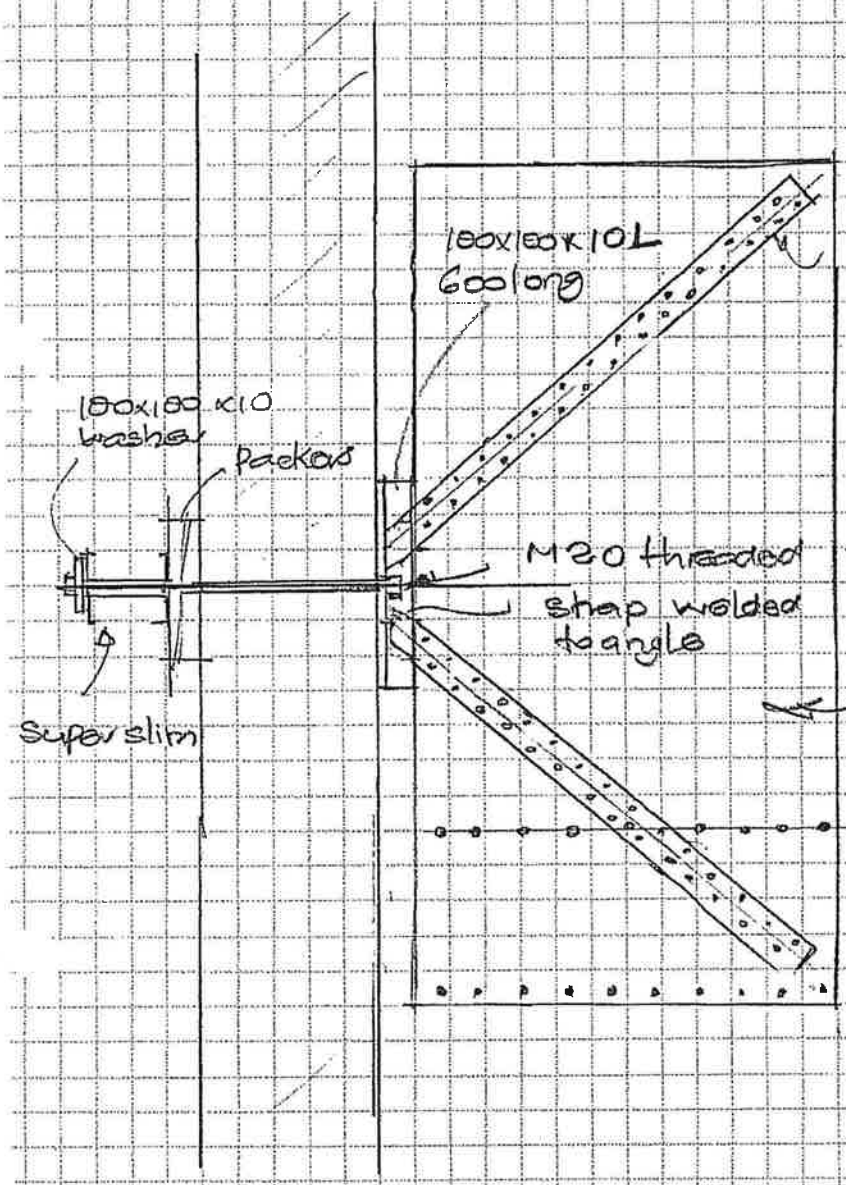
Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web

R.D. SULLIVAN CPEng IntPE **Consulting Engineer - Civil & Structural**
239 Armagh Street • P.O. Box 21185 • Christchurch 8143 • Tel. 365 3644 • Fax 365 5096

JOB TITLE Durham st
SHEET USE Annexe west wall support

BY RD
JOB No 5123-003
SHEET No 2
DATE 7/10/10



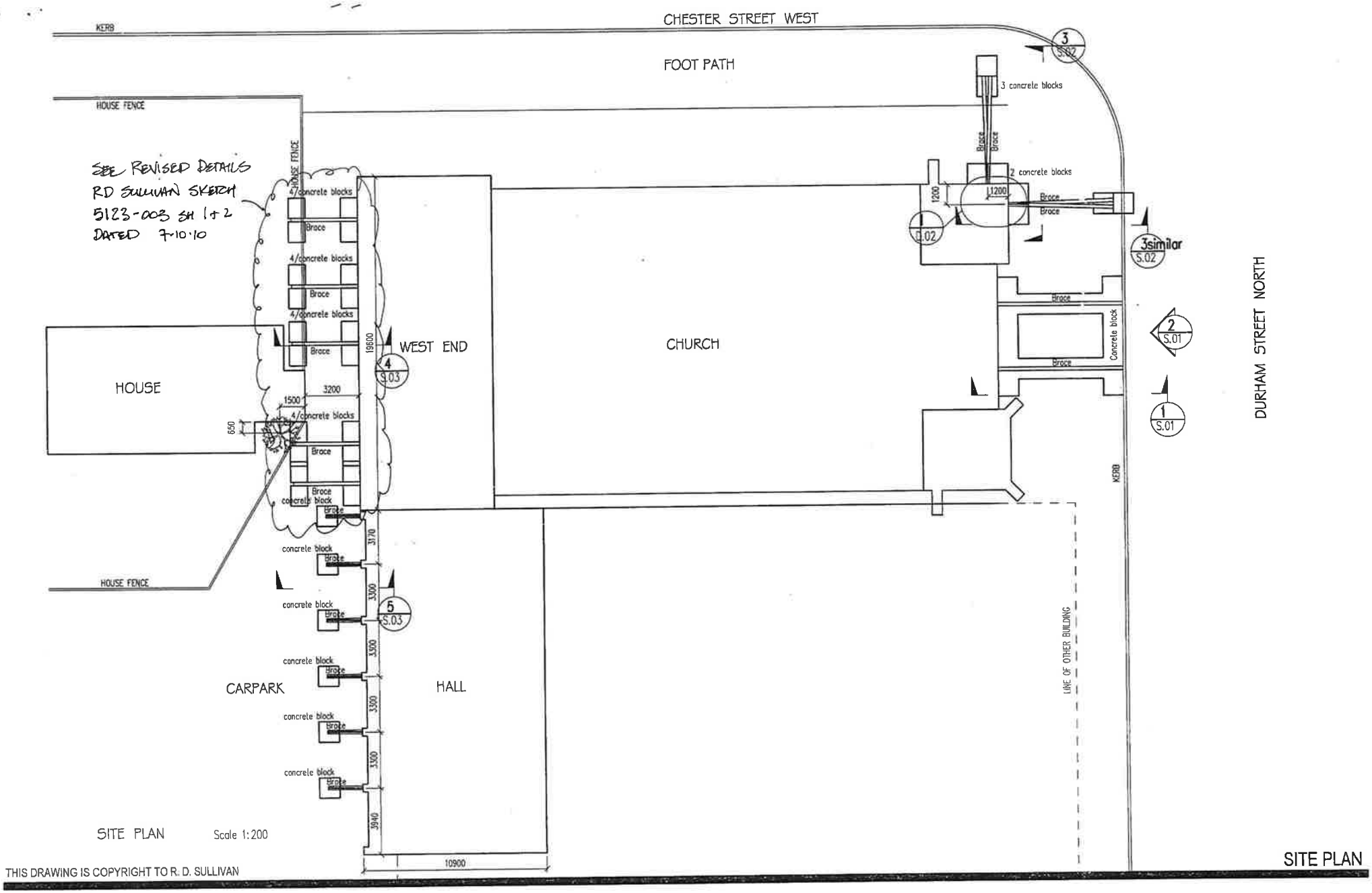
100x5 shap
fixed to plywood
with 2 rows of 3.55dia
nails, 30 per side

17.5 plywood nailed
with 10-90x3.55
nails to each joist
Joists assumed at
460 cs

Plan Detail of Connection
of Super Slim beam to
the timber first floor.

Note Engineer to confirm details when
flooring is exposed.

BUI.DUR309.0013.40



SITE PLAN

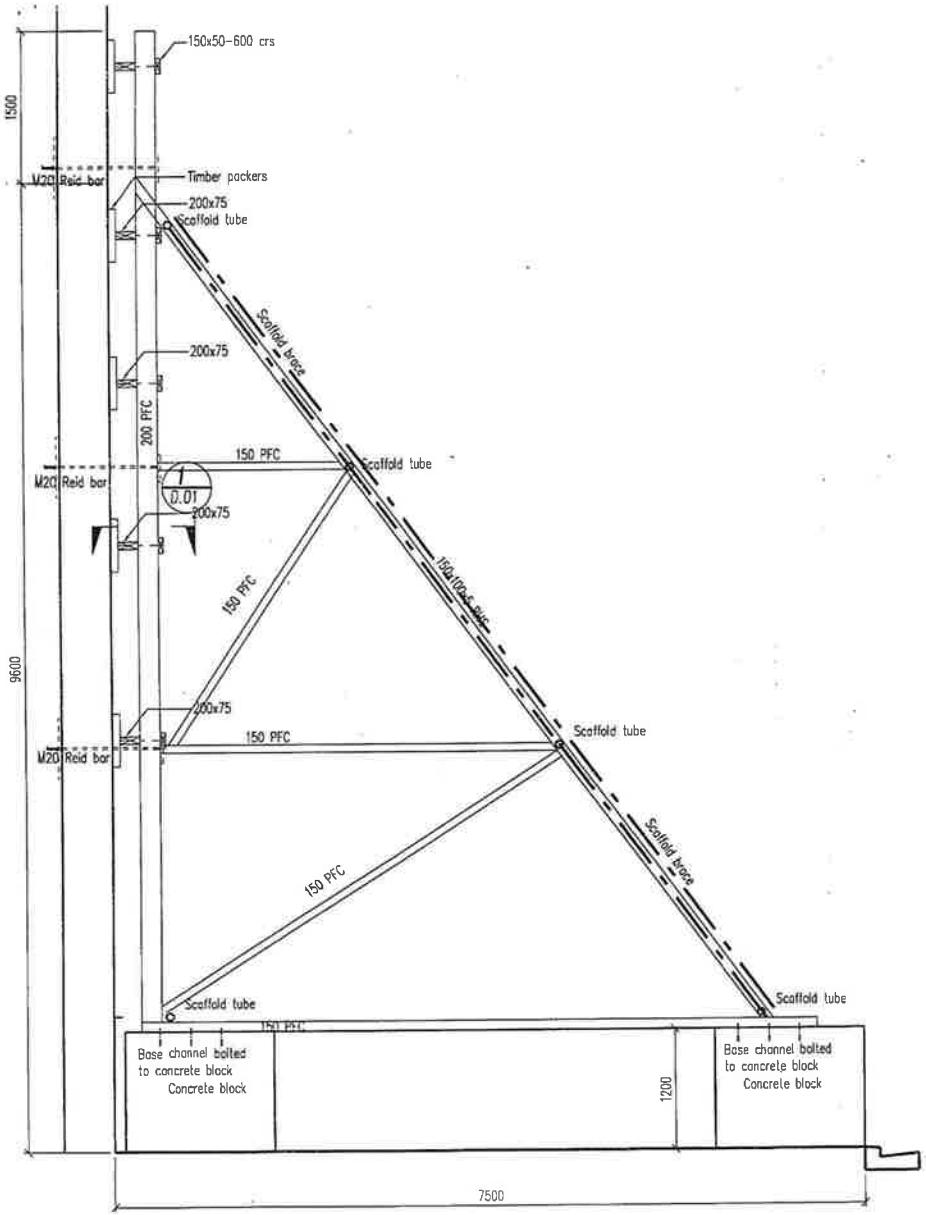
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

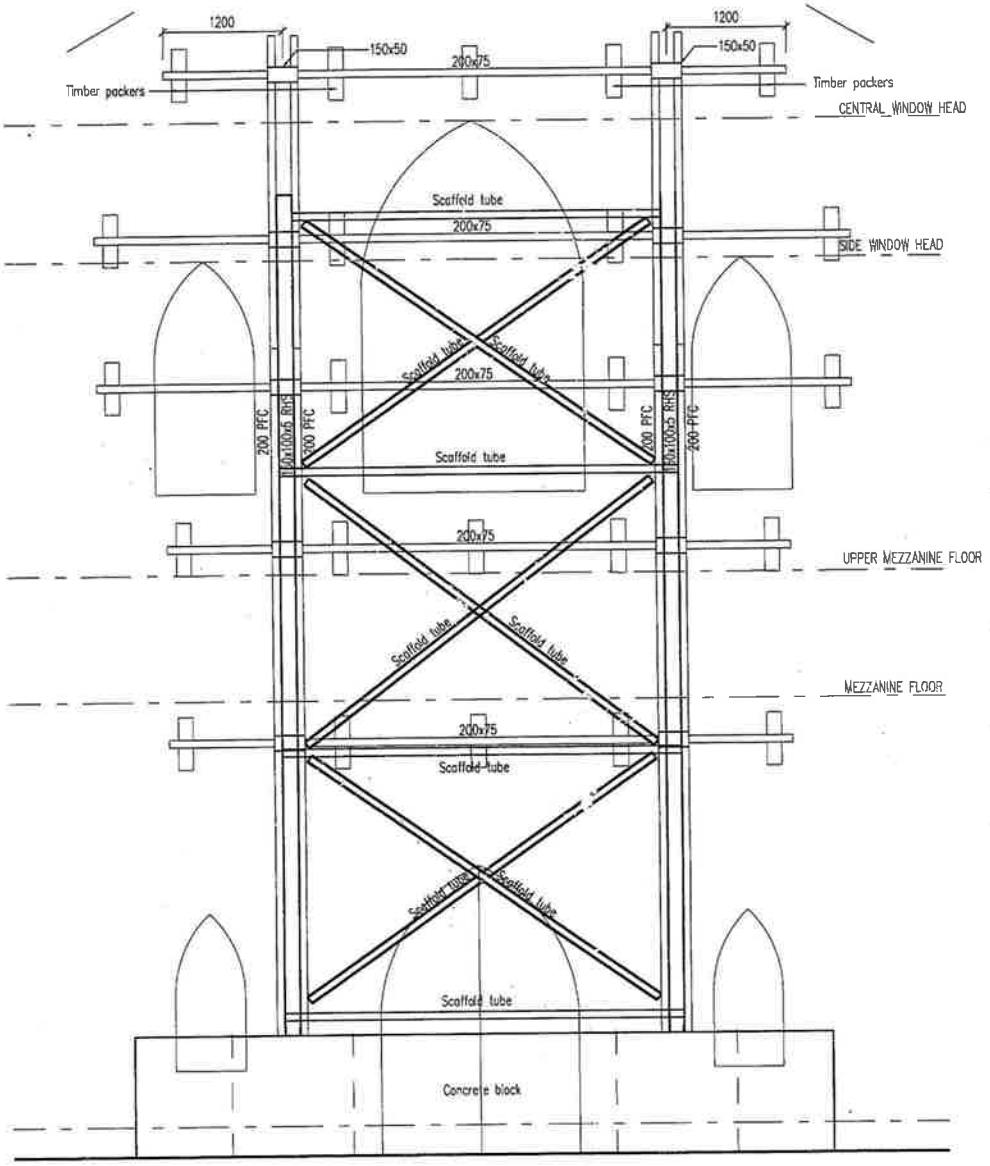
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	SN/TT
Date	06.10.10
Scale	@ A3

Job No. 5123.003
Sheet No. SP.01



BRACE SECTION 1 SP.01 Scale 1:50



BRACE ELEVATION 2 SP.01 Scale 1:50

SECTIONS

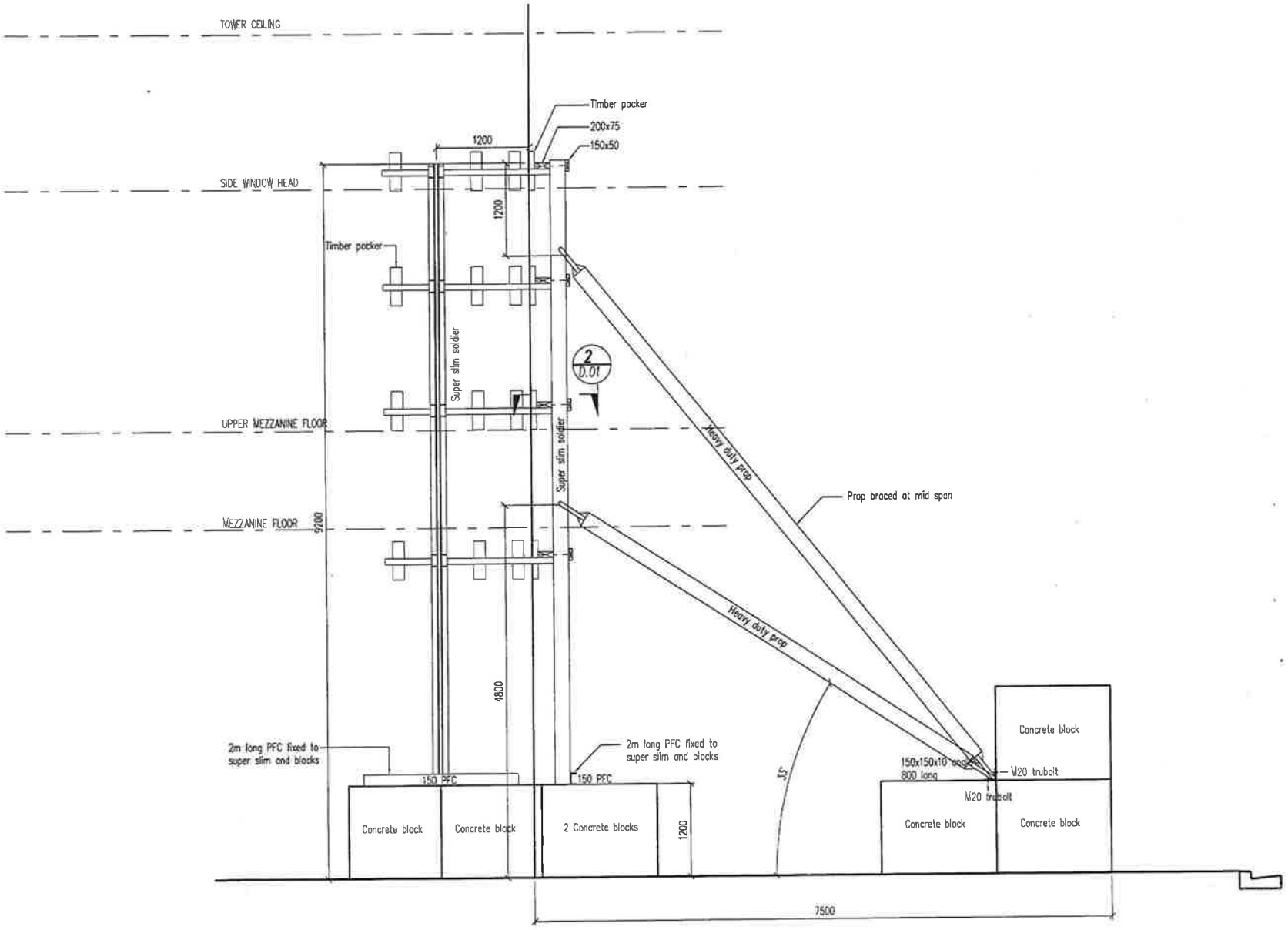
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	06.10.10
Scale	1.50@ A3

Job No. 5123.003
Sheet No. S.01



BRACE SECTION 3 SP.01 Scale 1:50

SECTIONS

R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

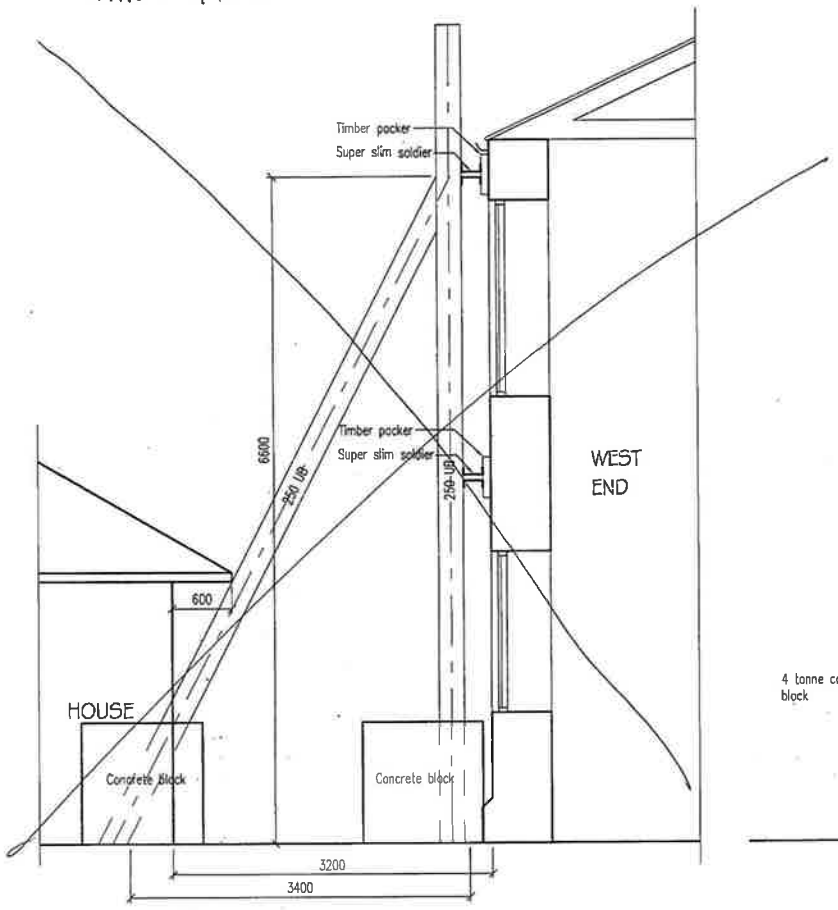
DURHAM ST METHODIST CHURCH

CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

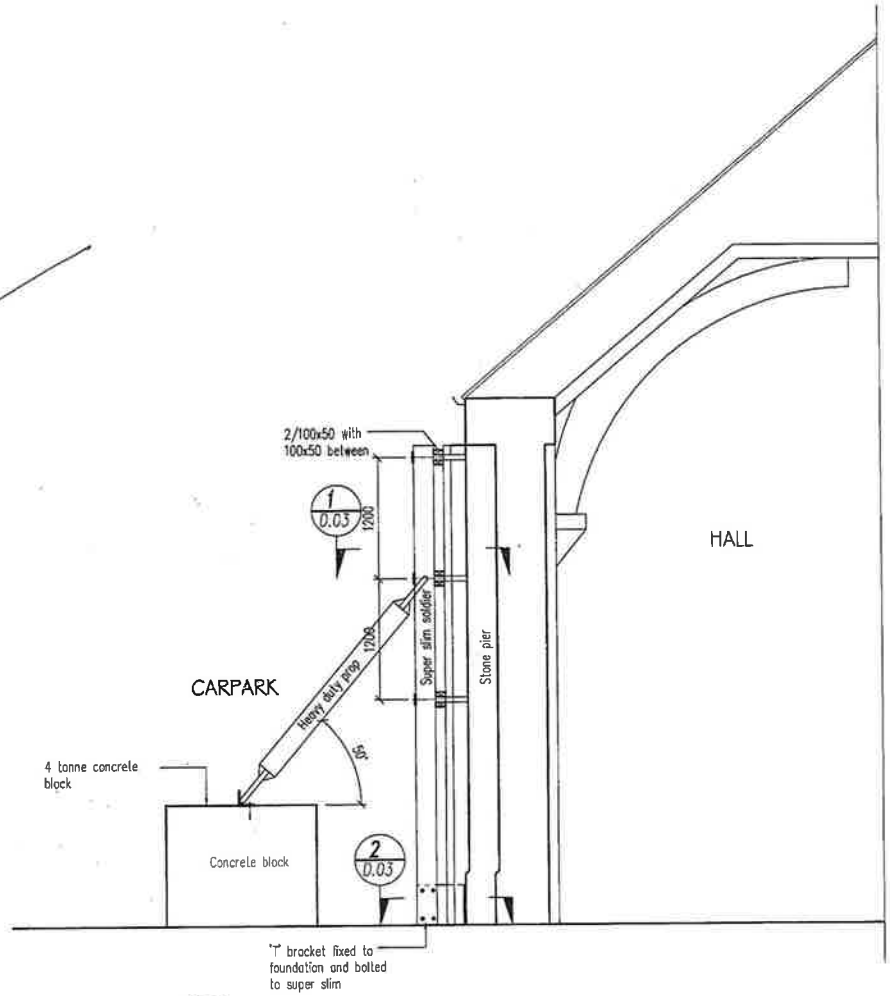
Design	RDS
Drawn	TT
Date	06.10.10
Scale	1.50@A3

Job No. 5123.003
Sheet No. S.02

REF REVISED DETAILS
RD SULLIVAN SKETCH
5123 -003 SH 1+2
DATED 7.10.10



SECTION 4/SP.01 Scale 1:50



SECTION 5/SP.01 Scale 1:50

SECTIONS

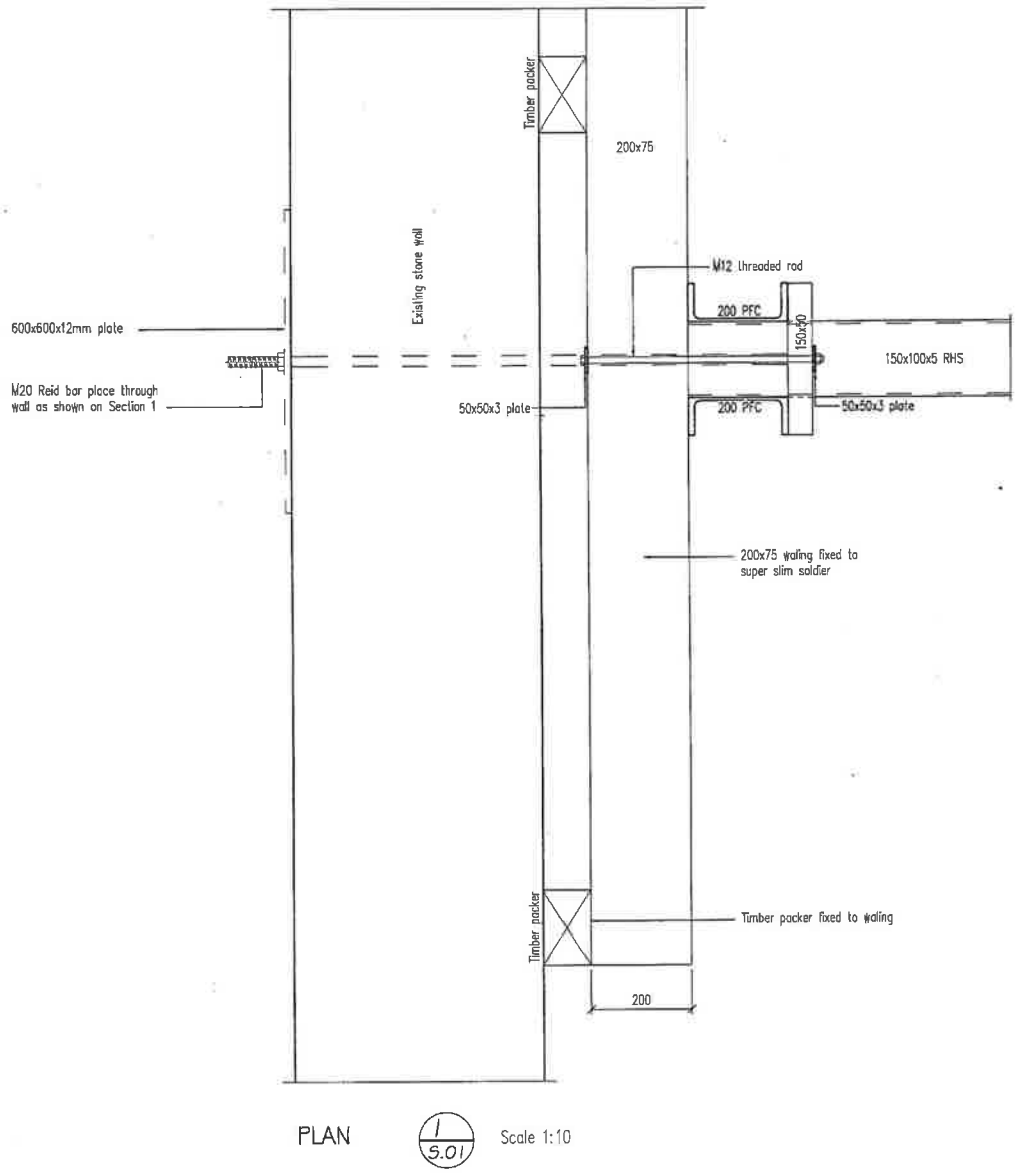
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

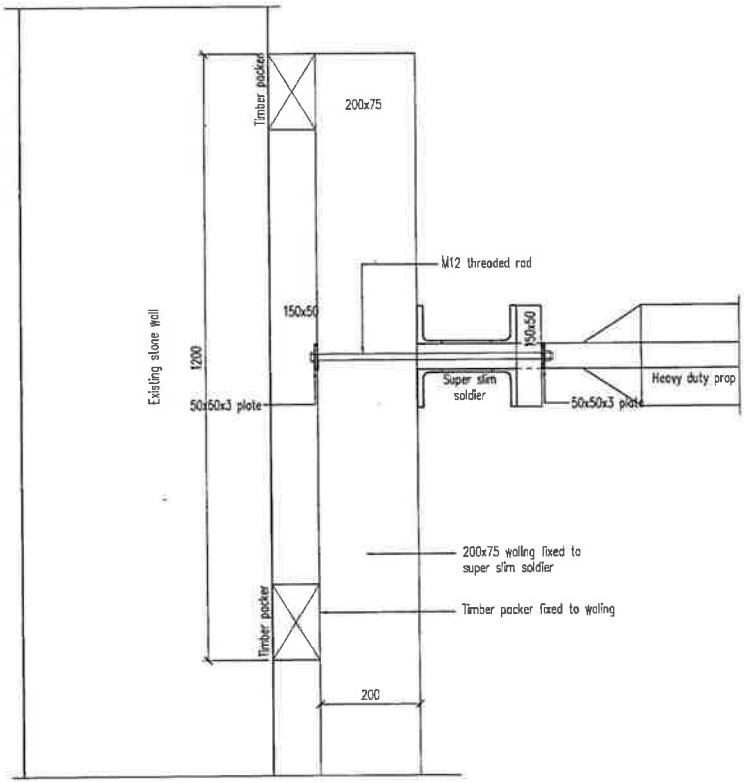
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	SN
Date	17.09.10
Scale	@ A3

Job No. 5123.003
Sheet No. S.03



PLAN (1/5.01) Scale 1:10



PLAN (2/5.02) Scale 1:10

DETAILS

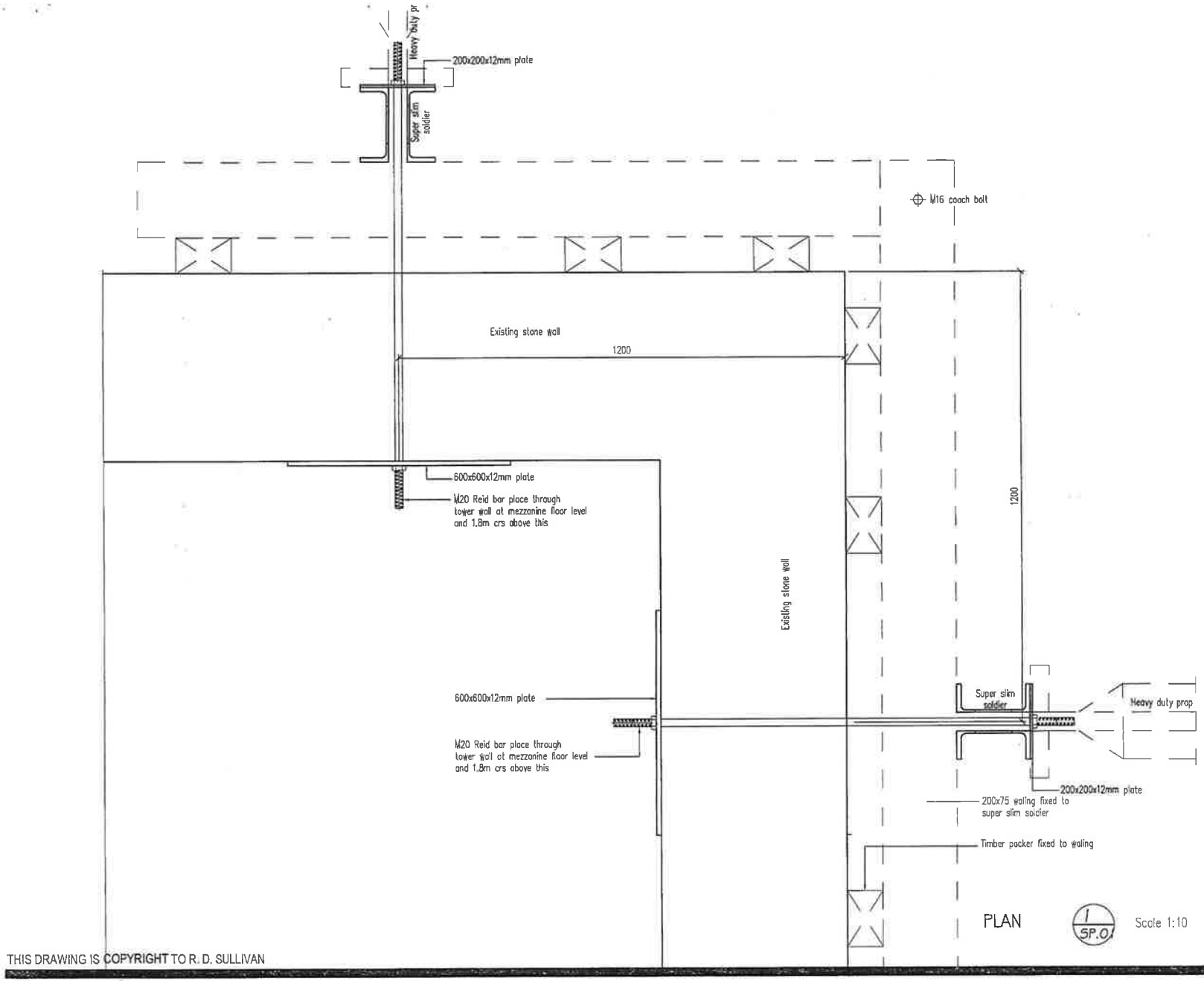
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	06.10.10
Scale	1.10@A3

Job No. 5123.003
Sheet No. D.01



DETAILS

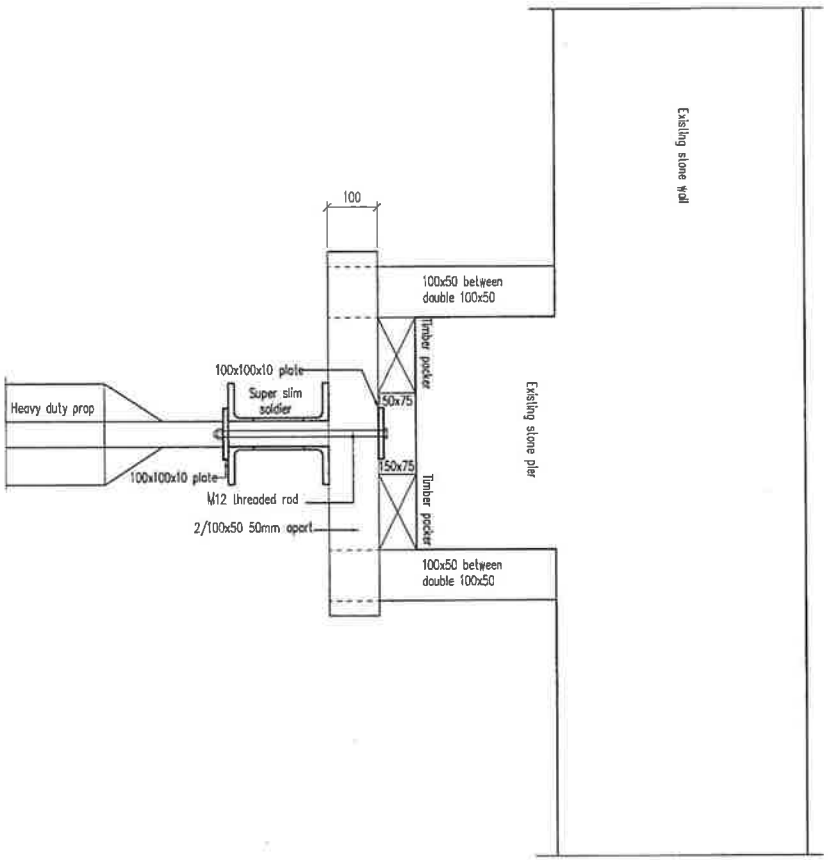
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

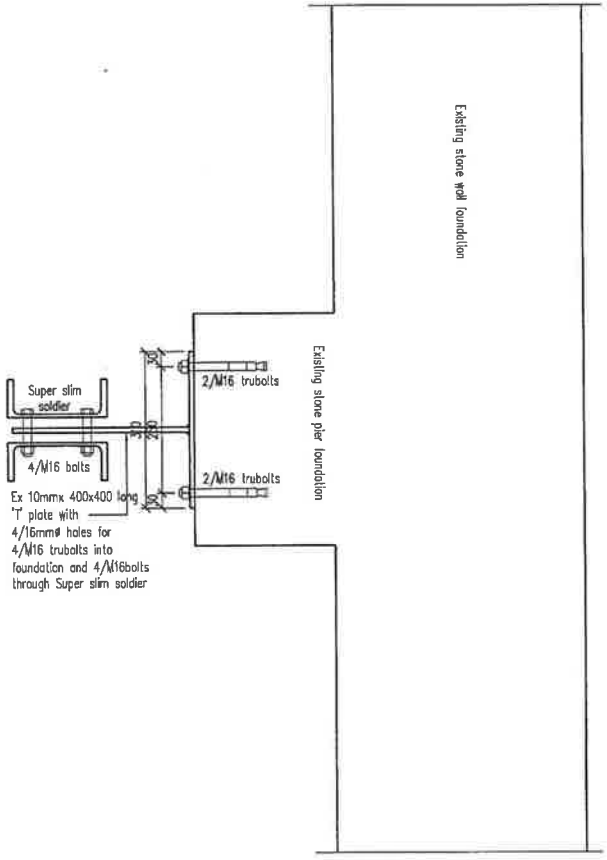
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	06.10.10
Scale	1.10@ A3

Job No. 5123.003
Sheet No. D.02



PLAN 1/5.03 Scale 1:10



PLAN 2/5.03 Scale 1:10

DETAILS

R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

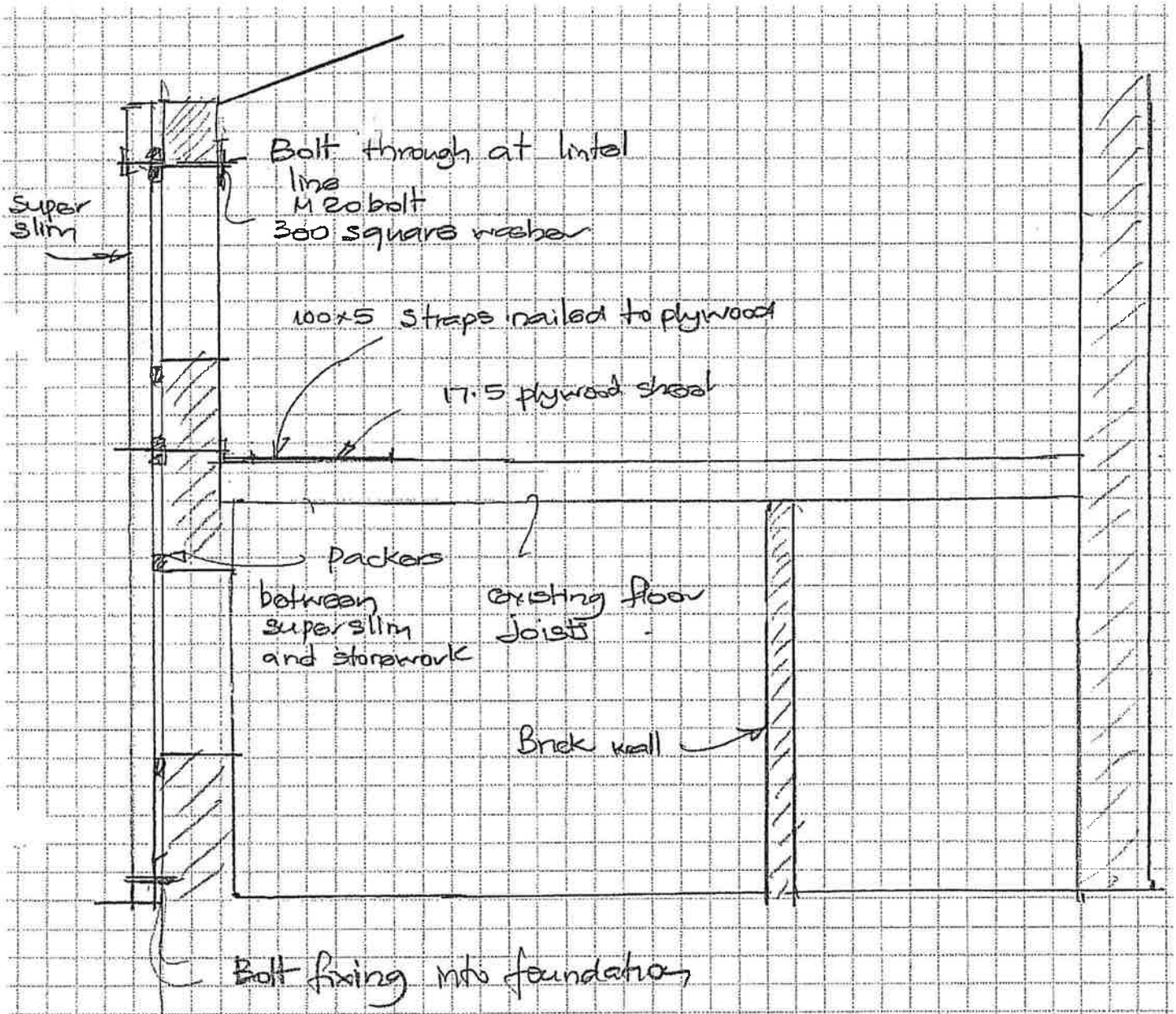
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	06.10.10
Scale	1:10@ A3

Job No. 5123.003
Sheet No. D.03

R.D. SULLIVAN CPEng IntPE **Consulting Engineer - Civil & Structural**
239 Armagh Street • P.O. Box 21185 • Christchurch 8143 • Tel. 365 3644 • Fax 365 5096

BY RDS
JOB TITLE Durham st
JOB No 5123-003
SHEET USE Annexe West Wall Support
SHEET No 1
DATE 7/10/10



Detail of Connection of West stone wall to the first floor

Allow for 6 support locations

E-mail Message

From:	Ohs, Amanda [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=AMANDA.ROSS]
To:	Askew, Kate [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=KATE.ASKEW]
Cc:	Carrie, Neil [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=NEIL.CARRIE]
Sent:	13/10/2010 at 11:15 am
Received:	13/10/2010 at 11:15 am
Subject:	Durham 309 Post Earthquake Enquiry 2010-10-13 1216 Email from Amanda seeking approval for streamlined process

Hi Kate -

I would have thought a more streamlined process would be for the applicant to get immediate CCC approval for emergency works, and then include them for retrospective consent as part of the same consent for the repair and strengthening works. Keen to hear your thoughts. I think there are time restrictions on retrospective consents that I don't know the details of.

Could you please liaise directly with Tim Fahy at Arrow consultants tim.fahy@arrowinternational.co.nz about this? Sorry I am too flat out to follow it up today,

Thanks,
Amanda

-----Original Message-----
From: Askew, Kate
Sent: Wednesday, 13 October 2010 9:31 am
To: Ohs, Amanda
Subject: RE: Temporary propping details - Durham Street methodist church

Hi Amanda,

I'm happy for them to apply for retrospective approval.
Have they given you any time frame of when this might take place, as it does seem they have enough information to apply for a consent now.
This could be processed quickly so as not to hold up the proposed works...

Kate Askew

Senior Planner
Environmental Policy and Approvals

DDI 03 941 8736
Email kate.askew@ccc.govt.nz
Web www.ccc.govt.nz

Christchurch City Council
Civic Offices, 53 Hereford Street, Christchurch PO Box 73013, Christchurch, 8154

-----Original Message-----
From: Ohs, Amanda
Sent: Tuesday, 12 October 2010 09:49
To: Carrie, Neil

Cc: Askew, Kate
Subject: Temporary propping details - Durham Street methodist church

Please advise if you have any comments/concerns - they need to get this work underway ASAP, and will include details and photographs with future RC application.
Thanks,
Amanda

------< TRIM Record Information >------

Record Number : 10/555855
Title : Durham St Methodist Church - Temp Propping Details

------< TRIM Record Information >------

Record Number : 10/555854
Title : Durham St Temp Propping 2 (2)

------< TRIM Record Information >------

Record Number : 10/555853
Title : Durham St Temp Propping 1 (2)

------< TRIM Record Information >------

Record Number : 10/555852
Title : Durham St Temp Propping 3 (2)

Judith Becker

From: Richard Sullivan [rdsull@xtra.co.nz]
Sent: Thursday, 14 October 2010 11:41 a.m.
To: Tim Fahy
Subject: Durham St bracing frames
Attachments: Durham St 14.10.10.pdf

Tim

Copy of suggested anchor block layouts attached.

Any comments please contact me.

Regards

Dick

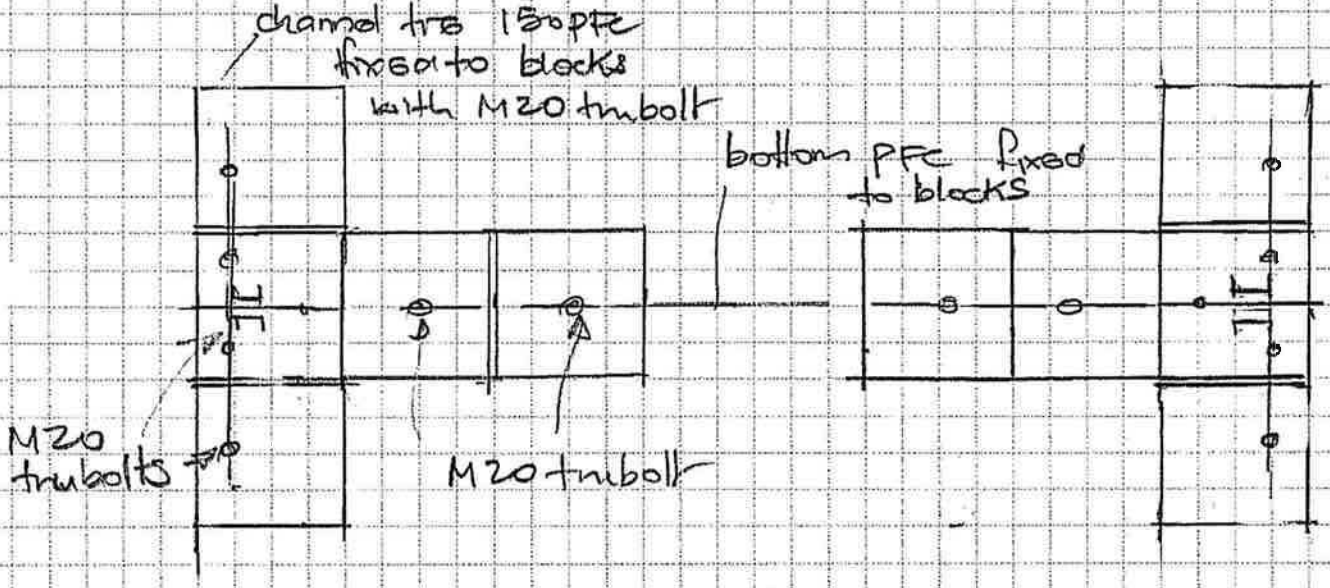
R D Sullivan & Associates Ltd

R.D. SULLIVAN CPEng IntPE **Consulting Engineer - Civil & Structural**
239 Armagh Street • P.O. Box 21185 • Christchurch 8143 • Tel. 365 3644 • Fax 365 5096

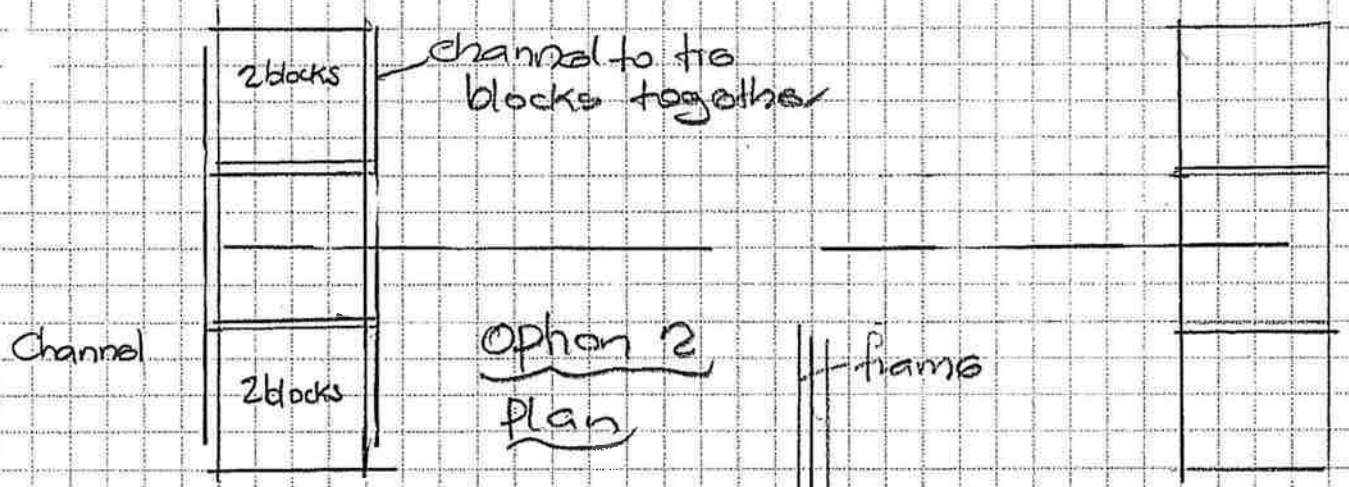
BY RDS
JOB No 5123.003
SHEET No
DATE 14/10/10

JOB TITLE Durham St
SHEET USE Options for Anchoring Bracing Frames

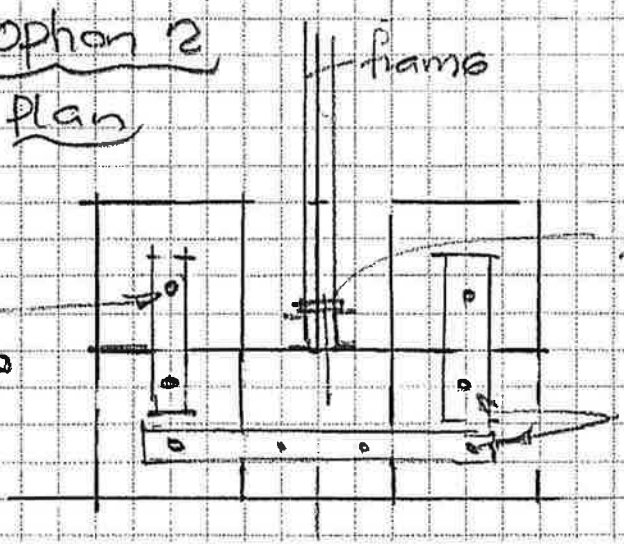
Each block 2 tonnes



Option 1 Plan



Option 2 Plan



Elevation

Judith Becker

From: Richard Sullivan [rdsull@xtra.co.nz]
Sent: Monday, 18 October 2010 5:46 p.m.
To: Tim Fahy
Subject: Durham St Methodist Church
Attachments: 5123.003 SP.01.pdf; 5123.003 S.01.pdf

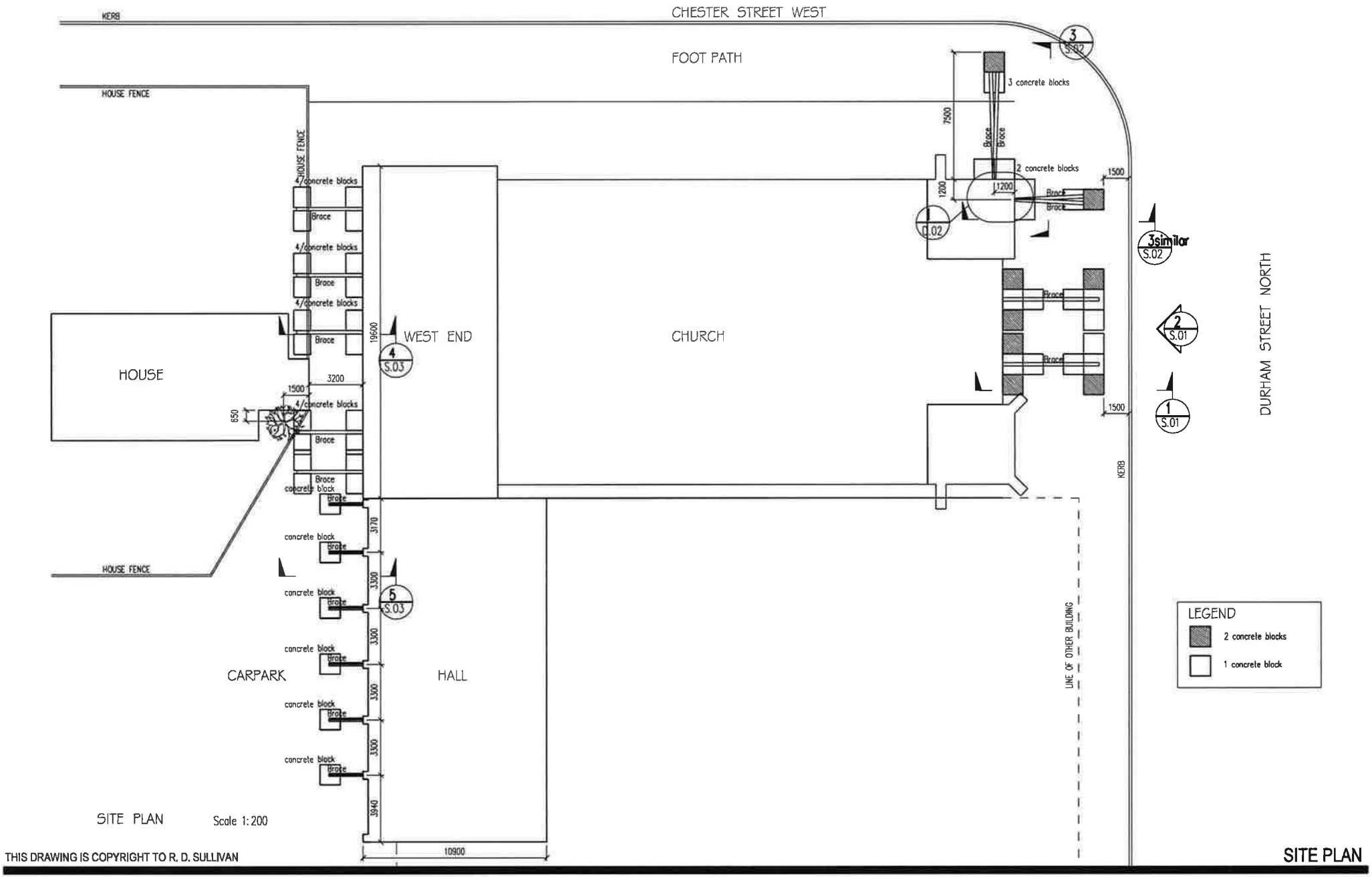
Tim

As discussed this morning. Please find attached amended drawings for the front facade retention allowing for a 1500mm gap between the foot of the concrete blocks and the Durham St kerb.

Regards

Peter Sullivan

RD Sullivan and Associates Ltd



SITE PLAN Scale 1:200

SITE PLAN

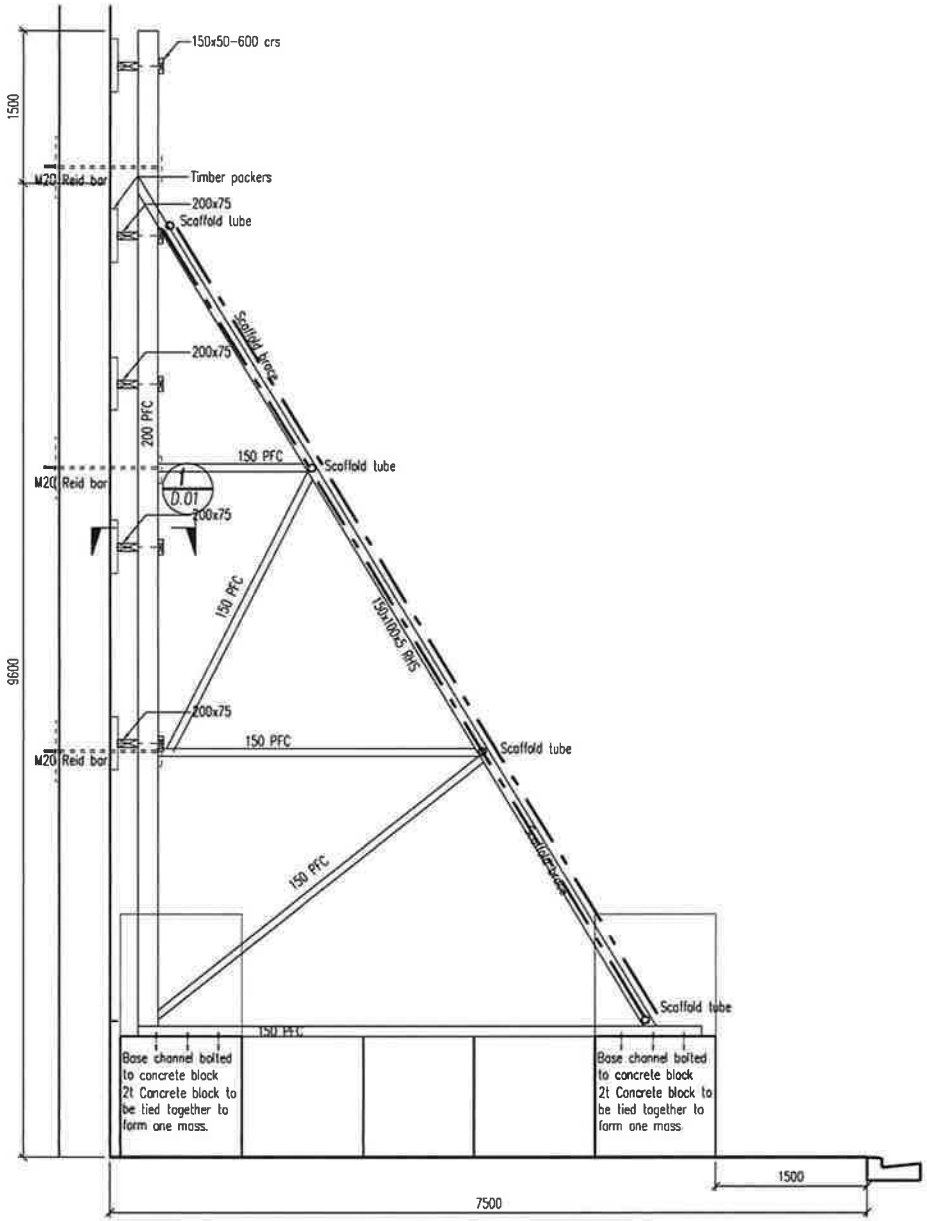
R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

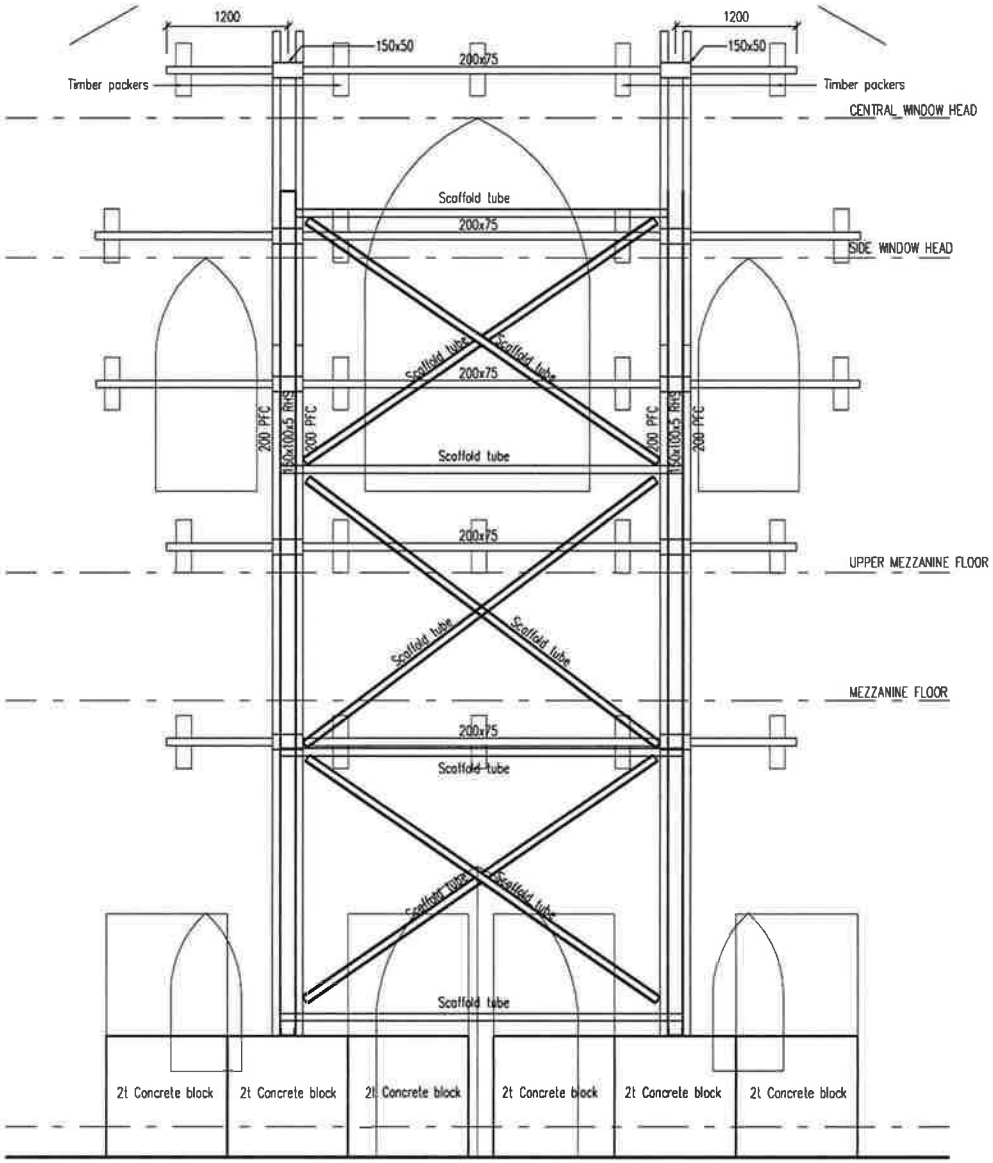
CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	SN/TT
Date	18.10.10
Scale	1.200@ A3

Job No. 5123.003
Sheet No. SP.01



BRACE SECTION 1/SP.01 Scale 1:50



BRACE ELEVATION 2/SP.01 Scale 1:50

SECTIONS

R.D. SULLIVAN
CONSULTING ENGINEER
P.O. Box 21-185 Edgeware
Ph 365-3644 Fax 365-5096 ChCh
Email rdsull@xtra.co.nz

DURHAM ST METHODIST CHURCH

CNR OF DURHAM ST & CHESTER ST WEST, CHRISTCHURCH

Design	RDS
Drawn	TT
Date	18.10.10
Scale	1.50@ A3

Job No. 5123.003
Sheet No. S.01

E-mail Message

From:	Tim Fahy [SMTP:tim.fahy@arrowinternational.co.nz]
To:	Askew, Kate [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=KATE.ASKEW]
Cc:	
Sent:	18/10/2010 at 10:39 am
Received:	18/10/2010 at 10:39 am
Subject:	Durham 309 Post Earthquake Enquiry 2010-10-18 1139 Email from Applicant confirming outcome of our discussion

Hi Kate,
Thanks for your call this morning.
I confirm that The Council understands the necessity to provide / install temp propping and support to the various Methodist Churches we are currently dealing with and that we will need to seek retrospective Resource Consents to cover that same temp work.
I also understand that The Council will give us about a months grace to apply for these Consents given the unprecedented circumstances.
I will certainly keep you informed as progress is made.

Kind regards

Tim Fahy
Project Manager
Arrow International

-----Original Message-----
From: Askew, Kate [mailto:Kate.Askew@ccc.govt.nz]
Sent: Wednesday, 13 October 2010 2:28 p.m.
To: Tim Fahy
Subject: Temporary propping details - Durham Street methodist church

Hi Tim,

Can you please give me a call on 9418736 to discuss your proposal.

Regards,

Kate Askew

Senior Planner
Environmental Policy and Approvals

DDI 03 941 8736
Email kate.askew@ccc.govt.nz
Web www.ccc.govt.nz

Christchurch City Council
Civic Offices, 53 Hereford Street, Christchurch PO Box 73013,
Christchurch, 8154

Please consider the environment before printing this email

and may not necessarily reflect the views of the Christchurch City Council.

If you are not the correct recipient of this email please advise the sender and delete.

Christchurch City Council
http://www.ccc.govt.nz
****

E-mail Message

From:	Askew, Kate [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=KATE.ASKEW]
To:	Tim Fahy [SMTP:tim.fahy@arrowinternational.co.nz]
Cc:	
Sent:	19/10/2010 at 9:18 am
Received:	19/10/2010 at 9:18 am
Subject:	Durham 309 Post Earthquake Enquiry 2010-10-19 1017 Email reply to applicant confirming Council's position

Hi Tim,

I just need to clarify, that Council is not giving carte blanche approval to undertake all propping stabilisation works.
In all instances you will need to provide Council with appropriate details of what you are proposing to do, so a Council judgement can be made prior to the works proceeding as to whether the works and proposed methodology are appropriate. We are only given this tacit verbal approval where absolutely necessary, and this often requires a site visit to assess the damage and discuss what is being proposed.
In each circumstance, there will also be building consent requirements (though you may be exempt under current dispensations available), again this will need to be confirmed.
Do you have any plans drawn up showing the works you are shortly seeking to undertake.
Feel free to give me a call to discuss further.

Regards,

Kate Askew

Senior Planner
Environmental Policy and Approvals

DDI 03 941 8736
Email kate.askew@ccc.govt.nz
Web www.ccc.govt.nz

Christchurch City Council
Civic Offices, 53 Hereford Street, Christchurch
PO Box 73013, Christchurch, 8154

-----Original Message-----
From: Tim Fahy [mailto:tim.fahy@arrowinternational.co.nz]
Sent: Monday, 18 October 2010 11:39
To: Askew, Kate
Subject: RE: Temporary propping details - Durham Street methodist church

Hi Kate,
Thanks for your call this morning.
I confirm that The Council understands the necessity to provide / install temp propping and support to the various Methodist Churches we are currently dealing with and that we will need to seek retrospective Resource Consents to cover that same temp work.
I also understand that The Council will give us about a months grace to apply for these Consents given the unprecedented circumstances.
I will certainly keep you informed as progress is made.

Kind regards

Tim Fahy
Project Manager
Arrow International

-----Original Message-----
From: Askew, Kate [mailto:Kate.Askew@ccc.govt.nz]
Sent: Wednesday, 13 October 2010 2:28 p.m.
To: Tim Fahy
Subject: Temporary propping details - Durham Street methodist church

Hi Tim,

Can you please give me a call on 9418736 to discuss your proposal.

Regards,

Kate Askew

Senior Planner
Environmental Policy and Approvals

DDI 03 941 8736
Email kate.askew@ccc.govt.nz
Web www.ccc.govt.nz

Christchurch City Council
Civic Offices, 53 Hereford Street, Christchurch PO Box 73013, Christchurch, 8154

Please consider the environment before printing this email

Judith Becker

From: Gary Haverland [GHaverland@structex.co.nz]
Sent: Thursday, 21 October 2010 9:44 a.m.
To: Judith Becker
Cc: Tim Fahy
Subject: Durham Street Propping
Attachments: Methodist Church - Durham St 02 Ltr Arrow.pdf

Hi Judith,

Please see attached letter.

In consideration for Dick I have called him this morning and let him know that the propping review was favorable with the recommendation of using the timber packer on the inside face which he was comfortable with.

Regards,

Gary Haverland
ghaverland@structex.co.nz

structex

Structex Metro Limited, Level 7, 138 Victoria Street,
PO Box 25438, Christchurch, New Zealand
Tel: +64 3 968 4925, Fax: +64 3 968 4927, Mob: 021 435 286

structex

structex metro ltd
level 7 lumley centre
138 victoria street
christchurch 8013
new zealand

tel:+64 3 968 4925
fax:+64 3 968 4927
metro@structex.co.nz
www.structex.co.nz

21 October 2010

Judith Becker
Arrow International Ltd
PO Box 42
Christchurch 8140

Dear Judith

Re: Methodist Church Durham Street – Temporary Propping

Thank you for forwarding to us the proposed temporary propping details for Durham Street Methodist church (SP 01A, S.01A, S.02, S.03, D.01, D.03 and one unlabelled sheet), designed by RD Sullivan, consulting engineer.

We understand you have contacted Dick Sullivan who has prepared these drawings to advise him that Structex are carrying out a review.

Our review consists of a brief overview of the drawings to provide a second opinion on how appropriate the proposed propping is, and does not include design calculations.

We also understand that the intention of the propping is to provide public safety and avoid collapse of the towers into the footpath.

We understand that the propping to the hall will not be installed and therefore we have not reviewed these details.

The proposed propping system and details appear to be of a robust nature to provide temporary medium term support to the east wall and north-east tower.

We understand the hole to the existing masonry wall for the RB20 Reid bar will be core drilled with a diamond drill from the outside face. We believe this is the most appropriate method to reduce vibration to the stone during drilling, with a very low risk of significant spalling to the inside face of the stone as the hole is created.

We would suggest that a 300 x 100 timber packer, 600mm long, with a 100 x 10 square washer be used on the inside face in lieu of the proposed 600 x 600 x 12mm plate. The timber packers are significantly lighter and would ease installation. Please refer to the marked up sketch attached.

Based on our inspection and report dated 4 October 2010, we believe that the main Church auditorium has not had significant structural damage and is therefore unlikely to collapse as a result of significant aftershocks. Temporary propping in addition to the tower is not considered to be necessary to allow removal of the organ, piano and music library. We recommend that

building occupancy be minimised to assist in reducing risks to persons carrying out the removal work.

If you have any questions, please feel free to contact me.

Yours sincerely
Structex Metro Ltd

Gary Haverland B.Eng (Hons)(Civil)
Senior Structural Engineer &
Director
MIPENZ CPEng # 209540

Judith Becker

From: Tim Fahy
Sent: Wednesday, 26 January 2011 5:02 p.m.
To: 'Gary Haverland'
Subject: Durham St Organ removal project

Hi Gary,

I need to discuss:
1) access for scaffolders into Durham St avoiding the need to come via Aldergate Atrium wondering whether we could erect some form of protection over the Chester St doors????
2) Parking scaffolders truck adjacent to the hall whilst the erect/dismantle,

Thanks

Cheers

Tim Fahy
Arrow International Ltd
Project Manager
Ph: 363 6059
Mobile: 0275 303 800

structex

structex metro ltd
level 7 lumley centre
138 victoria street
christchurch 8013
new zealand

tel:+64 3 968 4925
fax:+64 3 968 4927
metro@structex.co.nz
www.structex.co.nz

1 February 2011

Tim Fahy
Arrow International Ltd
PO Box 42
Christchurch 8011

By Email: tim.fahy@arrowinternational.co.nz

Dear Tim

Re: Methodist Church Durham Street, Christchurch

As requested we have carried out a further visit to the Methodist Church at Durham Street, Christchurch with yourself to view alternative egress routes for removing the organ and other chattels.

The current designated safe path from the Church building is through the protected Aldersgate entry.

In order to reduce the disruption in this area we reviewed the possibility of providing access through the north door of the annex. If access is to be provided through this area protective scaffold will be required over the door. This is necessary to provide protection against loose stonework being dislodged from the top of this wall. The scaffold and protective planks should be as high as possible to reduce the impact loading from falling stones.

A number of large pinnacle stones, which are loose, are present on the adjacent buttress. These will also need to be removed.

Also, in order to reduce disruption to the rear carpark, contractors trucks could be parked adjacent to the west wall of the hall. Although this wall is on an outward lean of about 80mm, roof ties are present to provide some stability to the wall. Parking in this area should be kept to a minimum in order to reduce the risk.

Contractors will need to be advised of the risk and evacuate the area immediately if there is a noticeable aftershock.

If you have any questions, please feel free to contact me.

Yours sincerely
Structex Metro Ltd

Gary Haverland B.Eng (Hons)(Civil)
Senior Structural Engineer &
Director
MIPENZ CPEng # 209540

ACENZ

structex

structex metro ltd
level 7 lumley centre
138 victoria street
christchurch 8013
new zealand

tel:+64 3 968 4925
fax:+64 3 968 4927
metro@structex.co.nz
www.structex.co.nz

1 February 2011

Tim Fahy
Arrow International Ltd
PO Box 42
Christchurch 8011

By Email: tim.fahy@arrowinternational.co.nz

Dear Tim

Re: Methodist Church Durham Street, Christchurch

As requested we have carried out an inspection of the Durham Street Church building on 19 January 2011 with yourself and Kayde from Arrow International.

The purpose of the building inspection was to observe additional damage that had occurred due to the earthquakes on 26 December 2010 and subsequent aftershocks, and determine any safety issues associated with removing the organ and pews from inside the church.

Cracking to the stonework was observed to be significantly worse compared with its condition when originally viewed on 4 October 2010. The ongoing aftershocks have resulted in additional cracking as well as increased cracks from hairline cracks to cracks that are now 20-30mm wide. This is particularly evident in five of the seven north side buttresses.

The west wall of the annex has displaced further away from the building. A number of stones on the north side of the Annex are dislodged at eave level with a large crack now formed above the door on the north Annex wall.

Crack width to the towers has also increased and we observed four cracks to the south tower.

The north tower and east wall are well braced and both north and south towers are wrapped with straps restraining the tops of the towers.

Cracks to the south wall buttresses adjacent to Aldersgate were still relatively minor.

During a subsequent visit on 1 February 2011, a significant bow was observed in the west gable wall of the church building. Although this appears to be mainly historical some additional brackets should be installed to the gable wall to provide additional stability to the wall while the organ and other chattels are removed.

The additional brackets can be provided most economically by fixing a steel bracket to the annex roof trusses and bolting through the wall. Please refer to the attached sketch for details.

Significant deterioration has occurred to this building as a result of ongoing aftershocks since the initial earthquake on 4 September. Based on our recent observations it is becoming less likely that this building will be able to be repaired and retained. We are underway with a detailed assessment and repair for the hall and church building and will forward our reports to you on 7 February 2011 when they are complete.

Although visible deterioration is ongoing, in our opinion the building is not yet in a condition that would prevent the removal of the organ and pews. The reasons are as follows:

- Stonework generally falls out from the building and all work is occurring inside. A safe protected path has also been constructed through Aldersgate.
- The side walls and end walls are restrained by a mezzanine and adjacent annex floor at the mid height, providing some stability to the walls.
- The roof trusses provide a good tie between the stone buttresses.

Workers who are carrying out the removal work should only access the building through Aldersgate, and should vacate the building immediately through this exit in the event of a noticeable aftershock.

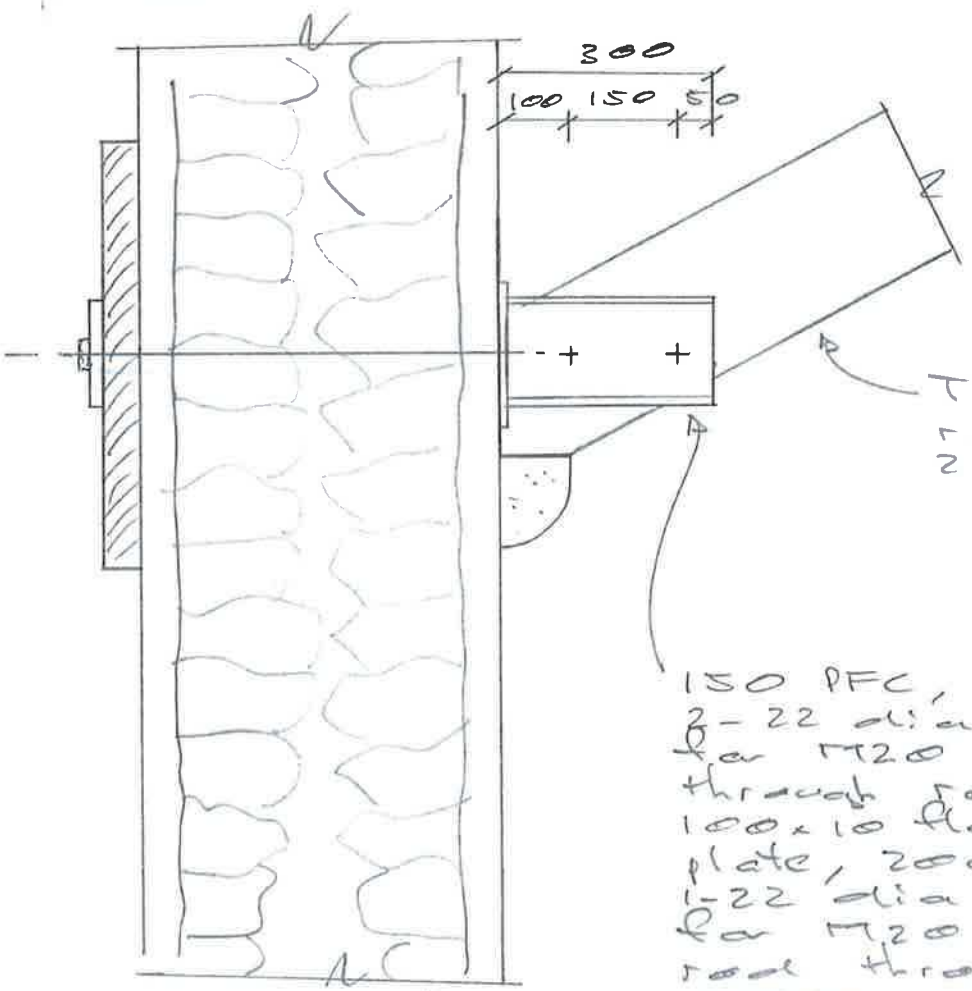
If you have any questions, please feel free to contact me.

Yours sincerely
Structex Metro Ltd

Gary Haverland B.Eng (Hons)(Civil)
Senior Structural Engineer &
Director
MIPENZ CPEng # 209540

West Gable wall / Roof Truss

Ties



ARROW INTERNATIONAL
Projects. Strategy and Delivery

02.02.11

Dave Anderson
John Jones Steel
PO Box 4241
CHRISTCHURCH

Dear Dave,

Methodist Church Earthquake Recovery

Temp Propping to Durham St Church

Contract Variation No.02

1) Supply and Install 4No MS Brackets with tie rods and washers as Per Structex Detail Sk1 File No 10499 dated 01.02.11 Related to wall stability for organ removal.
2) Ref your e mailed quote dated 02.02.11 9.48am
3) Price $3510 +gst includes scaffolding and core drilling
4) Installation will occur in two stages. Two brackets will be installed before any Organ removal starts and the final two installed once sufficient amounts of 'pipe work' is removed to allow access.
5) Work to be completed by Fri 11 Feb.
6) Contract Works Insurance cover to be specifically nominated for this project

Yours sincerely
Arrow International Limited

Tim Fahy
Project Manager

P:\43553 08\D110202Variation JJS Organ brackets 02_02_11-TF

Judith Becker

From: Tim Fahy
Sent: Wednesday, 2 February 2011 10:54 a.m.
To: Judith Becker
Subject: Scaffolding Protection to Chester St entrance

Hi Judith,

Braziers advise their price to erect a small protective frame over the Chester st doors is $200 plus $10 per week rental.

This will certainly assist the Organ removal team.

If we are going to proceed with removal of all the remaining stained glass windows, it could be very beneficial to retain this access for the duration that Graham Stewarts guys are on site.

Cheers

Tim Fahy
Arrow International Ltd
Project Manager
Ph: 363 6059
Mobile: 0275 303 800

Judith Becker

From: Brazier Christchurch [paul@brazier.co.nz]
Sent: Thursday, 3 February 2011 7:46 p.m.
To: Tim Fahy
Subject: Re: Durham St Methodist

Hey Tim

Correct email for john is quotes@brazier.co.nz

I will ensure he has the schematic for the job next week

regards Paul

Paul Faithfull
Regional Manager (Northern)
Brazier Scaffolding Christchurch
13 Nathan Pl (Next to Hirequip, Johns Rd)
P.O.Box 20141 Bishopdale Christchurch 8543
Ph 03 3592016 Fax 03 3592014 Mobile 021 2729440
Email paul@brazier.co.nz
Website www.brazier.co.nz

From: "Tim Fahy" <tim.fahy@arrowinternational.co.nz>
Date: Thu, 3 Feb 2011 14:05:13 +1300
To: <bruce@brazier.co.nz>
Subject: FW: Durham St Methodist

Hi Bruce,
I must have an incorrect e mail for John,
Please would you be kind enough to pass it on to him,
Thanks
Cheers

Tim Fahy
Project Manager
ARROW INTERNATIONAL LIMITED

ARROW INTERNATIONAL
Projects Strategy and Delivery

Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web

From: Tim Fahy
Sent: Thursday, 3 February 2011 9:31 a.m.
To: 'john@brazier.co.nz'
Subject: Durham St Methodist

Hi John,
Please see attached sketch showing in schematic form the scope of the protection envisaged for the Chester St doors,
Be assured we will be on site Wed morning to discuss in detail with your boys

Many thanks

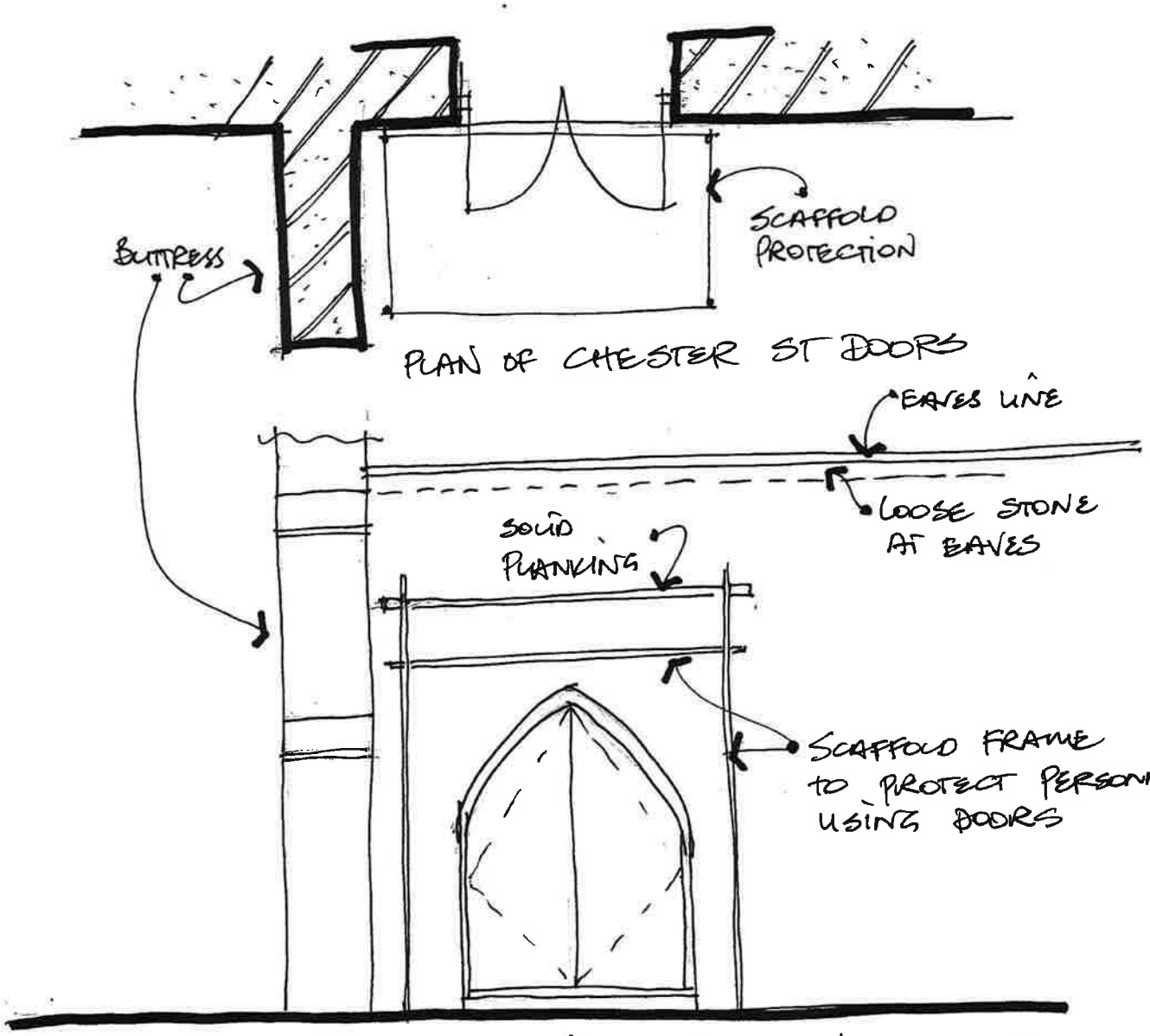
Cheers

Tim Fahy
Project Manager
ARROW INTERNATIONAL LIMITED

ARROW INTERNATIONAL
Projects Strategy and Delivery

Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web



DURHAM ST METHODIST
CHESTER ST DOORS
SCAFFOLD PROTECTION
AIL SK1
03-02-11

ARROW INTERNATIONAL
Projects: Strategy and Delivery

07.02.11

CHRISTCHURCH

T: +64 3 366 5418
F: +64 3 366 4304
www.arrowinternational.co.nz

Arrow International Limited
Level 1
253 Madras Street
Christchurch 8011

P O Box 42
Christchurch Mail Centre
Christchurch 8140
New Zealand

Ben West
Stoneworks (SI) Ltd
19 Huntsbury Ave
Christchurch

Dear Ben

PROJECT Methodist Church Earthquake Recovery

Trade: Stonework removal to make safe.

Arrow International Limited, acting as agent for the Methodist Church of New Zealand, is pleased to accept your estimate of $ 4000 exclusive of GST for the above contract works.

Scope of Work:

Removal of loose/ dislodged stone from the North western Chester St gable and pinnacle.

Please allow to place all removed stone on pallets in the Chester St driveway adjacent to currently stored stone.

We accept it is an estimate based on the fact that we cannot accurately quantify the amount of loose stone to be removed until you get to view it from above.

Contractors under your control

Titan Cranes

Whites Traffic management

Programme:

Depending on CCC approval of the Temp Traffic Management plan we understand work will take place Tuesday 8 Feb and be completed in one day.

Health and Safety:

Please be aware we are no longer operating under 'emergency works conditions' and need to ensure all Health and Safety documentation is in place prior to work commencing.

Arrow operate under Site Safe guidelines. If you are familiar with the requirements of SSSP please complete the necessary documentation and bring it with you to site. If this is unfamiliar our Construction Manager Cade Scott will complete the necessary forms with you prior to commencing work on site.

Insurance

Please provide evidence of your Public Liability Insurance to the amount of $2M.

Electricity

Please be aware there is no power available on site.

Contractor parking

Aldersgate personnel have now reoccupied their building and parking is at a premium. It would be advisable to allow to park on Chester St adjacent to the crane

Invoicing

Please ensure your invoice is addressed to

The Methodist Church of New Zealand

C/o Arrow International.

We look forward to working with you, and to the successful completion of this project.

Yours sincerely
Arrow International Limited

Tim Fahy
Project Manager

ARROW INTERNATIONAL
Projects: Strategy and Delivery

11.02.11

Clare Revell
Senior Planner
Environmental Policy and Approvals Unit
Christchurch City Council

Dear Clare,

RE: Durham St Organ removal

Thank you for your time on site yesterday.

The whole reason for removing the Organ is to prevent further damage to the organ and to allow adequate access for contractors, plant and machinery to work on the west gable.

As discussed please see attached information relating to the removal of the organ.

South Island Organ Report dated 08 Oct 2010

Organ Removal Outline Methodology, Programme and Site Plan dated 25.01.11

As we noted at the meeting the Organ dismantling and removal is programmed to commence Monday 14 Feb.

As agreed we will lodge a Resource Consent to cover

- Stone removal to make safe, temporary propping/ weatherproofing
- At risk Stained Glass Window removal
- Organ removal
- Fixed and Loose Furniture & Fittings

By Friday 18 Feb.

If you have any questions please call,

Yours sincerely
Arrow International Ltd

Tim Fahy
Project Manager

Durham St Methodist Church

Organ Removal

Outline Methodology 25.01.11

1 A scaffold platform will be erected directly in front of the organ and above the height of the choir stalls. It will be approx 10m long x 6m deep and approx 3m above the auditorium floor level.

South Island Organ Co Staff are the main contractor engaged to dismantle and remove the organ to storage. They will photograph and record the condition of all parts as they dismantle the organ. They will lower components from the platform to the auditorium floor level where they will be packaged

They will spend the first week dismantling and packaging components.

Much of the heavy machinery is located on the ground /Auditorium floor and will not require lowering.

2 The most efficient safe passage out of the building has been identified as out thru the Aldersgate Atrium.

3 A storage container will be situated on Chester St

4 SIOC staff will barrow packaged/ boxed components out thru the Aldersgate Atrium and around the footpath to be stacked in the container.

5 Once complete the container will be transported to a storage facility in Washdyke

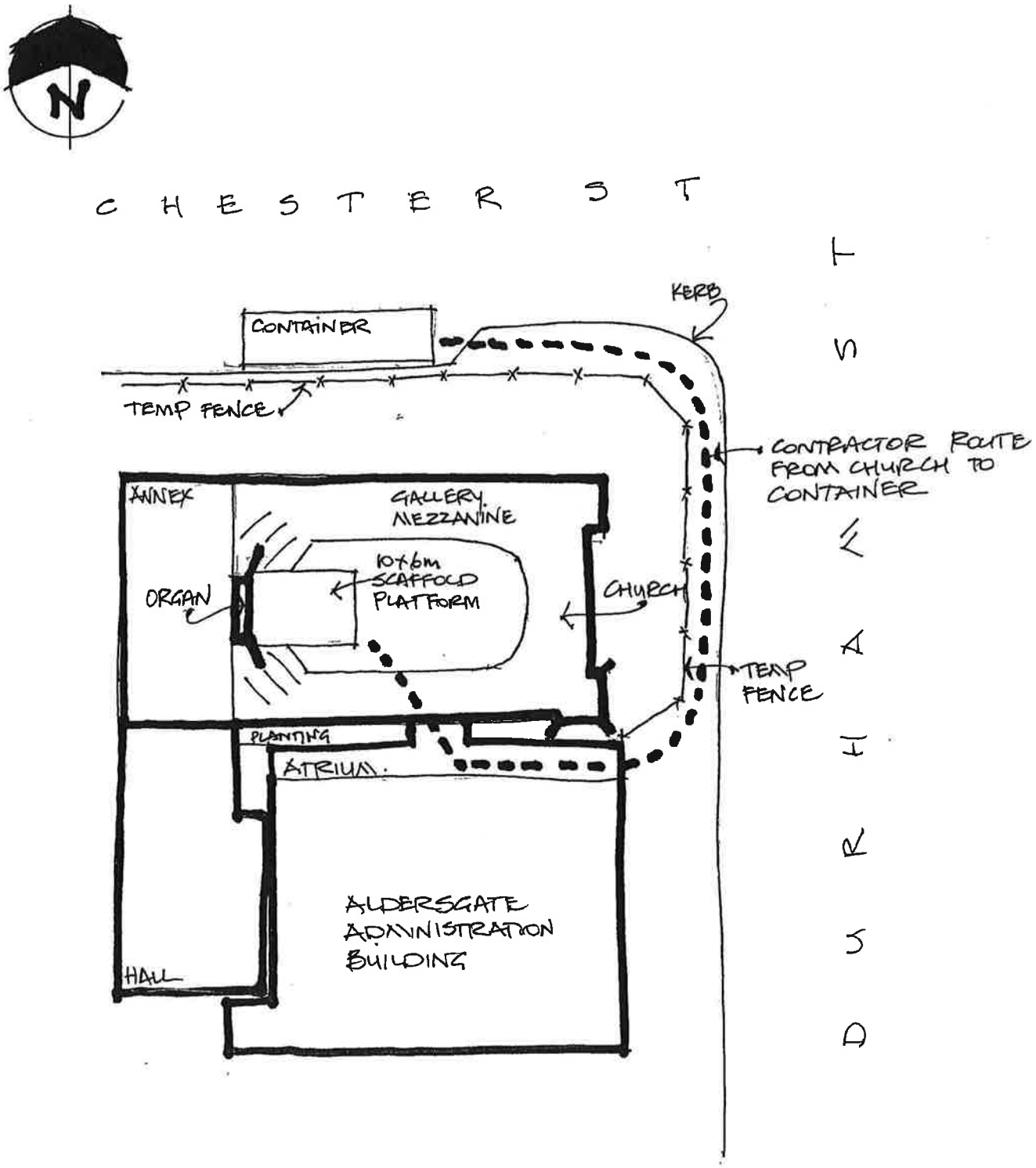
6 The components will then be restacked into another container inside a secure and weatherproof storage facility in Washdyke

Durham St Methodist Church

Organ Removal Project

Outline Programme date 25.01.11

Start Date	Fin Date	Duration	Task	Resource	Notes
09-Feb	11-Feb	3 Days	Erect Scaffold Platform	Brazier Scaffolding	
14-Feb	25-Feb	10 Days	Commence dismantling of organ	South Island Organ Company (SIOC)	
21-Feb	25-Feb	5 Days	Temp traffic management plan in place to allow container on Chester St	Chris White	
21-Feb	25-Feb	5 Days	Packing dismantled components into storage container situated on Chester St	SIOC	
25-Feb	25-Feb	1 Day	Container uplifted and transported to storage facility in Washdyke.	Toll- Tranzlink	
28-Feb	01-Mar	2 Days	Dismantle and remove scaffold	Brazier Scaffolding	



DURHAM ST METHODIST CHURCH COMPLEX SITE PLAN NTS

25-01-11

E-mail Message

From:	Ohs, Amanda [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=AMANDA.ROSS]
To:	Jenny May [SMTP:jenny@hms.net.nz]
Cc:	Revell, Clare [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=Clare.Revell]
Sent:	14/02/2011 at 9:52 am
Received:	14/02/2011 at 9:53 am
Subject:	Durham St Methodist Church Organ Removal - request for comments today
Attachments:	Arrow Logo.jpg Letter CCC Organ Removal 11.02.11.pdf

Hi Jenny,

You will recall we decided to work as a team to provide comment for this building, considering its significance and the enormity of any impending RC application.

Please let me know if you have any additional comments/conditions on this. They are starting work today, so we are on the back foot here.

For the RC application I will want to see engineers report outlining the risk of further damage to the organ, and also outlining works proposed to the west gable wall to justify requiring removal of the organ. Considering works are underway, and the church has told us they don't have complete structural reports yet, I will ask Clare for immediate information briefly explaining these aspects.

I will condition that where scaffolding elements abut heritage fabric they are to have foam padding protection - floors and walls. And that high res jpeg format photographs are to be provided documenting the organ and affected area of the church prior to, during and post removal.

I would also like immediate information on how they are going to mitigate risk to pews and other interior fittings from putting scaffolding up and taking it down, and transporting scaffolding and organ elements within the church.

Thanks,
Amanda

From: Revell, Clare
Sent: Monday, 14 February 2011 8:09 am
To: Ohs, Amanda
Subject: FW: Durham St Methodist Church Organ Removal

Hi Amanda,

Letter re organ removal. Can you please take a look today and let me know if you have any comments/ conditions for me to respond with.

Thanks

Clare

From: Tim Fahy [mailto:tim.fahy@arrowinternational.co.nz]
Sent: Friday, 11 February 2011 4:07 pm

To: Revell, Clare
Subject: Durham St Methodist Church Organ Removal

Hi Clare,
As discussed please see attached Organ removal report and supporting information,

Kind regards

Tim Fahy
Project Manager

Arrow International Limited

Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web

E-mail Message

From:	Ohs, Amanda [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=AMANDA.ROSS]
To:	Revell, Clare [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=Clare.Revell]
Cc:	
Sent:	14/02/2011 at 10:54 am
Received:	14/02/2011 at 10:57 am
Subject:	FW: Durham St Methodist Church Organ Removal - request for comments today
Attachments:	image001.jpg

FYI. Amanda

From: Jenny May [mailto:jenny@hms.net.nz]
Sent: Monday, 14 February 2011 11:18 am
To: Ohs, Amanda
Subject: RE: Durham St Methodist Church Organ Removal - request for comments today

My main concern here is that this work is being done without the proper consent process and that this is a group 1 cat 1 building. We should not be on the back foot and we can send down an enforcement officer to stop work if we have real concerns.

I have no real concerns over the organ removal - the South Island organ Company are outstandingly good and will take all the correct conservation procedures.

We can ask about risk mitigation to pews and other interior but they are not part of the listing unless fixed to the built fabric - this was Melinda's advice over the St Barnabas debacle some years ago. We have, as you know, no jurisdiction over objects that are not fixed and limited jurisdiction over things such as plaques etc but if screwed to the wall or floor they may be deemed to be part of the fabric of the building - a very grey area however and one in need of clarification by the planners.

I do have a concern that is beyond the scope of the consent and that is the complete removal of the interior fittings etc - that this might be the beginning of a move to not reinstate - it seems that this is the general desire of the congregation and church from the word on the street that is - so we will have to wait and see what they apply for.

In the interim I agree in general with what you are asking - the SI Organ Company usually pack and carry themselves.

Can we also ask please that all other objects removed are carefully labelled, conservation packed as appropriate, and detailed information about the place and

condition of the storage of these items. Can we also condition that they are returned to the church and restored to their original positions within 3months of the completion of the restoration work. A photographic record should be required also for the removal of all other objects other than the organ and these should be marked up on a plan as per S 10 Vol 3, 1.3.6.

There is no methodology supplied for the removal of at risk windows – who is doing this, we need to know about the crating of and storage of – again labelled and conditions about the place of storage and also please any details about proposed conservation while they are out. All other leaded plain or coloured glass windows should be boarded up with marine ply with conservation foam packing against the stone tracery.

I am sorry I did not know about the site meeting – it would have been really useful re decision making – is there to be another site visit?

Cheers

Jenny

From: Ohs, Amanda [mailto:Amanda.Ohs@ccc.govt.nz]
Sent: Monday, 14 February 2011 10:53 a.m.
To: Jenny May
Cc: Revell, Clare
Subject: Durham St Methodist Church Organ Removal - request for comments today

Hi Jenny,

You will recall we decided to work as a team to provide comment for this building, considering its significance and the enormity of any impending RC application.

Please let me know if you have any additional comments/conditions on this. They are starting work today, so we are on the back foot here.

For the RC application I will want to see engineers report outlining the risk of further damage to the organ, and also outlining works proposed to the west gable wall to justify requiring removal of the organ. Considering works are underway, and the church has told us they don't have complete structural reports yet, I will ask Clare for immediate information briefly explaining these aspects.

I will condition that where scaffolding elements abut heritage fabric they are to have foam padding protection - floors and walls. And that high res jpeg format photographs are to be provided documenting the organ and affected area of the

church prior to, during and post removal.

I would also like immediate information on how they are going to mitigate risk to pews and other interior fittings from putting scaffolding up and taking it down, and transporting scaffolding and organ elements within the church.

Thanks,

Amanda

From: Revell, Clare
Sent: Monday, 14 February 2011 8:09 am
To: Ohs, Amanda
Subject: FW: Durham St Methodist Church Organ Removal

Hi Amanda,

Letter re organ removal. Can you please take a look today and let me know if you have any comments/ conditions for me to respond with.

Thanks

Clare

From: Tim Fahy [mailto:tim.fahy@arrowinternational.co.nz]
Sent: Friday, 11 February 2011 4:07 pm
To: Revell, Clare
Subject: Durham St Methodist Church Organ Removal

Hi Clare,

As discussed please see attached Organ removal report and supporting information,

Kind regards

Tim Fahy
Project Manager

Arrow International Limited

Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web

E-mail Message

From:	Jenny May [SMTP:jenny@hms.net.nz]
To:	Revell, Clare [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=CLARE.REVELL], Ohs, Amanda [EX:/O=NZGOVT/OU=CHRISTCHURCH CITY COUNCIL/CN=RECIPIENTS/CN=AMANDA.ROSS]
Cc:	Dave Margetts [SMTP:dmargetts@historic.org.nz]
Sent:	15/02/2011 at 9:30 am
Received:	15/02/2011 at 9:31 am
Subject:	RE: Durham St Methodist Church Organ Removal

Hi Clare

This looks good and clear to me - just a couple of comments in red at the bottom of the letter - last few sentences.

Cheers

Jenny

From: Revell, Clare [mailto:Clare.Revell@ccc.govt.nz]
Sent: Tuesday, 15 February 2011 9:56 a.m.
To: Ohs, Amanda; Jenny May
Cc: Dave Margetts
Subject: RE: Durham St Methodist Church Organ Removal
Importance: High

Hi Jenny and Amanda, draft email to Tim Fahy - I'd appreciate it if you could both have a look at it before I send a final response. I don't want to come across too mean and grumpy, but want to make the point that they can't continue on as they are. Thanks Clare

Dave - I have copied you in case you have anything you'd like to add to my email, or in case you want to follow up separately.

Hi Tim,

Thanks for your email dated 11 February 2011 seeking approval for the removal of the organ from the Durham Street Methodist Church which is to commence immediately (14 February 2011). I understand that you also wish to seek that this be considered as part a retrospective resource consent application, that covers all of the temporary securing works (including propping and window removal) that have taken place since the earthquake, and some proposed new works that are yet to take place.

Approval and Conditions for Organ Removal

Amanda Oh's (Council Heritage Planner), Jenny May (Heritage Consultant) and myself have had the opportunity to review the organ removal proposal and are generally happy for this to proceed before resource consent is granted subject to the following conditions that will later form part of any resource consent granted and one point of clarification:

Conditions:

That a retrospective consent application is received by the Council no later than Tuesday 1 March 2011 (unless a subsequent date is discussed with and agreed to by Amanda, Jenny and Myself).

That the retrospective consent application contains a report from a registered engineer that outlines the risk of further damage to the organ should it remain in the church as well as any other options that were considered such as protection in situ and why these options were not considered appropriate in the circumstances. The engineers report should also outline the works proposed to the west gable wall to justify requiring removal of the organ (ie: is the organ removal required to gain access to further investigate this gable and its repair).

That the organ removal and storage be carried out by The South Island Organ Company in accordance with their letter attached to your email dated 10 October 2010.

No scaffolding shall be erected within the building in a manner which requires drilling or bolting to the interior of the protected building. In addition protective materials/ padding protection (such as foam) shall be placed between the poles, beams and board works of the scaffolding and the surface of the protected building where necessary to ensure that all decorative elements are protected from the possibility of the scaffolding knocking or rubbing against the heritage fabric.

That high resolution jpeg format photographs are provided to the Council's Heritage Team (via Amanda Ohs) documenting the organ and affected area of the church prior to, during and post removal. The photographic records are to be provided no later than 14 March 2011.

The application will need to clearly state that this is for the temporary removal of the organ while the church is repaired. We will likely be conditioning as part of any consent that the Organ be returned to the church and restored to its original position within 3 - 6 months of the completion of the repairs to the Church. Please advise the timeframe that the South Island Organ Company would need to complete the re-installation once the building is in an appropriate condition for the organ to go back in.

Point of Clarification:

The email and letter sent in relation to the organ removal contained no details about how any risk to other structures within the Church (eg: to pews and other interior fittings) fromputting scaffolding up and taking it down, and transporting scaffolding and organ elements within the church will be mitigated. Please detail any measures taken to prevent damage.

Consent for Other Retrospective Works (propping and window removal) and New

Proposed Works

In addition to the Organ above this building is now at a point where retrospective consent is required for a considerable amount of work on a Group 1 listed building including the propping at the front of the building on Durham Street, the removal and storage of some stone elements and the removal of some of the windows. As stated above it is our expectation that a retrospective consent application is received by the Council no later than Tuesday 1 March 2011 (given that the need for retrospective consent for the propping was first identified by the Council and communicated on 19 October 2010).

We have already received some of the details regarding the the window removal and this will need to be submitted with the application. In addition the following information will also need to be supplied:

Engineering plans for the propping works and a report from a registered engineer outlining why this was necessary and why the option chosen was the best solution for securing the building.

A detailed temporary protection plan for all of the works.

A description of who carried out which works.

A description of how the stone removed has been labelled, protected and stored.

High resolution jpeg photographs of all of the retrospective works (including any photographs taken before, during and after the works taking place).

In relation to the proposed new works for the removal of the interior features of the building such as pews, stone plaques and the alter etc.... as discussed on site resource consent will need to be granted before the work is carried out. As part of the the consent application we will be looking for a clear rational from the engineers as to why they consider the building to be of immediate danger to the interior features and why these objects can not be appropriately protected in situ. The application will also need to cover who will carry out the removal of the objects and what experience they have in dealing with heritage fabric, which conservation architect or heritage expert will oversee the works, how the objects will be labelled to ensure they can be returned to their original location, how the objects will be packed/protected (for while they are in storage), where the items will be stored and when it is anticipated that the objects will be returned to the building.

Process for Future Applications and Temporary Works

Given the amount of time that has past since my email of 30 November 2010 (copy attached) and follow up email of 21 January, outlining that resource consent would be required before the organ is removed it is disappointing that this has not occurred, or that the information was not sent through to the Council in October when it was obtained from The South Island Organ Company. I want to be quite clear that it is not appropriate for works to continue to be carried out on this building with out prior discussion with Myself, Jenny and Amanda. This is a Group 1 building under the City Plan with the highest level of protection and that for this reason we need to make sure a proper process is followed. It is important that discussions about the building take place as soon as new issues come to light as we also understand that it is important not to delay the process and emergency works.

If there are further emergency works proposed to secure the building we are happy to do this with urgency provided proper documentation is supplied to us for consideration and we are able to meet with the appropriate experts from your team and NZHPT on site to discuss the works, prior to them commencing. This will make for a smoother consent process for all involved when the application is lodged.

Other Recommendations

For future applications for resource consent for repairing and strengthening the building we strongly recommend that you commission a consultant planner involved to prepare applications as they will be familiar with the Council's requirements for such consents.

We would also like to see a full structural report for the building following the boxing day earthquakes completed as soon as possible, as the information contained in such a report will be required to support the retrospective and non-retrospective aspects of the resource consent applications.

Please do not hesitate to contact me if you require any clarification of the matters above or the City Plan process that is required to be followed pursuant to the matters under the RMA for historic heritage.

Regards

Clare

Clare Revell
Senior Planner
Environmental Policy and Approvals Unit
DDI: 03 941-8824
Email: clare.revell@ccc.govt.nz
Web: www.ccc.govt.nz
Christchurch City Council
Civic Offices, 53 Hereford Street, Christchurch
PO Box 73013, Christchurch, 8154
Please consider the environment before printing this email

From: Tim Fahy [mailto:tim.fahy@arrowinternational.co.nz]
Sent: Friday, 11 February 2011 4:07 pm
To: Revell, Clare
Subject: Durham St Methodist Church Organ Removal

Hi Clare,

As discussed please see attached Organ removal report and supporting information,

Kind regards

Tim Fahy
Project Manager

Arrow International Limited

Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web

E-mail Message

From:	Revell, Clare [EX:/o=NZGOVT/ou=Christchurch City Council/cn=Recipients/cn=Clare.Revell]
To:	Higgins, John [EX:/o=NZGOVT/ou=Christchurch City Council/cn=Recipients/cn=John.Higgins]
Cc:	
Sent:	15/02/2011 at 10:27 am
Received:	15/02/2011 at 10:27 am
Subject:	FW: TRIM: Durham St Methodist Church Organ Removal and Other Retrospective Matters

Hi John,

Just a quick heads up to let you know that I have a few concerns about some of the works that are occurring down at the Durham Street Methodist Church (a Group 1 Building and the first stone church in the city). Their project management team and insurers are getting a little carried away with the works and are getting close to a point where they are taking our retrospective approval process for granted. Kate and I have both made attempts in Oct and Nov last year to advise them that retrospective consents would be required for the works already carried out and that before any further works are carried out resource consent will be required. A site visit last week shows that they have continued to undertake work that we haven't given approval to.

In my email below I have tried to outline exactly what our requirements will be and have specified timeframes for them to meet for lodging a retrospective application. I just thought you should have a read in case they come back with a complaint about how we want to the process to run from here. We're going to have to keep a close eye on what's happening with this building.

Clare

From: Revell, Clare
Sent: Tuesday, 15 February 2011 11:12 am
To: 'Tim Fahy'
Cc: 'Jenny May'; Ohs, Amanda; Dave Margetts
Subject: TRIM: Durham St Methodist Church Organ Removal and Other Retrospective Matters

Hi Tim,

Thanks for your email dated 11 February 2011 seeking approval for the removal of the organ from the Durham Street Methodist Church which is to commence immediately (14 February 2011). I understand that you also wish to seek that this be considered as part a retrospective resource consent application, that covers all of the temporary securing works (including propping and window removal) that have taken place since the earthquake, and some proposed new works that are yet to take place.

Approval and Conditions for Organ Removal

Amanda Oh's (Council Heritage Planner), Jenny May (Heritage Consultant) and myself have had the opportunity to review the organ removal proposal and are generally happy for this to proceed before resource consent is granted subject to the following conditions that will later form part of any resource consent

granted and one point of clarification:

Conditions:

That a retrospective consent application is received by the Council no later than Tuesday 1 March 2011 (unless a subsequent date is discussed with and agreed to by Amanda, Jenny and Myself).
That the retrospective consent application contains a report from a registered engineer that outlines the risk of further damage to the organ should it remain in the church as well as any other options that were considered such as protection in situ and why these options were not considered appropriate in the circumstances. The engineers report should also outline the works proposed to the west gable wall to justify requiring removal of the organ (ie: is the organ removal required to gain access to further investigate this gable and its repair).
That the organ removal and storage be carried out by The South Island Organ Company in accordance with their letter attached to your email dated 10 October 2010.
No scaffolding shall be erected within the building in a manner which requires drilling or bolting to the interior of the protected building. In addition protective materials/ padding protection (such as foam) shall be placed between the poles, beams and board works of the scaffolding and the surface of the protected building where necessary to ensure that all decorative elements are protected from the possibility of the scaffolding knocking or rubbing against the heritage fabric.
That high resolution jpeg format photographs are provided to the Council's Heritage Team (via Amanda Ohs) documenting the organ and affected area of the church prior to, during and post removal. The photographic records are to be provided no later than 14 March 2011.
The application will need to clearly state that this is for the temporary removal of the organ while the church is repaired. We will likely be conditioning as part of any consent that the Organ be returned to the church and restored to its original position within 3 - 6 months of the completion of the repairs to the Church. Please advise the timeframe that the South Island Organ Company would need to complete the re-installation once the building is in an appropriate condition for the organ to go back in.

Point of Clarification:

The email and letter sent in relation to the organ removal contained no details about how any risk to other structures within the Church (eg: to pews and other interior fittings) fromputting scaffolding up and taking it down, and transporting scaffolding and organ elements within the church will be mitigated. Please detail any measures taken to prevent damage.

Consent for Other Retrospective Works (propping and window removal) and New Proposed Works

As discussed earlier, in addition to the organ above this building is now at a point where retrospective consent is required for a considerable amount of work on a Group 1 listed building including the propping at the front of the building on Durham Street, the removal and storage of some stone elements and the removal of some of the windows. As stated above it is our expectation that a retrospective consent application is received by the Council no later than Tuesday 1 March 2011 (given that the need for retrospective consent for the propping was first identified by the Council and communicated on 19 October

2010).

We have already received some of the details regarding the the window removal and this will need to be submitted with the application. In addition the following information will also need to be supplied:

Engineering plans for the propping works and a report from a registered engineer outlining why this was necessary and why the option chosen was the best solution for securing the building.
A detailed temporary protection plan for all of the works.
A description of who carried out which works.
A description of how the stone removed has been labelled, protected and stored.
High resolution jpeg photographs of all of the retrospective works (including any photographs taken before, during and after the works taking place).

In relation to the proposed new works for the removal of the interior features of the building such as pews, stone plaques and the alter etc.... as discussed on site resource consent will need to be granted before the work is carried out. As part of the the consent application we will be looking for a clear rational from the engineers as to why they consider the building to be of immediate danger to the interior features and why these objects can not be appropriately protected in situ. The application will also need to cover who will carry out the removal of the objects and what experience they have in dealing with heritage fabric, which conservation architect or heritage expert will oversee the works, how the objects will be labelled to ensure they can be returned to their original location, how the objects will be packed/protected (for while they are in storage), where the items will be stored and when it is anticipated that the objects will be returned to the building.

Process for Future Applications and Temporary Works

Given the amount of time that has past since my email of 30 November 2010 (copy attached) and follow up email of 21 January, outlining that resource consent would be required before the organ is removed it is disappointing that this has not occurred, or that the information was not sent through to the Council in October when it was obtained from The South Island Organ Company. I want to be quite clear that it is not appropriate for works to continue to be carried out on this building with out prior discussion with Myself, Jenny and Amanda. This is a Group 1 building under the City Plan with the highest level of protection and that for this reason we need to make sure a proper and robust process is followed (such that it is not open to criticism or challenge by a 3rd party) . It is important that discussions about the building take place as soon as new issues come to light as we understand that it is important not to delay the process and emergency works. Jenny, Amanda and/or myself can be available at reasonably short notice for advice if this is required.

If there are further emergency works proposed to secure the building we are happy to do this with urgency provided proper documentation is supplied to us for consideration and we are able to meet with the appropriate experts from your team and NZHPT on site to discuss the works, prior to them commencing. This will make for a smoother consent process for all involved when the application is lodged.

Other Recommendations

For future applications for resource consent for repairing and strengthening the building given the Group 1 status of the building we strongly recommend that you commission a consultant planner to prepare applications as they will be familiar with the Council's requirements for such consents and can ensure that the process runs smoothly.

We would also like to see a full structural report for the building following the boxing day earthquakes completed as soon as possible, as the information contained in such a report will be required to support the retrospective and non-retrospective aspects of the resource consent application(s) to be lodged. It may also identify further temporary securing works that could be undertaken to prevent further damage.

Please do not hesitate to contact me if you require any clarification of the matters above or the City Plan process that is required to be followed pursuant to the matters under the RMA for historic heritage.

Regards

Clare

Clare Revell
Senior Planner
Environmental Policy and Approvals Unit
DDI: 03 941-8824
Email: clare.revell@ccc.govt.nz
Web: www.ccc.govt.nz
Christchurch City Council
Civic Offices, 53 Hereford Street, Christchurch
PO Box 73013, Christchurch, 8154
Please consider the environment before printing this email

From: Tim Fahy [mailto:tim.fahy@arrowinternational.co.nz]
Sent: Friday, 11 February 2011 4:07 pm
To: Revell, Clare
Subject: Durham St Methodist Church Organ Removal

Hi Clare,

As discussed please see attached Organ removal report and supporting information,

Kind regards

Tim Fahy
Project Manager

Arrow International Limited

Level 1, 253 Madras Street
P O Box 42, Christchurch, New Zealand
Tel: 03 366 5418 | Fax: 03 366 4304
DDI: 03 363 6059 | Mob: 0275 303 800

e-mail | web

structex

Project 10715 – 17 February 2011

Methodist Church Hall
Durham Street
Christchurch

Structural Assessment & Strengthening Report

Contents

structex

structex metro ltd
level 7, lumley centre
138 victoria street
p box 25438
christchurch 8140
new zealand

tel:+64 3 968 4925
fax:+64 3 968 4927
metro@structex.co.nz
www.structex.co.nz

17 February 2011

Tim Fahy
Arrow International Ltd
PO Box 42
Christchurch 8140

Email: tim.fahy@arrowinternational.co.nz

Dear Tim,

Re: Durham Street Methodist Church Hall
Structural Assessment & Strengthening Report



Introduction

Structex Metro has been engaged to carry out a seismic assessment and report of the existing Durham Street Methodist Church Hall building in Christchurch.

The purpose of this report is to summarise the building damage caused by the recent Darfield earthquake on 4 September 2010, and assess the building to determine if it is earthquake prone. If the building is earthquake prone, strengthening options to 33% current code, and 67% current code are provided.

Walk-over surveys of the building were carried out in January 2011. A previous report has been written by Structex dated 4 October 2010 summarising damage and outlining possible repair options.

A level survey of the floor was also carried out.

Limitations of Report

Findings presented as part of this report are for the sole use of our client, the Methodist Church and their consultants to assist with insurance assessments on this building. The findings are not intended for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses.

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 this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

Executive Summary and Recommendations

The Durham Street Methodist Church Hall building has been damaged, in some areas substantially, as a result of the recent Darfield earthquake and aftershocks.

Building damage includes cracking to the stone side walls and gables. The top section of the east side wall has collapsed.

Collapsed and dislodged stone work will require re-laying. Cracked mortar joints will require deep rake out of the mortar and re-pointing.

Cracking has occurred to the existing lath and plaster ceiling which will require replacement or overlaying with GIB.

The west wall has displaced out by about 80mm and will require substantial repair work or reconstruction.

No ground liquefaction or gross settlement of the building was observed.

The building has been assessed as having a longitudinal (along the building) strength of 16% current code, and a transverse (across the building) strength of 17% current code.

Strengthening in the form of insitu concrete skin walls will increase the longitudinal strength to 33% and 67% depending on the extent of the new walls.

Strengthening work will require grouted tie rods to be installed to the stone walls, to stabilise the walls.

Connections between the gable end walls and the roof structure will be required to secure the gables in place.

Building Form

The Church is located in Durham Street, in the Central Business District of Christchurch city and was constructed in 1864. The Hall was constructed ten years later in 1874.

The complex consists of three main areas, the main Church auditorium, the Annex located at the western end of the auditorium and the hall located at the south-west corner of the site. This report is specifically for the hall.

The hall measures approximately 20m x 11m in plan.

The hall is generally constructed with stone walls, consisting of a natural stone exterior, a plastered stone interior with rubble filled cavity.

A concrete wall is present on the inside face of the two side walls, extending to a height of 1250mm.

The slate roof is likely to be supported on battens with diagonal timber sarking on purlins spanning between the main supporting exposed timber trusses. The ceiling is constructed of lath and plaster. The ground floor is timber and is likely to consist of timber flooring boards on joists supported on timber bearers on concrete or timber piles.

A gallery floor has been constructed at the north end of the hall.

wall construction viewed from inside

damaged entry roof & collapsed east wall

damaged ceiling & bulkhead

damaged bulkhead

Building Condition & Earthquake Damage

The building appears to have been in reasonable condition prior to the earthquake. The mortar used to construct the masonry has been tested using the standard punch test and is considered to be soft lime mortar. At some stage during the life of the building the external mortar joints have been re-pointed with what appears to be a stronger cement based mortar.

The foundations appeared to be in sound condition with few cracks observed and no evidence of significant settlement occurring.

Following the recent earthquake in Darfield, extensive damage has occurred to the building. The following is a summary of the areas and types of damage that has occurred:

- Significant damage has occurred to the upper section of the east wall where part of this wall at roof level has collapsed out.
- The ceilings have been damaged, with damage ranging from cracked lath and plaster throughout most of the hall to partial collapse of coved ceilings near the side walls.
- Cracking of stonework and spalling of plaster to side walls adjacent to the roof truss connections.
- Damaged slate roof and gutters to the two east side foyers, where the adjacent upper section of wall has collapsed.
- The west wall has displaced outwards with a permanent lean of about 80mm at the top. Two substantial cracks are present full length of the wall, one located near the top of the wall, and the other located about 1250mm above the floor and gutters.
- A number of cracks are present in the plaster surfaces inside the hall, particularly around the windows and doors, and in the corners of the walls adjacent to the gable ends.
- A crack has occurred in the wall in the south-west corner where the gable and side wall have started to separate.
- A horizontal crack has formed along both side walls, 1250mm above the floor, at the junction of the low height concrete wall and the natural stone wall above.
- Some buttress stones to the east side have been displaced, with cracked mortar joints.
- The lath and plaster bulkhead to both side walls has been substantially damaged.

crack along west wall

horizontal crack east wall 1250mm above floor

Displaced stones to east wall buttress

- A level survey of the floor indicates the floor is generally within ±10mm of a central datum with a small area of the north end is up to 25mm out of level. It is possible that this is historical and the floor at this location has settled over time.

A summary of the extent of damage is outlined in the attached sketches.

Seismic Assessment

A seismic assessment of the building has been carried out using AS/NZS 1170.5 to determine the applied loadings to the building. The NZ Society of Earthquake Engineering Guidelines, June 2006, has been used to assess the building capacity.

The building has been assessed as an Importance Level 2 (normal) building.

The assessed strength is based on the undamaged state of the building that would have existed prior to the recent earthquakes, or following the repairs noted in "Seismic Repairs & Strengthening" section (a) below.

Various aspects of the building are assessed to determine load paths to the seismic resisting elements, such as walls and buttresses. The capacities of these elements are also assessed to determine their in-plane shear strength, in-plane flexural strength, and out-of-plane strength when subject to face loads.

Strength of connections between the diaphragms and the resisting elements are also assessed.

The assessed strengths are expressed as a percentage of the full code requirements which is summarised in the table below.

Any item that has no appreciable strength, such as a gable end connection to the roof structure which is only nominally connected, is expressed as having 'nil' strength.

Elements that have less that 33% of current code strength are regarded as being earthquake prone and are highlighted in bold.

Transverse Direction (across building)

Element	Mode	% Code
South gable	shear	53%
	flexure	62%
North gable	shear	**17%**
	flexure	**32%**

Longitudinal Direction (along the building)

Element	Mode	% Code
East side wall	shear	**16%**
	flexure	**14%**
West side wall	shear	72%
	flexure	100%

Other Items

Element	% Code
Face load – side walls	59% (i)
Face load – end gable walls	38% (i)
Gable ties to roof	**nil**
Roof diaphragm (diagonal sarking) - side walls - gable walls	 71% 45%

Note (i): These values allow for two single skin walls at 210mm thickness each, although the thickness of the natural stone is significantly variable.

The results of this assessment indicate that a number of aspects of this building are earthquake prone. Christchurch City Council requirements are that buildings of this nature be strengthened to as close as practicable 67% current code.

Seismic Repairs & Strengthening

(a) Repairs

A number of repairs are required to be carried out to reinstate the building to its pre-earthquake condition.

A summary of the building damage is included in this report, which is also outlined in the relevant sketch.

The costs associated with the repairs will require assessment by a quantity surveyor who will need to visit the site to view the extent of damage.

A general outline of repairs is as follows:

- Reconstruct upper section of east wall with stonework.
- Repair cracks to lath and plaster ceiling or re-line with GIB throughout.
- Repair spalled plaster to side walls around roof truss connections.
- Repair roof truss connections where damaged or displacement has occurred.
- Replace damaged slate roof and gutters to the east side foyer roofs.
- Replace gutter to the east side wall.
- Allow to repair damaged flashing to gable end walls.
- Re-construct the displaced west wall, full length, or alternatively prop roof, remove stonework around truss supports, install jacking frame to exterior of west wall and push wall back into alignment with hydraulic jacking system. Reinstate stonework around trusses and reinstate truss supports.
- Remove plaster around cracked sections of wall, rake out mortar joints to a depth of 60mm and re-point. Re-plaster wall. Allow to carry out same re-pointing work to exterior face.
- Rake out mortar joints to damaged stone buttresses to a depth of 60mm and re-point.
- Mortar used for re-pointing shall be 7.5MPa lime mortar with cement content.
- Remove damaged lath and plaster side wall bulkheads and reinstate.
- Re-level 60m^2 of ground floor.

(b) Strengthening to 33% Code

In addition to the repairs outlined in the previous section, the following strengthening work is required to achieve a seismic strength of 33% current code.

Refer to the attached sketch for details of the required seismic strengthening.

- Fibre reinforced concrete facing to two sections of east wall, and north wall, including D20 vertical galvanised rods grouted into wall.
- Continuous reinforced concrete eaves beam to top of east and west side walls.
- Steel angles to north and south gable walls at roof and ceiling, complete with rose head washers at 1500 centres.
- Steel plates at each purlin joint over trusses.
- Stainless steel wall ties at 600 centres each way drilled and grouted into wall.
- Install new tie rods to three remaining trusses.

(c) Strengthening to 67% Code

In addition to the repairs outlined in section (a), the following strengthening work is required to achieve a seismic strength of 67% current code.

- Fibre reinforced concrete facing to two sections of east wall, and north wall, including D20 vertical galvanised rods grouted into wall.
- Continuous reinforced concrete eaves beam to top of east and west side walls.
- Steel angles to north and south gable walls at roof and ceiling, complete with rose head washers at 1500 centres.
- Steel plates at each purlin joint over trusses.
- Stainless steel wall ties at 600 centres each way drilled and grouted into wall.
- Install new tie rods to three remaining trusses.
- Braceline ceiling diaphragm in lieu of standard GIB ceiling.

Refer to the attached sketch for details of the seismic strengthening required.

A geotech investigation will be required prior to any strengthening work being designed and detailed, to confirm ground conditions.

If you have any queries regarding the above Structural Assessment Report, please do not hesitate to contact the undersigned.

Yours sincerely
Structex Metro Limited

Gary Haverland B.Eng (Hons)(Civil)
Senior Structural Engineer &
Director
MIPENZ; CPEng # 209540

Appendix

1. Building Act Requirements
2. Christchurch City Council Requirements for Earthquake Prone Buildings
3. Sketches

1. Building Act Requirements

The Building Act 2004 came into force on 31 March 2005 along with the Building Regulations.

In considering the structure of existing buildings the relevant sections of the Act are as follows:

Section 124 – Powers of territorial authorities in respect of dangerous, earthquake-prone, or unsanitary buildings

If the Territorial authority is satisfied that a building is dangerous or earthquake prone, the Territorial Authority may:

(a) put up a hoarding or fence to prevent people approaching the building;

(b) place a notice on the building warning people not to approach the building, or

(c) give written notice requiring work to be carried out on the building to reduce or remove the danger.

Section 122 – Meaning of earthquake-prone building

This section of the Act deems a building earthquake prone if its ultimate strength capacity would be exceeded, and the building would be likely to collapse causing injury or death, in a "moderate earthquake". The size of a "moderate earthquake" is defined in the Building Regulations as one third the size of the earthquake used to design a new building at that site.

Section 112 – Alterations to Existing Buildings

This section requires that after any alterations, the building shall continue to comply with the structural provisions of the Building Code to at least the same extent as before the alteration. This means that alteration work cannot weaken the building. Additional building strength would therefore be required where structural elements are to be removed or weakened, or additional mass to be added. The building will also need to be assessed in terms of the egress from fire, and access for persons with disabilities provisions of the Building Code and upgraded to comply, as nearly as is reasonably practicable.

Section 67- Waivers and Modifications

This section allows the Territorial Authority to grant a Building Consent subject to waivers or modifications of the Building Code. The Territorial Authority may impose any conditions they deem appropriate with respect to the waivers or modifications.

The Building Act was also altered by the Canterbury Earthquake (Building Act) Order 2010, which, amongst other things, gave additional powers to the Territorial Authorities, extended the definition of a dangerous building and extended the Schedule 1 list of building work exempt from Building Consent.

2. Christchurch City Council Requirements for Earthquake-Prone Buildings

The Christchurch City Council adopted a new policy for earthquake-prone buildings in September 2010.

The policy reflects the Christchurch City Council's determination to reduce earthquake risk to buildings and ensure that Christchurch "is a safe and healthy place to live in" and may be viewed on the Christchurch City Council website.

In summary, the relevant items of the policy are as follows:

(a) Buildings are assessed using the New Zealand Society of Earthquake Engineering (NZSEE) guidelines with applied loadings from AS/NZS 1170.5 and are classed as earthquake prone if its strength is less than 33% of the applied loading from the loading standard AS/NZS 1170.5.

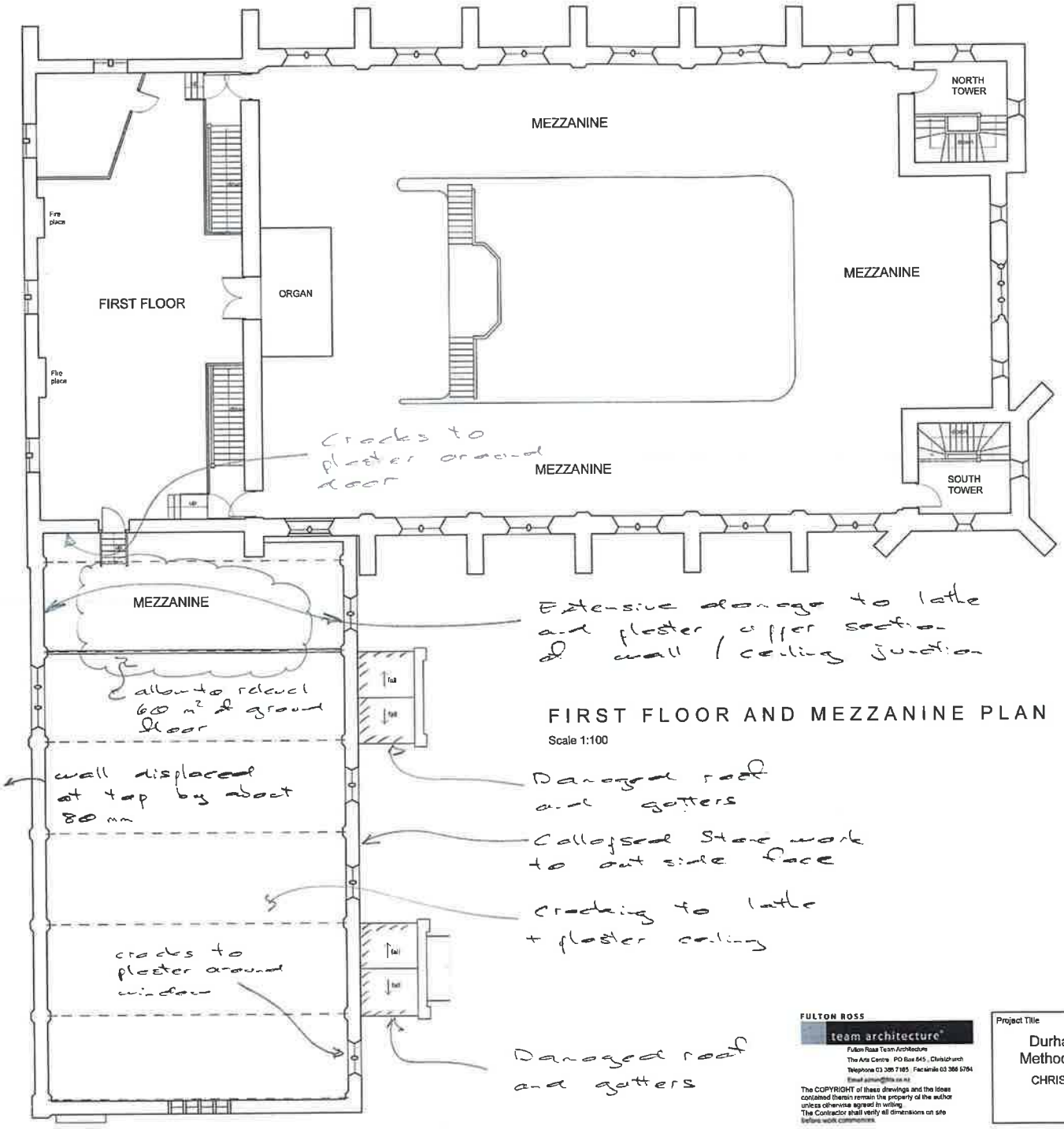
(b) It outlines the Council's approach to earthquake-prone buildings including identification, prioritisation, timeframes and implementation. In general, Importance Level 4 buildings (Post-disaster facilities, as defined by AS/NZS1170) will have 15 years from 1 July 2012 to either be strengthened or demolished. Importance Level 3 (crowd or high value) buildings will have 20 years and Importance Level 2 (normal) buildings will have 30 years. There are also additional triggers for requiring assessment and strengthening work to be undertaken at an earlier stage (including "significant" alterations or earthquake damage).

(c) The Council has a commitment to maintaining the intrinsic heritage values of Heritage buildings and has some discretion with regards to strengthening levels and methods. Each building will require discussion with Council Heritage team and Resource Consent prior to any strengthening or repair works being undertaken.

To date the Council has identified 67% of current Code as the target level for strengthening of earthquake-prone buildings. For buildings with a damaged building strength >33% current Code it is recommended (but not required) that the building also be strengthened to 67% of Code requirements

3. Sketches

Revisions



NORTH

structex

Job No: 10715

Date: 17 Feb 2011

Sketch : Sk 1 A

Damage Summary Hall

FIRST FLOOR AND MEZZANINE PLAN

Scale 1:100

Not to Scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre PO Box 845, Christchurch
Telephone 03 366 7165 Facsimile 03 366 5764

Project Title
Durham Street Methodist Church
CHRISTCHURCH

Drawing Title
FIRST FLOOR PLAN

scale
A2 @ 1:100

Drawn by MD Date January 2011
Checked WF Date January 2011

Issue PRELIMINARY
Date 25th January 2011
C.A.D file
Project No. 5461 E
Sheet No. A1.2
Rev

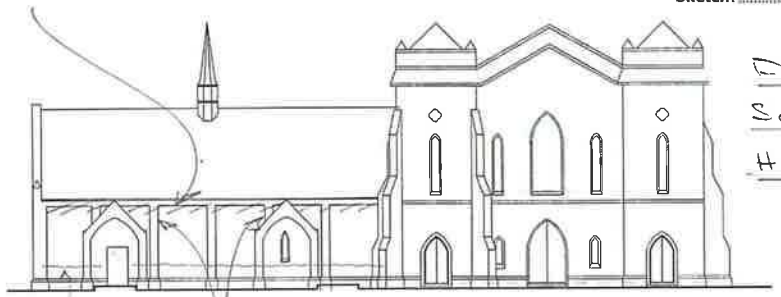
structex

Job No: 10715

Date: 3 Feb 2011

Sketch: sk 2

SOUTH ELEVATION



EAST ELEVATION

NORTH ELEVATION

WEST ELEVATION

Not to Scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre, PO Box 845, Christchurch
Telephone 03 366 7165 Facsimile 03 366 5764
Email admin@frta.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: ELEVATIONS

Scale: A2 @ 1:200

Drawn by: MD Date: January 2011

Checked: WF Date: January 2011

Issue: PRELIMINARY

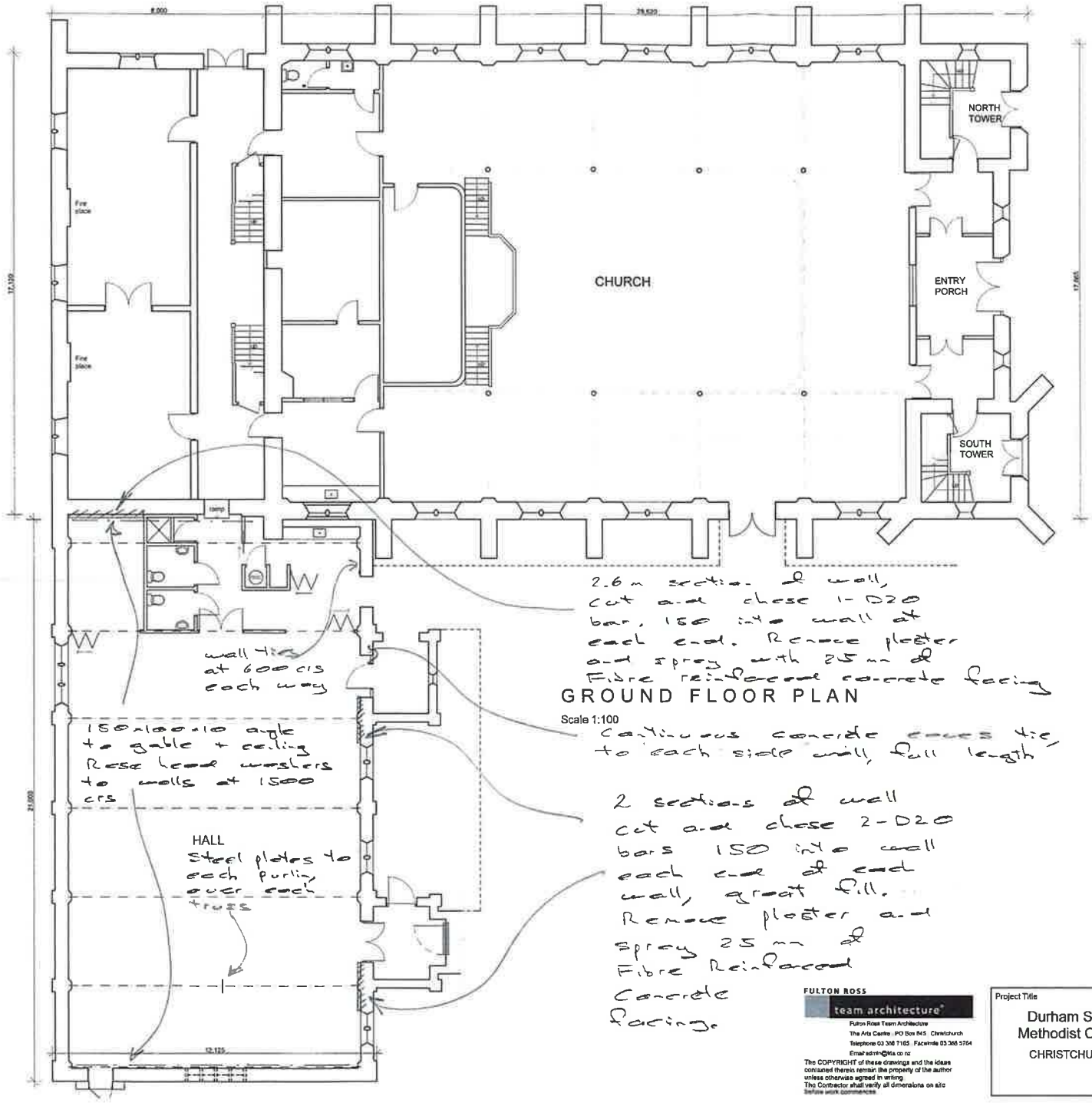
Date: 25th January 2011

Sheet No: A1.3

CAD file:

Project No: 5461 E

Rev:



NORTH

structex

Job No: 10715

Date: 3 Feb 2011

Sketch: sk 3

33% Strengthening

Hall

FULTON ROSS
team architecture
Fulton Ross Team Architecture
The Arts Centre · PO Box 845 · Christchurch
Telephone 03 366 7165 · Facsimile 03 366 5764
Email admin@fta.co.nz

Project Title
Durham Street Methodist Church
CHRISTCHURCH

Drawing Title — scale
GROUND FLOOR PLAN
A2 @ 1:100

Drawn by MD | Checked WF
Date January 2011 | Date January 2011

Issue PRELIMINARY
Date 25th January 2011 | Sheet No. A1.1
C.A.D file
Project No. 5461 E | Rev

DUR309.

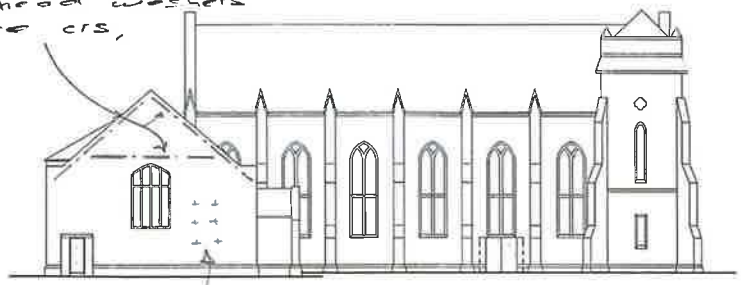
structex

Job No: 10715

Date: 2 Feb 2011

Sketch: SK 4

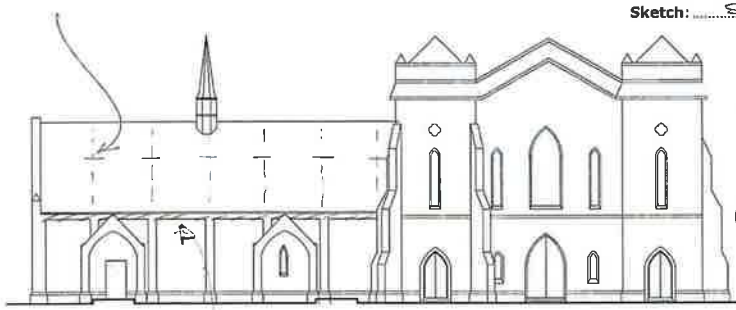
150x100x10 angle to gable + ceiling Rose head washers at 1500 crs, Both gables.



SOUTH ELEVATION

Stainless steel tie rods in all walls, at 600 crs each way

Steel plates to each purlin joint over trusses



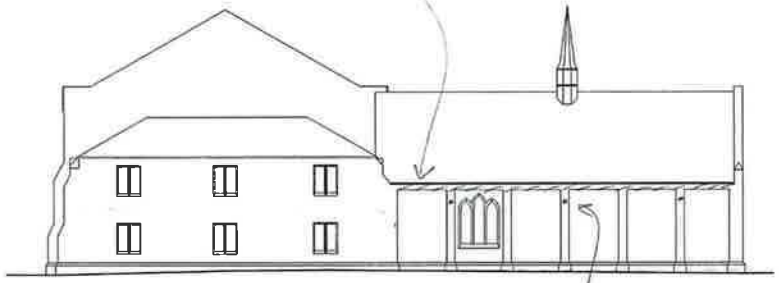
EAST ELEVATION

33% Strengthening Hall

(67% Strengthening similar)

New continuous concrete tie beam to top of side walls, drill + grout starters into top of wall

NORTH ELEVATION



WEST ELEVATION

New tie rods to 3 trusses

FULTON ROSS team architecture

Fulton Ross Team Architecture
The Arts Centre, PO Box 845, Christchurch
Telephone 03 366 7165, Facsimile 03 366 8764
Email admin@fra.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: ELEVATIONS

scale: A2 @ 1:200

Drawn by MD Date January 2011

Checked WF Date January 2011

Issue PRELIMINARY

Date 25th January 2011

Sheet No. A1.3

C.A.D file

Project No. 5461 E

Rev

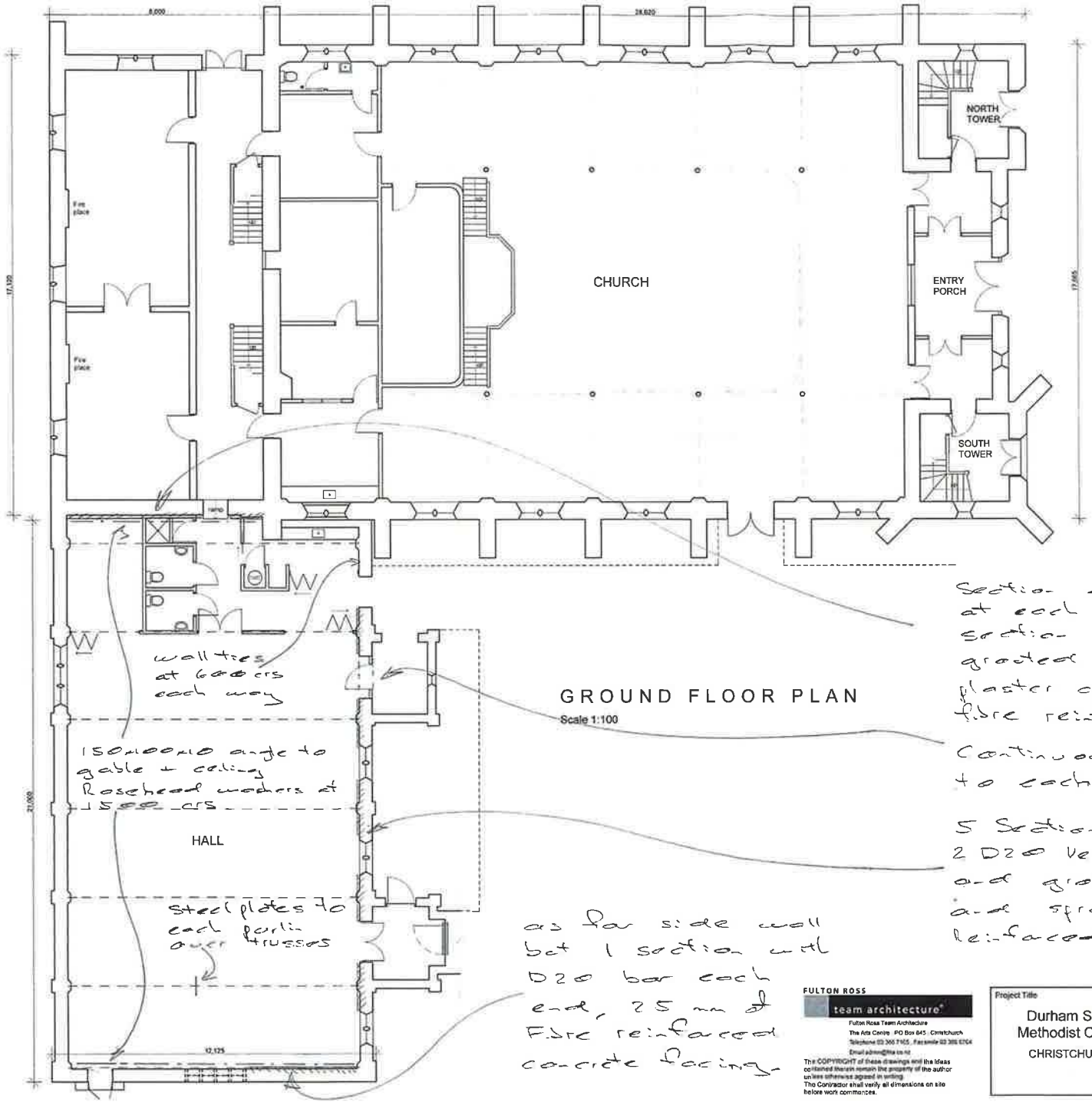
structex

Job No: 10715

Date: 3 Feb 2011

Sketch : sk 5

67% Strengthening Hall



GROUND FLOOR PLAN
Scale 1:100

Section of wall with 4-D20 vertical at each end of each section of wall chased and grouted 150 into wall, Remove plaster and spray with 40mm of fibre reinforced concrete facing

Continuous concrete covers tie to each side wall, full length

5 Sections of wall, cut and chase 2 D20 vertical bars 150 into wall and grout full, Remove plaster and spray 25mm of Fibre reinforced concrete facing

as for side wall but 1 section with D20 bar each end, 25mm of Fibre reinforced concrete facing.

not to scale

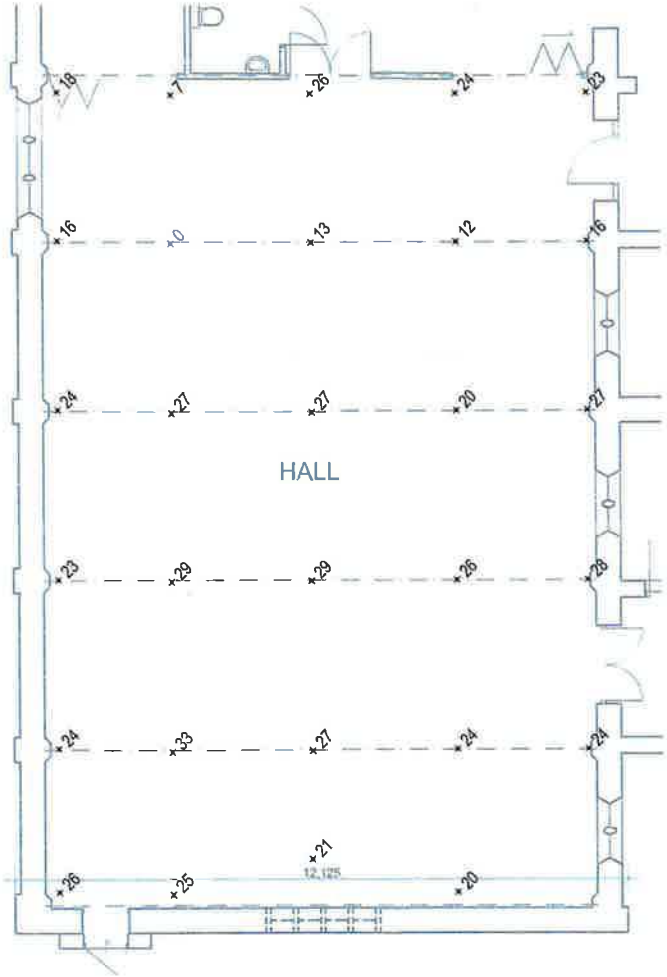
FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre PO Box 845 Christchurch
Telephone 03 366 7165 Facsimile 03 366 6764
Email admin@fra.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: GROUND FLOOR PLAN
scale: A2 @ 1:100
Drawn by MD Date January 2011
Checked WF Date January 2011

Issue PRELIMINARY
Date 25th January 2011
Sheet No. A1.1
C.A.D file
Project No. 5461 E
Rev

P:\PROJECTS\10715\D\10715.DWG 17/02/11 08:14 A3 ORIGINAL



ground floor part plan - hall

key:

+27 surveyed level

notes:

- all levels are in mm and are relative to the lowest point recorded.
- all levels in the hall were taken to timber flooring

2	FINAL	SP	GH	16-02-11	SP	GH	GH	1:100
1	PRELIMINARY	SP	GH	09-02-11				

ARROW

DURHAM ST METHODIST CHURCH REPAIRS

structex "Giving support a whole new meaning" www.structex.co.nz

floor level survey

SK6

project 10715

2

structex

Project 10715 – 17 February 2011

Methodist Church & Annex
Durham Street
Christchurch

Structural Assessment & Strengthening Report

Contents

structex

structex metro ltd
level 7, lumley centre
138 victoria street
p box 25438
christchurch 8140
new zealand

tel:+64 3 968 4925
fax:+64 3 968 4927
metro@structex.co.nz
www.structex.co.nz

17 February 2011

Tim Fahy
Arrow International Ltd
PO Box 42
Christchurch 8140

Email: tim.fahy@arrowinternational.co.nz

Dear Tim,

Re: Durham Street Methodist Church & Annex
Structural Assessment & Strengthening Report



Introduction

Structex Metro has been engaged to carry out a seismic assessment and report of the existing Durham Street Methodist Church and associated Annex in Christchurch.

The purpose of this report is to summarise the building damage caused by the recent Darfield earthquake on 4 September 2010, and assess the building to determine if it is earthquake prone. If the building is earthquake prone, strengthening options to 33% current code, and 67% current code are provided.

Walk-over surveys of the building were carried out in January 2011. A previous report has been written by Structex dated 4 October 2010 summarising damage and outlining possible repair options.

A level survey of the Auditorium floor was also carried out.

Limitations of Report

Findings presented as part of this report are for the sole use of our client, the Methodist Church and their consultants to assist with insurance assessments on this building. The findings are not intended for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses.

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 this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

Executive Summary & Recommendations

The Durham Street Methodist Church Hall building has been damaged, in some areas substantially, as a result of the recent Darfield earthquake and aftershocks.

The most substantially damaged areas are the stone towers and eastern wall facing Durham Street, where extensive cracking has occurred to the stone mortar joints, collapsing of the upper sections of the gable, and extensive cracking and spalling of the plaster inside the building. Much of this area would require reconstruction.

Cracking of stone mortar joints and plaster has also occurred to the west gable of the auditorium, side walls and buttresses.

The lath and plaster ceiling is substantially cracked throughout the Auditorium and will require replacement or overlaying with GIB board.

Some permanent displacement has occurred to the timber floor and posts supporting the mezzanine in the auditorium.

The west wall of the Annex has displaced out from the roof and floor structure. Some cracking is also present in mortar joints of the stone walls, with the most significant cracking occurring on the north wall where some displacement of stonework above the door and at the eaves has occurred.

Collapsed and dislodged stone work will require re-laying. Cracked mortar joints will require deep rake out of the mortar and re-pointing.

No ground liquefaction or gross settlement of the building was observed.

The building has been assessed as having a longitudinal (along the building) strength of 15% current code, and a transverse (across the building) strength of 10% current code.

Strengthening in the form of reinforced concrete skin walls to the tower combined with roof bracing and an eaves beam will increase the lateral strength to 33% and 67% depending on the extent of the new walls and bracing.

Strengthening work will require grouted tie rods to be installed to the stone walls, to stabilise the walls.

Connections between the stone walls and the roof structure will be required to secure the tops of the walls in place.

Building Form

The Church is located in Durham Street, in the Central Business District of Christchurch city and was constructed in 1864. An adjacent Hall was constructed ten years later in 1874.

The complex consists of three main areas, the main Church auditorium, the Annex located at the western end of the auditorium and the hall located at the south-west corner of the site. This report is specifically for the Church auditorium and west Annex.

The Auditorium and Annex combined measure approximately 36.6m x 17.7m in plan.

The building is generally constructed with stone walls, consisting of a natural stone exterior, a plastered stone interior with rubble filled cavity.

Two large stone towers are constructed at the east end of the building on the north and south corners.

The slate roof is likely to be supported on battens with timber sarking on purlins spanning between timber trusses. The ceiling to the Auditorium is constructed of lath and plaster. The ceiling above the first floor of the Annex is sheet panelling with battens.

The gallery floor to the Auditorium and the first floor of the west Annex are constructed of timber. Two offices and a corridor are located below the annex first floor.

The ground floor is also timber and is likely to consist of timber flooring boards on joists supported on timber bearers on concrete or timber piles.

Building Condition & Earthquake Damage

The building appears to have been in reasonable condition prior to the earthquake. The mortar used to construct the masonry is likely to be the same as the hall, which has been tested using the standard punch test and is considered to be soft lime mortar. At some stage during the life of the building the external mortar joints have been re-pointed with what appears to be a stronger cement based mortar.

The foundations appeared to be in sound condition with few cracks observed and no evidence of significant settlement occurring.

Following the recent earthquake in Darfield, extensive damage has occurred to the building. The following is a summary of the areas and types of damage that has occurred:

cracked & spalling plaster north tower

Annex

- The west wall of the Annex has displaced out from the building with a permanent residual lean of up to 30mm at roof level and up to 10-15mm at first floor.
- Cracked and spalling plaster to both faces of the Auditorium gable wall, west end.
- Extensive cracking with some displacement of stonework to the north wall of the Annex, including loose stones at eaves level.
- Cracked and spalling plaster to the inside face of the Annex, west wall near ceiling and north wall around window.
- Limited cracking to ground floor internal wall between offices.
- Various cracking of plaster and stonework around windows.
- Damaged and displaced truss supports to the west wall.
- Minor cracking of the west wall including displaced exterior stones at eaves level.

cracked lath & plaster ceiling

Auditorium side walls

side wall & Tower wall spalling plaster

Auditorium

- Extensive cracking of lath and plaster ceiling, flat portion and coved area, as well as some cracking to the ceiling below the gallery.
- Minor cracking to inside face of side walls, primarily around and near top of arch windows. Cracking is more significant adjacent to the towers.
- Damaged or displaced corbel stones supporting the gallery beams, 7 off.
- Extensive cracking to the stone mortar joints to the north tower and the east gable wall.

dislodged east gable parapet & finial

- Damaged and displaced stone finials to the north tower and east gable.

cracks to back of west wall gable

Annex west wall damaged truss support & displaced wall

Spalling plaster & collapsed corbel at gallery support beams

west wall annex displaced brick

- Extensive cracking and spalling of plaster to the inside face of the north and south towers, as well as the east gable wall.
- Displaced and dislodged stone to the north side wall buttresses.
- Cracking of stone mortar joints to the side wall buttresses. Four of the north wall buttresses have substantial cracking (5-15mm width). The remaining north and south wall buttresses are also cracked, with cracking 2-5mm wide.
- Cracking of some mortar joints to stonework window frames.
- A level survey of the floor shows the floor is constructed with a general fall to the west of about 100mm, however the floor is significantly out of level by up to 50mm. It is most likely that this has occurred over a long period of time with the weight of the side walls and towers having settled during the life of the building.

A summary of the extent of damage is outlined in the attached sketches.

Annex north wall spalling plaster around window

Damaged stone to north tower window

North wall buttress displaced stone

north wall cracked buttresses

Seismic Assessment

A seismic assessment of the building has been carried out using AS/NZS 1170.5 to determine the applied loadings to the building. The NZ Society of Earthquake Engineering Guidelines, June 2006, has been used to assess the building capacity.

As the Auditorium has a seating capacity in excess of 300 people, the building has been assessed as an Importance Level 3 (structures containing people in crowds) building. The design earthquake loads for this building are 30% higher than what a "normal" building is designed to.

The assessed strength is based on the undamaged state of the building that would have existed prior to the recent earthquakes, or following the repairs noted in "Seismic Repairs & Strengthening" section (a) below.

Various aspects of the building are assessed to determine load paths to the seismic resisting elements, such as walls and buttresses. The capacities of these elements are also assessed to determine their in-plane shear strength, in-plane flexural strength, and out-of-plane strength when subject to face loads.

Strength of connections between the diaphragms and the resisting elements are also assessed.

The assessed strengths are expressed as a percentage of the full code requirements which is summarised in the table below.

Any item that has no appreciable strength, such as a gable end connection to the roof structure which is only nominally connected, is expressed as having 'nil' strength.

Elements that have less that 33% of current code strength are regarded as being earthquake prone and are highlighted in bold.

Transverse Direction (across building)

Element	Mode	% Code
West wall Annex	shear	51%
	flexure	59%
West wall Auditorium	shear	61%
	flexure	87%
Auditorium	shear	**12%**
	flexure	**10%**
East Towers	shear	**17%**
	flexure	**17%**

Longitudinal Direction (along the building)

Element	Mode	% Code
North side wall	shear	**17%**
	flexure	**19%**
South side wall	shear	**15%**
	flexure	**20%**

Other Items

Element	% Code
Face load – east end gable wall	**15%** (i)
Face load – side walls	N/A (ii)
Face load - west end gable	**20%** (i)
Face load – Annex walls	52% (i)
Gable ties to roof	**nil**
Roof diaphragm (diagonal sarking) - side walls - gable walls	 **16%** **11%**

Note (i) These values allow for two single skin walls at 210mm thickness each, although the thickness of the natural stone is significantly variable, and are assumed to be restrained at the roof and floors.

(ii) Auditorium side walls are well restrained by the buttresses.

The results of this assessment indicate that a number of aspects of this building are earthquake prone. Christchurch City Council requirements are that buildings of this nature be strengthened to as close as practicable 67% current code.

Seismic Repairs & Strengthening

(a) Repairs

A number of repairs are required to be carried out to reinstate the building to its pre-earthquake condition.

A summary of the building damage is included in this report, which is also outlined in the relevant sketch.

The costs associated with the repairs will require assessment by a quantity surveyor who will need to visit the site to view the extent of damage.

A general outline of repairs is as follows:

- Re-line ceiling of Auditorium with GIB throughout.
- Repair Annex roof truss connections where damage or displacement has occurred.
- Realign and reinstate damaged and displaced stonework to buttresses.
- Remove damaged plaster around window frames, rake out cracked joints to a depth of 60mm and re-point.
- Reinstate damaged and dislodged corbels supporting the gallery beams, 7 off.
- Allow to remove and reinstate stones that have significantly cracked mortar joints and are displaced to the north wall buttresses, north tower and east gable. This will require reconstruction of some sections of the north wall of the buttresses and the north-east corner of the north tower.
- Reinstate damaged or displaced stone finials to the side wall buttresses and east gable wall.
- Re-level floor.
- Allow to repair damaged flashing to gable end walls.
- Remove plaster around cracked sections of wall, rake out mortar joints to a depth of 60mm and re-point. Re-plaster wall. Allow to carry out same re-pointing work to exterior face.
- Rake out mortar joints to damaged stone buttresses to a depth of 60mm and re-point.
- Mortar used for re-pointing shall be 7.5MPa lime mortar with cement content.
- The most significant area of damage is to the north tower and east gable wall where extensive cracking has occurred to stonework. Extensive cracking and spalling of the plaster to the inside face of the north tower, east gable wall, as well as the south tower has occurred; which will require significant reconstruction. This could be carried out in a number of ways:

  Option one includes carefully demolishing the towers and east gable wall, photographing and recording the layout of the stonework. A new reinforced concrete wall would be constructed to form the inside face and the stonework would be re-laid to the exterior face against the new concrete walls.

  Option two includes bracing the towers and east wall full height complete with tie rods passing through the wall to stabilise both faces of the wall. Displaced or dislodged stone can then be reinstated. The inside face of the wall will then be progressively removed from the top and spray concrete applied to the inside face of the exterior stonework, with tie rods progressively installed.

After the inside face of the stone is fully stripped out and first layer of sprayed concrete applied, a new insitu reinforced concrete skin wall can be constructed to secure the towers and east gable.

In both cases, the concrete walls to the tower and gable provide significant additional strength to the building.

It is likely that option 2 would be used with only the significantly damaged north-east corner of the north tower being totally reconstructed using option one. The internal walls of the tower could be removed completely and reconstructed in concrete.

(b) Strengthening to 33% Code

In addition to the repairs outlined in the previous section, the following strengthening work is required to achieve a seismic strength of 33% current code.

Refer to the attached sketch for details of the required seismic strengthening.

- Continuous reinforced concrete eaves beam to top of north and south side walls.
- Steel angles to east and west gable walls at roof, ceiling and floor level, complete with rose head washers at 1500 centres.
- Steel plates at each purlin joint over trusses, Auditorium and Annex.
- Stainless steel wall ties at 600 centres each way drilled and grouted into wall and buttresses.
- Install new fixings at roof truss locations, bolting right through buttresses complete with rose head washers, Auditorium and Annex.
- Install floor fixings complete with angle brackets and tie and rods each side of gallery floor beams to masonry walls.
- Install continuous steel angle to perimeter of Annex, floor and roof level, complete with angle brackets and threaded rods bolted through the stone walls with rose head washers at 1500 centres.
- New Braceline ceiling diaphragm to the first floor Annex ceiling and steel rod roof bracing to the Auditorium ceiling.

(c) Strengthening to 67% Code

In addition to the repairs outlined in section (a), the following strengthening work is required to achieve a seismic strength of 67% current code.

- Continuous reinforced concrete eaves beam to top of north and south side walls.
- Steel angles to east and west gable walls at roof, ceiling and floor level, complete with rose head washers at 1500 centres.
- Steel plates at each purlin joint over trusses, Auditorium and Annex.
- Stainless steel wall ties at 600 centres each way drilled and grouted into wall and buttresses.
- Install new fixings at roof truss locations, bolting right through buttresses complete with rose head washers, Auditorium and Annex.
- Install floor fixings complete with angle brackets and tie and rods each side of gallery floor beams to masonry walls.
- Install continuous steel angle to perimeter of Annex, floor and roof level, complete with angle brackets and threaded rods bolted through the stone walls with rose head washers at 1500 centres.

- New Braceline ceiling diaphragm to the first floor Annex ceiling and steel rod roof bracing to the Auditorium ceiling.
- New concrete skin walls to the Annex.

Refer to the attached sketch for details of the seismic strengthening required.

A geotech investigation will be required prior to any strengthening work being carried out to confirm ground conditions.

If you have any queries regarding the above Structural Assessment Report, please do not hesitate to contact the undersigned.

Yours sincerely
Structex Metro Limited

Gary Haverland B.Eng (Hons)(Civil)
Senior Structural Engineer &
Director
MIPENZ; CPEng # 209540

Appendix

1. Building Act Requirements
2. Christchurch City Council Requirements for Earthquake Prone Buildings
3. Sketches

1. Building Act Requirements

The Building Act 2004 came into force on 31 March 2005 along with the Building Regulations.

In considering the structure of existing buildings the relevant sections of the Act are as follows:

Section 124 – Powers of territorial authorities in respect of dangerous, earthquake-prone, or unsanitary buildings

If the Territorial authority is satisfied that a building is dangerous or earthquake prone, the Territorial Authority may:

(a) put up a hoarding or fence to prevent people approaching the building;

(b) place a notice on the building warning people not to approach the building, or

(c) give written notice requiring work to be carried out on the building to reduce or remove the danger.

Section 122 – Meaning of earthquake-prone building

This section of the Act deems a building earthquake prone if its ultimate strength capacity would be exceeded, and the building would be likely to collapse causing injury or death, in a "moderate earthquake". The size of a "moderate earthquake" is defined in the Building Regulations as one third the size of the earthquake used to design a new building at that site.

Section 112 – Alterations to Existing Buildings

This section requires that after any alterations, the building shall continue to comply with the structural provisions of the Building Code to at least the same extent as before the alteration. This means that alteration work cannot weaken the building. Additional building strength would therefore be required where structural elements are to be removed or weakened, or additional mass to be added. The building will also need to be assessed in terms of the egress from fire, and access for persons with disabilities provisions of the Building Code and upgraded to comply, as nearly as is reasonably practicable.

Section 67- Waivers and Modifications

This section allows the Territorial Authority to grant a Building Consent subject to waivers or modifications of the Building Code. The Territorial Authority may impose any conditions they deem appropriate with respect to the waivers or modifications.

The Building Act was also altered by the Canterbury Earthquake (Building Act) Order 2010, which, amongst other things, gave additional powers to the Territorial Authorities, extended the definition of a dangerous building and extended the Schedule 1 list of building work exempt from Building Consent.

2. Christchurch City Council Requirements for Earthquake-Prone Buildings

The Christchurch City Council adopted a new policy for earthquake-prone buildings in September 2010.

The policy reflects the Christchurch City Council's determination to reduce earthquake risk to buildings and ensure that Christchurch "is a safe and healthy place to live in" and may be viewed on the Christchurch City Council website.

In summary, the relevant items of the policy are as follows:

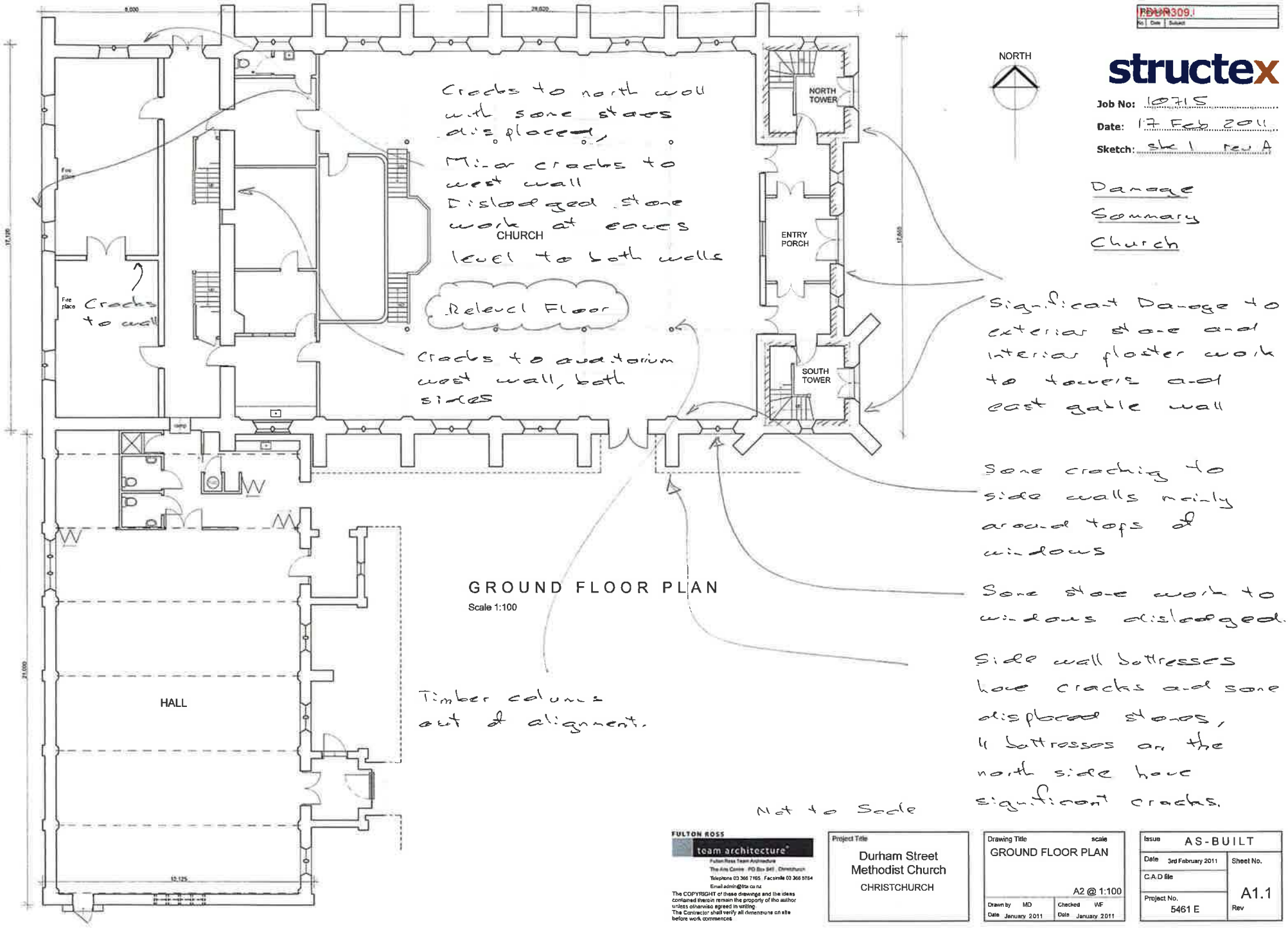
(a) Buildings are assessed using the New Zealand Society of Earthquake Engineering (NZSEE) guidelines with applied loadings from AS/NZS 1170.5 and are classed as earthquake prone if its strength is less than 33% of the applied loading from the loading standard AS/NZS 1170.5.

(b) It outlines the Council's approach to earthquake-prone buildings including identification, prioritisation, timeframes and implementation. In general, Importance Level 4 buildings (Post-disaster facilities, as defined by AS/NZS1170) will have 15 years from 1 July 2012 to either be strengthened or demolished. Importance Level 3 (crowd or high value) buildings will have 20 years and Importance Level 2 (normal) buildings will have 30 years. There are also additional triggers for requiring assessment and strengthening work to be undertaken at an earlier stage (including "significant" alterations or earthquake damage).

(c) The Council has a commitment to maintaining the intrinsic heritage values of Heritage buildings and has some discretion with regards to strengthening levels and methods. Each building will require discussion with Council Heritage team and Resource Consent prior to any strengthening or repair works being undertaken.

To date the Council has identified 67% of current Code as the target level for strengthening of earthquake-prone buildings. For buildings with a damaged building strength >33% current Code it is recommended (but not required) that the building also be strengthened to 67% of Code requirements

3. Sketches



Cracks to north wall with some stones displaced,

Minor cracks to west wall

Dislodged stone work at eaves level to both walls

Cracks to auditorium west wall, both sides

Cracks to wall

Timber columns out of alignment.

Not to Scale

structex

Job No: 10715

Date: 17 Feb 2011

Sketch: sk 1 rev A

Damage Sommary Church

Significant Damage to exterior stone and interior plaster work to towers and east gable wall

Some cracking to side walls mainly around tops of windows

Some stone work to windows dislodged.

Side wall buttresses have cracks and some displaced stones, 4 buttresses on the north side have significant cracks.

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre PO Box 847 Christchurch
Telephone 03 366 7165 Facsimile 03 366 5764
Email admin@fta.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: GROUND FLOOR PLAN

scale: A2 @ 1:100

Drawn by MD Date January 2011

Checked WF Date January 2011

Issue: AS-BUILT

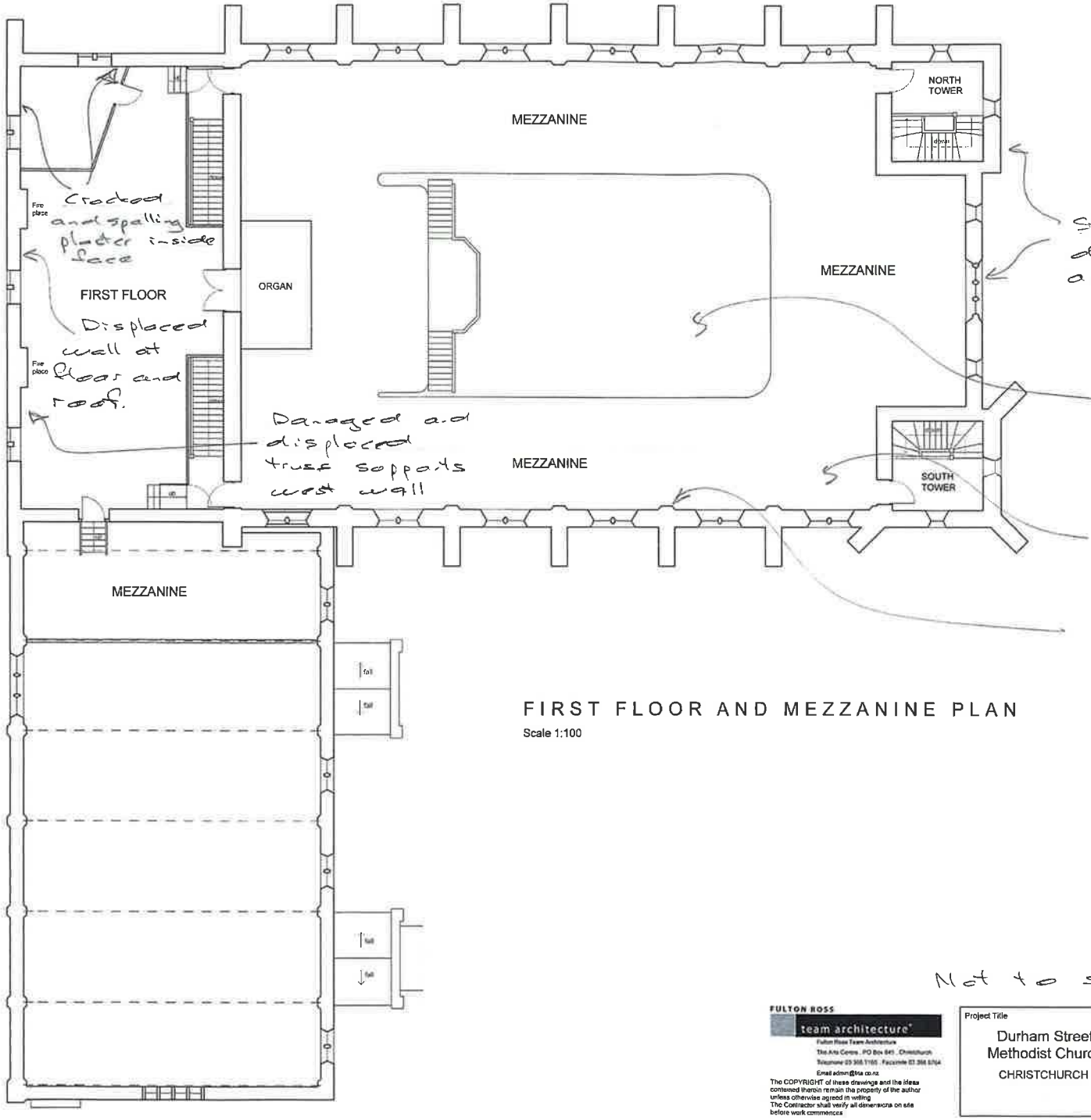
Date 3rd February 2011

Sheet No. A1.1

C.A.D file

Project No. 5461 E

Rev



FIRST FLOOR AND MEZZANINE PLAN

Scale 1:100

NORTH

structex

Job No: 10715

Date: 8 Feb 2011

Sketch: s/k 2

Damage Summary Church

Not to scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre . PO Box 641 . Christchurch
Telephone 03 366 7165 . Facsimile 03 366 6764
Email admin@fra.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: FIRST FLOOR PLAN

scale: A2 @ 1:100

Drawn by MD Date January 2011

Checked WF Date January 2011

Issue: AS-BUILT

Date: 3rd February 2011

Sheet No: A1.2

C.A.D file

Project No: 5461 E

Rev

No	Date	Subject

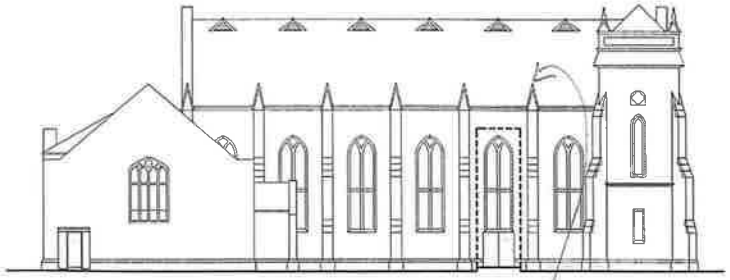
structex

Job No: 10715

Date: 8 Feb 2011

Sketch: sk 3

Damage Summary Church



SOUTH ELEVATION

Some stone window frames dislodged.

Some buttress stones dislodged

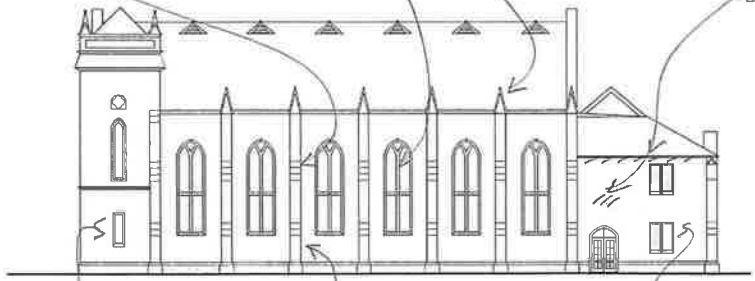
Some stone finials dislodged

EAST ELEVATION

Stone finials / parapet dislodged + removed.

Minor cracking to exterior south tower

Extensive cracking to exterior north tower and east gable



NORTH ELEVATION

Displaced stone at eaves and above door

Extensive cracking

Extensive cracking to exterior stone at tower

Large cracks to N north wall buttresses

Cracks to remaining buttresses

WEST ELEVATION

Minor cracking to stone

Not to scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre, PO Box 845, Christchurch
Telephone 03 366 7165, Facsimile 03 366 5764
Email admin@fra.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: ELEVATIONS

scale: A2 @ 1:200

Drawn by: MD Date: January 2011

Checked: WF Date: January 2011

Issue: AS-BUILT

Date: 3rd February 2011

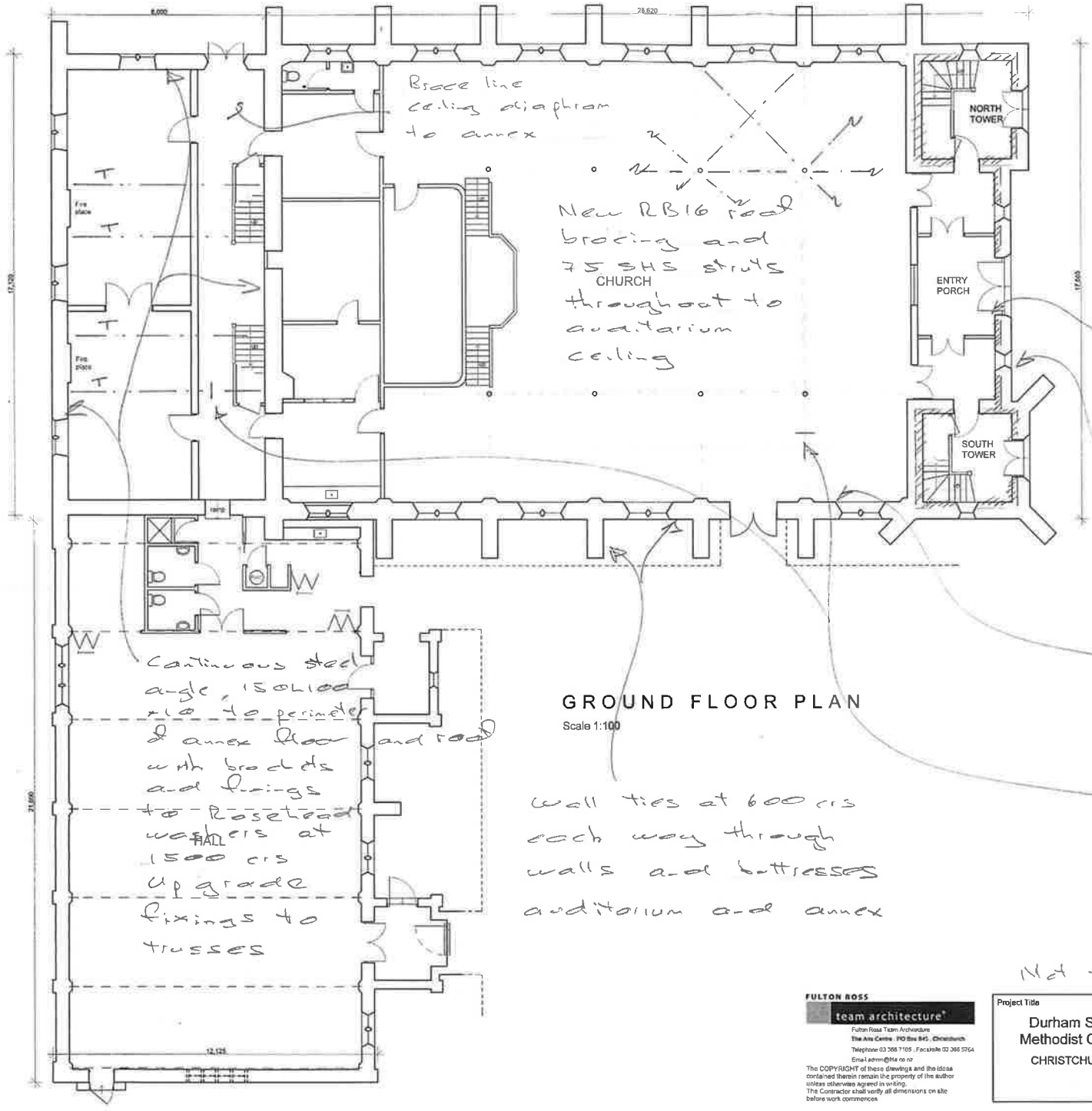
Sheet No.: A1.3

C.A.D file:

Project No.: 5461 E

Rev:

DUR309



GROUND FLOOR PLAN

Scale 1:100

NORTH

structex

Job No: 1671S

Date: 8 Feb 2011

Sketch: sk 4

33% Strengthening Church

Not to scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre PO Box 845, Christchurch
Telephone 03 366 7105 Facsimile 03 366 5764
Email admin@fta.co.nz

Project Title	Durham Street Methodist Church, CHRISTCHURCH
Drawing Title	GROUND FLOOR PLAN
scale	A2 @ 1:100
Drawn by MD	Checked WF
Date January 2011	Date January 2011
Issue	AS-BUILT
Date	3rd February 2011
C.A.D file	
Project No.	5461 E
Sheet No.	A1.1
Rev	

No	Date	Subject

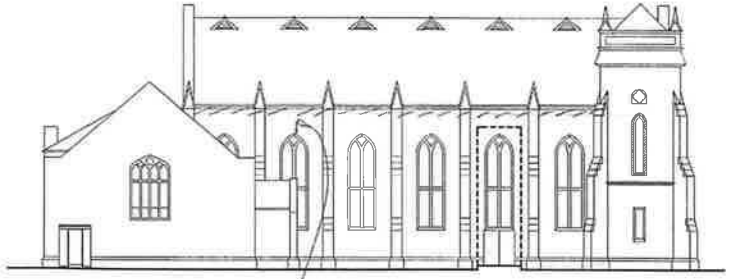
structex

Job No: 1215

Date: 16 Feb 2011

Sketch: sk 5 A

33 % Strengthening Church



SOUTH ELEVATION

Continuous concrete tie beam to top of side walls

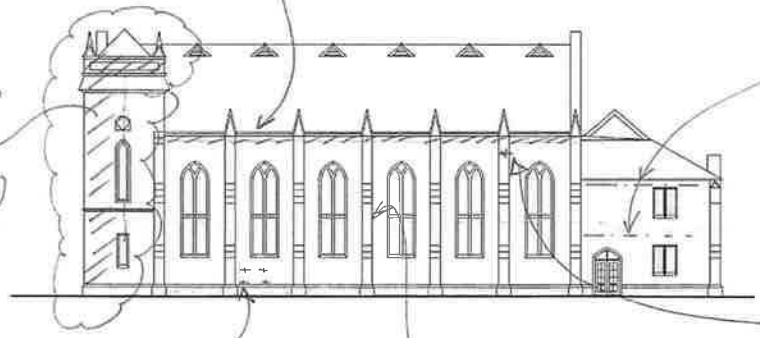
EAST ELEVATION

Steel angle tie, 150 x 100 x 10 and Rosehead washers at 1500 c/s,

Reconstruct extensively damaged walls

Steel angle tie and Rosehead washers at 1500 crs

Reconstruct extensively damaged walls



NORTH ELEVATION

WEST ELEVATION

Stainless steel tie rods in all walls and buttresses at 600 crs each way

Steel bracket fixing gallery beams to buttresses

New roof truss connections

Not to scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre PO Box 845 Christchurch
Telephone 03 366 7165 Facsimile 03 366 5764
Email admin@frta.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: ELEVATIONS

scale: A2 @ 1:200

Drawn by MD Date January 2011

Checked WF Date January 2011

Issue: AS-BUILT

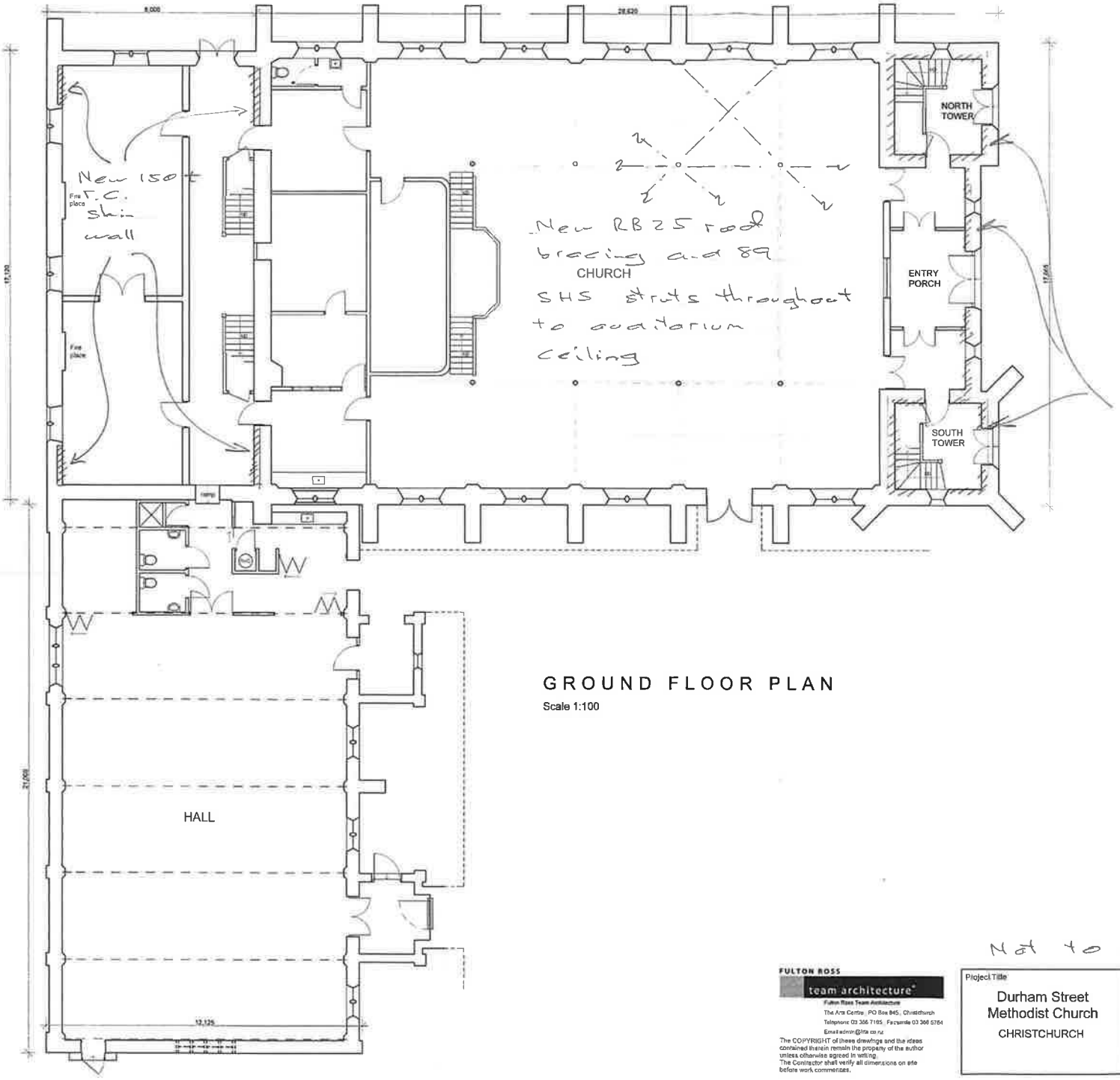
Date: 3rd February 2011

Sheet No: A1.3

C.A.D file

Project No: 5461 E

Rev



NORTH

structex

Job No: 10715

Date: 8 Feb 2011

Sketch : sk 6

67% Strengthening Church as far as 33% and

New 250 t R.C. shin wall to towers and gable.

GROUND FLOOR PLAN

Scale 1:100

Not to scale

FULTON ROSS team architecture
Fulton Ross Team Architecture
The Arts Centre, PO Box 845, Christchurch
Telephone 03 366 7185, Facsimile 03 366 5764
Email admin@fta.co.nz

Project Title: Durham Street Methodist Church, CHRISTCHURCH

Drawing Title: GROUND FLOOR PLAN — scale: A2 @ 1:100

Drawn by MD — Date January 2011 — Checked WF — Date January 2011

Issue: AS-BUILT

Date: 3rd February 2011

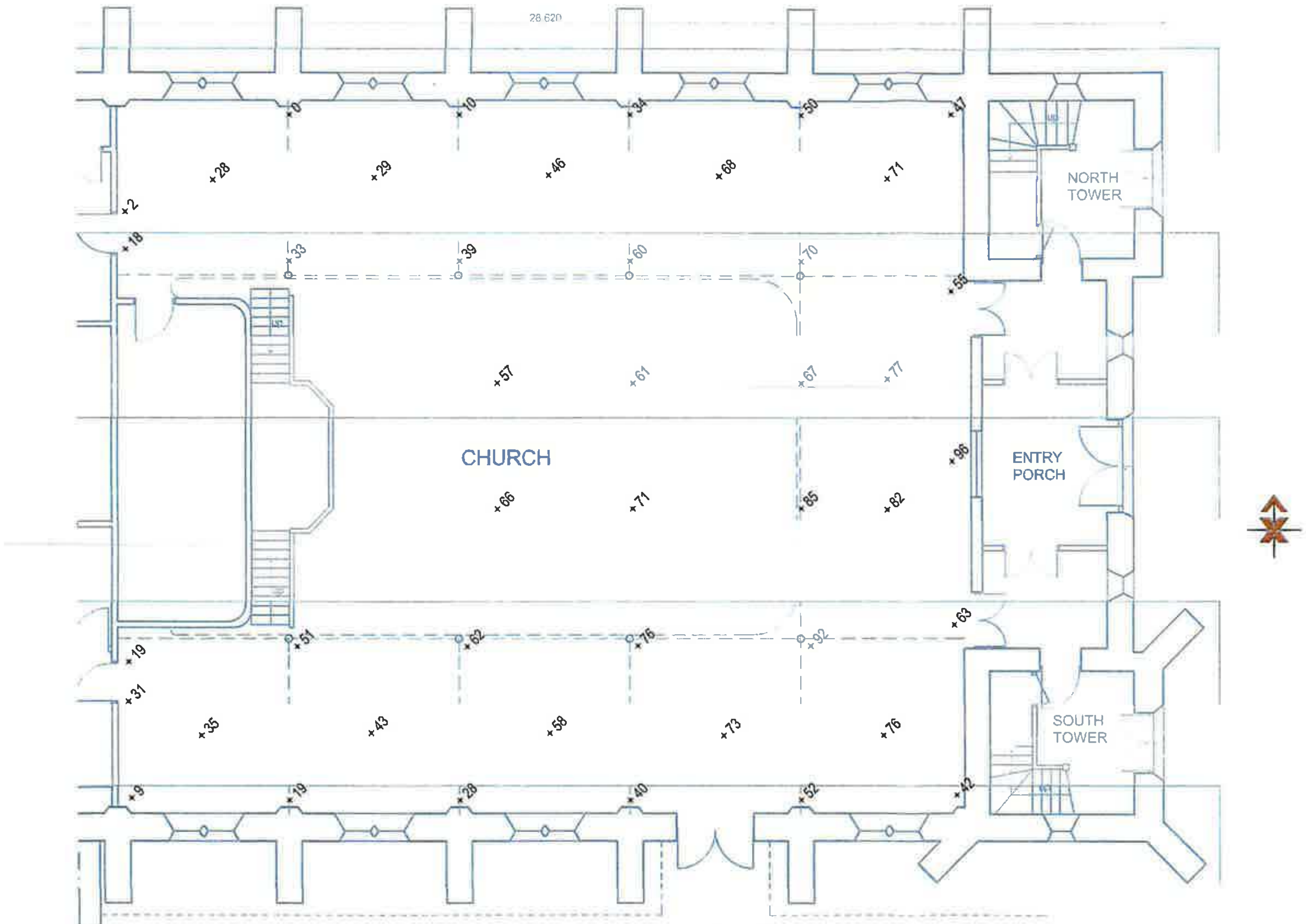
C.A.D file

Project No.: 5461 E

Sheet No.: A1.1

Rev

P:\PROJECTS\10715\D\10715 DWG 17/02/11 08:13 A3 ORIGINAL



ground floor part plan - church

key:

+27 surveyed level

notes:

- all levels are in mm and are relative to the lowest point recorded.
- all levels in the church were taken on carpet, allow +/- 2mm tolerance

2	FINAL	SP	GH	16-02-11	SP	GH	GH	1:100	ARROW	DURHAM ST METHODIST CHURCH REPAIRS	structex	floor level survey	SK7	10715 2
1	PRELIMINARY	SP	GH	09-02-11										
issue	description	by	appd	date	drawn	designed	approved	scale	client	project title	"Giving support a whole new meaning" www.structex.co.nz	drawing title	drawing no.	project / issue

BUI.DUR309.0013.138

Christchurch Eq RAPID Assessment Form - LEVEL 2

Inspector Initials: W
Territorial Authority: Christchurch City
Date / Time: 22/03/11 1500
Final Posting (e.g. UNSAFE): Y1

Building Name / Short Name: METHODIST CITY MISSION ALDERSGATE BUILDING
Address: 309 DURHAM ST NORTH
GPS Co-ordinates: S° E°
Contact Name:
Contact Phone:
Storeys at and above ground level: 2
Below ground level: 0
Total gross floor area (m²):
Year built:
No of residential Units: 0
Photo Taken: Yes / No

Type of Construction
- ☐ Timber frame
- ☐ Steel frame
- ☐ Tilt-up concrete
- ☑ Concrete frame
- ☐ RC frame with masonry infill
- ☐ Concrete shear wall
- ☐ Unreinforced masonry
- ☐ Reinforced masonry
- ☐ Confined masonry
- ☐ Other:

Primary Occupancy
- ☐ Dwelling
- ☐ Other residential
- ☐ Public assembly
- ☐ School
- ☑ Religious
- ☐ Commercial/ Offices
- ☐ Industrial
- ☐ Government
- ☐ Heritage Listed
- ☐ Other

Investigate the building for the conditions listed on page 1 and 2, and check the appropriate column. A sketch may be added on page 3

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	☑	☐	☐	NORTH EAST & SOUTH WEST CORNERS DAMAGED AND
Building or storey leaning	☐	☑	☐	ONGOING HAZARD FROM STONE CHURCH.
Wall or other structural damage	☑	☐	☐	
Overhead falling hazard	☐	☑	☐	AS ABOVE & CEILING PANELS.
Ground movement, settlement, slips	☐	☑	☐	NEWER EAST SEGMENT SEPARATED SOME
Neighbouring building hazard	☐	☑	☐	EAST FROM MAIN ALDER BUILDING
Electrical, gas, sewerage, water, hazmats	☑	☐	☐	HISTORIC STONE CHURCH, MAJOR COLLAPSE, FALL HAZARDS REMAIN

Record any existing placard on this building:

Existing Placard Type (e.g. UNSAFE): L1 R

Choose a new posting based on the new evaluation and team judgement. Severe conditions affecting the whole building are grounds for an UNSAFE posting. Localised Severe and overall Moderate conditions may require a RESTRICTED USE. Place INSPECTED placard at main entrance. Post all other placards at every significant entrance. Transfer the chosen posting to the top of this page.

INSPECTED GREEN: G1 G2
RESTRICTED USE YELLOW: Y1 Y2
UNSAFE RED: R1 R2 R3

Record any restriction on use or entry:

Further Action Recommended:

Tick the boxes below only if further actions are recommended

- ☐ Barricades are needed (state location):
- ☑ Detailed engineering evaluation recommended
  - ☑ Structural
  - ☑ Geotechnical
  - ☐ Other:
- ☐ Other recommendations:

Estimated Overall Building Damage (Exclude Contents)

None	☐		
0-1 %	☐	31-60 %	☐
2-10 %	☐	61-99 %	☐
11-30 %	☑	100 %	☐

Inspection ID: _____ (Office Use Only)

1508213

Sign here on completion: [signature]
Date & Time: 22/03/11 1500
ID: T. Wilson T.101

Ian Watson Eq
027420 5141

Structural Hazards/ Damage	Minor/None	Moderate	Severe	Comments
Foundations	☐	☑	☐	CONSIDERABLE EVIDENCE OF LIQUEFACTION IN STREET, NEW PORTION HAS MOVED EAST.
Roofs, floors (vertical load)	☑	☐	☐	
Columns, pilasters, corbels	☑	☐	☐	
Diaphragms, horizontal bracing	☑	☐	☐	
Pre-cast connections	☑	☐	☐	
Beam	☑	☐	☐	
Non-structural Hazards / Damage				
Parapets, ornamentation	☑	☐	☐	
Cladding, glazing	☐	☑	☐	DAMAGE TO ENTRANCE GLAZING FROM DEBRIS FROM CHURCH
Ceilings, light fixtures	☐	☑	☐	
Interior walls, partitions	☐	☑	☐	
Elevators	☑	☐	☐	
Stairs/ Exits	☐	☑	☐	REAR EXIT IN DANGER FROM DAMAGED CHURCH END WALL
Utilities (eg. gas, electricity, water)	☑	☐	☐	
Other	☑	☐	☐	
Geotechnical Hazards / Damage				
Slope failure, debris	☑	☐	☐	
Ground movement, fissures	☐	☑	☐	
Soil bulging, liquefaction	☐	☑	☐	

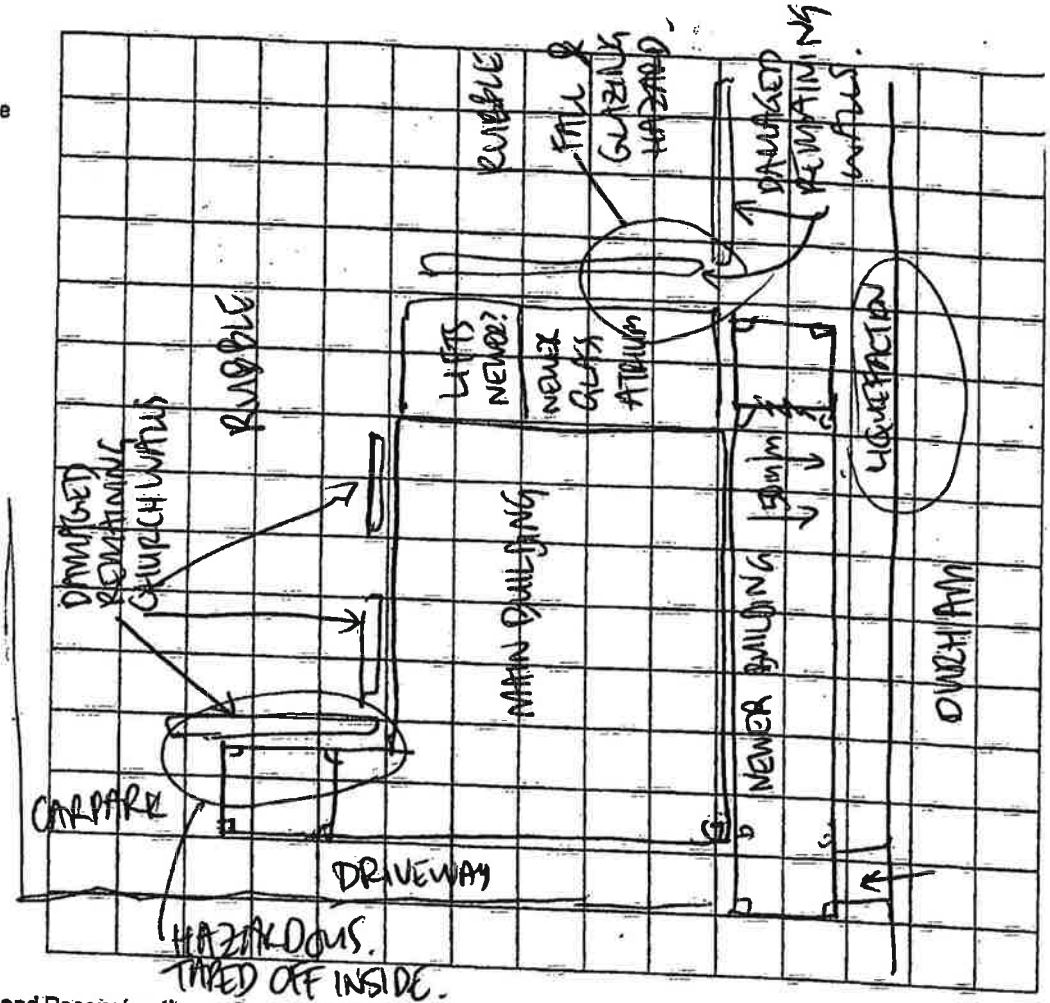
General Comment: MAIN STRUCTURE OK APART FROM NON-STRUCTURAL DAMAGE & REMAINING FALLING HAZARD FROM OLD CHURCH BUILDINGS IN NE & SW CORNERS. GLAZING DAMAGE IN FOYER. EASTERN LATER ADDITION HAS SEPARATED SO MUCH TO THE EAST, BUT REMAINS STABLE.

Usability Category

Damage Intensity	Posting	Usability Category	Remarks
Light damage *Low risk*	Inspected (Green)	G1. Occupiable, no immediate further investigation required	
		G2. Occupiable, repairs required	
Medium damage *Medium risk*	Restricted Use (Yellow)	Y1. Short term entry	RETRIEVE ESSENTIAL ITEMS. BEWARE FALLING HAZARDS IN SW/NE
		Y2. No entry to parts until repaired or demolished	
Heavy damage *High risk*	Unsafe (Red)	R1. Significant damage: repairs, strengthening possible	
		R2. Severe damage: demolition likely	
		R3. At risk from adjacent premises or from ground failure	

Inspection ID: _____ *(Office Use Only)*

Sketch (optional)
Provide a sketch of the entire building or damage points. Indicate damage points.



Recommendations for Repair and Reconstruction or Demolition (Optional)

REMOVAL OF REMAINING STONE CHURCH WALLS TO REMOVE HAZARD TO ALDERSGATE BUILDING.

3 *Inspection ID:* _____ *(Office Use Only)*