West Coast District Health Board

Te Poari Hauora a Rohe o Tai Poutini

Corporate Office
High Street, Greymouth 7840

Telephone 03 769-7400
Fax 03 769-7791

11 December 2019

9(2)(a) [redacted]

[redacted]

[redacted]

Official Information Request WCDHB 9373

I refer to your email dated 11 November 2019 requesting the following information under the Official Information Act from West Coast DHB regarding Manaakitanga mental health inpatient unit.

I understand the Manaakitanga mental health inpatient unit building's warrant of fitness issued by the Grey District Council is due to expire next year. Please provide the following information:

1. **Any engineering reports for the unit produced in the last five years.**
2. **Any reports/documents on whether the unit meets earthquake code/reports on bringing it up to code.**
3. **The building's warrant of fitness or other certification issued by Grey District Council in 2019 and 2018.**
4. **Any applications for 2020.**

Warrants of Fitness are issued annually by the responsible Territorial Authority. It confirms that specified systems in the compliance schedule (e.g. sprinklers) within a building have been inspected and maintained.

The information you have requested generally will not impact issue of a Building Warrant of Fitness (BWOF). Notwithstanding, please refer to the following appendices.

Appendix 1 - Grey Hospital EQ rapid Assessments 23/11/2016
Appendix 2 - Detailed Engineering Evaluation Grey Base Hospital 28/9/2012
Appendix 3 - Building Warrant of Fitness Grey Base Hospital (expires 1 July 2020)

Please note, we have redacted information pursuant to section 9(2)(a) of the Official Information Act to protect individual privacy.

I trust that this satisfies your interest in this matter.

You may, under section 28(3) of the Official Information Act, seek a review of our decision to withhold information by the Ombudsman. Information about how to make a complaint is available at www.ombudsman.parliament.nz; or Freephone 0800 802 602.

I trust that this satisfies your interest in this matter.

Please note that this response, or an edited version of this response, may be published on the West Coast DHB website after your receipt of this response.

Yours sincerely

Carolyn Gullery
Executive Director
Planning, Funding & Decision Support

APPENDIX 1

23 November 2016

Opus International Consultants Ltd

P +64 3 769 9330

Greymouth Office
23 High Street
PO Box 365, Greymouth 7840
New Zealand

Craig Shaw
Maintenance Manager
West Coast District Health Board
P O Box 387
Greymouth

Ref: 6-WWESE.10

Property inspected – Grey Hospital Buildings (various)

Dear Craig,

This report confirms the verbal advice provided to you on 23 November 2016 in relation to the rapid structural assessments Opus undertook of the Grey Hospital Buildings listed below (on Wednesday 23 November 2016) following the M7.8 earthquake which occurred on 14 November 2016:

- Boiler House Building,
- Acute and Community Mental Health Building,
- Laboratory Building,
- ED / Clinical Services Building,
- Morice Ward Building (Wards 1 and 2 North Building),
- Hannan Ward Building (Wards 3 and 4 Building),
- Kitchen Block Building,
- Child and Adolescent Mental Health Services (CAMHS).

The scope of our rapid structural assessments comprised of a brief visual inspection of the Buildings to ascertain the level of damage sustained to the primary structure and a brief external visual inspection of the neighbouring buildings and structures which we reasonably believe may impact the seismic performance of the Building.

Prior to carrying out these inspections we reviewed the original Opus Detailed Seismic Assessment Reports completed for these buildings (c2012-c2013) to confirm weaknesses identified in the assessments so that we could pay particular attention to these items in our inspection. We also reviewed previous photos of the Boiler House to assess whether there had been any increase in cracking at the junction between the Boiler House and Generator Buildings, and along the eastern wall of the Boiler House building.

The scope of our inspection is further detailed in the Earthquake Rapid Assessment Forms, which are attached to this letter.

Inspection Summary

In summary, our inspections noted the following observed damage:

- Negligible damage noted to buildings. Some cracking may have anecdotally worsened but generally no evidence of new damage to building.

Unless noted otherwise on the Earthquake Rapid Assessment Forms, we have not inspected any non-structural hazards.

Based on our inspections, it is our assessment that the Building's seismic performance has not been significantly affected. The Buildings listed may therefore be occupied on the same basis as prior to the Earthquake. However, if you become aware of any changes in seismic performance of the neighbouring buildings or structures, please contact us immediately as the change may impact this assessment. In addition, aftershocks may cause more damage that may change this assessment and warrant further inspection of the building and/or neighbouring buildings or structures.

Although it is our assessment that the seismic performance of the buildings listed has not been significantly affected, if you are aware that a Building was Earthquake Prone or is subject to strengthening requirements, we recommend that you review the strengthening actions to ensure that they are still fit for purpose.

We also recommend building maintenance staff carry out a full walk through of the entire hospital to identify any loose / damaged ceiling tiles so that these can be immediately repaired or replaced.

Do not hesitate to contact me if you require any further assistance.

Regards

9(2)(a) [redacted]

9(2)(a) [redacted], Senior Structural Engineer, 9(2)(a) [redacted]

Encl.: Earthquake Rapid Assessment Forms

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name*: 9(2)(a) [redacted]

Assessor ID*:

Authority*: WCDHB

2 Assessment Date*: 23 / 11 / 16 (Day / Month / Year)

Assessment Time*: 1000 (Hour / Minute, to nearest half hour) A ☑ AM B ☐ PM

BUILDING IDENTIFICATION

3 Building Name: BOILER HOUSE

Unit / Number*: /

Street*:

City/Town*: GREYMOUTH

GPS (Degree with 5 decimals after comma) South -, East ,

Other ID or access:

Photo taken A ☐ No B ☑ Yes Photo ID.

4 Contact Name: CRAIG SHAN

Type A ☐ Owner B ☐ Tenant C ☑ Other MAINTENANCE MANAGER.

Phone (with area code): 9(2)(a) [redacted]

5 Existing Placard* ☑ None ☐ W ☐ Y1 ☐ Y2 ☐ R1 ☐ R2 Date* (Day / Month / Year) Team ID*

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 01	A ☐ <1935	A ☐ Complex residential	A ☐ Timber frame	A ☑ Brick veneer
Storeys below ground: 01	B ☑ 1935-1976	B ☐ School	B ☐ Steel frame	B ☐ Concrete panels
Footprint (m²): 300	C ☐ 1977-1984	C ☐ Commercial/Office	C ☑ Concrete frame	C ☐ Steel
	D ☐ 1985-2000	D ☐ Industrial	D ☐ Concrete shear wall	D ☐ Glass
	E ☐ >2000	E ☐ Critical facility	E ☐ Tilt-up concrete	E ☐ Lightweight
	F ☐ Unknown	F ☐ Public assembly	F ☐ Reinforced masonry	F ☐ Other:
		G ☑ Other: Hospital/ Boilerhouse.	G ☑ Unreinforced masonry	
			H ☐ Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	☐	☑
2 Land instability above	☐	☑
3 Land instability below	☐	☑
4 Other	☐	☑

If required add sketch on separate page showing extent and nature of the external risk factors.

VERSION 01 – APRIL 2014

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	○	○	✓	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	○	○	✓	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	✓	○	○	○	○
14 Interior walls, partitions	○	○	✓	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 **Significant fire saftey** concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments: Cracking in walls appears pre-existing

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None	A ✓ None required	A ✓ None required	A ○ Standard
B ○ Level 2 Rapid Assessment (tick below if particular expertise is required)	B ○ Cordon required	B ○ Barricades already in place	B ○ Immediate action required
B1 ○ Structural Engineer	Describe extent (add diagram on separate sheet if required)	C ○ Barricades required	
B2 ○ Geotechnical Engineer		Describe extent (add diagram on separate sheet if required)	
B3 ○ Other:			
C ○ Further evaluation to be arranged by building owner:			

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*	
Exterior	A ○ Partial
	B ✓ Complete
Interior	C ○ Not accessed
	D ✓ Partial
	E ○ Complete

Assessor Signature* 9(2)(a) [redacted]

NOTES

13 Crack in northern wall of Generator shed. Reviewed March 2012 photos and cracking in Generator shed and back wall of Boiler House appears the same.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ✓ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name*: 9(2)(a) [redacted]

Assessor ID*:

Authority*: NCDHB

2 Assessment Date*: 23 / 11 / 16 (Day / Month / Year)

Assessment Time*: 1030 (Hour / Minute, to nearest half hour) A (✓) AM B ( ) PM

BUILDING IDENTIFICATION

3 Building Name: ACUTE & COMMUNITY MENTAL HEALTH

Unit / Number*: /

Street*:

City/Town*: GREYMOUTH

GPS (Degree with 5 decimals after comma) South - , East ,

Other ID or access: Photo taken A ( ) No B (✓) Yes Photo ID.

4 Contact Name: CRAIG SHAN

Type: A ( ) Owner B ( ) Tenant C (✓) Other MAINTENANCE MANAGER

Phone (with area code): 9(2)(a) [redacted]

5 Existing Placard*: (✓) None ( ) W ( ) Y1 ( ) Y2 ( ) R1 ( ) R2 Date* (Day / Month / Year) Team ID*

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 02 + plant room	A ( ) <1935	A ( ) Complex residential	A (✓) Timber frame	A (✓) Brick veneer
Storeys below ground: 01	B ( ) 1935-1976	B ( ) School	B ( ) Steel frame	B ( ) Concrete panels
Footprint (m²): 1240	C (✓) 1977-1984	C ( ) Commercial/Office	C (✓) Concrete frame	C ( ) Steel
	D ( ) 1985-2000	D ( ) Industrial	D (✓) Concrete shear wall	D ( ) Glass
	E ( ) >2000	E ( ) Critical facility	E ( ) Tilt-up concrete	E ( ) Lightweight
	F ( ) Unknown	F ( ) Public assembly	F ( ) Reinforced masonry	F ( ) Other:
		G (✓) Other: Hospital, non-essential	G ( ) Unreinforced masonry	
			H ( ) Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	( )	(✓)
2 Land instability above	( )	(✓)
3 Land instability below	( )	(✓)
4 Other	( )	(✓)

If required add sketch on separate page showing extent and nature of the external risk factors.

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	○	○	✓	○	○
14 Interior walls, partitions	○	○	✓	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 **Significant fire saftey** concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments: Recommend walkover by WCDHB to check ceiling tiles

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None B ○ Level 2 Rapid Assessment (tick below if particular expertise is required) B1 ○ Structural Engineer B2 ○ Geotechnical Engineer B3 ○ Other: C ○ Further evaluation to be arranged by building owner:	A ✓ None required B ○ Cordon required Describe extent (add diagram on separate sheet if required)	A ✓ None required B ○ Barricades already in place C ○ Barricades required Describe extent (add diagram on separate sheet if required)	A ○ Standard B ○ Immediate action required

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*	
Exterior	A ✓ Partial
	B ○ Complete
Interior	C ○ Not accessed
	D ✓ Partial
	E ○ Complete

Assessor Signature: 9(2)(a) [redacted]

NOTES

13 Inspected timber framed walls @ first floor level Critical elements – refer DSA). No evidence of movement/damage.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ✓ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name*: 9(2)(a) [redacted]

Assessor ID*:

Authority*: WCDHB

2 Assessment Date*: 23 / 11 / 16 (Day / Month / Year)

Assessment Time*: 11 00 (Hour / Minute, to nearest half hour) A ☑ AM B ☐ PM

BUILDING IDENTIFICATION

3 Building Name: LABORATORY

Unit / Number*: /

Street*:

City/Town*: GREYMOUTH

GPS (Degree with 5 decimals after comma) South – , East ,

Other ID or access:

Photo taken A ☐ No B ☑ Yes Photo ID.

4 Contact Name: CRAIG SHAW

Type: A ☐ Owner B ☐ Tenant C ☑ Other MAINTENANCE MANAGER

Phone (with area code): 9(2)(a) [redacted]

5 Existing Placard*: ☑ None ☐ W ☐ Y1 ☐ Y2 ☐ R1 ☐ R2

Date* (Day / Month / Year)

Team ID*:

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor:	A ☐ <1935	A ☐ Complex residential	A ☐ Timber frame	A ☑ Brick veneer
Storeys below ground:	B ☑ 1935-1976	B ☐ School	B ☐ Steel frame	B ☐ Concrete panels
Footprint (m²): 830	C ☐ 1977-1984	C ☐ Commercial/Office	C ☑ Concrete frame	C ☐ Steel
	D ☐ 1985-2000	D ☐ Industrial	D ☑ Concrete shear wall	D ☐ Glass
	E ☐ >2000	E ☐ Critical facility	E ☐ Tilt-up concrete	E ☐ Lightweight
	F ☐ Unknown	F ☐ Public assembly	F ☐ Reinforced masonry	F ☐ Other:
		G ☑ Other: Hospital – non-essential	G ☐ Unreinforced masonry	
			H ☐ Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	☐	☑
2 Land instability above	☐	☑
3 Land instability below	☐	☑
4 Other	☐	☑

If required add sketch on separate page showing extent and nature of the external risk factors.

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	○	○	✓	○	○
14 Interior walls, partitions	○	○	✓	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 **Significant fire saftey** concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments: checked trusses + connections in roof. No signs of damage.

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None	A ✓ None required	A ✓ None required	A ○ Standard
B ○ Level 2 Rapid Assessment (tick below if particular expertise is required)	B ○ Cordon required	B ○ Barricades already in place	B ○ Immediate action required
B1 ○ Structural Engineer	Describe extent (add diagram on separate sheet if required)	C ○ Barricades required	
B2 ○ Geotechnical Engineer		Describe extent (add diagram on separate sheet if required)	
B3 ○ Other:			
C ○ Further evaluation to be arranged by building owner:			

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*	
Exterior	A ✓ Partial
	B ○ Complete
Interior	C ○ Not accessed
	D ✓ Partial
	E ○ Complete

Assessor Signature* 9(2)(a) [redacted]

NOTES

13 Inspected short columns on southern wall and roof trusses + connection near mid span of ext. wall. No evidence of damage/movement.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ✓ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name*: 9(2)(a) [redacted]

Assessor ID*:

Authority*: NCOHB

2 Assessment Date*: 23/11/16 (Day / Month / Year)

Assessment Time*: 1115 (Hour / Minute, to nearest half hour) A ✓ AM B ○ PM

BUILDING IDENTIFICATION

3 Building Name: EQ / CLINICAL SERVICES BUILDING.

Unit / Number*: /

Street*:

City/Town*: GREYMOUTH

GPS (Degree with 5 decimals after comma) South -, East ,

Other ID or access:

Photo taken A ○ No B ✓ Yes Photo ID.

4 Contact Name: CRAIG SHAN

Type: A ○ Owner B ○ Tenant C ✓ Other MAINTENANCE MANAGER

Phone (with area code): 9(2)(a) [redacted]

5 Existing Placard*: ✓ None ○ W ○ Y1 ○ Y2 ○ R1 ○ R2

Date* (Day / Month / Year)

Team ID*

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 01 + plant room	A ○ <1935	A ○ Complex residential	A ○ Timber frame	A ✓ Brick veneer
Storeys below ground: 00	B ✓ 1935-1976	B ○ School	B ✓ Steel frame	B ○ Concrete panels
Footprint (m²): 1500	C ○ 1977-1984	C ○ Commercial/Office	C ✓ Concrete frame	C ○ Steel
	D ○ 1985-2000	D ○ Industrial	D ○ Concrete shear wall	D ✓ Glass
	E ○ >2000	E ✓ Critical facility	E ○ Tilt-up concrete	E ○ Lightweight
	F ○ Unknown	F ○ Public assembly	F ○ Reinforced masonry	F ○ Other:
		G ○ Other:	G ○ Unreinforced masonry	
			H ○ Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	○	✓
2 Land instability above	○	✓
3 Land instability below	○	✓
4 Other	○	✓

If required add sketch on separate page showing extent and nature of the external risk factors.

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	○	○	✓	○	○
14 Interior walls, partitions	○	○	✓	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 **Significant fire saftey** concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments:

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None B ○ Level 2 Rapid Assessment (tick below if particular expertise is required) B1 ○ Structural Engineer B2 ○ Geotechnical Engineer B3 ○ Other: C ○ Further evaluation to be arranged by building owner:	A ✓ None required B ○ Cordon required Describe extent (add diagram on separate sheet if required)	A ✓ None required B ○ Barricades already in place C ○ Barricades required Describe extent (add diagram on separate sheet if required)	A ○ Standard B ○ Immediate action required

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*	
Exterior	A ✓ Partial
	B ○ Complete
Interior	C ○ Not accessed
	D ✓ Partial
	E ○ Complete

Assessor Signature* 9(2)(a) [redacted]

NOTES

13 Inspected external columns. No evidence of cracking.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ✓ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name* 9(2)(a) [redacted]

Assessor ID*

Authority* WCOMB

2 Assessment Date* 23/11/16 (Day / Month / Year)

Assessment Time* 1130 (Hour / Minute *(to nearest half hour)*) A ☑ AM B ☐ PM

BUILDING IDENTIFICATION

3 Building Name MOLICE WARD (NARDS 1 & 2 NORTH)

Unit / Number* /

Street*

City/Town* GREYMOUTH

GPS (Degree with 5 decimals after comma) South -, East ,

Other ID or access

Photo taken A ☐ No B ☑ Yes Photo ID.

4 Contact Name CRAIG SMAN

Type A ☐ Owner B ☐ Tenant C ☑ Other MAINTENANCE MANAGER

Phone (with area code) 9(2)(a) [redacted]

5 Existing Placard* ☑ None ☐ W ☐ Y1 ☐ Y2 ☐ R1 ☐ R2

Date* (Day / Month / Year)

Team ID*

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 03	A ☐ <1935	A ☐ Complex residential	A ☐ Timber frame	A ☑ Brick veneer
Storeys below ground: 01	B ☑ 1935-1976	B ☐ School	B ☐ Steel frame	B ☑ Concrete panels
Footprint (m²): 530	C ☐ 1977-1984	C ☐ Commercial/Office	C ☑ Concrete frame	C ☐ Steel
	D ☐ 1985-2000	D ☐ Industrial	D ☑ Concrete shear wall	D ☑ Glass
	E ☐ >2000	E ☐ Critical facility	E ☐ Tilt-up concrete	E ☐ Lightweight
	F ☐ Unknown	F ☐ Public assembly	F ☐ Reinforced masonry	F ☐ Other:
		G ☑ Other: Hospital - Non essential	G ☐ Unreinforced masonry	
			H ☐ Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	☐	☑
2 Land instability above	☐	☑
3 Land instability below	☐	☑
4 Other	☐	☑

If required add sketch on separate page showing extent and nature of the external risk factors.

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	✓	○	○	○	○
14 Interior walls, partitions	✓	○	○	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 **Significant fire saftey** concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments: No evidence of movement @ seismic separation between buildings

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None	A ✓ None required	A ✓ None required	A ○ Standard
B ○ Level 2 Rapid Assessment (tick below if particular expertise is required)	B ○ Cordon required	B ○ Barricades already in place	B ○ Immediate action required
B1 ○ Structural Engineer	Describe extent (add diagram on separate sheet if required)	C ○ Barricades required	
B2 ○ Geotechnical Engineer		Describe extent (add diagram on separate sheet if required)	
B3 ○ Other:			
C ○ Further evaluation to be arranged by building owner:			

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*	
Exterior	A ✓ Partial
	B ○ Complete
Interior	C ○ Not accessed
	D ✓ Partial
	E ○ Complete

Assessor Signature* 9(2)(a) [redacted]

NOTES

13 Building now vacant.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ○ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional

1 Assessor Name*: 9(2)(a) [redacted]

Assessor ID*:

Authority*: WCOHB

2 Assessment Date*: 23 / 11 / 16 (Day / Month / Year)

Assessment Time*: 11 40 (Hour / Minute, to nearest half hour) A ☑ AM B ☐ PM

BUILDING IDENTIFICATION

3 Building Name: HANNAN WARD (NAROS 3 84)

Unit / Number*: /

Street*:

City/Town*: GREYMOUTH

GPS (Degree with 5 decimals after comma) South -, East ,

Other ID or access:

Photo taken A ☐ No B ☐ Yes Photo ID.

4 Contact Name: CRAIG SHAW

Type: A ☐ Owner B ☐ Tenant C ☑ Other MAINTENANCE MANAGER

Phone (with area code): 9(2)(a) [redacted]

5 Existing Placard*: ☑ None ☐ W ☐ Y1 ☐ Y2 ☐ R1 ☐ R2

Date* (Day / Month / Year)

Team ID*:

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 02	A ☐ <1935	A ☐ Complex residential	A ☐ Timber frame	A ☑ Brick veneer
Storeys below ground: 01	B ☑ 1935-1976	B ☐ School	B ☐ Steel frame	B ☐ Concrete panels
Footprint (m²): 1200	C ☐ 1977-1984	C ☐ Commercial/Office	C ☑ Concrete frame	C ☐ Steel
	D ☐ 1985-2000	D ☐ Industrial	D ☑ Concrete shear wall	D ☐ Glass
	E ☐ >2000	E ☐ Critical facility	E ☐ Tilt-up concrete	E ☐ Lightweight
	F ☐ Unknown	F ☐ Public assembly	F ☐ Reinforced masonry	F ☐ Other:
		G ☑ Other: hospital, non-essential	G ☐ Unreinforced masonry	
			H ☐ Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	☐	☑
2 Land instability above	☐	☑
3 Land instability below	☐	☑
4 Other	☐	☑

If required add sketch on separate page showing extent and nature of the external risk factors.

VERSION 01 – APRIL 2014

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	○	○	✓	○	○
14 Interior walls, partitions	○	○	✓	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 **Significant fire saftey** concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments:

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None	A ✓ None required	A ✓ None required	A ○ Standard
B ○ Level 2 Rapid Assessment (tick below if particular expertise is required)	B ○ Cordon required	B ○ Barricades already in place	B ○ Immediate action required
B1 ○ Structural Engineer	Describe extent (add diagram on separate sheet if required)	C ○ Barricades required	
B2 ○ Geotechnical Engineer		Describe extent (add diagram on separate sheet if required)	
B3 ○ Other:			
C ○ Further evaluation to be arranged by building owner:			

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*	
Exterior	A ✓ Partial
	B ○ Complete
Interior	C ○ Not accessed
	D ✓ Partial
	E ○ Complete

Assessor Signature* 9(2)(a) [redacted]

NOTES

13 Fine cracking in strengthened walls @ LG Level. Appears shrinkage related.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ○ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name*: 9(2)(a) [redacted]

Assessor ID*:

Authority*: NCDHB

2 Assessment Date*: 23 / 11 / 16 (Day / Month / Year)

Assessment Time*: 1200 (Hour Minute, to nearest half hour) A ☑ AM B ☐ PM

BUILDING IDENTIFICATION

3 Building Name: KITCHEN BLOCK

Unit / Number*: /

Street*:

City/Town*: GREYMOUTH

GPS (Degree with 5 decimals after comma) South – , East ,

Other ID or access:

Photo taken A ☐ No B ☑ Yes Photo ID.

4 Contact Name: CRAIG SHAW

Type: A ☐ Owner B ☐ Tenant C ☑ Other MAINTENANCE MANAGER

Phone (with area code): 9(2)(a) [redacted]

5 Existing Placard*: ☑ None ☐ W ☐ Y1 ☐ Y2 ☐ R1 ☐ R2

Date*: Day Month Year

Team ID*:

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 01	A ☐ <1935	A ☐ Complex residential	A ☐ Timber frame	A ☑ Brick veneer
Storeys below ground: 01 plant room	B ☑ 1935-1976	B ☐ School	B ☐ Steel frame	B ☑ Concrete panels
Footprint (m²): 150	C ☐ 1977-1984	C ☐ Commercial/Office	C ☐ Concrete frame	C ☐ Steel
	D ☐ 1985-2000	D ☐ Industrial	D ☑ Concrete shear wall	D ☐ Glass
	E ☐ >2000	E ☑ Critical facility	E ☐ Tilt-up concrete	E ☐ Lightweight
	F ☐ Unknown	F ☐ Public assembly	F ☐ Reinforced masonry	F ☐ Other:
		G ☐ Other:	G ☑ Unreinforced masonry	
		Kitchen	H ☐ Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	☐	☑
2 Land instability above	☐	☑
3 Land instability below	☐	☑
4 Other	☐	☑

If required add sketch on separate page showing extent and nature of the external risk factors.

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DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 Roofs, floors	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 Ceilings, light fixtures	○	○	✓	○	○
14 Interior walls, partitions	○	○	✓	○	○
15 Access/egress (elevators, stairs, exits)	○	○	✓	○	○
16 Significant fire saftey concerns	○	○	✓	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments: Some pre existing cracking around doors to corridor. Small crack opposite external doorway

9 Estimated Damage A ○ None B ✓ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None B ○ Level 2 Rapid Assessment (tick below if particular expertise is required) B1 ○ Structural Engineer B2 ○ Geotechnical Engineer B3 ○ Other: C ○ Further evaluation to be arranged by building owner:	A ✓ None required B ○ Cordon required Describe extent (add diagram on separate sheet if required)	A ✓ None required B ○ Barricades already in place C ○ Barricades required Describe extent (add diagram on separate sheet if required)	A ○ Standard B ○ Immediate action required

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*		
Exterior	A	✓ Partial
	B	○ Complete
Interior	C	○ Not accessed
	D	✓ Partial
	E	○ Complete

Assessor Signature* 9(2)(a) [redacted]

NOTES

13

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ○ No

EARTHQUAKE RAPID ASSESSMENT FORM

Complex Residential and all Non-Residential Buildings Level 2

ASSESSMENT

Fields with asterisks (*) are mandatory, others are optional.

1 Assessor Name* 9(2)(a) [redacted]

Assessor ID* [ ] Authority* NCOHB

2 Assessment Date* 23/11/16 (Day / Month / Year) Assessment Time* 1225 (Hour / Minute, to nearest half hour) A (✓) AM B ( ) PM

BUILDING IDENTIFICATION

3 Building Name CHILD & ADOLESCENT MENTAL HEALTH SERVICES (CAMHS)

Unit / Number* 107 /

Street* COWPER STREET

City/Town* GREYMOUTH

GPS (Degree with 5 decimals after comma) South -[ ], [ ] East [ ], [ ]

Other ID or access [ ] Photo taken A ( ) No B (✓) Yes Photo ID. [ ]

4 Contact Name CRAIG SHAW

Type A ( ) Owner B ( ) Tenant C (✓) Other MAINTENANCE MANAGER

Phone (with area code) 9(2)(a) [redacted]

5 Existing Placard* (✓) None ( ) W ( ) Y1 ( ) Y2 ( ) R1 ( ) R2 Date* [ ] (Day / Month / Year) Team ID* [ ]

BUILDING DESCRIPTION

6

Dimensions	Constr. Age	Building Type	Structure Type	Cladding Type
Storeys above ground incl. ground floor: 02	A ( ) <1935	A ( ) Complex residential	A ( ) Timber frame	A ( ) Brick veneer
Storeys below ground: 00	B (✓) 1935-1976	B ( ) School	B ( ) Steel frame	B (✓) Concrete panels
Footprint (m²): 150	C ( ) 1977-1984	C ( ) Commercial/Office	C (✓) Concrete frame	C ( ) Steel
	D ( ) 1985-2000	D ( ) Industrial	D (✓) Concrete shear wall	D ( ) Glass
	E ( ) >2000	E ( ) Critical facility	E ( ) Tilt-up concrete	E ( ) Lightweight
	F ( ) Unknown	F ( ) Public assembly	F ( ) Reinforced masonry	F ( ) Other:
		G (✓) Other: Hospital non-essential	G ( ) Unreinforced masonry	
			H ( ) Other:	

EXTERNAL RISKS

7

Potential Cause*	A Yes	B No
1 Objects falling from adjacent buildings. Adjacent building ID or address:	( )	(✓)
2 Land instability above	( )	(✓)
3 Land instability below	( )	(✓)
4 Other	( )	(✓)

If required add sketch on separate page showing extent and nature of the external risk factors.

VERSION 01 – APRIL 2014

DAMAGE ASSESSMENT

8

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Overall Hazard*	N/A	A	B	C	D
1 Collapse or partial collapse	○	○	✓	○	○
2 Building or storey leaning	○	○	✓	○	○
3 Other:	✓	○	○	○	○
Structural Hazards*	N/A	A	B	C	D
4 Foundations	○	○	✓	○	○
5 **Roofs, floors**	○	○	✓	○	○
6 Gravity systems (columns, beams, etc)	○	○	✓	○	○
7 Lateral systems (walls, frames, braces)	○	○	✓	○	○
8 Diaphragms, horizontal bracing	○	○	✓	○	○
9 Precast connections	✓	○	○	○	○
10 Other:	✓	○	○	○	○

	Damage				
	N/A	Unknown	Minor or None	Moderate	Severe
Non-structural Hazards*	N/A	A	B	C	D
11 Parapets, ornamentation, chimneys	✓	○	○	○	○
12 Cladding, glazing	○	○	✓	○	○
13 **Ceilings, light fixtures**	✓	○	○	○	○
14 Interior walls, partitions	✓	○	○	○	○
15 Access/egress (elevators, stairs, exits)	✓	○	○	○	○
16 **Significant fire saftey** concerns	✓	○	○	○	○
17 Utilities (e.g. gas, electricity, waste water, plumbing)	✓	○	○	○	○
18 Other:	✓	○	○	○	○

Comments:

9 Estimated Damage A ✓ None B ○ 0-10% C ○ 11-30% D ○ 31-60% E ○ 61-100%

SUGGESTED FURTHER ACTIONS

10

Recommended further Assessment*	Safety Cordon*	Barricades*	Urgency of suggested action*
A ✓ None B ○ Level 2 Rapid Assessment (tick below if particular expertise is required) B1 ○ Structural Engineer B2 ○ Geotechnical Engineer B3 ○ Other: C ○ Further evaluation to be arranged by building owner:	A ✓ None required B ○ Cordon required Describe extent (add diagram on separate sheet if required)	A ✓ None required B ○ Barricades already in place C ○ Barricades required Describe extent (add diagram on separate sheet if required)	A ○ Standard B ○ Immediate action required

SUMMARY

11

Observed Damage	Level 2 Rapid Assessment Outcome*
Light or no damage	W ✓ **CAN BE USED** (From assessment no known dangers)
Moderate damage	Y1 ○ **RESTRICTED ACCESS TO PART(S) OF THE BUILDING ONLY**
	Y2 ○ **RESTRICTED ACCESS – SHORT TERM ENTRY ONLY with or without supervision** Access to be supervised A ○ Yes B ○ No
Heavy damage	R1 ○ **ENTRY PROHIBITED (At risk from external factors)**
	R2 ○ **ENTRY PROHIBITED (Severe damage to building)**

12

Survey Extent*		
Exterior	A	✓ Partial
	B	○ Complete
Interior	C	✓ Not accessed
	D	○ Partial
	E	○ Complete

Assessor Signature*

NOTES

13 checked connection between original build + extension. No evidence of movement.

If required add a sketch on a separate sheet of paper showing building damage, access restrictions or cordoning areas. Identify the building on the sketch and staple the sheet to this assessment form.

Sketch included on separate page? ○ Yes ✓ No

OPUS

Detailed Engineering Evaluation

Quantitative Assessment Report

Grey Base Hospital
Acute & Community Mental Health Services Building

Detailed Engineering Evaluation

Quantitative Assessment Report

Grey Base Hospital
Acute & Community Mental Health Services Building

Prepared By [redacted]

Reviewed By [redacted]

Approved for Release By [redacted]

Opus International Consultants Limited
Greymouth Office
23 High Street
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Greymouth, New Zealand

Telephone: +64 3 769 9330
Facsimile: +64 3 768 7498

Date: 28 September 2012
Reference: 6-WCAN1.02
Status: FINAL

Contents

Executive Summary

The West Coast District Health Board appointed Opus International Consultants (Opus) to carry out a detailed seismic assessment of the Acute & Community Mental Health building at Grey Base Hospital in Greymouth. The key outcome required of this assessment was to ascertain the anticipated seismic performance of the structure and to compare this performance with current design standards. Opus was also asked to provide conceptual strengthening options to improve the building's seismic performance, with a target of meeting at least 67% of the New Building Standard (%NBS) for a building with Importance Level 2 (IL2).

Findings of the assessment are:

a) The building has a seismic capacity of 19%NBS along the building (North-South) and 15%NBS across the building (East-West). Therefore this building is classified as Earthquake Prone, as defined by the Building Act, and is a High Risk building when classified in accordance with NZSEE [2].

   Strengthening is required under the Building Act (2004) and Greymouth District Council (GDC) policy on Earthquake Prone Buildings [6]. GDC policy requires this building to be strengthened to achieve a minimum seismic performance of 67% NBS within 12 years.

b) Liquefaction and lateral spreading damage is not expected in an Ultimate Limit State (ULS) earthquake at the site. Any differential settlement would be due to large cyclic loads causing permanent settlements of the foundations. These differential settlements are hard to quantify, but generally are reasonably minor should not cause any issues from an ULS perspective.

c) A broad design concept to bring the building up to 67%NBS has been considered.

   Possible strengthening to improve seismic performance of the building could include the following:

   - Develop a bracing plan, calculating the length, type and location of new bracing elements required on the first floor, and
   - Remove existing first floor timber framed wall linings, install required hold-down restraints at the base of the wall and re-line walls with GIB bracing, or
   - Install steel straps with hold downs over the top of existing timber walls to act as bracing bays. Note that given the obtrusive nature of this strengthening option, it is unlikely to be a suitable long term solution.

Recommendations:

As this building is Earthquake Prone, GDC policy [6] requires strengthening work to improve the building performance to a minimum of 67%NBS to be completed within 12 years.

We recommend that a staged strengthening approach as detailed below is followed in order to understand and manage the economic impact of any proposed remedial actions. Specifically we recommend that:

a) The implications of the IL2 classification for this building be carefully considered prior to carrying out any future works on this building, noting that with an IL2 classification, this building is not expected to remain operational post-disaster.

   An IL2 classification may also limit future use of the building.

b) An outline scheme for structural strengthening – with a view to achieving at least 67%NBS should be further developed followed by costing by a quantity surveyor.

c) A quantity surveyor is engaged to determine the costs for strengthening the building.

d) Detailed design of a scheme for the strengthening of the structure is carried out.

In addition to the seismic strengthening scheme, there are several issues that were identified during the inspection that warrant further investigation:

- There is cracking and possibly spalling of concrete on the vent sills in the lower ground floor external walls on gridline K between gridline 1 and 8. This type of deterioration has also been identified elsewhere in the hospital and we recommend that chloride intrusion testing be carried out. This will help to identify whether there are any major issues with concrete deterioration of the building.

- There is extensive cracking in lower ground floor walls surrounding the storage area between gridline 1 and 8 and gridline K and M. These walls have been plastered and the reason why is unclear. This may indicate some underlying issue which we recommend be investigated further.

- The brick veneers at lower ground level are typically pulling away from the concrete walls behind. This may be due to the corrosion of galvanised tie wires behind the brick veneers. It is recommended that some brickwork be removed to allow for inspection of the tie-back and the investigation of other possible causes for the separation. The ground floor brick veneers were not inspected and we recommend that any further investigation / inspection include these also.

1 Introduction

Opus International Consultants Limited (Opus) has been engaged by the West Coast District Health Board (WCDHB) to undertake a detailed seismic assessment of the Acute & Community Mental Health Services Building at Grey Base Hospital in Greymouth.

The purpose of the assessment is to determine the likely seismic performance of the building and also if the building is classed as being Earthquake Prone in accordance with the Building Act 2004.

The seismic assessment and reporting have been undertaken based on the qualitative and quantitative procedures detailed in the Detailed Engineering Evaluation Procedure (DEEP) document (draft) issued by the Structural Engineering Society (SESOC) on 19 July 2011.

It was advised by the WCDHB that the Acute & Community Mental Health Building is to be assessed as an Importance Level 2 (IL2) building.

Definitions of an IL2 building can be found in AS/NZS 1170.0:2002 (Structural design actions Standard) [10]. The definition of an IL2 building (extract from Table 3.2 [10]) is: "Normal structures and structures not in other importance levels".

This designation will require the earthquake return period factor for the ultimate limit state of R_u = 1.0 (over an assumed building design life of 50 years) to be used. For the same design life an IL3 building has an earthquake return period factor of R_u = 1.3. Practically this means that an IL3 building is expected to withstand an earthquake of approximately 30% stronger than that expected of an IL2 building.

2 Compliance

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

2.1 Building Act

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

Section 112 - Alterations

This section requires that an existing building complies with the relevant sections of the Building Code to at least the extent that it did prior to the alteration.

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

Section 115 – Change of Use

This section requires that the territorial authority (in this case Grey District Council (GDC)) is satisfied that the building with a new use complies with the relevant sections of the Building Code 'as near as is reasonably practicable'.

This is typically interpreted by GDC as being between 67% and 100% of the strength of an equivalent new building.

Section 122 – Earthquake Prone Buildings

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

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

Section 124 – Powers of Territorial Authorities

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

Section 131 – Earthquake Prone Building Policy

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

2.2 Grey District Council Policy

Grey District Council adopted their Earthquake Prone, Dangerous and Insanitary Building Policy in 2006. This policy was amended in 2011 and an updated policy was adopted on 14 February 2011 [6].

The 2011 amendment includes the following:

- An audit process for identifying pre-1976 potentially Earthquake Prone commercial buildings within the 2011 financial year.
- The introduction of maximum timeframes for undertaking further structural assessment of buildings identified through the GDC audit process as being potentially Earthquake Prone.
- The introduction of maximum timeframes for strengthening Earthquake Prone buildings (1-25 years) dependant on the importance level and age of the building.

2.3 Building Code

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

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

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

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

1. *Giving Priority to the safety and well-being of the community and having regard to this principle in assessing obligations to clients, employers and colleagues.*

2. *Ensuring that responsible steps are taken to minimise the risk of loss of life, injury or suffering which may result from your engineering activities, either directly or indirectly.*

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

3 Earthquake Resistance Standards

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

A generally accepted classification of earthquake risk for existing buildings in terms of %NBS that has been proposed by the NZSEE 2006 [2] is presented in Figure 3.1 below.

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

Figure 3.1: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines

Table 3.1 below compares the percentage NBS to the relative risk of the building failing in a seismic event with a 10% risk of exceedance in 50 years (i.e. 0.2% in the next year)

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

Table 3.1: %NBS compared to relative risk of failure

3.1 Minimum and Recommended Standards

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

3.1.1 Cordoning

- Where there is an overhead falling hazard or potential collapse hazard of the building, the areas of concern should be cordoned off to prevent access (for guidance with this issue refer to GDC guidelines on Dangerous Buildings [6]).

3.1.2 Strengthening

- Industry guidelines (NZSEE 2006 [2]) strongly recommend that every effort be made to achieve improvement to at least 67%NBS. A strengthening solution to anything less than 67%NBS would not provide an adequate reduction to the level of risk.
- GDC policy [6] requires Earthquake Prone buildings of Importance Level 2 (IL2) be strengthened to a minimum of 67% NBS. The GDC policy [6] requires an Earthquake Prone building, designed to the 1976 codes be strengthened within twelve years.
- It should be noted that full compliance with the current building code requires building strength of 100%NBS.

3.1.3 Our Ethical Obligation

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

4 Background Information

4.1 Building Description

The Grey Base Hospital – Acute & Community Mental Health Services Building is a two storey Reinforced Concrete (RC) dual frame / wall building with internal timber framed first floor walls and roof structure. Structural drawings for the building are dated November 1977 and the building is believed to have been constructed circa 1978. Figure 4.1 below shows an aerial view of the building.

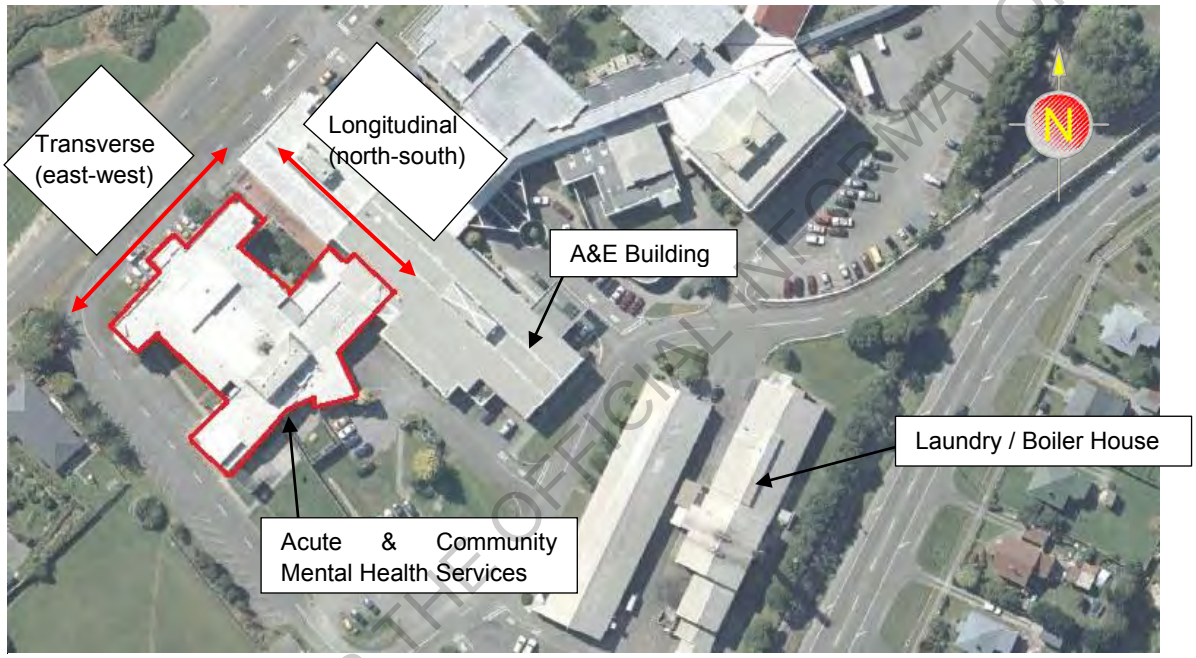


Figure 4.1: Aerial photo showing location of the Acute & Community Mental Health Services building at Grey Base Hospital.

The building contains both irregular geometries in plan and elevation. The north-western end of the building consists of two storeys plus a basement level and has an overall plan dimension of 25.9m long x 26.4m wide. The south-eastern end of the building consists of two storeys and has an overall plan dimension of 51.4m x 10.8m. The north western and south eastern ends are not seismically separated. They are linked together at the ground and first floor level by a 140mm thick concrete slab and will behave as one under seismic events.

For the purposes of this report and to keep with the naming convention used on site, the top level will be referred herein as the ground floor. Below ground floor is the lower ground floor and beneath this is the basement.

The ground floor structure consists of a pierced RC shear wall around the perimeter with internal timber framed walls supporting a timber framed roof structure. The roof structure consists of joists spanning between internal timber walls and external concrete walls. The

roof consists of a particle board overlay supporting a membrane cladding system. The roof is non-trafficable and accessible for maintenance purposes only. Below the ground floor level, the concrete floor slab is supported on RC walls and frames.

The foundations consist of a continuous strip foundation underneath the RC walls and individual pad footings underneath individual columns. Pad footings are linked together with RC groundbeams.

All stairways are cast in situ reinforced concrete.

The building is also connected to the Physiotherapy/Laboratory Block with a linkage slab. There is a seismic gap of 25mm between the two structures.

There are a number of non-structural timber framed partitions within the building separating various parts of the building.

The exterior cladding consists of 110mm thick brick veneer, supported on nibs cast in the concrete walls. Precast concrete fins are positioned at the vertical edges of all first floor windows for aesthetics purposes. These are dowelled into the concrete walls.

Figure 4.2 below shows the building elevations.

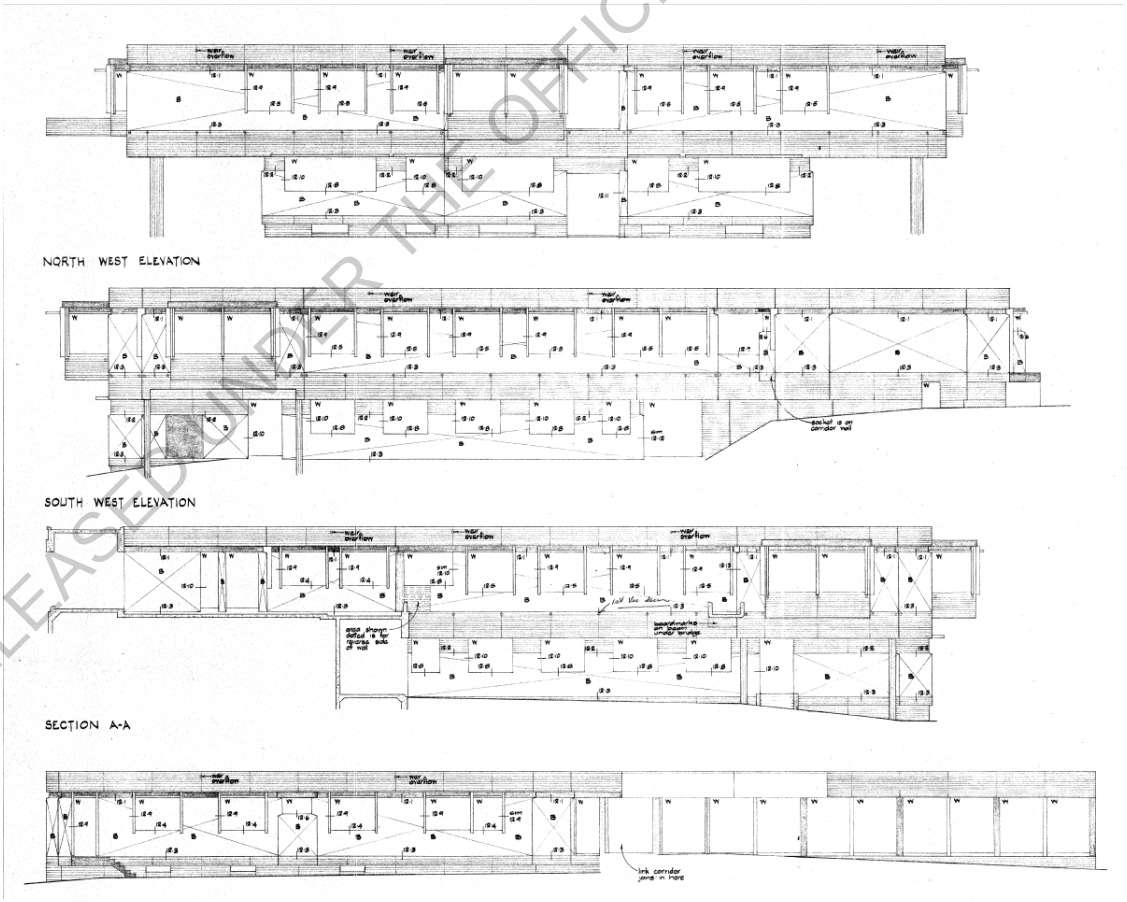


Figure 4.2: Acute & Community Mental Health Services Building Elevations

4.2 Building use

The Acute & Community Mental Health Building has offices, meeting rooms and an an acute mental health inpatient unit located on the ground floor. This inpatient unit provides overnight accomodation and is limited to a maximum of five beds.

The lower ground floor of the building contains offices and meeting rooms.

4.3 Gravity Load Resisting System

The main gravity load resisting system timber framed walls and perimeter RC walls. The main gravity load resisting system at lower ground floor and basement level consists of RC frames and walls.

The RC walls are supported on a continuous RC perimeter foundation extending around the building. The internal RC columns are supported on individual pad footings which are linked together by RC groundbeams.

4.4 Lateral Load Resisting System

Lateral loads are resisted in the transverse and longitudinal directions as indicated below.

4.4.1 Transverse Loading

Lateral loads in the transverse direction are resisted through the in-plane action of timber and RC walls. Timber framed bracing walls transfer the lateral loading from the roof level to the ground floor RC slab. The RC slab then acts as a diaphragm to distribute the loads to the concrete walls below. The RC walls on gridlines 1, 6, 8, 12, 14 and 18 then resist the majority of the lateral load through in-plane bending and shear. A number of bracing walls have been modified or removed since the building was originally built.

4.4.2 Longitudinal Loading

The lateral loads in the longitudinal direction are resisted through in plane action of timber and RC walls. Timber framed bracing walls transfer the lateral loading from the roof level to the ground floor RC slab. The RC slab then acts as a diaphragm to distribute the loads to the concrete walls below. The RC walls on gridlines B, D, I, J, K, M, N and O then resist the majority of the lateral load through in-plane bending and shear. A number of bracing walls have been modified or removed since the building was originally built.

4.5 Original Documentation

Copies of the following drawings were provided by the client and have been used in the seismic assessment of this building.

- Grey Hospital - Obstetric Block (Structural Drawings), prepared by Bruce-Smith Chapman & Amos, Consulting Civil & Structural Engineers, dated November 1977, sheets S1 to S70.

- Grey Hospital - Obstetric Block (Architectural Drawings), prepared by Porter and Martin, dated August 1977, sheets 9 to 12, 18 to 27 and 32 to 34.

- Grey Base Hospital Redevelopment – Acute Mental Health & Community Mental Health Services, Hopkinson Team Architecture Ltd, dated August 2000, sheets WD-A-415 to WD-A-437 and WD-A-499

The available drawings have been used to confirm the structural systems on-site, investigate potential Critical Structural Weaknesses (CSW's) and identify details which required particular attention.

5 Building Inspection

5.1 Visual Inspection

Visual inspections of the building were carried out by Jason Davidson of Opus on 31 July, 12 September and 13 September 2012.The purpose of these visual inspections was to verify information in the drawings and note changes or variations so that they could be considered in the seismic evaluation of the building.

A reinforcing bar scanner was also used during these visual inspections to verify position and spacing of reinforcing bars noted on the structural drawings.

Some intrusive investigation was also carried out during these inspections. The purpose of the intrusive investigation was to verify the construction details of the timber bracing walls so that an accurate bracing capacity value can be used during analysis. Intrusive investigation was also used to verify reinforcing steel in one of the RC piers and one of the RC columns, both at lower ground level.

5.2 General Observations

The building generally appears to be in a reasonably good condition with some areas of concern noted:

- There is cracking and possibly spalling of concrete on the vent sills in the lower ground floor external walls on gridline K between gridline 1 and 8. This type of deterioration has also been identified elsewhere in the hospital.

- There is extensive cracking in lower ground floor walls surrounding the storage area between gridline 1 and 8 and gridline K and M. These walls have been plastered and it

is unclear the reason why.

- The brick veneers at lower ground level are typically pulling away from the concrete walls. The first floor veneers were not inspected for this issue during this inspection.

6 Detailed Seismic Assessment

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

6.1 Critical Structural Weaknesses

The term Critical Structural Weakness (CSW) refers to a component or structural feature of a building that could contribute to increased levels of damage or cause premature collapse of a building. The following potential CSW's have been identified in this building.

a) Based on the intrusive testing of two timber bracing walls, it was identified that the walls are GIB lined but do not have bolted fixings to the concrete floor. They are nailed to the floor with Ramset or similar fasteners. We believe the walls are unlikely to meet the NZS3604:2011 requirements for fixing to the floor. As a result, it is possible that the walls may be overturned or slide along the floor during a seismic event, limiting their lateral load carrying capacity.

6.2 Quantitative Assessment Methodology

The probable seismic performance of the building has been assessed in accordance with the recommendations of the NZSEE publication "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes" [2] dated June 2006 (Including Corrigendum No.1). The following sections in particular have been used in this assessment:

- Section 7 "*Detailed Assessment of Reinforced Concrete Structures"*
- Section 11 *"Detailed Assessment Timber Structures".*

The probable Earthquake loading for this building has been calculated from NZS 1170 - Structural design actions, Part 5 Earthquake Action [1]. The building has been classed as Importance Level 2 (IL2) in accordance with AS/NZS1170.0 as the client has advised that it is not critical for this building to remain operational post–earthquake.

The building has been assessed using a force based approach by applying the forces that may be expected to be applied to the building by the design earthquake. Calculations were made in respect of several wall elements of the building in order to assess their likely performance in an earthquake. This performance has been measured as a %NBS (New Building Standard), that is as a percentage of the capacity that would be required for the design of an equivalent new building on this site.

As the building can be considered to be irregular in plan, a 3D model of the building has been developed using the structural analysis software ETABS. A modal response spectrum analysis was undertaken to capture the effect of the irregular form on the building response to earthquake actions, including the effects of the higher dynamic mode shapes.

6.3 Limitations and Assumptions in Results

Our analysis and assessment is based on an assessment of the building in its original condition.

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

- The normal variation in material properties which change from batch to batch.
- Approximations made in the assessment of the capacity of each element.

6.4 Seismic Coefficient Factors

The following seismic coefficient factors have been used in the evaluation of this building:

- Design life of building = 50 years, refer NZS1170.5 [1].
- Soil class C (shallow), refer NZS1170.5 [1] and Grey Base Hospital Geotechnical Assessment Report [8].
- Building Importance Level 3, refer AS/NZS1170.0.
- Seismic risk factor R_u = 1.3
- Seismic zone factor Z = 0.37, refer NZS1170.5
- Ductility μ = 1.5 (reinforced concrete) and 1.25 (timber framed bracing walls)
- Parts Acceleration in accordance with Section 8 of NZS1170.5 to calculate the seismic forces on the ground floor timber framed walls.

6.5 Material Properties

Assessments of material strengths have been based on limited drawings and site inspections. Characteristic material properties have been typically based on NZSEE guidance [2] and the Transit New Zealand Bridge Manual [7]. Probable material strengths have been used for the assessment of member capacities in accordance with NZSEE guidance [2].

The following probable material properties have been used in the assessment:

- f'_c = 25MPa (concrete nominal compressive strength)
- f_y = 275MPa (reinforcing steel nominal yield stress)

Based on the intrusive testing conducted on the timber bracing walls, it was found that the bracing walls are GIB lined, but do not have bolted fixings to the concrete floor. Instead they are nailed to the concrete floor slab. Hence the conservative valued strength of 3kN/m with a strength reduction factor of 0.7 provided in Table 11.1 of NZSEE guidance [2] was adopted. This is comparable to the bracing unit rating of GS1-N and GS2-N, both of which do not require additional end hold down fastenings and are rated to have 60 bracing unit per metre (3kN/m). [9]

We understand from information provided that a bracing schedule was not completed during the c.2000 refurbishment. Therefore it appears that the new internal walls were designed and constructed as internal partitions only and not as bracing walls. However, we have assumed that these c.2000 internal walls have a nominal bracing capacity as the drawings indicated that they are lined with 9.5mm GIB board and that the hold-down detail is likely to be equivalent or better than the original timber bracing wall.

The following soil characteristics have been provided by Hayden Bowen from Tonkin and Taylor for assessing the capacity of the shallow pad foundations:

- Minimum ultimate bearing strength of ground = 210kPa.

6.6 Quantitative Assessment

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

Structural Element/System	Failure mode or description of limiting criteria based on capacity of critical element.	Critical Structural Weakness and Collapse Hazard	% NBS based on calculated capacity
Concrete walls below ground floor – East West direction	In plane bending and shear of concrete walls.	No	100%
Concrete walls below ground floor – North South direction	In plane bending and shear of concrete walls.	No	100%
Timber framed bracing walls at ground floor – East West direction	In plane bending and shear of timber framed walls.	No	15%
Timber framed bracing walls at ground floor – North South direction	In plane bending and shear of timber framed walls.	No	19%

Table 6.1: Summary of Seismic Performance

6.7 Discussion of Results

The quantitative assessment of this building indicates that the building has the following seismic capacity:

- Seismic capacity in transverse direction (East – West direction) = 12%NBS.
- Seismic capacity in longitudinal direction (North – South direction) = 15%NBS.

The seismic capacity of the concrete framed and walled structure below ground floor has been assessed to be >100%NBS.

The predicted lateral deflection of the ground floor slab under the design seismic event is less than the 25mm gap provided due to the relatively stiff wall structure. This deflection is well within the 2.5% code drift limit. The small deflection and the fact that the stairs are constructed integrally with the adjacent RC walls means that the stairs are unlikely to be subject to additional loads (and subsequent damage or loss of function) due to being rigidly connected to both levels.

The seismic capacity of the building is governed by the capacity of timber framed bracing walls on the ground floor level to transfer the lateral load from the roof to the ground floor diaphragm in both the East-West and North-South direction. The bracing capacities of the timber framed bracing walls are limited due to the uncertainty in the hold-down capacity and nailing pattern of the walls. We believe that the nailed fixing to the floor slab will not allow the full ductile bracing capacity of the timber framed walls to be achieved, rather that the wall may rock or slide over the slab once the nailed fixings become overstressed.

Based on the assessed %NBS, this building is classified as Earthquake Prone.

It is expected that the building will sustain significant wall damage above first floor level under a design level earthquake (1000 year return period). The rocking or sliding of the timber framed walls is still expected to be a ductile type of failure, therefore we do not believe the building poses a collapse risk.

As this building is Earthquake Prone, GDC policy [6] requires strengthening work to improve the building performance to a minimum of 67%NBS to be completed within 12 years.

7 Summary of Geotechnical Appraisal (Tonkin and Taylor [8])

7.1 General

The Geotechnical Appraisal of the Acute & Community Mental Health Services Building is based on structural drawings provided by the WCDHB and the Geotechnical Assessment Report prepared for the Canterbury District Health Board by Tonkin and Taylor [8]. The drawings indicate the RC walls are supported on a continuous strip footing and RC columns are supported on isolated pad footings which are linked together by RC groundbeams.

The strip footing is typically 1.0m wide and is founded 1.0m below the ground surface. The isolated pad footings vary in size and are linked together with a 450mm wide groundbeam.

7.2 Geotechnical Appraisal

Based on the Geotechnical Assessment Report the area should be classed as a shallow soil site, ground class C in terms of NZS1170.5. The assessment result was based on four machine drilled boreholes to a maximum depth of 18.45m below ground level with Standard Penetration Tests (SPTs) at 1.5m intervals. Mudstone bedrock was encountered in two of the boreholes at depths of 15m and 17m below ground level.

The soil profile at the site was found to be 0-3m medium dense sand and gravel overlaying 3-12.5m of soft silt. Beyond that is very dense gravel.

7.3 Summary and Recommendations

The town of Greymouth has a high risk of intense seismic shaking. Associated with this shaking risk are some secondary earthquake risks that are site specific such as liquefaction.

The Grey Base Hospital site is identified as having a low potential for liquefaction induced ground damage. This is due the high permeability and density of the gravel and the high fine grain particles of the soft silt layers. Hence both layers are considered to be non-liquefiable.

As a result, liquefaction and lateral spreading damage is not expected in an ULS earthquake at the site. Any differential settlement would be due to large cyclic loads causing permanent settlements of the foundations. These differential settlements are hard to quantify, but generally are reasonably minor and should not cause any issues from an ULS perspective.

8 Remedial Options

The Acute & Community Mental Health building is Earthquake Prone and therefore requires strengthening under the Building Act. According to the Earthquake Prone building policy adopted by the GDC, it is required to be strengthened to a minimum of 67%NBS or be demolished within 12 years [6].

Possible strengthening concepts to improve the seismic performance of the building could include the following:

- Develop a bracing plan, calculating the length, type and location of new bracing elements required on the first floor, and
- Remove existing first floor timber framed wall linings, install required hold-down restraints at the base of the wall and re-line walls with GIB bracing, or
- Install steel straps with hold downs over the top of existing timber walls to act as bracing bays. Note that given the obtrusive nature of this strengthening option, it is unlikely to be a suitable long term solution.

9 Conclusions

The seismic performance of the Acute & Community Mental Health Services building has been assessed as:

- Seismic capacity above ground floor in the transverse direction (east – west) = 15%NBS.
- Seismic capacity above ground floor in the longitudinal direction (north – south) = 19%NBS.
- Seismic capacity below ground floor in both directions = 100%NBS

The building is therefore classed as Earthquake Prone as it has a seismic capacity of less than 33%NBS.

It is expected that the building will sustain significant damage under a design level earthquake (500 year return period) and the building is classed as a “high risk” building. However we do not believe that it poses a collapse risk.

This building requires strengthening in accordance with the policy adopted by GDC [6], to a minimum of 67% NBS or be demolished within 12 years.

10 Recommendations

We recommend that a staged strengthening approach as detailed below is followed in order to understand and manage the economic impact of any proposed remedial actions. Specifically we recommend that:

a) The implications of the IL2 classification for this building be carefully considered prior to carrying out any future works on this building, noting that with an IL2 classification, this building is not expected to remain operational post-disaster.

   An IL2 classification may also limit future use of the building.

b) An outline scheme for structural strengthening – with a view to achieving at least 67%NBS should be further developed followed by costing by a quantity surveyor.

c) A quantity surveyor is engaged to determine the costs for strengthening the building.

d) Detailed design of a scheme for the strengthening of the structure is carried out.

In addition to the seismic strengthening scheme, there are several issues that were identified during the inspection that warrant further investigation:

- There is cracking and possibly spalling of concrete on the vent sills in the lower ground floor external walls on gridline K between gridline 1 and 8. This type of deterioration has also been identified elsewhere in the hospital and we recommend that chloride intrusion testing be carried out. This will help to identify whether there are any major issues with concrete deterioration of the building.

- There is extensive cracking in lower ground floor walls surrounding the storage area between gridline 1 and 8 and gridline K and M. These walls have been plastered and the reason why is unclear. This may indicate some underlying issue which we recommend be investigated further.

- The brick veneers at lower ground level are typically pulling away from the concrete walls behind. This may be due to the corrosion of galvanised tie wires behind the brick veneers. It is recommended that some brickwork be removed to allow for inspection of the tie-back and the investigation of other possible causes for the separation. The ground floor brick veneers were not inspected and we recommend that any further investigation / inspection include these also.

11 Limitations

a) This report is based on a visual inspection of the structure of the Acute & Community Mental Health Services building and a quantitative assessment of the building.

b) Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time.

c) This report is prepared for WCDHB to assist with assessing the seismic capacity of this building. It is not intended for any other party or purpose.

12 References

[1] NZS 1170.5: 2004, *Structural design actions, Part 5 Earthquake actions,* Standards New Zealand.

[2] NZSEE: 2006, *Assessment and improvement of the structural performance of buildings in earthquakes,* New Zealand Society for Earthquake Engineering.

[3] Engineering Advisory Group, *Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury, Part 2 Evaluation Procedure*, Draft Prepared by the Engineering Advisory Group, Revision 5, 19 July 2011.

[4] Engineering Advisory Group, *Guidance on Detailed Engineering Evaluation of Non-residential buildings, Part 3 Technical Guidance*, Draft Prepared by the Engineering Advisory Group, 13 December 2011.

[5] SESOC, *Practice Note – Design of Conventional Structural Systems Following Canterbury Earthquakes*, Structural Engineering Society of New Zealand, 21 December 2011.

[6] Grey District Council, *Earthquake-Prone, Dangerous and Insanitary Buildings Policy,* Adopted 14 February 2011.

[7] Transit New Zealand: *Bridge Manual,* Second Edition 2003 (including amendments).

[8] Grey Base Hospital Geotechnical Assessment prepared by Tonkin & Taylor Ltd for Canterbury District Health Board, August 2012. T&T Ref: 53097

[9] GIB, *GIB EzyBrace Systems 2011*, July 2011

[10] AS/NZS 1170.0: 2002, *Structural design actions, Part 0 General Requirements,* Standards New Zealand.

Appendix A

PHOTOGRAPHS

Acute & Community Mental Health Services Building – Grey Base Hospital	
No.	**Photo**
General	
1.	North elevation
2.	West elevation
3.	East elevation
4.	Roof level
5.	Extensive cracking in lower ground walls surrounding storage area
6.	Cracking of concrete on the vent sills in the lower ground floor external walls
7.	Brick veneers pulling away from concrete walls
8.	Intrusive testing of first floor timber walls

Photo 1: North elevation

Photo 2: West elevation

Photo 3: East elevation

Photo 4: Roof level

Photo 5: Extensive cracking in lower ground walls surrounding storage area

Photo 6: Cracking of concrete on the vent sills in the lower ground floor external walls

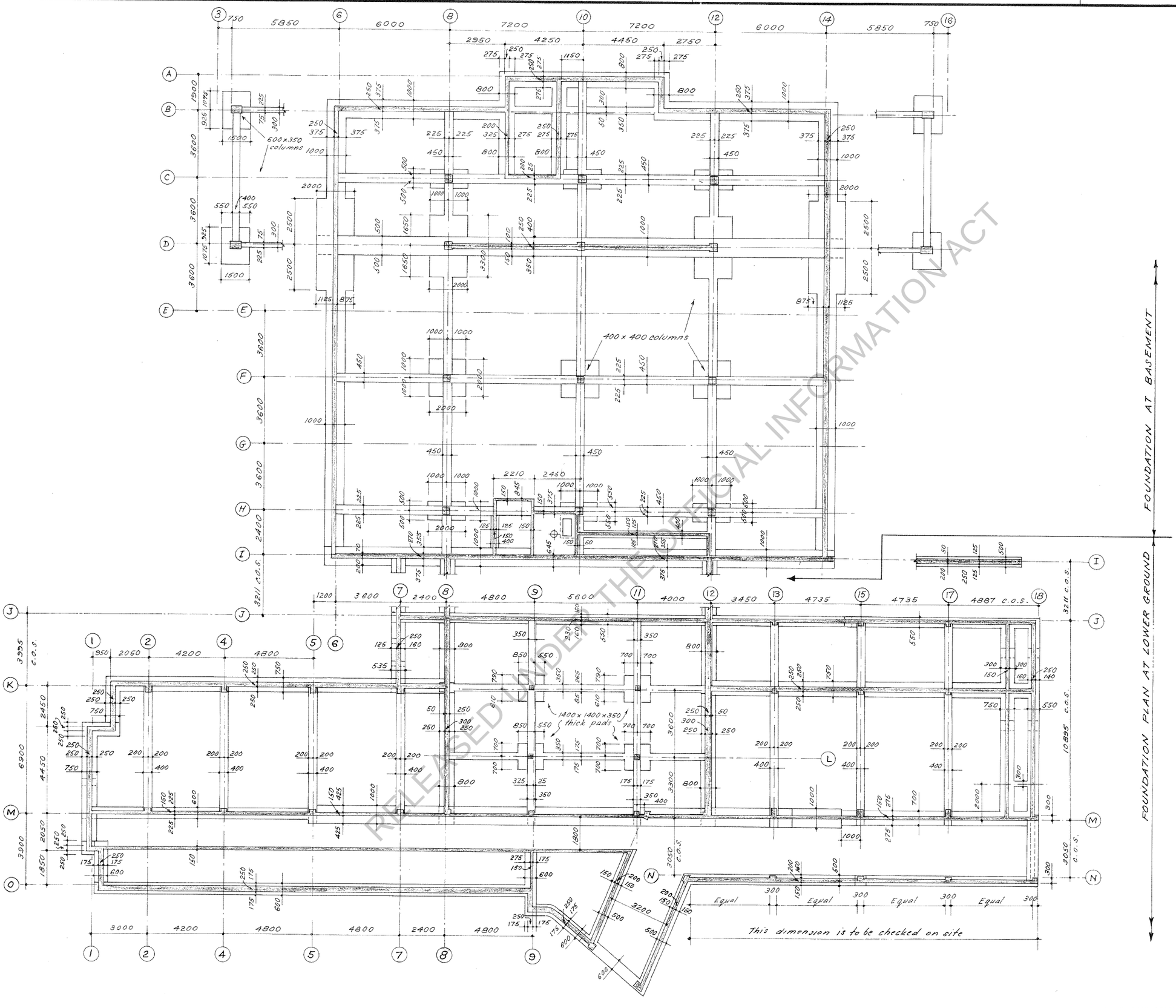
Photo 7: Brick veneers pulling away from concrete walls

Photo 8: Intrusive testing of first floor timber walls

Appendix B

DRAWINGS

Acute & Community Mental Health Service Building – Grey Base Hospital	
No.	**Drawings**
General	
1.	S2 – Grey Hospital Obstetric Block, Foundation Plan
2.	S3 – Grey Hospital Obstetric Block, Basement Plan
3.	S4 – Grey Hospital Obstetric Block, Lower Ground Floor Plan
4.	S5 – Grey Hospital Obstetric Block, Ground Floor Layout
5.	S7 – Grey Hospital Obstetric Block, Perimeter Wall on Line 6
6.	S9 – Grey Hospital Obstetric Block, Interior Columns From Basement Level
7.	S25 – Grey Hospital Obstetric Block, Perimeter Walls on Line B
8.	S50 – Grey Hospital Obstetric Block, Ground Floor Beams Lines C & D
9.	9 – Grey Hospital Obstetric Block, Sections F-F – K-K
10.	10 – Grey Hospital Obstetric Block, Sections L-L – Y-Y
11.	12 – Grey Hospital Obstetric Block, Brickwork Details, Concrete Finishes
12.	20A -Grey Hospital Obstetric Block, Ground Floor Partitions & Strapping Plan & Details
13.	21 – Grey Hospital Obstetric Block, Timber Roof Beams Plans
14.	24 – Grey Hospital Obstetric Block, Ground Floor Ceiling Framing Plan
15.	WD-A-402 – Grey Base Hospital Redevelopment, Construction Plan



BY	DATE	REVISIONS	LETTER

BRUCE-SMITH CHAPMAN & AMOS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
58 VICTORIA STREET WELLINGTON
PHONE 724648 P. O. BOX 2703

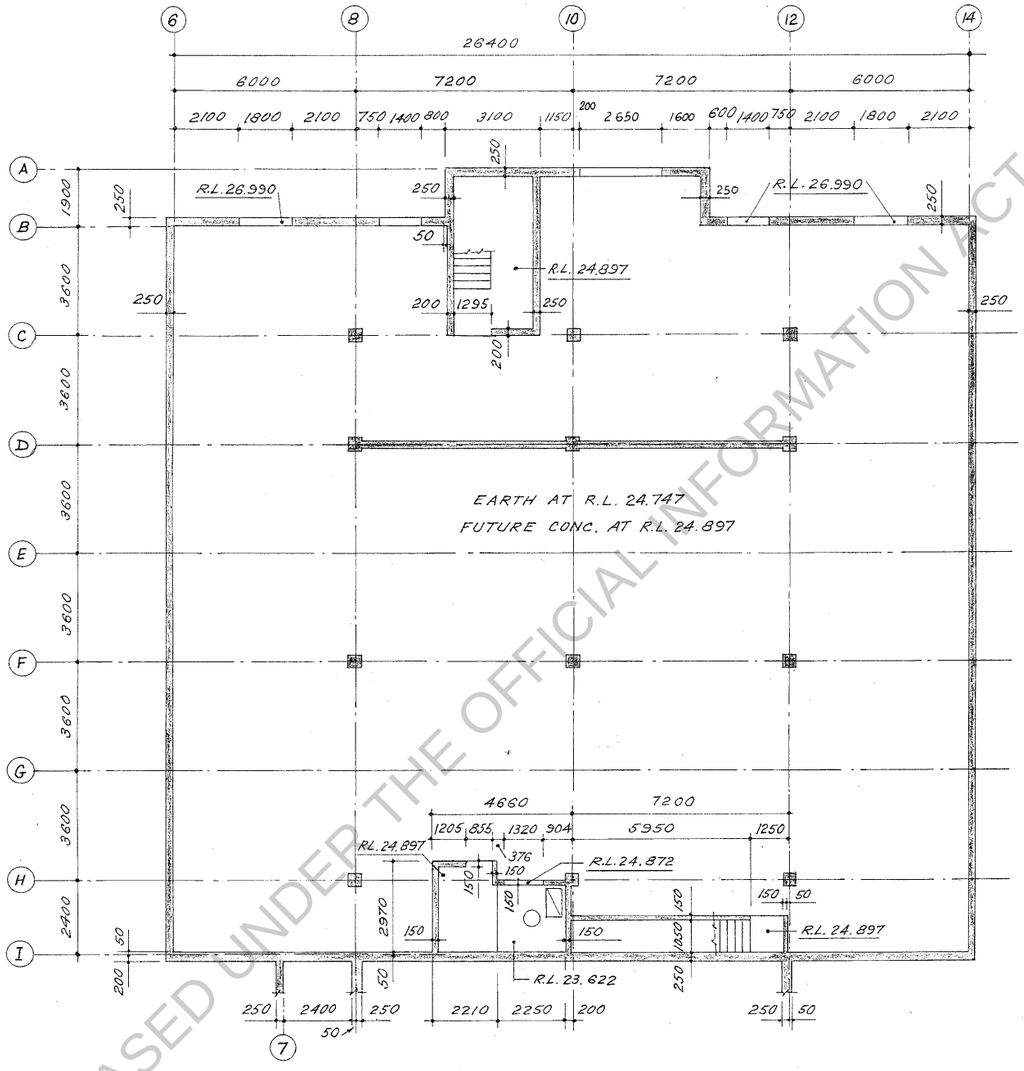
PORTER AND MARTIN
Registered Architects
Woodward House, 39 The Terrace, Wgtn.

GREY HOSPITAL OBSTETRIC BLOCK

FOUNDATION PLAN

DATE November '77	SCALE 1 : 100
NO. OF SHEETS:	
DRN: KSY	CHKD: TJWC
JOB NO: C/421	DRG NO: S 2

COOK CONSTRUCTION CO LTD.
Director



BASEMENT PLAN (Scale 1:100)

STRUCTURAL SLAB LEVEL – 24.897
EARTH LEVEL – 24.747

BY	DATE	REVISIONS	LETTER

BRUCE-SMITH CHAPMAN & AMOS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
56 VICTORIA STREET WELLINGTON
PHONE 724646 P. O. BOX 2703

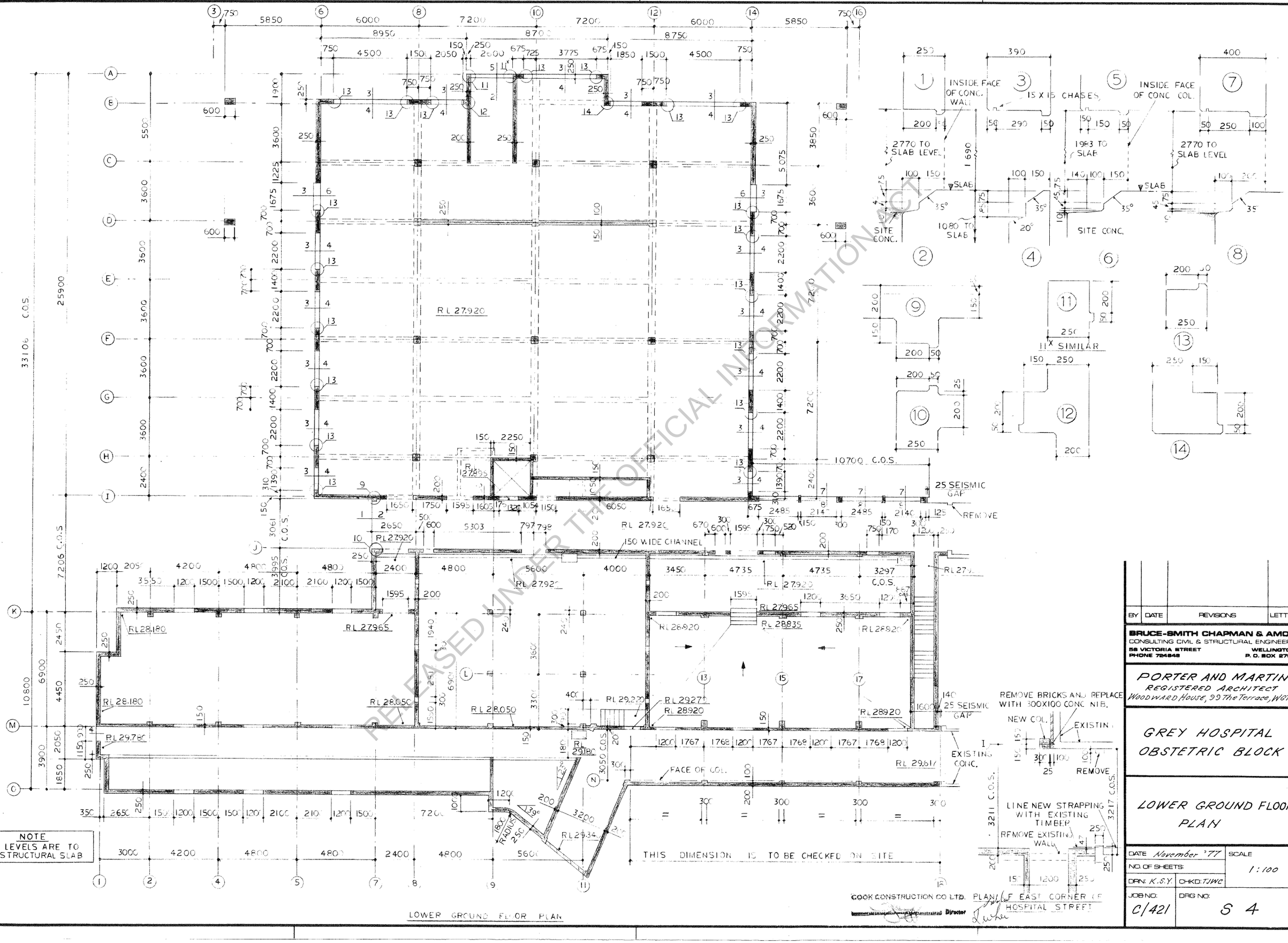
PORTER AND MARTIN
REGISTERED ARCHITECTS
Woodward House, 99 The Terrace, Wellington

GREY HOSPITAL OBSTETRIC BLOCK

BASEMENT PLAN

DATE November '77 | SCALE 1:100
NO. OF SHEETS:
DRN: K S Y | CHKD: T J W C
JOB NO: C/421 | DRG NO: S 3

COOK CONSTRUCTION CO. LTD.
Director



NOTE
LEVELS ARE TO STRUCTURAL SLAB

LOWER GROUND FLOOR PLAN

COOK CONSTRUCTION CO LTD. PLAN OF EAST CORNER OF HOSPITAL STREET

Director

BY	DATE	REVISIONS	LETTER

BRUCE-SMITH CHAPMAN & AMOS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
58 VICTORIA STREET WELLINGTON
PHONE 724848 P.O. BOX 2703

PORTER AND MARTIN
REGISTERED ARCHITECT
WOODWARD HOUSE, 99 The Terrace, WGTN

GREY HOSPITAL OBSTETRIC BLOCK

LOWER GROUND FLOOR PLAN

DATE November '77	SCALE 1:100
NO. OF SHEETS:	
DRN: K.S.Y.	CHKD: TJWC
JOB NO: C/421	DRG NO: S 4

DETAIL OF ALL REBATES IN EXTERNAL WALLS

10 X 10 CHAMFER

RL 32.187 (STRUCTURAL SLAB)

RL 32.137

RL 31.800

RL 31.875

RL 31.97

EXISTING HOSPITAL

LABS. AND PHYSIO BLOCK

End of existing main hospital corridor

NOTATION USED:
C.O.S. – CHECK ON SITE
= – EQUAL

STANDARD PRECAST CONC. FIN.

SLAB

LINE OF INSIDE FACE OF CONC. WALL

NORMAL SLAB LEVEL

250 WALL

BRICK

CONC.

Grid line

25 SEISMIC AP

DIMENSION AS 16

RELEASED UNDER THE OFFICIAL INFORMATION ACT

BY	DATE	REVISIONS	LETTER

BRUCE-SMITH CHAPMAN AND AMOS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
55 VICTORIA ST. – WELLINGTON

PORTER AND MARTIN
REGISTERED ARCHITECTS
WOODWARD HOUSE
93 THE TERRACE – WELLINGTON

GREY MATERNITY HOSPITAL

GROUND FLOOR LAYOUT

COOK CONSTRUCTION CO LTD.
Director

DATE	MARCH 1977	SCALE	1:10
NO OF SHEETS			1:10
R.L.K.S.Y.	CHK. TSNC		
JOB NO.	C/421	DWG NO.	55

WALL ELEVATION ON LINE 6

SECTION 1-1

SECTION 2-2

SECTION 3-3

SECTION 4-4

SECTION 5-5

SECTION 6-6

SECTION 7-7

SECTION 8-8

SECTION 9-9

SECTION 10-10

SECTION 11-11

SECTION 12-12

SECTION 13-13

SECTION 14-14

SECTION 15-15

SECTION 16-16

BY	DATE	REVISIONS	LETTER

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CONSULTING CIVIL & STRUCTURAL ENGINEERS
56 VICTORIA STREET WELLINGTON
PHONE 724848 P. O. BOX 2703

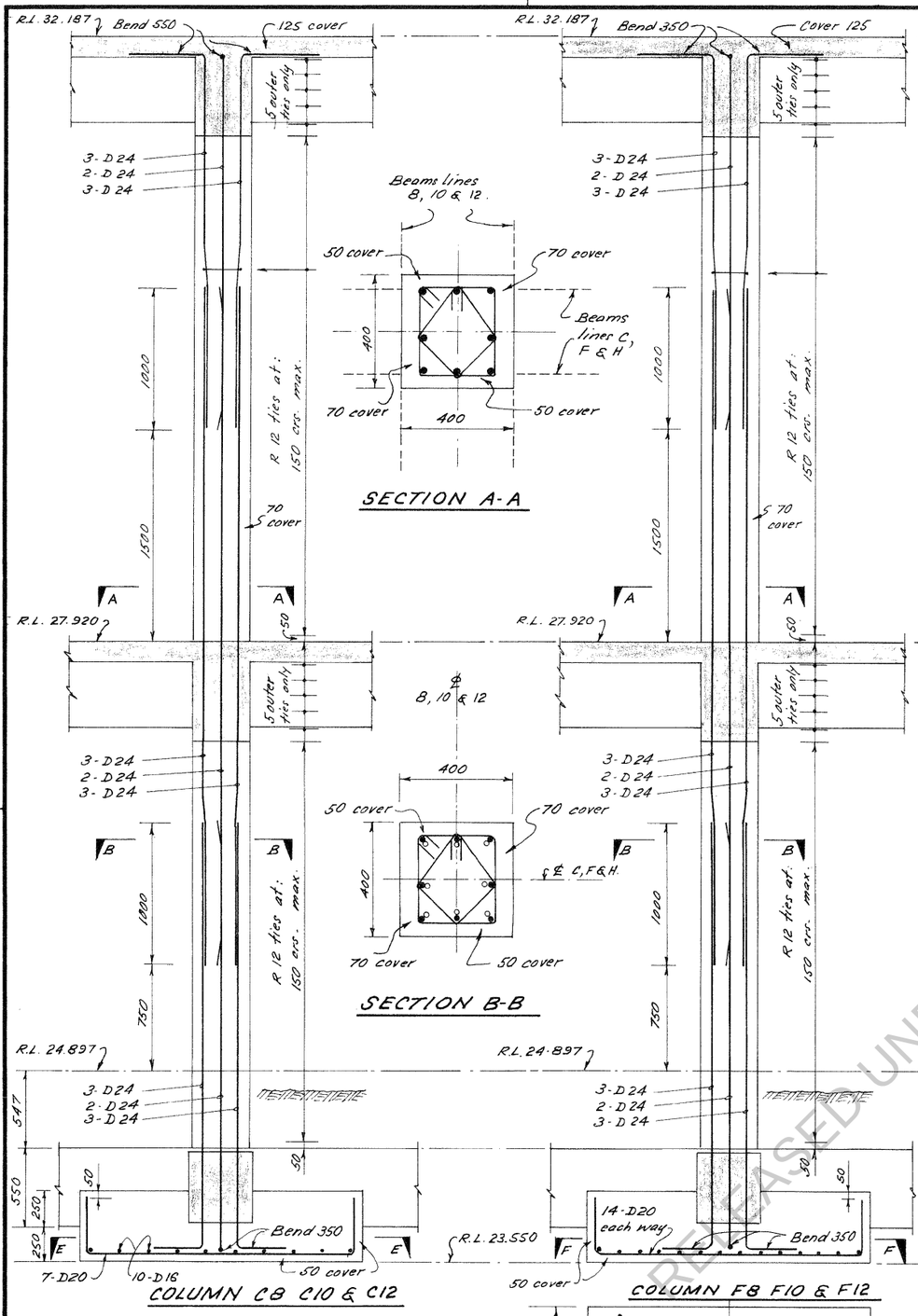
PORTER AND MARTIN
REGISTERED ARCHITECTS
WOODWARD HOUSE, 93 The Terrace, Wellington

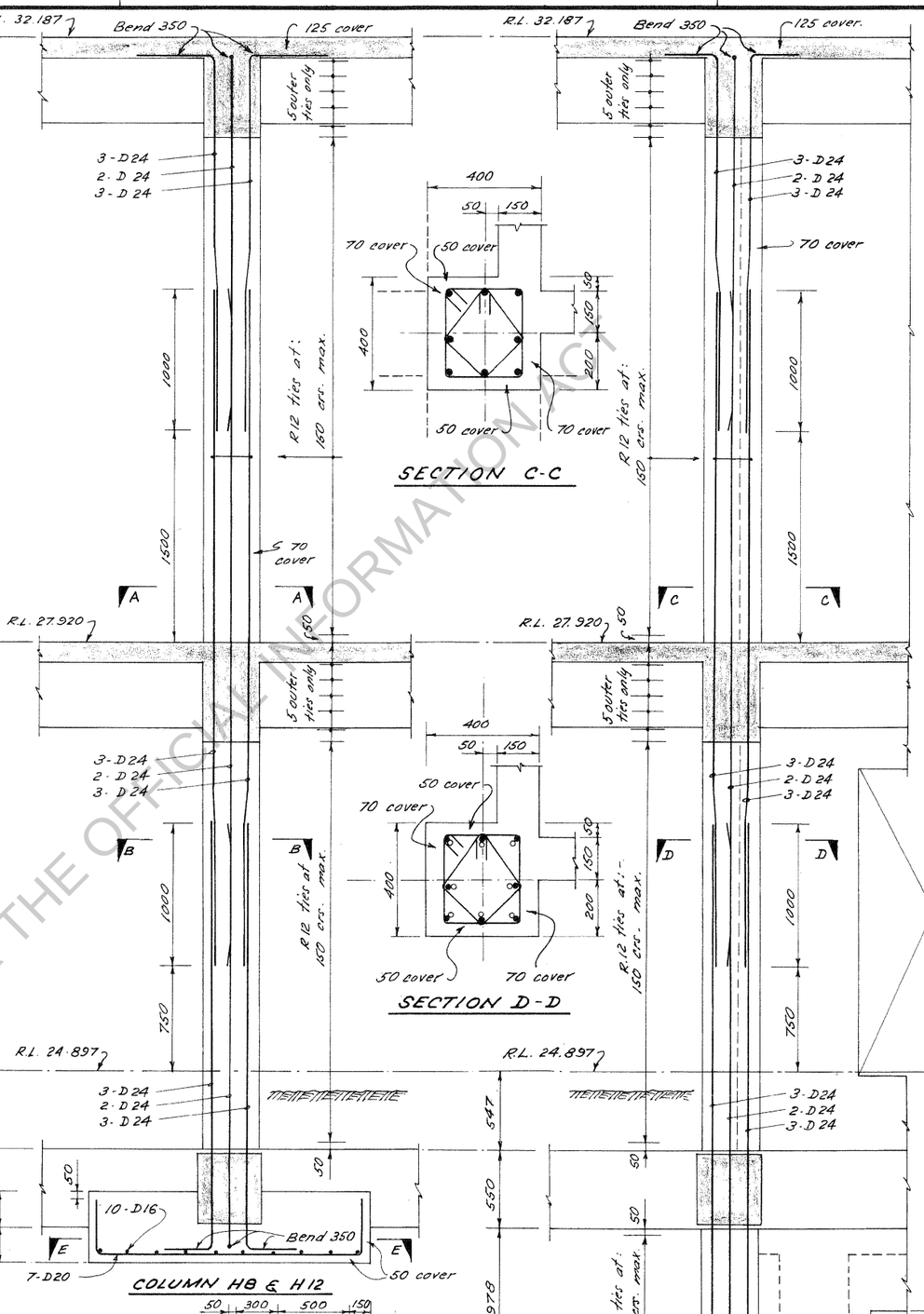
GREY HOSPITAL OBSTETRIC BLOCK

PERIMETER WALL ON LINE 6

DATE November '77	SCALE 1:50, 1:20, 1:10
NO. OF SHEETS:	
DRN: K.S.Y.	CHKD: T.J.W.C.
JOB NO: C/421	DRG NO: S 7

COOK CONSTRUCTION CO. LTD
Director





COOK CONSTRUCTION CO. LTD.

Director

BY	DATE	REVISIONS	LETTER

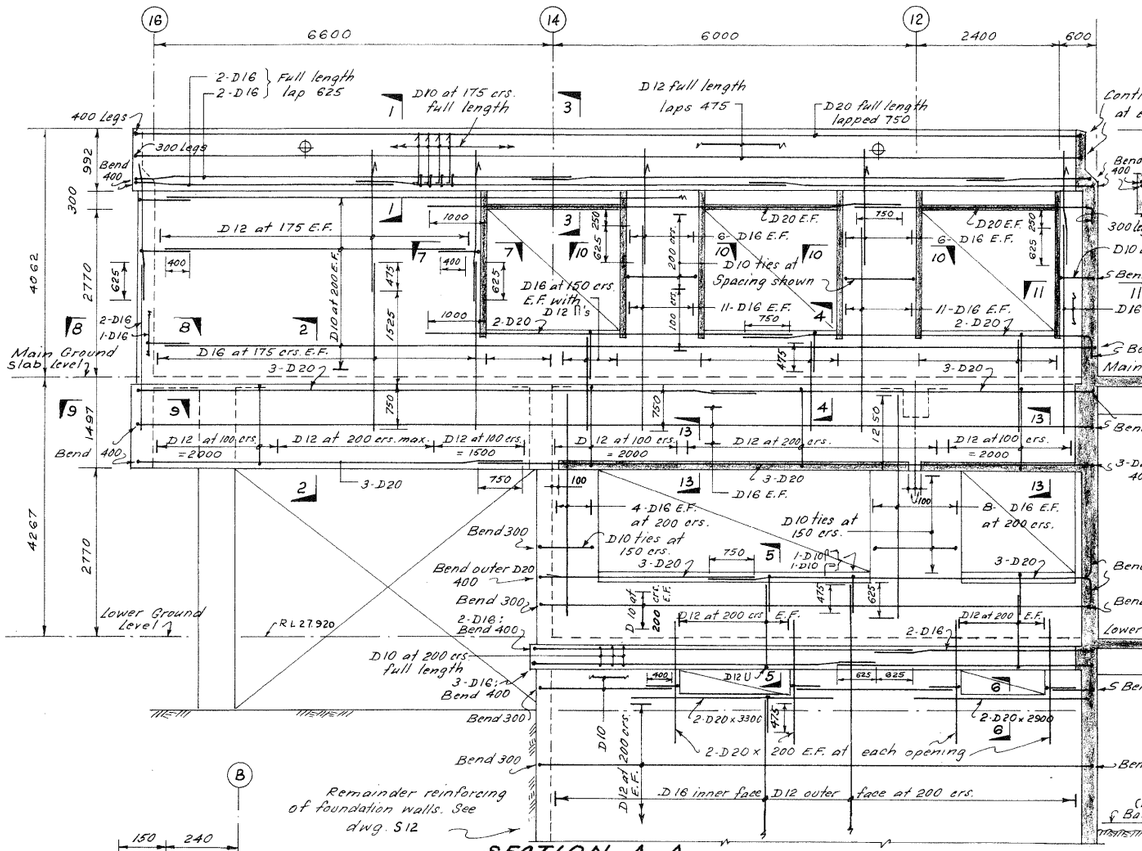
BRUCE-SMITH CHAPMAN & AMOS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
56 VICTORIA STREET WELLINGTON
PHONE 724548 P. O. BOX 2703

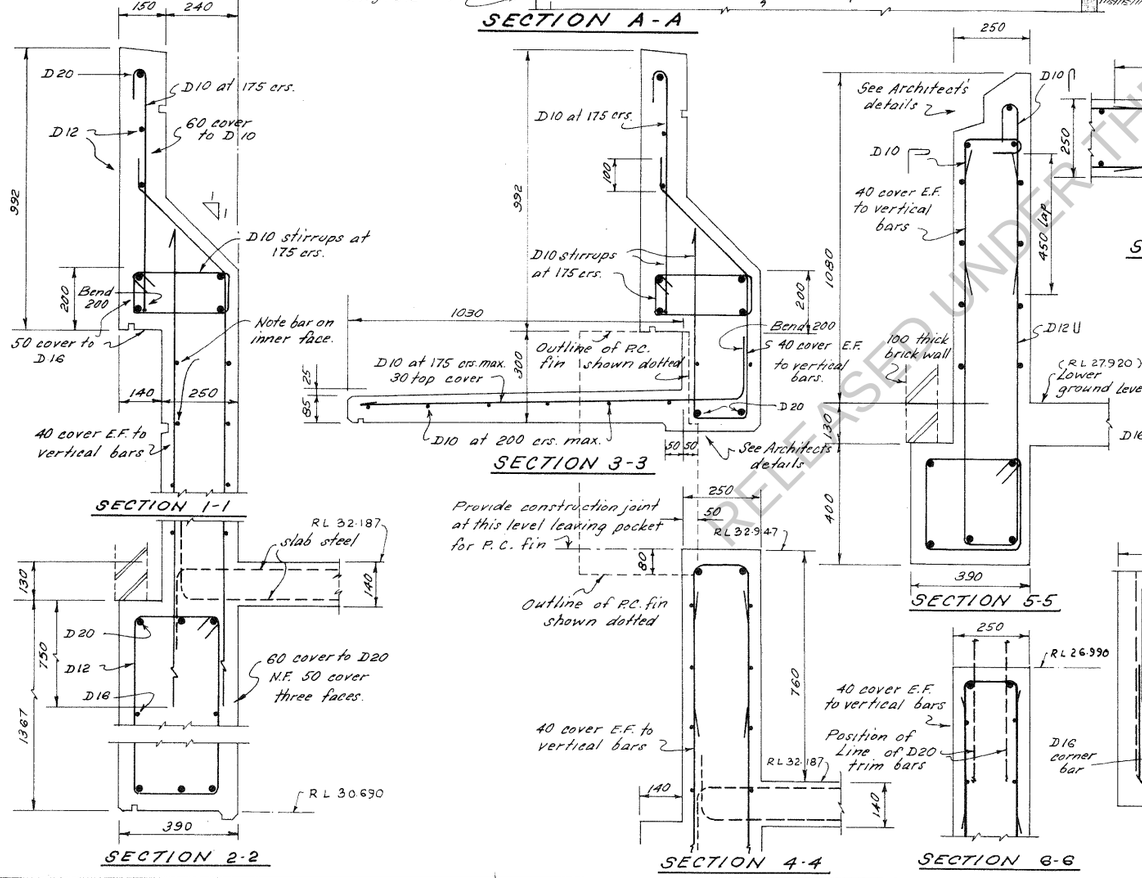
PORTER AND MARTIN
REGISTERED ARCHITECTS
WOODWARD HOUSE, 99 The Terrace, Wellington

GREY HOSPITAL OBSTETRIC BLOCK

INTERIOR COLUMNS FROM BASEMENT LEVEL.

DATE November '77	SCALE 1:20 1:10
NO. OF SHEETS:	
DRN: W.K.Y. CHKD: T.J.W.C.	
JOB NO: C/421	DRG NO: S. 9





BY	DATE	REVISIONS	LETTER

BRUCE-SMITH CHAPMAN & AMOS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
56 VICTORIA STREET WELLINGTON
PHONE 724648 P. O. BOX 5703

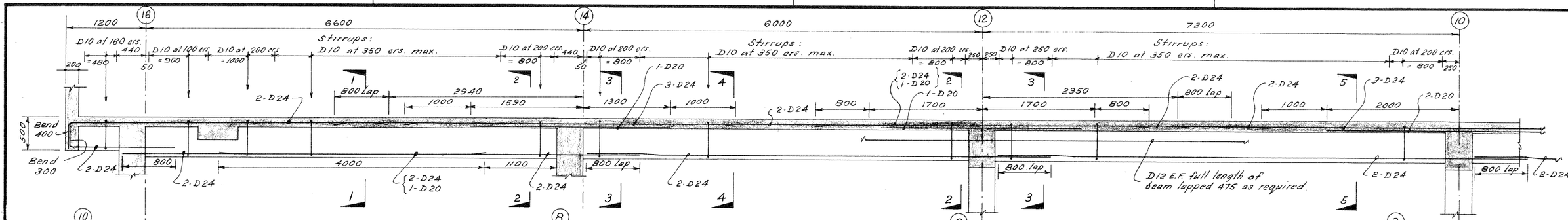
PORTER AND MARTIN
REGISTERED ARCHITECTS
WOODWARD HOUSE, 99 THE TERRACE, WELLINGTON

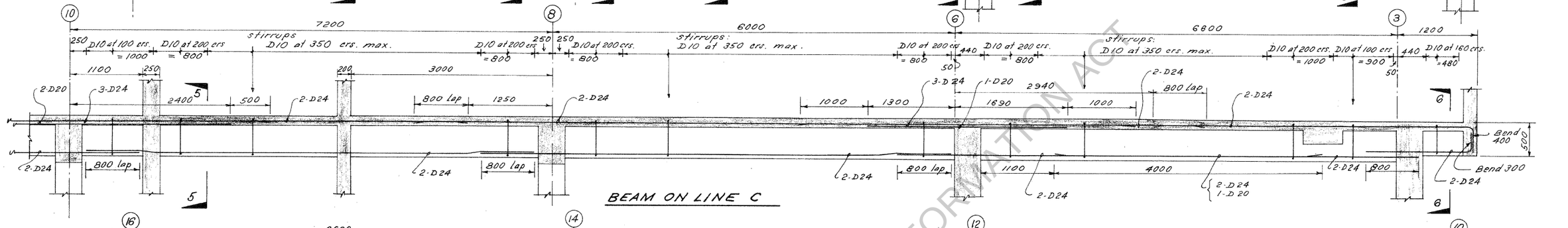
GREY HOSPITAL OBSTETRIC BLOCK

PERIMETER WALLS ON LINE B

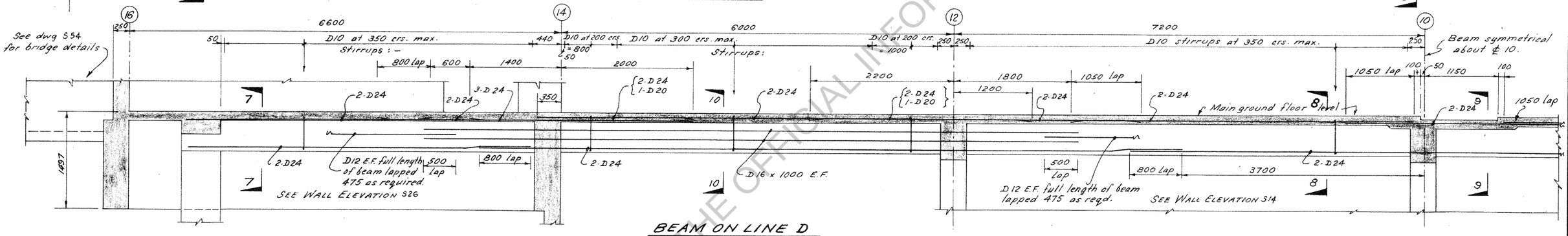
DATE November '77	SCALE 1:50 1:10
NO. OF SHEETS:	
DRN: K.S.Y	CHKD: T.J.W.C.
JOB NO: C/421	DRG NO: S 25

COOK CONSTRUCTION CO LTD
Director





BEAM ON LINE C



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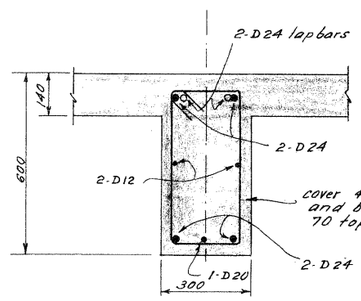

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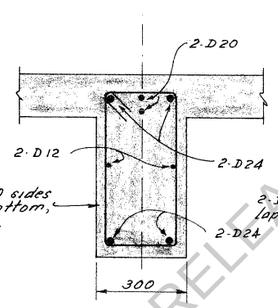

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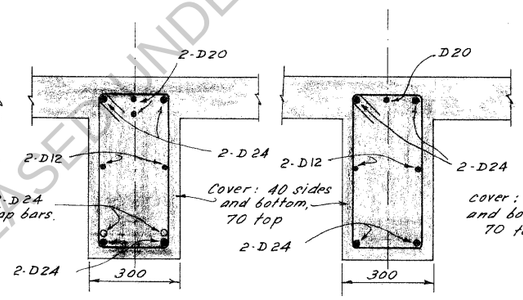

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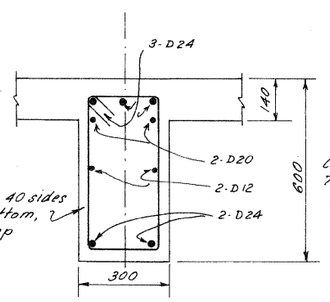
SECTION 4-4



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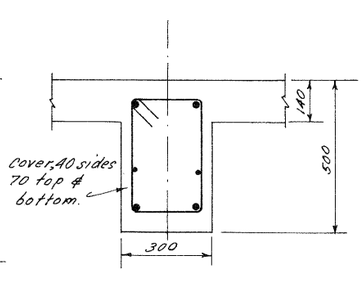

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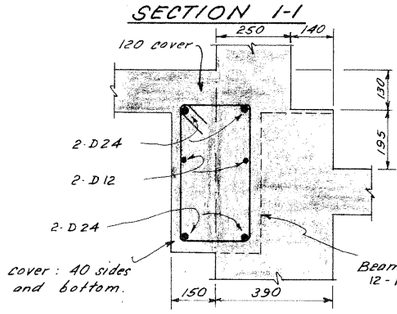

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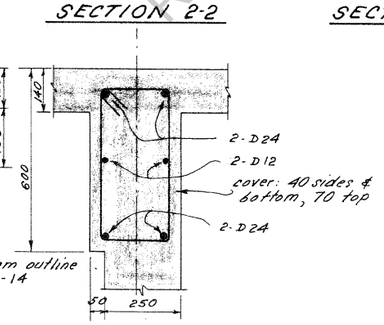

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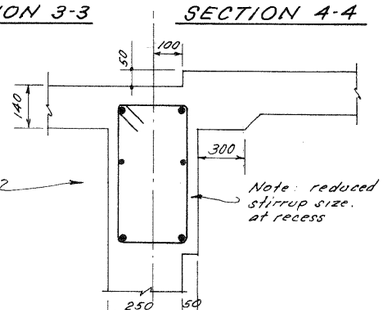

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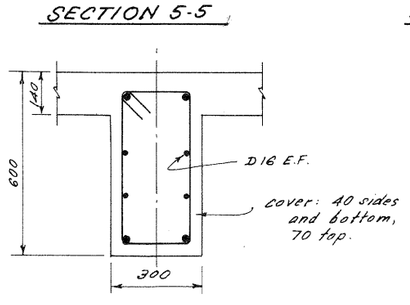


SECTION 10-10

COOK CONSTRUCTION CO LTD

Director

BY	DATE	REVISIONS	LETTER

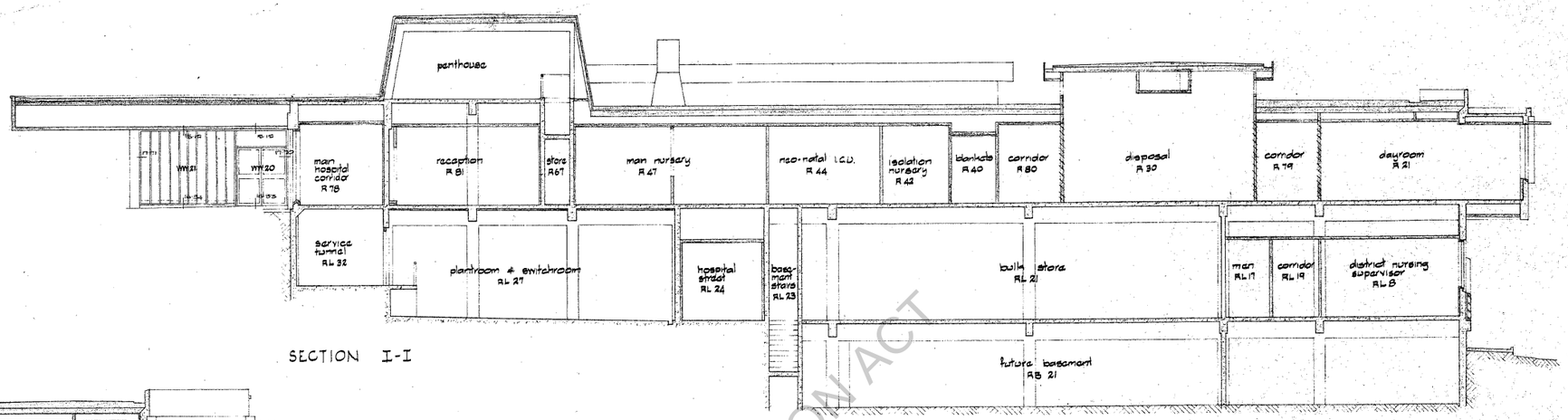
BRUCE-SMITH CHAPMAN & AMOS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
56 VICTORIA STREET, WELLINGTON
PHONE 724548, P. O. BOX 2703

PORTER AND MARTIN
REGISTERED ARCHITECTS
WOODWARD HOUSE, The Terrace, Wgtn.

GREY HOSPITAL OBSTETRIC BLOCK

GROUND FLOOR BEAMS LINES C & D

DATE: November '77	SCALE: 1:30, 1:10
NO. OF SHEETS:	
DRN: W.K.Y.	CHKD: T.J.W.C.
JOB NO: C/421	DRG NO: S 50



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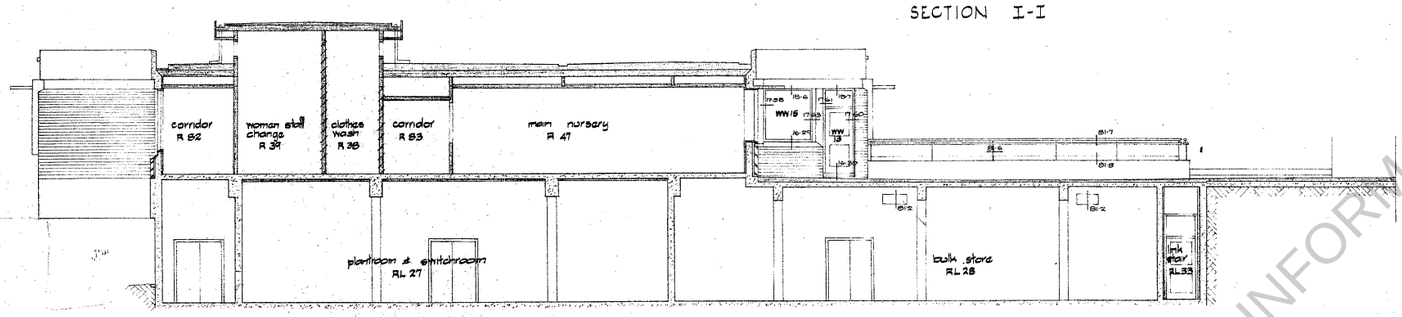

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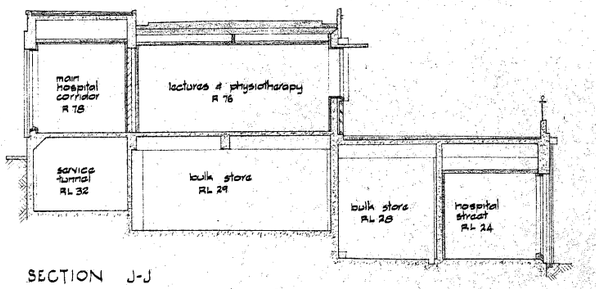

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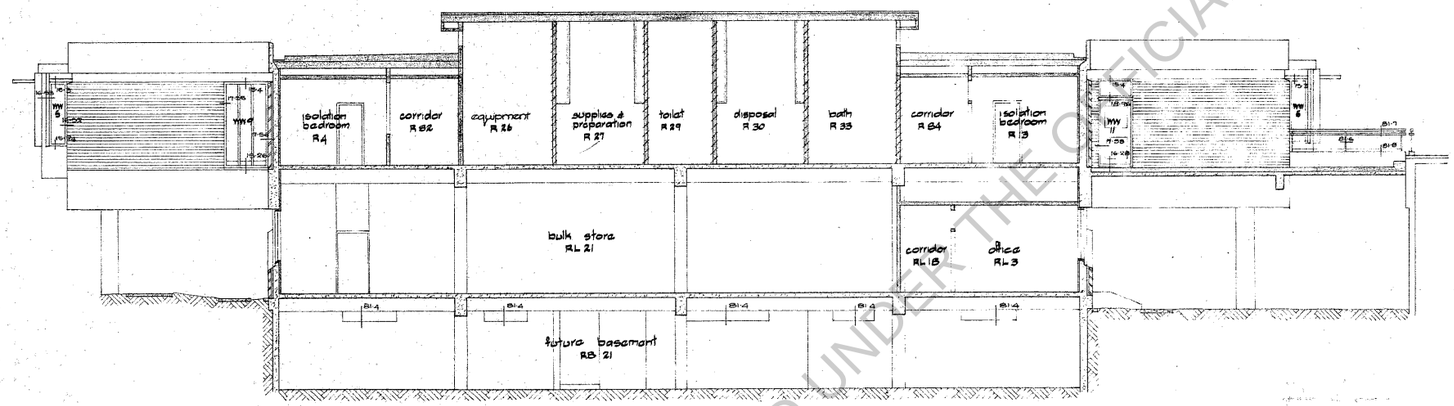

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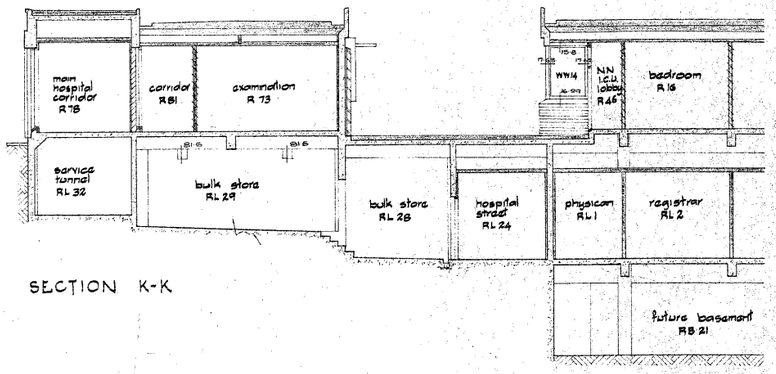

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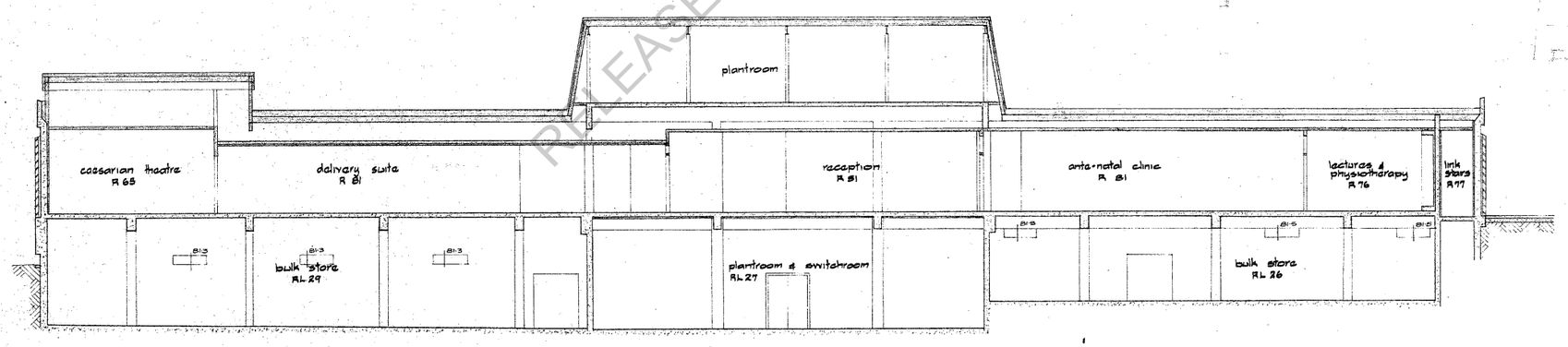


SECTION H-H

LEGEND

braced walls

20 AUG 1979

GREY HOSPITAL OBSTETRIC BLOCK

SECTIONS F-F — K-K

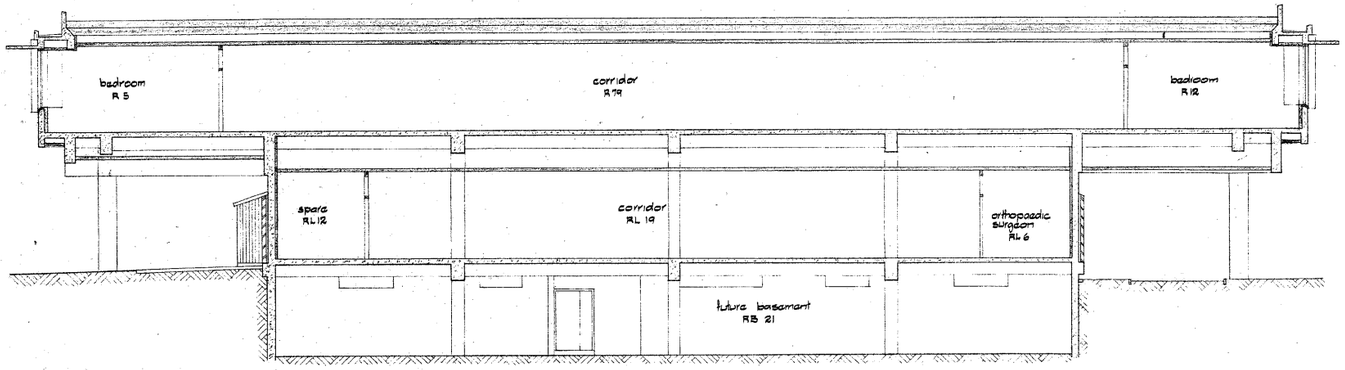
SCALES 1 : 100

710

9

PORTER AND MARTYN REGISTERED ARCHITECTS AND TOWN PLANNING CONSULTANTS WOODWARD HOUSE, 98 THE TERRACE, WELLINGTON C.1 TELEPHONE 728565 P.O. BOX 5029

DATE AUGUST 1977 JOB NO. DRAWING



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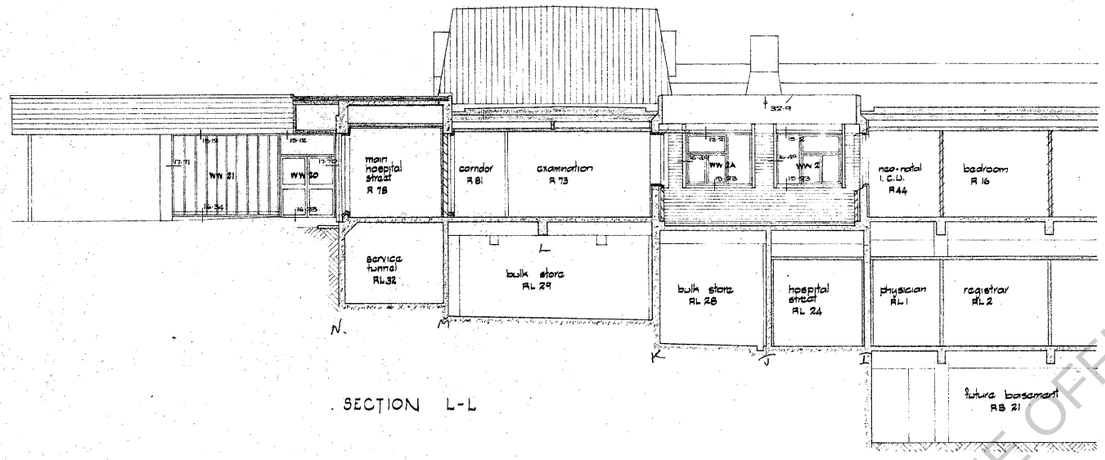

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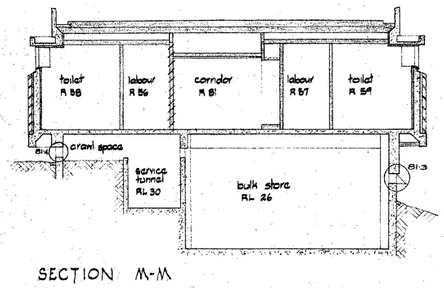

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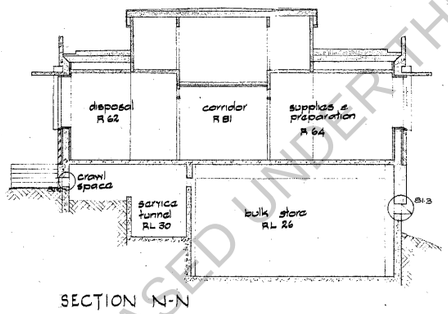

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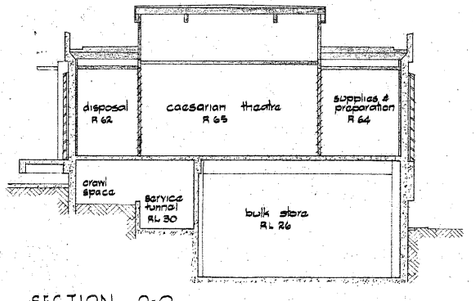
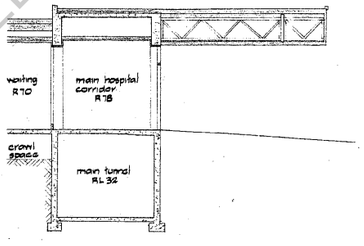


SECTION O-O



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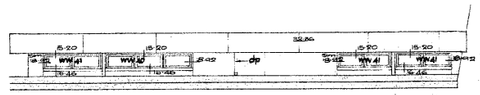

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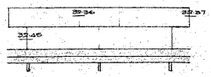

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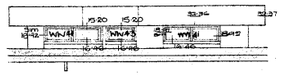

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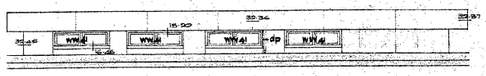

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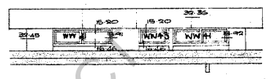
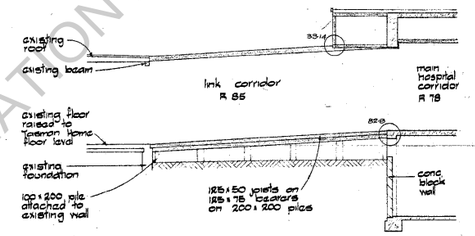


SECTION V-V

SECTION W-W



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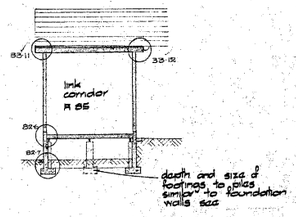


SECTION Y-Y

LEGEND

braced walls

LINK CORRIDOR PLAT DELETED SEE V.U.C.

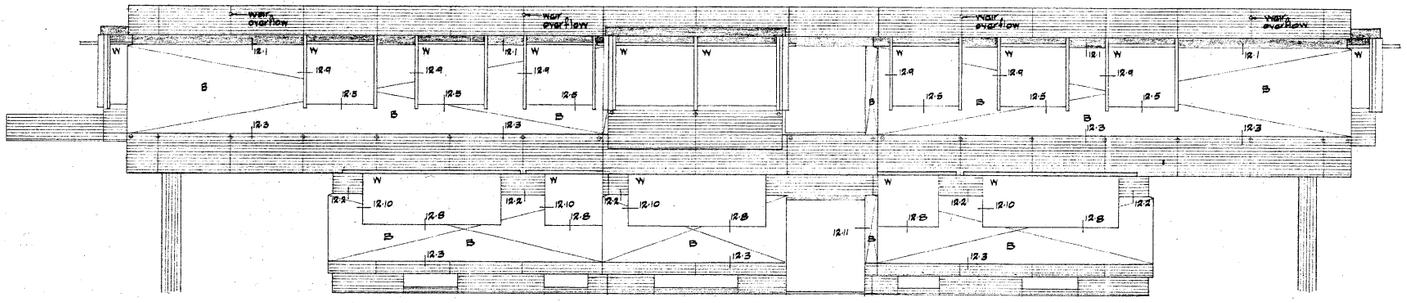
20 AUG 1979

GREY HOSPITAL OBSTETRIC BLOCK

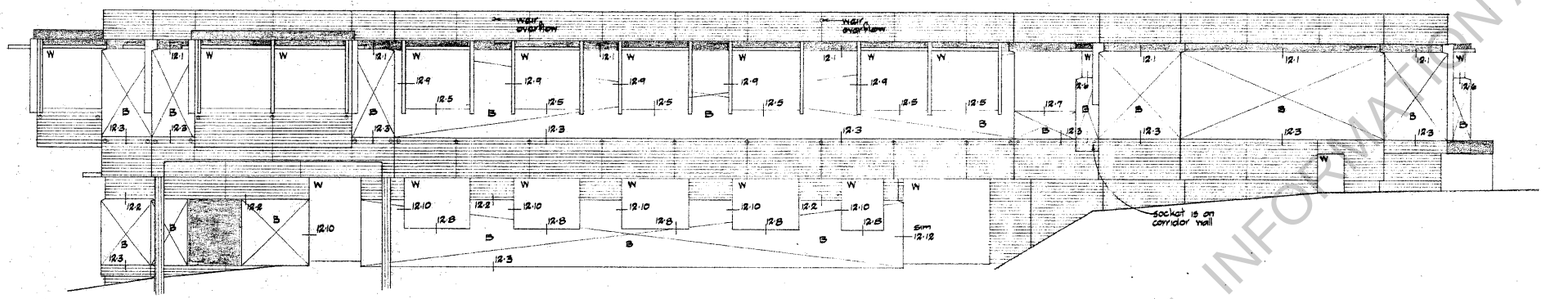
SECTIONS L-L — Y-Y

SCALES			
1 : 100		710	10 cp
DATE AUGUST 1977		JOB NO.	DRAWING

PORTER AND MARTIN REGISTERED ARCHITECTS AND TOWN PLANNING CONSULTANTS WOODWARD HOUSE, 98 THE TERRACE, WELLINGTON C.1 TELEPHONE 720555 P.O. BOX 5029



NORTH WEST ELEVATION



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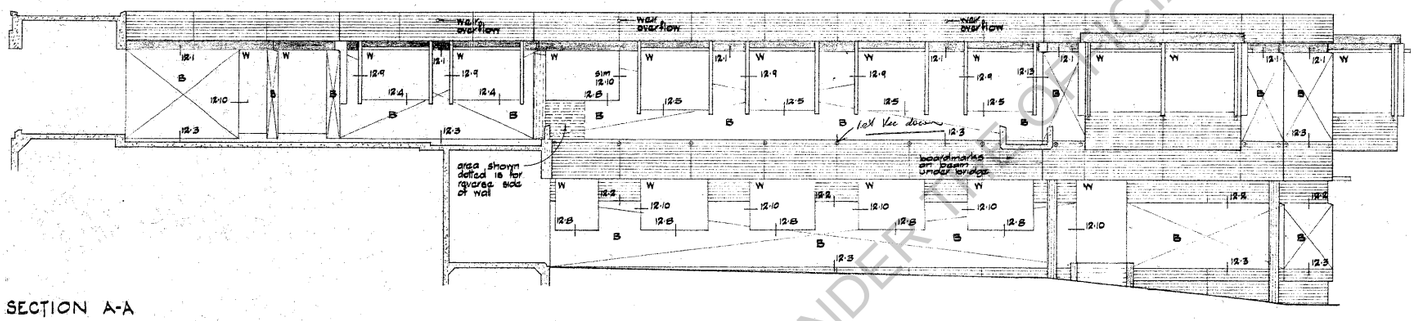
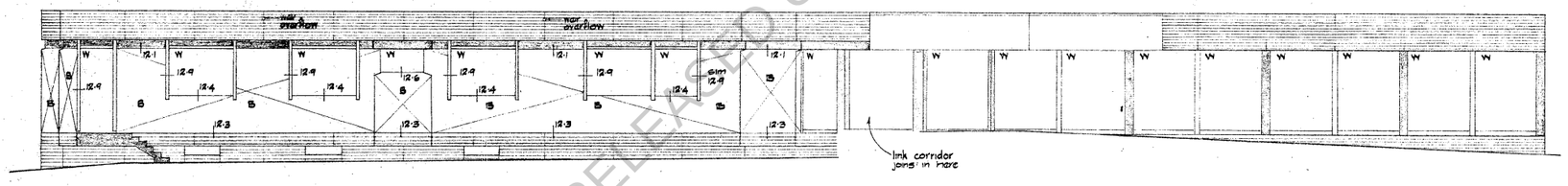


SECTION A-A



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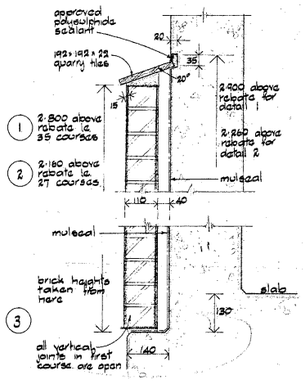
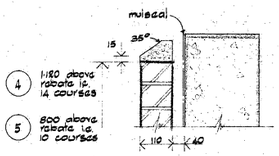
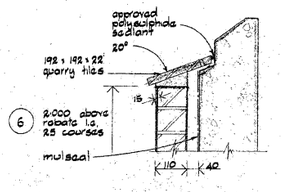
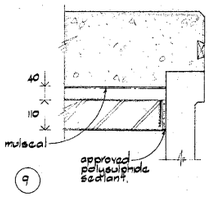
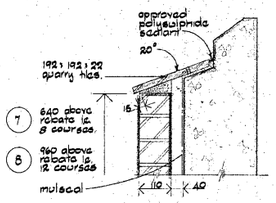
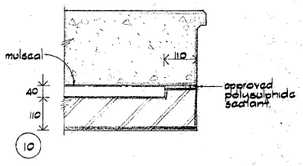


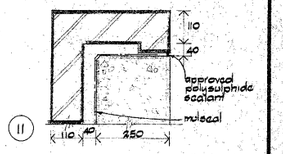


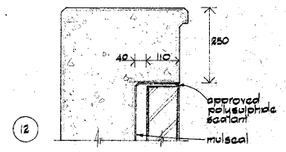


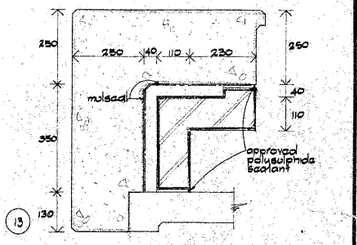


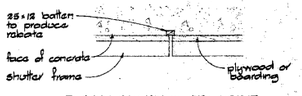












PLAN SECTION AT JOINT OF BOXING SHUTTERS.

N.B. See separate details for window joinery.

chamfers to precast frs at rebates and window rebates are 10mm clearance chamfers are 15 - 20 mm.

LEGEND

- horizontal boarding see jointed concrete surface.
- plywood shuttering (smooth) surface.
- vertical boarding see jointed concrete surface.
- B brick facings panel.
- W window or door openings.
- ⊙ socket for scaffold bracket.

20 AUG 1979

GREY HOSPITAL OBSTETRIC BLOCK

BRICKWORK DETAILS; CONCRETE FINISHES

SCALES 1 : 100 1 : 10 | 710 | 12

DATE AUGUST 1977 | JOB NO. | DRAWING

PORTER AND MARTIN REGISTERED ARCHITECTS AND TOWN PLANNING CONSULTANTS WOODWARD HOUSE, 99 THE TERRACE, WELLINGTON C.1 TELEPHONE 729555 P.O. BOX 5029

NOTE.

All framing 100 mm unless shown otherwise.

All strapping on concrete 50 mm unless shown otherwise.

Door sizes shown are finished size. Positions of doors shown are to finished doors i.e. door openings shown are not rough openings.

All other dimensions shown are to centre lines or faces of rough framing.

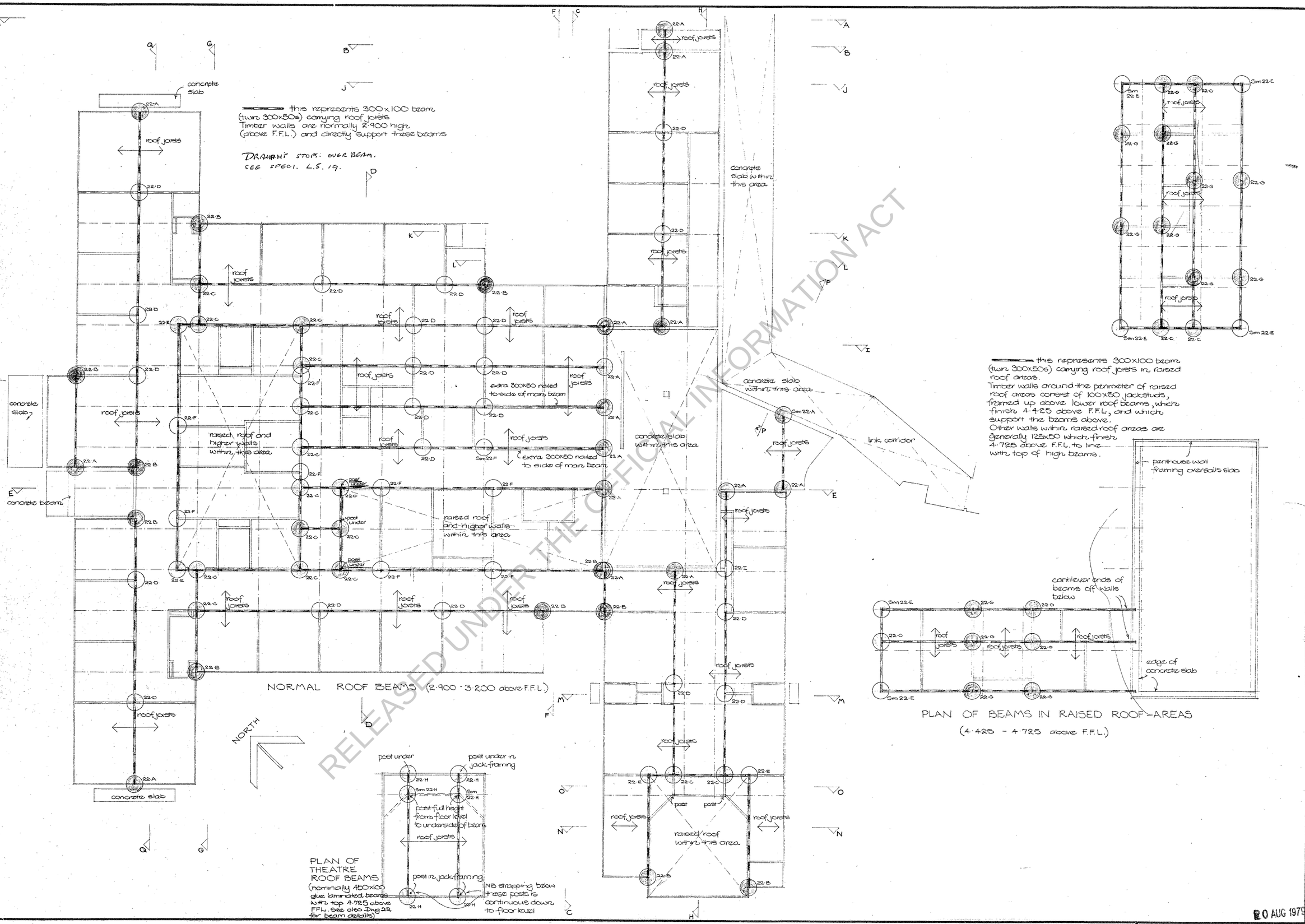
Walls shown thus //// denotes bracing in the walls.

NORTH

AMMENDMENTS
A BASIN R 41 VOIS

20 AUG 1979

GREY HOSPITAL OBSTETRIC BLOCK — GROUND FLOOR PARTITIONS & STRAPPING PLAN & DETAILS	SCALES 1 : 100, 1 : 10	710	20 A
PORTER AND MARTIN — REGISTERED ARCHITECTS AND TOWN PLANNING CONSULTANTS — WOODWARD HOUSE, 78 THE TERRACE, WELLINGTON C.1 — TELEPHONE 729588 P.O. BOX 3029	DATE SEPTEMBER 1977	JOB NO.	DRAWING



NORMAL ROOF BEAMS (2·900 - 3·200 above F.F.L.)

PLAN OF THEATRE ROOF BEAMS (nominally 450x100 glue laminated beams with top 4·725 above FFL. See also Dwg 22 for beam details)

PLAN OF BEAMS IN RAISED ROOF AREAS (4·425 - 4·725 above F.F.L.)

20 AUG 1979

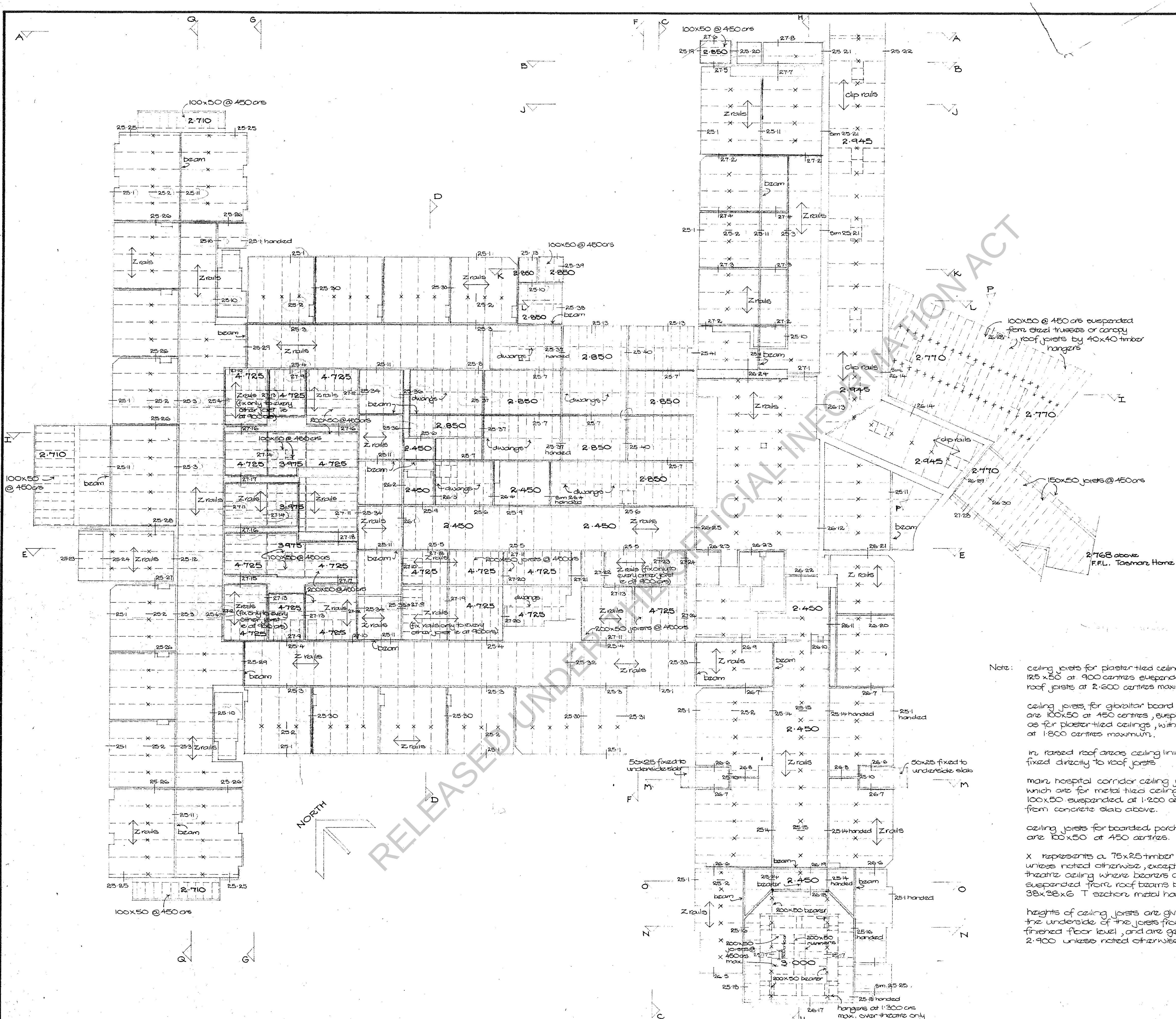
GREY HOSPITAL OBSTETRIC BLOCK

TIMBER ROOF BEAMS PLANS

SCALES 1 : 100 | 710 | 21

PORTER AND MARTIN REGISTERED ARCHITECTS AND TOWN PLANNING CONSULTANTS WOODWARD HOUSE, 99 THE TERRACE, WELLINGTON C.1 TELEPHONE 720535 P.O. BOX 3029

DATE AUGUST 1977 | JOB NO. | DRAWING



Note: ceiling joists for plaster tiled ceilings are 125 x 50 at 900 centres suspended from roof joists at 2·600 centres maximum.

ceiling joists for gibraltar board ceilings are 100x50 at 450 centres, suspended as for plaster tiled ceilings, with dwangs at 1·800 centres maximum.

In raised roof areas ceiling linings are fixed directly to roof joists

main hospital corridor ceiling joists which are for metal tiled ceilings are 100x50 suspended at 1·200 centres from concrete slab above.

ceiling joists for boarded porch ceilings are 100x50 at 450 centres.

X represents a 75x25 timber hanger, unless noted otherwise, except for the theatre ceiling where bearers are suspended from roof beams by 38x38x6 T section metal hangers

heights of ceiling joists are given to the underside of the joists from finished floor level, and are generally 2·900 unless noted otherwise.

20 AUG 1976

GREY HOSPITAL OBSTETRIC BLOCK	GROUND FLOOR CEILING FRAMING PLAN	SCALES 1 : 100	710	24
PORTER AND MARTIN REGISTERED ARCHITECTS AND TOWN PLANNING CONSULTANTS	WOODWARD HOUSE, 99 THE TERRACE, WELLINGTON C.1 TELEPHONE 729855 P.O. BOX 5029	DATE AUGUST 1977	JOB NO.	DRAWING

Refer to A3 1:50 plans & elevations for detail

1. New dry framed 100mm walls taken up thru to underside of roof. Bedroom walls lined with 9.5mm gib over 9mm MDF
2. Strip walls of ply, leaving existing 9.5mm gib. Re-line with 9.5 gib. New skirtings and architraves.
3. New dry framed walls to showers & toilets, lined with 9mm Villaboard.
4. New dry framed walls support existing post & beam structure. Refer to demolition plan which indicates the existing posts
5. Curved dry frame wall 4725mm high, tucks under lower ceiling. Frame down recessed door openings to 2400
6. New dry framed wall constructed as a 30/30 fire wall. Must extend up to underside of roof. Upgrade linings of existing wall to 30/30.
7. Existing bulkhead remains
8. Existing wall remains. Trim for 3 x 900 x 1200h openings
9. Existing laminated beam remains.
10. Construct new link.
11. Existing ventilation duct exposed.
12. Line walls above existing ceiling. Cut out & install 6 clerestorey windows, pack & line wall to enclose existing sprinkler pipes. Strengthen existing lintel beams below windows (refer to engineers drawings).
13. Construct new phonebooth in existing alcove relocate public telephone.
14. Construct wall to enclose cavity slider d09.
15. 9mm compressed sheet fixed to timber frame in accordance with Hardies bulletin "Hardpanel Titan".
16. New concrete frame to engineers drawing to enclose new window.
17. Construct lintels to NZS 3604 to support wall above 2400. Form bulkhead above
18. New lintels and beams to support existing structure. Refer to engineers drawing WD-S-401,402
19. Existing laminated beam supported on new timber piers. Enclose in bulkhead above 2400.
20. Construct duct for fittings, down pipes, pipework. Build in plinth for bath in Mc09
21. Existing door and door cavity.
22. Cut down ss bench/base from existing kitchen (1280 - 1100)
23. Burns & Ferrell manufactured recessed ss water fountain
24. STC55 acoustic wall - see Reflected Ceiling Plan WD-A-404
25. Drug cabinet relocated
26. Construct bed plinth from 100 x 50 frame. 20mm particle bd clad in 2mm vinyl
27. Chip back existing concrete floor to form accessible shower. Liaise with structural engineer.
28. Construct trimmed opening for counter balanced security grill. Complete with pelmet. Frame for reception/servery counter.
29. Frame opening for new, or existing relocated exterior door.
30. Frame for new internal windows. Refer window schedule.
31. Leave existing vinyl & remove buffer rail. Where rail base plates are removed cut in vinyl to diamond shape.
32. New data cable duct (refer M&E drawing)
33. Construct new Formica clad 1000x2000 modesty panel (refer 1:50 plan).
34. Plaster existing shower recess flush, prepare for vinyl flooring.
35. Grade existing floor slab for Butyl rubber - cove behind cladding.
36. Reline walls with 9.5mm gib for paint finish.
37. Provide and fit new windows to openings. reinstate brickwork at jambs
38. Relocate existing timber window from old Nursery to new office. Supply and lay Brick spandrel panel to match existing.
39. Strap existing 50 x 40 for 9.5 gib
40. Existing WHB reinstated once walls are lined
41. Extend existing walls up to underside of roof to provide smoke stop seal Wall linings to carry through from wall below

New walls

Mc01 CORRIDOR
Mc02 FOYER
Mc03 TREATMENT
Mc04 ASSESSMENT
Mc05 IPC BEDROOM
Mc06 ENTRANCE LOBBY
Mc07 ENSUITE
Mc08 IPC BEDROOM
Mc09 BATHROOM
Mc10 ASSESSMENT/EXAMINATION
Mc11 STAFF BASE
Mc12 ICU LOUNGE
Mc13 GAMES ROOM/OT
Mc14 LOUNGE/TV AREA
Mc15 SITTING ROOM
Mc16 OCCUPATIONAL THERAPY STORE
Mc17 KITCHEN
Mc18 DINING
Mc19 STAFF TOILET
Mc20 PUBLIC TOILET
Mc20a PUBLIC TOILET LOBBY
Mc21 HDU SINGLE BEDROOM
Mc22 SINGLE BEDROOM
Mc23 SINGLE BEDROOM
Mc24 SINGLE BEDROOM
Mc25 TWIN BEDROOM
Mc26 TWIN BEDROOM
Mc27 ENSUITE
Mc28 SHOWER
Mc29 SWITCHBOARD
Mc30 ENSUITE
Mc31 ACCESSIBLE SHOWER & TOILET
Mc32 SINGLE BEDROOM
Mc33 SINGLE BEDROOM
Mc34 ENSUITE
Mc35 SINGLE BEDROOM
Mc35a SINGLE BEDROOM
Mc36 READING ROOM
Mc37 CORRIDOR
Mc38 CORRIDOR
Mc39 BATHROOM
Mc40 PATIENT LAUNDRY
Mc41 STAIRWELL
Mc42 STAIRWELL
Mc43 NOT USED
Mc44 NOT USED
Mc45 NOT USED
Mc46 NOT USED
Mc47 NOT USED
Mc48 NOT USED
Mc49 NOT USED
Mc50 NOT USED
Mc51 EQUIPMENT STORE/& CLEAN LINEN
Mc52 DOMESTIC STORE
Mc52A DAY PATIENT TOILET
Mc52B SLUICE ROOM/DIRTY LINEN/CLEANER
Mc53 INTERVIEW ROOM
Mc54 WHANAU
Mc55 UNIT MANAGER
Mc56 NURSE STATION
Mc57 MEETING ROOM
Mc58 ACCESSIBLE TOILET
Mc59 STAFF ROOM
Mc60 RESOURCES
Mc61 SMALL MEETING ROOM
Mc62 STAFF TOILET
Mc63 OFFICE
Mc64 OFFICE
Mc65 STAFF TOILET
Mc66 CORRIDOR
Mc67 OPEN PLAN OFFICE
Mc68 OFFICE
Mc69 OFFICE
Mc70 OFFICE
Mc71 4 PERSON OFFICE
Mc72 BATHROOM
Mc73 OFFICE
Mc74 OFFICE
Mc75 OFFICE
Mc76 UNIT MGR - COMMUNITY MENTAL HEALTH
Mc77 FILING
Mc78 RECEPTION/SECTRETARY
Mc79 OFFICE
Mc80 OFFICE
Mc81 OFFICE
Mc82 FILING/STORAGE
Mc83 WAITING
Mc84 NOT USED
Mc85 NOT USED
Mc86 ICU TOILET
Mc87 ENSUITE
Mc88 STORE

NOTE
i) dimensions for curved wall, Refer to sheet WD-A-499
ii) see Engineers drawings for for cross referencing for details
iii) Refer to WD-F-401 for smoke and fire rated walls

The Contractor shall verify all dimensions onsite before work is commenced.

All work is to comply with NZS3604:1999 and the New Zealand Building Code

Unless stated otherwise, all dimensions are in millimetres

Do Not Scale - use Dimensions only

This drawing is to be read in conjunction with all others

Revisions.

Rev.	Date.	Details.
1	30 May 2000	Issued for Construction Door 59 altered,New wall in Mc60 Note 40 & 41 added Duct noted in Mc11 Window shifted over on dec Notes 29 & 38 modified.notes removed
2	23 Jul 2000	ICU area revised doors 95,96 added, windows 53, 54 added, Rooms Mc07,Mc87,Mc8 added MC16 Relocated Dimensions added, deck to Mc12 relocated, existing ramp deleted. Mc09 shower deleted, Mc66,Mc58 Amended
3	24 NOV 2000	Wash Hand Basins to Rooms Mc68,69,70,71,73,74,75,76, 79,80,81 removed Internal ducts for downpipes added

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MECHANICAL ENGINEERS: Cosgrove and Major
ELECTRICAL ENGINEERS: Cosgrove and Major
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QUANTITY SURVEYOR: Shipston Wilson

Project Manager
CARSON GROUP

Drawn by.	Checked.
SG	GH
Date	Date
January 2000	30 May 2000
Issue	Date
☐ FOR TENDER	2 May 2000
■ FOR CONSTRUCTION	24 Nov 2000

CAD File name
1837 WD-A-401

Project title.
Coast Health Care LIMITED
Surgical Services P.O.Box 387 Greymouth New Zealand Telephone 03 768 0499 Fax 03 768 2760
GREY BASE HOSPITAL REDEVELOPMENT

Drawing Title.	Scale.
CONSTRUCTION PLAN	1:100

AMHU & CMHS WARD
McBREARTY

Sheet No.	Rev.
WD-A-402	3

Appendix C

QUANTITATIVE ASSESSMENT METHODOLOGY AND ASSUMPTIONS

Reinforced Concrete Walls and Frames

C1. Analysis Parameters

The following parameters are used for the seismic analysis:

- Site soil category — Cl. 3.1.3, NZS1170.5
  C (shallow soil)
- Seismic hazard factor — Cl. 2.2.14$_B$, B1/VM1
  $Z = 0.37$
- Return period factor — Table 3.5, NZS1170.5
  $R_u = 1.0$ (Importance Level 3 structure, 50 year design life)
- Ductility factor — Cl. 2.6.1.2, NZS3101:2006
  $\mu = 1\text{-}1.5$
- Material properties (based on Transit New Zealand Bridge Manual Section 6)

Concrete nominal compressive strength, f'_c (MPa)	25
Mild reinforcing nominal yield strength, f_y (MPa)	275

Table C1: Analysis Material Properties

- Effective section properties

Table C6.6 – Effective section properties, I_e

Type of member	Ultimate limit state		Serviceability limit state		
	f_y = 300 MPa	f_y = 500 MPa	μ = 1.25	μ = 3	μ = 6
1 Beams					
(a) Rectangular ¶	0.40 I_g (use with E_{40}) §	0.32 I_g (use with E_{40}) §	I_g	0.7 I_g	0.40 I_g (use with E_{40})§
(b) T and L beams ¶	0.35 I_g (use with E_{40}) §	0.27 I_g (use with E_{40}) §	I_g	0.6 I_g	0.35 I_g (use with E_{40})§
2 Columns					
(a) $N^*/A_g f'_c > 0.5$	0.80 I_g (1.0 I_g) ‡	0.80 I_g (1.0 I_g) ‡	I_g	1.0 I_g	As for the ultimate limit state values in brackets
(b) $N^*/A_g f'_c = 0.2$	0.55 I_g (0.66 I_g) ‡	0.50 I_g (0.66 I_g) ‡	I_g	0.8 I_g	
(c) $N^*/A_g f'_c = 0.0$	0.40 I_g (0.45 I_g) ‡	0.30 I_g (0.35 I_g) ‡	I_g	0.7 I_g	
3 Walls ¶					
(a) $N^*/A_g f'_c = 0.2$	0.48 I_g	0.42 I_g	I_g	0.7 I_g	As for the ultimate limit state values
(b) $N^*/A_g f'_c = 0.1$	0.40 I_g	0.33 I_g	I_g	0.6 I_g	
(c) $N^*/A_g f'_c = 0.0$	0.32 I_g	0.25 I_g	I_g	0.5 I_g	
4 Diagonally reinforced coupling beams	0.6I_g for flexure Shear area, A_{shear}, as in text		I_g 1.5 A_{shear} for ULS	0.75 I_g 1.25 A_{shear} for ULS	As for ultimate limit state

NOTES –
(§) With these values the E value should be the elastic modulus for concrete with a strength of 40 MPa regardless of the actual concrete strength.
(‡) The values in brackets apply to columns which have a high level of protection against plastic hinge formation in the ultimate limit state.
(¶) For additional flexibility, within joint zones and for conventionally reinforced coupling beams refer to the text.

TableC2: Effective section properties from NZS3101:2006

- Earthquake load combination — Cl. 4.2.2, AS/NZS1170.0
  $G + E_u + \Psi_E Q$
- Floor live loading — Table 3.1 Part G, AS/NZS1170.1
  $Q = 3.0$ kPa
- Earthquake combination factor — Table 4.1, AS/NZS1170.0
  $\Psi_E = 0.3$
- Building seismic weight — Cl. 4.2, NZS1170.5
  $W_t = G + \Psi EQ$
  $Wt = 27{,}650$ kN

C2. Assessment Methodology

Static & Modal Response Spectrum Analysis

The seismic assessment was undertaken by completing static and Modal Response Spectrum (MRS) analyses for the building in accordance with NZS 1170.5:2004.

A 3D model was set up using the structural analysis program ETABS, and effective section properties for structural members were taken from Table C2 above. The first floor timber walls were not modelled. The ground floor slab was modelled as rigid diaphragms and the roof was also modelled as a rigid diaphragm for load distribution.

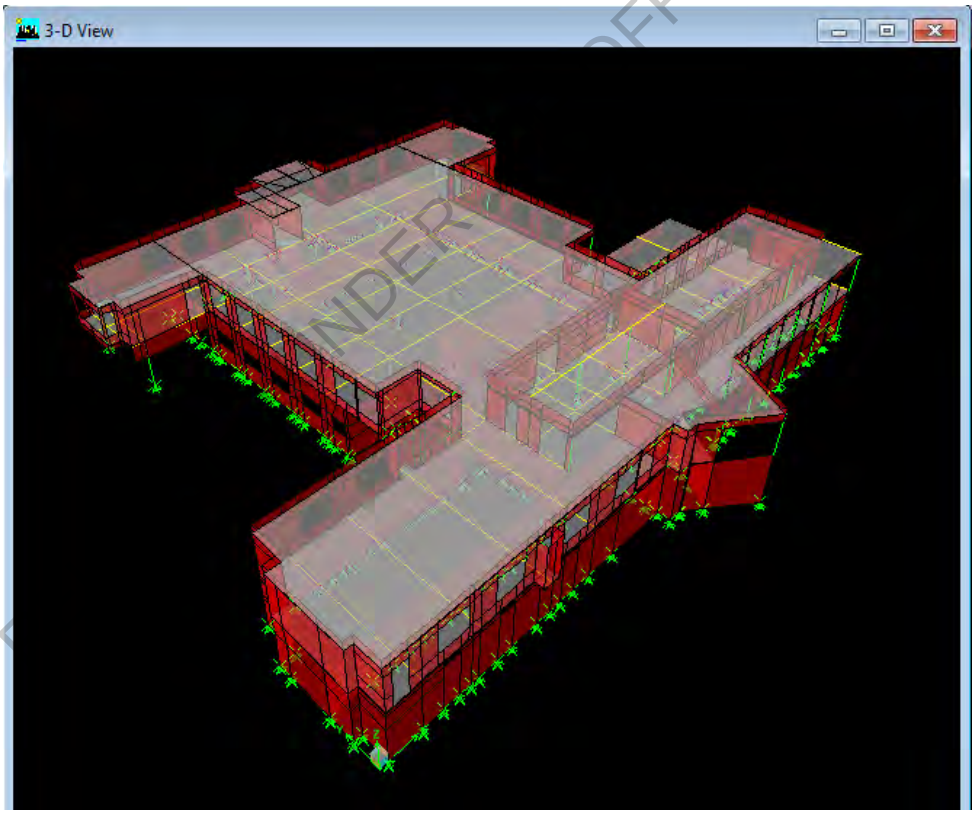

Figure A4.1: ETABS model of Acute & Community Mental Health Building

The fundamental building periods output from ETABS are:

Building	Period -E/W direction (s)	Period –N/S direction (s)
Community and Mental Health Building	0.05	0.06

Table C3: Fundamental periods

A total of 35 modes are used in the MRS analysis resulting in 97.6% and 98.8% effective participating mass in the E/W and N/S directions, respectively.

An equivalent static analysis was also carried out as a consistency check of the MRS analysis output. As the structure is irregular, the base shear from the MRS analysis was scaled up the equivalent static method base shear, as required by NZS1170.5, Clause 5.2.2.2. The base shears resulting from the equivalent static method are:

Building	Base shear -E/W direction (kN)		Base shear –N/S direction (kN)	
	Equivalent Static	MRS	Equivalent Static	MRS
Community and Mental Health	19950	12150	19950	13550

Table C4: Base shear from analysis

The forces from the MRS analysis were scaled up by 1.64 and 1.47 in the E/W and N/S directions, respectively. The design actions were applied separately in each perpendicular direction as required by NZS1170.5, Clause 5.3.1.1.

Timber walls

C3. Analysis Parameters

The following parameters are used for the seismic analysis:

- Site soil category — Cl. 3.1.3, NZS1170.5
  C (shallow soil)
- Seismic hazard factor — Cl. $2.2.14_B$, B1/VM1
  $Z = 0.37$
- Return period factor — Table 3.5, NZS1170.5
  $R_u = 1.0$ (Importance Level 3 structure, 50 year design life)
- Part risk factor — Table 8.1 NZS1170.5
  $R_p = 1.0$
- Ductility of the part — Table 8.2 NZS1170.5
  $\mu = 1.25$
- Period of the part — Estimated
  $T_p = 0.4$
- Bracing capacity — Table 11.1 NZSEE

Gypsum wall board, unblocked edges	3kN/m each side ($\Phi = 0.7$)

- Roof dead load (framing + cladding) Estimated
  G = 0.75 kPa
- Roof live loading Table 3.2 R2, AS/NZS1170.1
  Q = 0.25 kPa
- Earthquake combination factor Table 4.1, AS/NZS1170.0
  $\Psi_E = 0.3$

C4. Assessment Methodology

The diaphragm system in the roof is the GIB board ceiling. It is considered as a flexible diaphragm system and hence the seismic forces will be distributed roughly based on tributary area to its adjacent load resisting element.

To calculate the seismic forces acting on the timber walls, the total roof area that can be distributed to the exterior concrete walls was subtracted out the total roof area. It was then multiplied by the seismic mass and the parts acceleration factor in accordance with section 8 of NZS1170.5 assuming a ductility factor of 1.25.

The total seismic force was then divided by 2.1kN/m (0.7 x 3kN/m) to calculate the total length of wall required as the GIB walls are fairly evenly distributed. The length was wall required was compared to the length of wall provided to come up with a %NBS.

OPUS

APPENDIX 3

SGS

BUILDING WARRANT OF FITNESS

Section 12, Section 108, Building Act 2004 **BWOF Expiry Date :1 July 2020**

THE BUILDING	
Street address of Building: **71-111 Waterwalk Road Greymouth**	Legal Description of land where building is located: **Rateable Portion of res 1014 2001 2007 2089 Pt Sec 494 499 1707 Greymouth**
Building Name: **Grey Base Hospital (Main building, kitchen, GP Training)**	Location of Building within site/block number: **Main Entrance – off high street**
Level/Unit Number: N/A	Current, Lawfully established use: **Offices & Accomodation**
Year first constructed 2007	Intended life of the building (if 50 years of less): **Indefinite**
Highest fire hazard category for building use: **2**	Compliance Schedule No.: **184**
THE OWNER	
Name of Owner: West Coast District Health Board	Contact Person: 9(2)(a) [redacted] **Ph** 9(2)(a) [redacted]
AGENT:	
Name of Agent: **SGS NZ Ltd** **P O Box 8032 Christchurch 8440** Relationship to Owner: **Duly Authorised Agent**	Address: **151B Waterloo Road Christchurch 8042** Phone : **03 344 4510 Fax 03 344 4515** Email 9(2)(a) [redacted]

SYSTEMS – as per Building Act 2004

✓	1	Automatic Systems for Suppression of fire	✓ ✓	14/1 14/2	Emergency power systems for, or signs relating to, a system or feature specified in any systems 1 to 13
✓	2	Automatic or manual emergency warning systems for fire or other dangers	✓	15/2	Final Exits and Other Exit Doors
✓ ✓	3/1 3/3	Electromagnetic or automatic doors or windows	✓	15/3	Fire Separations Protecting a Means of Escape
√	4	Emergency Lighting systems	✓	15/4	Signs for Communicating information intended to Facilitate Evacuation
√	8/1	Passenger Lifts			

WARRANT

The maximum number of occupants that can safely use this building is: **GP Training 15 Hospitak< 500**

The inspection, maintenance, and reporting procedures of the compliance schedule for the above building have been fully complied with during the **12** months prior to the date stated below.

The Compliance Schedule is kept at: 71-111 Waterwalk Road Greymouth

ATTACHMENTS: a) Certificates relating to inspections, maintenance, and reporting (Form 12A
b) Recommendations for amendments to the compliance schedule, if any.

Signature Owner / or Authorised Agent: 9(2)(a) [redacted]	**Name:** 9(2)(a) [redacted]	17.6.19

Chubb *Care*

Certificate of Compliance with inspections, maintenance and reporting procedures

Form 12A, Section 108 (3)(c), Building Act 2004

Chubb Fire & Services *(IQP No. 016)* hereby certifies that the inspections, maintenance and reporting procedures in accordance with the compliance schedule have been fully complied with during the 12 months prior to the Building Warrant of Fitness date stated below:

Site Name	WCDHB Greymouth Hospital: Lab/Pharmacy - CS# 184
Site Address	(Section 2) 71-87 Waterwalk Road Greymouth
Legal Descriptio	Rateable Portion of RES 1014 2001 2007
Site Number	170235
BWOF Date	1-07-2019
Owner Name	West Coast District Health Board
Owner Address	C/- SGS M&I Ltd P. O. Box 8032 Christchurch
Owner Contact Name	9(2)(a)
Contact Name	9(2)(a)

The specified systems and features applicable to this certificate of compliance are:

Code	Equipment	IQP#	IQP Name:	Signature Of IQP:
SS 1	Automatic Systems for Fire Suppression	790	9(2)(a)	Inspection Date: 12.06.19
SS 2	Automatic Emergency Warning System	501	9(2)(a)	Inspection Date: 12.06.19
SS 3/3	Interface Fire or Smoke Stop Doors or Windows	501	9(2)(a)	Inspection Date: 12.06.19

Chubb *Care*

Certificate of Compliance with inspections, maintenance and reporting procedures

Form 12A, Section 108 (3)(c), Building Act 2004

Chubb Fire & Services *(IQP No. 016)* hereby certifies that the inspections, maintenance and reporting procedures in accordance with the compliance schedule have been fully complied with during the 12 months prior to the Building Warrant of Fitness date stated below:

Site Name	WCDHB Greymouth Hospital: Main Biulding/Kitchen/GP Training - CS#184
Site Address	(Section 1) 71-87 Waterwalk Road Greymouth
Legal Descriptio	Rateable Protion of RES 1014 2001 2007
Site Number	170234
BWOF Date	1-07-2019
Owner Name	West Coast District Health Board
Owner Address	C/- SGS M&I Ltd P. O. Box 8032 Christchurch
Owner Contact Name	9(2)(a) [redacted]
Contact Name	9(2)(a) [redacted]

The specified systems and features applicable to this certificate of compliance are:

Code	Equipment	IQP#	IQP Name:	Signature Of IQP:
SS 1	Automatic Systems for Fire Suppression	790	9(2)(a) [redacted]	
SS 2	Automatic Emergency Warning System	501	9(2)(a) [redacted]	
SS 3/3	Interface Fire or Smoke Stop Doors or Windows	501	9(2)(a) [redacted]	

dormakaba

dormakaba New Zealand Ltd
61-69 Patiki Road Avondale,1026
Auckland New Zealand
Ph: 0800 788 688
www.dormakaba.com.nz

FORM 12A

Certificate of Compliance with Inspections, Maintenance and Reporting Procedures
Form 12A Section 108 (3) (c), Building Act 2004

The Building

Legal Land Description:	RATEABLE PORTION OF RES 1014 2001 2007 2089 PT SEC 494 499
1707 GREYMOUTH	
Building Name:	Grey Base Hospital
Building Address:	71-111 Waterwalk Road Greymouth 7805
CS Number:	184
Owner Details:	West Coast District Health Board, PO Box 387, Greymouth 7840
Contact Person:	

Compliance:
The inspection, maintenance and reporting procedures of the Compliance Schedule have been fully complied with during the 12 months prior to the date stated below in relation to the following specified systems/s:

SS3/1 - Automatic Doors

Comments/Remedial Action:

Name of Company: dormakaba NZ Limited
Name of IQP : 9(2)(a) [redacted]

Signature: 9(2)(a) [redacted]

Date: **June 12, 2019**

CERTIFICATE OF COMPLIANCE WITH INSPECTIONS, MAINTENANCE AND REPORTING PROCEDURES

FORM 12A Section 108 (3)(c), Building Act 2004

THE BUILDING	
Street address of Building: **71-111 Waterwalk Road Greymouth**	Legal Description of land where building is located: **Rateable Portion of Res 1014 2001 2007&2089 Pt Sec 494 499 1707 Greymouth**
Building Name: **Grey Base Hospital (Main Building Kitchen & GP Training)**	Location of Building within site/block number: **Main Entrance – Off high street**
Level/Unit Number:	Annual BWOF Expiry Date: **1 July 2020**
	Compliance Schedule No.: **184**
THE OWNER	
Name of Owner: **West Coast District Health Board**	Contact Person: 9(2)(a) [redacted]
Mailing Address: **Po Box 387 Greymouth 7804**	Street Address/Registered Office: **71- 111 Waterwalk Road Greymouth**

COMPLIANCE

The inspection, maintenance, and reporting procedures of the compliance schedule have been fully complied with during the **12** months prior to the date stated below in relation to the following specified system/s:

SPECIFIED SYSTEMS AS PER BUILDING ACT 2004

✓	3/3	Interface fire or smoke doors or windows	✓ ✓	14/1 14/2	Emergency power systems for, or signs relating to, a system or feature specified in any systems 1 to 13
✓	4	Emergency Lighting systems	✓	15/2	Final Exits and Other Exit Doors
✓	7	Automatic backflow preventers connected to a potable water supply	✓	15/3	Fire Separations Protecting a Means of Escape
✓	8/1	Passenger Lift	✓	15/4	Signs for Communicating information intended to Facilitate Evacuation

Comments:

Name of Licensed Building Practitioner (Please Print):	9(2)(a) [redacted]	9(2)(a) [redacted]
Name of LBP/IQP Company	**SGS NZ Ltd**	
Signature of Licensed Building Practitioner:	9(2)(a) [redacted]	**Date: 6/6/2019**