

In the matter of the Commissions of Inquiry Act 1908

And

In the matter of the Canterbury Earthquakes Royal Commission

**Brief of evidence of Alistair Geoffrey Boys relating to 242 - 246 High
Street for hearing week commencing 13 February 2011**

Date: 27 January 2012



Solicitor on the record
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- 1 My full name is Alistair Geoffrey Boys.
- 2 I am a Structural Engineer employed by Holmes Consulting Group Limited (**HCG**).
- 3 I hold a bachelor's and master's degree in civil and structural engineering, BE (Hons) (Civil) and ME (Structural) conferred by the University of Canterbury. I also have undertaken training as a NZ USAR Engineer (Level 1).
- 4 I have three years postgraduate experience in engineering.

Scope of Evidence

- 5 I, on behalf of HCG, provide this Brief of evidence in response to the Canterbury Earthquakes Royal Commission's letter dated 9 November 2011 and email dated 23 November 2011 in relation to the building at 242 - 246 High Street (the **Building**).

Details of inspections/assessments

- 6 I am asked to provide details of any inspection/assessment made of the Building.

Response

Inspection: 15 September 2010

- 7 I attended the Building's site on 15 September 2010 to inspect the Building with the contractor and to provide advice to the contractor with respect to removing and/or securing the damaged portions of the southern parapet. During this visit I gained access to internal spaces and the roof area.

- 8 I completed a site report and Christchurch EQ RAPID Assessment Form – Level 2, confirming the placard status of the building to be Yellow. The Assessment Form notes "*chimneys fallen, damaged severely & parapet damaged*" and that there are "*fall hazards*".
- 9 My site report notes that there is internal damage limited to lathe and plaster ceilings. It also notes damage to the southern boundary wall caused by a fallen chimney, and significant cracking to the supporting parapet.
- 10 My site report recommends the contractor remove all loose masonry from the chimneys and parapets, and provides a temporary restraint detail for the parapet at the south-west corner of the building. The site report also records my observation that the front and northern boundary parapets were undamaged.
- 11 A copy of this site report is **attached** [A]. A copy of the Christchurch EQ RAPID Assessment Form – Level 2 is also **attached** [B].

Inspection: 21 September 2010

- 12 I attended the Building site on 21 September 2010 to review the completion of the temporary securing works for the southern parapet. I gained access to the roof area and carried out an inspection of the south parapet securing works.
- 13 I completed a site report noting that all loose masonry had been removed and the temporary securing detail (for the south-west parapet) had been completed. The site report notes that fall hazards have been removed. I also filled out a Christchurch EQ RAPID Assessment Form – Level 2, which was subsequently signed by Mr Galloway following an internal review of the damage observed and temporary securing works carried out.
- 14 The Christchurch EQ RAPID Assessment Form – Level 2 recommended the placard status of the building be changed from Yellow to Green, based on the removal of the fall hazard posed by the damaged south-

west parapet. The Assessment Form notes that there is minor cracking in remaining parapets which will require remedial work but are not life threatening. My recollection is that this refers to pre-existing cracks observed in the parapets that did not display any evidence of damage as a result of the 4th September earthquake.

- 15 A copy of this site report is **attached** [C]. A copy of the EQ RAPID Assessment Form - Level 2 is **attached** [D].

Inspection of north parapet wall

- 16 I am asked to provide further detail about my inspection of the north parapet wall, other than as contained in my site report.

Response

- 17 While I was on the roof of the building during my inspection on 15 September 2010, I inspected all parapets including the north parapet. I observed that the north parapet did not display any evidence of damage.

Photographs

- 18 Photographs taken during my site visits are **attached** [E].

Conclusion

- 19 I am asked to provide any observations/comments that might be relevant to the issue the Commission will have to address in relation to the Building i.e. the collapse of the northern wall.

Response

- 20 I do not believe that I have any other information that may assist with this issue, beyond that which I have already given to the Commission.

Date: 27 January 2011



Alistair Geoffrey Boys

"A"



Project Name 242-246 High St
 Project No: 105380.06
 S.R. No: 002
 Date: 15 September 2010
 Reviewed By: Alistair Boys

SITE REPORT

Work Reviewed:

- Re-inspect 3 Storey URM building at 242-246 High St with contractor to remove falling hazards from damage chimneys and parapet.

Observations & Comments:

- 3 Storey URM Building. Retail on ground floor and basement, and empty apartments above.
- Internally damage limited to lath and plaster ceilings.
- Front and Northern boundary parapets are undamaged.
- The southern boundary wall has fallen and damaged chimneys and significant cracking to the supporting parapet.
- Advised the contractor to remove all loose masonry from chimneys and parapets, and provided a temporary restraint detail for the remaining cracked parapet adjacent to the front corner of the building (detail attached).
- Building is to remain as YELLOW Tagged until remedial works completed.
- Adjacent building has also been YELLOW Tagged due to falling hazard from boundary wall.

Report Prepared By:

Alistair Boys
 STRUCTURAL ENGINEER

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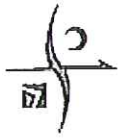
Hamilton

Wellington

Christchurch

San Francisco

Copies to:



Project Name

Project No

Drawn By

Date

Scale 1:M

Page No

Revision

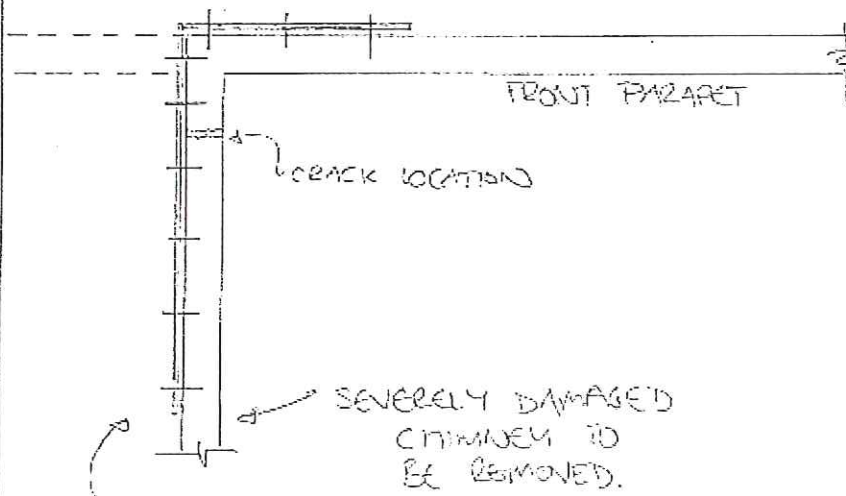
CALCS/SKETCHES

FRONT PARAPET TIE-BACK.

242 HIGH ST.

Plan → 2000 →

Street Front.



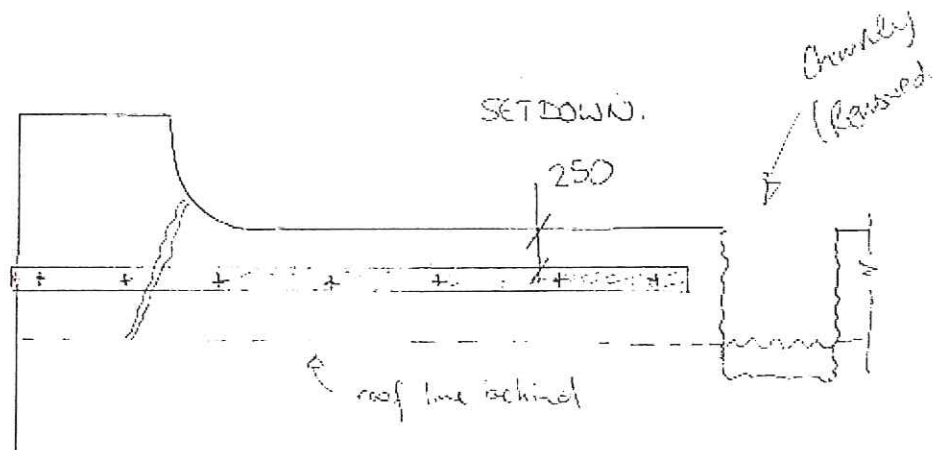
EXTEND PLATE
TO 200mm FROM
CHIMNEY.
OR 3000mm

PLATE 100x6
FPBW CORNER

FIXINGS @ 600CS MAX.
M12 THREADED INSERTS
100mm EMBED CS EPOXY
DO NOT HAMMER DRILL

ELEVATION

VIEW FROM
238 HIGH (TABULAR)



"B"

Christchurch EQ RAPID Assessment Form - LEVEL 2

Inspector Initials: ALB (HOMES) Date: 15/9/10 Final Posting: YELLOW
 Territorial Authority: Christchurch City Time: 2:30 pm (e.g. UNSAFE)

Building Name: _____ Type of Construction:
 Short Name: _____
 Address: 242-248 High St Timber frame Concrete shear wall
 Steel frame Unreinforced masonry
 GPS Co-ordinates: S° _____ E° _____ Tilt-up concrete Reinforced masonry
 Contact Name: _____ Concrete frame Confined masonry
 Contact Phone: _____ RC frame with masonry infill Other:
 Storeys at and above ground level: 3 Below ground level: 1 Primary Occupancy:
 Dwelling Commercial/ Offices
 Total gross floor area (m²): 300 Year built: _____ Other residential Industrial
 No of residential Units: - Public assembly Government
 School Heritage Listed
 Religious Other
 Photo Taken: Yes No

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

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Chimneys fallen, damaged severely & parapet damaged</u>
Building or storey leaning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wall or other structural damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Overhead falling hazard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>=> FALL HAZARDS</u>
Ground movement, settlement, slips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Neighbouring building hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Electrical, gas, sewerage, water, hazmats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Record any existing placard on this building:

Existing Placard Type (e.g. UNSAFE): YELLOW

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

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

Record any restriction on use or entry:

Further Action Recommended:

Tick the boxes below only if further actions are recommended

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

Estimated Overall Building Damage (Exclude Contents)

None	<input type="checkbox"/>	31-60 %	<input type="checkbox"/>
0-1 %	<input type="checkbox"/>	61-99 %	<input type="checkbox"/>
2-10 %	<input checked="" type="checkbox"/>	100 %	<input type="checkbox"/>
11-30 %	<input type="checkbox"/>		

Inspection ID: _____ (Office Use Only)

Sign here on completion
ALB
 Date & Time: 2:30 15/9/10
 ID: _____

Structural Hazards / Damage	Minor/None	Moderate	Severe	Comments
Foundations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Roofs, floors (vertical load)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Columns, pilasters, corbels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Diaphragms, horizontal bracing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pre-cast connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Beam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Non-structural Hazards / Damage				
Parapets, ornamentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Chimneys + Parapets are Fall Hazard ... to be removed / restrained.
Cladding, glazing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ceilings, light fixtures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Interior walls, partitions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elevators	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Stairs/ Exits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Utilities (eg. gas, electricity, water)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Geotechnical Hazards / Damage				
Slope failure, debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ground movement, fissures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Soil bulging, liquefaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General Comment _____

Usability Category

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

" C "

Hulmes Consulting Group



Project Name 242-246 High St
 Project No: 105380.06
 S.R. No: 003
 Date: 21 September 2010
 Reviewed By: Alistair Boys

SITE REPORT

STRUCTURAL AND CIVIL ENGINEERS

Work Reviewed:

- Re-inspect 3 Storey URM building at 242-246 High St after remedial works completed.

Observations & Comments:

- 3 Storey URM Building, Retail on ground floor and basement, and empty apartments above.
- All loose masonry has been removed.
- Temporary remedial detail has been implemented (as per detail provided).
- Fall Hazards have been removed.
- Building and adjacent Jay Jays Tenancy (238 High St) GREEN Tagged.

Report Prepared By:

Alistair Boys
 STRUCTURAL ENGINEER

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Christchurch

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Copies to:

"D"

Christchurch Eq RAPID Assessment Form - LEVEL 2

Inspector Initials: ALB (Holmes) Date: 21/9/10 Final Posting (e.g. UNSAFE): GREEN
 Territorial Authority: Christchurch City Time: 9:40

Building Name		Type of Construction	
Short Name		<input type="checkbox"/> Timber frame	<input type="checkbox"/> Concrete shear wall
Address: <u>242 High St</u>		<input type="checkbox"/> Steel frame	<input checked="" type="checkbox"/> Unreinforced masonry
GPS Co-ordinates: S° <u> </u> E° <u> </u>		<input type="checkbox"/> Tilt-up concrete	<input type="checkbox"/> Reinforced masonry
Contact Name		<input type="checkbox"/> Concrete frame	<input type="checkbox"/> Confined masonry
Contact Phone		<input type="checkbox"/> RC frame with masonry infill	<input type="checkbox"/> Other:
Storeys at and above ground level: <u>3</u>	Below ground level: <u>1</u>	Primary Occupancy	
Total gross floor area (m ²): <u>300</u>	Year built: <u> </u>	<input type="checkbox"/> Dwelling	<input checked="" type="checkbox"/> Commercial/ Offices
No. of residential Units: <u> </u>		<input type="checkbox"/> Other residential	<input type="checkbox"/> Industrial
Photo Taken: <input checked="" type="radio"/> Yes <input type="radio"/> No		<input type="checkbox"/> Public assembly	<input type="checkbox"/> Government
		<input type="checkbox"/> School	<input type="checkbox"/> Heritage Listed
		<input type="checkbox"/> Religious	<input type="checkbox"/> Other

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

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Damaged masonry (chimney + parapet) removed / secured.</u>
Building or storey leaning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wall or other structural damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Overhead falling hazard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ground movement, settlement, slips	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Neighbouring building hazard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Electrical, gas, sewerage, water, hazmats	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Record any existing placard on this building:

Existing Placard Type (e.g. UNSAFE): YELLOW

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

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

Record any restriction on use or entry:

Further Action Recommended:

- Tick the boxes below only if further actions are recommended.
- Barricades are needed (state location):
 - Detailed engineering evaluation recommended
 - Structural
 - Geotechnical
 - Other recommendations:

[Signature]
 Bruce Galloway
 Holmes Consulting Group
 366 3366

Estimated Overall Building Damage (Exclude Contents)

None	<input type="checkbox"/>	31-60 %	<input type="checkbox"/>
0-1 %	<input type="checkbox"/>	61-99 %	<input type="checkbox"/>
2-10 %	<input checked="" type="checkbox"/>	100 %	<input type="checkbox"/>
11-30 %	<input type="checkbox"/>		

Sign here on completion

[Signature]

Date & Time: 21/9/10 9:40am
 ID:

Inspection ID: _____ (Office Use Only)

Structural Hazards/ Damage	Minor/None	Moderate	Severe	Comments
Foundations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Roofs, floors (vertical load)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Columns, pilasters, corbels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Diaphragms, horizontal bracing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pre-cast connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Beam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Non-structural Hazards / Damage				
Parapets, ornamentation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Minor cracking in remaining parapets will require remedial work - not life threatening
Cladding, glazing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ceilings, light fixtures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Interior walls, partitions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elevators	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Stairs/ Exits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Utilities (eg. gas, electricity, water)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Geotechnical Hazards / Damage				
Slope failure, debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ground movement, fissures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Soil bulging, liquefaction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
General Comment				

Usability Category

Damage Intensity	Posting	Usability Category	Remarks
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Medium damage	Restricted Use (Yellow)	Y1. Short term entry	
Medium risk		Y2. No entry to parts until repaired or demolished	
Heavy damage	Unsafe (Red)	R1. Significant damage: repairs, strengthening possible	
High risk		R2. Severe damage: demolition likely	
		R3. At risk from adjacent premises or from ground failure	

"E"



CIMG1341



CIMG1342



CIMG1339

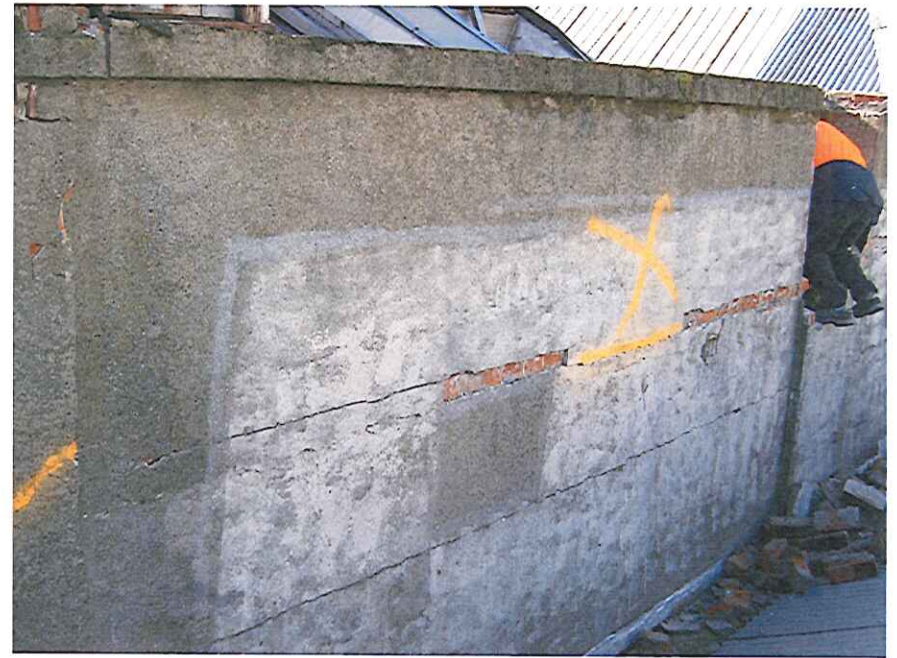


CIMG1340



CIMG1343

CIMG1345



CIMG1344

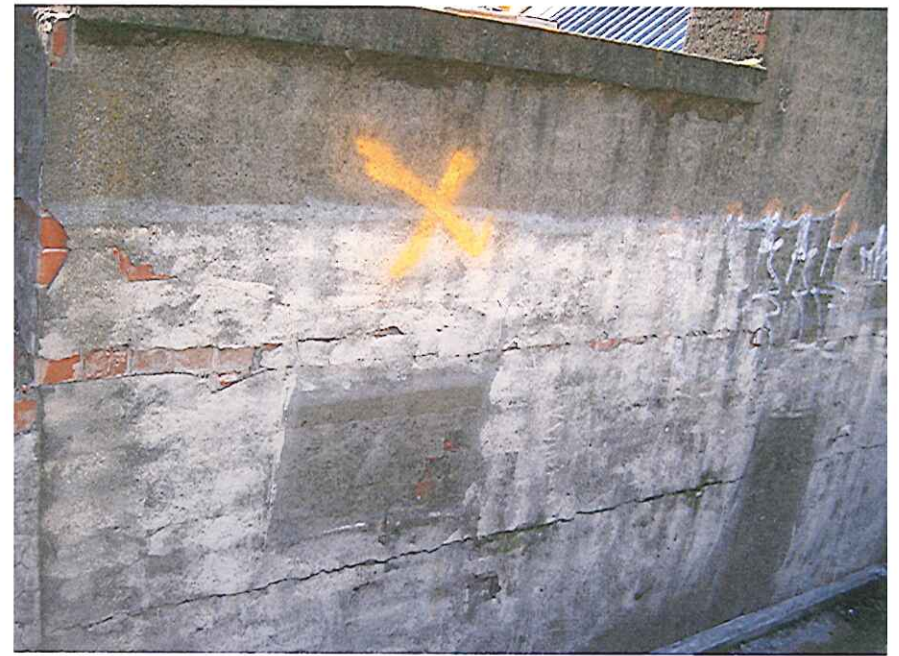
CIMG1346





CIMG1347

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CIMG1350





CIMG1351



CIMG1352

CIMG1353



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CIMG1357

CIMG1358



CIMG1355

CIMG1356





CIMG1359

CIMG1361



CIMG1360

CIMG1362





CIMG1363