

**INDEPENDENT ASSESSMENT ON EARTHQUAKE PERFORMANCE
OF
116 Lichfield Street**

**FOR
Royal Commission of Inquiry into building failure
caused by the Canterbury Earthquakes**

**Report prepared by Peter C Smith and Jonathan W Devine of
Spencer Holmes Ltd**

December 2011



Introduction

This report has been commissioned by the Royal Commission of Inquiry into building failure caused by the Canterbury Earthquakes to review the performance of the building at 116 Lichfield Street, Christchurch, during the Canterbury earthquake sequence.

The report is based on documentation provided by the Royal Commission of Inquiry into building failure caused by the Canterbury Earthquakes. No inspection of the building was possible before the building was demolished.

Location of Building

The building was located on the south west corner of the intersection of Lichfield Street and Manchester Street. The location of the site is shown on the aerial photograph of Christchurch. In Appendix 1

Description of Building

The building at 116 Lichfield Street was located on a corner site with street frontages to Lichfield Street and Manchester Street. It adjoined a building to the west on Lichfield Street (112-114 Lichfield Street). A fire escape stairwell and party wall was shared with that building. A common party wall was also shared with the building at 149 Manchester Street along the south side of the building.

The building was of three storey construction and had un-reinforced masonry exterior walls with timber framed roof and floors. The building was rectangular in plan, being approximately 27m long and 10m wide. A photo of the building and plans of the ground and first floor are included in Appendix 2.

Gravity System

The gravity loads were carried by the perimeter un-reinforced masonry walls and a central row of columns. The roof trusses used to span from support in line with the internal stairway wall to the Manchester Street frontage. All floors had two spans from in line with the internal stairway wall to a beam between the central columns and from the beam between the central columns to the Manchester Street frontage. The floor either end of the stairway used to span from the un-reinforced masonry boundary wall to a support along the line of the internal stairway wall. All foundations were shallow founded.

Seismic System

To the extent that the building had a seismic system, the lateral loads were resisted by the two internal boundary walls, the un-reinforced masonry walls to the stairwell central along the west wall and the street frontages. The street frontages were heavily penetrated.

The construction of a strong room on the ground floor provided some seismic resistance while the strongroom on the first floor may have been detrimental to the seismic performance of the building.

Compliance

Various changes had been made to the building during its life. Most of these changes involved minor changes to the interior partitioning of the building, however building permits were issued for strong rooms/safes to be constructed on the first floor in 1947 and on the ground floor in 1953. Both of these strong rooms/safes were constructed from reinforced concrete.

In 1964, brick infill panels that were located between columns at the ground floor on both the Manchester Street and Lichfield Street facades, were removed and replaced with glazed panels. There are no Christchurch City Council records of any other significant work having been carried out to the building that would have affected the seismic performance of the building.

In 1968, the parapets to Manchester Street and Lichfield Street were reduced in height and a concrete band constructed at the top of the walls.

A review of the Christchurch City Council records indicates that the building complied with the requirements of the Building Act 1991 due to the building pre existing the Building Act and no alterations or apparent change of use occurring since the introduction of the Building Act.

The building was listed as a category 4 historic building.

Christchurch City Council Policy on Earthquake Prone Buildings

We understand that following the introduction of provisions in the Municipal Corporations Act for territorial authorities to require building owners to strengthen or demolish un-reinforced masonry buildings, the Christchurch City Council applied for and was granted powers under Section 301A of the Municipal Corporations Act. The Christchurch City Council adopted a passive approach to the upgrading of earthquake risk buildings.

In the Christchurch City Council records there is reference to the removal of a parapet in 1951. In 1968 repairs were carried out to the roof. These repairs included a new corrugated iron roof, the removal of the original Oamaru stone cornice and removal of the parapets along both street facades. New reinforced concrete parapets were constructed where parapets were cut down. The new parapets were connected to the roof trusses using the existing/original steel straps. Notes within various reports suggest that the top of the chimney had also been removed to below the roof level.

The Christchurch City Council undertook a Seismic Risk Buildings-Survey of the building in December, 1991. The survey noted “2 street elev. No apparent cracking but cornices are weathered and eroded”. The building was attributed a numerical rating of 15 which resulted in a Building Classification A with a recommendation of immediate action. There is no record of this assessment having been passed to the building owner or the building owner having been required to undertake strengthening of the building. There is no record of a Hazardous Appendage Survey having been completed.

The Christchurch City Council rating unit properties document of the 19th of July, 2011 notes, under ‘Important LIM Information’, “site with a possible earthquake prone building Nov 24 1994”.

The Christchurch City Council's first policy in respect of earthquake-prone, dangerous and insanitary buildings was introduced in 2006.

This policy was reviewed in early 2010.

Events Subsequent to 4th September 2010 Earthquake

The building was damaged in the 4th September, 2010 earthquake.

A Rapid Assessment-Level I was undertaken on the 7th September 2010. The building was assigned a green placard.

On the 20th of September, 2010 R D Sullivan and Associates Ltd reported to the Wiersma Family Trust, the owners of the building, regarding the damage that occurred in the 4 September, 2010 earthquake. Inspections were carried out on the 7th and 14th of September, 2010.

R D Sullivan's report summarised the following findings and recommendations:

- Parapets around the central lightwell were damaged and loose bricks precariously placed.
- Loose bricks and parapets to be removed around the light well and the stairs reinstated to provide egress if the upper floors are to be used;
- Use of ground floor can be commenced once parapets are removed and egress from ground floor reinstated.

R D Sullivan commented that a full and comprehensive inspection had not been undertaken at that stage.

The letter notes that an insurance inspection was carried out on the 14th of September, 2010. During this inspection the following was noted:

- There were still loose bricks around the top of the stairwell;
- The water tanks support area had been further cracked;
- The remaining parapets supporting the air conditioning units had more cracks;

Photos of this damage were attached to show the condition of the brickwork. The report recommended, as a matter of urgency, that the water tanks be decommissioned and replaced with pressure reducing valves, and that the steel supporting beams and parapets be removed down to the roof level and the top of the walls over flashed to provide weatherproofing to the gutter.

Metro Structex Limited were engaged by the building owner at 114 Lichfield Street.

On the 22nd of September, 2010 Metro Structex Limited advised R D Sullivan via email of a design proposal for works to make safe the fire escape to the building. It was further noted that there were concerns as to whether the top floor of the building 114 Lichfield Street was being occupied.

On the 7th December, 2010, Metro Structex Limited were engaged by the insurer of 116 Lichfield Street to assess the structural condition of the building structure. Metro Structex Limited reported to the insurance brokers on the 20th December, 2010 that the building had suffered moderate damage in the 4 September, 2010 earthquake. The report was based on a visual inspection, inside and out, of the building carried out on the 7th of December, 2010. The exterior

was assessed from ground level and the fire escape and the interior was inspected throughout. The roof was not inspected, although it was noted that R D Sullivan & Associates Ltd had previously inspected the roof and identified damage to the fire escape parapets.

This report addressed the damage to the building in more detail, in particular identifying:

Ground Level:

- *Some stone facing panels appeared to have popped off ground floor perimeter columns (mortar cracked);*
- *Vertical and diagonal cracks at bricks each side of alleyway at SE corner of the building;*
- *Minor plaster board/ceiling cracks,*
- *Minor cracking to plasterboard bulkhead;*
- *Hairline cracks to concrete safe.*

Level 1:

- *Cracked plaster to the underside of the stairs;*
- *Minor wall plaster cracking noted throughout, particularly at vertical wall junctions;*
- *Lathe and plaster ceiling was cracked throughout.*

Level 2:

- *A vertical crack to the south wall parapet was identified in the R D Sullivan Report;*
- *Numerous cracks to plaster boards throughout, including at stairwell;*
- *NW corner of the building has pulled away from the party wall towards the street (also noted in the inspection of 114 Lichfield Street);*
- *Interior wood panelling has pulled away from the walls in places. The wood panelling has restricted access for the inspection of the inside face of some areas of the brick walls, however there were no obvious signs of significant damage observed from the exterior of the building;*
- *There were numerous minor cracks to the mortar around the stone blocks at the windows;*
- *The ceiling was bowed and cracked and the plaster cracked in the toilet area;*
- *The timber-to-brick wall interface plaster was cracked and had popped;*
- *Diagonal and vertical cracks at corners of intersecting walls at the SE and SW corners of the building;*
- *Debris was noted to the chimney, suggesting possible damage to the chimney stub in the roof space.*

Fire Escape:

- *Steel ladder treads and sections have been damaged/removed by falling parapet bricks;*
- *Vertical crack to bricks at NW junction with adjacent building;*
- *Diagonal cracks to north wall between and at windows and the bricks forming the upper window head have moved outwards;*
- *South wall parapet is still in place supporting roof water tank. The parapet is severely cracked and remains a full hazard to the fire escape below. There are also cracks to the window arches below;*
- *The parapet has been partially lowered by the contractor working on 114 Lichfield Street to allow safe removal of the parapet at that address;*
- *The east wall of the fire escape has diagonal cracks above the upper level windows as well as horizontal cracks closer to the floor levels.*

Under Structural Safety Evaluation of the Building, the report notes that;

“The parapets to the fire escape remain a fall hazard to the area below that are preventing access to the upper levels of both 114 and 116 Lichfield Street. A roof water tank is supported on these unsecure parapets. There are no apparent structural hazards to the remaining areas of the building.”

Under Temporary Securing the report recommends;

The roof water tank should be re-plumbed with a pressure reducing valve and removed to allow the removal of the remaining parapet around the fire escape. The rooftop AC units near the fire escape should have diagonal braces installed to the supporting timber framing. The fire escape treads and handrails should be repaired.

Long-term repair requirements were noted as the following:

- *Once the fire escape parapets have been removed, the damaged brickwork directly under should be repaired. The sections of wall with loose and/or dislodged bricks, particularly above the windows, should be carefully lowered and rebuilt. A new reinforced concrete capping beam should be formed over tying the walls together. A new parapet can be constructed over, either from reinforced concrete or from lightweight materials. The roof structure should then be tied into the concrete beam;*
- *Vertical and diagonal cracks and cracked archways in the URM walls should be stitched with Helifix ties. The mortar joints should then be re-pointed;*
- *Stitch upper level north façade to western party wall with Helifix as above;*
- *The minor cracks to the mortar around the stone blocks at the window frames should be repaired by being ground out and re-pointed inside and out. Any dislodged blocks should be stitched in place with Helifix ties, as above;*
- *The level 1 ceilings are extensively damaged and will likely require replacement or repair with a gib overlay ceiling throughout.*
- *Repair cracked wall and ceiling plasterboard linings in accordance with gib recommendations;*
- *Remove any cracked and popped plaster from inside face of exterior walls and re-plaster;*
- *Cracks greater than 0.2mm in the concrete safe could be injected with an epoxy such as Sika Injectokit. Any concrete cracks greater than 1.0mm should be referred to the engineer for review.*

The report recommended the following further investigation.

- *Investigated condition of upper chimney level stub in the roof space*
- *Where the ground floor stone facings panels appear to have moved or partially popped off these should be carefully removed to allow inspection of the column behind, this should include the two NE corner entrance columns.*

Under strengthening the report states, “It is possible the building is earthquake-prone (i.e. has a strength less than 33% current code), as defined by the Building Act 2004, and the Council will likely require a strength assessment of the building as part of any consent.”

The building was further damaged in the Boxing Day 2010 earthquake.

A USAR Damaged Building Reconnaissance Report on 112–114–116 Lichfield Street at 13.10pm on the 27th December, 2010 identified severe damage to parapets to 114 Lichfield Street. An undated Engineers Re-Inspection of Damaged Building Form referred to a concern with the parapets and initiated a Section 124 notice. The building was assigned a red placard.

The USAR assessment recommended that the street outside 114 Lichfield Street be cordoned off.

A Rapid Assessment-Level 1 of the buildings 110-116 Lichfield Street was undertaken at 4pm on the 27th December, 2010 which assigned the building a green placard. The Rapid Assessment recorded “rear parapet wall to 110 Lichfield damaged” and recommended a Level 2 Assessment be carried out.

The Christchurch City Council appear to have acted on the USAR report issuing a Section 124(1)(c) BA 2004 notice on the 29th December, 2010 and the owner was given until the 31st January, 2011 to complete the make safe works. The building was assigned a red placard.

A note on Christchurch City Council files records that on a walkabout on 10 January, 2011;

“the building was red stickered. Cordon on Lichfield side affecting turning lane and pedestrians. No barrier Manchester Street side. Sign off received from Sean Gardiner of Metro Structex Limited in reference to these cordons. Neville to have a look at it. Met Sean Gardiner of Metro Structex Limited on site today. He advised (and submitted a report saying the same) that the cordons on Lichfield Street can be removed, that there is limited access to some upstairs of some areas. Also, Neville advised I contact building owner and advise it is his responsibility to make sure that entry. Emailed Clara that cordons can be removed.

Ron from Honey Pot rang (027-2222424) wanting some information on this site. I advised him that as per Sean Gardiners update that the bottom floor is occupiable and that upper floors are not. He was mentioning that he thinks he will move premises as he had concerns about the building if there was another Email from Sean saying owner received letter ref S124. advised it was standard letter delivered to all with S124 notice. He also attached the latest reports in regards to securing works, added to file.”

On the 18th of January, 2011, an engineer’s instruction from Metro Structex Limited noted on photos of the building the works necessary to make the building safe. (Predominantly relating to 114 Lichfield Street)

On the 26th January, 2011 Metro Structex Limited reported to Cunningham Lindsay NZ Ltd on the condition of the building. The report followed an inspection of the building on the 21st January, 2011 and recorded that the building had suffered moderate damage and that the parapets around the stairwell had been lowered and the water tank removed. The walls around the fire escape were noted to remain a hazard to the area below and the fire escape should not be used. Loose bricks to the perimeter of Level 2 ceiling were noted and it was noted that Level 2 should not be used.

The report commented;

“It is possible the building is earthquake-prone (i.e. has a strength less than 33% current code), as defined by the Building Act 2004, and the Council will likely require a strength assessment of the building as part of any consent.”

On the 2nd February, 2011 the Christchurch City Council wrote to the building owner expressing concern over delays in undertaking remedial works covered under the S 124 notice issued on the 29th December, 2010 and requesting a post Boxing Day structural engineer's assessment, a time line for addressing dangerous building works and an update on progress to date. The letter identified public safety as the priority.

On the 2nd February, 2011 Fortis Construction undertook securing work on the parapet to 112 Lichfield Street and Metro Structex Limited advised Glen McConnell that securing works had been completed to allow removal of cordons. Mr McConnell responded on the 3rd February, 2011 commenting that;

"By the way Vincie ph'd & has ordered the cordons removed. (Note- Mr Gardiner has since clarified that the removal of cordons related to the properties at 112 to 114 Lichfield Street and that no cordons had been placed around 116 Lichfield Street at that time.)

However, on inspection of 116 it should have a cordon on Manchester Street. The parapet and corbel are dislodged; the south east corner on Manchester Street is fractured from the floor to ceiling in multiple cases on the top floor. The parapet over the south wall is cracked, broken & dislodged. This would fall on the building next door from 2 storeys above. Did you get the pics I linked to you? "

After being advised by the contractor of further damage to the property, Metro Structex Limited issued another engineers instruction on the 4th February, 2011. The additional damage is noted on a drawing as being:

- Horizontal and diagonal cracking to external walls;
- Vertical cracks to parapets.

On the 9th February, 2011 a further engineer's instruction was issued with a drawing noting securing works for the building. Marked up photos were also referred to on the drawing. Mr Gardiner also emailed the Council commenting "I trust that our involvement in assessment and securing works is sufficient to satisfy the Council that work is progressing?"

There is an undated Engineers Re Inspection of Damaged Buildings form for 116 Lichfield Street in the Christchurch City Council records which refers to parapets, ornamentation at rear-access via lane on Manchester "looks like honey pot parapet/fall hazard- require CPEng sign off. Not sure which number building damage applies. Fences can be moved once honey pot sign off-it looks like the work is done-case manager to chasc. The form indicated heavy damage, unsafe red significant damage "do not enter"

A large portion of the building collapsed during the 22nd February, 2011 earthquake.

A Rapid Assessment-Level 1 was undertaken on the 26th February, 2011 which assigned a red placard and recommended at least partial demolition.

A Heritage Building report was issued on the 2nd of March, 2011 which noted the collapse of the Manchester Street façade and significant damage to the Lichfield Street façade.

A memo of the 2nd of May, 2011 notes that 116 Lichfield Street had been demolished.

No comment was made as to any liquefaction that was observed on the site.

Structural Failure

The building had weak lateral load resisting walls to the Manchester Street and Lichfield Street frontages.

The photos taken after the earthquake indicated that the building failed through an outward collapse of the Manchester Street façade due to inadequate restraint at the level of each elevated floor and the roof. (Refer photos Appendix 3). It is likely that the collapse was progressive.

The details of the floor and roof connections to the Manchester Street façade are unknown. An outward failure of the Manchester Street facade in the severity of shaking that occurred in the 22nd February, 2011 earthquake was not unexpected given the absence of strengthening or upgrading of the building. The building withstood the Boxing Day earthquake without significant further damage.

The code lateral load coefficient for a façade to an elastic responding structure in Christchurch at the time of the earthquake sequence was 1.23g at roof level of a three storey building. The analysis of un-reinforced masonry construction is not covered in the New Zealand Building Code. The industry uses the New Zealand Society for Earthquake Engineering guidelines 'Assessment and Improvement of the Structural Performance of Buildings in Earthquakes' 2000 and 'Assessment and Improvement of Un-reinforced Masonry Buildings for Earthquake Resistance' 2011. Calculations using these documents indicate that a sound 225 mm thick unreinforced masonry wall spanning 3m from third floor to roof level and effectively restrained at roof level would not have met code requirements without strengthening.

Based on GNS Science records of measurements of accelerations in the Christchurch CBD during the 22nd February, 2011 earthquake, the building is likely to have been subjected to a ground acceleration of 0.9g. This level of ground acceleration equates to a 1.68g acceleration at roof level. In addition significant vertical accelerations are known to have occurred and it is probable that the façade was subjected to a vertical acceleration at the same time as being subjected to severe horizontal acceleration. Clearly the failure of the unrestrained wall was almost inevitable under the severity of loading that occurred on the 22nd February 2011.

Issues Arising from Review

Occupancy of earthquake damaged buildings

While the Christchurch City Council files record that Metro Structex Limited advised the Christchurch City Council on the 10th January, 2011 that the cordons around 112 to 114 Lichfield Street could be removed, Metro Structex Limited advise that the date of Metro Structex Limited's advice that the cordons could be removed was the 2nd February, 2011. Christchurch City Council relied on the assessment, allowing access into the building and removing cordons.

Given the historical damage from the previous earthquakes and the poor structural layout of the building, in the benefit of hindsight, it may not have been appropriate that the building should have been occupied or public allowed access into the potential fall zone of the facades while there was a risk of a significant aftershock. Earthquakes are infrequent events and engineers receive no training in the assessment of earthquake damaged un-reinforced masonry buildings. Further the rapid assessment process is primarily focussed on addressing damage to buildings.

The building withstood the Boxing Day earthquake without significant further damage, the Boxing Day earthquake being the level of aftershock that was expected following the 4th September, 2010 earthquake. Following the substantial failure that occurred on the 22nd February 2011 it is suggested that prior to occupancy of an un-strengthened un-reinforced masonry building or public access within the fall zone of the building after a significant earthquake, the controlling authority should establish minimum strength criteria and require an engineering assessment establishing that the building achieves the minimum strength requirement. It is also suggested that engineers receive professional CPD training on the strength assessment of earthquake-damaged buildings after a significant earthquake.

Upgrading of un-reinforced masonry buildings

The damage that occurred to the building in the 22nd February, 2011 earthquake demonstrates the risk that un-reinforced masonry buildings pose to the occupiers of the building and people in the vicinity of the building at the time of such an event. Tragically the earthquake sequence has highlighted the danger to the public of inadequately restrained street facades to many un-reinforced masonry buildings

The Building Act provides two opportunities for the structural upgrading of buildings. These opportunities are:

- upon a change of use
- implementation and enforcement of an earthquake prone building policy

Improved public safety in a significant earthquake relies on territorial authorities adopting and implementing a meaningful programme for strengthening and upgrading of un-reinforced masonry buildings and enforcing the provisions for structural upgrading when a building is subject to a change of use.

The delay in the Christchurch City Council implementing a policy on earthquake prone buildings may or may not have contributed to the damage which occurred as a result of the severe 22nd February, 2011 earthquake. It is unfortunate that the Christchurch City Council did not at least require building owners to remove or secure the parapets to buildings along the street frontages.

Undoubtedly the Christchurch City Council's attitude to earthquake risk buildings was influenced by the perception that Christchurch was a low seismic hazard zone.

New Zealand is a seismically active country with many un-reinforced masonry and other low seismic strength buildings in cities and rural communities. These communities need to address the risk that un-reinforced masonry buildings pose in the event of a moderate to severe earthquake if loss of life is to be reduced in a future event.

Basis of Rapid Assessments

The Christchurch 22nd February, 2011 earthquake has demonstrated that in circumstances where a significant aftershock is possible, un-reinforced masonry buildings pose an unacceptable hazard to the public.

The performance of the building in future aftershocks was not specifically addressed by the Rapid Assessment process. The Rapid Assessment process focuses on damage caused to the building by the recent earthquake. Historically aftershocks have caused lesser levels of shaking than the initial earthquake. Buildings that have survived the initial earthquake without significant

damage are assessed as having sufficient resilience to withstand an aftershock. The Canterbury series of earthquakes has tragically identified the potential for an aftershock, located closer to the developed area, to cause more severe shaking. It is suggested that the basis of the Rapid Assessment process be reviewed to require a structural assessment of all un-reinforced masonry buildings that demonstrates that the building has a minimum strength that the controlling authority nominates prior to occupancy or public access within the fall zone of an un-reinforced masonry building after a significant earthquake.

Earthquake Prone Building Policy - Protection of Public Spaces

Tragically the earthquake sequence has highlighted the danger to the public of inadequately restrained street facades to many un-reinforced masonry buildings. The 22nd February, 2011 earthquake demonstrated the need for greater caution in the occupancy of and access in the vicinity of un-reinforced masonry buildings following a significant earthquake.

The failure of many street facades of un-reinforced masonry buildings was almost inevitable given the severity of shaking that occurred on 22nd February, 2011.

There is a need for territorial authorities to require building owners to adequately secure the upper level walls of un-reinforced masonry buildings, particularly the facades of buildings which present a fall hazard over public spaces or adjoining buildings. These buildings pose a serious risk to the public and those that work in or near the building in the event of a significant earthquake.

Improved techniques for improving the restraint of facades will be necessary if failure of such facades is to be prevented in future earthquakes of the severity of the 22nd February, 2011 earthquake.

Consideration should be given to prioritising the strengthening and upgrading of un-reinforced masonry parapets, facades and other elements that have the potential to cause loss of life in public spaces or adjoining buildings in a significant earthquake.

Erection of Barriers

The buildings at 114 – 116 Lichfield Street were damaged in the 4th September, 2010 and 26th December, 2010 earthquakes. The buildings had been assigned red placards and cordoning of the Lichfield Street frontage is understood to have occurred for the properties 112-114 Lichfield Street due to a parapet hazard.

Christchurch City Council provided barriers to protect the public from a failure of the damaged Lichfield Street façade of the buildings 112-114 Lichfield Street. On advice from Sean Gardiner of Metro Structex Limited, the barriers are understood to have been removed. On the 3rd February, 2011 Metro Structex Limited were advised by a contractor that a fall hazard was present on Manchester Street. While remedial work had not been undertaken by the 22nd February, 2011, Metro Structex Limited have commented that the 'prescribed amount of remedial work or the likely extent of a cordon around this area would not have prevented the resultant wall failure due to the magnitude of the event.'

The Canterbury earthquake sequence has demonstrated that if a repeat of the tragic loss of life that occurred on the 22nd February, 2011 is to be prevented, barriers should be provided to prevent public access within the fall zone of all un-reinforced masonry buildings with a strength below a nominated minimum requirement. This would require barriers to be erected to isolate

public access to the full extent of the fall zone of un-strengthened un-reinforced masonry buildings until such assessments were completed.

Such a policy has obvious economic implications, but would have been necessary to prevent the loss of life that occurred in the 22nd February, 2011 earthquake.

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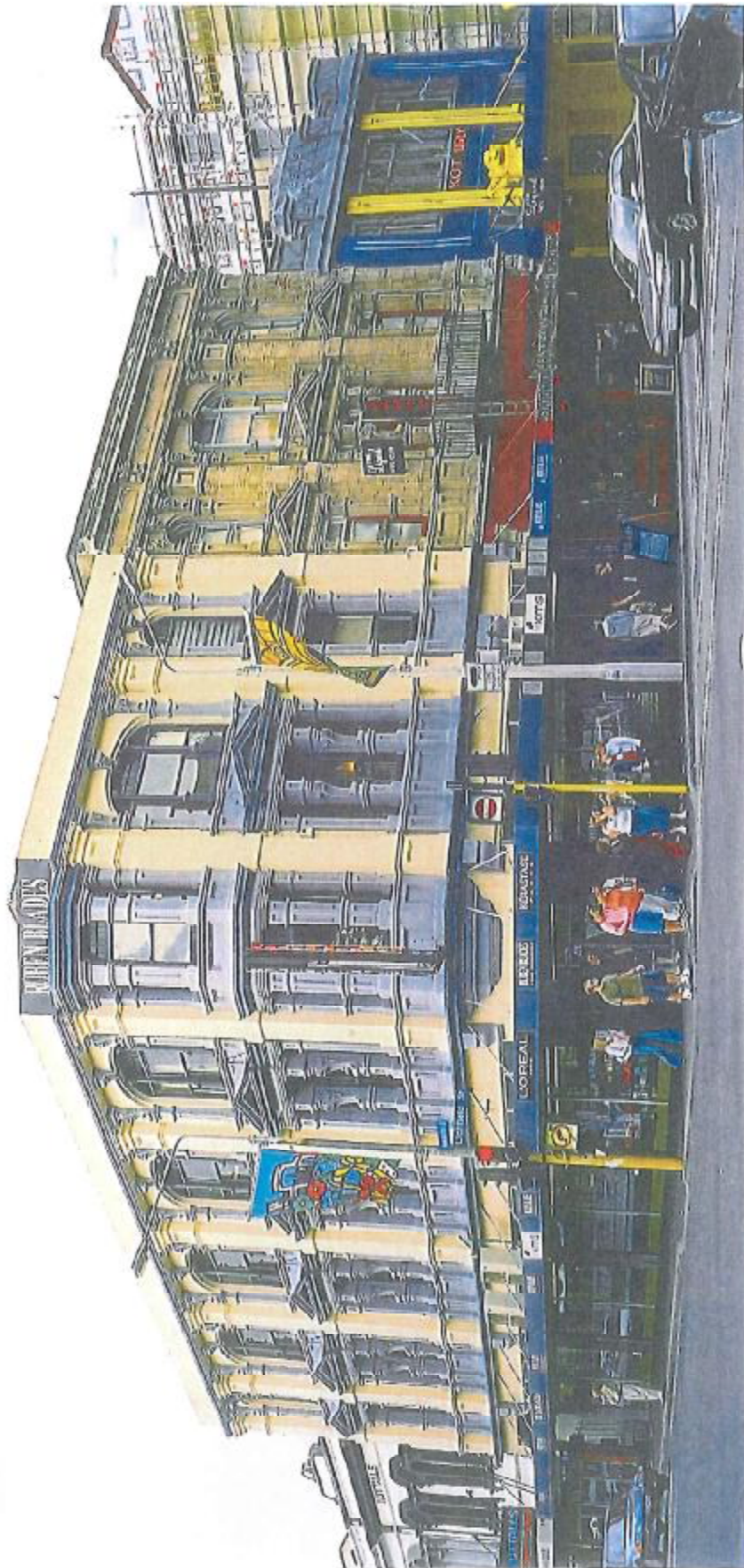
APPENDIX 1:

Site Plan



APPENDIX 2:

- **Photo of building before Earthquake**
- **Floor plan of ground and first floor**



23-11-54 urgent

This permit does not exempt the holder from giving to the Inspector the notices required by the Building and Regulations Act, 1924.

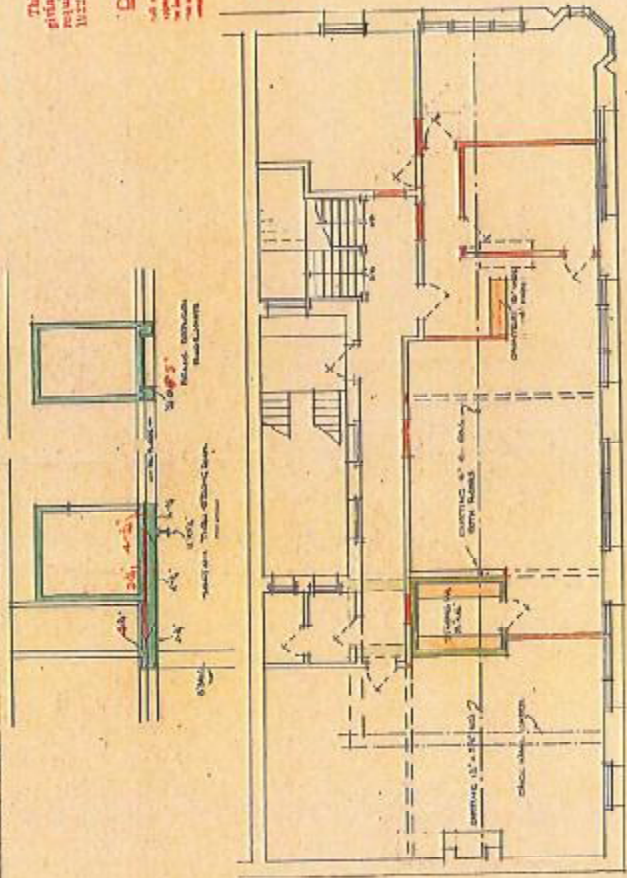
"DANGER" ELECTRICAL WORK
Electricity and Gaswork are dangerous and the person carrying out any work during any building construction, shall when the work is finished and during the progress of the work, shall be liable to the penalties of the Electrical Regulations and the Gas Regulations if he is negligent in his work.

This Permit is issued subject to the Building and Regulations Acts being complied with and the person carrying out the work shall be liable to the penalties of the Building and Regulations Act, 1924, if he is negligent in his work.

Window area to be one-eighth of floor area.



25-11-54

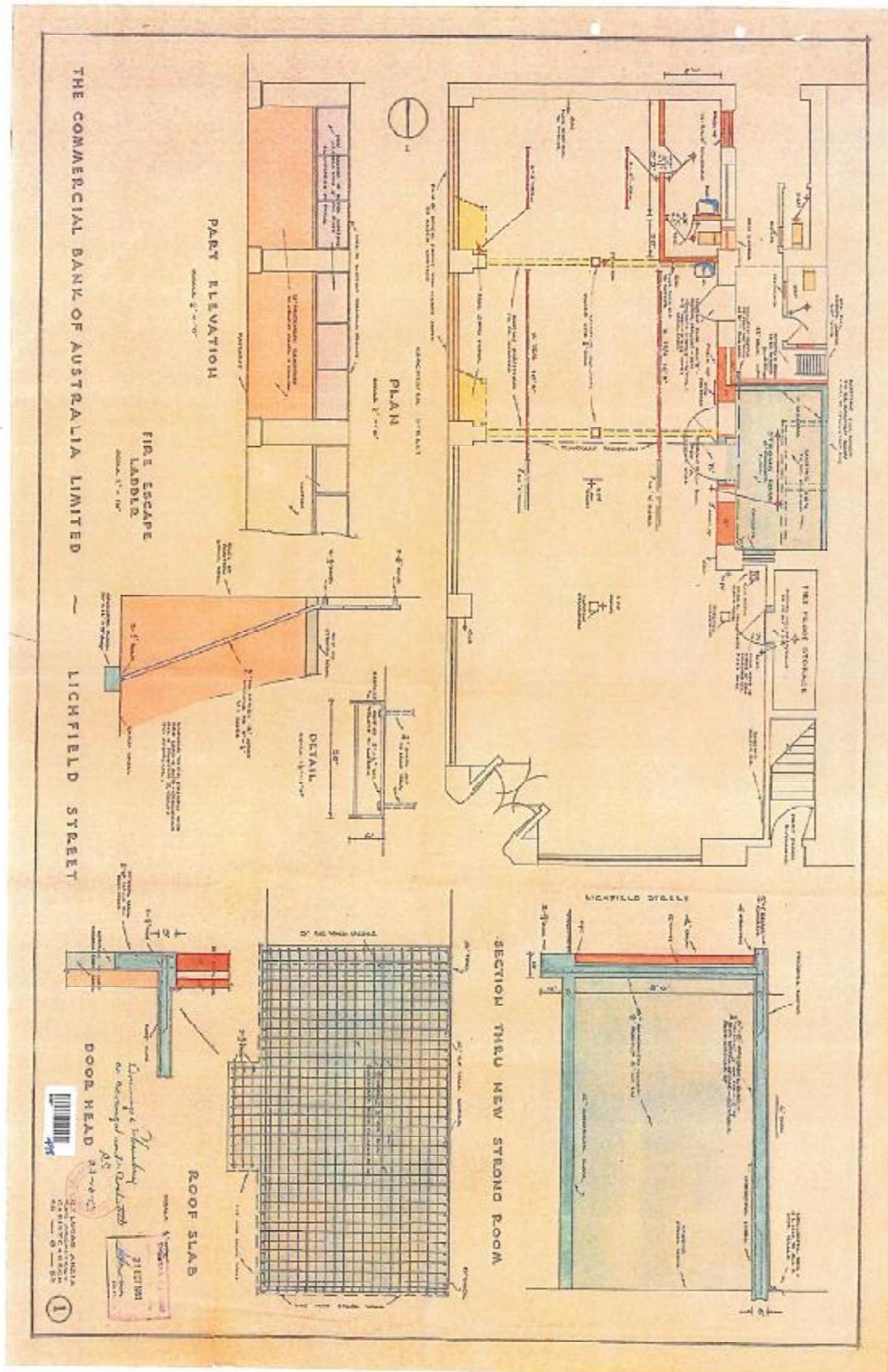


FIRST FLOOR PLAN
RIDLEY BLDG.
SCALE: 1/8"

533

116 Lichfield

- STRUCTURE -
- CHANGING TO BE 4 1/2" x 11" x 11" AIR
- BRICKS TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- WALLS TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- ROOFING TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- FLOORING TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- CEILING TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- STAIRS TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- WINDOWS TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- DOORS TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- PLASTER TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- PAINTING TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- GLAZING TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- FINISHING TO BE 10" x 10" x 10" WITH 1/2" JOINTS
- CONTRACTOR TO BE CHECKED OVER AND LEFT IN WORKING ORDER



APPENDIX 3:

- Photos of building following 22nd February, 2011 Earthquake



Photo 116-0018-016: The building shown with a view











8_116 Lichfield Street (Rueben Blades) PHOTOS



8_116 Lichfield Street (Rueben Blades) PHOTOS

