

In the Planning and Environment Court
Held at: Brisbane

No. BD 313 of 2010

Between: **JOHN EDWARD MYTTON BARNES and GEOFFREY
FREDERICK COOK**

Appellants

And: **SOUTHERN DOWNS REGIONAL COUNCIL**

Respondent

And: **THE CHIEF EXECUTIVE, DEPARTMENT OF
ENVIRONMENT AND RESOURCE MANAGEMENT**

First Co-respondent

And: **McCONAGHY GROUP PTY LTD
ACN 108 353 199**

Second Co-respondent

**Supplementary Engineering Experts' Joint Report
with regards the front section of the Plumb's Chambers building**

Introduction

1. In accordance with the orders of the Court in these proceedings, the expert witnesses for structural engineering called by the Appellants and Second Co-respondent held a meeting of experts (by teleconference) in accordance with Part 3 of the *Planning and Environment Court Rules 2010* ("the Rules") on 3rd June 2011.
2. This document is the joint report prepared in accordance with Part 3 of the Rules:
 - (a) stating the joint opinion of experts in relation to an issue in dispute in the proceeding; and
 - (b) identifying the matters about which the experts agree or disagree and the reasons for any disagreement.

Matters upon which we agree

3. The front part of the building comprises 3 basic elements. These comprise a 15x3.6m verandah with a skillion roof over the Fitzroy St. footpath; a 15x10m with 2 storey timber floors on two levels and gabled roof section and a 15x8.5m single level skillion roofed section to the rear with a concrete ground floor.
4. The verandah floor is timber framed joists and rafters spanning from columns and beams just behind the kerb line to the front sandstone wall of the building.
5. The building comprises Yangan sandstone external walling of a hybrid English Cross Bond with internal brick masonry walling. Internally both the ground and

upper floors are timber framed with the joists appearing to span from front to rear, supported on the external and internal walls.

6. The roof is a timber framed gable roof supported on the internal and external walls.
7. There is evidence of some termite infestation into the upper level structure, and it would appear that the ground floor structure has significant termite infestation.
8. Rising damp can be observed in internal and external walls in the lower floor.
9. The western wall of the front part of the building is approximately 7.5 metres tall by 10 metres long as a two storied section having three 'tie rods' horizontally located just below the upper floor level ceiling line extending across the building. One rod being in the centre through the chimney one at the southern end (broken inside the building) and the third at the northern end.
10. The rods have been anchored by means of a cross plate on the external face of the two side walls. At the locations of these cross plates, the stone work in the wall has been restrained relative to the rest of the wall face, resulting in lateral displacements between the restrained stonework and the balance of the wall of up to 30mm or so.
11. The masonry wall terminates and then breaks into a skillion approximately 8.5 metres long, being approximately 4.5 metres to 2.5 metres high at the south.
12. There are three windows in this wall being at the lower level and thence an upper window approximately 1.2 metres above floor level, that at first floor a section has been in filled and it is approximately 2 metres long.
13. The following defects are present in the western wall:-

Note: Crack severity is as defined in Appendix C of AS2870-2011 The Australian Standard for Residential Footings

Class 1 cracks are less than 1mm wide- do not need repair

Class 2 cracks are less than 5mm wide-noticeable but easily filled

Class 3 cracks are 5-15mm wide- can be repaired but might need wall replacement

Class 4 cracks are 15-25mm wide- require extensive repair work involving breaking out and replacing sections of walls

- The stonework is such that there are several light cracks being class 2 in the wall at the north/west end, and these are four stones from the north end and in bed and perpend to the original window opening which is 1.2 metres from the north end.
- Thence coming down to floor level from the middle of the window in bed and perpend as a saw tooth crack.
- Thence there is a crack down to the window in the north end and this then cracks through the key stone and thence through the lintel at the arch bar.
- The next crack is a crack extending for approximately 1.8 metres being on either side of the central chimney and that this is at the cross rod and is a

class 4 plus crack, and that the wall now extrudes to the west approximately 65 mm to 75 mm for three courses from the head.

- Then it is a stepped crack to the north in bed and perpend to the prior mentioned north window.
 - There is thence a bow in the wall to the south of the central rod, and this bow extends approximately 100 mm out from north to south and that one block to the south from the end of the cross rod section there is a step in bed and perpend down four courses and this is a class 2 crack.
 - At the centre of the remaining area there is separation of the bed course at the crest and at the corner there is cracking in bed and perpend approximately 3.5 metres from the south end and this is in bed and perpend extending down as a saw tooth to the north head of the second window over the key stone and through the lintel.
 - At the south end there is a step in bed and perpend and this has been repaired, and that the wall has separated to the window in the south elevation towards the east and that this is from the head lintel to the head to the roof line, and this is a class 3 crack.
 - In the rear section which is a later inclusion and five courses from the abutment of the skillion to the building there is a rain water down pipe and this is a stacked bond vertical perpend joint, and then there remainder of the brickwork is toothed which has cracks of class 1.
 - It should be noted that there is a further crack in over the central window to this skillion area (which is sheeted with FC), and this is in bed and perpend to the head of the window and this is a class 1 crack.
 - On the south side there is a crack extending from the head down to the head of the window at the lintel and this is a class 1 crack.
 - This wall has been plastered over several beds and perpends, and is not professionally covered.
 - It should be noted that the bottom two courses of this wall have been plastered and that there are air-vents, but that one section in the second window in the two story section is weathered and that there is depletion of the bricks due to removal of the protective coating.
14. It should be noted that approximately 1.2 metres from the south end of this wall in the road is a gully field inlet, and that the rain water down pipe prior motioned at the two story section at the south end discharges directly to the ground adjacent to the foundations.
15. This water runs in a trough valley towards the street.
16. A pipe at this field inlet which is approximately 800 mm deep is directed towards the west to an outlet unknown at this stage.

17. The roadway is sealed with Asphaltic Concrete.
18. A review of the columns to the verandah to the street indicates that the west column is buried in a plinth of concrete and is slightly depleted.
19. The remainder of the columns which are approximately 2.4 metre centres are all hardwood columns 150 mm square, and have metal saddles projecting out of the plinths and these are slightly rusted.
20. There are five such columns. All bases need to be repaired to a greater or lesser degree.
21. The head of this is a 150 mm by 100 mm head and floor joists are 220x50 mm hardwood at 450 centres.
22. These are seated on the head and built into the front masonry wall and are joined to the floor joists of the internal section, which extends through the masonry wall.
23. The masonry wall to the north wall of the building has minor cracking, but the stone has been protected by paint and rendering to a degree.
24. There is in the west end over the doorway of the front elevation a minor crack in bed and perpend for three brick courses and these extend down to the west end of the doorway, and is a class 1 crack.
25. At the window on the west end there is a class 2 crack which extends in bed and perpend as a tooth and this extends down and splits the lintel at the west end.
26. Given this, the area of decking above some of this has been replaced with Meranti type timber and the remainder is hard wood with butt joints (not shot edge) with gaps so as not to pond water.
27. There are holes and gaps in the flooring that appear to be from rotted timbers. Evidence of bird roosting is scattered over the floor.
28. This deck is reasonably level and in line.
29. The roof structure is such that the 100x100 columns extend through and are tongue and groove into the head comprising a 150 mm x100 mm hardwood bearer. The rafters are birds mouthed over the head at 700 centres and the battens are 150 mm by 50 mm at 900 centre sheeted with a corrugated iron roof. These are built into the wall. A pole plate is bracketed into the stone work at the upper level.
30. At the upper level there is a stepped crack over the doorway to the north/west side which is a class 2 crack.
31. The central rod across the building that on the east side this is stepped and has pulled in approximately 15 mm to 20 mm.
32. The east wall has been re-pointed at about the same locations to the prior and the rod in the centre has bowed in and there is render at the doorway with a sink outside, and this wall would need cleaning and re-pointing.

33. On this side the water adjacent to the foundations has been controlled by means of a spoon drain of stone base with poured concrete sides and slopes to the street with a reasonable fall.
34. All the floor joists and ceiling joists travel from north to south through the building and are at similar spacing as the rafters of the exposed balcony, and the joists in the floor to the lower ground floor also run in a similar fashion.
35. Internal walls to the structure dividing the internal rooms including that adjacent to the stair well are Flemish bond clay brick masonry of 230 mm thickness and these appear to be on separate footings.
36. Significant cracking can be observed at the junctions of the internal and the side external walls, in some cases up to 20mm wide, generally wider at the top of the walls, in the two storey section. At the junction of the internal walls with the west external wall there are significant cracks. There is also evidence of lateral as well as longitudinal distortion from inside the building in the western wall. These are generally Class 4 cracks.
37. Attempts have been made in the past to arrest the observed movements using 3 tie rods running across the building from side wall to side wall just under the upper floor ceiling at the front middle and rear of the side walls. The rearmost of these rods has subsequently snapped.
38. The ground floor timber framing is affected by rot and/or termite infestation.
39. The upper floor and roof timber framing appear to be in reasonable condition, only requiring of minor structural repairs.
40. However, both experts would recommend that the ground floor be removed and not replaced as a timber floor, but the floor be totally removed and replaced after underpinning works to the walls with a concrete floor over which could be placed a timber floating floor to match the remainder of the building. Issues related to termite infestation would indicate that a reticulated termite treatment system be installed.

Matters upon which we disagree

1. Andrew Farr believes that the rotation and settlements in the external walls are the result of foundations being supported on reactive clays that are affected by shrinkage and swelling as the moisture content changes with the seasons. It is also likely that the wetting of the foundation material has resulted in softening in the clay soils.
2. Andrew Farr believes that the most effective long term solution to the problems with the instability in the western wall foundation is to carefully demolish the said wall and cast a new foundation support beam and piers if necessary and then rebuild the existing wall in an identical manner of it's original construction. In the interim, the wall should be braced with an external frame in order that Haig Lane may be reopened to public use.

However, and if the DERM and the Southern Downs Council would agree, it may be that the underpinning of the western wall could be carried out in Haig Lane as

proposed by Roy Hoskins. This would however require permanent foundations of the building to be placed in the Haig Lane road reserve, and easement created in favour of the owner of Plumbs Chambers to restrict the Crown's ability to interfere with these foundations.

The eastern wall should also be underpinned and repaired to a straight and even line.

3. Roy Hoskins believes the failure of the western wall could very well be that the vibration of the trucks progressing along this road have given cause to further depletion of the foundations leading to cartwheel rotation of the foundation and that this has given cause to the settlement and the movement within the wall due to vibration.
4. Roy Hoskins believes that given this, he would be of the opinion that this building could be restored and that a method of restoration would be that given Council approval to locate piles and head stocks within the road reserve that a series of seven piles of 600 diameter with head stocks, could be located under the two story section and this could then be with additional propping to squeeze the wall located back by jacking into place an underpinning system.

The final seven metres could be undertaken with piles of 450 diameter with head stocks, and this needs only to be jacked to take load.

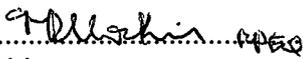
The building could best be underpinned and stabilised socketed into the rock at an estimated 3.5 metres, and the head stocks then would be located below the foundation to the west wall of this building at such a level that it would be approximately 900 mm to 1 metre below existing pavement road level.

This would then facilitate the proposed work of stabilising this wall as the angle of jacking would be from the exterior pushing the wall in rather than drilling internally and thence trying to locate the wall.

This would be a far more economical and functional way of stabilising this wall then working from the interior.

5. Roy Hoskins believes that the central rod across the building where on the east side the wall has been pulled in approximately 15 mm to 20 mm, could be returned by the release of the rod and the relocation of the stones.
6. Roy Hoskins believes that water running along the external walls may have wetted up the stone base of the wall and depleted the said stone.

Signatures of experts participating in the joint report


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Roy Hoskins
Engineering expert for the Appellants

Date: 22-07-11


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Andrew Farr
Engineering expert for the Second Co-Respondent

Date: 22-09-11