VICTORIAN CIVIL AND ADMINISTRATIVE TRIBUNAL

CIVIL DIVISION

VCAT REFERENCE NO. D972/2012

DOMESTIC BUILDING LIST

CATCHWORDS

Domestic Building Act 1995 – s.8. – implied warranties – design and construct contract – footing to be waffle pod slab designed by Builder's engineer – not built in accordance with design – Residential Slabs and Footings Standard (AS2870) –standards for design of footing to be adhered to – interpretation – modification of standard design on engineering principles – Permissible to use the Concrete Code (AS3600) – negligence – duty of care owed by engineer to owner – proof of actual damage required for cause of action – design nonetheless sufficient so no actual damage – excessive and uneven slab deflection – slab constructed on inconsistently and insufficiently compacted foundation – continuing and irregular movement 7 years after construction – finding that slab will probably never stabilize – assessment of damage – Owner to be placed in the position he would have been in had there been no breach – demolition and re-construction reasonable – loss of rental – duty on Owner to mitigate loss.

APPLICANT	Mr Graham Hooper
FIRST RESPONDENT	Metricon Homes Pty Ltd (ACN: 005 108 752)
SECOND RESPONDENT	Structural Works Pty Ltd (ACN 078 600 129)
WHERE HELD	Melbourne
BEFORE	Senior Member R. Walker
HEARING TYPE	Hearing
DATE OF HEARING	7-16 October and 3 December 2013; 5, 7, 10-14 and 25 February 2014
DATE OF ORDER	18 March 2014
CITATION	Hooper v Metricon Homes Pty Ltd (Domestic Building) [2014] VCAT 277

ORDER

1. Order the First Respondent to pay to the Applicant $289,589.65.
2. The Applicant's claim for interest is reserved for further argument.
3. The proceeding against the Second Respondent is dismissed.
4. Costs reserved.

SENIOR MEMBER R. WALKER

APPEARANCES:

For the Applicant	Mr T. Sedal of Counsel
For the First Respondent	Mr B. Carr of Counsel
For the Second Respondent	Mr K. Howden of Counsel

REASONS

The parties

1 The Applicant ("the Owner") is the owner of a House in Hollows Circuit, Tarneit, an outer suburb of Melbourne ("the House"). For ease of reference in these reasons I shall assume that Hollows Circuit runs from north to south and that the House is on the west side of the street.

2 The First Respondent ("the Builder") is and was at all material times carrying on business as a builder. The Second Respondent ("the Engineer") is and was at all material times carrying on business providing geotechnical and structural engineering advice and designs.

The claim

3 On 1 November 2006 the Owner signed a building contract ("the Contract") with the Builder for the construction of the House. The particulars on page 1 of the Contract described the building works as being the construction of a dwelling house "as set out in the specifications and plans".

4 A description of the specifications and of the eight sheets of plans prepared by the Builder followed. Both the specifications and the architectural plans were attached to the Contract and were initialled by the Owner and a representative of the Builder. As to the engineering plans, the Contract stated:

> "There are 8 sheets in the ENGINEER'S DESIGN/S AND it/they was/were prepared by STRUCTURAL WORKS ENGINEERING for the BUILDER". (sic.)

5 It is not disputed that the words "STRUCTURAL WORKS ENGINEERING" were intended to refer to the Engineer. There were eight pages prepared by the Engineer appended to the Contract but they but were not engineering designs. They were simply the results of a soil test and recommendations as to the construction of footings. They did not contain any design. The recommendation in these pages was for a stiffened raft footing system appropriate to a site with "H" class reactivity.

6 This soil report went on to say:

> "If certification is provided to confirm that the filling is compacted as per AS 3798 specifications to "controlled fill" standard as per AS 2870 a

"rigid" waffle footing system suitable for the site's reactivity may be appropriate for an articulated brick veneer dwelling. The waffle footing system may bear directly onto the compacted filling and shall be designed to take account for a differential settlement of the fill by an Engineer experienced with the design of "rigid" waffle footings.

ALTERNATIVELY a waffle footing system suspended on piers/piles founded into firm natural B horizon CLAY, may be appropriate for an articulated brick veneer dwelling. Refer AS 2870-1996 fig 3.4 and Clause 3.2. Waffle footing systems shall be designed for an "H" site reactivity by an experienced Engineer".

7. Two sets of plans were prepared by the Engineer for a waffle pod slab for the House. The first of these ("the First Plan") was in existence at the time the Contract was signed and the other ("the Second Plan") was prepared shortly afterwards. They are detailed below. The Owner argues that it was the First Plan that the Builder was to follow but the Builder denies that and says that it was to follow the Second Plan.

8. When the slab was constructed, purportedly in accordance with the Second Plan, it was found to be much higher than the Second Plan had directed. The effect of that, which was immediately apparent, was that the edges of the slab were well above ground level and so would be unsightly. After the Owner complained about the excess height the slab was surveyed and it was found to have a datum level of 100.690 instead of 100.485 as required by both the architectural plans and also by the Second Plan. In other words, it was 205mm too high.

9. After some negotiations an agreement was reached that the Builder would deduct $7,500 off the price of the House and import soil onto the site following completion in order to bring the external landscape level up to that of the brick rebate on the sides of the slab. The construction of the House was then completed and an occupancy permit for the House was issued on 10 July 2007.

10. The Owner moved in on 10 October 2007. He said that within two months of moving in he noticed cracks. He said these became more severe during the following twelve months and the front bedroom window would not open. He complained to the Builder and some windows were re-fitted and a section of wall in the front bedroom was re-plastered.

11. The Owner moved interstate to work in 2009 and the House was tenanted. He said that the Tenants complained about cracking and the front door jamming. He said that the front door was adjusted once by the Builder and that he paid a carpenter himself to repair it on several other occasions. The problems became worse with windows not opening and large cracks opening up in the plasterwork.

12. Following further complaints by the Owner, the Builder had the drainage system inspected to see if there were any plumbing leaks. There were none

detected. It then wrote to the Owner stating that the problems were due to "edge heave". The letter claimed that this was no fault of the Builder but due to the landscaping undertaken by the Owner and to excessive garden watering.

13. The Owner engaged a building and engineering expert, Mr Cross, who inspected the House in October 2011. After obtaining a survey of internal levels in the House and an investigation of the soil upon which it had been constructed, Mr Cross concluded that:

    (a) the slab had deflected in a differential and non-linear manner;

    (b) the fill soil below the slab was not consistently or adequately compacted;

    (c) the varying densities of the supporting fill were resulting in soil compaction and adverse building movements;

    (d) the House and its footings will experience ongoing movement into the future due to the inadequate foundation and the inadequate rigidity of the slab; and

    (e) it would be cheaper to demolish and re-build the House than repair it.

14. This proceeding was commenced by the Owner on 26 September 2012 claiming damages of $264,784 plus loss of rent. In essence, the Owner contends that the slab and/or the foundation upon which the House has been constructed are defective and that the House needs to be demolished.

The hearing

15. The matter came before me for hearing on 7 October 2013 with 10 days allocated. Mr T. Sedal of Counsel appeared on behalf of the Owner, Mr B. Carr of Counsel appeared on behalf of the Builder and Mr K. Howden of Counsel appeared on behalf of the Engineer. The first day was taken up with submissions and on the morning of the second day there was an on site inspection.

16. The hearing was adjourned part heard on 16 October 2013 to 20 January 2014 with a further five days allocated. That date was subsequently vacated and the further hearing was re-fixed for 5 February 2014 with five days allocated. After further delays the evidence concluded on 14 February 2014 and submissions were made on 25 February 2014.

17. Witnesses for the Owner were as follows:

    (f) The Owner and his step father, Mr Proctor, gave lay evidence.

    (g) Surveying evidence was given by Mr John Macey, a licensed surveyor;

    (h) Geotechnical evidence was given by Mr Steven Hennig, Mr Steven Buffinton and Mr Phillip Morgans of Civiltest, Geotechnical engineers ("Civiltest");

(i) Structural Engineering and building evidence was given by Mr George Cross of BBS Bayside Building Services;

(j) Valuation evidence was given by Mr David Matler of BMT Valuers;

18. Witnesses for the Builder were as follows:

(k) Its Operations Manager, Mr Trebilco;

(l) Its then Construction Manager, Mr David Sweeting;

(m) Its then Warranty and Service Site Manager, Mr Damien O'Connell.

(n) Surveying evidence was given by Mr Justin Isbester of Wilson Surveying;

(o) Geotechnical evidence was given by Mr David Lawrance of D.M. Lawrance Soil Testing Pty Ltd and also by Mr John McFarlane of McFarlane & Partners Pty Ltd;

(p) Structural Engineering evidence was given by Mr John McFarlane;

(q) Building evidence was given by Mr Stuart McLennan;

(r) Valuation evidence was given by Mr Ronald Courtney, a valuer.

19. Witnesses for the Engineer were its Directors, Mr Kennedy, who is a soil expert, and Mr Yap, who is a structural engineer.

The engineering requirements

20. The First Plan drawn by the Engineer was for a waffle pod slab supported by piers. It was drawn on 19 October, only twelve days before the signing of the Contract, but it was not initialled by the parties nor was it attached to the Contract. Mr Sedal submitted that it was nonetheless incorporated into the Contract by reference.

21. Mr Sedal referred me to the following definition of "Engineer's Design" in Clause 1.0 of the Contract:

> "'Engineer's Design' includes a footing design or other structural design that has been prepared by a qualified engineer for the concrete footings, stumps, piers or slab construction, or for a design, drainage design where appropriate and computations accompanying the foregoing."

22. He said that at the time the Contract was signed, there were in existence eight pages prepared by the Engineer for the construction of the House. Four of these were the First Plan and the other four were structural computations relating to other parts of the House. He said that, when the contract referred to "8 sheets in the ENGINEER'S DESIGN/S", that is clearly not a reference to the eight pages making up the geotechnical report and footing recommendations because they are not Engineer's Designs within the meaning of the Contract. He said that it must be interpreted to mean the eight pages that were then in existence that answered the description on page one of the Contract.

23. Mr Carr submitted that I should simply look at the contract document and assess objectively from the document what was the true intent of the parties. He referred me to page one of the specifications which stated that the concrete slab was to be constructed in accordance with AS 2870.1-1996 and in accordance with the engineer's design. He said there was no specific design in the contract documents but the geotechnical report described two alternatives for the design.

24. I prefer Mr Carr's approach. Looking at the form of building contract and the other documents the parties initialled, I cannot find that they intended to incorporate into it something additional that Mr Hooper had never seen or turned his mind to. The fact that contract documents were signed and initialled by the parties would suggest that it is these documents and no others that record their agreement.

25. Since there were no engineering designs that formed part of the Contract and since the House could not have been constructed without engineering designs and since it is common ground that it was for the Builder to provide the designs, it must have been an implied term of the Contract that the Builder would obtain engineering designs suitable for the construction that were consistent with the contract documents; that is, any such design would have to be consistent with the architectural plans, the specifications and the geotechnical report. The Builder would then construct the House in accordance with those engineering designs.

26. A note on the First Plan states:

> "Footings designed assuming that the filling on site will not be certified as 'controlled fill' in accordance with AS2870-1996. The slab design may change if certification is provided."

27. Possibly in response to this note, an employee of the Builder sent to Mr Yap a copy of a letter dated 12 January 2006 that the Builder had received from one Winslow Constructors Pty Ltd enclosing compaction results ("the Compaction Results") of the fill material that had been deposited on the subdivision by the developer ("the Subdivisional Fill"). The letter states:

> "The attached compaction results, which were located randomly throughout the fill profile, are considered to be representative of the bulk fill materials that were placed across the allotments by Winslow Constructors during this period."

28. On 6 November 2006 that is, five days after the Contract was signed, the Engineer designed an amended footing layout plan in which the piers were removed from the design and the steel reinforcement was "upgraded". This was the Second Plan. The work was done under the supervision of Mr Yap and he certified the design on 8 November 2006.

29. The Second Plan, which appears to have been endorsed by the Relevant Building Surveyor ("the Surveyor") on 13 November 2006, contains the same endorsement as above, plus the following further endorsement:

"NOTES:

1) REMOVE SURFACE SOIL CONTAINING GRASS, ROOTS AND ORGANIC MATTER FROM THE BUILDING AREA.

2) CUT AND/OR FILL SITE TO FORM A LEVEL BENCH.

3) THE ENTIRE BUILDING PLATFORM SHALL BE WELL COMPACTED AT OPTIMUM MOISTURE CONTENT BY REPEATED ROLLING WITH AN EXCAVATOR OR NON-VIBRATING SMOOTH DRUM ROLLER IN ORTHOGONAL DIRECTIONS AS PER AS2870-1996 Clause 6.4.2(b). PRIOR TO PLACING WAFFLE BOXES, ANY FILLING PLACED AS PART OF CUT AND FILL SHALL BE PLACED AND COMPACTED IN 150mm LAYERS.

IF BUILDING PLATFORM IS SOFT OR SUSPECT THEN CONTACT THIS OFFICE FOR ADDITIONAL REQUIREMENTS."

30. The second page of the footings plan contains a typical section through the waffle raft. It depicts the whole of the slab as being cut into the existing ground level. As stated above, because of the pre-construction height of the Subdivisional Fill, the designed finished floor level would have required that as well.

31. Clause 6.4.2(b) of AS2870-1996 is as follows:

> "Rolled fill consists of materials compacted in layers by repeated rolling with an excavator. Rolled fill shall not exceed 0.6 m compacted in layers not more than .3 m thick for sand material or 0.3 m compacted in layers not more than 0.15 m thick for other material.
>
> NOTE: The depths of fill given in this Clause are the depths measured after compaction"

32. The Second Plan therefore required the building platform for the slab to be cut into the existing soil profile and, insofar as it was fill, it was to be rolled fill within the meaning of this Clause. The specification of rolled fill was not in accordance with AS2870-1996 which required Controlled fill for the support of edge beams.

Construction of the slab

33. A building permit for the construction was issued on 14 November 2006 but there was some delay before work commenced. The Builder received an invoice from its earthmoving Contractor, a company called Earthlift ("Earthlift"), on 10 January 2007 for "Site preparation in accordance with site plan" and "Proof Rolling as per engineer's specifications". (Tribunal Book 328).

34. There is no direct evidence as to how this slab was prepared and poured. The site manager, a Mr Bruno Grimaldi, was not called. He attended the

site with Mr Sweeting immediately after the slab was constructed following a complaint by the Owner that it was too high. At that time a significant problem with the construction of the slab was apparent and Mr Grimaldi was available. One would expect that some enquiry would have been made at that time concerning how it was prepared and poured and, notwithstanding that it was not as designed, whether it was nonetheless sufficient, but no evidence as to those matters was given.

35. The concreter who prepared and poured the slab was also not called. It was suggested on behalf of the Builder that al least part of the extra height was due to extra concrete having been used. According to the Builder's evidence it was the Builder and not the concreter that paid for the concrete that was delivered to the site but no documentation recording the quantity of concrete delivered was produced. No-one from Earthlift was called to give evidence as to the preparation of the site.

36. During final submissions I was informed by Mr Carr that some enquiries had been made but no-one could recall this slab over the many others that had been prepared and poured around that time. I can understand that would be the result if enquiries are only made now. However it was known that there was a problem with the pouring of this slab immediately afterwards and the Owner's complaint about the height was resolved at some cost to the Builder. I was told that the Builder had a file for this construction. It is difficult to believe that no enquiry was made at the time as to what went wrong and that nothing made its way onto the Builder's file. Nevertheless, Mr Sedal does not ask me to draw any inference from the failure of the Builder to lead evidence about how the slab was prepared and poured and so I draw no inference.

37. In the absence of direct evidence I am asked by the Builder to draw inferences. Mr Sweeting said in his witness statement:

> "There was no additional fill imported to the site. Earthlift would not have done any work not covered by the purchase order without approval, as this would have meant that they wouldn't have been paid, and any approval would have needed to have come from me."

38. That is a positive assertion based upon what is <u>not</u> in one document and I am not prepared to draw such an inference. It is clear from the acknowledged presence of scoria under the slab that some material was brought onto the site that is not mentioned in that document. Moreover, the geotechnical evidence demonstrates that a considerable amount of soil was brought on to the site.

39. According to the Second Plan the Engineer prepared, the slab was to be 385mm thick from ground level (that is, from founding level) to finished floor level. According to the architectural drawings the finished floor level was to be 100.485 datum level. It was therefore to be founded at 100.100 which was entirely within the Subdivisional Fill.

40. On 20 September 2006 and before construction commenced, an initial survey was carried out by Wilson Surveying. That showed the site as it was with the Subdivisional Fill. The lowest point was the south east corner where the level was 100.11 or thereabouts (that level not being precisely in the corner) and then increasing progressively in height in a north easterly direction to a high point of 100.320 towards the front of where the garage was to be and 100.27 near the north east corner of the footprint for the House and then falling steeply to the front boundary. In essence, from the front of the House the land fell sharply by about 600mm to the front boundary and fell more gradually to the back of the site by about 300mm.

41. The Builder's construction manager Mr Sweeting, acknowledged that in order to achieve a finished floor level of 100.485 it would have been necessary to excavate the Subdivisional Fill down to about 100.100. That would mean that the slab would be set down into the ground at the high point on the footprint of the building and the surrounding soil would be approximately level with the rebate in the slab. This did not occur. Had it been cut down as designed, there would have been no need for any fill material between the excavated surface of the Subdivisional Fill and the underside of the slab. Yet after it was poured it was 205mm too high.

42. Mr Buffinton put a borehole through the slab in a cupboard of Bedroom 2 and found that the concrete at that point was 125mm thick instead of 85mm as it had been designed. Mr Cross suggested that this might have been due to a workman's boot accidentally pushing down the void former in that position. Mr McFarlane said that was unlikely and what he said about that makes sense. If it did occur there is a 15 mm void under the slab in that position that would then need to be accounted for. I cannot speculate. I must take the experts' findings as they are and say that the only evidence that I have of the thickness of the top of the slab is that it is 125mm thick instead of 85 mm as designed.

43. That extra 40 mm in the height of the concrete accords to a large degree with the observed extra thickness of the edge beam which varies from 35 mm to 65 mm above the designed thickness of 385mm. The edge beam heights are inconsistent. From the descriptions given by the experts as to how a waffle pod slab is prepared and poured it is apparent that, at the time of pouring, the ground level was not level but was lower in the places where the edge beam is thickest.

44. If one were to assume that the slab was poured 40mm too thick then that would account for that much of the 205 mm excess height but what of the extra 165 mm? Some of that might be accounted for if the Builder did not cut into the site but there is no evidence about whether it did that or not. Apart from this extra 40mm of concrete, the geotechnical evidence established that the remaining additional height was additional soil brought onto the site by the Builder ("Builder's Fill").

Surveying evidence

45. The survey by Wilson Surveying in January 2006 immediately following the pouring of the slab and the Owner's complaint about its height established that the finished height of the slab was 100.690.

46. The later surveys were directed to establishing the degree to which the slab was out of level. Mr Macey carried out a survey on 15 February 2013 and another on 20 September 2013. Mr Isbester of Wilson Surveying carried out a survey in February 2013 and another on 21 December 2013.

47. For their first surveys Mr Macey and Mr Isbester used different datum points. Mr Isbester used the lid of the sewer pit that was used when it was first found that the slab was too high. It is at the rear of the property and, before the House was constructed, it was at ground level. By February 2013, as a result of the build up of the soil on the site in accordance with the agreement by the Builder to do so, the sewer pit was 300ml underground. Mr Macey was unable to locate it and so for his first survey he used five datum levels external to the allotment.

48. Mr Macey said that he placed a rivet in the kerb outside the allotment and then took levels back to two separate Tarneit permanent survey marks, the top of the electricity pit outside the House and a chisel cut in a nearby drain pit. In this way he had five reference points. He found that:

    (a) The weep hole levels differed by up to 71mm;

    (b) The floor levels differed by up to 71mm in the House and by 38mm in the garage; and

    (c) The ceiling levels differed by up to 83mm.

49. Mr Macey returned to the site on 20 September 2013 and took further levels using his original five datum points and found that one of them had moved by 2mm. Comparing his results with the earlier results of his survey in February, he found that the levels had dropped by up to 15mm. He took levels to the top of the sewer pit that had been used by Mr Isbester so as to enable his levels to be compared, assuming the top of the sewer pit had not moved between the two surveys.

50. For the internal levels Mr Macey took the finished levels that is, the surface of the carpet and the surface of the tiles. He also took ceiling levels. Mr Isbester took the levels of the slab, deducting 10mm for the assumed thickness of the tiles and carpet to arrive at the level of the slab underneath.

51. Mr Isbester's first survey was on 21 February 2013. He based his survey on a single bench mark, which was the lid of the sewer that he had used before and plotted his findings on a plan. He summarized his findings by saying that the left, the rear and the front right of the slab had elevated since the original check in February 2006.

52. Mr Isbester's second survey was on 9 December 2013. Again, he based his survey on the lid of the sewer but also took levels to other points. He

plotted his findings on a plan after deducting 10mm for the assumed thickness of the floor coverings. He summarized his findings by saying that across the individual spot levels there were differences of between 0mm and 14mm from his first survey.

53. Mr Macey prepared a composite plan overlapping the findings of his two surveys, and compared the results of the February survey with the results of his September survey. He found that there had been changes in the levels between the two dates. A comparison of Mr Isbester's two surveys showed similar changes.

54. Some point was made by Mr Sedal that Mr Macey is a Licensed Surveyor whereas Mr Isbester is not, that Mr Macey based his survey upon five datum levels instead of one and that he used more "state of the art" equipment. He also took his levels to the finished floor levels instead of adjusting them to take account of what the thickness of floor coverings was assumed to be.

55. The qualification of each surveyor is expressed in terms or years of experience. The description of Mr Macey's is longer and more detailed than that of Mr Isbester. Mr Macey is also a past examiner for the Surveyor's Registration Board of Victoria. Although, insofar as one can quantify such things, Mr Macey appears to be more qualified than Mr Isbester, I am satisfied that Mr Isbester was qualified to carry out his surveys.

56. Mr McFarlane questioned the reliability of the datum points used by Mr Macey saying that they might have moved and said that the sewer lid was less likely to move. Two of the datum points Mr Macey used are official datum points and one is a drain lid that is anchored below the surface. Each of the levels was checked against the others and only one was found to have moved and that was by 2mm. I am satisfied that the datum points are reliable.

57. If I had to choose between the two survey results I would prefer the findings of Mr Macey on account of his more sophisticated equipment and his use of five datum points instead of one. However it does not appear that I have to discount the evidence of either surveyor.

58. Mr Cross has compared the two Macey surveys with each other and the two Isbester surveys with each other. In this regard I prefer Mr Cross' evidence over that of Mr McFarlane who attempted to compare all four surveys with each other after making some adjustments which may or may not be valid. The two surveyors used different equipment and in the first survey had different datum points from each other. I am not prepared to discount any of Mr Macey's results by adjusting them as Mr McFarlane suggested. Both surveyors have sworn their findings are accurate and I accept their evidence.

59. Mr Cross was cross-examined extensively on the methodology that he adopted to compare the survey results which involved assessing heights at

points a little away from where a level had been taken on another occasion. I see nothing to criticize in his methodology. Mr McFarlane challenged the accuracy of some figures but after examining the results I accept that Mr Cross' interpretation is sufficiently accurate for the points that he made.

60. Although the period and the figures in each case are not the same both comparisons show substantial movement having occurred between the earlier and the later surveys.

61. For the Macey results, between the two surveys the floor in the middle of the House towards the front has dropped by up to 18mm. Towards the kitchen it has dropped up to 13 mm although at a nearby spot it has dropped only 2mm. Along the north side of the House behind the master bedroom it has dropped an average of 7mm. Part of the floor in the Master Bedroom has dropped by 13mm whereas the northeast corner of the same room has risen by 2mm. The period of comparison was from 15 February 2013 to 20 September 2013.

62. For the Isbester results, the floor at the front door dropped by 8mm, it has risen by 1mm in the middle of the hallway and then dropped by up to 6mm along the centre of the House. The whole southern side of the House has dropped by an average of about 9mm although in one place it dropped by 12mm. In the northwest corner of the House it rose by up to 4mm but in the centre of the House the north side dropped from 1mm to 6mm. The whole of the Master Bedroom has dropped by up to 4mm but averaging about 3mm. The period of comparison was from 21 February 2013 to 9 December 2013.

63. The deflections in the slab were found by Mr Macey to be up to 86mm and by Mr Isbetser, to be up to 75mm. Deflections in the ceiling were found by Mr Macey to be up to 79 mm and by Mr Isbester to be up to 60mm. It is clear from the evidence that these are very substantial movements and that they were continuing, at least up to September 2013. The continuing nature of the movement is said to be of great concern.

Stabilization

64. In his report Mr Cross said that the slab had not stabilized and was unlikely to ever stabilize when the slab has insufficient stiffness to cope with the Subdivisional Fill and when it is founded on loose variable compacted fill. In response to that Mr McFarlane said in his supplementary report that it is commonly accepted that stabilization can be assessed by monitoring slab movements and that:

> "If future slab movements are in general, not more than say +/- 5mm then stabilization can be assumed."

65. In cross-examination concerning the differences in level that were found by the surveyors between their earlier and later surveys Mr McFarlane conceded that the slab was not "completely stable" although he said it was

approaching stabilization. He was unable to say when stabilization would occur, except to say:

> "At some stage the issues with the current abnormal moisture conditions will stabilize, but we still can expect the slab to move within the performance requirements of the footings code."

66. As to future stabilization, Mr Buffinton said:

> "The moisture content of moisture condition that we've got in the soil at the moment, if we're talking about all of this reaching some of equilibrium, then we are going to get some future movement. I can't see that we can expect it to stabilize in the near future. The house is, what, now nearly six years' old and it has moved to the extent that it has well beyond the time period that we would normally expect it to stabilize in. So I just don't believe that it has reached its equilibrium quite yet".

67. Mr Lawrance said:

> "I agree completely that it hasn't reached the equilibrium point, which is what he said, but our experience of hundreds of these cases over decades has shown us that the moisture tends to stabilize and heave eventually ceases. That's well known as a geotechnical phenomenon."

68. When asked whether, given the substantial changes, stabilization was a fair way off he said:

> "Well, it's hard to know exactly but if you're still getting significant changes you're some way away, yes".

69. Mr Lawrance said that he would expect movement to be reduced when the garden and paving was established and the moisture levels stabilized although he agreed that that assumed that the slab had been constructed and designed properly.

70. I am satisfied that the slab has not stabilized and that any stabilization of the soil, if it should occur at all, would be at some indeterminate time in the future. The question is whether it will ever stabilize. Mr Cross said that it will not, because the slab has insufficient stiffness and it is founded on loose variable compacted fill. That the Builder's Fill is loose and variable is borne out by the evidence.

The soil profile

71. There was some dispute about the depth of the fill and whether there was any "Builder's Fill" at all imported onto the site which might account for the greater constructed slab height. I have no evidence from those who prepared and constructed the slab. The best evidence that I have of what lies beneath it is the geotechnical evidence, including the bore logs and the samples that were taken.

72. The first soil profiles were taken on 21 September 2006 by the Engineer. The first sample ("E1") was from near the middle of the driveway. The

second ("E2") was taken from a position immediately adjacent to where the external living room wall now is, approximately in the middle of that wall and the third ("E3") was taken where the Family Room floor now is.

73. Bore logs "E1" and "E2" showed 600mm of fill while bore log "E3" had 700mm of fill. Immediately below that was 100mm of "Clayey Silt" which, according to the experts, is the original topsoil. Below that, to a depth of 1500mm (the bottom of the borehole) was a very stiff brown silty clay. The report states: "Site was classified "P" due to filling encountered."

74. The top fill referred to in this report was the Subdivisional Fill referred to in the compaction certificates. It is also apparent from the survey that the Subdivisional Fill at the rear of the site at "E3" was 100mm thicker than it was at the front.

75. The slab was constructed in January 2007 on the then ground level and shortly afterwards an unknown quantity of soil was brought onto the site by the Builder to cover the slab rebates. I shall refer to this as "the Landscaping Fill".

76. In February 2011 Mr Hennig of Civiltest excavated three test pits adjacent to the House. Test pit One ("C1") was next to the south wall between the Study and Bedroom 2 windows. Test pit Two ("C2") was next to the north wall almost at the north western corner of the House and Test pit Three ("C3") was also on the north side, a little to the west of the front corner of the House. A fourth Test pit ("C4") was made as a control away from the House and towards the northwest corner of the allotment. None of these was anywhere near where any of the earlier samples were taken.

77. Mr Hennig found that the waffle slab footings that he encountered were founded at levels of between 250mm and 270mm into the silty clay fill. He measured the thickness of the slab edge beams and found them to be 450mm in C1, 430mm in C2 and 420 in C2. He said that he took three samples of the soil below the level of the edge beam and beside it at each location.

78. Mr Hennig said that a nuclear density gauge was used to determine the field density and the Hilf Rapid Method was used to test the density of the samples in the laboratory. He said the compaction of the fill along the footing at C1 was 89%, in C2 it was 90.5% and in C3 it was 83%. He said that the compaction of fill placed in residential developments is generally at least 95%. He did not discuss the soil levels in the body of his report but referred to the attached bore logs.

79. A copy of Mr Hennig's findings was provided to Mr Lawrance who was asked to make his own investigation on behalf of the Builder.

80. On 23 October 2012 Mr Lawrance drilled six boreholes. The first borehole ("L1") was made not far from Mr Hennig's Test pit C1, the second ("L2") was close to Mr Hennig's Test pit C2, the third ("L3") is close to Mr Hennig's Test pit C3 but around the corner at the front of the House. His

fourth borehole ("L4") was near the northeast corner of the dining room window. The fifth ("L5") was between the front of the House and the street in about the middle of the frontage and the sixth ("L6") was between the pathway outside bedroom 3 and the back boundary.

81. Mr Lawrance said in Clause 3.0 of his report:

> "Based on information obtained from the boreholes it is evident that the soil profile across this site consists largely of two distinct layers of filling overlying a relatively thin layer of original clayey silt topsoil which in turn overlies natural highly reactive high bearing strength basaltic clay."

82. As to the two layers of filling he said:

> "The uppermost fill layer consists of a mixture of red/brown silty clay and clayey silt. This layer was observed to have an overall thickness of between 0.30m and 0.40m. Based on a visual tactile assessment of this filling and from the Dynamic Cone Penetrometer (DCP) testing carried out, it is evident that this second layer of filling is moderately to well compacted. This layer of filling appears to have been placed over the site after estate development was completed. Based on information in the Cross report it appears that approximately 0.20m of this top fill layer was placed over the ground surface after the slab was poured. This is confirmed by the fact that the ground surface drops away towards each of the surrounding boundaries.
>
> The second fill layer consists predominately of light grey highly reactive silty clay. This layer was observed to be around 0.30m to 0.60 m thick in [*boreholes L1 to L3 and L6*]. Based on a visual tactile assessment of this filling and from the Dynamic Cone penetrometer (DCP) testing carried out, it is evident that this second layer of filling is moderately to well compacted. This layer of filling appears to have been placed over the site during the original estate development."

83. On 22 February 2013 Mr Buffinton drilled the core hole referred to above through the concrete slab in the wardrobe of Bedroom 2. He also excavated a further test pit near C3 and L3 in an attempt to resolve the apparent inconsistencies in the findings of Mr Hennig and Mr Lawrance in that area.

84. Mr Buffinton said that the bore hole through the concrete slab showed that the concrete was 125mm thick overlaying the void former, which was 300mm thick which in turn overlays a thin layer (30mm) of red ground gravel followed by brown silty clay which was found to be dry to moist with a moisture content of 15%. He said there was a plastic membrane separating the void former the thin gravel layer. He also observed a 15mm space between the void former and the plastic membrane.

85. The further test pit ("C 6") near the earlier C3 confirmed the depth of fill at that point as being 1100. He pointed out that Mr Lawrance's L3 was at the front of the house where, he said, the ground level was approximately 300mm lower.

86. In each case an expert has sworn as to the accuracy of his findings and there is no contrary evidence. The mere fact that two experts taking bore logs near each other find a different soil profile is not a reason to doubt the accuracy of either. In the absence of some other evidence I must find that each bore log represents the profile of the soil in the place where it was taken.

Was there any Builder's Fill on the site?

87. Mr Carr suggested that a possible explanation for the constructed slab level was that there was a "cut and fill" of the site, that is, a cut of the higher part with the removed soil being deposited on the lower part. He suggested that it would not have been necessary to import any soil onto the site to account for the extra height. There are problems with that suggestion.

88. In the first place, the Subdivisional Fill placed by the Developer is of a different colour. Both Mr Hennig and Mr Lawrance described it as being light grey or pale grey. The bore logs show that fill of that colour is some distance below the founding level of the slab. Secondly, neither Mr Hennig nor Mr Lawrance suggested that the soil below the founding layer was any different in appearance from the soil above, which is the Landscaping Fill deposited by the Builder. Finally, even allowing for an edge beam thickness of 420 to 450, more soil would need to have been imported onto the site in order to arrive at a constructed height of 100.690.

89. On the balance of probabilities I must find that the upper layer of red/brown fill was placed by the Builder and that the light grey or pale grey fill immediately above the topsoil was the Subdivisional Fill placed by the Developer. Of the upper layer of fill, the portion which is between the Subdivisional Fill and the underside of the slab is the Builder's fill upon which the slab was constructed. Above that is the Landscape Fill. The relative thicknesses of these levels are shown in the bore logs.

The bore logs

90. Starting with the Engineer's bore logs, they show that, shortly before construction commenced the depth of the subdivisional fill at the front of the site and also halfway down the driveway was 600mm. Towards the rear of the footprint of the proposed house in the centre of the allotment it was 700mm deep. It is described as damp Clay/Silt mix moderately compacted of a low dry strength.

91. In subsequent bore logs the Subdivisional Fill level and the second level of a different material are shown. Ignoring a thin top layer of gravel or mulch on the surface deposited by the Owner in some locations, the rest has been deposited by the Builder. The upper part is the Landscape Fill that was brought onto the site pursuant to the agreement to build up the soil level around the edge beam. The lower part was to raise the level of the building platform to support the slab. According to the Second Plan, the slab ought

to have been constructed at or below the then surface of the Subdivisional Fill within the footprint.

92. In the following summary of the bore logs I have omitted the boreholes that do not relate the levels to the edge beams because it is impossible to determine what in those boreholes is above the founding level of the slab (Landscape Fill) and what is below (Builder's Fill). In Mr Lawrance's bore logs he does not say whether there was any and what gravel or mulch on top of the Landscape fill as Mr Hennig does, but simply gives the depths of the edge beams from ground level. The depths given below are from the surface in each case.

93. The Landscape Fill is described as follows:

Expert	**Bore**	**Colour**	**Nature**	**Compaction**	**Depth** mm
Mr Hennig	C1	Brown	Silty Clay	Soft firm moist	30-270
Mr Lawrance	L1	Red/Brown	Silty Clay	Moderate	0-270
Mr Hennig	C2	Brown	Silty Clay	Stiff Firm moist	50-250
Mr Lawrance	L2	Red/Brown	Silty Clay	Variable/Moderate	0-270
Mr Hennig	C3	Brown	Silty Clay	Stiff moist	60-250
Mr Lawrance	L3	Red/Brown	Silty Clay	Variable to Moderate	0-250
Mr Lawrance	L4	Red/Brown	Silty Clay	Variable/Moderate	0-270

The similarity of these results is apparent as is the variability in the descriptions of the level of compaction observed, albeit only upon a tactile examination.

94. The Builder's Fill is described as follows:

Expert	**Bore**	**Colour**	**Nature**	**Compaction**	**From surface**
Mr Hennig	C1	Brown	Silty Clay	Soft firm moist	270-500
Mr Lawrance	L1	Red/Brown	Silty Clay	Variable/Moderate	270-400
Mr Hennig	C2	Brown	Silty Clay	Stiff Firm moist	250-500
Mr Lawrance	L2	Red/Brown	Silty Clay	Moderate	270-400
Mr Hennig	C3	Brown	Silty Clay	Stiff moist	250-1100
Mr Lawrance	L3	Red/Brown	Silty Clay	Variable to Moderate	250-300
Mr Lawrance	L4	Red/Brown	Silty Clay	Variable/Moderate	270-400

A similar comment can be made here, although the difference between C3 and L3 should be noted.

95. The Subdivisional Fill is described as follows:

Expert	**Bore**	**Colour**	**Nature**	**Compaction**	**From surface**
Mr Hennig	C1	Pale grey	Silty Clay	Stiff/V.stiff moist	500-850
Mr Lawrance	L1	Light Grey	Silty Clay	Moderate to well	400- 820
Mr Hennig	C2	Pale grey	Silty Clay	Stiff/V.stiff moist	500-1000
Mr Lawrance	L2	Light Grey	Silty Clay	Moderate to well	400-820
Mr Lawrance	L4	Light Grey	Silty Clay	Moderate to well	400-820
Mr Hennig	C3	Pale grey	Silty Clay	V.stiff moist	1100-1500
Mr Buffinton	C6	Pale grey	Silty Clay	Stiff moist	1100-1500

The description given by the Engineer for this material was slightly different. He described the fill as "Clay/Silt mix. Brown. Moderately compacted".

96. The Residual Topsoil is described as follows:

Expert	Bore	Colour	Nature	Moisture	Depth/Level
Engineer	E1-3	Brown	Clayey Silt	Moist	100mm
Mr Lawrance	L1	Red/brown	Clayey Silt	Moist	820 to 920
Mr Lawrance	L2	Red/brown	Clayey Silt	Moist	820 to 920
Mr Lawrance	L3	Red/brown	Clayey Silt	Moist	300 to 490
Mr Lawrance	L4	Red/brown	Clayey Silt	Moist	820 to 920
Mr Lawrance	L5	Red/brown	Clayey Silt	Not stated	270 to 400
Mr Lawrance	L6	Red/brown	Clayey Silt	Moist	950 to 1050

97. Mr Lawrance described the Residual Soil as follows:

Bore	Colour	Nature	Moisture	Depth mm
L1	Red/brown-Light & Brown/grey	Silty Clay	34%	920 to 1500
L2	Red/brown-Light & Brown/grey	Silty Clay	34%	920 to 1500
L3	Red/brown-Light & Brown/grey	Silty Clay	30% & 42%	490 to 1500
L4	Red/brown-Light & Brown/grey	Silty Clay	27%	920 to 1500
L5	Red/brown-Light & Brown/grey	Silty Clay	37%	400 to 1500
L6	Red/brown-Light & Brown/grey	Silty Clay	34%	1050 to 1500

The Engineer described the Residual Soils as: "Silty Clay, becoming grey. Very stiff. High plasticity. No rejection."

The compaction and reactivity of the Subdivisional Fill

98. The compaction certificates state that the Subdivisional Fill was compacted in accordance with AS3798 which is the Earthworks Code. Mr Buffington said that AS3798 required the top soil to be ripped up and re-compacted in order to place controlled fill for the purpose of AS2870. Mr Hennig said that the site clearly was not ripped because a distinct topsoil layer was found. If it had been ripped, as Mr Buffington said it should have been, it would not have been there.

99. The Engineer described the Subdivisional Fill as "Moderately compacted"; Mr Hennig described it as "Stiff to Very stiff". Mr Lawrance said that it was "Moderate to well compacted". However none of the experts questioned the degree of compaction set out in the certificates.

100. There was a major dispute as to how reactive the Subdivisional Fill on the site and the soil below it was. According to the evidence, reactivity of soil is expressed as being the "Ys" of the soil. The Ys is a measure of reactivity and is the degree by which the surface of the soil is expected to move from a normal summer to a normal winter without any adverse moisture conditions. The classification of the reactivity of the site for construction purposes and the consequent design of the footing is dependent on the Ys.

101. At the time of construction, sites were classified as “A”, “S”, “M” or “H” according to their reactivity. According to Mr Buffinton, the soil on an “A” site hardly moves at all, an “S” site moves up to about 20mm, an “M” site moves between 20 and 40mm and an “H” site moves from 40-70mm. He said that a site with a Ys of over 70mm would be classified as an “E” site. He said that the closer to the surface the soil is, the more it is exposed to the environment and the more it shrinks and swells. He said that at a depth of 2.3 metres it is hardly exposed to any environmental factors and so remains fairly stable.

102. One way of working out the Ys of the soil for any particular site is to judge it by identifying the soil profile and comparing it with other profiles known to be performing in a particular way. Another is by doing what is called a “shrink-swell test”.

103. A shrink-swell test is a measurement of the shrinking and swelling of an undisturbed sample of the soil in a laboratory. The test is done according to a procedure set out in the Australian Standard AS1289-7.1.1.

104. Mr McFarlane said that the Ys was the characteristic value that has a 5% chance of being exceeded in the life of a House which may be taken as 50 years. He said it assumed normal moisture conditions and normal seasonal changes. He said that in his opinion the movements above 70mm in the present site were due to some very high moisture content in some local regions.

105. Mr McFarlane’s Ys calculation was substantially less than that of Mr Buffinton. Apart from a difference in rounding the figures there seem to be two main differences. The first is what is called the crack zone and the second is as to the reactivity of the topsoil.

106. It was agreed between the experts that, when soil absorbs water the clay swells but not all of the movement is going to be vertical. Some of the expansion is going to be taken up by closing shrinkage cracks that are already present in the soil. The reactivity of the soil will close those gaps before the soil moves vertically. One of the things to consider is how deep those cracks will go and where they will start.

107. According to the Australian Standard the crack zone in the present case is .75 of 2.3 metres and so it is likely to extend from the surface of the soil down to a depth of 1.75 metres. From that depth no more cracks would be expected and the reactive movement of the clay below that point will be vertical.

108. When fill material is placed over the natural soil and compacted, the fill material itself does not have a crack zone and the relevant code assumes it will take at least five years for a crack zone to develop in it.

109. Further, when fill material is placed over the natural soil and compacted, some of the fill material will fill the cracks and the compactive effort will also compact the natural ground, destroying some of the cracks that were

naturally there. Mr Lawrance said that this would be confined to the upper levels. He suggested 200 to 300 mm would be affected but stressed that was a subjective judgment.

110. Mr Buffinton said that AS3798 requires the developer, after stripping away any vegetation, root matter and so forth down to a suitable foundation, to compact the natural soil down to a depth of another 150mm before placing any fill. He says this will destroy the cracked zone in that natural ground for that 150mm depth but it will upset the cracks below that as well but how far the effect continues depends upon how highly compacted the fill was going to be on the surface.

111. According to Mr Buffinton the compaction certificates show that the Subdivisional Fill in the present case was very highly compacted to the extent that he was horrified when he saw the results because the fill material was highly reactive clay that had been compacted to a very high density and at a very low moisture content. He said with all the voids closed up it would swell excessively when it got wet. Mr Yap said that he too was concerned about the heave of the Subdivisional Fill when he saw the compaction certificates.

112. The calculation that Mr Buffinton made of 75mm for the Ys of the site was, he said, the Ys that it had at the time the site was classified by the Engineer before the House was constructed. He said that if there were no crack zone the Ys would be very close to 100 which, he said, was very reactive.

113. As a result of the investigations and on the assumption that there is an additional 200mm of fill on top of the 700mm fill found by the Engineer, Mr Buffinton re-calculated the Ys of the soil including an additional 200mm of fill at 90. He provided a re-calculation during evidence in which he compared his figures with those calculated by Mr McFarlane on behalf of the Builder. This resulted in a calculated Ys of 97.59 compared with Mr McFarlane's figure of 74.2. He said that the Code requires the figures to be rounded to the nearest multiple of 5. Consequently he rounded his figure to 100 and Mr McFarlane's figure to 75. He said that whether one took his calculation of 100 on Mr McFarlane's of 75, the site was nonetheless properly classified as "E".

114. Mr McFarlane said that when 600mm of fill was placed on top of the existing soil the original cracked zone of 1.75 metres would remain, less some compaction of the upper levels. It would start 600mm below the surface and would be the full depth below the 600mm of fill, so in calculating the Ys he assumed that it was still there.

115. Mr Buffinton said that the Standard required the assumed crack zone to be measured from the surface, which included the fill and so the last one metre of the original cracked zone would be assumed to be uncracked. Mr McFarlane said that that interpretation did not reflect the intention of the Standard. Mr Buffinton said than, in any case, in his experience the top one metre of the original cracked zone would have gone because of the high

degree of compaction achieved. Mr McFarlane disagreed with Mr Buffinton that the cracks would be closed in the course of compaction.

116. I think Mr McFarlane's interpretation concerning the bottom level of the cracked zone reflects the realities of the situation even if it is not what the Standard requires. On the other hand, I prefer Mr Buffinton'e evidence in regard to the effect that the compaction had on the top level of the original cracked zone, given the high level of compaction said to have been achieved.

117. The other difference between the experts concerned the topsoil. Mr McFarlane said this 100mm was silt and had no reactivity and so he gave this an "IPS" figure of 1. Mr Buffinton gave it 4.3 and said that his IPS figure was based upon the actual soil collected at that level. Both the Engineer and Mr Lawrence described the topsoil as "Clayey Silt". It is not simply silt as Mr McFarlane appears to have assumed for his calculation. I therefore prefer Mr Buffinton's classification since it is based upon his observation of what Civiltest actually found.

118. Both witnesses said that the Engineer ought to have taken into account the fact that the subdivisional fill on the site was extremely dry when designing the slab.

119. Mr McFarlane said that both the shrink swell test and the judgement from appearance were both simply estimates of the reactivity of the soil and that any geotechnical engineer would have classified that site as an H site. He and Mr Buffinton agreed that if the site were to be reclassified today it would be classified as H2 and there is no deemed to comply design for a waffle pod slab on such a site, although an Engineer designed waffle pod slab could be used.

120. It seems from the evidence that the Ys of the Subdivisional Fill was more than 75 and so was highly reactive and that this ought to have been considered by the Engineer in designing the slab. I prefer Mr Buffinton's method of calculation in regard to the topsoil to that of Mr McFarlane and I think the ISS of the material at the level indicated as 1 by Mr McFarlane should read 4.3 if the calculation is to be done correctly. That adjustment would increase the Ys of the site to 78.09 which, when rounded up to the nearest 5, would give a Ys of 80.

The claim against the Engineer

121. The claim against the Engineer is in negligence. There is a dispute as to whether there is any duty of care owed to the Owner by the Engineer.

122. Mr Howden referred me to a number of authorities, including *Bryan v. Maloney* [1995] HCA 17; *Woolcock Street Investments Pty Ltd v. CDG Pty Ltd* [2004] HCA 16; Gunston v. Lawley [2008] VSC 97.

123. In *Gunston*, Byrne J said (at para 28 – *citations omitted*):

> "The feature which is of great importance in the cases, at least since 1999 in determining the existence of a duty of care in the architectural draftsman to the proprietor is vulnerability, that is, the ability of the plaintiff to protect itself from the loss in the event of negligence. In the normal case, where duty is said to be owed by a sub-contractor to a proprietor, this requirement may be difficult for the proprietor to satisfy. There will usually be a contract between the proprietor and the head contractor which will contain covenants protecting the proprietor from defective work. Even if it does not, it will be difficult in the typical case for the proprietor to persuade the court that it did not have the ability to protect itself in this way. In the present case, the terms of any contract between the proprietor and the builder are not known. It may be that the relationship between the two companies was so intimate that there was no formal contract at all. Even so, it is difficult to suppose that the builder undertook the work for the benefit of the proprietor otherwise than pursuant to some contractual arrangement, express or implied, between them. The fact remains that the proprietor had the ability to protect itself by contract from the consequences of the architectural draftsman's defective work. In any event, if there was in existence a building contract, it would contain the statutory implied warranties under s 8 of the Domestic Building Contracts Act 1995 if, indeed, these were implied in respect of the design work in this case."

124. Mr Howden also referred me to s48 and s.49 of the *Wrongs Act* 1958, relating to foreseeability of harm and "not insignificant risks". He submitted that the existence of a contract and the warranties given by the Builder under the scheme of the *Domestic Building Contracts Act* 1995 are critical. He said that the warranties imposed on the Builder by the statutory scheme were designed to do away with the need for any duty of care owed by the Engineer to the Owner.

125. That argument is inconsistent with the weight of authority. Mr Sedal referred me to the following passages in the judgment of Maxwell P. in *Moorabool Shire Council v. Taitapanui* [2006] VSCA 30 (paras 23 to 25 - *citations omitted*):

> "23 The first point to note is that no issue arises in the present case about what the High Court in *Woolcock* referred to as the "anterior step". That is, the Council – and its employee, the surveyor – owed the first owner a duty of care to avoid pure economic loss. So much was conceded – quite properly – by the Council on the appeal. (Both the Tribunal and the learned Judge addressed the anterior step substantively, and concluded that the duty existed.)
>
> 24 Nor is there anything in the decision in *Woolcock* to suggest that the class of case – the "species of negligence" – represented by the decision in *Bryan* could not, as a matter of principle, have encompassed an engineer just as much as a builder. On the contrary, the discussion in *Woolcock* of the "anterior step", and of the concept of vulnerability, seems to have assumed without question that an engineer – like a builder – could owe a duty of care to the first owner and – potentially, at least – to a subsequent owner, to avoid pure economic loss.

25 In my view, there is nothing in the reasoning in *Woolcock* or in *Bryan,* nor is there any consideration of principle or policy, which would require or justify the *a priori* exclusion of a surveyor from the same class of case. After all, the surveyor – like the builder and the engineer – has a responsibility to the first owner to take reasonable care to ensure that the house as constructed complies with all applicable building regulations. As I have said, the existence of that duty is not in issue on this appeal."

126. There is nothing in the *Domestic Building Contracts Act* 1995 to the effect that the benefit of the statutory warranties is intended to replace a duty of care that would otherwise be owed by a sub-contractor to an owner. The mere existence of those warranties does not render an owner invulnerable to loss. Mr Sedal referred me to the following passage from the joint judgment of Ormiston and Ashley JJA in *Taitapanui* (at para181):

> "The relevant provisions of the *Domestic Building Contracts Act* and the Act imply commonplace warranties into contracts to which a builder is a party. The warranties are such as particularly relate to construction work carried out by a builder. It is true that the particular warranties run in favour of successors in title. But it is another thing altogether to conclude that the Parliament objectively intended to displace the common law as it should otherwise apply in respect of the quite different conduct of a building practitioner of another class."

127. In the present case the Owner was vulnerable to loss if the Engineer should design the slab negligently. He had no opportunity to contract directly with the Engineer and no right to be consulted about the slab design or even see it before construction. Even if he had he would not have known whether or not it was properly designed. Even if he did, and disliked it, he had no right to reject it unless he could persuade the Builder to do so. He had to accept what was designed. He had no right to have the design checked by his own engineer or altered. In regard to all these matters he was entirely reliant upon others. It was foreseeable on the part of the Engineer that the Owner would be relying upon its specialist skill and knowledge in the design of the slab and that if the slab were designed negligently the Owner might suffer loss.

128. In these circumstances I am satisfied that the Engineer owed the Owner a duty of care in the design of the slab and indeed, in the structural design of the House as a whole.

129. The Owner claims that the Engineer was negligent in the following respects:

    (a) <u>Failure to consider site characteristics and design a slab that was suitable for the site</u>

        (i) The design of the slab was governed by AS2870-1996. Because the site was classified as "P", a standard design for the slab could not be

used. A slab had to be designed "…by the engineering principles described in Section 4."

(ii) Section 4.1 provides:

> "Slabs or footings designed in accordance with engineering principles shall be designed in accordance with the following Clauses and AS 3600 (except where more specific provisions are given here).
>
> Engineering principles may be used to extend the range of validity of the deemed-to-comply designs or to modify the designs set out in Section 3 of this Standard.
>
> The general requirement for footings for rafts designed under this Clause shall be in accordance with Clause 3, Figure 3.1 and the relevant sections of Clause 4.4 and Section 5 of this Standard."

(iii) To design in accordance with Clause 3, Figure 3.1 and the relevant sections of Clause 4.4 and Section 5 of the Standard, calculations must be made and to perform those the engineer needs to take account of the site characteristics, particularly the Ys of the soil. That is apparent from those clauses. The Second Plan was prepared after Mr Yap became aware of the contents of the compaction certificates. He acknowledged in cross-examination that he did not do site specific computations for the slab. The design used was a standard design with additional steel that he thought would be sufficient.

(iv) I think a breach of duty is established but the real question is whether the design was nonetheless adequate for the purpose. If it was, there is no loss and consequently no cause of action because an essential element in any cause of action in negligence is proof of actual damage (*Halsbury: Laws of England* 4th Ed. Vol 12 para.1105).

(b) <u>Use of a maximum design differential movement of 40mm</u>

(i) Table 4.1 of Section 4 provided that, in designing a slab for articulated masonry veneer, the maximum differential footing movement was 30mm. Mr Yap said in evidence that it was his practice to use 30mm on the outside of the slab where there is brickwork and 40mm for anything 2 metres inside and away from the wall. He pointed out that the internal part of the House had no brickwork. He acknowledged that this is not specified in the Standard but added that it was also "not not specified".

(ii) He described this as an engineering interpretation of the Standard but I see nothing in the Standard that refers to confining the maximum differential footing movement for a slab to support articulated masonry veneer to two metres from the edge of the slab. In effect he appears to be saying that whereas the external edge of the slab is designed to resist movement beyond 30mm, the internal part of the slab is only designed to resist movement above 40mm, even though it

is the same slab. I prefer Mr Cross' interpretation that 30mm should have been used for the whole slab.

(iii) Mr Sedal pointed out that the centre of the House carries a load bearing wall and suggested that the Engineer had not taken that into account. Since no calculations were done. I cannot see that Mr Yap designed the slab taking anything specific to the House into account. He has used and adapted a standard design that he believed was appropriate.

(iv) On this issue I prefer the evidence of Mr Cross that there is no justification in Table 4.1 to use two different maximum differential footing movement figures for the one slab. The appropriate figure to use for the design of the slab was 30, not 40 for the inside and 30 for the outside.

(v) Again, I think a breach of duty is established but there is no cause of action in the absence of proof of actual damage.

(c) Failure to perform computations or further geotechnical investigations upon receiving compaction data

(i) Mr Buffinton said that the compaction certificates showed that the sub-divisional fill had been placed at a compaction of between 95% and 107% at a moisture content of between 2.5% and 5.5% dry. He said that the filling was placed dry of optimum and that it had the potential to swell excessively and the Ys would be well in excess of a normal clay site. He said that the original site classification by the Engineer did not take either of those matters into consideration.

(ii) Mr Sedal pointed out that Mr Yap acknowledged that when he received the compaction certificates for the allotment he was concerned about heave of the soil although he confined that to a concern about the potential for abnormal moisture conditions along the edge beams. He said that as a consequence he upgraded the steel to "nearly double".

(iii) He did not visit the site, do any tests or perform any calculations to see how the earlier design should be amended. He answered his concerns by simply putting more steel into a standard design without calculating whether or not that would be sufficient.

(iv) Both Mr Cross and Mr McFarlane agreed that the Engineer should have taken the reactivity of the site into account in designing the slab. Since Mr Yap made no calculations it is impossible to say that he did

(v) Again, the issue here is whether any is proof of actual damage.

(d) Failure to take reasonable steps to calculate the Ys of the site

(i) The site had been examined and classified as "P". Mr Yap was entitled to rely upon that classification and design the slab having regard to what was in the soil report. The Ys was considered to be

between 40 and 70. The tactile method used to classify the site appears to be more commonly used than the shrink swell test carried out by Civiltest and I accept that the original classification was appropriate having regard to what was then known.

(ii) Following further investigation it is now established that the true Ys of the soil is considerably greater than between 40 and 70 but establishing that took two and a half days of evidence during the hearing. I cannot criticize Mr Kelly or Mr Yap for not knowing that.

(iii) When Mr Yap received the compaction certificates he had the concerns referred to above but performed no calculations. He was concerned that the soil was more reactive than he had thought or he would not have added extra steel. The complaint here is really that he did not do any calculations.

(iv) Mr McFarlane said that he has standard designs himself and he does not do calculations for every site but uses a standard design and adds reinforcement or increases the depth and knows by experience that it will perform.

(v) The real issue again is whether there is proof of actual damage.

(e) <u>Failure to design beams that were sufficiently deep to cope with the reactivity of the site soil</u>

(i) Mr Cross said that Table 4.1 of AS 2870-1996 provided that the maximum differential footing movement permitted in a raft slab with articulated masonry veneer construction is 30 mm. The paragraph immediately preceding that Table states:

> "A stiffened raft footing system which supports a superstructure that relies entirely on the footing system or raft stiffness to resist movement and cracking shall be proportioned as follows:
>
> ……..
>
> (b) The tolerable limits for relative differential movement depend on the form of construction, surface finish and the actual detailing of the superstructure, and in the absence of more specific information shall be taken from Table 4.1"

(ii) He pointed put that the slab had moved more than 30 mm in a number of places.

(iii) Using Section 4 of AS2870-1996, Mr Cross calculated that the edge beams for the slab as designed at 385mm were sufficient to cope with a Ys of up to 66. Mr McFarlane did not disagree with that calculation. Mr Cross calculated that, if the Ys were 90, the edge beam should have been 550mm deep.

(iv) Mr McFarlane said there were two ways to make the slab stiffer. One was to increase the depth of the beam and the other was to add more steel. He acknowledged that AS2870-1996 did not provide a means of calculating how to do that but said that the design could be done on engineering principles. Although Mr Yap had performed no calculations, Mr McFarlane said that he calculated the stiffness himself using AS 3600, which is the Concrete Code. Mr Sedal submitted that, where the design was to be by engineering principles, it had to be done according to Section 4 of AS2870-1996. That is true, but Section 4.1 also allows it to be in accordance with the Concrete Code (see above).

(v) Section 3 of AS2870-1996 relates to standard designs. In cross-examination, Mr Carr referred Mr Yap to Section 3.2 which, under the heading "PIER-AND-BEAM, PIER-AND-SLAB OR PILE SYSTEMS" continues as follows:

> "Generally a pier-and-beam, pier-and-slab or piled footing system shall be designed in accordance with engineering principles.
>
> The waffle raft for a one-storey house, the clad frame or masonry veneer on a H site may be supported on piers as follows without structural design of the waffle raft:
>
> Piers shall be located at the intersection of every third rib.
>
> An additional Y12 bar at the top shall be provided in the ribs intersecting the piers, but no shear fitments are required."

Mr Yapp agreed with Mr Carr that that was what he did. Mr Carr then referred Mr Yap to Clause 4.2 and he agreed that he designed the slab to achieve the performance requirements set out in Clause 1.3 when subjected to the loads noted therein.

(vi) In summary, the footing system is to be designed to achieve acceptable probabilities of serviceability and safety of the building during its design life. According to Clause 1.3.1 a site not subject to abnormal moisture conditions is expected to experience no damage, a low incidence of damage Category 1 and an occasional incidence of damage Category 2. Damage categories are classified as set out in Appendix C.

(vii) Although Mr Yapp said that he designed for that level of serviceability he did not say how, since he performed no calculations, he was able to satisfy himself that he had achieved it. Mr Yapp also said that if he designed to meet the performance requirements in accordance with 1.3 he need not meet the requirements of 4.2. That does not accord with the wording in Section 4.

(viii) Mr Cross said that although adding steel into the slab will increase the rigidity of the beam, it does virtually nothing for the cross-sectional area of stiffness. He said that it is only depth that gives

strength in a structural element. He referred to the formula in Clause 4.5.2 for stiffness, which is the width of the slab multiplied by the depth cubed, so if you increase the depth that increases the stiffness by a large factor. He said that if you put more steel in it but keep the depth the same, it will be a little bit stiffer but that it is far better structurally to increase the depth.

(ix) Mr Yap simply said that the slab had been designed to meet the performance requirement but that seems to have been on the basis of his judgment and experience rather than any calculations to support the assertion.

(x) Mr McFarlane said that, although there is no computation in AS 2870 that would allow you to work out what difference additional steel would make for the performance of a slab it can be done under the Concrete Code, AS 3600. He said that, using the Concrete Code he calculated that the slab was sufficient. The calculation he was referring to is in his most recent report to the effect that the upgrade of the reinforcement increased the slab stiffness by 62% for the same beam depth.

(xi) I am satisfied that the slab was not designed in accordance with Section 4 of AS2870-1996 but, on the basis of Mr McFarlane's calculations, I find that it was designed in accordance with AS3600 and that Mr Yap succeeded in strengthening his standard design to the degree required.

(f) Deletion of the concrete piers

The First Plan was not a contract document and using the Second Plan was the choice of the Builder. The question is therefore not whether deleting the piers was negligent but rather, whether the Second Plan was sufficient and I have found that it was.

(g) Specification of rolled fill instead of controlled fill in breach of AS2870

This was discussed above. I accept that the specification of rolled fill instead of controlled fill for the edge beams was negligent because the Code stated that it should be Controlled Fill. I find a breach of duty but I must also find actual damage. Causation is considered below.

(h) Quarry product

(i) The "optional quarry product' allowed under the slab is not identified in the Second Plan. Mr Yap said in evidence that it was intended to be a levelling layer of well-graded material in varying sizes from gravel to dust. He said that it is very hard to get a level surface on clay but they had to ensure that the waffle boxes were placed very flat.

(ii) Mr Cross referred me to Clause 3.2.2.2(a)(1) of the Building Code of Australia which provides that filling placed under a slab must be controlled fill or rolled fill and that sand used in controlled fill or rolled fill must not contain any gravel size material. He said that this was because gravel cannot be compacted and there are always voids where water can enter. Mr McFarlane pointed out that the scoria used varied in size from coarse to fine material and that any voids would be filled either by the fine scoria or by the clay in the soil. He said that putting scoria under a slab was common practice.

(iii) I accept that in specifying "optional quarry product" the Engineer ought to have stated that it should not contain any gravel sized material in order to comply with Clause 3.2.2.2(a)(1) of the Building Code of Australia. However it was for the Builder to ensure that, if it used any quarry product it would not contain any such material. Whatever Mr Yapp might have thought would be used, the Second Plan did not specify gravel and so I find no breach of duty.

(i) Drainage

Mr Sedal referred me to Clause 5.5.3 of AS2870-1996 which says that reactive sites classified "H" or "E" shall be provided with an adequate system of drainage, designed in accordance with a number of specified matters. He said that the Engineer does not appear to have considered any of those matters. There is no evidence that the Engineer was retained by the Builder to design any site drainage. There is a requirement in the Second Plan for the compacted building platform to be sloped away from the slab by 50mm over a distance of one metre which is said to be sufficient. I do not find any breach of duty by the Engineer in not having designed more than that.

The claim against the Builder

130. The Owner claims that the Builder is breach of the Statutory warranties included in the Contract by s.8 of the *Domestic Building Contracts Act* 1998, in that it:

(a) Failed to properly compact the soil under the slab and past the edge of the footprint by at least one metre;

(b) Used gravel sized material under the slab;

(c) Failed to vibrate the concrete;

(d) Allowed concrete overspill to occur;

(e) Failed to install concrete piers under the slab;

(f) Failed to provide a building that was fit for the purpose.

Failed to properly compact the soil under the slab

131. Mr Cross said that AS 3798 – 1990 Table 5.1 required residential sites to have a minimum compaction of 95%. That figure did not appear to be disputed.

132. The design of the slab by the Engineer assumed that the Subdivisional Fill placed upon the site by the developer had been compacted to a level of at least 95%. That assumption was justified by the compaction certificates. It also assumed that the Builder would cut into that fill and that, apart from an apparently thin but un-dimensioned and unspecified level of "optional quarry product" which is shown on the plans as being directly below the slab, the slab would be fully founded upon it.

133. The Builder issued a work order to Earthworks to cut and fill the site, remove the surplus soil and proof roll the surface. Had that been done in accordance with the Second Plan this slab would have been founded upon the levelled, Subdivisional Fill, which was already highly compacted, with any final levelling being achieved with the 'quarry product" without any gravel sized material.

134. Since the profile of the cut shown on the slab design shows the whole of the building footprint to be below the existing surface level. The note on the engineering design of the slab that specifies rolled fill can only refer to the layer of optional quarry product. In either case, it is not in accordance with Clause 6.4.3(c)(iii) of AS 2870-1996 which requires Controlled Fill under the edge beams.

135. Earthlift did not charge for removing any soil from the site, nor did it charge for a cut and fill. Instead it charged for "Site preparation in accordance with site plan" and "Proof rolling to engineer's specifications". It made no charge for removing any soil from the site. Upon receipt of that invoice it should have been apparent to the Builder that its instructions may not have been followed but there is no evidence that any enquiries were made or if there were, the result of them.

136. It is unknown whether Earthlift removed any soil from the site or did a cut and fill, without charging for it in either case. However it is apparent from the bore logs that the Builder brought a substantial amount of fill onto the site. That was not what the slab had been designed to be founded upon.

137. The depth of this Builder's fill is highly variable. It ranged from only 50mm in bore log L3 to 130mm in bore logs L1 and L2 and as much as 850mm in bore log C3. In L3, Mr Lawrence found no Subdivisional Fill at all. Instead that corner of the slab is sitting upon only 50mm of Builder's fill placed over the natural topsoil. It would seem from this that what the slab is sitting on down to the depth of 2300mm is highly variable from place to place in regard to what proportion is natural ground, what proportion is Subdivisional Fill and what proportion is Builder's Fill under any particular part of the slab. The geotechnical evidence demonstrated that the

calculation of the reactivity of the soil is dependent upon an examination of the characteristics of the soil at each level. For the footprint of the House as constructed that would depend upon where the soil engineer dug. Each spot would appear to have a different reaction to the addition of moisture.

138. What if anything was done in order to compact this Builder's Fill is unknown. It was described by Mr Hennig as being "Soft firm moist" in bore log C1, "Stiff firm moist" in bore log C2 and "Stiff moist" in bore log C3. Mr Lawrence described it as having "Variable/Moderate" compaction in bore logs L1, L3 and L4 and as "Moderate" in L2. The differences in these descriptions would suggest some variability in the degree of compaction detected, at least on a tactile examination.

139. Mr Hennig said in his report that because the slab footings are founded into the silty clay fill they are not founded in accordance with AS 2870-1996 unless the clay fill is "Controlled Fill". Mr Phillip Morgans, a laboratory manager of Civiltest, gave evidence as to the testing of the three samples of soil from the three test pits on the site taken by Mr Hennig and found that the density ratio for the soil in C1 was 89%, for C2 it was 90.5% and for C3 it was 83%. Mr McFarlane suggested that the samples tested may have contained Subdivisional Fill, saying that the Builder's Fill did not exceed 170mm. That is not what the bore logs show. Mr Hennig said that he sampled the upper fill layer and I should accept that evidence.

140. Mr Buffinton said that the compaction level of between 83% and 90.5% showed that the soil was poorly compacted and that it would barely meet the requirements of rolled fill as defined in AS2870 6.4.2 (b). He said that rolled fill was not suitable to support edge beams. The moisture level in all three samples varied from the optimum by between 2.5% and 6%. Mr Buffinton found that the sample from under the House through the core hole had a relative compaction of 90.2% and had a moisture content of 15%. He concluded that that also did not meet the requirements of controlled fill as defined in the Standard. However Mr McFarlane said that the results of the sampling through the core hole should be adjusted to take account of the moisture level. I need not resolve this dispute. Both experts acknowledged that the testing of the compaction results from this core hole were unreliable and so I place no weight on them.

141. Mr Cross referred in his report to Clause 6.4.3(c)(iii) of AS 2870-1996, which states:

> "Edge beams shall not be founded on rolled fill. Edge beams may be founded on controlled fill compacted in accordance with Clause 6.4.2(a). This fill shall continue past the edge of the building by at least 1 m and shall be retained or battered beyond this point by a slope not steeper than two horizontal to one vertical."

142. Clause 6.4.2(a) defines controlled fill (where relevant) as follows:

> "Controlled fill is material that has been placed and compacted in layers by compaction equipment within a defined moisture range to a defined density requirement. Except as provided below, controlled fill shall be placed in accordance with AS 3798.
>
> ……
>
> Non-sand fill up to 0.4 m deep, well compacted in not more than 0.15 m layers by a mechanical roller, shall be deemed to comply with this requirement. Clay fill shall be moist during compaction."

143. Mr McFarlane agreed that the edge beams of the slab ought to have been constructed on controlled fill and that the controlled fill should have extended out for a metre beyond the edge beam.

144. Mr Cross said that the Builder's Fill was unsuitable to support the slab. He said that, at 83%, the soil in bore log C3 was virtually uncompacted. This was supported by Mr Morgans who said that, straight out of the back of a dump truck, soil would have compaction of 85 to perhaps 90 per cent depending on the moisture condition of the soil and how much it just settled under its own weight.

145. It follows from this evidence that the soil, at least in some parts, may not have been compacted at all or if it was it was certainly not sufficiently compacted. I cannot find that the Builder's Fill under the slab is Rolled Fill. Such evidence as I have is to the contrary.

146. Mr Buffington said on page 15 of his report:

> "As this fill was poorly compacted, it also has a high permeability that allows water to readily access the underlying very dry subdivisional filling to become over wet and hence swell excessively."

147. Mr McFarlane agreed that there was a potential for water to penetrate under the slab but he said that there was no evidence that it had because there is, he said, no evidence of heave under the slab. The survey evidence shows that there has been.

148. Mr McFarlane said that the foundation only needed a bearing capacity of 50kpa. Mr Yap also said that all slabs on ground need a minimum 50 kPa bearing capacity and that if you design a slab so as to be supported by a platform that has a bearing pressure of at least 50 KPA then you have complied with the Code. That is not what the Code says and I do not accept that evidence. I prefer the evidence of Mr Cross that it should have been designed and constructed in accordance with AS2870-1996.

149. I am satisfied that, in breach of the Contract, the Builder failed to construct the slab in accordance with the Second Plan and that it also failed to adequately compact the fill material upon which the slab was constructed.

Quarry product

150. Although Mr McFarlane said that it is commonly used, the Builder's use of scoria under the slab was in breach of the Building Code of Australia. Mr Buffinton said that it is porous and water will run through it like a sieve.

151. Mr Cross said that quarry product under the slab would be satisfactory if it was sand placed above the surrounding ground level. However he said that pieces of scoria of between 2 and 20 mm in diameter are stones. They are porous and water can run through them. He said that has been exacerbated by mounding soil against the outside of the edge beam. That has submerged the scoria so that any water that gets on the surface can percolate through to the path of least resistance, which is the scoria. He said that you can then get water directed under the slab which is the last place you would want it.

152. In his most recent report Mr McFarlane said that compacted sand would also allow water to flow under the slab. Mr Cross agreed but said that the flow would not be as great.

153. I am satisfied on this evidence that the use of scoria was in breach of the Building Code of Australia and so was a breach of warranty and that its use has contributed to the passage of water under the slab although the extent of that contribution is uncertain.

Failure to vibrate concrete

154. There is no dispute that the concrete had to be vibrated. Mr Cross said that he did not believe that it had been vibrated because of its appearance in the photographs. He said that it should have an "icy" appearance. It did not look "icy" to me in the photographs and I noticed what appeared to be some honeycombing but I am not an expert and I must rely upon expert interpretation.

155. Mr McFarlane said that he could not say whether the concrete had been vibrated or not. Although Mr Cross believes that it has not been, his view is based only upon the photographs and photographs can be misleading. No core sampling was done.

156. I am not satisfied that it has been proven that the Builder failed to vibrate the concrete in the slab.

Concrete overspill

157. The photograph which is Exhibit "A", which was taken immediately after pouring, shows a great deal of concrete overspill and the land to the north of the slab sloping down towards the fence and to the front of the allotment. The extent of this seems to show a remarkable lack of care in the pouring of the slab in that a great deal of concrete appears to have escaped through the formwork.

158. If the land next to the edge beam sloped down that would lend some support to Mr Cross' suggestion that the external edge of the overspill

would be at a lower level. Mr Macey's survey dated 15 February 2013 (Tribunal Book 587) shows the allotment sloping down from the slab in all directions. However the current ground level has been built up by the Builder since the slab was poured.

159. In the locations which were exposed by the Builder's workmen in December 2013, Mr McFarlane found varying degrees of overspill which he described in his supplementary report. Only four test pits were excavated. The first "TP1" was in about the same spot as C1, the second "TP2" was in about the same spot as C2; the third "TP3" appears to have been between C3 and L3and the fourth was in about the same spot as L4.

160. The overspill at TP1 extended out 40mm past the slab and was about 90 mm thick. The edge beam there was found to be 430mm thick deep and it was founded on red scoria. The underside of the edge beam was found to be flat, indicating that the overspill does not extend below the level of the edge beam.

161. The overspill at TP2 extended out 110mm past the slab and was about 80 mm thick. The edge beam there was found to be also 430mm thick deep. The underside of the edge beam was found to be flat, indicating that the overspill does not extend below the level of the edge beam.

162. The overspill at TP3 is substantial. Some of the concrete in this location was part of the design to support the front pillars of the House but the majority is overspill. According to Mr McFarlane's sketch which is Figure 11 in his most recent report, it extended 480mm out from the beam towards the road, it goes round the corner and up the side of the House with a starting width of 300mm and was still present past the first window of Bedroom 1 at which point the width had reduced to 200mm.

163. Significantly, the overspill is greatest in front of the pillar which is close to the location of bore log L3, where Mr Lawrance observed the concrete to be sitting on just 50mm of Builder's Fill on top of the natural soil. The overspill was found to be irregular in shape. At the point where Mr McFarlane has made a sectional drawing it is zero at the bottom of the concrete but it is bulging out above. The shape would suggest that the concrete followed the position of the adjacent soil at the time of pouring since no formwork would be that shape.

164. The concrete here was found to be 790mm deep, of which 460mm is from the bottom of the rebate to the founding depth. This differs from Mr Lawrence's findings in L3 but he was measuring to the bottom of the edge beam whereas Mr McFarlane was measuring to the bottom of the concrete pad poured to support the front pillar. That pad is integral with the slab. These findings suggest that the footing material of the House in this area is very inconsistent and considerably bigger than designed. It is this corner of the House that has moved up over the period when the rest moved down.

165. The overspill at TP4 extended out 50mm past the slab and was about 80 mm thick. The edge beam there was found to be also 450mm thick deep. The underside of the edge beam was found to be flat, indicating again that although the overspill extends out beyond, it does not extend below the level of, the edge beam.

166. Mr McFarlane concluded that there was no direct correlation between the width of the overspill and the slab heave. He said that concrete overspill can contribute to slab heave but in this case the contribution is minor compared with the heave caused by abnormal moisture conditions. He agreed that overspills effectively increase the width of the footing and so reduce the bearing pressure on the footing material but he said that the uplift pressure from heave was significantly higher.

167. Mr Cross said that the overspills are extending the edge beams and giving them more support so that, if they are raised, they cannot go down because they need very little bearing capacity to support them and they are not being pressed down with sufficient pressure.

168. It is agreed that the overspills are a defect and that they must be removed. That would address one problem identified by Mr Cross but it is not established that, when the overspill is removed, the heave will settle as a result. Mr McFarlane's calculations would suggest perhaps not.

Failure to install concrete piers

169. I have already found that there was no contractual obligation on the Builder to install the piers.

Fitness for purpose

170. Mr Sedal said that the House was not fit for the purpose for which it was constructed. I think that allegation should be dealt with in considering the consequences of the breaches of contract that I have found.

Basis of liability

171. The Owner relies upon the statutory warranties which are implied by s.8 of the *Domestic Building Contracts Act* 1995 which are as follows:

> "(a) the builder warrants that the work will be carried out in a proper and workmanlike manner and in accordance with the plans and specifications set out in the contract;
>
> (b) the builder warrants that all materials to be supplied by the builder for use in the work will be good and suitable for the purpose for which they are used and that, unless otherwise stated in the contract, those materials will be new;
>
> (c) the builder warrants that the work will be carried out in accordance with, and will comply with, all laws and legal requirements including, without limiting the generality of this warranty, the *Building Act 1993* and the regulations made under that Act;

(d) the builder warrants that the work will be carried out with reasonable care and skill and will be completed by the date (or within the period) specified by the contract;

(e) the builder warrants that if the work consists of the erection or construction of a home, or is work intended to renovate, alter, extend, improve or repair a home to a stage suitable for occupation, the home will be suitable for occupation at the time the work is completed;

(f) if the contract states the particular purpose for which the work is required, or the result which the building owner wishes the work to achieve, so as to show that the building owner relies on the builder's skill and judgement, the builder warrants that the work and any material used in carrying out the work will be reasonably fit for that purpose or will be of such a nature and quality that they might reasonably be expected to achieve that result."

There are similar warranties in Clause 11 of the Contract.

172. The defects in the preparation of the site and the pouring of the slab relate to defective workmanship and fall within 8(a), (b), and (d). The failures to follow the requirements of the BCA fall within 8(c).

Relief to be granted

173. As a general rule, where a party sustains a loss by reason of a breach of contract, he is, so far as money can do it, to be placed in the same situation, with respect to damages, as if the contract had been performed: (see *Robinson v Harman* (1848) 154 ER 363 at 365 per Parke B).

174. In *Radford v. De Froberville* [1977] 1 WLR 1262 Oliver J said (at p. 1270):

> "Now, it may be that, viewed objectively, it is not to the plaintiff's financial advantage to be supplied with the article or service which he has stipulated. It may be that another person might say that what the plaintiff has stipulated for will not serve his commercial interests so well as some other scheme or course of action. And that may be quite right. But that, surely, must be for the plaintiff to judge. Pacta sunt servanda. If he contracts for the supply of that which he thinks serves his interests – be they commercial, aesthetic or merely eccentric – then if that which is contracted for is not supplied by the other contracting party I do not see why, in principle, he should not be compensated by being provided with the cost of supplying it through someone else or in a different way, subject to the proviso, of course, that he is seeking compensation for a genuine loss and not merely using a technical breach to secure an uncovenanted profit."

175. The measure of damages for defective workmanship by a builder is prima facie the amount required to rectify the defects complained of and so give to the owner the equivalent of a building on the owner's land which is substantially in accordance with the contract *(Bellgrove v Eldridge* [1954] HCA 36; (1954) 90 CLR 613) provided that is a reasonable course to adopt.

176. The correctness of that approach was confirmed by the High Court in *Tabcorp Holdings v. Bowen* [2009] HCA 8; [2009] 253 ALR 1.

177. In *Clarendon Homes Pty Ltd v. Zalega* [2010] VCAT 1202, after referring to these and other authorities I said (at para 165 et seq.):

> "165. I think the following principles concerning the assessment of damages for the breach by a builder of a domestic building contract can be spelled out from the cases referred to:
>
> (a) Where the work and materials are not in conformity with the contract, the prima facie measure of damages is the amount required to rectify the defects complained of and so give to the owner the equivalent of a building which is substantially in accordance with the contract *(Bellgrove);*
>
> (b) The qualification, however, to which this rule is subject is that, not only must the work undertaken be necessary to produce conformity, but that also, it must be a reasonable course to adopt *(Bellgrove);*
>
> (c) Reasonableness is a question of fact *(Bellgrove)* and the onus of proving unreasonableness so as to displace the prima facie measure is upon the builder. It is the builder who is seeking to displace the prima facie position *(Tabcorp per Rares J.)*;
>
> (d) In considering whether it would be unreasonable to award the cost of rectification, the tribunal should consider all the circumstances of the case before it. The nature and significance of the breach should be looked at in terms of the bargain the parties had and the relative importance of the breach within the context of the contract as a whole The decision in *Ruxley* suggests that account can be taken of the following matters at least:
>
> (i). Whether and to what extent the work, although not in conformity with the contract, is nonetheless serviceable;
>
> (ii). Whether and to what extent the defect has affected the value of the work or the building as a whole;
>
> (iii). The cost of rectification, the proportion that the breach bears to the cost of rectification and whether the cost of rectification would be wholly disproportionate to the real damage suffered by reason of it;.
>
> (iv). The likelihood that, if rectification cost is awarded, the sum so ordered will actually be spent on rectification. Obviously, a successful plaintiff can spend his damages as he sees fit but this may be a useful indicator of whether the amount sought is greater than the real loss suffered.
>
> Quite obviously, this list is by no means exhaustive. Other matters might be relevant according to the facts of the particular case. For example, the innocent party might have elected to accept the non-conforming work,

whether by taking the benefit of it or otherwise; the owner might have waived the breach or so acted after becoming aware of the breach as to create an estoppel or to make rectification impracticable. There might also be many circumstances in which it could be argued that an award of rectification cost would give the innocent party an uncovenanted profit *(Radford)*."

I still think that this is a fair summary of the applicable principles.

The consequences of the breaches of Contract

178. Erecting a house on an inadequate foundation is a serious breach. It is clear that the deflections in the slab have gone substantially beyond what the slab should have been designed for, and this has occurred notwithstanding that it has been made thicker than it was designed, albeit the extra thickness is not uniform. However it was not founded on the material specified in the Second Plan.

179. Mr Cross referred to the following section of Clause 1.4.2 of AS 2870-1996:

> "Foundation movement shall be assessed as the level which has less than 5% chance of being exceeded in the life of the structure, which may be taken as 50 years"

He said that the "maximum allowable differential movement of the slab" had been increased to 127% in less than four years. I think a better phrase would have been the "maximum expected movement for which the slab was designed".

180. Mr McFarlane said that the 30mm of movement specified in Table 4.1 was a design criteria and, after reading the section, I think he is right. The table appears in the section of AS 2870-1996 under the heading "DESIGN BY ENGINEERING PRINCIPLES". It does not seem to be concerned with the actual performance of the slab following construction.

181. Nevertheless, one might still ask how, if the slab was designed to cope with a 30mm movement, it should be moving by so much more than that, particularly when it was built thicker than designed.

182. I have found on Mr McFarlane's evidence that the design of the slab, although not in accordance with Section 4 of AS2870-1996, was adequate as a design under the Concrete Code AS3600. It should therefore have performed in accordance with that design if it had been properly constructed.

183. Mr Cross said that the movement of the slab since construction has not been linear, consistent or conforming to any identifiable pattern. The survey results support this opinion.

Settlement or heave – moisture content

184. Mr McFarlane said that any settlement would have occured shortly after the slab was poured. The soil settles under the weight of the concrete placed upon it. If that is so, then any such settlement would have occurred before Wilson Surveying's first survey. Yet the survey evidence shows the slab has dropped in some places by up to 7mm since then.

185. Although Mr McFarlane said that there was no significant settlement he also said that there was no heave in the centre of the footprint of the House. The drops in levels in most of the House, including the centre, over the last 12 months are substantial and must be due either to settlement or to what Mr McFarlane has called "heave recovery". If the latter, there must have been heave in the centre of the footprint before the first of the Macey and Isbester surveys.

186. The only bore hole through the centre of the slab found a void of 15mm which Mr McFarlane suggested was the slab bridging over a low spot. Mr Carr submitted that it would not be there if there were settlement but it is also possible that the low spot is an area where there has been settlement away from the slab.

187. When asked to explain the degree of movement that has been experienced Mr McFarlane said that it was the result of a number of factors. He said that the high heave was because the House was built at the end of a very extended drought. The soils were extremely dry so any rainfall that fell would cause some heave and there was heave around all edges of the building. However he said that cannot explain what he described as the excessively high moisture at the front corner where the highest magnitude of heave was experienced.

188. In its letter denying liability the Builder asserted that the movement was due to edge heave attributable to the Owner's landscaping. Both Mr McFarlane and Mr Lawrance supported this view. Mr McFarlane said there was excessively wet soil in the soil samples taken at the front corner of the House where there is maximum heave. He referred to Mr Lawrence's findings that the natural soil there had a moisture content of 30% under the topsoil and then 42%about a metre down. He said that this was abnormally higher than you would expect from seasonal events.

189. He suggested that the cause of this abnormal wetness were over watering of the garden and defective plumbing. The Builder has inspected the plumbing and found that it is not leaking. As to over watering of the garden, the Owner said there was no-one there much for the first 18 months. He said there was no hose or sprinkler that he was aware of. He was unable to say to what extent the tenants watered the garden. Mr McFarlane produced aerial photographs showing the House and surrounds at various times. Some of these, particularly one taken in April 2011, show the lawn behind the House to be quite green. However the adjacent vacant paddock shown in some of

these photographs appears green too. I do not think the photographs assist me much.

190. The garden seems very modest in size and scope and there is no evidence that anyone was watering it since the tenants left. The House is now vacant and has been for some considerable time. The Owner lives interstate it seems unlikely that anyone has watered the garden, such as it is, for more than a year yet the slab is still moving substantially and the soil at the front corner is still said to be abnormally wet.

191. Mr Buffinton said that Civiltest's results showed relative moisture ratios around the House of 111.5, 124.0 and 110.0. He said that the lowest 110.0 was at the front of the House where Mr McFarlane is maintaining there was abnormal moisture content. In terms of the moisture ratios, that area was, he said, the lowest or their results.

192. He said that the equilibrium moisture content that he would normally expect around a house is around about 115 to 120 per cent of the optimum moisture content. He said that the moisture ratios they found at this site were 111.5, 124.0 and 110 and that there was nothing in these results which indicate there is an abnormal condition.

193. One possible explanation for the difference in the wetness detected by Mr Hennig and Mr Lawrance is that they have each sampled a very different soil profile. What Mr Lawrance found to be wet was the natural soil. What Mr Hennig found to be relatively dry was the Builder's Fill not far away.

194. When Mr Buffinton was asked to account for the degree of movement experienced, he said:

> "I believe it's rain water that's done it. If we look at the way this slab has been built, it's sitting on a layer of scoria or honeycomb rock, as it's sometimes referred to, which is pretty porous, sort of water will run through, like, you know, it'll run through it like water through a sieve. Then around the outside of the building, after construction, we've had the builder push fill up to the outside of the building to create the required fall away from the building. Now, it's quite clear (indistinct) is fairly poorly compacted, it's fairly loose, and when you get rain the rain will penetrate into that soil, into that loose soil, it will run down to the bottom of the edge beam and it will just continue on if the fill then is still loose. It will also be picked up by that drainage layer that's under the slab, and the water will migrate sideways under the slab and through that drainage layer. Now, that can cause heave, so I believe that if we have heave here this has primarily occurred from two things: the rain water percolating into that soil; and wetting up the extremely dry condition that was there when the subdivisional fill was placed."

195. Mr Buffinton agreed with Mr McFarlane that there had been edge heave. However the survey levels do not support Mr McFarlane's statement that there is edge heave all around the House. The degree of edge heave is uneven. There is none in front of the garage where the rainwater cannot

penetrate the driveway and that appears consistent with Mr McFarlane's general thesis, although not his statement that it is all around the House. However there is also virtually no edge heave in that part of the dining room wall that is next to the Living Room and very little in the wall of the Living Room, yet these are adjacent to an unpaved driveway and a garden bed. When I asked about that it was suggested that it was because that was the north side of the House. Yet the same can be said for the north east corner which is claimed to be the wettest and where the heave is greatest.

196. Mr Cross said that if it were simply edge heave the contours would be parallel to the slab edges and dissipate at a maximum distance of 2.00 to 2.4 m in from the slab edge. He also said that it should start at the outside edge of the adjacent paving. Although the worst heaving is at the four corners of the House, the contours shown on the various surveys do not reflect that pattern. In particular, there is no heaving along much of the northern side of the House.

197. Mr Cross suggested that the loose fill would allow water to infiltrate under the slab. Mr Heddig agreed that loose fill could allow the migration of water but Mr McFarlane pointed out that the soil encountered in Mr Buffinton's borehole was dry and the soil at the front of the House was found to be excessively wet. As I have already noted, that sample, in L3, was taken in natural soil. The slab ought to have been supported at that place by properly compacted fill in accordance with the Second Plan.

198. The sample taken nearby by Mr Heddig was comparatively dry. Moreover, as Mr Cross pointed out, the moisture level in the soil does not appear to have changed between the CivilTest report and the Lawrance report from 2012 to 1213 yet there have been significant changed in levels.

199. On all of the evidence I am unable to find that there are unusual moisture conditions around the House. Mr Buffinton said that he thought the wetting of the soil was by rainwater and in the absence of evidence of any other source I find on the balance of probabilities that it was.

Lack of density

200. The Engineer's design and AS 2870-1996 required the slab to be placed upon Controlled Fill. There is no evidence that the Builder's fill upon which it has been constructed was compacted at all but, even if it was, the compaction of the soil under the edge beams was found by CivilTest to have been inadequate. Mr Cross said that the Builder should have informed the Engineer about the fill before pouring the slab. That is what the note on the Second Plan required and there is no evidence that it was done. I am not satisfied that the Builder's Fill was adequately compacted.

201. Mr Hennig said that soil with lower density is generally found to have a higher moisture content due to the voids between the soil particles being filled with water. He said that the water allows the soil particles to move

more freely which can cause settlement over time. Poorly compacted soil will also have greater permeability.

202. Below the Builder's fill was the highly compacted and highly reactive Subdivisional fill. This was sloping from the north east corned to the south west corner and so in order to follow the Engineer's design the Builder was required to excavate it so as to provide a level platform. If it did not do so there would be more highly reactive soil under the northeast corner and more Builders fill on the lower parts of the footprint which would, according to Mr Cross, result in an uneven movement when the soil became wet.

203. It is not known with any certainty what the compaction is under the slab nor, apart from the limited documentation referred to, has the Builder led any evidence as to how it constructed. The bore logs show different soil profiles suggesting a lack of homogeneity in the foundation. I think it is likely that Mr Cross is right in saying that the problem is caused by an inadequate foundation under the slab.

204. Moreover, when it was put to Mr Yap that the slab had failed, he said:

> "I wouldn't necessarily say the slab has failed. I would have said the ground has failed."

205. The slab was not constructed as designed. It is 40mm thicker and the edge beams the edge beams where they have been exposed are deeper although they are not uniformly deeper. The depth varies and only a minority of the edge beam has been exposed. No explanation was given for this.

206. The building platform was also not cut into the Subdivisional Fill and founded upon it as required by the Second Plan but instead the slab was founded upon fill that, if compacted at all, was compacted inconsistently and not to the required 95%. The northeast corner of the building footprint is resting upon only 50mm of Builder's Fill overlying the natural soil.

207. I am unable to say whether the slab was otherwise constructed in accordance with the Second Plan because there is no evidence how it was constructed. However I am satisfied on the balance of probabilities that the slab is moving irregularly and to an extent well outside what it was designed for and that it was not built upon an adequate foundation. I find that this irregular movement is due to defective workmanship by the Builder in preparing the footing and constructing the slab.

Sewer easement and service trenches

208. Mr Cross criticized the absence of any trench and drainage design in the documents. I have already found that I am not satisfied that the Engineer was negligent in not including such a design in the engineering documents.

209. As to the Builder, this allegation was not explored much in the evidence. I am not able to say that then trenches were inadequately backfilled.

Causation

210. I am satisfied that the slab was not constructed as designed. It was built upon an inadequate foundation. I find that the Second Plan was adequate, notwithstanding that it was not the result of any contemporaneous calculations. Consequently although I have found various breaches by the Engineer of its duty of care to the Owner there is no proof of actual damage arising from those breaches. The responsibility for the foundation failure lies wholly upon the Builder.

The severity of the problem

211. Mr McFarlane suggested in his first report that the slab may have stabilized and that, once it has stabilized its future performance will be satisfactory. Mr Cross disagreed, because he said that slab had insufficient stiffness to cope with the foundation upon which it was laid and the loose fill was allowing water to enter under the slab and was not an appropriate foundation for any slab. The material is also not evenly compacted. In this regard his prediction is borne out by the more recent surveys which show that there have been substantial and irregular movements over less than 12 months.

212. Because there has been heave under the slab I find that water is entering under the slab. I also find that the loose fill, not being Controlled Fill and not being evenly compacted, is an inadequate foundation material. Additionally, it is more likely to admit water than properly compacted fill.

213. I accept Mr McFarlane's evidence that some slab movement is to be expected when it is constructed upon such reactive soil. There will be seasonal movements around the edges of the slab associated with changes in water content of the foundation. The House is intended to cope with such changes by means of a sufficiently engineered slab and articulation joints although some movement and minor cracking is to be expected. However the Second Plan for the slab required a proper foundation and the Builder has not provided it.

214. The Owner was criticized by both Mr Carr and Mr Howden for exaggerating the extent of the damage to the House. Not many of the problems appear to have been documented by the Owner or the agent. The front door jammed on two occasions and the back glass door was difficult to open in July 2010. In July 2010 garage roller door did not open and close all the time although the cause of that was not identified. The tenants seemed happy with the House although they did have some complaints. The Condition reports that were produced do not show much of relevance but they were intended to identify things for which a landlord or tenant might be responsible. They were not dilapidation reports. The evidence of the extensive work done by the Builder was not contradicted and the present defects are identified in the experts reports. I am satisfied as to the seriousness of the damge.

215. Mr McFarlane and Mr McLennan suggested that the extent of the damage now observed was only Category 1 or Category 2 damage within the meaning of Table C1 of Appendix C of AS 2870-1996. They said that for there to be damage within the meaning of that Table there must be a crack. I do not accept that interpretation.

216. The references to doors and windows sticking, service pipes fracturing, weather tightness being impaired, walls leaning and bulging noticeably, windows and door frames distorting and loss of bearing in beams make no reference to cracking. Plainly, walls can be damaged without exhibiting cracks. Category 3 damage sustained by the House are the sticking windows and doors. The category 4 damage is the distortion of the windows and doors and what would have to be done if the House were to be repaired to realign door jambs and window frames. There is also the loss of bearing on the party wall which has been lifted by the trusses it is supposed to support. The damage that required replacement of part of the wall in Bedroom 1 by the Builder would also seem to be Category 3, although the details of that are unclear.

217. Mr Cross said that the windows, doors and cabinetry are out of level, the shower door cannot be closed, the ceilings are out of level and the walls are disconnected. He said that the consequential damage could be patched but it would need to be done again at the next major weather event. He also suggested that it might move in a random manner, as happened last year, when it has gone down by either settlement or shrinking of the soil and yet gone up in Bedroom 1.

218. The problem that I have is that the slab has not stabilized and, according to Mr Cross, whose predictions so far have come true, it will never stabilize. If the slab stabilized then the floors and ceilings could be levelled, the damage could be repaired and the House could be put into a condition approaching that in which it ought to have been from the start. However as the slab is continuing to move any remedial work will have to be repeated at unknown intervals over an unknown period into the future. That was what happened in regard to the earlier repairs.

219. A house performing in this way is not what the Builder contracted to build.

Relief to be granted

220. There having been a breach of contract the prima facie measure of damages is the cost of providing the Owner with a house of the description required by the Contract, that is, a house of the agreed design that is properly built and structurally sound in accordance with the Contract documents. Since the existing slab cannot be underpinned or rendered stable the only way that result can be achieved now is by demolishing the House and re-erecting it upon a sound foundation. I do not accept Mr Carr's submission that it is not necessary to do that in order to produce conformity. However I must consider whether that is a reasonable course to adopt.

Reasonableness

221. Whether the demolition and re-building of the House is reasonable in the circumstances is a question of fact and the onus is on the Builder to displace the prima facie position that the Owner is entitled to get what he paid for.

222. The first consideration is the magnitude of the breach. That is considerable. Instead of a house erected upon a sound foundation the Owner has a house on an inadequate foundation that is still moving 7 years after the slab was poured. Walls are leaning doors and windows have jammed, substantial cracks have opened and structural parts of the House are separating. Any repair of the obvious damage will be temporary because the movements are continuing.

223. This is not a situation where one can say that, although the work is not in conformity with the Contract it is nonetheless serviceable. The House will require constant and ongoing repair.

224. Mr Carr submitted that the demolition of the House was neither necessary nor justified. He said that the existing damage can be repaired and some ongoing movement of the House on this reactive soil is to be expected. In essence he is suggesting that the real damage suffered by the Owner is disproportionate to the cost of demolition and rebuilding.

225. I do not accept that submission. The movements experienced are not the normal seasonal movements that should be expected on a reactive site. They are severe and irregular and will continue for the life of the building. It is quite unreasonable to expect any owner who has paid for a properly constructed house to accept in its place one on a defective foundation that requires constant maintenance. There is also the problem of assessing damages in some other way. How do I know what the Owner will have to pay to maintain this building over and above normal maintenance as a result of its defective foundation for the period of its expected life?

226. According to Mr Cross, to demolish and reconstruct the House will cost $264,784. In addition, during the period of demolition and reconstruction, for which Mr Cross has allowed a year, the Owner will be without any rental income from the House. At $300 per week that loss of rent would amount to $15,600.

Loss of value

227. As an alternative to demolition, evidence was led as to the diminution in value of the House and the allotment by reason of the defects.

228. Of the two valuers called I preferred the evidence of Mr Matler to that of Mr Courtney. Mr Matler based his valuation upon comparable sales in the area and provided a well researched and well reasoned report. Mr Courtney was requested to provide his valuation with little notice and had no time to research comparable sales although he appeared to do the best that he could in the limited time allowed to him.

229. Mr Matler said that, if the House had been free of defects, the property would have been worth $380,000 if it was not suffering from distress and slab heave. However he believed that it could not be sold in its present condition. He said that because he was aware that there were structural difficulties in the House he would not want to be involved in its sale. He added that anything is saleable, even for land value which he assessed at $184,000. On that basis the diminution in value is $196,000.

230. Mr Courtney valued the Property at $345,000 in its present condition on the assumption that there was nothing structurally wrong with the House. He said that if the visible defects were repaired it would be worth $355,000.

231. I think that Mr Matler is correct in his assumption that the hypothetical purchaser would be made aware of the extent of the defects in the House. Mr Courtney's assumption that there is nothing structurally wrong with the House is unwarranted. I therefore prefer Mr Matler's evidence. If I were to assess damages on the basis of diminution in value it would be in the sum of $196,000.

Demolition or diminution?

232. The argument that damages should be assessed on the basis of diminution of value did not seem to be seriously pressed in final submissions.

233. In *Bellgrove v Eldridge* [1954] HCA 36 a house was built with foundations and brickwork that were so defective they could not be rectified. The owner sought the cost of demolishing the house and erecting another in its place. The builder argued that although the house was defective it had some value and that the measure of damages was limited to the diminution in value caused by the defects. The High Court rejected the argument, saying (at para 5):

> "In the present case, the respondent was entitled to have a building erected *upon her land* in accordance with the contract and the plans and specifications which formed part of it, and her damage is the loss which she has sustained by the failure of the appellant to perform his obligation to her. This loss cannot be measured by comparing the value of the building which has been erected with the value it would have borne if erected in accordance with the contract; her loss can, prima facie, be measured only by ascertaining " (emphasis in original)

234. As already stated, the qualification for this rule is that demolition must not be an unreasonable course to adopt. I do not find that it is unreasonable.

Rental

235. As to rental, Mr Matler said that it would be rented to the lower end of the market for what you could get. The rental value, according to Mr Courteney, was $290 to $300 per week in its present condition and $300 to $310 per week if the damage was repaired.

236. On the basis of Mr Courtney's evidence, the Builder argued that the House could and should have been let and that the loss of rental claimed arises because of the Owner's failure to mitigate his loss.

237. Mr Sedal submitted that the Owner had acted reasonably in not letting the House following the departure of the last tenant for the following reasons:

    (a) The jamming of the doors and windows not only affected serviceability but was also dangerous;

    (b) The rental would have been reduced;

    (c) The Owner would have had to carry out ongoing repairs;

    (d) The House would only attract a lower quality tenant;

    (e) Potential legal liability to tenants to provide a safe and habitable property;

    (f) Administration costs in dealing with complaints from tenants.

238. There is some substance to all of these matters but I do not believe that the House was in a dangerous condition. I am satisfied that, despite its defects, it could have been rented by the Owner, albeit at a reduced rent to someone willing to put up with the ongoing maintenance. The cost of that maintenance would have needed to be set off against the rental and compensation could have been claimed by the tenant for inconvenience and loss of use whilst repairs were carried out from time to time.

239. Mr Sedal submitted that the Owner should not be criticized for failing to rent the House after the last tenants left because the hearing of this proceeding might have been thought to have been imminent. That may be so but he was nonetheless obliged to mitigate his loss and ought not to have left the House empty expecting the Builder would bear the resulting loss.

240. In the Amended Points of Claim the claim for loss of rent is $28,533.85, being $1,274..60 per calendar month from March 2011 to March 2012; $1,306.46 per calendar month from March 2012 to March 2013. The loss is said to be ongoing. In his final submissions, Mr Sedal said that the claim was now $43,773.50 and provided calculations which support that figure.

241. I think that the Owner has suffered a loss of rent but that it should be assessed on the hypothetical basis that he mitigated his damage by renting it for the relevant period. Mr Courtney provided two figures, that is, $290 to $300 per week. That is the present rental value and since the rental for the earlier period would presumably have been a little less I will base my calculation on the lower of these two figures.

242. From 2 May 2011 until 25 February 2014, that would amount to 147 weeks at $290.00. If I should deduct two weeks to take account of ongoing repairs to the property to keep it in a habitable condition, that would leave 145 weeks which, at $290 per week would amount to $42,050 the Owner might reasonable have received had he let the House. From that I should make an

allowance for rectifying the present defects which, according to Mr McLennan, would have cost $7,482.16, leaving a balance of $34,567.84. Deducting that from the damages of $43,773.50 claimed for loss of rent leaves a figure (rounded) of $9,205.65 and I will allow that sum as damages for loss of rental.

Conclusion

243. As soon as the Builder received the Owner's complaint about the slab in January 2006 it was apparent to the Builder that this slab had not been built in accordance with the Second Plan. The Builder knew that the soil on the site was highly reactive and required the slab to be designed by an engineer. It knew the importance of following the Engineer's design so as to ensure that the House was built upon a proper foundation. It ought to have addressed the problem then instead of proceeding with the construction of the House on a manifestly defective foundation. The damages now are substantial but that is a problem of its own making.

244. The following amounts will be allowed:

(a)	Cost of demolition and re-construction	$264,784.00
(b)	Loss of rental during demolition and re-construction	$ 15,600.00
(c)	Loss of rental	$ 9,205.65
Total		$289,589.65

245. Although I have found that the Engineer was in breach of its duty of care to the Owner in a number of respects, the claim against it will be dismissed because I am unable to find that any actual damage arose by reason of those breaches. The slab as constructed would have been sufficient had it been constructed on a proper foundation in accordance with the Second Design.

246. Costs and the Owner's claim for interest will be reserved for further argument.

SENIOR MEMBER R. WALKER