

Beckhaus Civil P/L v The Council of the Shire of Brewarrina (incorporated solely by reason of the LGA 1993(NSW))

JUDGMENT : Master Macready : Equity Div. T&C Lists. Supreme Court of New South Wales. 16th September 2004

- 1 These are proceedings in which the plaintiff claims against the Council a sum of \$838,969.10 being the claimed balance under a contract for the construction of a series of earthwork levees around the town of Brewarrina in North Western New South Wales. There is a cross-claim by the Council against the plaintiff and its principal Mr Dennis Beckhaus. The cross-claim is brought against the plaintiff for breach of contract and seeks damages for rectification of the construction work carried out by the plaintiff. The cross-claim is also brought against the plaintiff and Mr Beckhaus under the **Trade Practices Act 1974** (Cth) and the **Fair Trading Act 1987** (NSW). This claim alleges that there was misleading and deceptive information given as to the plaintiff's financial standing and the existence of a quality assurance program in the pre-tender process.
- 2 There is also a second cross-claim, which is brought by the plaintiff against Civil Engineering Testing Services Pty Ltd. That company carried out a series of geotechnical tests during the course of the contract on behalf of the plaintiff. The third cross-defendant did not appear to contest the second cross-claim and the plaintiff seeks to proceed against it in the event that it is unsuccessful in its defence of the defendant's cross-claim. The principal of the third cross-defendant gave evidence in the proceedings.
- 3 A judge of the court has referred the whole of the proceedings to me for hearing.

Plaintiff's claim

- 4 The first claim made by the plaintiff is for the sum of \$702,678.45 being the full amount of progress claim number 7 dated 26 April 2002. In the alternative a claim is made for the same amount under the **Building and Construction Industry Security of Payment Act 1999** (NSW).
- 5 The plaintiff also claims on an alternative basis for damages for work done on the basis that it had completed the works under the contract and was entitled to recover its entitlement under the contract and variations which occurred during the course of the contract. The plaintiff had applied for practical completion in March 2003 which the Council denied. This alternative claim is in the sum of \$838,969.10. During the course of the hearing the Council did not adduce evidence in respect of some variations and having regard to the size of some of them it was conceded that the plaintiff was entitled to succeed on variations numbered 1-9 and 12-15. The remaining variations, which are in issue, are numbers 10, 11,16,17,18,20 and 21. The plaintiff concedes variation number 19 in respect of gravel purchased by the plaintiff from the Council in an amount of \$23,374.00.

Short chronology

- 6 The levees around the town of Brewarrina were originally constructed in 1976. In 1991 there was an audit conducted by the New South Wales Department of public works in respect of the levees in which recommendations were made for further work to upgrade the levees.
- 7 After the flood in the year 2000, during which the population of Brewarrina were heavily engaged in saving the existing levees, the Council commissioned a redesign of the levees with a view to upgrading them to make them more effective. There was a design of new works to upgrade the levees by PPK Environment & Infrastructure Pty Ltd ("PPK"). There was a tender process and PPK recommended to the Council that the tender of the plaintiff company be accepted. This report was made on 9 August 2001 and on 25 September 2001 the Council accepted the recommendation.
- 8 The contract was entered into 13 October 2001 and work commenced the following day. The contract incorporated the general conditions of contract 2124-1992 which provided for the position of a superintendent. Mr Komp, an employee of the Council, was appointed superintendent on 16 December 2002.
- 9 Work continued under the contract through until March 2002 when it became apparent to the Council that the plaintiff, having nearly completed the works, was about to apply for a certificate as to practical completion. On 21 March 2002 the Council removed Mr Komp as superintendent and Mr Corven was appointed as superintendent. He immediately set about what the plaintiff described as employing a contractual broom against the plaintiff and on 22 March 2002 he issued a series of directions to the plaintiff.
- 10 As a result of receiving the various test results Mr Corven sent a series of letters at the end of March outlining his views as to the plaintiff's non-compliance with the contract. On 26 April 2002 progress claim 7 was lodged with the Council. The amount of the claim was for \$702,678.45 payable by the Council to the plaintiff.
- 11 On 28 May 2002 Mr Corven issued progress certificate No 7 requiring payment by the plaintiff to the Council of \$952,874.47.
- 12 These proceedings were commenced on 4 June 2002 and went through a number of interlocutory stages. These included an application for summary judgment on the plaintiff's claim which I granted and an appeal to the Court of Appeal in which that summary judgment was set aside.

Council's cross-claim for breach of contract

- 13 There were many witnesses called by the Council in respect of their cross-claim including experts in various fields of the geotechnical sciences and other engineering specialties. The principal experts for the Council were Professor Fell and Dr Truscott. Professor Fell inspected the levees in early 2003 and concluded that much of the fill in the levy banks was uncompacted, the fill material was highly erosive, the levees could be breached at several locations under conditions of high flood and that lives may be lost as a consequence. Dr Truscott carried out geotechnical investigations in the first half of 2003 and concluded the one or more of the levees would fail in

the event of a flood and that the safety of the levees required urgent attention. Dr Burman gave the principal geotechnical evidence on the part of the plaintiff. Both he and other witnesses called by the plaintiff disputed the correctness of the Council's testing and hence the opinions expressed by Dr Truscott and Professor Fell.

- 14 The Council's evidence on its cross-claim addressed both questions of liability and costs of rectification. It is necessary in order to understand the matter, to describe in a general sense the nature of the works carried out under the contract and the issues which have arisen as a result of the testing carried out during and after completion of construction of the levees.

A short description of the works

- 15 The town was originally protected by what are known as the southern and northern levees. The contract included the upgrading of the northern levee and a small part of the southern levee. The balance of the southern levee became redundant because of the construction of new levees on the site of Charlton road and Tarrion Creek road. There was also constructed a new levee around parts of north Brewarrina which had not before been protected by the then existing southern and northern levees. The layout of the levees can be seen on the general layout plan, which is contained in various exhibits before the court. The construction of the levees on the site of the existing roads required a new road to be constructed on the top of the completed earth levee.
- 16 The levees were constructed with earth fill taken from particular locations known as "borrow pits". At the commencement of work these areas were tested for appropriate soil properties and in particular to see how much meadow lime needed to be added in order to achieve an appropriate linear shrinkage, which was a requirement of the contract.
- 17 At a point between the northern and southern levees there was constructed a levee with concrete walls which was referred to in the evidence as the Doyle street levee. There is an issue in respect of the concrete testing carried out in respect of that concrete work.

Principal issues arising under the cross-claim

- 18 The following main issues were identified in general terms in the opening submissions:
1. Whether the construction of the levees achieved the contractual requirements, which specified a compaction to 95 percent minimum dry density,
 2. Whether the contractual requirements for stabilisation of the levee bank material as set out in clause 8.10 of the specification, which required linear shrinkage of the soil to be less than 12 percent had been achieved,
 3. Whether key trenches, which were required under the specification at the foot of the new levy banks, were installed,
 4. The effectiveness of various road pavements which were constructed on the top of the levee banks, and
 5. Whether soil around the culverts, which were part of the construction, had been sufficiently compacted.
- 19 It will no doubt be appreciated that the resolution of the above questions depend substantially upon the various geotechnical tests which were carried out both during the course of contract and after completion of the contract works. The various geotechnical tests were carried out by different organisations and they were generally referred to in the evidence and in expert reports by reference to the name of the organisation that carried out the tests.
- 20 During construction the plaintiff had an extensive programme of compaction and linear shrinkage testing carried out under the terms of the contract by the third cross-defendant Civil Engineering Testing Services Pty Ltd, a company that has been referred to in the evidence and reports as "CETS". At the commencement of the contract the Council had a small number of tests carried out by way of audit by the company K & H Construction Services. This led to a confrontation between the plaintiff and the Council and in the event the Council carried out no further testing until the plaintiff had left the site.
- 21 In April 2002 after the plaintiff left the site, Douglas partners carried out a limited set of tests for the Council and gave a report, which generally recommended that the appropriate compaction had been achieved. On 25 March 2002 there were excavations for 13 tests carried out by Barnson Pty Ltd ("Barnson") at various locations to determine linear shrinkage. Notice of this testing was given to the plaintiff who attended and received duplicate samples.
- 22 In April 2003 Barnson carried out a series of compaction tests under the direction of Gutteridge Haskins and Davy ("GHD") on behalf of the council. A further test series was carried out in July 2003. These tests were carried out by the Council without the Council informing the plaintiff that the tests were to be conducted. They have generally been referred to in the evidence and the documents as the Barnson tests.
- 23 In August 2003 Golder & Associates ("Golder") carried out a series of tests on the plaintiff's behalf and in the presence of the representatives of Barnson, GHD and the Council. At the same time there was some parallel testing by Barnson on behalf of the Council.

Plaintiff's claim

- 24 The plaintiff's claim is expressed on an alternative basis. Its principal claim is that it is entitled to the sum of \$842,944.40 for breach of contract in respect of the work, which it has performed under the contract. The breach alleged is a breach of the provisions of clause 3.1 of the general conditions of contract, which requires the principal to pay for work executed and completed under the contract. This claim is made on the basis that the plaintiff will be successful in either defeating the Council's cross-claim which alleges that the works were not

properly performed and contained a number of defects or successful to the extent that there has been substantial performance of the contract with the Council being allowed a deduction for defects.

- 25 As a secondary breach the plaintiff alleges that in breach of clause 42.5 of the general conditions, the Council failed to issue a certificate of practical completion for the works. Although the obligation to make payment under clause 3.1 of the general conditions is arguably not conditioned upon the issue of a certificate of practical completion, such a certificate is important for other purposes under the contract. Under clause 42.8 the entitlement to the release of retention monies by the contractor is by reason of a number of the provisions of the contract conditioned upon the issue of a certificate of practical completion. The certificate of practical completion is also necessary in order to claim interest on overdue payments under clause 42.9 of the contract.
- 26 Leaving aside the question of the cross-claim and the defects alleged by the Council, the following matters arise on this part of the claim.
1. Whether or not the plaintiff achieved practical completion within the terms of the contract,
 2. Whether or not, as submitted by the Council, the contract was a lump sum contract,
 3. Alternatively if it was not a lump sum contract, the amount properly allowable for provisional items, and
 4. The amount properly allowable for variations.
- 27 In the event that it is found that the plaintiff did not achieve practical completion, the plaintiff advances its claim to recover on a contractual basis the amount of progress claim number 7 dated 26 April 2002 and alternatively the same amount under the **Building and Construction Industry Security of Payment Act**.
- 28 The issues, which arise under the contractual claim for progress claim number 7, relate to whether or not liability arose under clause 42.1 by reason of an alleged failure to supply information to the superintendent pursuant to that clause. This arises because although the superintendent failed to respond to the progress claim within the time limited by the contract, the Court of Appeal in *The Council of the Shire of Brewarrina v Beckhaus Civil Pty Ltd* [2003] NSWCA 4 has held that the supply of information pursuant to clause 42.1 is a condition precedent to liability arising under the clause. Although the defence to this claim also raised a defence concerning the failure to supply a statutory declaration as required by s43 (b) of the contract this was not relied upon in submissions no doubt because I had determined that matter adversely to the defendant in the summary judgment application and it was not the subject of the appeal.
- 29 In respect of the statutory claim for the progress payment the Council submits that as it is dependent upon the establishment of a contractual entitlement, that issue should follow the result of the contractual claim for the progress payment. This matter has however already been determined by me against the defendant in the summary judgment application. See *Beckhaus Civil Pty Ltd v The Council of the Shire of Brewarrina* [2002] NSWSC 960 at paras 52-77. Strangely enough, the Court of Appeal did not deal with this aspect of the judgment. The conclusion which I reached was adopted by Nicholas J in *Walter Construction Group Ltd v CPL (Surry Hills) Pty Ltd* [2003] NSWSC 266 who referred to the fact that it was consistent with the opinion of Heydon JA (as he then was) in *Fyntray Constructions Pty Ltd v Macind Drainage and Hydraulic Services Pty Ltd* [2002] NSWCA 238 at p 51.
- 30 I will deal now with these various aspects of the plaintiff's claim.

Practical completion

- 31 Clause 42.5 of the General Conditions of Contract provides: *"The Contractor shall give the Superintendent at least 14 days notice of the date upon which the Contractor anticipates that Practical Completion will be reached."*
- 32 The clause then provides: *"When the Contractor is of the opinion that Practical Completion has been reached, the Contractor shall in writing request the Superintendent to issue a Certificate of Practical Completion."*
- 33 There is an obligation to issue such certificate within 14 days or give reasons in writing for not issuing the certificate. Practical Completion is defined as follows:
- "'Practical Completion' is that stage in the execution of the work under the Contract when --*
- (a) the Works are complete except for minor omissions and minor defects --*
 - (i) which do not prevent the Works from being reasonably capable of being used for their intended purpose; and*
 - (ii) which the Superintendent determines the Contractor has reasonable grounds for not promptly rectifying; and*
 - (iii) rectification of which will not prejudice the convenient use of the Works; and*
 - (b) those tests which are required by the Contract to be carried out and passed before the Works reach Practical Completion have been carried out and passed; and*
 - (c) documents and other information required under the Contract which, in the opinion of the Superintendent, are essential for the use, operation and maintenance of the Works have been supplied."*
- 34 Mr Beckhaus gave evidence that shortly prior to 18 March 2002 he attended the site of the works and observed that the works had been completed by the plaintiff and were useable except for minor omissions or work for which the Council had not provided access. Photographic evidence supports this conclusion. He then formed the opinion that the works had reached practical completion. Following the forming of that opinion on 18 March 2002, the plaintiff wrote to the Council advising that the works had reached practical completion and that certification was requested. Reference was made to the following minor omissions:
- "Complete installation and connect electricity to pumps (n.b. mains power not yet available)*
Final seeding of embankments
Installation of trash racks

*Tidy up borrow pits and works areas
Outstanding test results for concrete and earthworks
Outstanding inspections and test plan sign offs
Disestablish major plant"*

- 35 Mr Corven, the new superintendent, was appointed on 21 March 2002. In cross examination he agreed that it was common ground that the works were fairly near completion at the time of his appointment. He expanded upon this evidence in re-examination to say that the appearance of the levee was such that there were only minor matters to be carried out. There was no list of minor omissions as defects issued by Mr Corven. A consideration of this evidence (leaving to one side for the moment the issues on the cross-claim) would indicate that there has been compliance with that part of the definition of practical completion as set out in sub-paragraph (a). It will be noted that in the letter of 18 March 2002 there was reference to "outstanding test results for concrete and earthworks". This raises the question under sub-paragraph (b) of the definition of practical completion as to when such tests were required and completed.
- 36 In connection with the outstanding testing the following appears to be the position. In one of the requests on 22 March 2002, the superintendent wrote to the plaintiff requiring copies of test certificates pursuant to clause 5.6 of the specification. This related to concrete work. There were other requests in respect of requirements for surveys and also as to achievement of appropriate levels for road works. These matters are not concerned with this part of the definition that only concerns tests.
- 37 The relevant specification made provision for testing in three main areas. These were compaction testing, testing for linear shrinkage and concrete testing. Compaction control testing is referred to in clause 1.11 of the specification. Special condition 25 of the contract provided that soil control testing for the contract should be conducted by the contractor using suitably experienced personnel and a NATA registered laboratory. Clause 8.9 of the specification deals with achieving the necessary compaction and in particular with testing. It is apparent from these provisions that testing takes place during the course of the works. Clause 8.10 is a provision for stabilising soil with Gypsum to achieve the required 12% linear shrinkage criteria. Clause 8.11 provides for testing. Apart from requiring the appropriate linear shrinkage to be reached, the sections do not provide a regime for testing. Section 9 of the specification deals with the pavement, which is the material immediately below the finished surface. It has provisions for compaction and testing. This also is subject to ongoing testing during construction.
- 38 As will be demonstrated later, the testing for compaction and linear shrinkage in the levees during the course of the work up until the time of practical completion was either satisfactory or if not satisfactory the material was reworked to achieve the required specification limits. The technical specification did not require certificates to be made available in respect of compaction and frequently reporting on tests was done orally so that the work could proceed. In respect of compaction testing at the culverts the specification required one test per layer and, as I conclude later, this level of testing was not achieved.
- 39 In contrast, the provisions in the specification for concrete, which appear in s 5 of the specification, are slightly different. In particular under clause 5.6 there is a requirement for testing by an appropriate NATA laboratory in respect of each placement of concrete with appropriate provisions for the number of samples. The provisions also require the prompt supply of test certificates to the superintendent. It was this to which the superintendent was referring when he wrote his letter of 22 March asking for the certificates.
- 40 It is apparent that in respect of one small section of the Doyle Street wall, the concrete testing did not pass the required specification. In addition, it is plain that some of the testing was done by CETS which was not accredited for concrete testing although it was accredited with NATA for compaction and other testing.
- 41 Clause 5.13 of the specification in particular allows for the rejection of hardened concrete if it does not come up to the appropriate specified test strength. This test strength is obviously determined by the compressive tests, which are carried out in the course of work. The "under-strength" concrete that was identified in the earlier part of the Doyle Street wall was allowed to remain.
- 42 Under the specifications there clearly were a series of tests in respect of concrete which were required to have been passed, but did not pass. In order to deal with this problem the plaintiff submitted that the clause which deals with this in the definition of practical completion, was one that required the particular test to be a prerequisite to the issue of the certificate of practical completion. A consideration of sub-clause (b) shows that it is only concerned with the passing of tests and not the supply of written test results. There are perhaps two ways one can look at sub-clause (b). One is to consider it as referring to a requirement of passing a particular test as a condition of achieving practical completion. The other is to consider the sub-clause as simply imposing a temporal requirement in respect of tests before the works reach practical completion. On this latter view if the contract required, as it did in this case, compaction testing of the fill and strength testing of the concrete during the course of construction, then it was necessary that those tests be passed in that period of construction which was obviously before the works reached practical completion. A sensible construction of the contract indicates to me that it is the latter which is the correct construction.
- 43 In the instant case there was a small amount of concrete that failed its test. Thus there was no compliance with sub-clause (b). There might be compliance if the provisions were waived and it is thus necessary to see what happened in respect of the concrete that had failed its tests.

- 44 These failures were made known to Mr Komp shortly after the pour. He accepted the results and directed the plaintiff to leave the footings in place as he was of the view that there was a sufficient safety factor in the design. This is an acceptance of defective work under clause 30.5 of the general conditions. In these circumstances there is a waiver of the requirement for the test to be passed.
- 45 In respect of the testing at culvert locations it should be noted that the definition of practical completion addresses the contractual requirement for the number of tests to be carried out as well as passing of the tests. Clearly the required number was not carried out at the culverts. There does not appear to be any evidence that this fact was known to the Superintendent and accepted by him. There is thus no compliance with this requirement of the contract.
- 46 In respect of sub-paragraph (c) there does not appear to be any evidence of the Superintendent forming an opinion called for in that part of the definition. The Council put nothing in its submissions on these aspects. In these circumstances and leaving aside the cross-claim it is clear that under the terms of the contract the contractor did not achieve practical completion.

Was the contract a lump sum contract?

- 47 The Council's submission was that the contract entered into between the parties was a fixed lump sum which included provisional items which were required to be assessed and quoted on by the plaintiff in determining the lump sum prior to entering into the contract. The submissions relied both upon the proper construction of the contract and, to explain any ambiguity in the contract, upon certain pre-contractual documentation.
- 48 The Council relied upon the following description of the classical fixed-price or "lump sum" contract which appears in **Hudson's Building and Engineering Contracts** (11th Ed, 1994, p. 416): *"More substantial contracts of this kind will usually contain additional documents with itemised prices, often called 'schedules of rates' or 'schedules of prices' in the United Kingdom, but in these contracts they will have no pricing significance other than for valuing such variations as the owner may decide to call for under a power contained in a variation clause, or for valuation purposes if interim periodical payment, rather than fixed instalment payment, is called for. Sometimes these pricing documents may even contain estimated quantities of the whole work as well as the itemised prices, and in some cases may actually be called 'bills of quantities', with the prices grossed up to produce a total contract sum, and so indistinguishable from the pricing documents used in United Kingdom contracts where the quite different pricing intention is to re-measure the entire work and re-calculate the contract price in the light of the final 'as built' quantities, whether or not variations have been ordered. In lump sum contracts, however, such a document, even if so entitled, will simply be a guide to assist tendering contractors in arriving at their lump sum tenders, with its pricing significance limited to the valuation of variations, should these be ordered, or for interim payment valuations."*
- 49 The provisions of the contract to which the Council referred in submissions on the construction were conveniently set out in those submissions which were in these terms:
- "28. The Conditions of Tender, Clause 1 (Exhibit J, page 77), headed 'Nature of Tender' contain the following express provision: 'The Works ... shall be completed for a Lump Sum Price in accordance with the Agreement, **fixed and firm** for the duration of the Agreement. The Lump Sum Price shall be for completion of the whole of the works described and intended in the Tender Documents...'
29. This was followed by an express provision: 'This Contract will not be subject to Rise and Fall': (Conditions of Tender Clause 2, Exhibit J, page 77).
30. Further, Special Condition 18 (Exhibit J, page 123) expressly states: 'The Lump Sum accepted by the Principal is deemed to include the cost of the whole of the work under the Contract. A Schedule of Prices has been included for the assessment of Progress Payments and valuation of Variations'. (Emphasis added)
31. In addition, Special Condition 20 (Exhibit J, page 124) also provides: 'The quoted lump sum price and rates quoted in the Schedule of Prices are to be fixed and firm'.
(See also SC 10 and SC 17, Exhibit J, pages 120 and 123)
32. The Schedule of Prices - included with the Plaintiff's Tender Submission and forming part of the Contract at Exhibit J (commencing page 49) - provides, *inter alia*: 'This Schedule of Prices shows the components of the Tender Sum including Provisional Sums with various rates for use in tender evaluation and, should this Tender be accepted, for the assessment of progress Payments and the valuation of Variations, where applicable...The sum of the amounts entered for all Tender Sum components Items is the Lump Sum amount payable for completion of the whole of the work described and shown in the Tender Documents...The quantities shown are derived from solid measurement and shall be checked by the Tenderer and the quantities adjusted if necessary...'
- (See also Exhibit J at p 48 'For the Lump Sum ...')
- 50 On the face of the provisions to which the Council has referred the schedule of prices would appear only to be for the purpose of evaluation and assessment of variations and progress payments. A clue to the position of provisional sums is a reference to that expression in the opening paragraph of the schedule of prices referred to immediately above. The general conditions of contract contain two definitions that are applicable. They are: *"'Provisional sum' includes monetary sum, contingency sum and prime cost item;*
'Schedule of rates' means any schedule included in the contract which, in respect of any section or item of work to be carried out, shows a rate or respective rates of payment for the execution of that work and which may also include lump sums, provisional sums, other sums, quantities and prices;"

- 51 The general conditions therefore clearly contemplate that there may be provisional sums. Indeed, clause 11 of the general conditions provides that where a provisional sum is included in the contract and is performed by the contractor it is to be valued under clause 40.5 of the general conditions. Such a valuation then creates a liability on the principal to make payment for the amount ascertained by the Superintendent at the rates provided for under the contract.
- 52 However, perusal of the schedule of prices indicates a different position to the clause referred to by the Council. The schedule of prices is in two parts described as separable portion A and separable portion B. Separable portion B dealt with the Charlton Road upgrade while separable portion A dealt with the remainder of the works. When one looks at the detailed listing of prices one finds a number of items that are particularly identified as provisional quantities.
- 53 For example, the following items appear in the listing for separable portion A:
Item 6(iv). Excavate material as found in the Key Trenches and cart to spoil within 2km of site (provisional quantity)
Item 6(v). Excavate unsuitable material from embankment foundation and base of Key Trench and cart to spoil within 2 km of site and replace with compacted Zone A Clayfill material (provisional quantity)
Item 6(vi). Selectively win from borrow or load from existing levee clay stockpile, place and compacted Zone A clayfill material to Key Trench (provisional quantity)."
- 54 After the description, there then follow columns for "estimated quantity", unit, rate and amount.
- 55 At the end of the listing for each separable portion there are notes referring to expressions used in the listing. One of the notes is as follows: *"'Provisional Quantity' refers to items where the quantity is unknown. Payment for provisional items will be made by multiplying the tendered rate by the measured quantity. Measurement will be by the superintendent."*
- 56 On its face these words are quite contrary to the general expressions in the special conditions of contract which appear earlier and to which I have already referred.
- 57 The specification has a more detailed description of the procedures involved in the activities, which are referred to as "provisional quantities" in the schedule of prices. For example clause 8.3 deals with unsuitable material and the procedures for removal of it and inspection by the superintendent before further progress. The clause includes the following: *"The removal of replacement unsuitable material shall be paid as a provisional quantity and, as such, it is necessary that the contractor provides adequate survey to calculate the quantity of unsuitable material removed. Survey calculation shall be afforded to the superintendent for checking and approval for payment purposes."*
- 58 The excavation of Key trenches is another example. The procedures are set out in clause 8.5 of the specification that provides inter alia: *"Payment for excavation of material from Key trench and removal to spoil shall be made under the provisional item in the schedule of prices."*
- 59 Another example is the cost of additional gypsum over and above the 5 percent minimum limit under the contract. Clause 8.10 of the specifications provides that the superintendent (sic) shall bear the additional cost at the rate given in the bill of prices.
- 60 The only direct inconsistency is between special conditions 18 of the contract and the schedule of prices, both of which documents, like the specification, are incorporated in the contract. Clause 8.1 of the general conditions deals with discrepancies in contract documents. The opening words of the clause are as follows: *"The several documents forming the contract are to be taken as mutually explanatory of one another."*
- 61 The clause then goes on to deal with the situation where a discrepancy is discovered during the course of the contract and provides that if such discrepancy causes the contractor to incur more or less cost than could reasonably have been anticipated, that the difference shall be valued under clause 40.5. Given that I am now dealing with the final resolution of the matter, I should take into account the words to which I have referred in construing the contract.
- 62 The submissions made on behalf of the Council did not, apart from the general reference to the provisions I have quoted above, identify any particular ambiguity in language, which would make it necessary for the court to have recourse to the evidence of surrounding circumstances in order to explain any such ambiguity. In my view it is a matter of resolving the particular inconsistency thrown up by the words in special conditions 18.
- 63 A perusal of the more detailed provisions in the specification to which I have referred to above indicates the fact that the parties would not be able to identify the particular quantities which are referred to in those parts of the specification and the schedule of prices. It is only when the job is underway that particular quantities can be ascertained. In these circumstances it seems to me that the more particular provisions should prevail and accordingly, although the contract may be described as a lump sum contract, it does contain appropriate conditions for certain provisional quantities which are, under the terms of the contract, to be determined by measurement.

The amount properly allowable for provisional items

- 64 The amount of the provisional quantity items claimed by the plaintiff totals \$89,167.00 although the Council in its submissions refers to the sum of \$91,021.00. Leaving aside questions which I have already determined as to whether the contract was a lump sum contract, the Council's basis for resisting this claim is that the plaintiff has not demonstrated that the items were measured and approved by the superintendent in accordance with the contract.

65 It was only in the submission of progress claim number 7 that the plaintiff claimed an allowance by showing an increase over and above 100 percent for the relevant items. The superintendent rejected that claim and there is no evidence of him having measured the variation as required under the contract. Given the nature of these proceedings, the matter could be determined if there was evidence of the measurement of the amount. Neither Mr Beckhaus nor Mr McCartney gave any evidence of the measurement of these items. It is referred to as a percentage in progress claim 7. They were supported by log summaries of measurements forwarded undercover of letters from the plaintiff to the Council of 10 April 2002, 24 April 2002 and 1 May 2002. There was no cross examination on the amount of this claim.

66 In these circumstances, it seems that the plaintiff has measured the volumes in the claim and accordingly the amount should be allowed.

The amount properly allowable for variations

67 I will now deal with the various variations claimed by the plaintiff.

Variation 10

68 The plaintiff's submissions which adequately described the variation were in these terms: "*Variation 10 relates to additional concrete required for the construction of eight retaining walls to a greater height than allowed for in the contract.*

A quote in respect of the additional cost was provided prior to commencement of the work (Tab 33 of Ex H). The quotation was for an additional cost of \$30,400 but in fact less additional concrete than expected was required and the final additional cost as agreed between Mr Stratigis and Mr Komp was \$15,089 plus GST. (See paragraph 67(b) of Exhibit G and paragraph 7(b)(ii)A of Exhibit O).

Both sub-paragraph (j) of the particulars to paragraph C39 of the Amended Summons and paragraph 67(6) of Exhibit G erroneously described the additional concrete as being for the Doyle Street Levee. In paragraph 23 of Ex Q Mr Beckhaus corrected this error and provided further detail in relation to the increased height of the retaining walls.

Mr Beckhaus was not cross examined in relation to this variation."

69 The Council raised the following defences to this claim:

1. Non compliance with clause 40 of the general conditions, which requires a direction by the superintendent or approval in writing by the superintendent,
2. No power in the superintendent to approve variations without the prior written consent of the principal,
3. No evidence of an agreement on the amount of the variation said to be agreed between Mr Stratigis and Mr Komp, and
4. No credit for a reduction in length of 10 m.

70 In relation to the first point Annexure G to Mr Komp's statement is a fax of 29 January 2002 which having regard to Mr Komp's evidence in chief is a relevant direction within the terms of clause 40. There is in evidence a quotation for some \$30,400.00 but the evidence also makes it plain that the amount was somewhat less. With regard to the second point above it is clear that the actual instrument of delegation given to Mr Komp provided that any variation should not be approved without the principal's prior written approval. Although a breach of this provision might cause some difficulty between the then superintendent and his principal it is not relevant to the exercise of his functions under the contract as superintendent. There is no evidence of any agreement on the amount of the variation. There is a quotation for the additional material. The original specification provided for masonry block walls and the quotation referred to the fact that the original walls were 33 cubic metres and they estimated the new ones would be 73 cubic metres. Evidence of the concrete pours indicates that 77.8 cubic metres of concrete was required and this means that the variation actually used an additional 44.8 cubic metres.

71 The quotation claimed a rate at \$760.00 per cubic metre being derived from a calculation of the volume and tendered amount in the tender. That may have been an appropriate measure for a masonry concrete wall but it was not appropriate for poured concrete. A note was given for a similar type of work, namely, at item 9ii being for the concrete footings. It was \$420.00 per cubic metre. Using that figure an appropriate amount would be \$19,040.00. However, the plaintiff only ever claimed \$15,089.00 for this work and does not seek to claim any more. In this case I am satisfied that the plaintiff is entitled to \$15,089.00 for this variation.

Variation 11

72 The plaintiff submissions on this variation were as follows: "*This variation relates to additional excavation required for the North Brewarrina Access Road. The amount in issue is \$455 plus GST. Mr Beckhaus provided details of the variation in paragraph 67(c) of Exhibit G. He was not cross examined in relation to this evidence.*"

73 Although there is minimal evidence that this variation was measured on-site there is no evidence of any approval or direction.

74 In these circumstances the variation should be refused.

Variation 16

75 The plaintiff's submission in relation to this variation were as follows: "*This variation relates to additional testing costs. The amount claimed is \$26,348 plus GST. The basis of calculation of this amount is set out in the letters dated 17 April 2002 and 24 April 2002 which are tabs 34 and 35 to Exhibit H.*

This variation is dealt with by Mr Beckhaus at paragraph 67(d) of Exhibit G. Mr Beckhaus was not cross examined in relation to this evidence.

The Plaintiff's entitlement to the costs of additional testing arises pursuant to the terms of the letter from the Plaintiff to Mr Komp on behalf of the Defendant dated 10 September 2001 which was incorporated into the contract (pages 26-27 of Exhibit J).

The relevant provision is item 9 which provides:

'9 Testing – Item 16 (SP1) and 7(SP2) are not priced as provisional. Any additional tests required would be charged at their relevant rate but a lesser testing regime will not reduce these values.'

The references to item 16 (SP1) and 7(SP2) are clearly references to the Schedule of Prices included in the Plaintiff's tender which was incorporated into the Contract (pages 49-61 of Exhibit J).

Item 16 (SP1) is clearly Item 16 of the Schedule relating to Separable Portion A (page 56 of Exhibit J). That item, next to which a figure of \$32,000 is listed, provides:

'16 Geotechnical/Concrete Testing in accordance with Specification (Provisional Quantity).'

Item 7 (SP2) is clearly Item 7 of the Schedule relating to Separable Portion B. (page 59 of Exhibit J). That item, next to which a figure of \$18,000 is listed, provides:

'7 Geotechnical/concrete testing in accordance with Specification (Provisional Quantity).'

In the Plaintiff's submission it is clear that the intention behind Item 9 of the letter of 10 September 2001 was that the Plaintiff would be entitled to be paid the sum of \$50,000 in respect of testing, even if the cost to the Plaintiff of testing in accordance with the specification was less than \$50,000. However if the cost of testing exceeded \$50,000, the Plaintiff was to be entitled to reimbursement of such additional costs.

This intention appears clearly both from the words of item 9 in the letter of 10 September 2001 and from the fact that in the absence of item 9 the costs of testing would have been a fully provisional sum by reason of the terms of Items 16 (of Separable Portion A) and 7 (of Separable Portion B) of the Schedule of Prices.

As is demonstrated in the schedule attached to the letter of 17 April 2002 (Tab 34 to Exhibit H) the sum claimed by the Plaintiff as variation 16 is the additional costs of testing incurred by the Plaintiff in excess of the \$50,000 allowed in the Schedule of Prices.

Pursuant to the terms of Item 9 of the letter of 10 September 2001 the Plaintiff is entitled to those costs as a provisional sum."

- 76 What is not apparent from the plaintiff's submissions is that the letter of 10 September 2001 was a pre tender letter, which set out a list of items that were to be discussed at a pre-contract meeting on 17 September 2001. The letter asked the Council to consider that and other items in the discussion. The evidence of the outcome of such discussions, which occurred before the execution of the contract, was rejected. The written document, which was executed, was a one-page formal instrument of agreement. It incorporated by attachment a number of different documents. For example, the tender, special conditions, specification and Beckhaus Pty Ltd post-tender correspondence. It also incorporated minutes of a post tender meeting held on 8 August 2001 but did not incorporate the minutes of the meeting held on 17 September 2001 at which the plaintiff in its letter of 10 September 2001 had asked that a number of matters be considered. In a letter written on the day after the acceptance of the tender on 25 September 2001 the plaintiff did not refer to the particular matter in question. There is thus no correspondence or other document which puts item 9 in the letter any higher than a request for discussion. There is thus no provision in the contract for the payment of any extra amount for testing.

- 77 Clearly in the letter Mr Beckhaus is referring to the fact, which appears on the face of his tender document, that his tender was for a lump sum figure. In my view there is no entitlement to this variation.

Variation 17

- 78 The submissions on this variation were confused because the plaintiff in its submissions on the variation in chief addressed the claim for provisional quantities, which I have dealt with earlier. In its submissions in reply it says that variation 17 does not relate to excavation and filling of key trenches but rather to the conditioning of soil for the filling of key trenches. It claims that this is a separate item to what is dealt with by way of provisional items in the schedule of prices when it deals with key trenches. The costs are said to be at the agreed rate as per item 5 (i) of separable portion A of the schedule of prices for stabilising additional soil not included with items 4 (ii) or 5 (i) of separable portion A or item 4 of separable portion B.
- 79 The actual letter making the claim is dated 24 April 2002. The letter talks of the measurement of provisional items and then goes on to describe the present claim in these terms: "Assessment of these quantities have let us to find that no allowance has been made within the schedule for the provision of zone A material less than 12 percent linear shrinkage for these extra volumes or indeed for any other unsuitable removed during the work. In this regard we hereby provide details of claim for this work based on stabilisation rates shown in the schedule."
- 80 The claim is then made for a volume of material at the rate of \$5.20 per cubic metre totalling \$106,240.40. It is the rate that is referred to in item 5 (i) of the schedule of prices.
- 81 The first question is whether the requirement, for instance under item 6 (vi), includes any necessary stabilisation of that material. The terms of that clause envisages the whole of the process, namely taking from the borrow pit,

transport, placing and compaction of the zone A clay fill material. The material to be placed must have been stabilised. Borrow pit stabilisation is dealt with under 4 (ii). What the plaintiff is saying is that the quantities referred to in item 4 (ii) namely 47370, or if existing levee material under 5 (i) is used, namely 10,920 did not include an estimate of the volume required for key trenches and the replacement of unsuitable material.

- 82 If that is the case, then there is no item for the stabilisation of the additional material. The plaintiff would not be able to estimate the amount to include in the quantities to which I have referred because it was not known at the time of tender how much material would be excavated from key trenches or deemed as unsuitable material. Those volumes are quite properly dealt with by provisional quantities in the schedule of prices. The plaintiff has adopted the correct procedure and used only stabilised material. In these circumstances there is a clear omission of necessary work from a schedule of prices and the plaintiff should be entitled to recover in respect of this item under clause 3.3(a) of the general conditions.
- 83 The remaining question is whether it is factually correct that the additional volume of material was not included in the estimated quantities for the two particular items to which I have referred. There was cross examination of Mr Beckhaus on this aspect but unfortunately the cross examination put totals to Mr Beckhaus, which included items, which were not part of the provisional quantities. This means that his cross examination is of no assistance. According to the letters for the submission of the claim, the appropriate estimation has been made. Accordingly, I am satisfied that the additional quantities which had to be stabilised were not included in the fixed prices for stabilisation estimated in the schedule of prices. In these circumstances the plaintiff is entitled to be paid for this variation in the sum of \$106,240.40.

Variation 18

- 84 The plaintiff concedes that it cannot succeed on this variation.

Variation 20

- 85 This variation relates to the costs incurred in preparing measurements of provisional quantities as required by the superintendent by letter dated 22 March 2002 (tab 36 of Exhibit 11). The amount claimed is \$650.00 plus GST.
- 86 The plaintiff's submission was that these costs are payable by the Council either pursuant to clause 31.7 of the General Conditions of Contract as a cost of testing (pursuant to clause 31.1, "test" includes measure), or pursuant to the last paragraph of clause 40.5 of the General Conditions of Contract.
- 87 Clause 31.7 provides the costs of and incidental to testing that shall be valued under clause 40.5 and shall be borne by the principal or paid by the principal to the contractor unless, *inter alia*, the contract provides for the contractor to bear the costs. The request was made in respect of clause 8.3, 8.4 and 8.5 of the specification. In clause 8.3 the contractor is to provide an adequate survey to calculate the quantity of unsuitable material removed. In 8.5 the contractor shall allow for such a survey and is obliged to supply the survey information. Clause 8.4 is silent on the matter.
- 88 In these circumstances I am not satisfied that the plaintiff is entitled to this variation or any part thereof as the evidence does not address each item of the specification.

Variation 21

- 89 This variation claim is summarised in the following submissions made by the plaintiff: "*Variation 21 reflects the costs to the Plaintiff of holding its machinery in Brewarrina after the Plaintiff sought practical completion, in order to rectify any defects notified by the Superintendent. Because the Superintendent failed to grant Practical Completion and failed to provide a list of defects, the Plaintiff was obliged to keep its machinery and employees on standby for over a month.*

The cost of keeping equipment and employees on standby is payable by the Defendant either as delay costs pursuant to Clause 36 of the General Terms and Conditions (Exhibit A) or alternatively as damages for breach of Contract by reason of the Defendant's failure to ensure the Superintendent acted promptly to issue a list of defects.

The Plaintiff notified the Defendant of the delay costs being incurred by letter dated 4 April 2002 (Tab 40 to Exhibit H), and notified the Defendant of the amount claimed by letter dated 29 May 2002 (Tab 41 to Exhibit H).

Mr Beckhaus was not cross examined in relation the calculation of the delay costs. Nor was it put to Mr Beckhaus that in fact those costs had not been incurred.

The Defendant's resistance to the Plaintiff's claim in respect of variation 21 appears to rest on the proposition expressed in paragraph 113 of Mr Corven's affidavit of 5 March 2004 that there were during the relevant period outstanding directions requiring the Plaintiff to rectify or complete works so that the delays were not the responsibility of the Defendant.

In the Plaintiff's submission none of the purported directions referred to by Mr Corven was properly issued. However, that question raises issues which are the subject of evidence on the cross-claim which has not been concluded. Therefore this issue cannot properly be the subject of submissions at this stage."

- 90 The Council agreed that the variation raised issues on the cross-claim, which will require reference to that evidence and my findings thereon in order to determine the claim. The Council also raised various directions from the Superintendent Mr Corven, which it says required the plaintiff to rectify or complete certain works and to provide test certificates. In part, these matters have been dealt with by me when dealing with the claim for a declaration in respect of the date of practical completion and also in part in respect of the matters which I will

consider under the next heading. However, given my findings later on the cross-claim, the parties may wish to make further submissions on this claim. I will receive these and deal with them in due course.

Supply of information in respect of progress claim No 7

- 91 As I stated in my earlier judgment on the summary judgment application in this matter, the entitlement to receive information is based upon the opening sub-paragraph of clause 42.1 of the general conditions. That provision requires the contractor to deliver "to the superintendent claims for payment supported by evidence of the amount due to the contractor and such information as the superintendent may reasonably require". On a first reading of this clause it would seem that the claim, when delivered, would need to be supported by the appropriate information. The superintendent would need to have identified the information prior to the lodgement of the claim. Making a request after the lodgement of the claim would not be in accordance with the clause. The Court of Appeal approved this approach.
- 92 On 22 March 2002 Mr Corven issued two directions for information only one of which appeared to be related to an assessment of a progress claim. That was the letter in which he asked for surveys to be provided for the calculation and determination of payment for provisional sums regarding various numerated items. The information he required was to be received no later than 4 pm on Thursday 28 March 2002.
- 93 Progress claim no 6 was lodged on 27 March 2002 and the information requested by Mr Corven in his letter of 22 March 2002 had not been supplied by the time it was required on 28 March 2002.
- 94 I am, of course, concerned with progress claim no 7 which was lodged on 26 April 2002.
- 95 In a letter written by Mr Corven on 18 April 2002 the following was said: *"I have reviewed my files including those handed to me by the previous superintendent and have not found any progress reports as is required under clause 22 of the special conditions of contract. I advise that your submission of progress claims do not constitute progress reports.*
- Accordingly I confirm the advice of 17 April 2002 that I am unable to agree to your proposed progress meeting on 18 April 2002 until such time as I have received from you a progress report on the whole of the contract to date in the format that I have attached.*
- I direct that you provide me with a progress report in accordance with the attached format by 4.00 pm on 30 April 2002."*
- 96 The letter enclosed a form headed "contractor's monthly report", which was the form which was filled out and submitted under cover of letter of 29 April 2002 from the contractor to Council. In a letter of 3 May 2002, Mr Corven indicated that the information supplied in the report was not sufficient.
- 97 What Mr Corven had probably not directed his attention to at that stage were the precise provisions of special condition 22 which dealt with the submission of progress reports. That provided that the contractor shall issue monthly progress reports in a format mutually agreed by the contractor and the superintendent. As became perfectly plain during Mr Corven's cross examination, he sought no agreement on the form of the report prior to submitting it and he was aware at the time that the parties had dealt with the matter orally on site. Mr Komp who was the former superintendent had not required any progress report. In my view the attempt by Mr Corven to unilaterally impose a form of reporting without seeking to agree to an appropriate format beforehand was not reasonable in the circumstances. Accordingly, I would not regard this request as one which would be a condition precedent to the obligation to issue a progress certificate.
- 98 I note also that unlike the hearing before me on the summary judgment application there was no evidence by Mr Corven as to his purpose in sending the letter of 18 April 2002.
- 99 I return again to the question of the request for survey material, which was required in the letter of 22 March 2002. Clearly it was supplied, as I have mentioned for progress claim no 6. By the time progress claim no 7 was issued there were claims for additional material by way of provisional sums. Clause 8.3 of the specification which deals with unsuitable material requires the contractor to provide an "adequate survey to calculate the quantity of unsuitable material removed. The survey calculation shall be forwarded to the superintendent for checking and approval for payment purposes..."
- 100 Clause 8.5 which deals with key trench excavation and other provisional items provides that "the contractor shall allow for survey pick up of the excavated key trench prior to backfill and forwarding of the survey data in .DXF4.ASCII the format for calculation of solid quantities by the superintendent". The provision of this material was first referred to in a letter of 10 April 2002 from the plaintiff to the Council.
- 101 According to the covering letter for the progress claim no 7, the original letter was to be hand delivered by Mr Strategis on the following Monday that was in fact 29 April 2002. A letter of that date refers to the fact that such information had been completed and submitted. The letter then goes on to deal with the cost of such work. What actually happened seems to be reflected in a letter from the plaintiff to the Council of 1 May 2002 which was in these terms: *"We note that you would not accept measurement logs for provisional quantities offered to you by John Strategis at your office last Monday. Of course you are well aware that (on 22/03/02) you directed us to supply this information. 'Required for calculation and determination of payment for provisional sums...in CSI schedule of prices'."*

Not only have we supplied these log surveys (taken by our site supervisor in agreement with the superintendent) but we have calculated the quantities so removed and made the claim in pc#7. You should also be aware that the responsibility for these measurements rested with the superintendent who has advised us of our intention to make a claim (BRWNFX SUPT41) for costs of preparing these records and measurements.

The superintendent has a responsibility under the contract to receive and assess claims made by the contractor. We attach herewith the log summaries prepared by John. Please assess them in the next progress certificate."

102 No reference was made in the affidavit material of Mr Corven to the insufficiency of the material which apparently was tendered on the lodgement of the original progress claim no 7.

103 There was some debate in cross examination about the supply of this information and whether or not it was survey information. The situation that emerged was as follows:

"Q. We touched on this morning. In relation to the key trenches, you did seek survey information from Mr Beckhaus?

A. Yes, I did.

Q. You sought that information pursuant to clauses 8.3, 8.4 and 8.5 of the technical specification?

A. I believe they're appropriate clauses, yes.

Q. Your second letter in behind tab 3, the letter of 22 March written one day after you embarked upon your job as superintendent; you see that?

A. Yes, that's correct.

Q. You accept now that to have been an oral agreement between Beckhaus and Mr Komp that such survey information was not required?

A. Yes.

Q. Notwithstanding that you assisted upon his supply?

A. No.

Q. Mr Stratigis ultimately provided you with a survey that he had carried out?

A. No, he provided me with some calculations based on the drawings.

Q. When you discovered this agreement. Did you write back and say: We no longer now require survey information or not.

A. Yes - Not in those terms.

Q. You didn't, did you?

A. But I did say this morning when you drew my attention to one of these documents clause 17 - item 17 that I had agreed that I understood there was an agreement.

Q. Before you wrote any of the letters that you wrote seeking documents and information to Mr Beckhaus in March, did you go and sit down and have a hand over meeting with Mr Komp to find what you could ask for and what you wouldn't having regard to what had gone on before?

A. No, I didn't.

Q. You think that would have been something that a superintendent who is charged with acting reasonably and impartially ought to have done?

A. Was that a question?

Q. Yes. Do you think that a superintendent charged with the obligation of acting impartially and fairly, ought to have spoken to the previous superintendent in some hand over meeting before going ahead with issuing directions?

A. Mr Komp still-

Q. Do you think it was something that ought to have been done?

A. In normal circumstances Mr Komp did do work for council and I did have several conversations with him.

Q. You didn't have any discussions before you wrote your letters of the 22 or so March?

A. That's irrelevant. The information which was required in the contract wasn't in the documents handed to council.

Q. If it wasn't in council's file irrespective of whether it was required by Mr Komp or not, you took the view that you could demand it?

A. It was required under the contract.

Q. If the information that was required under the contract was not in the council's file and irrespective of whether or not Mr Komp during his administration had required it, you took the view that you had justification for demanding this provision?

A. Yes.

Q. You regard such a stance as being one which demonstrates, on your part, that you were acting reasonably and impartially?

A. Yes, these were simple requests for information. If the contractor had an agreement with the previous superintendent that the information was not required, then surely he would have advised me of that upon receipt of my requests for information."

104 Mr Corven had not taken the trouble to acquaint himself fully with the project and the arrangements in hand between the contractor and the previous superintendent. It seems to me somewhat unreasonable that at the end of the contract, after the opportunity for survey had passed, for him to then insist upon survey information rather

than the logs of the material taken. In these circumstances I do not think that the superintendent was acting reasonably.

105 It follows that there was no breach of the condition in respect of progress claim no 7.

The cross-claim

106 The cross-claim includes claims for damages for breach of contract and damages and orders pursuant to various sections of the **Trade Practices Act** 1974 (Cth) and the **Fair Trading Act** 1987 (NSW). I will deal first with the claim for damages for breach of contract. It is to be borne in mind that the council thus has cross-claimed and has the onus of proof in respect of the cross-claim. In this regard section 140 of the **Evidence Act** 1995 (NSW) should be noted. It repeats in some respects the common law and is in these terms:

“140 *Civil proceedings: standard of proof*

(1) *In a civil proceeding, the court must find the case of a party proved if it is satisfied that the case has been proved on the balance of probabilities.*

(2) *Without limiting the matters that the court may take into account in deciding whether it is so satisfied, it is to take into account:*

- (a) *the nature of the cause of action or defence, and*
- (b) *the nature of the subject-matter of the proceeding, and*
- (c) *the gravity of the matters alleged.”*

107 The reason for mentioning this section is that much emphasis has been placed in the Council's submissions upon the gravity of the consequences if the levies should fail. I have earlier referred to the general conclusions expressed by Professor Fell and Dr Truscott and their accounts in terms of danger to the population of the town of Brewarrina. Reference was made to the 1991 audit which referred to the substantial costs which would result from flooding which would cause extensive damage to the town and include injuries, loss of life and trauma.

108 In this respect, the project with which this case is now concerned is like many civil engineering projects in the State insofar as it is one that is undertaken for the public good and the public safety. As to precisely how I should take into account the issue in respect of public safety was not addressed in submissions. To the extent that there are submissions that there has been a wilful disregard of the contractual requirements, no doubt any decision on that matter would need to take into account the seriousness of any such conduct in terms of public safety. It does not however mean that because public safety is involved there should be a lesser standard of satisfaction in respect of a decision on the cross-claim.

109 It should also be appreciated in respect of this case that although one expert expressed views about the inadequacy of the design of the levies the appropriateness or otherwise of the design is not a question that is raised in these proceedings. The proceedings only deal with the construction of the levees as specified in the contract.

110 It will be necessary to look at the evidence of the Council's principal experts on each of the main areas concerned in the cross-claim. I will first deal with the most critical area, namely, whether or not an appropriate standard of compaction was achieved in accordance with the contract specifications. In doing this I will first look at the nature of the evidence given by Professor Fell and Dr Truscott and then move to a detailed consideration of the basic facts upon which their conclusions are based.

Compaction

111 The principle requirement for the compaction of earthworks is contained in clause 8.9 of the technical specification. For the purposes of this case the important clause is clause 8.9.2 which is in the following form:

“8.9.2 Levee Embankments

This clause applies to Zone A Clayfill as well as Material Replacing unsuitable Material, and backfill to the Discharge Pipes and Stormwater Drainage Pipes.

Materials shall be uniformly compacted in finished layers not exceeding 300mm in thickness by the use of a padfoot roller or similar which provides a kneading method of compaction. The use of power tampers in compacting thin layers shall be applied for all areas which cannot be compacted using a roller.

*Materials shall be placed and compacted to achieve a minimum *Hilf* Density Ratio of 95% (Standard) when tested in accordance with test method AS1289 – 5.7.1. The *Hilf* moisture variation shall be within – 3% dry to)% wet of the Optimum Moisture Content.*

Care shall be exercised during lapses of construction to prevent surface drying of these zones. Should this occur then approved corrective action shall be employed. This action shall consist of either scarifying the surface, rewetting and compacting to the above standard or removal of the upper dry material to the satisfaction of the Superintendent.”

112 Section 3 of the specification dealt with stormwater drainage including culverts, reference to which is made throughout the evidence. Clause 3.7 of the specification provides for a similar percentage and maximum density and provides that the compaction shall be in layers not exceeding 150 mm of compacted thickness.

Professor Robin Fell's evidence

113 Professor Fell considered the likely mechanism for failure of the levee and concluded that the most likely failure mode was by internal erosion and piping which was likely to be through the embankment around pipes and conduits and behind cutaway walls. He identified the factors most likely to affect a failure as being: *“The degree of compaction of soil – if the soil is poorly compacted there will be permeable zones in which seepage and initiation of erosion can occur.*

The erodibility of the soil as measured by laboratory tests, and as observed in the field, and how this is modified by compaction; and the adding of lime or gypsum which inhibits dispersion.

Whether the soil cracks to a depth such that when the flood waters reach the cracked soil, erosion can initiate."

- 114 Professor Fell then went on to consider the question of compaction and referred to the results of the density tests which had been carried out and to which I have earlier referred. He also referred to and relied upon some dynamic cone penetration tests which were done by Guttridge Haskins and Davies in 2003. These tests were referred to in the evidence as "DCP" tests. On the assumption that all such results were accurate, apart from the CETS tests he concluded as follows:

"19 From this it is concluded that:

- (a) Much of the fill in the Charlton Road Levee was compacted to the Specified 95% density ratio, but a significant amount was not well compacted.*
- (b) The fill in the Northern and Southern overlays was not well compacted. About 7% (the red zones) is virtually uncompacted, about 28% (the yellow zones) is poorly to inadequately compacted, and 65% probably satisfactorily compacted. If only the (more reliable) density in place testing is used, only about 15% passes the specification.*
- (c) The fill above the pipes and culverts is very poorly compacted. Virtually all falls into the "red" or "yellow" zones. It seems likely much of the fill was not compacted at all or if it was, it was in thick layers with inadequate rolling and moisture content control.*
- (d) The backfill behind the retaining walls on the North Brewarrina level is all in the "red" or yellow" zones, and it seems fill behind three of the four walls was not compacted at all.*
- (e) The remaining fill in the North Brewarrina Levee is a mixture of well compacted and inadequately compacted soil."*

- 115 Having based his results on the tests, other than the CETS tests, he then had to explain those tests. The CETS testing, as I have earlier recounted, showed that in respect of compaction the finished material achieved the desired result. In paragraph 22, Professor Fell suggested that the CETS tests results could be ignored for the following reasons:

"22 The question arises why the CETS Testing showed the fill was well compacted, where the later testing shows otherwise. Possible explanations are:

- (a) Most of the testing was on the Charlton Levee which Douglas testing showed mostly met specification.*
- (b) The testing was done on selected, well compacted soil; for example, on the top of layers which were well compacted.*
- (c) No testing was done on backfill around pipes, culverts and wall backfill.*

23. It is thought likely that all three reasons apply."

- 116 Professor Fell provided some questions and answers to those instructing him. He developed what might flow from the failure to achieve the required contractual level of compaction. In answer to a question as to what the potential consequences, if any, of the departure in respect of the compaction relating to the performance of the levee, its safety and integrity, he said the following:

"48 Answer: The levees are much more likely to develop internal erosion and piping problems than if they had been compacted to specification. It must be recognised that it takes only one layer of poorly compacted soil to give a path for seepage and initiation of erosion. There are many such layers in the Northern and Southern levees, and around pipes, culverts and walls, and most likely some layers in the Charlton, North Brewarrina and Tarrion Creek levees."

- 117 Professor Fell then went on to deal with what was necessary to rebuild the levees. In doing so, he recognised that the cost of such work would be substantial. Other persons gave evidence as to the cost of any necessary rework.

Dr Glen Truscott's evidence

- 118 In Dr Truscott's report he refers to the density testing which was carried out at the conclusion of the contract and during his investigations in 2003. He also refers to the DCP tests. He puts to one side the testing carried out throughout the course of the contract and his ultimate conclusions at paragraph 12 were as follows: *"In my opinion, it is highly probable that one or more of the levees will fail in the event of a flood, for the following reasons:*

The density of the material around the culverts and immediately adjacent to the levee retaining walls is so low that the levee is likely to wash out at at least one of these locations during a flood considerably less than the design flood. This situation is aggravated by the high linear shrinkage results. This matter is considered critical to the security of Brewarrina and remedial works are required urgently.

Generally the density of the material in the overlays on the Southern and Northern Levees is also low and remains about the same as for the levees dumped in the 1970's. The only improvement is the random reduction in linear shrinkage. Hence, most of these levees are no better than the old, dumped levees.

The materials in the Charlton Road and Tarrion Creek Levees are also generally below the required density and have linear shrinkages above 12%. This, together with the low densities in the pavements, means the pavements cannot be relied on to prevent cracking and cracks are likely to extend below the 1 % flood level. These levees will therefore leak and probably fail during floods less than the design flood.

Density testing and the DCP results on North Brewarrina Levee indicate that this is not adequately compacted. Also the linear shrinkage results indicate a significant amount of the levee material has a linear shrinkage greater than 12%. Hence this levee cannot be relied upon to protect North Brewarrina in the event of a significant flood.

The above matters are critical to the safety of the levees and require urgent attention.”

Council’s case on the aspect of compaction

- 119 The plaintiff presented three broad bases upon which it attacked the conclusions of Professor Fell and Dr Truscott. These were:
1. *It called its own expert, Dr Brian Burman to deal with the assumptions made by Professor Fell and Dr Truscott in their reports.*
 2. *It relied upon the cross examination of those involved in the carrying out of the Barnson’s reports to show that the Barnson tests were conducted improperly and were unreliable.*
 3. *It submitted that in any event the opinions expressed by Professor Fell and Dr Truscott failed to comply with the requirements laid down in the **Makita (Australia) Pty Ltd v Sprowles (2001) 52 NSWLR 705** in that their opinions did not describe or elucidate the process by which the logical step between the test data and their ultimate conclusions in respect of the condition of the levees was made.*
- 120 I will first briefly refer to the points made by Dr Burman in his report before moving to the second of the matters referred to above which became fundamental to the adequacy or reliability of the Barnson test results.
- 121 Dr Burman dealt with the compaction of the levees and culverts in separate parts of his reports. In respect of levees the matters to which he addressed himself were as follows:
1. *The CETS method of testing was more reliable than the nuclear densonmeter testing adopted by Barnson.*
 2. *The location of the Barnson’s tests. He identified that some of the tests done by Barnson were not in the new levees but in the old levees dating back to 1976 or might arguably be in such old material.*
 3. *The reliability of Barnson’s tests. On this aspect Dr Burman referred to*
 - (a) *calibration of the Troxler nuclear gauge*
 - (b) *calibration range of the Troxler nuclear gauge*
 - (c) *field moisture content*
 - (d) *comparative nuclear and sand replacement tests*
 - (e) *field procedures*
 - (f) *DCP correlation*
- 122 Dr Burman’s ultimate conclusion was that the GHD/Barnson test results were flawed in several significant respects and that those results were further compromised as to their locations to the extent that there was insufficient reliable data on which Professor Fell and Dr Truscott could reasonably have based their far reaching and serious conclusion.
- 123 Dr Burman referred to Golder’s testing in August 2003.
- 124 Dr Burman analysed them under these headings:
- (a) *maximum dry density tests*
 - (b) *field moisture condition*
 - (c) *location of the Golder tests*
- 125 His conclusions showed that the Barnson field density results were not only unreliable, but mostly, if not all, wrong. This together with his earlier matters led him to the view that the expert opinions did not have the appropriate foundation in the results.
- 126 In respect of the culverts Dr Burman analysed the field density testing carried out by Barnson and Golder at culverts and he concluded that the opinions had been based upon flawed data.

Barnson’s compaction tests

- 127 These tests were carried out under the supervision Mr Newnham a geologist with GHD Pty Ltd (“GHD”). His factual report annexed to his first affidavit sets out the results. The test pits were dug by a Mr Wilson who used a backhoe. It is to be appreciated that the purpose in taking the tests was to take tests at a depth in the levee material in contrast to the progressive testing conducted as the works were constructed and carried out by CETS.
- 128 The measurements by a nuclear densonmeter gauge were taken in the field in the excavated pits by Mr Brown from Barnson. In respect of compaction he also did the laboratory testing required to complete the tests. All the tests were collated by Mr Newnham and presented in his report.
- 129 The tests which were supervised by Mr Newnham were carried out in April 2003 and in July 2003. This was some fourteen to seventeen months after completion of the project. In the April 2003 testing there were fourteen tests carried out on the northern and southern levee overlays. It will be recalled that these levees were constructed over the existing levees and hence the use of the word “overlays”. In respect of these tests none of them achieved the contractual limit of 95% and the minimum was 74%. In April 2003 there was also a series of tests carried out around the culverts in the northern levee, southern levee and Charlton Road levee. There were ten tests in all, one of which passed the contractual density ratio of 95% and the minimum being 68%.
- 130 In July 2003 there were six tests taken in the north Brewarrina levee none of which achieved the contractual specification figure with the lowest being 85%. There was thus no testing in the Tarrion Creek levee. All these results are extraordinarily low and given the other testing, namely, the CETS testing during the course of

construction and the Douglas Partners immediately on the conclusion of the work, there is a real question which arises as to the accuracy either of the Barnson tests or those with which they are contrasted. For example, the Douglas Partners test done in April a month after the site was left showed that nine out of ten of the tests passed the specified contraction limit of 95% and the one that failed was only 94% which was well within the order of accuracy expected from such tests.

- 131 The other testing with which Barnson was involved was the parallel testing which occurred when Golder carried out testing for the Council in August 2003. Golder carried out eighteen compaction tests and Barnson carried out seven by testing in parallel close to where some of the Golder test pits had been dug. I will return to these in due course but I will first deal with the analysis of the procedures involved in carrying out the April and July tests by Barnson under the supervision of GHD.
- 132 The following criticisms of the test procedures adopted in April and July were made:
1. Use of a backhoe to dig to test depth.
 2. Failure to take standard counts in trenches.
 3. Excavating below probe depth to take a sample.
 4. Failure to identify location of the tests.
 5. Calibration of the Troxler machine and its use outside its calibrated range.
 6. Unreliability of laboratory test procedures.
 7. Laboratory tests performed outside the moisture limits fixed by standards.
- 133 I now turn to each of these matters.

Use of a back hoe to dig to test depth

- 134 There is no doubt that a backhoe having a tooth bucket was used to dig to the appropriate test depth during these trials. It also should be noted that the same procedure was used in the Golder Barnson tests which were carried out in August. The relevance of the matter is that there must be no disturbance of the surface material in respect of which the test is conducted by placing the nuclear densometer on the surface. Dr Burman noted in his report that the plain bucket is normally used to prepare test sites. Both Dr Burman and Dr Truscott agreed that surface preparation was important. This is so that the gauge sits flat on the ground with no air voids under it which could cause errors in the reading. It is clear that there was preparation of the surface. Without further evidence I do not think that the fact that a back hoe with teeth was used leads to the inference that the surface was not prepared properly, a fact which Mr Brown gave sworn evidence that it was so prepared.

Failure to take standard counts in trenches

- 135 Note 3 to the Australian Standard AS 1289.5.8.1 provides that a nuclear densometer gauge should not be used within 150 mm of a vertical projection. That note (which appears on page 5 of the Standard) also states that when a gauge is used within 600 mm of a building, trench or other structure, the effects of reflected radiation can be minimised by determining standard counts of each proposed test site prior to each test.
- 136 It is plain from the evidence that no standard counts were taken in any of the trenches during the April or July testing. This emerged because Mr Brown was informed of the need to do this when he was conducting the parallel testing in August by someone from Golder.
- 137 The question that naturally arises on this involves the width of the pits that were dug using the backhoe. Mr Brown conceded at times that the trenches were dug using a 300 mm wide bucket but claimed there was never a trench that was less than 600 mm to start with. The evidence of Mr Wilson who actually operated the backhoe to dig the trenches is quite different. He used the backhoe in all but two test locations and used the 300 mm bucket for all of the holes he dug with the backhoe. There were photographs of the test pits and with the benefit of these photographs Mr Wilson was cross-examined as to the width of the test pits which were easy enough to determine given the number of teeth on the bucket. There were obviously one or two test pits that were wider than 300 mm but he agreed in terms of the deeper test pits most, if not all, of them were dug to one bucket width.
- 138 The Troxler gauge is 231 mm wide and in order for the gauge to be placed so that it is more than 600 mm away from the trench wall on either side, the trench would have to be at least 1.4 metres wide. This clearly was not the case. There is thus a breach of the standard in relation to the failure to take a standard count. In trenches that were only 300 mm wide it was of course, given the size of the Troxler gauge impossible to keep it more than 150 mm away from the walls of the trench. In these circumstances the standard did not allow for such equipment to be used to take field density measurements.
- 139 There was cross examination of Dr Burman directed to suggesting that the effects of proximity to walls were only relevant when testing moisture content by using the back scatter mode of the equipment. In his cross examination Dr Burman did not concede to that proposition. He also pointed out that a result would not be achieved if one did not use the direct transmission mode. A perusal of the manual for the Troxler gauge or such parts of it that are in evidence in Exhibit 22 would indicate the use of offsets when determining density and moisture because of the problems of vertical structures scattering neutrons and gamma photons back to the gauge. The procedures for determining the standard counts involved the use of the device in back scatter mode but that does not make the problem irrelevant when using direct transmission mode. I am satisfied that the standard requires these appropriate standard counts to be taken when using the gauge in direct transmission mode which occurred during the measurements on this occasion.

- 140 As the manual makes plain, the failure to do this increases the possibility of moisture or density errors due to high counts. In my view this is a serious breach of the testing protocol which renders the results suspect.

Excavating below probe depth to take a sample

- 141 Standard AS1289.5.8.1 requires that where it is necessary to take a sample in addition to the measurement from the gauge, the sample should be obtained from a test site by excavating a hole with vertical sides to the depth at which the probe was located during the tests. There was a concession in the evidence by Mr Brown that on occasions he took the sample from further down than the probe depth. There is no evidence as to how often this occurred and the effect it might have on the results is doubtful. Obviously the standard is there to ensure that the same material is used as was used in the nuclear densimeter gauge readings, namely, from the bottom of the probe depth back up to the gauge. Given the absence of any evidence on the effect of any such practice and the lack of detail, I do not think this is a serious matter.

Failure to identify location of the tests

- 142 Following the raising of this matter by Dr Burman in his report, Mr Newnham conceded that three tests taken in the northern levee being tests numbers 29 and 51 were in fact carried out in the old levee material. In respect of two further tests in the northern levee, namely, tests numbers 15 and 18, he classified them as doubtful as the test pit logs indicated that the test was located in new levee fill but the site survey indicated that the test lies below or on the boundary of the design base of the zone A clay fill. There was also one test, namely, test number 13 in the southern levee which fell into this category. It was Mr Newnham's view that on the basis of the test pit log it was most likely that the results were located in the new levee material or reworked material.
- 143 There are a number of problems with the measurement of the location of the test pits and this is of importance in determining whether or not these doubtful tests were taken within construction work or in old fill. The test pits themselves were sometimes up to four metres by four metres of disturbed soil. However, the particular length of the test pit was not measured. Although the gauge would have been in the middle of the two sides of the pit, its distance horizontally from the logged face was not recorded. The logged face of the test pit was identified to within half a metre. It will be appreciated that these tests are on the side of the levees and at this point there is a slope of one in three where the new material is placed over the existing material. Even accepting the method of recording as being accurate, the question that arises is whether it is appropriate to have regard to the test pit logs rather than a clear demonstration of the position of the probe in a portion of the bank that was constructed in the material. In several places in his reports Dr Truscott indicated that it was difficult to determine whether exposed material in test pits was newly placed material or part of the old levee. This throws real doubt upon whether the test pit logs are reliable on this aspect. One surprising thing about test pit log 13 is that it seems to be located at the crest of the disused southern levee. In these circumstances one would assume that it was in old material. Test pit 13 clearly seems to be in old material and having regard to Dr Truscott's evidence there must be some doubt as to whether test pits 15 and 18 are located within the old material or the new fill. However, for the purpose of this analysis I will assume that test pits 15 and 18 had tests taken in new material.

Calibration of the Troxler machine and its use outside its calibrated range

- 144 The relevant Troxler machine at the time it was used to carry out the April and July tests was out of its calibration period. The machine had to be re-calibrated every two years and it was last calibrated on 11 October 2000. However, there is evidence from Mr Pilgrim, the manager of the company which leased the equipment, as to the tests which he did when the gauge had been returned after the tests. Those tests showed that no change had occurred in the integrity of the calibration of the Troxler and it was still operating within the manufacturer's specifications. In these circumstances the lack of a certificate has no direct effect on the result of the testing.
- 145 The Troxler machine has a certain calibration range within which it is to operate. It is plain from the cross examination of Mr Brown that in respect of most of the results the machine was operating outside its calibration range. Apparently if results approaching the proper compaction under the specification had been achieved it would have been operating within its calibration density range. The evidence given as to the effect that it might have on the results was that of Dr Fell who described the issue as not significant. Accordingly, this matter can be put to one side.

Unreliability of laboratory test procedures

- 146 This matter relates to the laboratory HILF tests carried out to determine the HILF density ratio of the soil. There is an Australian standard AS1289.5.7.1.-1993 which governs the relevant laboratory procedures. Those procedures required three separate samples to be prepared and treated in accordance with the standard. It emerged that Mr Brown had not collected enough soil in the field in order to have three samples and, accordingly, he reused the soil for each separate test. Mr Brown agreed in cross examination that the tests in April and July 2003 were thus not performed in accordance with the standard.
- 147 The effect of this was explored in the cross examination of Dr Burman who agreed that the effect of re-using the sample was to make the soil finer. This would mean that it would increase the maximum dry density. He was shown the page from the earth manual which indicated that the re-processing of soil tends to result in maximum dry unit weights of between 1 to 5 pounds higher than that obtained using unprocessed soil. Since relative density is the ratio between the field density and the maximum density overstating the maximum density, will result in an understatement of the relative compaction of the soil. It is thus clear that this procedure, which is not permitted by the standard, has the effect of reducing the relative density, which is the specification requirement. The degree of

reduction was not dealt with in the evidence but the matter clearly applies to all the April and July compaction tests and must affect their accuracy.

Laboratory tests performed outside the moisture limits fixed by standards

148 The standard, which is the one to which I have referred above, makes it plain that because of the empirical basis for the calculation of moisture variation, the method is limited to added moisture values between minus 4% and plus 6%. This means that the test is not appropriate when it is necessary to add more than 6% or subtract more than 4% moisture from the field sample in order to perform one of the three compactions. In cross examination Mr Brown agreed that most of the tests were not conducted in accordance with the standard in this respect and that, accordingly, they must be considered suspect. The standard itself makes that point. In respect of the tests in the northern and southern levee banks, tests 14 and 20, they were carried out within the limits. The tests at the north Brewarrina levee that were conducted in July were all carried out within the limits. This means that a large number of the tests in the northern and southern levees were not performed in accordance with the standard and may not be reliable.

Other matters which support the Branson tests

149 Mr Wilson, the backhoe operator, made reference to the fact that he found the digging quite easy. Given his experience is not directly relevant I do not find this evidence of any assistance. It certainly cannot extend to any quantitative evaluation that might in any way lead to compliance or not with the specification.

150 Such evidence has to be seen having regard to the actual evidence of those people on site including Mr Komp, Mr Moojen, Mr Macartney as to the factual way in which the compaction was achieved. There is no doubt about the evidence that the levee banks were compacted with a pad foot roller as required under the contract.

151 In the July tests Barnson used a Humboldt nuclear densometer rather than the Troxler machine. This machine only determined the wet density in the field, which is part of the procedure. This part was replicated in July by using a sand replacement method to determine the wet density. The sand replacement tests were thus only achievable in the field testing and they could not verify Mr Brown's laboratory procedures. The same procedures were used by him to determine the density ratio in the laboratory using the wet density determined in the field by the sand replacement method. Given the problems with the laboratory procedures these problems would affect the tests derived from the sand replacement method.

Conclusions on the Branson testing procedures

152 There are a number of serious errors in the testing procedures which were adopted in the field and in the laboratory. There is evidence to show that these serious problems mean that the results are unreliable and therefore *prima facie* one would not rely upon them for conclusions.

CETS testing

153 The CETS testing provided that in respect of the completed work all tests passed the required compaction levels. There were a substantial number of them, namely, in the order of 307 tests performed during construction. That result, if the tests were done properly cannot stand with the results of the Barnson tests in April and July. One explanation might be that the CETS procedures were inappropriate. On the other hand the explanation may lie in the Barnson procedures or, indeed, in the difference between the type of testing undertaken or the time difference between the construction work tests and the April and July 2003 tests. Whichever way the matter is observed it is necessary to consider the question, which was a live one in the proceedings before me, namely, the reliability of the results obtained from the CETS testing.

154 Mr Fred Moojen was the principal of CETS and he had working for him several technicians. He also had a secretary. His company had been used previously by Mr Beckhaus on another project and it was for this reason he was suggested for the present project. His laboratory was located at Musselbrook in the Hunter Valley and the site in question is at Brewarrina which is about a six hour drive away. The type of testing required sampling at the site with various tests and then a return to the laboratory to carry out the laboratory part of the tests.

155 Accommodation was made available for Mr Moojen and his staff if they wished to stay overnight at Brewarrina but they would some times simply leave early in the morning from Musselbrook and arrive at the start of working day at Brewarrina to carry out the appropriate tests. Mr Moojen gave evidence that all the tests referred to in his test reports had been carried out.

156 There was fairly extensive cross examination of Mr Moojen regarding his recording of the test results and it is apparent that there were a number of errors in the filling out of sheets in terms of dates and times and the failure to keep original handwritten notes made in the field. During the course of his cross examination it was suggested to him that he did not undertake field tests and laboratory tests on the same day as his records indicated and also that he did not attend the site on the dates which the Beckhaus Civil daily reports did not record the presence of a tester on site. There were a number of his records which showed him being on site doing testing on days where his presence or that of his employees was not noted on the Beckhaus daily reports. According to Mr Moojen in cross examination, there was no substance to the present submissions of the Council. The Council's submissions suggested that the test reports reported tests which had not taken place and that thus the working papers and test reports were fraudulently concocted. The basis for this submission seems to be:

1. That it was physically impossible to do the number of tests on some of the days in question.
2. There was no attendance on the site on certain days because the Beckhaus daily reports did not record the presence of the tester.

3. The establishment claims on the CETS invoices confirms the few times that CETS was on site.
- 157 The proposition that the test reports were fraudulently concocted was not squarely put to Mr Moojen nor was it put to any of the others who would have been involved in such a fraudulent enterprise, namely, Mr Beckhaus, Mr Macartney and others. The closest occasion came in cross examination was when it was put to Mr Moojen that the invoice he sent in January 2003 was sent because tests which he had invoiced were never undertaken by him and that the sending of the invoice was an attempt to cover his tracks.
- 158 What is plain when one looks at the attack mounted on Mr Moojen's evidence is that the Council has not sought to make a case that the testing was unreliable. More importantly it did not seek to make a case that the testing was not carried out using correct procedures. This is in marked contrast to the situation of Barnson testing which on my analysis was flawed in respect of the procedures, which they adopted.
- 159 Notwithstanding the failure to put these matters to Mr Moojen I will consider the basis for the submissions. The first matter was that it was physically impossible to do the number of tests on some of the days in question. The specific examples given were one day when Mr Moojen did 20 tests in the field and another day in April when he did 25 tests. Throughout the course of the contract in the field Mr Moojen carried out what are called sand replacement tests as well as taking samples back to the laboratory for further testing. This is in contrast to the determination of the relevant density by using the nuclear densometer. The occasion when tests were done in April was the only exception because on that occasion tests were done using the sand replacement test as well as the nuclear densometer humboldt machine. That particular series of tests which was after completion was of pavement and was required by the Council to be in that form. What we are dealing with here is Mr Moojen's ability to conduct the sand replacement tests.
- 160 The Council's submissions referred to the cross examination of Mr Moojen at transcript 732. At transcript 643.51 a careful consideration of the evidence given by Mr Moojen makes it absolutely plain that it only took him 10 minutes to do the test because he was dealing with clay material. At one stage he accepted as an assumption for the purposes of questions that it may have taken 30 minutes but it is plain that his evidence was that he could do the sand replacement test in 10 minutes. This evidence is consistent with Mr McKillop's evidence that a sand replacement test could be done in 10 minutes.
- 161 Given the evidence of Mr Moojen and Mr McKillop, which I accept, it is plain that to do 20 tests would probably take upwards of four hours in the field. The evidence of Mr Moojen was that if he got a call from Mr Macartney requiring testing he would frequently get up at 2 am and drive to Brewarrina, carry out the field work and then on the same day drive back to Muswellbrook to start the necessary laboratory testing. On several occasions and, indeed on the occasion concerning the day when 20 tests were done, he returned the following day to do further tests.
- 162 It is plain that such a programme would be physically demanding on Mr Moojen but it is perfectly apparent from his evidence, and I accept that he was endeavouring to provide a prompt and efficient service to his client. Obviously if he was testing work under construction it was critical that the contractor knew that the work had passed before further placement of soil and compaction could take place. Hence there was a need for a very fast turn around of the tests. The evidence was that the results were conveyed orally and the test certificates were sent to Beckhaus some days later when the paper work was completed. Having seen Mr Moojen give evidence on this aspect and when the considering the circumstances, it seems to me quite plausible that he would have worked this hard. He was running his own business in a competitive industry having gone out on his own some four years earlier. In my view there is no substance to the suggestion that it was physically impossible for him to have done the required number of tests in the time available. There is no doubt that the testing that he had to do in the laboratory required a time period of some 24 hours and there was some confusion in the evidence about the dates on which that part of the testing was said to have been entered in his records. Clearly what has happened, given his practice, is that the date recorded for the laboratory testing was at the commencement of the tests not at their respective conclusions.
- 163 The next point concerns the site diary records which have provision for recording whether a tester was on site and contained entries. Those daily reports indicate that CETS was on site a total of 13 times during construction and twice in April 2002. There were some 34 occasions when the CETS records indicate that they were on site and testing, which were not recorded in the Beckhaus daily reports. One of those records indicated a testing comment "tester on site!" for 25 January. Previously there had been some wait for the tester to get back to the site. CETS records show that the last tests for what was presumably the Christmas shutdown, were done on 13 December and they resumed on 8 January. According to their records there was a person on site on 8, 9, 12 and 14 January. There was then a break until 22 January when they were on site on 22 and 23 January. One would have thought that there would have been a large break before 25 January to justify the comment made but that no doubt depends upon whether Mr Stratigis was on site earlier. He was responsible for keeping the relevant records but he gave no evidence before me.
- 164 The same point about other records was made in respect of the invoices issued by CETS. There were invoices issued at the end of the month for October, November, December and January and then a further invoice a year later on 31 January 2003. On all except the last invoice there was shown an establishment fee, which was said to cover travelling to and from Muswellbrook, and was part of the quote. The number of establishment fees charged in the first four invoices amounted to ten and none were charged in the invoice submitted a year later. This latter invoice covered tests numbered 158 to 332 from 6 February 2002. At this time, the field notes and reports

- record Mr Moojen as conducting both the testing and checking of the tests in contrast to the earlier ones which from time to time, apart from Mr Moojen involved the work of other testers.
- 165 The CETS invoice for 30 October records three establishment costs at \$165.00 and 12 compaction tests. It was clearly paid and the CETS records show in fact 12 tests were carried out on 20 October using a humboldt presumably before the contract started. The contract required the test to be by sand replacement. Alternatively, it may have been testing in the borrow pits because some 40 linear shrinkage tests were done and referred to in that invoice. Interestingly, in the Beckhaus diary there was no reference to the tester being on site.
- 166 The CETS invoice for 30 November records three establishment costs and 58 compaction tests. According to the CETS records there were some 63 compaction tests done at that period. In respect of 29 of the tests covering some four days, there is no record of the testers being on site in the Beckhaus site diary. That invoice was also paid in full by Beckhaus.
- 167 The invoice for the end of December records two establishment costs and 30 on site tests. The number of tests tallies precisely with the CETS records and field notes for the number of tests carried out in this period. The Beckhaus site diary does not record any attendance of a tester during December and, once again, this invoice was paid by Beckhaus. The invoice issued at the end of January records two establishment costs and 47 tests. There were 47 tests according to the records of CETS in this period and once again the invoice was paid by Beckhaus. In respect of two of the eight days involved, the Beckhaus site diary showed the presence of testers but not on the other days.
- 168 What these records tend to indicate is that the invoices are substantially consistent with the amount of tests claimed to have been performed. Importantly, Beckhaus paid for them all. It would seem therefore that the Beckhaus daily reports must be substantially incomplete. Given the existence of these invoices throughout the period of this part of the contract there can be no suggestion that any of the records beforehand were created at a later date.
- 169 The invoice for 30 January 2003, as I have said, dealt with tests 158 to 332. It claims no establishment cost and makes claim for 180 compaction tests. The CETS records justify this claim. The submission was that the reports numbered 158 to 332 are a fabrication. There is no doubt that the contract continued throughout February and into March and in the ordinary course would have required a substantial amount of testing. It seems extraordinary that for some reason there would have been a commencement of a deliberate fabrication of records from 6 February onwards. There is no doubt that the testing on 21 April, which was a requirement by the Council, to be by sand replacement and humboldt, was carried out and interestingly shows the close correlation in the results between the two methods of testing. The failure to issue an invoice for a year was no doubt as a result, I would have thought, of the contractual breakdown which occurred in March when Mr Beckhaus related to Mr Moojen the problems he was having with the Council and the reasons for these problems.
- 170 In my view there is nothing in the suggestion that there was a fabrication of the records suddenly commencing on 6 February 2002 and persisting through until the end of the contract.
- 171 There were a number of criticisms in the evidence of Mr Moojen's record keeping. There is no doubt that mistakes were made and it is plain that his original handwritten notes from the field were not retained. What would happen is that he would have those notes transcribed by others onto the sheets which were kept as a record of the testing. No doubt this was a breach of the standard in relation to his laboratory's accreditation in that a proper audit trail of the testing was not kept. There was also criticism of Mr Moojen for failing to keep records in respect of tests which failed. He explained this in two ways. The first fairly natural one was that he could generally tell in the field whether a test was likely to fail because he had his balances there to make all the necessary calculations for density. He says that frequently if he told the contractor the test was likely to fail they would rework the area and not have him complete the test. Mr Moojen also says that Beckhaus did not require the reporting of any failed tests. Given the general procedure which involved a rework of the area, once a test was likely to have failed, or failed, there does not seem to be anything sinister in this.
- 172 The fact that there was no proper compliance in respect of record keeping does not mean that the tests were not carried out correctly. It is notable that there was no attack in cross examination upon the actual method of carrying out the tests by Mr Moojen and, in my view, the tests should be accepted at their face value.
- 173 The acceptance of the CETS testing impacts, of course, upon the reports to Dr Fell and Dr Truscott. Dr Fell in paragraph 22 which I have earlier quoted gave three explanations why the CETS showed that the fill was compacted where the later testing showed otherwise. After reading Dr Burman's report in his report in reply, he accepted that the explanations in clause 22 (a) and (c) were not accurate and were wrong. He relied on the remaining explanation, namely, "(b) the testing was done on selected well compacted soil, for example, on the top layers which were well compacted." Given the fact that the evidence shows that the testing was performed throughout the course of the contract this explanation cannot stand. In providing that explanation, he did not take into account the evidence of Mr Moojen - see transcript 472.
- 174 Professor Fell indicated that the only possible explanation would be if the material was placed in layers which were substantially thicker than that required under the contract. There is no reason why I should not accept the evidence of Mr Macartney and Mr Komp, the Superintendent, that the material was in fact placed in the appropriate layers.

175 Dr Truscott dealt with the CETS testing in paragraph 1.6 of his report in reply. His reasons for discounting them were three. The first was really the contrast with the results achieved from what he described as the independent testing, namely, the Barnson tests. The second suggestion was that the tests might have been at the top of the compacted layer and do not check the density at the bottom of the layer. On the evidence this does not appear open. The third reason was that the method of selection of the CETS tests locations was unknown. The evidence before me from Mr Moojen establishes that the test sites were selected by him at random and not as requested by Beckhaus.

176 It is clear therefore that both reports suffer from the problem of having dismissed the CETS results for inadequate reasons.

Dr Brian Burman's evidence on the compaction of the levees

177 Dr Burman dealt with this aspect under a number of different headings. It is necessary to consider the various points he makes having regard to the findings I have made so far.

Reliability of CETS testing

178 Dr Burman expressed the view that field density testing by the sand replacement method was more reliable than by the nuclear method which was used in the Barnson testing. His view seems to have been based upon the simpler procedure which is the sand replacement method. As is apparent from my findings it is plain that the problems with the testing procedures adopted have intruded upon the reliability of the nuclear method.

Location of Barnson tests

179 I have already dealt with this above and it is plain that some of them were not conducted in the appropriate material and some were doubtful. This reduces the number of tests available which would have ramifications on the final conclusions based upon the tests.

Reliability of Barnson tests – calibration range of the Troxler nuclear gauge

180 I have already determined that this is not a relevant matter.

Reliability of Barnson tests - test No 12

181 This matter dealt with a specific error in respect of test No 12 which related to either the test depth at which the test was taken or for the insertion of the relevant depth on the gauge in order to make the appropriate calculations. By plotting various tests and their depths it is apparent that test pit 12 which was recorded as being at 250 mm must have been taken with either the wrong depth put into the gauge or the wrong depth recorded on the field sheet. In these circumstances test No 12 should be excluded.

Reliability of Barnson tests – field moisture content

182 In the context of possible error associated with nuclear field density tests Dr Burman mentioned that there appeared to be a consistent bias in the Barnson results for gauge moistures to exceed moistures determined by the oven drying in the laboratory. The bias appeared to be in the order of 20%. This would merely be some confirmation of possible field procedure problems.

Reliability of Barnson tests – comparative nuclear and sand replacement tests

183 The July 2003 tests apparently were an attempt to inter alia establish the validity of the earlier nuclear tests carried out in April 2003. It is clear that there was a good correlation between the density ratios calculated from the nuclear densometer field densities and those calculated from the sand replacement field densities. That does not prove the accuracy of the earlier tests. The hymboldt gauge was used in the July 2003 tests and it is not subject to some of the errors with the Troxler used in the April 2003 tests. Importantly this does not deal with the procedures in the laboratory testing to which I have referred.

Barnson test – field procedures

184 I have already dealt with these above.

Reliability of Barnson tests - DCP correlation

185 The testing in April included dynamic cone penetration tests which were tabulated by Professor Fell in his first report and amended in his second report. He referred to those illustrated in his diagrams by red as uncompacted, yellow poor to marginal and those not shaded at all as reasonably well compacted. Professor Fell agreed that the DCP testing is not an accurate test and that in situ density testing is more reliable than DCP testing. DCP testing is merely a count of the number of blows required to travel per 150 mm.

186 Dr Burman plotted the correlation between the DCP results and the degree of compaction determined by the in situ density testing. One would expect and Dr Fell accepted that there was poor correlation.

187 Dr Truscott's evidence was to the effect that the test was not inaccurate, but the only data you could really get from a DCP result that is low, is of low density. It is notable that on the northern and southern levees it is apparent from Table 3 in Dr Fell's report in reply that the only low results were in either the old levee or in top 750 mm. In these circumstances, Dr Truscott accepted that the lapse of time since compaction could be significant.

188 A consideration of the evidence seems to indicate that the use of DCP is really a confirmation of other testing. The other testing is necessary because I have to judge whether or not the standard called for in the contract was achieved. The DCP results are not quantitative in that sense. In the absence of relevant in situ density tests, the DCP tests are ultimately of no assistance in determining whether the contractual specification has been achieved.

Golder/Barnson parallel testing in August

189 A field testing programme was carried out by Golder on behalf of the plaintiff with 18 compaction tests in nine test pits. In respect of some of those compaction tests, namely, seven, Barnson carried out testing in parallel. Four of the seven tests which were done in parallel failed to meet the contractual standard. The relative difference between the results between those carried out by Golder and Barnson was quite minimal. Such differences Dr Burman thought were of an order that was credible. However, the results of the tests and their relative densities against the results for the levee fill and the culvert backfill obtained earlier in 2003 he thought not credible. For the purpose of considering whether this showed anything about the reliability of the earlier results, Dr Burman postulated three possible hypotheses to explain the substantial difference between the parallel tests and the earlier tests. These hypotheses were as follows: *“The population has a very wide spread encompassing both sets of results. GHD/Barnson sited its tests at locations representing the lower portion of the population range and Golder sited its tests at locations representing the upper portion of the population range. The odds against this particular combination are very high, particularly given the numbers of tests on both sides. It can be demonstrated by rigorous statistical means that the two data sets are not from a common population. Details of the statistical tests are included in Appendix 5.*

Both sets of results are correct and each accurately represent the population from which it came. This would require that the population had changed over time and would indicate there has been significant physical change in the levees over the period between tests that involved a reduction in the dimensions of the levees amounting to about 10% between April and August 2003. This seems an unlikely hypothesis, and if it were accepted then it would be impossible to claim that the contract requirements were not met.

One of the data sets is wrong and the population does not have the wide range of values implied by both sets. Given the confirmation provided by parallel testing in August 2003, it is obvious that the GHD/Barnson results from the April/July investigation would have to be the set that is wrong. In addition it has been demonstrated that the GHD/Barnson testing regime was substantially compromised (Refer Section 2.4) in several respects and its results were unreliable.”

190 Dr Burman’s report referred to the distributions difference being an offset of about 10%. In his view this proved that the Barnson field density tests were not only unreliable but mostly, if not all, wrong. He acknowledged the possibility of some other view related to the changes in the levee over the period but said it was a phenomenon that was beyond his experience.

191 The differences pointed out by Dr Burman probably add some weight to the results which appear from the errors in the test procedures which I have detailed above which confirm that the April and July testing is clearly wrong and cannot be relied upon.

192 As Dr Burman points out, the actual results obtained in the two sets in August 2003 has significance in the context of the contractual requirement.

193 It was to address this effect on the contractual requirements that Dr Burman produced his table 8 and his comments on that in order to explain the results. As this was the subject of some comment in the evidence I set out the details of what is there contained.

“Table 8C Corrected summary of relevance of Golder field density tests based on the location of tests relative to design profiles and existing levee profiles. Relative densities and the respective test numbers for each group are shown bracketed.

Levee	Irrelevant	Doubtful [Located in old levee reworked fill]	Considered adequate [>90%]	Adequate [>95%]	Problematic	Total
Northern	1 [85.5%] [FD3]	0	5 [92.5; 90.5; 92; 93; 91.5%] [FD2;5;7;8;9]	2 [95.0;99.0] [FD4;6]	1 [89.0%] [FD1]	9
Southern	0	0	0	1 [101.0%] [FD13]	1 [87.0%] [FD14]	2
North Brewarrina	0	0	2 [92.5;93.0%] [FD10;12]	1 [99.0%] [FD11]	0	3
Charlton Road	0	0	1 [90.0%] [FD15]	1 [95.5%] [FD16]	0	2
Tarrion Creek	0	0	1 [91.0%] [FD18]	1 [100.5%] [FD17]	0	2
Totals	1	0	8	6	2	18

“The grouping of Golder’s relative density results are self-explanatory, with the possible exception of the considered adequate group based on values between 90 and 94% which is a level of compaction that might be considered adequate in the circumstances but below the specified level of compaction. The reasoning behind this grouping is that:

It is unrealistic to expect that the level of compaction of fill placed in early 2002 might not vary over a period of about 2 years. The fill consists of expansive clays that will be affected by climatic and other environmental factors. Soils are not inert materials, they can and do change with time and changes in environmental conditions and in many instances the prediction of actual field behaviour is uncertain within the present state-of-the-art.

The 95% specification requirement is itself an arbitrary figure based on common practice rather than on any quantified geotechnical characteristic specifically relevant to the performance of the levees. The nature of compacted fill does not change dramatically below the 95% level: rather there is generally a regular change in geotechnical characteristics. Compacted fill at less than 95% continues to exhibit those factors required for satisfactory levee performance albeit to somewhat different extents. Similarly changes can also occur as a result of changes in moisture content at a given compaction level

By way of example, the saturated permeability of clay tends to a minimum value around Standard optimum moisture. Substantially wet and dry of optimum permeability is essentially independent of compaction level, but varies by several orders of magnitude between wet and dry. Typically the effect of a lower level of compaction at say 3% dry, might be one order compared to two orders at optimum. If a permeability of below say 1 E-7m/s might be expected at 95% Standard and -3% then at 90% a higher permeability would be expected but might be say 1 E-6m/s. Impermeability would be compromised but not necessarily to a detrimental extent. On the other hand, unsaturated permeability is largely independent of compaction level and would not be materially compromised. A suite of permeability test on a range of fill materials compacted to different relative density and moisture variation levels would be required to define these issues:

It is generally accepted that there will be variations below the specified limit in properly compacted and tested fills and that such variations are unlikely to significantly affect performance of the fill."

- 194 Before dealing further with this question which is relevant to the compliance with the contractual specification, I think it probably appropriate that I deal with some of the submissions made as to Dr Burman's credit. In terms of his experience it was suggested that Dr Burman had no experience with levees adjoining rivers designed to protect the town or area from floods. This may well be so but he had adequate experience in relation to dams and other relevant structures and in my view he is qualified.
- 195 It was suggested that from time to time Dr Burman was evasive, giving qualified answers to questions. I have considered the references to which reference was made where Dr Burman used words such as "in general" and they do not change the opinion of him that I formed by watching him give evidence. He was a careful witness and, if necessary, he would qualify an answer if indeed he believed a qualification was required. On only one occasion I found it necessary to remind him not to add a rider in answering a question when it was not called for. He took this on board and there was no further problem in that regard. In my view he gave evidence in a most appropriate manner.
- 196 In relation to the comments on his Table 8 which I have referred to above, he was taken to task for having referred to a period of about two years instead of one year. The actual time between April 2002 and August 2003 was, in fact, sixteen months and I do not consider it an exaggeration.
- 197 One of the criticisms Dr Burman made of Professor Fell's and Dr Truscott's findings was as follows: *"The Barnson compaction tests produced some spectacularly low levels of compaction. There were a significant number of tests with values in the low to mid 70% and one as low as 67.6%. In my almost 40 years of experience as a geotechnical engineer I have never encountered, directly or indirectly, values as low as those reported by Barnson. My immediate reaction to such low values is that there must have been something wrong with the testing that produced these results. Nor would I be alone in such a reaction as it is a commonly express view among experienced geotechnical engineers that compaction levels at or below the 80% are physically implausible."*
- 198 Dr Burman was tackled in cross examination upon a report of his which was not in evidence but which simply referred to the existence of some tests that achieved a result of 77% plus a minus 3.4%. Given the level of Barnson results which Dr Burman was referring to was one as low as 67.6%, reference to him having seen one which was put to him in cross examination is not really an appropriate direct comparison. It seems plain that he was talking about some very low results. I do not find this criticism a substantial one. Plainly what Dr Burman was doing was indicating that the actual figures of the Barnson tests were lower than figures that he ever seen earlier. The cross examination did not demonstrate that he had seen figures as low as were reported in the Barnson tests. There was some suggestion that he may have seen tests as low as 60% but Dr Burman indicated that that was a particular laboratory test and the re-examination clearly demonstrated that he was referring to some tests that Dr Truscott had done as a result of his experimentations in the subject case, but which for reasons which Dr Burman advanced in re-examination were quite irrelevant. The last sentence of the quote that I have included above is also criticised in the sense that it did not use the words "in general". Dr Burman uses the word "implausible" rather than impossible and in my view he is right. Cross examination on this aspect did not detract from the real view which Dr Burman was expressing in the paragraph by reference to the actual Barnson results which went as low as 67.6%.
- 199 Dr Burman was criticised for referring to the fact that the Troxler gauge was out of certification. He knew that it was within calibration as his cross examination plainly admitted. The point that Dr Burman was bringing to the Court's attention was the procedures involved because if after the report the calibration check showed it was out of calibration, it would make the results useless and confirm what was sloppy procedure.

- 200 Dr Burman was criticised for having omitted some tests in his report that he had arranged to have done by Coffey. Since the tests did not relate to compaction Dr Burman was right in his reasons for omitting them, namely, that they did not add to the store of knowledge on the matter in question and that to tender those tests would not have taken the matter any further. Reference was made to cross examination on certain pin hole dispersion tests and pocket penetrometer tests undertaken by Mr Russell of Coffey at the direction of Dr Burman. It was suggested that these confirmed similar results to that of Barnson. There was no identification of such similar tests by Barnson and the relevant tests on which the cross examination proceeded were not tendered. In these circumstances nothing can be made of this inconclusive cross examination.
- 201 Reference was made to the fact that Dr Burman had criticised the use of the CETS tests by Professor Fell and Dr Truscott and then used them himself. He was cross-examined about some DCP results which he relied upon in 1998 but once again these were not put before the Court. It was plain from Dr Burman's cross examination that his views had changed over time. It should be borne in mind that Dr Burman had good reason for not accepting the DCP tests as being less reliable because they did not correlate with the actual in situ density tests. Given the limited amount of information about the occasion in 1998 I do not find this criticism valid.
- 202 The submissions on Dr Burman's credit pointed out that he had contacted both Mr Pilgrim and Mr Russell. Precisely what criticism is levelled is hard to understand since any discussions with Mr Pilgrim were before Dr Burman made a statement to the Council. Furthermore, Mr Russell never became a witness for the Council as the Council withdrew his affidavit and did not seek to read it.
- 203 There was criticism of the fact that after Dr Burman was engaged in November 2003 he did not have further tests undertaken. It was not suggested to Dr Burman that it was his decision to carry out any further tests and accordingly this not a matter of moment.
- 204 There was a submission that in respect of the engagement of Mr Russell by Dr Burman to do some tests that he gave a false answer as to whether he asked Mr Russell to undertake the testing on his behalf after he had prepared his report dated 2 February. A careful reading of the evidence concerning Exhibit 24 and the various testing makes it plain that there were tests by Mr Russell of Coffey before and after his report. The proposition put forward by the Council is not supported by the evidence and, if the proposition had been put to Dr Burman he probably could have dealt with it quite easily.
- 205 A consideration of all the matters put forward by the Council in respect of Dr Burman's credit do not detract from the view which I formed of him that he was a careful and accurate witness with appropriate knowledge.
- 206 I return to the Table 8 referred to by Dr Burman which I have set out above. In cross examination the Council sought to deal with the matters which it commonly referred to as Dr Burman's de-compaction theory. A perusal of the material that I have quoted above does not indicate that he advocated such a theory but rather that he simply pointed to the fact that there can be changes to environmental conditions over time. He referred to this in the first bullet point in the table.
- 207 A careful reading of his comments does not purport to be an absolute explanation of the differences obtained in the Golder tests and those obtained by the CETS tests during construction.
- 208 When considering the Council's submissions on this aspect it is important to note Dr Burman was assuming that the compaction achieved was at least 95%. The Council's submissions referred to the CETS tests as showing substantial numbers of results over 100% but what that submission failed to take into account was that those results included many pavement tests which are required to exceed 100%.
- 209 It is to be noted that Dr Truscott referred to the possibility that an increase in moisture levels could account for the differences between the Barnson and Golder tests. This aspect of changes of moisture content was explored in the cross examination of Dr Burman and he agreed that at best a reasonable rule of thumb is that a 1% change in moisture would result in a 1% change in density and that in respect of the 5% change in moisture content the relationship was very approximate. It is apparent from Table 6 at page 18 of Dr Burman's first statement that the variation in moisture content between some tests could be as much as 3%.
- 210 All that can be said about this is that even if there has been some change in moisture content then there might be a similar percentage affect on the test results. That leaves other factors, the only one of which was not explored fully in relation to the Golder tests being whether there was any possible disturbance of the sample in the method of excavation.
- 211 In summary Dr Burman only postulated a partial explanation of the difference between the results and the specified requirements under the contract.
- 212 One of the problems about the tests is, of course, that they were spread over all the different levees. For instance, for the Tarrion Creek levee and Charlton Road there were two tests while at North Brewarrina there were three tests. In the Southern levee there were only two tests whereas in the Northern levee there were eight tests. Of the seventeen tests, six, being at least one in each levee, achieved the standard of compaction required under the contract and nine were between 90% and 95%. Two tests failed. In other words they were below 90%. This is a very small spread of results over each levee and there is no evidence that has dealt with the significance of those results in a statistical sense. Hence one has the substantial number of CETS tests during construction which achieved appropriate levels. In these circumstances I do not think that the Golder tests really assist in determining whether the levees in general were compacted as required under the contract.

- 213 It is also relevant in a general sense, although they are also subject to the same problem as the Golder tests, that the Douglas Partners tests all provided satisfactory results immediately after the conclusion of the works.
- 214 I am satisfied having regard to the CETS tests which I regard as accurate, and having regard to the undoubted evidence of compaction while the works progressed under the daily supervision of Mr Komp, that the levees themselves were compacted in accordance with the relevant specification.
- 215 I note of course the opinions of Professor Fell and Dr Truscott but their opinions are predicated on the acceptance of the Barnson testing which I have rejected. They also suffer from what was submitted by the plaintiff to be a problem in that their opinions do not seek to describe or elucidate the process by which the logical step between the test data and their ultimate conclusions in respect of the condition of the levees was made.
- 216 In respect of Professor Fell and Dr Truscott, when their reports and affidavits were tendered or read, objection was taken to the relevant conclusions on the basis that such conclusions offended the principles which were recently referred to by the Court of Appeal in *Makita (Australia) Pty Ltd v Sprowles*. At paragraph 85 Heydon JA set out the principles for the admissibility of expert opinion evidence. There he said: *"In short, if evidence tendered as expert opinion evidence is to be admissible, it must be agreed or demonstrated that there is a field of 'specialised knowledge'; there must be an identified aspect of that field in which the witness demonstrates that by reason of specified training, study or experience, the witness has become an expert; the opinion proffered must be 'wholly or substantially based on the witness's expert knowledge'; so far as the opinion is based on facts 'observed' by the expert, they must be identified and admissibly proved by the expert, and so far as the opinion is based on 'assumed' or 'accepted' facts, they must be identified and proved in some other way; it must be established that the facts on which the opinion is based form a proper foundation for it; and the opinion of an expert requires demonstration or examination of the scientific or other intellectual basis of the conclusions reached: that is, the expert's evidence must explain how the field of 'specialised knowledge' in which the witness is expert by reason of 'training, study or experience', and on which the opinion is 'wholly or substantially based', applies to the facts assumed or observed so as to produce the opinion propounded. If all these matters are not made explicit, it is not possible to be sure whether the opinion is based wholly or substantially on the expert's specialised knowledge. If the court cannot be sure of that, the evidence is strictly speaking not admissible, and, so far as it is admissible, of diminished weight. And an attempt to make the basis of the opinion explicit may reveal that it is not based on specialised expert knowledge, but, to use Gleeson CJ's characterisation of the evidence in *HG v R* (1999) 197 CLR 414, on 'a combination of speculation, inference, personal and second-hand views as to the credibility of the complainant, and a process of reasoning which went well beyond the field of expertise' (at [41])"*.
- 217 There was debate as to the admissibility of the reports and at transcript 120 I ruled that at that stage the reports would be admitted but that the question of whether such evidence was properly admitted or, alternatively their weight, could be argued at a later stage.
- 218 As was made plain in the debate as to admissibility there are two principal problems with both reports in this area. The first of these is their statistical relevance of extrapolating a small number of tests over the large area of the levee banks. The second area is the logical step from the existence of non-compaction or compliance with requirements for linear shrinkage, to the proposition that the levee banks are likely to fail. I turn now to the first of these matters.
- 219 In their submissions the plaintiff made the following points: *"In essence the plaintiff's objection to the conclusions expressed by Dr Truscott and Professor Fell in respect of which Makita objections have been taken is that the opinions do not seek to describe or elucidate the process by which the logical step between the test data and their ultimate conclusions in respect of the condition of the levees was made.*

Even accepting the Barnsons/GHD testing as reliable (which the plaintiff submits elsewhere it clearly is not) the data upon which the defendant's experts have sought to draw conclusions consists of the results of tests taken at a very small number of discrete points spread over five levees. Those tests can themselves be divided between tests taken at culverts, tests taken in pavements and tests taken in embankments (ignoring for the moment the contest over whether all these tests were in fact taken in fill required to be compacted in the course of the contract).

These discrete points are a very small proportion of the total population of areas of fill. Even at the chainages where tests were taken the test results only relate to the specific point at which the test was taken, they do not necessarily reflect the condition of the entire embankment at that point.

It is not permissible to draw the conclusion that any test or group of tests is representative of any area within the embankments without careful justification. The appropriate method of so doing (if possible) would have been by properly documented statistical analysis. Such statistical analysis would have required identification of those areas which were considered to constitute a statistically valid population and the reasons why they are so considered.

For example, the areas surrounding culverts cannot be considered to be part of the same population as the embankments since they were clearly constructed and compacted by different methods. Equally, there are significant differences between levees constructed as overlays and those constructed from scratch. In the plaintiff's submission, a proper analysis of these issues would have required justification for treating even discrete parts of the same levees as part of the same population.

Both Dr Truscott's and Professor Fell reports are signally devoid of any such analysis.

The next step in seeking to generalise from a limited number of tests to a whole population must be the statistical analysis itself. It is simply not appropriate to draw the conclusion that a limited number of tests is representative of the whole population from which they were drawn without proper statistical analysis. No attempt at such analysis is contained in any of Dr Truscott's or Professor Fell reports.

One factor that ought to loom large in any attempt to assess whether the test results indicate that the levees were not properly compacted at the time of construction is an assessment of the degree of accuracy of the tests themselves. Again there is no consideration of this issue by either Professor Fell or Dr Truscott.

As canvassed elsewhere in these submissions the evidence shows that the degree of precision of Hilf compaction tests is no more than 4%. When allied with the 2% limit of accuracy of the Nuclear densometer gauges, it is apparent that relative density testing may be out by as much as 6%. As Dr Truscott noted in cross examination (T376-377) in considering whether some results below 95% could be considered as indicative of an improperly compacted levee bank it 'depends how below and it depends how many'. In other words, it requires a statistical analysis, and neither of the defendant's experts has sought to perform such an analysis."

220 If one looks at Professor Fell's reports, one sees his somewhat incomplete and an inaccurate reference to the testing in Table 1 and the dynamic cone penetration tests in Table 2. After referring to these tests in paragraph 17 he then gives his results in paragraph 19. These are repeated in a slightly different form in the answer provided at paragraph 46. It is plain that he gives no logical reason or explanation as to how he comes to the conclusions as to the level of compaction in the different levees from the particular results. When one looks at Dr Truscott's evidence and particularly his conclusions at section 12 of his report one does not see in the preceding material any explanation as to why test results are indicative of the whole of the levees.

221 There was no evidence from any of the experts that one should engage in some statistical analysis. However, this is really self-evident and it is worth noting that the parties specified a regime under their contract which led to there being upwards of 300 compaction tests during the course of the job. In contrast, the Golder tests numbered only 18 tests. Presumably the engineers who drew the specification requirements for testing gave consideration to what would be an appropriate level of testing to ensure the desired result.

222 In considering these objections it is probably useful to bear in mind the purpose for which the matter is being considered, namely, there is a decision to be made as to whether or not the plaintiff complied with the contract in respect of the compaction requirement. If it did not, the next question that arises is whether there has been a substantial performance of the contract. This question of substantial performance clearly must take account of, if one were to rely on Professor Fell's and Dr Truscott's evidence, the second question in respect of their reports to which I have referred above. Namely, whether there is a proper elucidation of their reasons for moving from the proposition that the levees contain weaknesses and the proposition that the levees are likely to fail. In this respect the plaintiff's submissions were as follows: "The second step in respect of which Professor Fell and Dr Truscott fail to provide proper elucidation of their reasons consistently with the requirements of *Makita v Sprowles* is in moving between the proposition that the levees contain weaknesses and the proposition that the levees are likely to fail. Although there is discussion of 'piping' and cracking, there are a number of intermediate steps which are left unexamined. It is first necessary to draw the conclusion that areas of weakness extend right through the levees (that is through a whole cross-section). If that conclusion cannot be drawn it is necessary to identify the extent of the areas of weakness and then identify the manner in which such limited areas of weakness are said to expose the levees to the risk of failure.

A proper analysis of the foregoing issues would require some quantitative assessment of the impact of such deficiencies in the construction of the levees as could properly be established on the extent of piping and cracking (in particular by reference to that which could have been expected in the levees had such deficiencies not been present). Neither Dr Truscott nor Professor Fell sought to or was apparently able to carry out such quantitative analysis. In respect of linear shrinkage the best Dr Truscott could do was 'if it is lower it is better if it is higher it is worse' (T396.4) and 'it is not just as good whether it is significantly worse I don't know' (396.42). At the same time all the tests concerning the dispersivity of the fill used in the construction of the levee suggested it was not dispersive. It is dispersive soils that are more susceptible to piping. (T473.42)

Finally the defendant's experts seek to dismiss the CETS results on the basis that they cannot be correct. Yet again there is no attempt to engage in any form of statistical analysis to assess whether the subsequent test results actually demonstrate that that is the case. If the subsequent test results were to be used to impugn the CETS results it was incumbent upon the defendant's experts to provide a coherent explanation for that conclusion. Again, in contravention of the requirements of *Makita v Sprowles*, no such explanation is provided.

For the foregoing reasons the plaintiff submits that those parts of the various expert reports to which *Makita* objections were taken should not be admitted into evidence. However, even if this submission is not accepted, consistently with the penultimate sentence of paragraph 85 of *Makita v Sprowles*, the evidence should be accorded little weight."

223 It is plain that Professor Fell and Dr Truscott are substantially basing their ultimate conclusion that the levees would fail upon the fact that a failure at only one point is necessary in order to for there to be a total failure of the levees by flooding the township. In their submissions the defendant referred to Professor Fell's evidence in this regard in the following terms: "All experts agreed that failure at only one point would result in a total failure of the levee. The Defendant has identified many potential failure points. Prof Fell's evidence was clear: 'It must be realised

that even one poor layer through the levee is sufficient for erosion and piping to initiate and may lead to failure of the levee. That is why specifications for dams and levees require full compliance' (Fell affidavit 9 March 2004, para 13). At paragraph 31 Prof Fell confirmed that in his view 'much of the soil in the embankments is not treated with lime and does not meet the requirements for linear shrinkage'. By 'much' he meant between 35% and 60%. He also gave the following evidence: 'The levees are much more likely to develop internal erosion and piping problems than if they had been compacted to specification. It must be recognised that it takes only one layer of poorly compacted soil to give a path for seepage and initiation of erosion. There are many such layers in the northern and Southern levees, and around pipes, culverts and walls, and most likely some layers in the Charlton, North Brewarrina and Tarrion Creek levees' (Fell affidavit 28 July 2003, para 48). He also indicated that 'since the poorly compacted soil is distributed throughout the fill, it is likely that the levees will have to be completely rebuilt' (at para 50)."

224 The plaintiff's criticism of this approach is that Professor Fell has without any explanation or analysis extrapolated from the tests at a particular point in the levees to the proposition that there are many such layers of poorly compacted soil in the northern and southern levees. These criticisms are probably appropriate.

225 One perhaps gets nearer to it when one looks at Dr Truscott's evidence because what was important for him was that if one does not get consistent results then that is an indication the material has not been placed in a consistent manner. His evidence in chief was that a levee could fail at any location where the fill is sufficiently loose or cracks extend too deep. Hence the entire levee must meet acceptable standards in order to avoid the risk of failure. In cross examination he gave the following evidence:

"Q: That would not be or that information does not necessarily give an indication of the conditions which may there be encountered across the site?

A: If you're talking about the investigation in the natural materials, correct. If you are talking about something that is man made and supposedly been put in a controlled manner, then you need to do a certain number of tests to demonstrate that what the material is like and then provided the thing has been built in an uniform manner, then you can project it across the rest of the site.

Q: Do you accept that the actual characteristics of the subsurface material may vary significantly even between adjacent test points and may be influenced by sample intervals?"

A: I don't think they're influenced by sample intervals. It can vary across the site. No question.

Q: You agree that the results may vary across the site significantly?

A: Yes.

Q: One could not project upon the balance of probabilities that information disclosed at one test location would be on the standard that I put to you, an indication of the material to be found at an adjacent location?

A: If you're talking about an embankment that has been built by a contractor or whatever, then you should be able to do it – should be able, yes. You should be able to say if I have tested here and here, you have to have enough tests. If you have enough tests, and it depends upon the test results. If in doing the testing, you find that you are getting consistent results over the whole, whatever you've tested, then you can. If you can't get any consistent results, then it is an indication that the material has not been placed in a consistent manner". (T324.47-325.1-14; see also T 391).

226 The Council submitted that enough independent tests were conducted (including by Golder) to determine that the levee banks were consistently shown to be uncompacted and deficient in lime to satisfy the contractual requirements. Dr Truscott was of the view that on the Golder tests alone he would still have said that the levees were not properly built. It seems that Dr Truscott is making an assumption that it flows from tests in isolated spots. He does not really explain how that particular test or result showing the lack of compaction at a particular spot is likely to lead to failure.

227 For all these reasons I would attach little weight to the opinions of Professor Fell and Dr Truscott.

228 One of the areas that the experts did refer to was the area around the culverts. They identified the culverts as a place which is particularly susceptible to erosion. I will now turn to consider the question of the compaction of the culverts.

Compaction of the culverts

229 Professor Fell and Dr Truscott expressed opinions in their reports as to the compaction of the fill above the culverts. Professor Fell said: "The fill above the pipes and culverts is very poorly compacted ... It seems likely much of the fill was not compacted at all or if it was, it was in thick layers with inadequate rolling and moisture content control (Ref 2, C119c) and ... Failure is most likely around the very poorly compacted soil above the pipes and culvert (Ref 2, C177)."

230 Dr Truscott also dealt with the matter in these terms: "There has been minimal if any compaction of the zone A clay fill at the culverts and this fill has not been compacted in accordance with the requirements of the technical specifications. The culverts are the most vulnerable areas during floods and levee failure will almost certainly occur with this level of compaction (Ref 3, Sect6.2).

All test data shows that the culverts were not properly installed and present an unacceptable risk of failure by piping along the culverts in the event of flood (Ref 3, Sect7.1)."

231 It is plain that both experts were relying on the testing in April 2003 and as well as the Golder tests in August 2003. In respect of the April tests there were ten field density tests in eight test pits at four culvert locations. The

tests showed what had been described as spectacularly low results giving an average of some 75.2%. For reasons which I have already advanced I do not consider that these tests are sufficient to base an opinion upon because of the deficiencies in the procedures. It is plain that Dr Burman like Professor Fell and Dr Truscott recognised that culverts and other embankment penetrations are well recognised points of potential weakness in water retaining structures. Dr Burman expressed the view that further investigation of these areas would have been prudent.

- 232 Unfortunately the Golder tests only included two field density tests at culverts. They indicated that at a depth of .15 that the field dry density was 95% and a depth of 1.2 was 90.5%. The Barnson parallel test from a depth of 1.2 indicated a result of 88.0%. The tests carried out in April 2003 at this particular location by Barnson gave relative density results of 77% and 70% respectively which is a substantial variation from the Golder results. This certainly indicates the likely errors in the Barnson tests.
- 233 Having regard to the fact that there were only two tests at culverts on which one can rely, clearly both Professor Fell's and Dr Truscott's wide ranging conclusions cannot be drawn. On an interesting note, the linear shrinkage tests at culverts all complied with the contractual requirement of 12% with one only being above the limit in the Charlton Road levee at 16%.
- 234 Professor Fell and Dr Truscott made reference to the dynamic cone penetration results. However these alone were not sufficient I would not have thought having regard to the matters I have earlier dealt with in relation to them as a foundation alone for the opinions expressed.
- 235 There is again the actual evidence as to whether compaction took place at the culverts during the course of construction. The evidence disclosed the following as summarised in the plaintiff's submissions in paragraph 8. *"Komp, the Superintendent under the contract during construction, witnessed compaction occurring at culvert locations [T768.41 to T769.4, T771.1 to .31]. He was not challenged on this evidence under cross examination;*
The daily records of Beckhaus Civil support that compaction occurred at culverts [paragraph 29 of Exhibit C, Exhibit D at pages 11, 13, 18, 20, 23, 27, 35, 41 as examples only – the list is not exhaustive];
Macartney's evidence is that compaction was carried out at culverts [paragraph 29 of Exhibit C];
Whilst Macartney under cross examination admitted that the specified number of compaction tests was not taken at culvert locations [T86-87], his evidence that compaction was actually performed at culverts was not seriously challenged [T89-90, T94.20-53].
Tests results taken by CETS at culvert locations confirm that compaction was satisfactory: refer to attached table."
- 236 The fact that sufficient tests were not taken at the culverts as appears from Mr Macartney's evidence precludes me from coming to a conclusion that there has been compliance with the specification requirements for the frequency of testing in respect of the culverts. However, the evidence before me clearly demonstrates that there has been substantial compliance with the contractual requirements for compaction over the culverts.

Linear shrinkage testing

- 237 The provisions of the contract which governs this matter are first, clause 8.7 of the specifications which deals with embankment materials and construction. The relevant part of that clause is as follows: *"The levee embankments shall consist of Zone A Clayfill material as indicated on the Drawings. The Zone A Clayfill shall be selectively won from borrow or excavated from the existing Northern or Southern Levees and stabilised with gypsum in accordance with Clause 8.10.*

8.7.1. Levee Embankment & Key Trench

The levee embankment and Key Trench shall be constructed of Zone A Clayfill material, being clay material selectively won from the borrow area of existing Northern or Southern Levees and having a maximum linear shrinkage value of 12%.

The frequency of testing for compliance with the linear shrinkage requirements will be such that a minimum of one (1) sample is taken for each 3,000m³ of Zone A material. Each sample shall be tested to determine the Atterberg Limits in accordance with AS 1289 3.1.1, 3.2.1 and 3.3.1.

Zone A material shall be placed and compacted in accordance with Clause 8.9 of this Specification."

- 238 The stabilisation with Gypsum is referred to in clause 8.10 which is in the following form:

"8.10 Gypsum Stabilisation

Gypsum shall be added to Zone A Clayfill at a minimum rate of 5% (by dry weight). Should this rate be insufficient to meet the required 12% linear shrinkage criteria, additional gypsum shall be added in 1% increments until the Contractor can verify that the criteria is satisfied. The cost of additional rates of Gypsum Stabilisation will be borne by the Superintendent and shall be calculated as per the rate given in the Schedule of Prices.

Gypsum shall have a calcium sulphate content of at least 65% by mass of the supplied material.

Gypsum shall not be added to the clay materials on the embankment fill.

Gypsum shall be evenly spread over the area to be stabilised and mixed thoroughly to produce a uniform material. Gypsum may be substituted with 3% Hydrated Lime by dry weight subject to the Superintendent's approval."

- 239 Although these documents are part of the technical specification they are amended by contractual correspondence referred to at page 70 of Exhibit "J" under which "3% meadow lime (exDML Attunga) in lieu of 5% Gypsum" became part of the contract. This is clearly an amendment to clause 8.10.
- 240 There was a difference between the parties as to the construction of the clauses. The plaintiff suggested that the minimum amount of 3% did not have to be added if the material already met the 12% linear shrinkage criteria. The Council submitted that the amount of 3% was a minimum that had to be added and that more should be added if it did not result in a meeting of the 12% linear shrinkage criteria. It would seem on an ordinary reading of two clauses together there are two conditions, namely, the addition of the relevant amount of Gypsum plus more if necessary to make sure the maximum linear shrinkage value is 12%.
- 241 It is perfectly obvious from the evidence given in the case that the purpose of having achieved a particular linear shrinkage was to reduce the likelihood of deep and wide cracking in the embankment which might allow initiation of internal erosion and piping failure under flood conditions. In addition the adding of lime or Gypsum does inhibit dispersion if the soil is dispersive and makes it less likely to begin to erode or if erosion begins to slow the rate of erosion. It follows that the addition of lime reduces the shrinkage potential of the soil and thus reduces the depth of potential cracks.
- 242 The addition of 3% of meadow lime to all the materials may be a condition of the contract but a breach does not seem to have any consequence. This follows because the parties clearly contemplated that what is to be achieved is the placing of materials which had a maximum linear shrinkage of 12%. The whole testing regime in the contract is there merely to measure this requirement and there is no need for a demonstration of adding the particular 3% meadow lime.
- 243 There was cross examination of Mr Beckhaus as to the amount of lime that was actually used on the project. It is apparent that approximately 970,000 cubic metres of earth was worked under the contract which equates to approximately 165,132 tons of soil. The addition of 3% lime required about 4,953 tons of lime which at \$70.00 per ton would involve a cost of \$346,710.00. Delivery dockets for the project indicated deliveries of 328.86 tons of lime which is a value of about \$25,000.00. The daily reports showed somewhat less being received on site. As I have indicated earlier these are somewhat unreliable.
- 244 All this probably indicates is that the plaintiff was adding sufficient lime to ensure that it met the contractual requirement that the material should meet the 12% maximum linear shrinkage specification. It clearly did not comply with the contract requirement to add at least 3% by weight to the material. This no doubt is the result of a misunderstanding of the contract.
- 245 As required by the contract there was of course testing by CETS throughout the course of the contract in respect of linear shrinkage. There were also linear shrinkage tests done by the various bodies that carried out compaction tests to which I have already referred. In addition to this there were some tests conducted on 24 October 2001 by K&H Construction Services Pty Ltd. These tests were conducted only for linear shrinkage at the request of Mr Komp, the superintendent. The actual test results which were taken at six places showed results ranging from 14% to 18%. These results were conveyed to the plaintiff and as a result the areas were reworked with additional lime being added. It is clear from Mr Komp's evidence that this rework was in respect of the area which had been tested and found wanting. Mr Komp did not have any further check tests done and, accordingly, throughout the rest of the construction, the testing by CETS showed that the results achieved the required level of 12%.
- 246 I turn to deal with the testing post completion for linear shrinkage.
- 247 It will be recalled that the Douglas Testing proved substantially satisfactory in respect of compaction. At the same time as they tested in April 2002 immediately after completion they did ten linear shrinkage tests the details in respect of the results are as follows:
- (a) Two tests were taken in the Charlton Road levee one showing 8% and one giving a result of 14.5%.
 - (b) One test only was taken in the Tarrion Creek levee giving a result of 18.5%.
 - (c) One test only was taken in the Southern levee giving a result of 18.5%.
 - (d) Four tests were taken in the Northern levee three of which were less than 12% and one of which was 15.5%. The test result of 15.5% was taken at a depth of .35 metres in the section of the levee where the top .5 metre of the levee was not removed by Beckhaus Civil at the direction of Mr Komp. Therefore such test was most likely taken within the existing old levee material and can be disregarded.
 - (e) Two tests were taken in the North Brewarrina levee giving a result of 12% and 15.5%.
- 248 With regard to the Barnson tests in April 2002 the actual excavation of the test material was carried out by a person who was not a NATA registered tester. Given the simple nature of the excavations this is probably not a problem. The relevant results of the tests appear to be as follows:
- (a) At Charlton Road two tests in the vicinity of a culvert showed results of 16% and 13%.
 - (b) In the Northern levee fourteen tests were taken, eleven of which were equal to or less than 12% and two results were marginally above at 12.5% and one result at 17%.
 - (c) Eight tests were taken in the Southern levee, two of which were 12% and the remaining six tests being either 15% or 16%.
 - (e) Eight tests were taken in the North Brewarrina levee, two of which were less than 12% and the remaining six varying between 12.5 and 14%.

- (f) No linear shrinkage tests were taken at the Tarrion Creek levee.
- 249 In respect of the Golder linear shrinkage testing done in August 2003 the results appear to be as follows:
(a) There were six tests in the Northern levee, one of which was 14.5% and the remainder were either 12% or less.
(b) In North Brewarrina levee there was one test at 12.5%.
(c) In the Southern levee there were two tests showing results of 16% and 18%.
(d) At Charlton Road there was one test showing a result of 16%.
(e) At Tarrion Creek there was one test showing a result of 17%.
- 250 It is perfectly plain that the results indicate a variety of failures and a variety of occasions when the specifications were met. The only suggestion from Mr Moojen as to why this might have happened is that there might have been clay lumps in the particular samples but there was nothing to really substantiate this. The real problem with all this material is the question of whether or not one can extrapolate any result across the whole levee in respect of these results. To start with, on some occasions there was only one test in the whole levee. This raises the key question to which I have referred above as to the basis for assuming that because some results showed failures, all the material in the levees was below the requisite compaction.
- 251 It is notable that there was no substantial criticism of any of the testing in respect of this material or any suggestion of a variation over time. Given the existence of these failures it is hard to conclude there has not been some breach of the specifications. Once again it is whether or not such a breach would have any effect that is important. In this respect given my conclusion that there has been substantial compliance with the compaction requirements it is necessary to look at the evidence as to what these results, even if they are representative, do to the use of the levees.
- 252 There are a number of matters that arise in relation to the addition of lime. One matter that should be mentioned is that the addition of lime has the potential to change highly dispersive soil to non-dispersive soil. This is of course a desired outcome because non-dispersive soil resists piping and erosion to a far greater degree. The only tests to determine whether or not soil has been placed in the levee banks was non-dispersive were those carried out by Douglas Partners immediately after the conclusion of the project. There were ten tests taken over all the levees and all the test results showed that the soil was non-dispersive. There were also some tests taken on borrow pit samples but it is plain that there were no laboratory tests taken on fill materials or borrowed pit samples where the borrowed pit was actually used as a source of fill material which indicated dispersive soil.
- 253 This leaves the major question as to the effect or otherwise of not achieving the 12% linear shrinkage called for under the specification. Professor Fell is clear that the lime was required to be added and mixed with the soil to reduce the shrinkage of the soil so that the depth of the cracking was kept to acceptable levels consistent with the freeboard that was specified in the design of the dam. He could not say why a level of 12% was selected in the specification but he assumed it was based on experience with similar soil. Indeed, Professor Fell agreed that it is not usual practice to specify a linear shrinkage as criteria for the construction of dams. Professor Fell's conclusions that appear at paragraph 63 of his report were that between 50% and 90% of the soil in the embankments do not meet the specification and that that is spread throughout the levee banks. He said that it is likely that there are untreated layers in areas that persist from the upstream to downstream of the levee banks. No basis was given for this conclusion nor is there any basis for the earlier conclusion as to how much does not meet the specification. The consequences he says are that the banks are more likely to develop internal erosion and piping problems than if they had been treated as required by the specification. His opinion at paragraph 74 as to any cumulative effect seems to rely on the fact that the soils were potentially dispersive but this is not shown on the evidence.
- 254 Additionally, Dr Truscott was of the view that the lime was to be added to reduce linear shrinkage to at least 12% to reduce expansive shrinkage behaviour of the soil to reduce cracking potential. He went on to express some opinions as to the effect of the failure to add lime which are predicated upon the layer thickness required for 300 mm not having been complied with. It is plain on the evidence before me that it was complied with and accordingly little can be taken from these conclusions.
- 255 The plaintiff raises the same objections based upon *Makita* in respect of the conclusions which have been reached in that there has been no demonstration of any statistical basis for the general conclusions expressed. On this aspect it is interesting that Dr Truscott when shown the test results from Barnson in respect of the Northern levee on which there was substantial compliance, stated that he had no problem with the Northern levee in terms of linear shrinkage. When he was shown two tests in respect of Charlton Road he also agreed that just two tests would not allow one to deduce anything in relation to that levee bank about the state of the levee so far as concerned linear shrinkage. The two tests he was shown were ones showing results of 16% and 13%.
- 256 Having regard to his views on the Northern levee it would seem that there has been compliance with the contract. In respect of the other levees such results as they are show a different picture indicative of 12% not having been achieved for the majority of cases. However, whether such results given their small number are sufficient to lead one to conclude that the whole of the levees do not meet the specification depends upon whether one can extrapolate such a result from a small number of tests. There is nothing in the plaintiff's expert's material that deals with this and it would seem that this is a flaw in their evidence which would lead me to give it little weight.
- 257 Dr Burman adopted the mean of the results in order to come to some conclusions. The basis of this is somewhat doubtful as that is not what is required under the contract. His conclusion was: "There is probably a significant non-

compliance in respect of the southern levee, substantial compliance to the Northern levee and North Brewarrina levees probable compliance for Charlton Road levee but the level of compliance for Tarrion Creek levee is unproven.”

- 258 In relation to what might be described as a quantitative effect of any non-compliance, Dr Burman noted the following in respect of the matter: *“In my view the 12% linear shrinkage requirement was an arbitrarily selected limit that is not directly related to a relevant geotechnical performance parameter (spelling). No factual evidence has been produced to indicate that the 12% value is critical to or a determinative of levee performance, neither has either Professor Fell or Dr Truscott stated that a degree of non-compliance with a 12% requirement would prejudice stability of the levees. They have not claimed that the 12% linear shrinkage limit corresponds to the onset of cracking, or a structurally significant cracking in the levee banks.”*
- 259 His comments on Professor Fell's and Dr Truscott's evidence are correct. They may well have testified as to the purpose of adding the lime which I have referred to above but as pointed out by Dr Burman they have not taken the matter further.
- 260 Both experts were asked some questions about the quantification of any departure from the specification. Professor Fell gave this evidence:
- “Q. Am I correct in understanding that linear shrinkage is not usually used when constructing dams?*
- A. That's correct. Could I qualify that. It is quite common to, if you specifying the earth fill material for the core of the dam to indicate a rank of what are the 'outer limits'. There is the liquid limit, plastic limit and linear shrinkage is usually quoted there. This is usually simply to define the soil that has been used will be material that is broadly consistent with what the designer understood.*
- Q. It is very unusual for the linear shrinkage specification to have made with respect to this levee bank?*
- A. It is the first time that I have seen linear shrinkage specifically specified.*
- Q. If you had a linear shrinkage result of 15 or 16 as opposed to the specified 12, it would be impossible to say whether that had any practical effect on the levee?*
- A. I would not be able to quantify the difference.*
- Q. You couldn't say with any degree of accuracy whether a higher linear shrinkage significantly changes the risk?*
- A. As I said, in a qualitative sense, the soils with a higher linear shrinkage you would expect to shrink more than the soils with a lower linear shrinkage, but to absolutely quantify that, no, I can't.”*
- 261 This was returned to in re-examination and he gave this further evidence:
- “CHRISTIE:*
- Q. I might go backwards so to speak in terms of the questions asked by Mr Rudge. There are a few questions I would like to ask you. You were asked some questions about linear shrinkage and you were asked to draw a comparison between linear shrinkage of, let's say, 15 and 16 percent as opposed to 12 percent?*
- A. Correct.*
- Q. I think you told his Honour that there was a difference but it was not possible to quantify that difference. What did you mean by "quantify" in this context?*
- A. Well, what I meant was that it would be not possible to say that soil with a linear - sorry I don't know how to differentiate between the soil with a linear shrinkage of 16 percent and 12 percent in respect to whether or not the soil will erode; or in fact I have no relationships between that and the likelihood that a levee or a dam would fail.*
- By comparison I do have and it is in one of those documents that was tabled at the beginning of my evidence, quite good data to relate the likelihood of a failure by piping for degree of compaction and whether a soil is dispersive or not. In a sense, it was in - by comparison. I don't know how to quantify it.”*
- 262 Dr Truscott commented in respect of the Southern levee probably the one which shows the worst results leaving aside the CETS tests as follows:
- “Q. If we look at the southern levee, there are 8 tests, two of which are 12 percent and the rest of which are between 15 and 16 percent; do you see that?*
- A. Correct.*
- Q. Would the answer that you give me in relation to the Charlton road concerning the difference between 12 percent and some higher figure whether it is quantifiable and whether it has any effect, you just can't say?*
- A. I can say in a non mathematical sense that obviously it is not as good as if it was 12 percent but whether that means the risk is significantly changed, it is -.*
- Q. You can't say?*
- A. You can't say, no. I mean I'm not going to try and pretend, no. I can say it is not just as good. Whether it is significantly worse, I don't know.*
- Q. Then we look at the north Brewarrina levee. Is the result there you see is the answer you gave to a similar question that I just asked in relation to the southern levee the same for the north Brewarrina levee. These results are some what closer to 12 percent?*
- A. Yes, I think they probably depend on the borrow area but I - the answer's the same, yes. I mean it is not as good as it should be but whether it is significantly worse, I don't know.*
- Q. You just cannot say sitting there that it is or it is not significantly worse from the point of view of the integrity of this dam?*

A. All I can say, I don't know - I think you used the word "fit for purpose", I don't know.

Q. You can't say that it isn't?

A. Not really, no, as regards to linear shrinkage that is.

Q. As regards linear shrinkage?

A. Yes."

- 263 Plainly when Dr Truscott considers linear shrinkage alone he is not prepared to give any evidence that the levee banks are not fit for the purpose having regard to what differences were thrown up by the later tests.
- 264 Professor Fell and Dr Truscott apparently totally disregarded the CETS testing in their conclusions.
- 265 Bearing in mind my conclusion that there has not been demonstrated a sufficient departure from the compaction requirement it seems to me that there has been substantial compliance with the contract in respect of linear shrinkage. This flows from the fact that such testing as there is, seems to indicate a compliance in the Northern levee which is agreed to be sufficient. In respect of the other levees the evidence is of little weight because there is no basis expressed for the conclusions reached. In particular I am satisfied that in respect of linear shrinkage the levees are fit for their intended purpose.

Road Pavements

- 266 The Council puts forward four different areas to suggest that the plaintiff did not complete this work appropriately. They were:
- (a) Pavement compaction not in accordance with the contract requirements.
 - (b) Pavement thickness not in accordance with the contract requirements.
 - (c) Lack of freeboard on the levees.
 - (d) Alleged recent cracking and pavement failures supposedly in support of the above allegations which were observed by Dr Truscott and Mr Whiteside.

Pavement Compaction

- 267 Clauses 9.4 and 9.5 of the specification required a relevant density ratio of not less than a value of 100%. Testing was to be carried out randomly on each lot. In respect of Charlton Road and Tarrion Creek there are sealed surfaces over the compacted pavement. Tests were carried out by Barnson at the base course and sub-grade for both of these roads. The test results for the base course range between 90% and 98% compared with the specification requirement of 100%. Density tests carried out by Douglas Partners on behalf of the Council in April 2002 reported results of 95% to 100%. During construction CETS tests for Charlton Road showed results over seventeen tests between 99.9% and 102.8% and for Tarrion Creek between 100.7% and 103.1% over five tests. A comparison with nearby tests between the test sites between Barnson and CETS indicates a substantial difference in results. In respect of the testing of the pavement it is likely that there would be less problems with that testing because there would be less likely to be any disturbance of the sample because of the standard compaction testing in the laboratory, the variance between field moisture content and because optimum moisture content is not significant. In these circumstances, and bearing in mind my earlier comments on Barnson testing, I prefer the CETS tests. Another reason for accepting them is that Dr Truscott said that the density in areas close to the surface was likely to vary over time.
- 268 Mr John Harrison, a civil engineer experienced in roads, gave evidence on the subject. He gave evidence that if the road had been compacted at 95% rather than 100% it should prematurely fail but his observations of the road did not indicate any premature failure.
- 269 In these circumstances I am satisfied that the pavement met the required technical compaction requirements.
- 270 In respect of the Northern, Southern and North Brewarrina levees Dr Truscott says that the compaction requirements of the pavement on these (which of course are not sealed by bitumen coating) have not been met. There were two tests in the Northern levee, one in North Brewarrina and two in the Southern levee. Given the small number of tests and the lack of explanation of what this ultimately means I find that there is substantial performance of the contract in this regard.

Pavement depth

- 271 The pavement gravel under clause 9.3 of the specification was to be sourced from Redhill Quarry. The quality was to be as directed by the Superintendent or his representative. During the execution of the work the superintendent approved the re-use of existing pavement gravel as pavement gravel for the new roads in lieu of and in addition to the specified Redhill Quarry gravel.
- 272 It seems clear that the measurement of pavement thickness by Dr Truscott did not take into account the thickness of the gravel which was re-used by the contractor from existing pavements. I am satisfied that the normal required depth of pavement thickness of 300 mm was achieved. In respect of North Brewarrina Mr Komp approved a lesser thickness of gravel. This occurred in respect of an access road at North Brewarrina where the superintendent authorised a thickness of 100 mm. Apparently the reason for permitting it was because of an existing Telecom access line across the area. Given the directions of the superintendent there are no breaches in this regard.

Lack of freeboard on the levees

- 273 Dr Truscott identified some areas of the crest of the Charlton Road and the Southern levees that are considerably lower than specified. Dr Truscott gave evidence that the survey showed that in respect of the Charlton Road and

Southern levees the crests were considerably lower than was specified. He indicated that the other levees were satisfactory. When one looks at the plans one finds that in respect of Charlton Road there is a maximum flood level of 117.3 metres with a minimum crest level of 117.8 metres. It is clear that the centre line measurements of the road even on curves were above that minimum contract requirement. The actual apparent loss of freeboard that was identified by Dr Truscott in his Table 3 attached to his statement appears to be as a result of the super elevation on the curved sections rather than a failure of the levee to attain minimum crest level as designed. There is one spot between chainage 55 and 60 where the 117.8 is not achieved. Discrepancies are .13 of a metre and .4 of a metre. That appears to be where it merges into the Southern levee. In respect of the Southern levee at chainage 5.54 and 9.843 there is a similar discrepancy and this is where the two levees meet. In the Southern levee there is a further break at chainage 257.577 but that is deliberate because it is where a road passes through the Southern levee that would normally be blocked in flood times. On the Northern levee there is a similar low spot that appears to be caused by a road passing through the levee which I assume would normally be blocked if a flood was anticipated.

- 274 Dr Burman concedes that on the Southern levee there may be some areas where top up is required and he is no doubt referring to the ones that I have just mentioned. Accordingly, it would seem that there may be some basis for some rectification work in this area but given the small extent it would seem to me that there is substantial compliance and the defendant should have some claim for an amount necessary to rectify the levee in this area of the Southern levee and also in respect of the Charlton Road levee where I have indicated above.

Recent observations of cracking and pavement failure

- 275 There was an inspection of the site on 7 May 2004 after there had been rainfall of some 65mm at Brewarrina. Dr Truscott and Mr Whiteside observed longitudinal cracking in the seal along both the Tarrion Creek and Charlton Roads. Cracking was apparently 600 to 1500mm in from the edge of the seal. Dr Truscott also observed a pavement failure at the edge of the seal. His opinion was that the cracking was caused by settlement at the edge due to the poorly compacted fill or swelling of the poorly compacted fill as the rainwater penetrated the sides of the road. He blamed inadequate pavement thickness and inadequate compaction which he had earlier identified.
- 276 Photographic evidence produced by Dr Burman and Dr Truscott identified longitudinal cracking in the Tarrion Creek Road.
- 277 In respect of pavement failures it appears that apart from disturbances where test pits were dug in the course of the investigations for this case the only failure is in the gravel shoulder beside the bitumen fill. It will be recalled that the defendant specified and determined the nature of this gravel. It appears that such matters are minor and as Dr Burman says, it is really a maintenance issue for the defendant. In respect of longitudinal cracking photographs demonstrated the existence of these cracks which were not wide. Evidence was given by Dr Truscott that this was a result of inadequate pavement thickness and inadequate compaction. On both of these I have found against Dr Truscott. Mr John Harrison, an engineer, specialising in roads, gave evidence that such cracking is typical of roads in Western New South Wales after rainfall and the repair of the road is simply a maintenance issue. He also indicated that to avoid such problems one needed to seal the shoulders. In this case, this was not required under the contract between the parties.
- 278 There was also an issue raised following the inspection about scouring on the sides of the roads. It seems that this also is a maintenance issue as nothing has been done, for instance, to grass the sides to prevent scouring which would normally occur.
- 279 It seems to me that in respect of these recent observations, the evidence sought to be adduced does not assist the Council.

Key trenches

- 280 Dr Truscott carried excavations at ten locations to check cut off trench details. The data is summarised in Table 8 and of the ten test pits only two pits on the Southern levee exposed key trenches. Dr Burman examined these details in relation to the plan and in three cases the test pits appear to have been sighted where the levee had been over-built rather than in the design location of the key trench. Therefore the absence of a key trench at that point is irrelevant.
- 281 There is a substantial amount of other evidence that does indicate that key trenches were installed at Tarrion Creek, Charlton Road and the Southern and Northern levees. These included daily reports, a video of the excavation at Tarrion Creek and express evidence of Mr McCartney that they were constructed. Mr Komp also gave evidence that he observed key trenches being constructed at Tarrion Creek levee. When he was called he gave evidence that that paragraph also applied to other levees. He was not cross-examined on this matter. There are also in evidence hold point release forms signed by Mr Komp on behalf of the Council which confirmed the presence of key trenches. Given that he signed these it seems clear that there was an inspection.
- 282 In the circumstances I am satisfied that key trenches were installed as required under the contract.

Doyle Street levee

- 283 It seems clear that there is no real question about the structural adequacy of the wall. There are some cracks which are shrinkage cracks in the wall and the witnesses seem to accept that these could be easily repaired by coating with a sealant on the road side of the levee.

- 284 Earlier in these reasons I dealt with the appropriateness of the concrete testing and the test results. It is plain that the concrete tests undertaken in the footing in the earlier part of the wall showed two failures where the concrete did not achieve the strength of 25 mpa. These failures were made known to Mr Komp, the Superintendent, and he accepted them and directed the plaintiff to leave the footings as he was of the view that there was a sufficient safety factor in the design for it not to be a problem. This is clearly an acceptance of defective work under s 30.5 of the General Conditions and there has been no demonstration of any loss or suffering as a result.
- 285 The Schmidt hammer tests were carried out once the defendant raised a problem in relation to the concrete testing and they were satisfactory. On 24 April 2002 the designer of the wall, Mr Saran, carried out a detailed inspection, reviewed the testing and concluded that the levee wall conformed to the design requirements and therefore was considered structurally acceptable.
- 286 The only matter of concern that seems to have been raised by Dr Truscott was the cracking and Mr Saran gave evidence that was likely to have been caused by concrete shrinkage and was not a structural defect. He thought the water ingress would be minimal but Dr Truscott thought that there was a path which should be prevented. In my view the concrete wall is substantially fit for its purpose but the defendant should be allowed some allowance for surface treatment of the cracks to the wall.

Plaintiff's claim in restitution for total failure of consideration

- 287 Having regard to my findings that there has been substantial performance of the contract this claim will not lie. In any event given the fact that the contract provides for:
- (a) Progress payment
 - (b) Adjustment on default (clause 46.6)
 - (c) Damages (clause 44.1, 44.2 and 44.10)
 - (d) A schedule of quantities allocation of separate sums for separate parts of the work.
 - (e) An express division into two severable portions the contract is not an entire contract.

Trade Practices Act 1974 (Cth) and Fair Trading Act 1987 (NSW) claims

- 288 The further amended cross-claim alleges liability on the part of Beckhaus Civil under s52 of the **Trade Practices Act 1974 (Cth)** and s42 of the **Fair Trading Act 1987 (NSW)**. In the case of Dennis Beckhaus the cross-claim also alleges accessorial liability in respect of the alleged breaches by the plaintiff. The claims relate to three alleged representations set out in paragraphs 14 and 16 of the further amended cross-claim. They were
- (i) Beckhaus Civil had assets worth \$2 million;
 - (ii) Beckhaus Civil had an annual turnover of between \$3 million and \$6 million; and
 - (iii) Beckhaus Civil operated a third party accredited quality system.
- 289 The first two representations are alleged to have been made orally by Dennis Beckhaus at the post tender meeting on 8 August 2001 and to have been repeated in writing by the minutes of the post tender meeting.
- 290 The third representation is alleged to have been made in writing both in the tender submission (page 70 of Exhibit J, the relevant wording is "Beckhaus Civil operates a third party accredited quality system for all projects") and in the "Resume" of Completed Contracts attached to a fax of 2 August 2001 (page 31 of Exhibit J, the relevant wording is "a third party accredited quality system has been in operation since 1990.").
- 291 The response of the Cross-Defendants to these allegations is that:
- (a) The representations were not made in the terms alleged;
 - (b) No representation that may be established to have been made was misleading or deceptive;
 - (c) The evidence does not establish any reliance on any representations that may be proved to have been made;
 - (d) Mr Beckhaus has not been shown to have been knowingly involved in any misleading or deceptive conduct;
 - (e) No damage has been shown to have been sustained by the Council by reason of any representations that may be found to have been made.

- 292 I turn now to consider each of the representations.

Representation as to financial position of Beckhaus Civil

- 293 Mr Witherdin was a civil engineer who worked for a company formerly known as PPK Environment & Infrastructure. That company was retained by the Council to coordinate and evaluate tenders for the construction of the Brewarrina levees. Mr Witherdin also recommended a preferred tenderer based on the tender assessment criteria, which had been established for the purpose.
- 294 Prior to preparing his evaluation report that was eventually submitted to the Council, Mr Witherdin attended a tender interview on 8 August 2001 at Singleton. Mr Dennis Beckhaus was present. In his affidavit Mr Witherdin gave evidence that Mr Beckhaus said: "*Beckhaus Civil has an annual turnover of between \$3 million and \$6 million. It does not work off huge overdrafts. It pays accounts within 30 days. It has a current cash surplus of \$200,000.00 in the bank and assets worth \$2 million.*"
- 295 A record of the meeting formed part of the contract. The minutes record Mr Dennis Beckhaus of Beckhaus Civil being present and under the heading "Financial Status" there is a listing of the five statements, which Mr Witherdin alleges were made in his affidavit.
- 296 Mr Beckhaus' evidence of the relevant conversation was that in response to a question, "*Would you please advise your current financial position*" he responded in these terms: "*Our turnover is generally in the area of \$3 million but*

it has been as high as \$6 million. We don't work off huge overdrafts. We pay our accounts within 30 days. We have a current cash surplus of about \$200,000.00 in the bank. We have assets worth about \$2 million."

297 One will notice the clear difference between referring to Beckhaus Civil and Mr Beckhaus' use of the word "our" or "we". This arises because there are at least three companies involved in his operation. There is Beckhaus Civil Pty Ltd, the plaintiff in the action, Beckhaus Civil Engineering Pty Ltd and Beckhaus Pastoral Pty Ltd. The first two companies are described by Mr Beckhaus as operational companies for the performance of various contracts and the third is the company which owns the plant and equipment which is hired out to the first two companies. Although I will refer to this in more detail later in general terms it is plain that if Mr Beckhaus was referring to the group of companies then his statements would have been substantially accurate. If they simply referred to the plaintiff, Beckhaus Civil, they were completely inaccurate and misleading. For example, the plaintiff's total assets for the year ended 30 June 2001 was \$713,345.00 and its net assets were \$349,677.00. It hardly need be mentioned that it was only Beckhaus Civil that entered into the contract, not the other two companies.

298 It is also plain that the statement made by Mr Beckhaus as to cash surplus of \$200,000.00 and an annual turnover of between \$3 million to \$6 million was perfectly true in relation to the plaintiff, Beckhaus Civil. It is only the statement of assets worth \$2 million that does not apply to the plaintiff, Beckhaus Civil. This difference was eventually taken up with Mr Beckhaus in cross examination at T 288 in these terms:

"Q. When you indicated that the current cash surplus of \$200,000 in the bank was in place, you said that because you knew from your own knowledge that there was about that much in the bank?

A. Yes.

Q. And the balance sheet behind tab 13 would tend to support that, wouldn't it?

A. It would, yes.

Q. Then going to the first bullet point, that was based on your understanding of the turnover of Beckhaus Civil for the preceding years?

A. The 200,000 was based on—

Q. No, sir, I am asking you to look at the first bullet point.

A. To which?

Q. The first bullet point, "Annual"?

A. The first?

Q. The first bullet point under 7.5.

A. Oh, sorry. "Annual Turnover", yes.

Q. Again, that was based on your knowledge of the turnover of Beckhaus Civil in the previous years?

A. Yes.

Q. Then you see there is reference to assets worth \$2 million?

A. Yes.

Q. That was a false statement, wasn't it?

A. False statement, no.

Q. Beckhaus Civil didn't have assets of \$2 million?

A. No.

Q. You disagree with me?

A. Sorry? Yes, they didn't have, Beckhaus Civil didn't, no.

Q. And you were not asked questions at the meeting about other companies, were you?

A. No.

Q. How can you tell his Honour that the statement as recorded in the minutes is not false?

A. How can I tell him? The statement was made in relation to all the other companies. I mean in a pure sense, it was false.

Q. And do you tell his Honour that that is what you meant in your own mind when you made the statement?

A. I certainly did.

Q. But you didn't say it, did you?

A. I didn't say it? I very much doubt whether I was asked these questions.

Q. Could you answer the question please, Mr Beckhaus?

A. I am beginning to doubt whether I was ever asked these questions.

Q. And I am asking you to answer the question please?

A. Sorry, go back again. Where did we get to?

Q. You explained to his Honour, I think it is fair to summarise, that when you said assets worth \$2 million, or words to that effect, you were referring not only to Beckhaus Civil?

A. Correct.

Q. Other companies?

A. I was.

Q. You didn't actually refer to those other companies in your discussions on that occasion, did you?

A. No."

299 The version of the conversation put by Mr Beckhaus in his affidavit was put to Mr Witherdin. He stated that he did not recall that conversation and could not recall it either way. He conceded that he may have said it and that he did not recall it given the passage of time. He preferred to rely on the minutes as a basis for his recollection and it will be recalled from the minutes that in the substantive part they make no reference either to "Beckhaus Civil" or to "we" or "our".

300 In these circumstances I am prepared to accept that Mr Beckhaus' reported conversation in his affidavit is correct.

301 It is to be borne in mind that what Mr Beckhaus was attending on the day in question was a post tender meeting and that the tender had been submitted by the plaintiff, Beckhaus Civil. He was well aware of the relevance of the fact that the assets were held in another company because he structured his affairs that way so as to preserve the assets in case anything happened to the contracting companies. In the context of a meeting for this purpose, namely, considering the tender of the plaintiff, Mr Beckhaus' reference to "we" and "our" having regard to the circumstances and the particular facts to which he was referring, for example, the turnover and the money in the bank, were clearly directed by him to refer to Beckhaus Civil. It was no doubt understood by those to whom the statements were made in that sense. Plainly, as Mr Beckhaus concedes, the statement was false in relation to the assets. Mr Beckhaus did nothing to suggest to those at the meeting that it was other companies that had assets of this amount and that they would be available to the plaintiff. In the circumstances I am satisfied that the statement made by Mr Beckhaus was intended by him to refer to the plaintiff and that it was false.

Representation as to a third party accredited quality system

302 I have set out above the relevant representations which were made. Clearly these or at least one of them implies that such a system was in place at the time of making the representations. Mr Beckhaus concedes in his affidavit that the previous third party accredited quality system which was in force in Queensland expired on 23 March 1997. In cross examination Mr Beckhaus conceded that the statement was inaccurate because it did not say, "currently accredited".

303 Given the fact that the assessment of the tenderers required amongst other things the various tenderers to be allocated a score out ten for quality control, such a statement would be likely to mislead or deceive Mr McNabb who dealt with quality control issues in relation to the tender.

Causation and reliance upon the representations

304 Specific evidence was given by Mr Witherdin to whom I have referred about whether or not he would have made the recommendation which he did make to the Council as to the preferred tenderer if he had known the true situation. In respect of financial capacity he said: *"I say that I would not have recommended the acceptance of the Beckhaus Civil tender, particularly in the light of the magnitude of the overstatement of assets. PPK would not recommend a contractor in such a financial position. The low value of the net assets of Beckhaus Civil, in conjunction with its very low tender price, would present a risk regarding the potential insolvency of Beckhaus Civil and a real risk to the completion of the project. In addition it would raise a concern about Beckhaus Civil making spurious variation claims."*

305 In relation to the representation about an existing third party accredited quality system he gave evidence that it was important in the assessment process.

306 It is necessary to consider the extent of reliance by Mr Witherdin on the representations and then consider what flows from that in the terms of his report to Council and the Council's acceptance of the tender.

307 In respect of quality assurance situation it is plain that Mr McNabb sought and obtained some examples of quality systems that had been employed by the plaintiff on previous projects. In a letter of 2 August 2001 Mr McNabb asked for evidence of the nominated third party accredited quality system as well as typical plans used for other jobs. The response from Mr Beckhaus was to reply, indicating that he would drop off some plans from the current contract and a previous quality plan from their contract at Warren in 1998. He indicated that a job specific quality plan would be developed for the particular project. He made absolutely no mention of and did not provide evidence of the nominated third party accredited quality system.

308 Clearly the existence of the third party accredited quality system was still a fact which was relied upon in the assessment of the tenders. In discussing the Beckhaus Civil tender Mr Witherdin said the following when referring to their quality control: *"Quality – third party accredited quality system, was previously RTA qualified. Would have a qualified engineer on site. Submitted previous quality procedures for other jobs."*

309 Clearly Mr Witherdin accepted the statement of the existence of the third party accredited quality system and that became part of his recommendation for the acceptance of the tender.

310 Mr Witherdin was cross-examined concerning his reliance on representations concerning quality systems and a consideration of that indicates that he still relied upon the existence of a third party quality assurance system. The fact that other scores of various tenderers were close to that of Beckhaus does not detract from the fact of his reliance which, as I say, is also clear from the terms of his report.

311 I have referred to the evidence given by Mr Witherdin as to the importance which he placed on the financial capacity. Nothing detracted from his view on that and I accept his evidence in this regard that he would not recommend a contractor in such a financial position so far as a low value of the net assets was concerned.

312 Of course it was not Mr Witherdin who made the decision to accept the tender. That decision was made by the Brewarrina Council. The matter was considered at a meeting of the Council on 25 September 2001. There were

eleven members present and it was resolved that the Beckhaus tender be accepted, "As recommended by the consultants PPK Environment and Infrastructure and agreed to by DLWC and DPWS after a thorough review". There is no evidence to suggest that either the review or recommendation was put before the Council. No evidence was given as to reliance by members of the Council. There was evidence from Mr Walters who put the matter forward to the Council that if PPK had not recommended Beckhaus he would not have recommended them to the Council. He himself did not read the full PPK report but merely noted their ultimate recommendation. In **Henville v Walker** (2001) 206 CLR 459 it was held that where a contravention of s 52(1) was one of two concurrent causes of a loss that was enough to enable damages to be recovered under s 82. McHugh J at paragraphs 106 to 109 referred to the matter in these terms:

"[106] If the defendant's breach has 'materially contributed' to the loss or damage suffered, it will be regarded as a cause of the loss or damage, despite other factors or conditions having played an even more significant role in producing the loss or damage. As long as the breach materially contributed to the damage, a causal connection will ordinarily exist even though the breach without more would not have brought about the damage. In exceptional cases, where an abnormal event intervenes between the breach and damage, it may be right as a matter of common sense to hold that the breach was not a cause of damage. But such cases are exceptional.

[107] Of particular importance to the present case is the long-standing recognition of the possibility that two or more causes may jointly influence a person to undertake a course of conduct. In separate judgments in *Gould v Vaggelas*, *Wilson and Brennan JJ* emphasised that a representation need not be the sole inducement in sustaining the loss. If 'it plays some part even if only a minor part', in contributing to the course of action taken -- in that case the formation of a contract -- a causal connection will exist.

[108] This principle has been applied in cases where a complicating factor is the intervention of some act or decision of the plaintiff or a third party that allegedly constitutes a more immediate cause of the loss or damage. Thus, in **Medlin v State Government Insurance Commission Deane**, Dawson, Toohey and Gaudron JJ said:

'The ultimate question must, however, always be whether, notwithstanding the intervention of the subsequent decision, the defendant's wrongful act or omission is, as between the plaintiff and the defendant and as a matter of commonsense and experience, properly to be seen as having caused the relevant loss or damage. Indeed, in some cases, it may be potentially misleading to pose the question of causation in terms of whether an intervening act or decision has interrupted or broken a chain of causation which would otherwise have existed. An example of such a case is where the negligent act or omission was itself a direct or indirect contributing cause of the intervening act or decision.' (Emphasis added.)

[109] Similarly, in respect of claims under s 82, courts have accepted that loss or damage is causally connected to a contravention of the Act if a misrepresentation was one of the causes of the loss or damage sustained by the claimant. As the Full Federal Court pointed out in **Como Investments Pty Ltd (In liq) v Yenald Nominees Pty Ltd**:

'The law does not consider cause and effect in mathematical or in philosophical terms. The law looks at what influences the actions of the parties. Acknowledging that people are often swayed by several considerations, influencing them to varying extents, the law attributes causality to a single one of those considerations, provided it had some substantial rather than negligible effect.'

313 True it is that no-one from the Council who actually made the decision to award the tender was called to give evidence but it is plain from the minute that there were two matters put forward in favour of the acceptance of that tender. One was the recommendation by PPK and the other was that the investigations be carried out separately. It would seem to me that the recommendation by PPK was a material matter on which the decision was based. As I have found that recommendation was brought about in part as a result of the misleading conduct, causation is established.

314 So far as damages are concerned in these circumstances where the question was whether the Beckhaus Civil tender should be accepted in contrast to that of the next lowest tenderer who was Sudholz it should be noted that the difference between the two tenders was approximately \$1 million. In these circumstances the damages which the Council may recover on its cross-claim would be no greater than the cost of rectification less the unpaid portion of the contract sum including provisional costs items and also less the difference between the contract sum and the amount which would have been paid to Sudholz as the next most likely tenderer.

315 Having regard to my decision on the cross-claim it is clear that the damages will not anywhere near approach a sufficient sum to demonstrate that the Council has in fact suffered damage.

316 As has been noted in submissions, the tender by Sudholz was about \$1 million higher than that of Beckhaus but having regard to the terms of its tender and the provisional quantities, it would be likely to be at least another \$200,000.00 more than those claimed by the plaintiff. There is nothing in the circumstances of this case which would lead one to consider some other order under s 87 rather than damages under s 82.

Conclusion

317 I have found that in respect of the cross-claim the Council is entitled to damages for two small matters and naturally enough the evidence before me did not address those specific costs. The damages claim was based on estimates on several different bases predicated on substantial success by the Council on its cross-claim. In these circumstances it is probably appropriate that the parties either agree to these additional small amounts of damages or, if necessary, appropriate evidence can be taken.

318 I direct the parties to bring in short minutes to give effect to the reasons I have expressed in this judgment. If there are any matters requiring further consideration, such as interest and variation 21, the parties can let me have submissions and we can deal with the matters on the next occasion.

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M.Christie & V. Culkoff for defendant instructed by Paul Ward-Harvey