

Neutral Citation No. [2005] NIQB 68

Ref: **COGC5319**

*Judgment: approved by the Court for handing down
(subject to editorial corrections)*

Delivered: **24/10/05**

IN THE HIGH COURT OF JUSTICE IN NORTHERN IRELAND

QUEEN'S BENCH DIVISION (COMMERCIAL LIST)

BETWEEN:

**BRIAN BLAIR AND JOAN BLAIR (AND OTHER INDIVIDUALS
IDENTIFIED IN THE SCHEDULE ATTACHED TO THE WRIT OF
SUMMONS DATED 17 APRIL 2003)**

Plaintiffs;

-and-

AWG RESIDENTIAL LIMITED

First Defendant;

-and-

**BRENDAN LOUGHRAN, ENDA LOUGHRAN, DERMOT LOUGHRAN
AND EUNIN LOUGHRAN TRADING AS BRENDAN LOUGHRAN
AND SONS**

Second Defendants;

-and-

ROSSORRY DEVELOPMENT

Third Defendant;

-and-

**TPA TAYLOR, GI BLACK, RG KERR AND N MAGILL PRACTISING AS
TAYLOR AND BOYD (A FIRM)**

Fourth Defendants;

-and-

TENSAR INTERNATIONAL LIMITED

Fifth Defendant.

COGHLIN J

[1] The original plaintiffs in these proceedings comprised a substantial number of residents who had purchased units at a development of apartments and town houses at Rossorry Quay, Sligo Road, Enniskillen. Rossorry Developments Limited (“RDL”) is the owner of the development at the site and was the body which contracted to sell the units to the original plaintiffs. So far as any of the properties were leasehold, RDL was the freeholder. AWG Residential Limited (“AWG”) was previously known as Morrison Homes Limited. AWG was the developer of the site as well as being a part-owner of RDL. Brendan Loughran and Sons (“BLS”) was the contractor engaged by AWG to construct the development. Taylor and Boyd (a Firm) (“the defendants”) were contracted by AWG as a firm of engineers to provide consulting engineering services in relation to the construction of the development. Tensar International Limited (“Tensar”), previously known as Netlon, provided the design for the Load Transfer Platform (“LTP”) which was ultimately used as a vital element in providing the foundation for the development and Tal Limited (“Tal”) was the company that supplied the geotextiles that formed part of the LTP.

[2] Unfortunately, as a result of failure of the foundations which produced significant subsidence many of the residential units on the site became uninhabitable and substantial portions of the site have now been demolished. At the commencement of the hearing the court afforded some time to the parties for the purpose of ascertaining whether some of the issues might be resolved or, if not resolved, reduced somewhat in complexity. This time was effectively and constructively utilised and, as a result, the original plaintiffs were compensated for their losses and RDL and AWG effectively stepped into their shoes. RDL and AWG also took over carriage of the claims made by BLS and Tensar for the purpose of prosecuting claims against the defendants.

[3] Clause 8.1 (b) of the Consultancy Agreement concluded between AWG and the defendants limits their liability to such sum as the defendants ought

reasonably to pay having regard to their responsibility for the total loss and damage upon a similar basis to that contained in the Civil Liability (Contribution) Act 1978. Clause 8.1 (c) of the same agreement obliged AWG to indemnify the defendants in respect of any liability beyond that incurred by the defendants under the provisions of Clause 8.1 (b) (“the net Contribution Clause”). In such circumstances it becomes possible to reduce the issues to the question as to whether the defendants were negligent in their performance of the Consultancy Agreement and, if so, the percentage of the loss which that firm should bear by virtue of the net Contribution Clause. Although the precise level of damages is yet to be calculated, it would appear that the total loss is likely to be in the region of some 15 million.

[4] RDL and AWG and the parties associated with them were represented by Mr Paul Darling QC and Ms Jacqueline Simpson while Mr Gerald Simpson QC and Mr RM Berry appeared on behalf of Taylor and Boyd. This was a substantial and complex piece of litigation and I wish to acknowledge my gratitude to both sets of counsel for their industry and application in the presentation of the evidence as well as for the clarity and economy of their oral and written submissions.

The site

[5] The site is located to the south west of Enniskillen town centre on the A4 Sligo Road and is roughly rectangular in shape with dimensions of approximately 300 meters by 1020 metres. The site is bounded on the east by the River Erne, to the west by the Sligo Road and to the north and south by low lying areas of shrub and trees. Upon this site the plaintiff proposed to construct a development consisting of six blocks of town houses, three blocks of apartments and three jetties together with associated car parking, gardens and services.

[6] An initial appraisal by the defendants, dated 28 November 1997, noted that much of the site was extremely wet and marshy with a stream running across the southern boundary together with a culvert and other ditches. This document also referred to evidence of uncontrolled dumping and raised the possibility of contamination as a potential problem. The defendants noted that borehole records obtained for an adjacent site revealed the presence of 2 metres of fill on 5.5 meters of peat/peaty clay on top of 4 metres of very soft organic clay on limestone rock. The defendants noted that peat and peaty clay were highly compressible and that any load placed upon such layers would result in large but unpredictable settlements, the possible extent of which could not be ascertained until a more detailed site investigation had been completed. They advised that all of the buildings would have to be piled and that even laying a hardcore platform on the site could result in movement.

[7] The views expressed in the defendants' initial appraisal were fully supported by the subsequent detailed site investigation carried out by Glover Site Investigations Limited dated December 1997. This document confirmed the presence of limestone bedrock overlain by a thin deposit of boulder-clay followed by very soft Lacustrine Deposits associated with Lough Erne and varying depths of fill across the upper parts of the site. Settlement calculations prepared by Glover Site Investigations in relation to the roadways indicated that placing one metre of stone fill on the site would lead to settlements in excess of 800 millimetres and shear failure of the very soft materials was likely to occur leading to "mud waves." Glover Site Investigations recommended that all buildings, roadways, landscaped areas and jetties should be piled. This report specifically recorded that:

"It cannot be over-emphasised how soft and compressible these Enniskillen Lacustrine Deposits are and there are too many examples of failures in the area due to lack of careful design."

[8] There is no doubt that the difficulties presented by this site were fully appreciated by the defendants. As Mr Norman Magill put it in evidence ... "there were bad sites and then there was Enniskillen." The conditions were also appreciated by the plaintiff as illustrated by the internal fax dated 9 December 1997 from the McKenzie Partnership, the plaintiffs' project manager, quoting John Shaun Magill, another employee of the defendant, referring to ground conditions as "mush on mush" or "like ice cream down there..." In their initial appraisal document the defendants advised that all of the buildings would have to be piled and that pre-cast concrete piles with rock shoes were required which would be driven to and keyed into the rock.

The Load Transfer Platform

[9] A Load Transfer Platform (LTP) is a type of soil embankment reinforced with horizontal layers of plastic geogrid designed to act as a foundation that transfers the weight of overlying structures through the embankment and underlying soil directly onto pile caps placed on piles that are firmly anchored into the underlying bedrock. The purpose of such an embankment is to provide satisfactory foundation support for structures that are to be built upon weak underlying soils without incurring the substantial costs of constructing concrete rafts or ground beams.

[10] At Rossorry Quay the original design for the LTP was produced by Tensar and required a triangular arrangement of piles. The piling platform was to be some 500 millimetres in depth although, in some parts of the site, it was actually 1.5 metres. Above the piling platform the LTP was to be constructed commencing with a bottom layer of fill of compressed strong granular material some 200 millimetres in thickness. Upon this was laid the

lowest layer of geogrid followed by a further layer of fill, a second layer of geogrid, further fill and a third layer of geogrid. The load represented by the structures was intended to be transferred downwards through the LTP onto the pile caps in cone-shaped pathways with 45 degree sides. A final layer of fill was to be added over the third layer of geogrid to ensure that an arch was formed between the upper edges of the cones resting upon adjacent pile caps. Tensar calculated that the volume of soil inside the arch would be carried by the geogrid. The triangular pattern of pile caps formulated by Tensar would produce a tetrahedron of soil within the arches and Dr Milligan, on behalf of the plaintiff, was critical of Tensar for failing to make a sufficiently robust assessment of this three dimensional aspect of their design. Dr Milligan also expressed surprise at the triangular arrangement of the piles in a situation where the geogrid itself was designed to run on rectangular lines. He also noted that the Tensar method had been developed from research work by Guido in 1987 but that, subsequently Guido's approach had been seriously called into question.

[11] There is no doubt that the LTP has generally failed across the site causing widespread cracking and deformation of the buildings and other structures thereon. All of the relevant experts, including Professor McGown representing Tensar, agreed that the cause of this failure was settlement of the ground away from the fill material below the lowest geogrid causing the LTP to sag to such an extent that there was a failure of the arching mechanism upon which the Tensar method depends. Failure of the Tensar arching mechanism transformed the LTP into a "tension membrane" for which the Tensar geogrids were inadequate and largely ineffective. A large proportion of the full weight of the LTP together with the load thereon including buildings, roads and car parks was then transferred to the ground causing substantial further settlement. There has been no significant movement or failure of the piles themselves and it is important to record that the basic cause of failure was not the inability of the LTP to support the weight of the structures beneath which it was constructed but rather the extremely poor ground conditions which caused settlement away from the bottom of the LTP before the arching had time to form or any of the structures had been erected.

British Standard 8006

[12] The British Standard Code of Practice 8006 was published in 1995. Professor Ingold, who was called on behalf of the defendant, sat on the committee charged with the task of producing BS 8006 which started work in 1984. When finally published BS 8006 was based on knowledge ranging from the late 1960's to 1990 at the latest. Professor Ingold described BS 8006 as a conservative's standard and noted that it was currently being revised by the honorary BSI Technical Committee B 526/4 primarily to ensure compatibility with emerging European standards that will ultimately replace national

standards. A Tensar staff member sits on the present committee representing the Institution of Civil Engineers.

[13] BS 8006 deals with a number of topics including design of piled embankments with basal reinforcement. Paragraph 8.3.3.6 of the BS refers to vertical load shedding with the vertical embankment load being transferred onto the pile caps. There is no specific reference to LTPs in the BS although such platforms are recognised as a species of reinforced embankment. However at paragraph 19 figure 1 there is a specific pictorial reference to building foundations accompanied by the note that:

“There is not yet enough experience with this application to be included in a Code of Practice.”

The selection of the Load Transfer Platform

[14] Mr Norman Magill was the defendants’ Project Partner in relation to the Rossorry Quay development and, consequently, he was responsible for role co-ordination, client liaison and attendance at project or design team meetings. Mr Robert Paul was designated by the defendant as the Project Associate in relation to Rossorry Quay which meant that he was responsible for design and the general running of the project on a day to day basis including attendance at site meetings. It seems that, prior to October 1997, neither Mr Magill nor Mr Paul had any previous experience of using LTPs although they had been aware for some four or five years that Tensar and another firm, Maccaferrie, supplied geotextile materials.

[15] In October 1997 Tensar held a “road show” at a Belfast Hotel which was attended by a number of engineers. Representatives from Tensar also attended a lunch-time seminar at the offices of the defendant. Mr Magill did not attend either the road show or the lunch-time seminar nor did he have access to any notes or documents relating to the contents of these events and he agreed in cross-examination that he had not seen any brochures from Tensar relating to the use of LTPs. Mr Paul, a senior structural engineer, was based in Derry four days a week but he attended the lunchtime seminar at the defendants’ office. Prior to doing so, he had heard of Terram, a geotextile product manufactured by Maccaferrie, but did not know that there was more than one manufacturer of geogrids. The seminar at the defendants’ office lasted about one hour and included a reference to LTPs. It appears that Tensar said that these could be used where ground conditions were particularly poor. The design philosophy was explained on the basis that the arches formed in the stone fill operated to shed the load onto the piles. Mr Paul agreed in cross-examination that the seminar lasted approximately one hour and dealt with other matters apart from LTPs although the latter did occupy a significant part of the time. Mr Paul stated that Mr Magill was the partner who was concerned with the managerial aspects of the Rossorry

Quay project while his involvement was more technical. He said that he knew very little about LTPs although it appears that an LTP had been used at a project in Downpatrick in which the defendants were involved in connection with the construction of a supermarket, petrol filling station and car park. This project was approximately four to six weeks in advance of Rossorry Quay. Mr Paul did not have any role to play in the Downpatrick project.

[16] The defendants were aware of the poor ground conditions at Rossorry Quay from an early stage in the project and they reflected their concerns in the memorandum dated 28 November 1997 entitled "Sligo Road, Enniskillen. Structural and Civil Engineering considerations." This memorandum commenced by stating:

"The site is situated adjacent to a river in an area of Fermanagh notorious for poor ground conditions and ground movement. Part or all of the site has been infilled at some time in the past and has been reclaimed from the river. Much of the site is extremely wet and marshy. "

The memorandum went on to note that contamination could be a problem, that there was an obvious and real danger of flooding, that the peat and peaty clays that there present were highly compressible and that any load placed on these layers could result in large but unpredictable settlements and that "...even laying a hard core platform on the site could result in movement." The defendants emphasised that all the buildings would have to be piled and that even the roads and parking areas might require to be piled depending on the amount of settlement/ongoing maintenance that was acceptable. They raised the possibility of using a geotextile grid such as Tensar for the roads, parking areas and drainage runs depending upon the extent of settlement which would not be known until the site investigation was complete.

[17] A Project Team Meeting took place on Wednesday 3 December 1997 which was attended by Mr Magill. According to Mr Magill the concept of an LTP was described to the client at this meeting and it was explained that this was a specialist design which would involve contact with outside bodies. He said that he received permission from the client for this to be done although it was explained that there was a need for sensitivity because of the way in which the site had been acquired which involved "a gentleman's agreement". There is no note of such an explanation or request in the minutes of this meeting which record, inter alia, Mr Magill's concern that traditional road construction techniques could result in settlement of up to two metres and his recommendation that, in such circumstances, consideration should be given to piling below the proposed roads. Mr Magill accepted in cross-examination

that, subsequently, he could have applied to amend or correct the minutes but had not done so.

[18] Subsequent to the meeting of 3 December 1997 contact took place between Mr Paul and representatives of Tensar and the documents confirm a discussion about the roads and gardens areas being constructed upon an LTP supported by piles.

[19] On 27 January 1998 an Outline Residential Specification was issued on behalf of the plaintiffs which described the substructure for the buildings as being reinforced concrete ground floor slab, ground beams and pile caps on driven reinforced concrete pre-cast piles. At a Project Team Meeting held on the following day the defendants presented a report on the civil construction ground works which advocated that roads, driveways and other large areas of hard landscaping should be constructed on a LTP. The main buildings were to be supported on piles and ground beams with polystyrene being introduced to fill any voids left under the ground floor slabs. On 11 February 1998 the defendants wrote a letter to the Bruce Shaw Partnership, the chartered quantity surveyors, a copy of which went to the plaintiffs' project managers, McKenzie Partnership, putting forward two options for the foundations under the buildings. They suggested either a continuation of the LTP under the units with the construction of a raft foundation or use of traditional ground beams and pile layouts to suit the walls. The defendants advised that due to the high concentration of loads arising from clear span construction a raft foundation was unlikely to be economical for the clear span option or for the unit which required a clear basement for underground parking.

[20] On 30 January 1998 Mr Paul sent the defendants' report on civil construction/ground works of 28 January 1998 to Tensar. Mr Paul recollected in evidence that around the start of February 1998 the defendants were considering technical problems produced by the junction between the buildings supported upon traditional piles and ground beams and the surrounding areas constructed upon an LTP and piles. Such junctions required an additional row of piles and ground beams to support the edge of the LTP. Ultimately, Mr Paul accepted that it was his decision to extend the LTP under the buildings as well the surrounding ground works. The handwritten note to this effect on the covering letter of 30 January 1998 from the defendants to Tensar was probably created as a result of this decision and a subsequent conversation between Mr Paul and Mr Gilchrist of Tensar. An internal Tensar e-mail from Alistair Gilchrist to Chris Jenner, dated 20 February 1998, confirmed that:

“The client, Morrisons, has given the go ahead for the scheme and Taylor and Boyd now need a design for the LTP.

The LTP will now go under all the roads and the houses other than the four storey building.”

This was followed by a fax from Tensar to Mr Paul on 27 February 1998 that included a section illustrating the LTP for the roads and houses area. The Outline Residential Specification issued on 3 March 1998 specified that, generally, a 500ml hardcore working platform reinforced with Tensar was to be laid across the entire site with a LTP comprising 100ml of hardcore reinforced with three layers of Tensar supported off pre-cast concrete piles. Well compacted hardcore fill was to be provided above the LTP to make up levels below all town houses, roads and parking areas. On 2 March 1998 Mr Paul forwarded sketches to the Bruce Shaw Partnership showing the LTP extended below the houses and undertook to distribute colour copies at the design team meeting on the following day, 3 March. Paragraph 2.02 of the minutes for that meeting referred to:

“Civil works document showing piling and site works have been submitted and did not change from the original scheme.”

Mr Paul was adamant that these drawings were tabled at that meeting and that he drew them to the attention of the project manager as well as the quantity surveyor.

[21] On 10 March 1998 the defendants Civil Construction Ground Works report was reissued but, despite the decision that had been taken to extend the LTP under the buildings, this document again confirmed, at paragraph 2.1:

“The main buildings are supported on piles and ground beams but in order to avoid excessive or damaging depths of fill underneath these floors, polystyrene has been introduced to fill any voids left under ground floor slabs.”

During the course of their evidence neither Mr Magill nor Mr Paul was able to explain the repetition of this assertion in this document.

[22] On 20 March 1998 Tensar sent a list of projects which had involved the construction of LTPs to the defendants in connection with a project under construction at Downpatrick.

[23] On 1 June 1998 the defendants sent out tender documents for the construction of the LTP to Maccaferri and Tensar. A covering letter confirmed that the section of work described in the documents formed a sub-contact of

the building works and that each firm had been named as one of the designers of the Load Transfer Platform. Under the heading "General Description" the contract was described as a preliminary sub-contract to enable the development of the site as a residential development and confirmed that it would provide a stable platform from which the construction of the town houses, parking areas and roads could be completed. The works were said to include the provision of a stable platform from which to drive piles and the construction over the pile caps of a LTP to support additional fill, structural and civil works. The LTP was to be based on either the Tensar or Maccaferri system and was specified to be a contractor designed element. The defendants specified that the final design proposal would have to be submitted with the tender for the approval of the defendants and that the submission should include full calculations and specifications for the LTP with a Bill of Quantities for the work to permit an evaluation of the design and to value any variations. Both firms also received copies of the existing level survey, the site layout drawings, typical sections, and the site investigation report.

[24] On 10 June 1998 the defendants issued tender documents for the design and construction of the piling platform, piling and LTP to a number of contractors. On 15 June the contractors received additional documentation including the specific requirement that the piling and LTP should be designed in accordance with BS8004:1986 Foundations and BS8006:1995 Strengthened/reinforced soils and other fills. A copy of the documentation went to both Tensar and to Maccaferri as well as the plaintiffs' Project Manager.

[25] On 16 June Tensar provided a tender submission on the first page of which it was pointed out that the Tensar method differed from BS8006 with respect to vertical load shedding. Under the heading "Introduction" Tensar stated:

"This design of the Load Transfer Platform will be carried out in accordance with principles set out in BS8006 'Code of Practice for Strengthened/reinforced soils and other fills based on an ultimate and serviceability limit state. The Tensar method differs only with respect to the vertical load shedding. The equations incorporated within the British Standard for load shedding are based upon empirical values of arching co-efficients for positive projecting sub surface conduits and the design of the geosynthetic reinforcement is to provide a simple support membrane to the fill without any interaction with the fill that is being supported."

Under the heading "Serviceability" this document provided that:

"In the working condition the existing soil beneath the Load Transfer Platform will give some support to the structure which is additional to that which is adopted in the ultimate limits state design. The serviceability limits are therefore unlikely to be attained during the design life of the proposed structure."

Maccaferri submitted a design based on a modified BS8006 design approach but then notified the defendants that they were finalising a new design approach which they had developed in association with Mott McDonald, a firm of engineers. This submission was not available in time for the Enniskillen design submission date.

[26] A problem developed in relation to the main contractor originally selected, Deane Public Works, when that firm claimed to have made an error in the calculation of the volume of stone involved in submitting their tender and, as a consequence, requested additional costs of around £45,000. The plaintiffs' Project Managers wrote to the defendants on 12 October 1998 with regard to this problem noting that the details of the site engineering contract had been included in the outline specifications at the defendants instigation and confirming their understanding that, as a result of the specialist nature of the works, the defendants had recommended a contractor design. In their response dated 13 October 1998 the defendants confirmed that, while they had initially designed the LTP in conjunction with advice from Tensar and that this design had been used by the quantity surveyors to calculate quantities, there had been agreement that the tender documents should be issued based on a performance specification only leaving it entirely as a contractor designed item. Later in this letter the defendants said:

"We continued to evaluate the technical merits of the submitted design and assumed that as the final pre-Tender estimate for the enabling works had been prepared by Bruce Shaw the day before tenders were returned that they would be checking the financial aspects of the submission."

Essentially, this letter constituted a response by the defendants to the suggestion that they might have had some responsibility for the problem that had arisen in relation to Dean Public Works. Ultimately Dean Public Works withdrew in favour of Brendan Loughran and Sons and on 14 October 1998 the plaintiffs' Project Manager wrote to the defendants confirming that the latter firm were able to stand over the price of £979,000 and proceeded to deal with the issue of warranties in the following manner:

“You will be aware however that the enabling works involving the piling and load transfer platform are to be a contractor’s design. I understand that the piling contractor and ‘Nethlon’ (Tensar) as the contractor undertaking the load transfer platform are to provide design warranties, these being originally intended to be obtained through Deans.”

The defendants subsequently wrote to the plaintiff on 20 October 1998 confirming the acceptance of the tender from Brendan Loughran and Sons and stating that:

“Brendan Loughran’s have not completed work of a similar nature, but only a few contractors in Northern Ireland have. However, with the experience that they do have along with suitable care taken on site and by following the Tensar specification, there is no reason why they would not be capable of successfully completing the scheme.”

The defendants subsequently wrote to Brendan Loughran and Sons requiring them to put in place collateral warranties for a piling design and the Tensar Geogrid Design. Brendan Loughran and Sons were subsequently provided by Tensar with a construction sequence and design brief for the Load Transfer Platform.

The visit of Mr Statin to the defendants’ premises

[27] Mr Statin is a chartered civil engineer with a post graduate diploma in Geo-technical engineering. Between 1996 and 2001 he was employed by Maccaferri initially as technical manager and subsequently as technical director. He is currently the managing director of an associated wholly owned subsidiary based in Durban.

[28] In 1998 Mr Statin was based in Oxford and working for Maccaferri on several projects involving LTPs. The Maccaferri LTP employed a geogrid known as Terram Paralink. This was the material specified by Maccaferri in their submission to the defendants for the development as Rossorry Quay on 27 April 1998. Mr Statin commissioned the geo-technical engineering firm of Mott McDonald to validate his proposal for the design of an LTP to be used at Rossorry Quay as well as to produce a design which he conceived would be likely to be used by Tensar. Mott McDonald applied three dimensional numerical modelling to both designs using software known as FLAC. Mott McDonald recorded this exercise in a report dated 29 July 1998. The conclusions reached by Mott McDonald included a finding that the behaviour

of the piled Load Transfer Platform was shown to be significantly affected by the presence of sub-soil even when conservative estimates of soil properties were assigned. The numerical analysis of the proposed design incorporating the Tensar materials showed that it would not be able to sustain the stresses generated and Mott McDonald concluded that, in the absence of significant support from the sub-soil, the Tensar geogrid material would yield resulting in large total and differential settlements.

[29] Mr Statin stated that he took the Mott McDonald report to a meeting with the defendants in their boardroom on 5 August 1998 and that he discussed the merits of the Maccaferri and Tensar designs with the assistance of a Powerpoint presentation. Mr Statin accepted that, at the time, he was not familiar with the details of the Tensar design that had been actually used at Rossorry Quay and that he was using his "guesstimate" for presentation purposes. According to Mr Statin, while he appreciated at this time that Maccaferri was unlikely to be awarded the project, he was concerned to communicate to the defendants the criticisms and misgivings which Mott McDonald had expressed about the Tensar design. In cross-examination Mr Statin accepted that the model which he had used to represent the Tensar design was based upon a number of errors when compared to the design actually used by Tensar at Rossorry Quay and he conceded that the effect of such errors could not be ascertained without running a further analysis. He maintained that he had not been delivering a "sales pitch" to the defendants and that he had simply attended in order to provide them with significant information about the Tensar/Guido method. He said what the defendants did with the information was "up to them" but that it should have "rung alarm bells".

[30] I do not accept the impression that Mr Statin sought to create that the purpose of the meeting was the disinterested provision of information to the defendants in order to illustrate the risks of adopting a Tensar design. If that had been the case, I should have thought that Mr Statin's first priority would have been to ensure the defendants were provided with copies of the Mott McDonald report and the Powerpoint presentation. When asked about this Mr Statin was unable to give any reason as to why such materials should not have been left with the defendants. The Maccaferri project notes confirm that Maccaferri did not consider that they had lost the contract until January 1999 and, accordingly at the time of this meeting I am of the view that it would have been reasonable for the defendants to regard Mr Statin as the representative of a competing tenderer. Both Mr Magill and Mr Paul attended the meeting on behalf of the defendants and both maintained that if Mr Statin had produced the Mott McDonald report they would have taken the criticism much more seriously. Mr Paul said that, after the meeting, he checked with Mr Mistry of Tensar as to whether their design relied on support from the sub-soil and he was referred to the Tensar design submission which confirmed that such reliance was not necessary. Mr Magill

conceded that he had not followed up the academic criticisms of the Guido method contained in the articles in Ground Engineering Magazine and that, after a long discussion, they had decided to take no other steps apart from contacting Tensar. While I have no doubt that Mr Magill, with the benefit of hindsight, regrets the decision not to take further action, I am not persuaded on the balance of probabilities that it was unreasonable for the defendants to act as they did having regard to the contemporary circumstances of this meeting.

The first failure at block D

[31] On 17 February 1999 Mr Magill received a report from one of the defendants' employees at the site indicating that he had observed cracks in the blinding concrete at block D. Mick Park from Tensar attended the site on 18 February and recorded "...mushroom shape of pile cap visible, speculation that piles have punched through grid." Three piles were excavated and in each case the bottom layer of geogrid was found to be SS20 rather than SS30 as specified. There was also evidence of voids at the side of the piles. Mr Park speculated that the voids might be evidence that the grids were not truly spanning between the piles after settlement of the original ground level or that the ground immediately under the slope of the edge and between the edge pile had been settling pulling the grid down and away from the pile with the result that the grid had ruptured. The employees of Brendan Loughran who had been constructing the LTP had no explanation as to why the bottom layer of geogrid was not in accordance with the specification. Further observations by Tensar indicated that an area of the LTP had settled by around 180 millimetres between the piles. Tensar advised that the lower grid of SS20 was not as strong as the SS30 specified, the position of the lower grid was between 60 and 120 millimetres above the pile cap, the spacing between the geogrid layers varied from 100 to 300 millimetres despite, 300 millimetres having been specified, that the depth of fill above the top layer of geogrid was between 470 and 650 millimetres, as opposed to 700 millimetres specified, that the overall thickness of the LTP and bulk fill varied between 920 to 1310 millimetres, whereas 1500 millimetres had been specified, and that no Tensar 55 RE horizontal restraint reinforcement was evident.

[32] On the 26 February 1999 the defendants wrote to Brendan Loughran and Sons emphasising that the design of the LTP was a contractor designed item which was their responsibility and the responsibility of their domestic sub-contractor Tensar. Mr Gilchrest of Tensar met with Mr Paul on site on 3 March 1999 and he proposed a reinstatement of the LTP with SS40 for the lower grid, SS30 for the middle grid and SS20 for the top grid. It seems to have been suggested that this additional strengthening would be used as far into the site as any damage was shown to the existing SS30 and that the LTP would terminate 500 millimetres beyond the outside edge of the outside line of piles. In a fax to the defendants dated 4 March 1999 Mr Gilchrest

suggested that these remedial actions had been agreed but in a letter to Brendan Loughran and Sons of 8 March 1999 the defendants emphasised that any additional works were matters for Tensar who were the designers of the LTP.

[33] Building Control learned of the failure and retained Dr Gregory of Kirk McClure and Morton. In response to a number of queries raised by Dr Gregory Tensar wrote to the defendants on 26 March 1999 in the following terms:

“With regard to the design of the LTP, it is considered in isolation from the ground on which it stands. The original design submission of 16 6 98 does not refer to the strength of the foundation soil. Page 2 of this submission refers to the grids being able to support the layer of granular fill above them within the arch while the foundation and soil is assumed to be capable of supporting the initial 200 millimetre thick layer of fill below the lowest grid. Although it is assumed that the foundation and soils are capable of supporting this layer of fill and that of the actual piling platform itself, this degree of support is not taken into account in the design.

Any settlement of this fill away from the underside of the LTP would be assumed to cause no distress to the piles as the lateral force imposed on the piles act on all directions..... With regard to the failure on site and the suggested remedial measures, it appears that the distress caused to the load transfer platform has resulted from an unforeseen rapid draw-down of the water level outside of the embankment. It would appear that this draw-down has induced a failure outside of the load transfer platform, inducing a dynamic load effect to the load transfer platform through geogrids which extend into the embankment area. The revised geogrid layout suggested for the remedial measures is an acknowledgement of the problems that have occurred and the grades of geogrid suggested have been increased purely as a prudent measure. The existing calculations previously supplied remain valid...”

On 30 March 1999 Dr Gregory met Alistair Gilchrest of Tensar and as a result of discussion they concluded that Dr Gregory’s queries related to the performance of the piles rather than to the LTP. Ultimately, after a series of

scientific investigations carried out with the assistance of facilities at Queen's University, Belfast Dr Gregory's concern about potential horizontal movement of the piles was satisfied. Dr Milligan, the geotechnical engineer called on behalf of the plaintiffs, did not consider that the defendant's reaction to the first failure at block D was unreasonable given the apparent deficiencies in construction of the LTP and the detailed investigation and analysis carried out by Dr Gregory. Mr Darling QC formally accepted that he made no criticism of the defendants' reaction to the first failure.

The second failure at block D

[34] In April 1999 a further 5 millimetres wide crack appeared in the mud-mat for the raft at block D which was observed both by Taylor and Boyd and an inspector attending the site on behalf of the National House Building Council ("NHBC"). In a fax dated 12 May 1999 Tensar maintained that this crack bore no resemblance to the crack pattern associated with the same area in February 1999 pointing out that the current crack was regular and appeared to follow the outline of the junction between the area of the LTP that had been repaired and the undisturbed LTP. The original draft of this fax stated that, from the visual information, it was highly unlikely that the crack had been caused by a similar movement to that which caused the original displacement and it was more likely to have been the result of differential settlement between the repaired area and the undisturbed LTP. However, in the final version of this fax as sent this section was altered to simply read "...it is very difficult to identify the reason for this minor cracking which could result from a number of different mechanisms. Without understanding the mechanism it is not possible to produce an analytic report." The defendants' response was to point out that the cracking was not co-incidental with the vertical profile of the raft, that it was not minor and was growing at a rate of one millimetre per week and that it was necessary for Tensar to explain the next step towards solving the problem if the mechanism was not currently understood. The defendants explained these views at a meeting held on 12 May 1999 and offered as an alternative method of construction, which did not rely on the LTP supporting the weight of the buildings, the suggestion that a concrete raft should be cast directly off the pile caps. The LTP would then rest on the scarcement, or edge detail, of the raft. A meeting held on site on 17 May 1999 was attended by Brendan Loughran, Mr Paul, representatives from Tensar and David McCausland from Robinson Patterson Partners, the project architects. A decision was taken to monitor ground movement with the use of inclinometers at the sites of two piles. Minutes of the meeting indicated that the defendants agreed with Tensar that the crack seemed to be caused by lateral movement rather than differential settlement due to the crack opening horizontally rather than vertically. Tensar maintained that they had never encountered such a problem before despite having completed more than 60 LTP projects in the past.

[35] At a meeting held on 25 May 1999 the defendants confirmed the principle of the LTP and piles worked but suggested that the problem was unique to block D in view of the fact that was the only location on the site which appeared to be suffering from cracking distress. The meeting generally agreed to adopt the defendants' solution of lowering a raft to pile cap level and using a suspended concrete floor system. On the same date Dr Gregory of Kirk McClure and Morton wrote to the chief building control officer at Omagh District Council confirming that he was prepared to approve the piling and LTP in principle subject to monitoring. After a further series of correspondence Dr Gregory reported to the chief building control officer on the 28 July 1999 that, on the basis of Finite Element Modelling that had been carried out and the most recent monitoring, he was satisfied that the work complied with part D of the Building Regulations. In a sense this was a continuation of the earlier failure and, again, I think that it is difficult to be critical of the reaction of the defendants viewed in the context of Dr Gregory's thorough investigation and all the other relevant contemporary circumstances.

The legal relationships between the parties

[36] RDL and AWG have stepped into the shoes of the plaintiffs in order to pursue their actions against the other defendants and they have also taken over the cases of BLS and Tensar. Accordingly the claims to be adjudicated upon by the court are the claims of the plaintiffs, RDL, BLS, AWG and Tensar against these defendants. These claims comprise various causes of action including AWG's claim against the defendants for breach of the Consultancy Agreement, RDL's claim for breach of its Collateral Warranty, the alleged breach by the defendants of the duties owed under the Defective Premises (Northern Ireland) Order 1975 to the plaintiffs, RDL and AWG, breach of the common law duty of care owed by these defendants to the plaintiffs, RDL and AWG and claims for contribution by these defendants from RDL, AWG, BLS and Tensar in accordance with the provisions of the Civil Liability (Contribution) 1978.

[37] On 20 October 1999 the defendants executed the Consultancy Agreement clause 2.1 of which incorporated the Association of Consulting Engineers Conditions of Engagement 1995 ("the ACE Conditions").

[38] Paragraph 8.1B of the ACE Conditions provides as follows:

"Notwithstanding anything to the contrary contained elsewhere in this Agreement, the total liability of the Consulting Engineer under or in connection with this Agreement (other than liability for claims arising out of or in connection with pollution or contamination

which is excluded) whether in contract or in tort, in negligence or for breach of statutory duty or otherwise for any claim shall be limited to the lesser of:-

- a.* the amount stated in the Memorandum of Agreement as the limit of the Consulting Engineer's total liability, and
- b.* such sum as the Consulting Engineer ought reasonably to pay having regard to his responsibility for the total loss or damage suffered on the basis that all Other Consultants and all other parties providing design management or financial services or labour or materials or plant or equipment for incorporation in the Project or the Works or executing the project or the works or any part thereof shall be deemed to have provided contractual undertakings on terms no less onerous than that set out in condition 2.4 hereof to the Client (whether or not they shall be so provided to the Client) in respect of the provision of their services or labour or materials or plant or equipment in respect of executing the Project or the Works or any part thereof and shall be deemed to have paid to the Client such contribution which it would be just and equitable for them to pay having regard to the extent of their responsibility for any loss or damage."

Paragraph 8.1C of the ACE Conditions provides:

"8.1 C

The Client shall indemnify and keep indemnified the Consulting Engineer from and against all claims, demands, proceedings, damages, costs, charges and expenses arising out of or in connection with this Agreement or the Project and/or the Works in excess of the total liability of the Consulting Engineer agreed in Condition 8.1B or which may be in respect of the events occurring after the expiry of the period of liability stated in the Memorandum of Agreement and/or arising out of or in connection with pollution or contamination."

[39] Clause 4 of the Consultancy Agreement provided as follows:

“4. General Services

4.1 The Consultant shall:

4.1.1 provide a full and complete structural engineering service in relation to the planning, design, construction and completion of the Development, to include all the duties listed in Appendix 1 of the ACE Conditions except for the following duties:

4.1.2 exercise all reasonable skills, care and diligence in the discharge of the Services to the standards which may reasonably be expected of a professional person experienced in carrying out such services for a development comparable in size, scope, complexity and purpose to the Development:”

[40] Clause 5 of the Consultancy Agreement provided as follows:

“5. Particular Services

5.1 The Consultant shall provide all the Particular Services as specified in Schedule 5.”

Schedule 5 of the Agreement comprised a list of services abstracted from appendix 1 of the ACE conditions.

It will be appreciated that there is a potential conflict between the absence of any exceptions to appendix 1 specified at clause 4.1.1 and the inclusion of clause 5.1. In the circumstances I accept the submission of Mr Simpson QC that the ‘contra proferentem’ rule should apply and that clause 5.1 should prevail. The services specified in clause 5.1 had to be performed by the defendants in accordance with the standard set out at clause 4.1.2.

[41] One of the ACE Conditions incorporated into the Agreement as a consequence of clause 2.1 was clause 2.7 which provides as follows:

“2.7 Design by Contractors or Sub-Contractors

The Consulting Engineer may recommend to the Client that a detailed design of any part of the Works

should be carried out by a Contractor or a Sub-Contractor. The client shall not unreasonably withhold consent to such recommendation and the Consulting Engineer shall integrate that detailed design into this own design. The Consulting Engineer will not be responsible for the detailed designs of any contractor or Sub-Contractor or liable for defects in or omissions from them.”

The defendants sought to rely upon condition 2.7 in relation to the detailed design of the LTP.

[42] The defendants owed the same tortious duty to take reasonable care in the course of discharging their obligations common to other construction professionals and this was reflected in clause 4.1.2 of the Consultancy Agreement. In addition, Mr Darling QC referred the court to the following passage contained in paragraph 2-123 of the 5th Edition of Jackson and Powell on Professional Negligence relating to the adoption of new techniques:

“In individual cases, however, where the new technique has failed, the defendant usually faces the allegation that he was negligent to depart from general and approved practice....It is doubted that any general principle can be formulated in respect of such cases, beyond that stated above. However, important matters in determining whether the defendant exercised reasonable skill and care are:

- (a) whether there was any necessity to attempt a new technique in the instance case,
- (b) whether the client was adequately informed
- (c) the risks involved, and the amount and quality of the preliminary research carried out.”

The liability of the defendants

[43] The defendants had already been engaged in four or five contracts for the plaintiffs before they were contacted about involvement in the Rossorry Quay project by Mr Outram from McKenzie Partnership, the Project Manager, in November 1997. As a consequence of this telephone call Mr Norman Magill attended the project team meeting held on 20 November 1997 at 9.00 am. There is no doubt that, from the earliest stage, the defendants were aware of the poor ground conditions at the site. They consulted the Geological Survey which confirmed the presence of peat and soft highly compressible soils and, having done so, they increased the number of boreholes to be carried out by Glover Site Investigations

Limited. The “structural and civil engineering considerations” document prepared by Mr Magill on 28 November 1997 underlined the poor quality of the ground conditions noting that “even laying a hardcore platform on the site could result in movement” and emphasised that all of the buildings would have to be piled. The same document referred to the possibility of using a geotextile grid such as Tensar but this was simply to equalise any settlements and only to be laid under the roads, parking areas and drainage runs. At this stage neither Mr Magill nor Mr Paul had any direct personal experience of the use of a Tensar LTP. Mr Magill had not attended either of the Tensar seminars although Mr Paul had attended the seminar presented at the defendant’s office. An LTP was to be employed at the defendant’s development in Downpatrick which incorporated a supermarket, filing station and car park but Mr Paul, who was the defendants’ technical representative on the Rossorry Quay Project, had not been involved at all at Downpatrick. Mr Paul himself had no geotechnical expertise.

[44] Mr Norman Magill maintained that he provided the plaintiffs with a description of a LTP at the project team meeting on 3 December 1997, explaining how it was made up and how it might be utilised beneath the roads and parking areas. He also said that he had emphasised that such a construction would require a specialist designer, that the defendants did not have the relevant expertise and that it would be necessary to contact outside companies. He stated that it was particularly important to obtain the consent of the plaintiffs to such contact because of sensitivity about the circumstances in which the site had been acquired. I am not persuaded that Mr Magill's recollection is accurate in relation to this aspect of the case. Mr Magill himself accepted this was an important matter and yet there is no reference to such an explanation having been given in the minute of the meeting. The absence of an appropriate record is even more difficult to understand in the context of item 2.04 of the minutes which contains a reference to Mr Magill highlighting concern about the existing ground conditions, the danger of settlement of up to two metres and his recommendation that if a development was to proceed the introduction of piling beneath the proposed roads should be considered. Mr Magill accepted that he had been circulated with a copy of the relevant minutes, that he could have asked for them to be amended but that he did not do so. Nor does he appear to have recorded any dissension from the notes of the 3 December meeting when given an opportunity to do so at the next Project Team meeting on 13 January 1998. Indeed the manuscript notes made by Ms. Andrews of Morrison Homes of that meeting included a specific reference to Mr Magill not seeing the abnormalities at Enniskillen as “a specialist job.” Mr Magill sought to explain this as a reference to “construction” of the LTP rather than “design”. Mr Magill also asserted that the concept of the LTP was fully explained at the Project Team meeting on 24 February 1998 when a discussion also took place of the decision to extend the LTP under the townhouses. This would have been consistent

with the internal Tensar memo of 20 February 1998 but, once again, no record of any such explanation or discussion appears in the relevant minutes. I accept that Mr Magill may well have raised the possibility of alternatives to traditional road construction techniques and that he was given the authority to consult appropriate bodies but I do not accept that he explained to the plaintiffs that this was because the defendants did not possess enough expertise to design an LTP. Indeed, on 14 January the defendants submitted fee proposals to the Project Manager explaining that they were charging a higher percentage than they had agreed at Carrickfergus purely as a result of the considerable additional effort involved in designing the site-works. The detailed document setting out the services that the defendants intended to provide included "design of foundations, reinforced concrete works, floor slabs, masonry panels and miscellaneous structural elements" under the heading "Structural Engineering." Under the heading "Civil Engineering" the defendants included "Design of piling and ground improvements within the vicinity of development." This document which was submitted to the Project Manager did not contain any reference to the need to engage an outside contractor to design the LTP because of a lack of relevant expertise on the part of the defendants.

The outline residential specification dated 27 January 1998 and tabled at the project team meeting on 28 January described the sub-structure of the development as "In situ reinforced concrete ground floor slab" ground beams and pile caps on driven reinforced concrete pre-cast piles." The defendants report on Civil Construction Ground Works dated 28 January 1998 again drew attention to the poor ground conditions and stated that in order to construct the road, driveways and any large areas of hard landscaping a "Netlon" LTP should be used but still maintained that the main building should be supported on piles and ground beams. The drawings accompanying this report illustrated the difficulties of constructing a satisfactory and effective junction between the roadways and parking areas supported on LTP and the buildings supporting on traditional pile foundations. In a letter to the Bruce Shaw Partnership dated 11 February 1998 the defendants raised the options of continuing the LTP under the buildings and this letter was copied to the Project Manager. It is clear from the handwritten note dated 18 February 1998 on the letter from the defendants to Netlon Limited dated 30 January 1998 and the internal memorandum from Mr Gilchrest to Mr Jenner of 20 February 1998 that, at some time around 18 to 20 February, Mr Paul took the decision to extend the LTP beneath all of the buildings apart from the four story building and communicated this to Tensar.

[45] During the course of giving evidence Mr Magill maintained that the decision to construct a LTP was a consequence of constant pressure from the plaintiffs aimed at the reduction of costs. He accepted that, given the poor site conditions, the reliable "tried and tested" method would have

been to employ piles and ground beams in accordance with the strong recommendation contained in the Glover Site Investigation Report. Indeed, Mr Magill stated that this would have been the defendants "preferred" option and but for the potential reduction in costs, he would not have chosen the LTP. With hindsight, he was prepared to accept that he ought to have told the plaintiffs that the defendants would not have recommended a load transfer platform but for the saving in cost. On the other hand Mr Magill was unable to provide any real detail of the extent of the cost saving effected by the adoption of the LTP. He believed that the quantity surveyors had said that it was the cheaper solution but he did not say by how much and that the defendants simply received the impression that it was "cheaper by a reasonable sum". Mr Paul also recollected that he had been told by the quantity surveyor that the LTP was the cheaper option but he stated that he had initiated the decision to use the concept because he felt it to be a satisfactory technical solution. He reached this conclusion despite the fact that this was the first occasion upon which he had ever used a LTP.

[46] Both Norman Magill and Robert Paul maintained throughout the hearing that neither of them possessed sufficient geotechnical expertise to design or to carry out any useful degree of analysis necessary to effectively evaluate a LTP. They maintained that, once a decision has been taken to delegate this part of the project to a specialist designer, their role in terms of evaluation was to ensure that the LTP was compatible with and satisfactorily integrated into the rest of the development. They relied heavily upon the representations made to them by Tensar including, in particular, that the LTP had a safe bearing capacity of at least 100kN/m² (a factor that was more than three times the capacity required at Rossorry Quay) and that settlement angular distortion would be limited to one in one thousand. They also took into account the fact that Tensar was prepared to, and did, provide a collateral warranty. In this context it is important to remember that Dr Milligan, one of the experts called on behalf of the plaintiffs who has worked as an academic and a consultant geotechnical engineer since the 1970s, accepted that the design of an LTP was something which would usually be delegated to a specialist designer and that an average structural engineer could well have accepted the Tensar guarantee that angular distortion would not exceed one in one thousand. Dr Milligan accepted the proposition that, had Tensar complied with that requirement, the damage would not have occurred. Similarly he accepted that Tensar's claim that the LTP could support a hundred kilonewtons per square metre would have been adequate for the buildings at Rossorry Quay. Dr. Milligan also agreed that Tensar had been furnished with the site investigation and a full description of the ground conditions at Rossorry Quay and that, in such circumstances, the defendants could reasonably have expected such a specialist to report that their design would not be appropriate if such had been the case.

[47] I am satisfied on the balance of probabilities that the defendants failed to exercise reasonable skill and care in the circumstances. The ground conditions at Rossory Quay were exceptionally poor yet the defendants were prepared to advise the adoption of a foundation solution with which neither of them was familiar without carrying out even the most basic preliminary research. In so doing they abandoned the tried and tested system of ground beams and piles. Despite the evidence of the defendants, I am satisfied that the client was not properly or adequately informed of the novelty of the proposed solution or of the risks that it might entail as compared with the traditional approach.

[48] One of the principal reasons put forward by the defendants for the adoption of the LTP was that of cost. Piling is a notoriously expensive technique and both common sense and judicial experience confirm that it is an expense that developers are generally anxious to avoid or contain. I am prepared to accept that the client, the Project Manager, the Quantity Surveyor etc did exert some continuing degree of pressure in relation to cost without every instance finding its way into the minutes. However I do not believe that it could ever be consistent with the professional duty of care required from consulting engineers to advise that a "preferred" solution for foundations should be abandoned in favour of an unfamiliar concept in order to save costs without ensuring that the client was comprehensively advised in relation to such a course of action and that advice being clearly and accurately incorporated into the written record of the contract.

[49] The decision to extend the LTP under the buildings was also a matter which required to be carefully explained to the client by the defendants and that decision together with the explanation appropriately recorded. Any such explanation should have made clear their lack of any practical experience of such an exercise and identified any associated risks to be balanced against the reduction in piling costs and improved integration of the overall foundation system. The only document involving a contribution from the defendants in which this decision was formally recorded was at paragraph 2.00 of the Outline Residential Specification dated 3 March 1998 which was prepared by the entire Design Team and co-ordinated by the Project Manager but this was followed on 10 March by a re-issue of the defendants' Civil Construction Ground Works report which repeated, at paragraph 2.1, the recommendation that the main buildings should be supported on piles and ground beams. In the circumstances of this development at that particular stage there was no room for confusion or ambiguity. As Mr Barr, one of the experts called on behalf of the defendants, observed, the pros and cons of such a decision should have been thoroughly discussed at a meeting with the Design Team, the Architect and the Project Manager in order to ensure that the client was kept properly informed.

[50] Throughout the case the defendants emphasised their lack of geotechnical expertise and their consequent inability to effectively evaluate the design of the LTP. If such was the case, again, I am satisfied that this limitation upon their services should have been effectively brought home to the client. If it had been I have no doubt that it would have been recorded. This failure was compounded by the defendants giving the impression that they did possess such ability and examples include their letter offering services of 14 January 1998, their invitation to Maccaferri and Tensar to tender of 1 June 1998 and their letter to the Project Manager of 13 October 1998. I have referred earlier to Ms Andrews' record of Mr Magill's view that this "...was not a specialist job."

[51] Additional factors tending to suggest a failure on the part of the defendants to meet the requisite standard of care include the evidence relating to the provision of the Tensar list of other projects and B.S 8006.

[52] On 20 March 1998, about a month after Mr Paul had taken the decision to extend the LTP under the buildings, Mr Gilchrist, Tensar's Area Civil Engineer, supplied a list of projects in which LTPs apparently had been successfully constructed by Tensar. This list was furnished to Mr Cromie, who was the representative of the defendants at the Downpatrick site, but it was also seen by both Mr Magill and Mr Paul. The former "believed" that the list included structures with a greater loading than those to be built at Rossory Quay but accepted in evidence that he never read through the list in any detail to confirm whether his belief was accurate. Mr Paul remembered looking at the list but he does not appear to have noticed that none of the structures contained therein resembled the three story buildings to be placed upon an LTP at Rossory Quay. This must be seen in the context that he was the defendants' technical representative, that it was his decision to extend the LTP under the housing blocks, that he had no previous experience of LTPS and that this list was the only available empirical evidence of the use of LTPs. The fundamental validity of propositions based upon empirical evidence depends upon the similarity of the examples observed. Despite the results of their own inquiries and the report from Glover Site Investigations, neither Mr Magill nor Mr Paul made any attempt to ascertain whether the ground conditions encountered at any of the projects on the Tensar list were comparable to those at Rossory Quay. Had they done so they should have been in a position to advise the client as to the relevance of the list to the circumstances at Rossory Quay.

[53] Mr Magill did not believe that he had personally read BS 8006 nor did he give any instruction to anyone to do so. He thought that Mr Paul might have looked at the standard. According to Mr Paul there was no copy of BS 8006 in his office in Derry and he was at a loss to know why Mr Magill thought that he would have read the document. Mr Paul did not read BS 8006 and assumed that it would be too specialised for an ordinary

consulting engineer to understand. Notwithstanding this situation the defendants specified compliance with BS 8006 in letters to Tensar and Maccaferrie on 15 June 1998. On 24 March 1999 Mr Paul wrote to Kirk McClure and Morton, acting on behalf of Building Control, in the following terms:

“Finally, we are confident that all relevant British Standards have been complied with in the design of the load transfer platform and trust that your approval shall be forthcoming.”

It is clear from their own evidence that neither Mr Paul nor Mr Magill had any justification for giving such an assurance. Furthermore neither of them were adequately equipped to effectively assess Tensar’s statement that their method differed from BS 8006 with respect to vertical load shedding and hence to advise the client of the significance of such a qualification.

Are the defendants entitled to rely on Clause 2.7 of the ACE Conditions?

[54] The content of Clause 2.7 has been set out at paragraph [41] above and, in appropriate circumstances, it provides a defence for a consulting engineer in respect of defective design on the part of a contractor or sub-contractor. For such a defence to be available the consulting engineer must have made a recommendation to which the client has consented.

[55] I have no doubt that the client and the Project Manager, being the client’s representative, were fully aware that the design of the LTP was to be a Contractor Design carried out by Tensar and, in his closing submissions, Mr Darling QC accepted that this would have been quite apparent from the documents by June 1998 at the latest. However the protection afforded by Clause 2.7 is dependant upon the client receiving and consenting to an appropriate recommendation. Such a recommendation and consent need not be formal or in writing but, as Mr Barr confirmed in evidence, it is necessary for both to occur in order to ensure that the client is fully informed as to the need for delegation of responsibility for design.

[56] In this case the defendants have consistently maintained that they did not have the relevant expertise to either design or evaluate a design for an LTP and it is not difficult to accept that this would be a legitimate reason for delegation of that function. However, for the reasons set out above, I am not satisfied that such a lack of expertise was ever made clear to the client or the Project Manager. In fact it seems to me that the defendants permitted the impression to be created that they did retain the ability to usefully evaluate the design of the LTP in documents dating from the fee proposals of 14 January 1998 and the invitations to tender of 1 June 1998 to the reference to “our design concept” and the assurance that “We are fully satisfied that the original design concept is based on sound engineering principles.....”

contained in the letter to the Robinson Patterson Partnership of 16 June 1999.

[54] When the problem with Deane Public Works developed in October 1998 the Project Manager wrote to the defendants on 12 October stating, *inter alia*, "It appears to me that the details of the site engineering contract were included in the outline specification at your instigation and I also understand that as a result of the specialist nature of the works Shaun Magill recommended a contractor's design." By way of reply on 13 October the defendants said:

"We initially had designed the load transfer platform in conjunction with advice from Netlon Ltd. and our design was used by Bruce Shaw Partnership to calculate the quantities involved and to produce their estimates for the work. However, there was concern that if only Netlon were involved, then the Tenders may not be competitive.....As the thickness of the stone required depends on the piling grid, there are a number of possible solutions to the problem therefore, it was agreed that we should issue Tender documents based on a performance specification only and leave it entirely as a Contractor designed item which would encourage competition and economy of design."

In the course of the remainder of the letter the defendants referred to how they ..."continued to evaluate the technical merits of the design which they eventually accepted. In a further letter to the defendants on 14 October, which was copied to the client, the Project Manager again referred to the piling and LTP as "a contractor's design."

[55] In my view this correspondence requires to be considered in the appropriate context which is basically that of the Project Manager seeking to allocate blame for Deane's failure to stand over its tender. If anything, it rather tends to suggest that the recommendation was made in the interests of economy. It does not provide evidential support for the type of informed recommendation and consent contemplated by Clause 2.7 particularly in circumstances in which the defendants continued to refer having a role in designing and evaluating the technical merits of the LTP.

[56] Accordingly, in my opinion, the defendants are not entitled to rely upon Clause 2.7 of the ACE Conditions.

Contributions

[57] Mr Darling QC submitted that the only conceivable result of a proper assessment of the two potential forms of foundation would have been a recommendation to utilise piles and ground beams and a rejection of the LTP. He accepted that Tensar had been at fault but argued that the plaintiffs

would not have been exposed to that fault but for the negligence of the defendants. Mr Darling QC sought to rely upon a concession by Mr Barr that no responsible body of consulting engineers would have recommended the use of an LTP. However it is important to place this concession, if concession it was bearing in mind that Mr Barr's evidence was somewhat inconsistent on this aspect of the case, in the context of the rest of the expert evidence.

[58] The experts on both sides accepted that Tensar was a well known company being one of two specialist designers with a history in the construction industry. Dr Milligan, the geotechnical expert called on behalf of the plaintiffs, accepted that Tensar could have produced a design which would have made the project technically feasible and that if Tensar had provided an LTP with an angular distortion factor of less than 1 in 1000 metres the project would not have failed. He agreed that the average structural engineer could reasonably have concluded that Tensar could conform to such a requirement. He also noted that the Tensar website currently included the claim that their LTP could span a void without surface soil support. At all material times Tensar were fully aware of the very poor ground conditions at Rossory Quay and Dr Milligan also agreed that the defendants could reasonably have expected Tensar, as the specialists, to indicate that an LTP would not be appropriate. He would not have expected the average consulting engineer to have been familiar with the work of Guido. Dr Milligan accepted as "fair comment" the suggestion that Tensar had misled many people in the course of the contract and he described the Tensar responses to the failures at Block D as "wholly misleading." He agreed with Mr Simpson QC's suggestion that Tensar had been "obstructive" in relation to the defendants' inquiries.

[59] Mr Masterton, who was also called by the plaintiffs, is employed by the Babbie Group as Managing Director of the Environment Business Centre. He gave evidence as a professional consulting engineer with over 27 year's experience in the civil and structural fields. While he emphasised the extremely poor ground conditions at Rossory Quay and the consequent need to consult with and carefully advise the client, he accepted that the liability of the defendants fell to be considered in the context that a recognised specialist firm had been retained which had been fully appraised of the conditions, had represented that it could provide an appropriate solution and had undertaken to do so with a collateral warranty. He agreed that if Tensar had produced the design that they had promised the development would have succeeded and that, in those circumstances it was not unreasonable to employ an LTP. Mr Masterton did not criticise the defendants in relation to the detailed design of the LTP which he accepted was the responsibility of Tensar. He also agreed with Dr Milligan that Tensar had been guilty of misleading conduct with regard to the amended fax of 12 May 1999.

[60] Professor Ingold also expressed the view that an LTP could have worked and said in evidence that, properly designed, an LTP would have been as reliable as a traditional foundation of ground beams and piles. On the other hand he also agreed that he did not think that the current revision of BS 8006 would recommend the erection of three story buildings on LTPs. Mr Barr expressed the opinion that if all Tensar's representations had been born out the LTP would not have failed although he qualified this opinion in cross-examination by accepting that it would have been wrong to accept all Tensar's claims at face value without empirical examples of similar projects that had proved successful or the ability to carry out an effective technical appraisal.

[61] In view of the general agreement between the expert witnesses that a properly designed LTP could have worked it is necessary to consider what the outcome might have been if the defendants had properly consulted with and advised the client. I accept immediately that such an exercise is speculative and very difficult to conduct without being influenced by hindsight. Ms Fearon the plaintiff's Regional Director said that she would have put the engineers over the use of the LTP "very carefully" had she been informed of the risks. Mr Donnelly, AWG managing director and a director of Morrison Homes, said that if he had been told that there might be serious problems if the foundations incorporated an LTP he would have stopped the project and asked for a letter of comfort. On the other hand I am satisfied that cost was a very significant factor and that the LTP probably offered the cheaper solution. Mr Graham of the Bruce Shaw Partnership explained that his colleague Mr Montgomery had not carried out the expected cost comparison exercise in relation to the foundation options because he felt himself to be under so much pressure from the client that they had to proceed to tender. Mr Donnelly dismissed that as a "feeble excuse" although he also conceded that there was pressure to keep costs down as in all developments. It seems that the letter from the defendants to the Bruce Shaw Partnership of 11 February 1998 providing two options for the foundations never reached the client although Mr Lord, the commercial manager for Morrison/AWG in Northern Ireland, volunteered in cross-examination that it quite often happened that the Quantity Surveyor would recommend the cheaper solution without reference to the client. Against this background there must be at least a possibility that, given the cost advantage and the representations and assurances that Tensar would undoubtedly have proffered, even if the defendants had given adequate advice and warnings, the client would still have authorised the construction of the LTP. On the other hand, in my opinion, the negligence on the part of the defendants to which I have referred above effectively prevented such a set of circumstances from coming into existence. Furthermore, had the defendants displayed an appropriate degree of healthy scepticism and carried out a reasonable amount of investigations, inquiries and research

their reaction to the subsequent failures might well have been different. Doing the best that I can on the basis of the evidence and accepting that it is not an exact science, it seems to me that responsibility should be allocated between the defendants and Tensar upon a 35%/65% basis.

[62] The defendants and Tensar were certainly not the only parties to fail to perform satisfactorily in relation to this project. I have already mentioned Mr Montgomery from Bruce Shaw Partnership, the Quantity Surveyors, who, according to his colleague Mr Graham, did not carry out cost comparisons of the alternative foundation methods because of "pressure of business in the office" and "pressure from the client" to proceed to tender. No sub-contract seems to have been created between Brendan Loughran and sons, the contractor, and Tensar and, according to Mr Lord, Morrison/AWG commercial manager for N.I., no attempt was made to look for one until the spring/summer of 2002, after substantial failures of the foundations had occurred. He was unable to say why no earlier inquiries had been made. The defendants themselves were not required to sign the Consultancy Agreement until October 1999 well after work on the site had commenced.

[63] However perhaps the most surprising evidence came from Mr Outram and Mr Tennant of the McKenzie Partnership, the Project Manager. Mr Outram accepted that the role of his firm was to co-ordinate the activities of the parties and ensure a free flow of information between them and the client. Mr Outram initially said that he was not aware that the enabling works included a contractor designed item but he was quite unable to maintain this assertion in the face of the documentation including the Enabling Works report of 1 June 1998 which he accepted that he had read. He also claimed that he had understood that the LTP would only support gardens and roads but he was unable to explain why he had not been informed of the change by Mr Tennant who had attended the meeting on the 9 June when the relevant documentation had been produced. Mr Tennant, by contrast, accepted that he had known that the LTP was to be a contractor designed element for which Tensar was to be responsible. Mr Tennant agreed that the extension of the LTP under the townhouses as recorded in the Outline Specification of March 1998 differed from the January 1998 proposals but he was unable to explain why he had not recognised the change and then proceeded to suggest that it was not a change after all. He said that he continued to rely upon the January document but was unable to provide an explanation for so doing. He accepted that the tender documents forwarded to Tensar and Maccaferri in June 1998 had been copied to him but sought to argue that such documents were ambiguous as to whether the LTP would extend under the buildings. In my view any such argument was patently untenable.

[64] Despite the shortcomings to which I have referred, it does not seem to me that any other party could be said to have materially contributed to the damage. I consider that a clear distinction is to be made between knowing that the LTP was to be a contractor designed item and appreciating the risks that were involved and that the defendants did not possess adequate expertise to advise in relation to or effectively assess such risks.

[65] I shall hear counsel as to the appropriate form of the Order and in relation to costs.