PROOF OF EVIDENCE

of

Hugh David St John Ph.D, BSc

Appeal against Refusals by Camden Council of Planning Permission and Conservation Area Consent for Redevelopment at 29 New End, Hampstead, London NW3 1JD

(Camden Refs: 2012/3089/P and 2012/3092/C)

Planning Inspectorate Ref: APP/X5210/A/14/2218243

on behalf of Karawana Holdings Limited

1. BACKGROUND

1.1 My name is Hugh David St John. I am currently a Senior Consultant for the Geotechnical Consulting Group LLP (GCG). My CV is attached as appendix 1. I have been working with Taylor Whalley Spyra (TWS) assisting Kanawa ltd on this project since around 2010. My colleagues and I have prepared reports on the ground and groundwater issues related to the preliminary designs that have been prepared. I have also discussed the design and construction principles with TWS at various stages . These reports have been prepared in support of the Planning Applications specifically to address the issues raised in the LBC requirements to produce a Basement Impact Assessment.

1.2 I have been involved with the design and construction of basements (including deep basements since around 1971. My Ph.D. was based on measurements of ground movements that were made by myself and others during the construction of deep basements in and around London at that time. My entire career has largely comprised working on the design and construction of deep foundations and basements, firstly in research and subsequently in practice. Although a significant proportion of the basements that I have been involved with have been in the London area, I have participated in similar projects throughout the UK and worldwide. The projects that I have been involved with range in scale from small shallow domestic basements to large deep basements for commercial developments. These have been in a wide range of soil types and groundwater conditions and have varied considerably in terms of complexity. Because of my experience my advice is widely sought. I am involved in projects at conception through to completion and I have acted as an expert witness on issues related to basement and substructure matters on numerous occasions in the UK and overseas. In some instances I have been called in to advise where problems have occurred. During my career I have had the opportunity to observe both good and bad practice and am therefore more aware than most professionals where the principal risks lie. In many instances the role of both myself and my colleagues at the Geotechnical Consulting Group has been to assess the potential impact of construction on the surroundings. We frequently undertake detailed numerical analyses of basement construction during the design phases of projects in order to estimate the movements of, and potential damage to, buildings and infrastructure.

1.3 In recent years I have contributed to a number of projects within the London Borough of Camden (LBC) where basement construction has been an issue and have witnessed the evolution of the current policies and the impact that these have had on the way in which planning applications have been dealt with. Many of these projects have been in the Hampstead area. We referred to two such projects in our report on damage assessment as being particularly relevant; the Witanhurst project on the west side of Highgate Hill and 5 Cannon Lane which is to the east of the New End site. Both these projects have been successfully completed. Both projects involved excavation to similar depths to the deepest excavation at New End. Both are in similar ground and groundwater conditions. Careful observations were made at both sites and the experience from these can be brought to bear during the design development on this project. This applies particularly to the issue of groundwater where WJ Groundwater whose preliminary advice has been sought during the planning stages on this project, have been involved in the implementation of ground water control measures.

1.4 LBC obtained independent reviews of both the geotechnical and groundwater issues (the RKD and CGL reports). The terms of reference given to the two reviewers are stated in the reports produced. These comprise two parts, firstly, the sufficiency of the proposals with regard to the Basement Impact Assessment, and secondly comment on the reports and critique submitted by neighbours to the proposal. The latter are the Eldred report dated 25th July 2012 and the First Steps report dated 23rd July 2012 together with the letter from The Heath and Hampstead Society dated 26th July 2012.

1.5 Both reviewers concluded that what had been presented:

- identified the principle issues,

- was sufficiently robust and accurate,

- was accompanied by sufficiently detailed amelioration/mitigation measures to ensure that the grant of planning permission would accord with Policy DP27,

They acknowledged that it would be necessary to carry out more work at the detailed design phase but that this was an entirely appropriate and normal approach.

The reviewers, whilst acknowledging the relevance of the comments and critiques in some instances, were of the view that none of the concerns raised changed their views on the adequacy of the proposals at this stage. Officers recommended planning permission be granted and that there was no sustainable reasn to refuse planning permission on the bases related to the basement construction. Planning permission was refused but not on the basis that the construction of the basement would be inappropriate in stability or geotechnical terms.

1.6 Non-compliance with the terms of DP27 was therefore not given by LBC as one of the reasons for refusing to grant planning permission.

1.7 In their Statement of Case the Rule 6(6) Parties state in their summary (3.3 (8)):

In the absence of an acceptable BIA and robust section 106 Agreement, each required to be compliant with the planning policies(e.g.DP23,DP27 and CPG4); critical demolition, construction, hydrological and engineering issues remain unresolved placing adjacent listed buildings and schools at risk of substantial harm'.

1.8 In elaborating on this statement (para 6.38) the Rule 6(6) Parties refer to the Eldred and First Steps reports and a review and commentary carried out by Stark Associates for the Neighbours dated 27th June 2013. The latter review summarises the comments made by Eldred and First Steps and also the issues raised by RKD. They add their own comments. Comments are also made on the later submissions made by TWS and GCG (dated April 2013) which were produced after the previous RKD and CGL reports in order to address a detailed issue regarding the affect of construction on the buttressed wall adjacent to Lawn House. It should be noted that although these reports post-dated the original reviews they were reviewed by LBC's consultants who

gave their views at the meeting of the Planning Committee when the project was discussed. Both RKD and CGL advised that the proposals were acceptable.

1.9 I am not personally familiar with Stark Associates, nor with Stephen Stark who prepared the overall summary of the objector's case. I note that he is a Hampstead Conservative Councillor. He is, or has been, I understand, on the Planning Committee of the Heath and Hampstead Society who object and had commissioned the reports by First Steps and Eldred Geotechnics.

1.10 The Rule 6(6) Parties also refer to a letter from the Diocese of Christ Church, concerns as to foundation stability at 10-14 New End and the presence of an underground passageway between the former New End Hospital and the former Mortuary (now the Village Shul). They finish this section stating that:-

In short, the present BIA and Review(s) represent no more than a feasibility study whose shortcomings will only become apparent once demolition has taken place and excavation has begun'.

1.11 This statement is just not true. LBC considers that the BIA is adequate. It has been made clear in the reports that, as is usual and necessary, more detailed work will be carried out before any excavation is undertaken. No work on the basement construction will be started before the detailed design has been completed. Although, as with most basements, it is the intention to make careful observations during the work once it is started, the purpose of this is to give forewarning of any unexpected behaviour so that, if necessary, the construction procedure can be appropriately modified in detail in order to take account of this. This 'observational' approach is standard practice in geotechnical engineering and recognises that there are always risks of uncertainties in the ground.

1.12 I have been asked to address the issues raised where they relate to geotechnical or groundwater matters. Other issues, relating to construction and the overall structure and detail of the BIA are dealt with by TWS.

1.13 I have divided my responses broadly into two. In the first part I have tried to put the work that has been carried out during this stage into the context of the overall scheme development. In the second part I have attempted to respond to the detailed issues raised. I have used the general headings given in the tabulated summary comments prepared by Stark Associates. Many of the points are repeated and I have tried to answer the main points in the context of the headings used in the table, i.e.,_

- A) Existing condition
- B) Construction
- C) Ground conditions and report
- D) Ground Water/Hydrogeology
- E) Slope Stability
- F) Foundations of Existing Buildings/Basements
- G) Ground Support around the site
- H) Construction Sequence
- I) Damage Assessment
- J) Rail

For convenience and completeness I have also added my comments to the appendix in the TWS report based on tabulated critique prepared by Stark Associates. I have also responded to the additional concerns raised in the Rule 6(6) document.

2. GENERAL COMMENTS

2.1 From a geotechnical point of view the main emphasis at this stage in a project such as this is to select a method of construction which will control ground and water movement in such a way as to ensure that the surroundings are protected. This is principally about movement of the ground as it is generally this that has the potential to cause damage. However, in this instance, it is also about ensuring that movement of ground water is controlled so that any changes in flow do not result in adverse effects. The objective at this stage is to demonstrate that there is sufficient certainty about these issues that a clear, safe and sufficient solution can be advanced. The fine detail needs to wait until the detailed design.

2.2 This basement is by no means exceptional. There are many examples of basements built in London and elsewhere which are much larger and deeper, sometimes in much poorer ground conditions, especially near to the surface. The techniques used to construct these are the same as it is proposed to use for the New End basement. Such basements have the same issues with regard to the potential damage to surrounding buildings. There are many experienced contractors who can undertake this work safely. It is important however to recognise that this site is not an 'easy' one. It is a confined sloping site and it is important to understand and deal with the ground water issues.

2.3 In the ground movement report submitted, the emphasis was on trying to explain the general reasoning behind the conclusions regarding the potential damage to the surrounding structures, rather than to go into significant detail. Such detail will be provided in the detailed design which will require a number of steps comprising 1) further site investigations to better define the groundwater and groundwater control issues, 2) detailed numerical modelling to understand the way the temporary works will work and eventually 3) the development of a very detailed monitoring scheme and construction methodology to control the ground movements. As is explained in the report, the initial assessment of the potential ground movements is best done on the basis of experience rather than reliance being placed entirely upon detailed calculation. Calculations have been carried out in order to check the size of the retaining wall and the overall stability the site and the walls but there will be a series of checks as part of the iterative design process. In the case of the movements due to installation of the piles, there is no way precisely to estimate the ground movements other than on the basis of experience and on-site measurement. As suggested, the cautious approach has to be taken where there may be risks to property by first installing piles where the operation does not affect any buildings, to measure movements and if necessary to adapt the construction method so that movements are acceptable. Having said that, recent experience of installing walls under very similar conditions in the local area (at Witanhurst and 5 Cannon Lane) has given confidence that the work can be done with minimal impact.

2.4 The developer's consultants have identified a suitable way of constructing the proposed scheme. In doing so they have identified ways that they consider appropriate to address risks. Once detailed design starts, more detailed investigation is undertaken and a contractor is appointed. It is at this later stage that it is appropriate to carry out the detailed assessments which are expensive, and time consuming and require full access to all relevant parts of the site. This is what we did recently (together with TWS) on the scheme at 120 Finchley Road which is also a complex sloping site. The appropriateness and merit of this approach is recognised by LBC and their consultants.

2.5 During the main excavation stages the key to limiting the effects on the ground around the new basement will be to identify support systems which ensure that the pressure from the ground on the uphill side is effectively transmitted to the downhill side. This will be done through the temporary support systems and the secant walls acting in shear and by sequencing the work in such a way that the load paths are effective. By using adjustable props the movement at the tops of the walls and in critical locations (such as adjacent to Lawn House) can be controlled sufficiently to keep the horizontal movements down to an acceptable level. Similarly, where it is important at a lower level, the prop positions and stiffnesses can be adjusted to ensure that the wall movements are controlled. The proposals for the construction sequence recognise these matters and the calculations that have been carried out have been aimed at checking that the elements of the scheme are broadly the correct size and capacity and that a detailed scheme can be developed which will provide the necessary protections. The exact sizes of piles, the amount of reinforcement, the sequence and levels of excavation and propping have all yet to be finally selected. It would be premature and potentially counter-productive for this detail to be specified at this stage.

2.6 The overall picture is complex because the ground falls both to the east and the south. This means that in general, because all thrusts are transmitted to the opposing walls, the walls to the east and the south will move less, whilst the walls to the north and the west will move forward more in towards the excavation, being controlled where necessary. At the corners of the new basement wall the secant wall at the top part of the site will provide a significant buttressing effect that will transfer load down into the ground, particularly during the early stages of the excavation when the embedment is high. As the Rule 6(6) Parties advisors have stated the condition is not simple. It is not appropriate to make detailed ground movement predictions at this stage.

2.7 In order to assess potential for damage it is important to understand what can actually cause damage. If the ground under a building simply tilts, that in itself will not cause damage. It may result in movements of the building relative to, say, abutting walls if they are supported differently, or differently affected (e.g. because of having very shallow foundations and there being local excavations or tree growth under them). If a building moves bodily horizontally (by virtue of its inherent strength/stiffness) it will not be damaged. The assessment of damage potential, as

described in CIRIA C580 (see attached extract) is therefore a matter of assessing the potential for distortion created by the differential movement of the ground under the structure (assuming in this case that the building itself does not modify the movement pattern). The stability of a foundation or wall is generally not affected by the ground under it moving. It is only affected if support is removed or it is made to lean over so much that it becomes unstable.

2.8 In my experience the main cause of damage is unexpected localised movement due to poorly controlled/monitored work or the use of inappropriate construction methods. This is why it is so important to carefully monitor what is happening and to sequence work in such a way that potential problems can be identified without putting vulnerable buildings at risk.

2.9 My understanding is that the proposed Section 106 undertaking and the relevant parts of the Building Regulations are aimed at making sure that the work (both in terms of design and construction) is being carried out in such a way that the work is properly controlled.

2.10 I am truly satisfied that for the purposes of the grant of planning permission, an appropriate level of assessment has been undertaken to ensure that, for planning purposes, the basement can be safely and securely constructed.

3. RESPONSES TO DETAILED COMMENTS .

- 3.1 In responding to the issues raised I have only dealt with issues related to the ground and groundwater. TWS will provide separate comments on all other issues.
- 3.2 Comments on Stark Associates summary table

A) Existing condition (comments 1-8)

A.1 The comments relate largely to the lack of detailed information. Regarding ground and groundwater the main concerns seem to be that there is not a clear understanding of what the conditions actually are. In the reports provided all available sources of information have been reviewed in order to get a broad picture of the geology and the hydrology. This is, in fact, the desk top study that it is suggested has not been carried out. The information from the site specific boreholes has been used to confirm what the local conditions are. This information is sufficient to be able to characterise the conditions and carry out calculations sufficient for Planning purposes pending further investigation particularly with regard to the control of ground water (see below).

A.2 There is a suggestion that underground rivers or springs exist at the site. There is no evidence that this is the case. There are numerous springs around this area and they are associated with the geological conditions. They occur principally at or just above

where clay horizons sit below sands and gravels. On this side of the hill the spring line is well below the level of the proposed basement and it would be extremely unlikely were there to be any streams near the surface. If there were, because of the number of local buildings it is something that would have been reported in the past. We have been unable to find such reports.

A3. However, even if, contrary to present evidence, further investigation changes the current ground and groundwater models, there will be the opportunity to review the proposals and, if necessary, make adjustments to the proposed method of working. It should be noted that such detailed investigations could, in fact, show conditions that are *less* onerous than have been assumed.

B) Construction (8-14)

B.1 Concern has been expressed about the appropriateness of the propping system to control movement. The support system comprises a number of elements:

- the bored pile walls themselves which transfer loads deeper into the ground by virtue of both their bending stiffness when pushed from behind and the stiffness in the plane of the wall.

- the temporary soil berms left in place in front of the walls.

- the props themselves which bear against capping beams and waling beams designed to transmit the support they provide between the piles.

- the raft slab used largely as a means of transmitting load from one side of the excavation to the other.

The precise suite of measures to be employed will of course be detailed in the emergent design.

B.2 The interaction between these different elements can only be finally determined by setting up a model of the entire system within the ground and simulating the construction process. It will need to be done with the contractor appointed to design and construct the basement and will inevitable result in having to modify the detail of the proposed support system, if only in minor way, to find what is both practical and effective. As explained above this is far too detailed an analysis to undertake at this stage of the design. At this stage the appropriateness of the system to control movements can only be judged on the basis of some simplifications and assumptions which enable straightforward calculations to be done together an understanding of how the support system is likely to work based on experience.

B.3 Concerns have been expressed about the lack of data on ground water and the understanding of where water is flowing. Experience at Witanhurst and 5 Cannon Lane where the geological conditions also comprise Bagshot Beds over the Claygate member and London Clay has taught us that ground water flow is complex, although not difficult in principle. It is affected by local changes in lithology within each of the strata which make it difficult to predict very detailed flow patterns. At 5 Cannon Lane pumping tests were carried out and measurements of water levels made both before and during the basement construction. Wells were used to control ground water pressures in the long term should it prove necessary. However, the latter proved to be unnecessary because the flow rates were very low and there was no

significant effect of the construction on the water levels. It will be necessary to undertake similar pumping tests at the New End site so that the groundwater control systems can be properly designed. These will enable a model of the groundwater flow to be set up and the effects of the proposed changes to be evaluated.

B.4 The opinions expressed by WJ Groundwater are based on the above local knowledge, and as with the issues about ground movements, until further very detailed investigations are carried out, the final detail of the groundwater control system cannot be provided.

B5. In summary, the issues raised all relate to details that will be dealt with during the final design which will include further investigation and detailed analysis. Recent experience on nearby site in similar ground conditions can be used to great effect.

C) Ground Conditions and Report (15-18)

C.1 There is a suggestion that the site investigation results obtained to date are suspect and lacking in detail and, as a result, the possible effect of construction on the neighbouring properties may not be accurate. It is suggested by Dr de Freitas that the methods of investigation were inappropriate and the information insufficient. Neither suggestion has any foundation. The three borings undertaken were carried out in accordance with normal practice and showed consistent results. The principal tests carried out to assess the ground properties were Standard Penetration Tests (SPTs) supplemented by limited laboratory tests to determine some of the mechanical properties. This is standard practice in what are predominantly granular soils. The SPT results can be used, as described in the RKD report, to derive soil strength parameters based on empirical correlations, as can the soil stiffness. Again, this is standard practice and perfectly adequate for use at this early stage of a project. As RKD say, the soil parameters actually used in the analyses that have been done, are conservative, i.e. they are, appropriately, a cautious estimate.

C.2 The scope of the investigation work that has been done to date has been limited necessarily because of the difficulty of gaining access to the site while the existing building is still in place. Access can only be gained from New End and there is limited width around the sides of the building. Equipment cannot be lifted over the exiting building to obtain access to the rear of the site. It is the top end of the site which it is most important to carry out the investigation as this is where the retained height of the basement is greatest. Once the existing building has been demolished and the site cleared these constraints will be removed. Further investigations can then be done. The investigations to date have been sufficient to determine broadly the geological and groundwater conditions and the likely ground properties so that the initial calculations can be carried out.

C.3 The Rule 6(6) parties state that the developer has not clearly set out what further investigation work will be required and ask why such investigation could not be carried out now. The reports refer to the need for additional investigation, particularly with respect to the acquisition of further information on ground water flow. Such investigations will require the installation of a number of additional boreholes at least

one of which will be used as a well and others to observe changes in ground water level whilst pumping is being carried out. In-situ testing and sampling will be carried out while these are being done in order to provide further details of the variation of ground conditions across the site. This all forms part of the final design and the details will be decided once the project proceeds. It would be impractical to try to do all this investigation now, as explained above.

C4. In summary, the investigation work that has been done to date is adequate for the determination of the ground conditions and choice of parameters for analysis for the purposes of planning. Further investigations will be put in place once Planning Consent is granted. This is normal practice.

D). Ground water/Hydrogeology (19-21)

D.1 The Rule 6(6) parties raise issues concerning the current scarcity of information on groundwater flow. Information has been collected which has shown that there is little variation of ground water levels seasonally. The reasons for this is likely to be that there is limited infiltration above the site and that, as at 5 Cannon Lane the flow of water down the slope is a function of the relatively low permeabilities and the presence of intermittent layers of more clayey layers within the predominantly sandy soils. This will become more apparent when the detailed studies have been carried out.

D.2 Reference is made to the seasonal path of water causing loss of ground ' thus raising the risk of damage to adjacent buildings'. This is pure conjecture and raises the question of why this would not be happening anyway. The whole idea of the proposed method of dealing with the groundwater flow across the site is to avoid significant increases in flow velocities that would be likely to cause increased internal erosion. The detail of the groundwater control measures cannot be determined until further investigation has been carried out.

E. Slope Stability (22-23)

E.1 We have carried out a stability check for the global slope failure, i.e., were excavation to reduce the load on the slope, the entire slope could move. In such an analysis it is assumed that the individual walls are propped internally against each other. The calculations for individual retaining walls (using WALLAP) also carry out stability checks for the walls at different stage. In all cases the factors of safety were adequate. In all cases the calculations assume that the excavation is a infinitely long trench, which is far from reality as additional resistance is gained from sides of the basement excavation.

Comments made about the lack of slope stability checks are unjustified.

E.2 The Rule 6(6) parties state that no assessment has been made of the out of balance forces on the basement design and the ground level differences. It is correct to say that no assessment has been carried out of the out of balance forces. However, it is misleading to express it in this way. As explained under the general comments above, the forces are not out of balance. They have to be balanced. The stresses against the

backs of the walls change as the walls move relative to their initial position, dropping as they move inwards towards the excavation and increasing if they are pushed into the ground. This process can, and will, be modelled, but it is complex. The important thing at this stage is to define a scheme which ensures that suitable support is provided at all stages of the construction process to control ground movements.

F). Foundations of Existing Buildings/Basements (24-25).

F.1 It is stated in the comments that there has been insufficient investigation of the foundations of the existing buildings and that no assessment has been done of the potential damage to adjacent garden walls and paths.

F.2 This is not true. While it is true to say that exhaustive investigations have not been carried out, such investigations as have been done have been largely confined to the site for obvious reasons. Further investigations will be carried out pursuant to Party Wall legislation during Party Wall negotiations (if it is deemed necessary). Having said that, it is only in very limited cases where the foundations of nearby structures are relevant to their performance during the process of the works. Where open excavations are to take place near to a foundation such checks need to be done. If a robust retaining wall is to be installed before any excavation takes place, then once it is in, movements of the ground are controlled by controlling the movement of the wall. The adjacent foundations may move with the ground, but not because of any reduction in the ability of the ground or the structure to support them. The important issue remains ensuring that the new retaining wall is installed carefully.

F.3 In the case of the garden wall to the west and the retaining wall on the west side of Christchurch Passage these will only move with the ground. In the latter case it is possible that the top of the new retaining wall will be pushed back (to the east) by a few millimetres and that the old wall will be pushed with it. This is not likely to affect its stability regardless of what it is founded on. However, this will be checked during the final design.

G). Ground support around the site (26-28).

G.1 Concern about the details of relating to the garden walls is expressed again under this heading. I repeat my comments above.

G.2 Most of these concerns are actually about the walls to the east of Lawn House. This matter was addressed in the supplementary reports. This was mainly a concern when the bored pile wall was shown to be closer to the boundary. It was subsequently moved away from the boundary (after the Eldred and First Steps had been issued) and the new proposals were accepted as reasonable by RKD.

H). Construction Sequence (29-31).

H.1 There are concerns that the proposals do not take into account the nature of the surroundings (both in terms of the different structures and the changes in ground leve). I have explained above that it is not the intention that the developer will just build what is described and hope that everything will be OK provided that the work is monitored. There is much work to be done to complete a detailed design which will

take into account the above factors. It will still be necessary to monitor the ground (and the water) carefully at all stages and have proposals in place for changes in the construction procedure should movements be larger than expected.

I).Damage Assessment (32-40).

I.1 There are a number of comments that have been made about the assessments of damage that have been made. These can be divided up into two categories, firstly how the assessments were made, and secondly the basis on which the movements have been estimated.

1.2 The process of damage assessment has been described in the GCG report. The main sources of movement that might affect the adjacent structures are the installation of the bored pile walls and the process of excavation. The issue of long term heave and settlement have been raised in the comments. Although vertical movements under the site will occur as the ground is unloaded and reloaded with the new structure and these will be accompanied by movements outside the basement these are unlikely to be significant in terms of potential damage as they are not likely to result in any distortional settlement or to any lateral movement outside the confines of the site. The effect of this has therefore not been considered. RKD found no reason to comment on this. It should be noted, however, that, when the detailed analyses are carried out these effects will form part of the analysis.

I.3 The assessments have been carried out using the methodology generally described as the 'Burland' method. For structures where estimated movements are small (less than 5 mm) it is judged that there is no need to undertake such an assessment as it is clear that damage is likely to be very limited. Although under these circumstances it is very possible that there will be no damage at all, even small movements can have an effect on a structure which may be almost at the point of cracking in its current condition. It is therefore appropriate to categorise such buildings as possibly experiencing 'negligible' damage.

I.4 The only structure which is more vulnerable is Lawn House. This has been carefully considered using conservative estimates of the possible differential settlement across the building and the axial strain resulting from lateral movement. The objective was to demonstrate that the predicted damage lay within the 'slight' category which proved to be the case.

I.5 It is stated that there are limited examples of basements constructed in sand. It is certainly true to say that there are fewer case histories for sand than for predominantly clay soils. Much of the data reported in the CIRIA C580 report relates to basements which extend into the London Clay. It is often the case, however, that even these involve installing piles through the upper layers of made ground, alluvium and granular Terrace Deposits before the clay is reached. In the case of installing the piles for the walls it is normally the penetration of these that causes the largest movements local to the walls. Such local movements are the ones that have the potential to cause damage, not the movements that are seen at some distance from the wall. The recent experience locally at Witanhurst and 5 Cannon Lane is very important, particularly when assessing the likely effect of pile installation. These give confidence that the predicted movements are unlikely to be exceeded.

I.6 No matter what the predictions of movement are it will still be essential to take a cautious approach to controlling the effects of construction by using extensive monitoring. In the case of the effects of installation of the piles there is the opportunity to check what these might be, and if necessary to modify the construction process before the work is carried out near to existing buildings.

I7. In summary, the comments show little understanding of the realities of making assessments of potential damage and the normal approach to control of the construction process. They do not have the advantage of first- hand experience of working in these ground conditions.

J.Rail (41).

J.1 We are well aware of all the rail tunnels in this area there are none that are relevant to this project.

3.3 The Stark Associates commentary also comment on the Addenda of April 2013 produced by TWS and GCG which review the possible effects of the construction of the basement in its modified position on the buttresses supporting the boundary wall adjacent to Lawn House. The GCG report discusses how the ground movements that may occur could affect the buttresses, the listed wall and Lawn House. It does not attempt to assess damage to the listed wall which seems to be the main concern because the only likely detrimental effect of differential settlement that could occur is a slight rotation of the wall. The wall is not perfectly vertical as it stands and such a small rotation would be completely undetected visually. It is suggested that separation of the buttress from the wall would have a detrimental effect because it would reduce the support. This is illogical. If such separation occurred it would be because the wall does not need the support of the buttress.

3.4 No doubt it will be possible to look into the details of the construction in this particular area once the constraints currently imposed have been removed and some of the fears expressed by Stark Associates can be laid to rest.

3.5 Concerns have been raised by Christ Church (para 6.38(5) to the north and 10-14 New End (para 6.38(6)) at the bottom of the site. The predicted movements at both locations are small. In the case of the Church the building is 24 metres from the basement. Even were there to be problems with the existing foundations (which is a fact that I have not been made aware of) any ground movements that might occur would not change the condition of the ground. Therefore the condition of these foundations will not be worsened by the proposed construction. Any differential movements across the Church would be so small that the structure would not be affected. The basement at the New End side of the site is of very modest proportions and likely ground movements are small. The main concern, which will be addressed in the detailed design, will be how loads from the top of the site will be transferred in the ground at the bottom of the site, i.e. there is likely to be a thrust to the south that will decrease the amount of lateral movement of the ground towards the excavation. This reduces the risk of the development of tensile strain in the adjacent buildings. 3.6 In our view the concerns raised by Christ Church and 10-14 New End are unfounded.

4. SUMMARY

4.1 The Rule 6(6) Parties have raised a large number of issues, many of which overlap. The main comments raised come from one source and it is doubtful that, although referred to as coming from three independent engineers, these reports can be regarded as truly independent in the same way that the TWS, Arup and RKD and CGL reports can. The overriding conclusion from LBC's own advisors is that the scheme as proposed satisfies the requirements of LBC's BIA, a fact which is disputed by the Rule 6(6) objectors.

4.2 It is recognised that further investigation is required and detailed analysis has to be carried out. It is normal practice to defer detailed design and investigation until it is known that the scheme is to proceed. The provisions of other legislation such as the Building Acts and the Party Wall legislation control the more detailed elements of such analysis. The main objections are matters of detail, not matters of lnd use principle.

4.3 There is no reason why this basement, as described in the submission, cannot be carried out without causing damage more than the 'slight' category to any of the surrounding buildings, provided that the work is carried out with sufficient care. This has been done on other projects nearby in similar environments and the experience gained from these projects can be used to good effect.

4.3 What is important, if the project is to proceed, it to ensure that the detailed design is carefully carried out, that it is coordinated with the construction process and that the construction is carefully controlled and monitored.

DECLARATION

The evidence which I have prepared and provide for this appeal reference APP/X5210/A/14/2218243 in this proof of evidence is true and I confirm that the opinions expressed are my true and professional opinion.

Hugh David St John

October 2014