

**81 Fordwych Road
NW2 3TL**

**Basement Impact Assessment
Audit**

For

London Borough of Camden

Project Number: 12066-46
Revision: D2

October 2015

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D2	12/10/15	Comment	PCDjw12066-46-081015-81 Fordwych Road-D2.doc	P C Daniels	A Marlow	E Brown

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Document Details

Last saved	12/10/2015 11:32
Path	PCDjw12066-46-081015-81 Fordwych Road-D2.doc
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Project Number	12066-46
Project Name	81 Fordwych Road, London NW2 3TL
Planning Reference	2015/2802/P

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1.0 NON-TECHNICAL SUMMARY

- 1.1. CampbellReith has been instructed by the London Borough of Camden (LBC) to carry out an audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 81, Fordwych Road, London NW2 3TL - Planning Reference 2015/2802/P.
- 1.2. The Audit has been carried out in accordance with the Terms of Reference set by the LBC. The Audit has reviewed the BIA for potential impacts on land stability and on local ground and surface water conditions arising from the proposed basement development.
- 1.3. CampbellReith has accessed LBC's Planning Portal and reviewed the latest revisions of submitted documentation against an agreed audit check list.
- 1.4. The BIA and associated building condition survey and basement structural calculations have all been carried out by established companies and the authors are generally considered to be suitably qualified. However, the qualifications of the BIA reviewer have not been supplied and should be confirmed.
- 1.5. The existing building (and also its immediate neighbour N^o 83) has been subject to historical cracking (in some places severe) and settlement. The front wall of the building has been underpinned with concrete to an estimated depth of 2m bgl. The party wall to the property was underpinned as part of works undertaken in 2007 to N^o 83 which was underpinned on all four sides. The depth, condition and nature of this underpinning requires further investigation.
- 1.6. The proposed basement is to be excavated to a depth of 3.2m bgl and will cover the entire footprint of the existing building, extending some 8.4m beyond the rear façade line, although the length of the extension to the rear is unclear and requires confirmation.
- 1.7. The BIA has confirmed that the basement will be constructed predominantly within firm to stiff London Clay. The London Clay is expected to be of generally low permeability and it is anticipated that groundwater flow rates will be minimal. However, no groundwater monitoring information is provided within the BIA to confirm this. Any available data should be provided.
- 1.8. The BIA reports the ground in the area of the property to have a modest slope of some 2.5° or so running north-west to south-east. The BIA notes that the property is not located within a fluvial or tidal flood plain nor within an area considered at risk of flooding due to the breach of a reservoir containment system.
- 1.9. The BIA considers that despite Fordwych Road having been flooded in 1975 (see also comments on the basement planning application referring to flooding of Fordwych Road in 2012 or 2013), N^o 81 would not have been affected due to the southerly slope of the road. However,

given the suggestion of recent flooding, it is considered that the full nature and extent of past flooding in the vicinity of N° 81 and N° 83 should be confirmed, together with the risk of flooding in the future.

- 1.10. Due to the generally very low permeability of the London Clay formation to N° 81, the property is not considered to be at risk of flooding due to rising groundwater.
- 1.11. The BIA notes that there will be a nominal only increase in the area of impermeable surfacing resulting from the development, leading to no significant increase in discharge of surface water to local storm water and foul drainage systems. However, this matter requires clarification due to discrepancies in the documentation provided as to the extent of the basement beyond the current building line.
- 1.12. Structural calculations have been submitted for the light well boundary retaining walls only. No calculations have been provided to cover wall stability i.e. overturning, sliding and bearing capacity for either the light well walls or the underpinning walls. Structural calculations should be provided for the reinforced underpinning walls and stability calculations should be provided for both the light well walls and the underpinning walls.
- 1.13. No indication is given as to working space provisions or the methods of excavation, temporary support and construction to be adopted for the light well walls. This information should be provided. Greater detail should be provided showing the construction methodology envisaged in order to demonstrate the practicality of the proposals and to validate the assumptions made in design.
- 1.14. It may be noted here that the BIA makes no mention of the fact that N° 83 has already been underpinned. This aspect should be addressed and the calculations and anticipated construction methodology adjusted as necessary.
- 1.15. The light well walls are shown to be provided with an external pumped drainage system and groundwater pressures have therefore been ignored in the design. The potential for settlement of the foundations to N° 83 arising from the lowering of groundwater levels should be addressed if back of wall drainage is to be adopted.
- 1.16. Calculations have been presented in the BIA in order to make an estimate of the inward yielding of the excavation and surface settlements (average values) that may be expected as a result of excavation for the proposed basement. Given that the calculations are quite simplistic, it is considered that worst case rather than average values should be used to predict damage and the damage category revised as necessary.

- 1.17. No construction monitoring has been proposed to check the predicted settlement values. It is recommended that such monitoring be undertaken to assess movements as excavation proceeds, with contingency provisions in place should on-going movements indicate the likely exceedance of predicted values.
- 1.18. N° 83 may be in a fragile state as a result of previous settlement induced cracking and it is therefore recommended that a full structural pre-condition survey (with photographs) is undertaken of the property to assess its vulnerability to sub-surface excavations at N° 81 before any basement works are commenced.
- 1.19. It is recommended that hand shear vane and/or hand penetrometer testing of the London Clay is undertaken during excavation below the building footprint to confirm existing data. The nature of the ground to be retained by the light well walls should also be clarified i.e. whether imported backfill or insitu Made Ground and London Clay. Additionally, it is recommended that long-term groundwater monitoring be undertaken in the existing standpipes at the site to establish equilibrium groundwater levels.
- 1.20. Queries and requests for clarification / further information are summarised in Appendix 2.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by the London Borough of Camden (LBC) on 10 September 2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 81, Fordwych Road, London NW2 3TL - Planning Reference 2015/2802/P.
- 2.2. The above Audit has been carried out in accordance with the Terms of Reference set by the LBC. The Audit has reviewed the above BIA for potential impacts on land stability and on local ground and surface water conditions arising from the proposed basement development.
- 2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within the following documents:
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
 - Camden Planning Guidance (CPG) 4: Basements and Lightwells.
 - Camden Development Policy (DP) 27: Basements and Lightwells.
 - Camden Development Policy (DP) 23: Water.
- 2.4. The BIA should demonstrate that schemes:
- a) maintain the structural stability of the building and neighbouring properties;
 - b) avoid adversely affecting drainage and run off or causing other damage to the water environment; and,
 - c) avoid cumulative impacts upon structural stability or the water environment in the local area.

The BIA should evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described within the GSD and should make recommendations for detailed design.

- 2.5. The LBC Audit Instruction described the planning proposal as a '*Proposed basement with front and rear light wells.*' The Audit Instruction noted the following:
- Neither the building proposed for development nor any of the neighbouring buildings are 'listed' buildings.

- The building is located within an area subject to slope stability constraints and surface water flow and flooding constraints.
- The application does not require determination by the Development Control Committee (DCC).
- The scope of the BIA does not extend beyond the screening stage.

2.6. CampbellReith accessed the LBC Planning Portal on 30 September 2015 and examined the following documents relevant to the audit:

- Engineering Report on Findings of Site Investigation at 81, Fordwych Road, London NW2 3TL prepared by B.H. Maule & Partners, dated 6 November 2007.
- The BIA prepared by 'Soiltechnics, Environmental and Engineering Consultants', dated 19 May 2015.
- Structural calculations and details, including notes on underpinning methodology by JC. Structural Solutions for the basement retaining walls and building underpinning, dated 21 May 2015.
- An architects 'Design and Access Statement' prepared by 'Zyntax', dated July 2015.
- The application for Planning Permission, dated 6 July 2015.
- Planning application drawings consisting of:
 - Existing plans and elevations (Drg No 31-14-EX01) dated September 2014.
 - Proposed plans and elevations (Drg No 31-14-EX12) dated March 2014.
 - Ordnance Survey (OS) map detailing the locations of existing surrounding basements.
- Comments received from the public on the planning application.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are the BIA author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	No	No programme of works is provided. Limited information on construction methodology and sequencing supplied. The basement design calculations list some key issues for the construction contractor to resolve - without being specific.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	
Are suitable plans/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	No	
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Unknown	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Not in the BIA but nearby basements are highlighted on an Ordnance Survey (OS) map presented on the LBC planning portal.
Is a geotechnical interpretation presented?	No	
Does the geotechnical interpretation include information on retaining wall design?	No	
Are reports on other investigations required by screening and scoping presented?	No	Further investigation of flooding risk to be provided.
Are baseline conditions described, based on the GSD?	No	
Do the base line conditions consider adjacent or nearby basements?	No	

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	No	
Are estimates of ground movement and structural impact presented?	Yes	These are considered to be simplistic and upper-bound ground movements should be considered in the damage assessment.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	No	
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	The BIA does not acknowledge the fact that N° 81 has been partially underpinned to arrest subsidence and cracking and that N° 83 has also suffered from subsidence and cracking and has been underpinned on all four sides.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	
Does the BIA report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	But see above.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. Only Stage (1) screening has been undertaken in the submitted BIA. The BIA has identified a number of potential impacts and is required to be re-submitted with all required stages completed. There are also many mis-quoted references in the document and these should be corrected.
- 4.2. The BIA and included limited GI (dated 19 May 2015) has been carried out by an environmental and geotechnical consulting company with a track record of undertaking GIs, including factual and interpretative reporting and the derivation of soil parameters for design. The report author is a chartered civil engineer (C. Eng., M.I.C.E) and Fellow of the Geological Society (FGS) who is stated in the BIA to have 34 years' experience in geotechnical engineering, flood risk assessment and drainage design. The author's CV records experience in producing BIAs but no details are given as to the scope or extent of this element of his work. The BIA is noted to have been reviewed by a chartered geologist with expertise in hydrogeology. Comments by the reviewer on the BIA form Appendix C to the report but these were not included within the submitted document. Evidence of the reviewer's qualifications has not been provided and should be confirmed.
- 4.3. A condition report (Engineering Report on Findings of Site Investigation) for the property (dated 06 November 2007) has been prepared by a company of chartered engineers and surveyors. The author of the report is a chartered civil engineer (C. Eng., M.I.C.E).
- 4.4. The structural calculations for the basement works (dated 21 May 2015) have been undertaken by a registered company of structural engineers. The author of the report is a chartered structural engineer (C. Eng., M.I.Struct. E) and a chartered member of the Institute of Water and Environmental Management (M.C.I.W.E.M).
- 4.5. The property to be extended comprises a substantial three-storey semi-detached house on the north side of Fordwych Road with a limited headroom coal cellar crossing the house in an east-west direction. The property adjoins N^o 83 Fordwych Road. The property has gardens to the front and rear. The BIA cover photograph shows a number of trees to be present in the gardens to the property but this is believed to be an old photograph, many of the trees having now been removed - see the site condition report referenced below.
- 4.6. The building condition report (prepared by B.H. Maule & Partners) including the results of a visual inspection and building level/verticality measurements and movement monitoring, revealed the property to have suffered from cracking throughout, with Category 4 (BRE Digest 251) cracking for the full height of the party wall at the location of the central staircase.

Differential settlement of some 150mm of the front of the property relative to the rear was noted, increasing to a 300mm differential (back to front) for the adjacent N° 83.

- 4.7. At the time of the building condition survey, vegetation in the front and rear gardens to N° 81 was noted to comprise several small trees plus a number of bushes and shrubs. A large tree was noted in the public footpath some 12m from the front of the house.
- 4.8. Explorations showed the foundations to N° 81 generally to be very shallow, bearing on to firm dark brown mottled grey clay, although exploration at the front right hand side of the property (east) showed the footings at that location to have been underpinned with concrete to an estimated depth of 2m bgl, again bearing on clay. Roots were generally in evidence in both the front and rear gardens up to 1.5m bgl. Measured soil moisture contents were not indicative of desiccation, although laboratory plasticity tests showed the clay to have a high shrinkage potential.
- 4.9. It is noted in the condition report that N° 83 was fully underpinned (including the party wall with N° 81) during the period August to October 2007 to a depth of up to 3m bgl. It was also noted that significant vegetation reduction had been undertaken at this property (date not given).

It was concluded in the condition report that there had been much historic movement of N° 81 with settlement occurring primarily to the front of the building (now underpinned) but with more recent movements occurring to the party wall and to the rear of the property. The initial settlement of the front of the building was attributed to the generally sloping nature of the site from back to front and the presence of the mature tree in the public footpath to the front. The more recent movements were attributed to vegetation in the rear garden and rotation about the cellar. It was postulated that further movement of N° 81 could occur unless more vegetation is removed to the rear, or the building is underpinned to the same depth as N° 83.

- 4.10. The proposed basement covers the entire footprint of the existing building and is believed to extend some 8.4m beyond the rear façade line, although there are discrepancies between the BIA and the basement structural submission regarding the length of the extension to the rear. This discrepancy should be resolved. The rear façade of the building will be supported on new steel beams spanning the full width of the basement. The basement is to be provided with light wells at both the front and the rear of the property and these further extend the footprint of the proposed works into the existing garden areas. The basement is noted in the BIA to be excavated to a depth of 3.2m bgl. External access to the basement from the rear garden is to be by steps. There is to be no external ground level access to the basement at the front of the house. A flat-roofed extension to the property at first floor level is to be constructed over the basement at the rear of the property.

- 4.11. The BIA has confirmed that the proposed basement will be founded predominantly within firm to stiff London Clay. Pocket penetrometer results show the London Clay to be firm to stiff to 1.5m bgl or so, becoming stiff to very stiff below this. One only of the two boreholes sunk during the GI encountered Made Ground but because of confusion within the BIA commentary and the absence of an accompanying borehole location plan, it is not clear whether this was in the front or the rear garden.
- 4.12. No groundwater seepages were encountered during the above GI. Because of the generally low permeability of the London Clay, it takes time for water to find its way into a bore or excavation and ideally, long-term borehole piezometer monitoring should be implemented to establish equilibrium water levels. Standpipes were installed in the above two boreholes although no groundwater level monitoring information is provided within the BIA. Existing groundwater data should be made available.
- 4.13. The BIA reports the ground in the area of the property to have a modest slope of some 2.5° or so running north-west to south-east. Garden levels are reported to be reasonably uniform. The BIA notes that the property is not located within a fluvial or tidal flood plain nor within an area considered at risk of flooding due to the breach of a reservoir containment system.
- 4.14. Regarding the potential for surface water flooding, the BIA notes that the property is located near and slightly north of the headwaters to the former River Westbourne (a tributary of the Thames). However, this river was culverted many years ago when the local area was first urbanised. The BIA notes that river culverts were often constructed beneath roads and a check was made for any major culverting beneath Fordwych Road but found no records of such culverting.
- 4.15. Reference to the Camden Geological, Hydrogeological and Hydrological 2010 Study indicated Fordwych Road to have been flooded in 1975 but not in 2002. Comments on the basement planning application by members of the public include reported flooding of Fordwych Road in 2012 or 2013. It is argued in the BIA that it is unlikely N° 81 would have been affected due to the southerly slope of the road. However, it is considered that the nature and extent of past flooding in the vicinity of N° 81 and N° 83 and the risk of flooding in the future should be confirmed.
- 4.16. The London Clay is of generally very low permeability and thus the area is not considered to be at risk of flooding due to rising groundwater.
- 4.17. The BIA notes that there will be a nominal only increase in the area of impermeable surfacing resulting from the development and that this will lead to no significant increase in discharge of surface water to local storm water and foul drainage systems. This matter requires clarification because there are discrepancies as to the extent of the basement beyond the current building

line. It should be noted here that no current or future building drainage will have been discharged to soakaways as the London Clay formation is not amenable to soakaways due to its low permeability. Any additional flows to the sewer network should be mitigated where possible and agreed with Thames Water.

- 4.18. Walls to the new basement are to comprise 'L shaped' reinforced concrete walls to the front and rear light wells and conventional mass or reinforced concrete underpinning walls to the existing building walls, including the party wall shared with N° 83.
- 4.19. Structural calculations have been submitted for the light well boundary retaining walls only. No calculations have been provided to cover wall stability i.e. overturning, sliding and bearing capacity for either the light well walls or the underpinning walls. Structural calculations should be provided for the reinforced underpinning walls and stability calculations should be provided for both the light well walls and the underpinning walls.
- 4.20. No indication is given as to working space provisions or the methods of excavation, temporary support and construction to be adopted for the light well walls. This information should be provided as it has a bearing on the design and permits validation of the calculations. Whilst a number of requirements have been listed in the calculations with regard to the construction of the underpinned walls relating to the need for adequate propping and support to the existing property walls, the need for appropriate sequencing of construction and the need for supervision of the works by a competent person etc., these are of a general nature only with much of the responsibility being transferred to the contractor. Details of the construction methodology envisaged are required to demonstrate the practicality of the proposals and validate the assumptions made in design.
- 4.21. It may be noted here that the BIA makes no mention of the fact that N° 83 has already been underpinned. This aspect should be addressed and the calculations and anticipated construction methodology adjusted as necessary.
- 4.22. The light well walls are shown to be provided with an external pumped drainage system and groundwater pressures have therefore been ignored in the design. The potential for settlement of the foundations to N° 83 arising from the lowering of groundwater levels should be addressed if back of wall drainage is to be adopted.
- 4.23. Calculations have been presented in the BIA in order to make an estimate of the inward yielding of the excavation and surface settlements that may be expected as a result of excavation for the proposed basement. Average and upper-bound surface settlements were calculated as 9mm and 18mm respectively, with settlements anticipated to gradually reduce with distance from the excavation walls over a 13m wide settlement zone. Settlement contours were developed assuming average rather than upper-bound conditions to pertain. Given that the method of

settlement calculation adopted is quite simplistic, it is considered that worst case rather than average values should be used to predict damage and the damage category revised as necessary.

- 4.24. No construction monitoring has been proposed to check the predicted settlement values. It is recommended that such monitoring be undertaken to assess movements as excavation proceeds, with contingency provisions in place should on-going movements indicate the likely exceedance of predicted values.
- 4.25. As already noted, N^o 83 is known to have been underpinned, although details of the underpinning form, quality and depth are not currently available. Such prior underpinning should mean that N^o 83 will be less sensitive to the construction of the basement at N^o 81 than would otherwise have been the case. However, N^o 83 may be in a fragile state as a result of previous settlement induced cracking and it is therefore recommended that a full structural pre-condition survey (with photographs) is undertaken of the property to assess its vulnerability to sub-surface excavations at N^o 81 before any basement works are commenced.
- 4.26. No significant additional GI is considered necessary at the site although it is recommended that hand shear vane and/or hand penetrometer testing of the London Clay is undertaken during excavation below the building footprint to confirm existing data. The nature of the ground to be retained by the light well walls should also be clarified i.e. whether imported granular backfill or insitu Made Ground and London Clay. Additionally, it is recommended that long-term groundwater monitoring be undertaken in the existing standpipes at the site to establish equilibrium groundwater levels.

5.0 CONCLUSIONS

- 5.1. Only Stage (1) screening has been undertaken in the submitted BIA and so the BIA is required to be re-submitted with all required stages completed. There are also many mis-quoted references in the document and these should be corrected.
- 5.2. The BIA and associated building condition survey and basement structural calculations have all been carried out by established companies and the authors are generally considered to be suitably qualified. However, the qualifications of the BIA reviewer have not been supplied and should be confirmed.
- 5.3. The existing building (and also its immediate neighbour N^o 83) has been subject to historical cracking (in some places severe) and settlement. The front wall of the building has been underpinned with concrete to an estimated depth of 2m bgl. The party wall to the property was underpinned as part of works undertaken in 2007 to N^o 83 which was underpinned on all four sides. The depth, condition and nature of this underpinning requires further investigation.
- 5.4. The proposed basement is to be excavated to a depth of 3.2m bgl and will cover the entire footprint of the existing building, extending some 8.4m beyond the rear façade line, although the length of the extension to the rear is unclear and requires confirmation.
- 5.5. The BIA has confirmed that the basement will be constructed predominantly within firm to stiff London Clay. The London Clay is expected to be of generally low permeability and it is anticipated that groundwater flow rates will be minimal. However, no groundwater monitoring information is provided within the BIA to confirm this. Any available data should be provided.
- 5.6. The BIA reports the ground in the area of the property to have a modest slope of some 2.5° or so running north-west to south-east. The BIA notes that the property is not located within a fluvial or tidal flood plain nor within an area considered at risk of flooding due to the breach of a reservoir containment system.
- 5.7. The BIA considers that despite Fordwych Road having been flooded in 1975 (see also comments on the basement planning application referring to flooding of Fordwych Road in 2012 or 2013), N^o 81 would not have been affected due to the southerly slope of the road. However, given the suggestion of recent flooding, it is considered that the full nature and extent of past flooding in the vicinity of N^o 81 and N^o 83 should be confirmed, together with the risk of flooding in the future.
- 5.8. Due to the generally very low permeability of the London Clay formation to N^o 81, the property is not considered to be at risk of flooding due to rising groundwater.

- 5.9. The BIA notes that there will be a nominal only increase in the area of impermeable surfacing resulting from the development, leading to no significant increase in discharge of surface water to local storm water and foul drainage systems. However, this matter requires clarification due to discrepancies in the documentation provided as to the extent of the basement beyond the current building line.
- 5.10. Structural calculations have been submitted for the light well boundary retaining walls only. No calculations have been provided to cover wall stability i.e. overturning, sliding and bearing capacity for either the light well walls or the underpinning walls. Structural calculations should be provided for the reinforced underpinning walls and stability calculations should be provided for both the light well walls and the underpinning walls.
- 5.11. No indication is given as to working space provisions or the methods of excavation, temporary support and construction to be adopted for the light well walls. This information should be provided. Greater detail should be provided showing the construction methodology envisaged in order to demonstrate the practicality of the proposals and to validate the assumptions made in design.
- 5.12. It may be noted here that the BIA makes no mention of the fact that N° 83 has already been underpinned. This aspect should be addressed and the calculations and anticipated construction methodology adjusted as necessary.
- 5.13. The light well walls are shown to be provided with an external pumped drainage system and groundwater pressures have therefore been ignored in the design. The potential for settlement of the foundations to N° 83 arising from the lowering of groundwater levels should be addressed if back of wall drainage is to be adopted.
- 5.14. Calculations have been presented in the BIA in order to make an estimate of the inward yielding of the excavation and surface settlements (average values) that may be expected as a result of excavation for the proposed basement. Given that the calculations are quite simplistic, it is considered that worst case rather than average values should be used to predict damage and the damage category revised as necessary.
- 5.15. No construction monitoring has been proposed to check the predicted settlement values. It is recommended that such monitoring be undertaken to assess movements as excavation proceeds, with contingency provisions in place should on-going movements indicate the likely exceedance of predicted values.
- 5.16. N° 83 may be in a fragile state as a result of previous settlement induced cracking and it is therefore recommended that a full structural pre-condition survey (with photographs) is

undertaken of the property to assess its vulnerability to sub-surface excavations at N° 81 before any basement works are commenced.

- 5.17. It is recommended that hand shear vane and/or hand penetrometer testing of the London Clay is undertaken during excavation below the building footprint to confirm existing data. The nature of the ground to be retained by the light well walls should also be clarified i.e. whether imported backfill or insitu Made Ground and London Clay. Additionally, it is recommended that long-term groundwater monitoring be undertaken in the existing standpipes at the site to establish equilibrium groundwater levels.

Appendix 1: Resident's Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Earl	Chairman, Fordwych Residents Association	19/08/15	<p>Notes the site to be on a slope and that surface and underground drainage is an important issue.</p> <p>Notes the flooding of coal cellars with a report on the matter having been issued by the LBC.</p> <p>Notes the absence in the BIA of any reference to the issue of cellar flooding and the above LBC report.</p> <p>Notes the failure of the BIA to fully consider the issue of structural stability.</p> <p>Considers the assessment of the effects on basement construction on N° 83 to be unrealistic.</p> <p>Considers the BIA to have ignored the possible effects of basement construction on other local properties which are known typically to have shallow foundations.</p>	<p>The site slopes are noted in the BIA to be relatively gentle at 2.5° or so.</p> <p>The issue of flooding risk has been addressed in this audit (see 5.7).</p> <p>Comments have been made in this audit on the scope of the structural calculations and the validity of the movement predictions and recommendations made. Further information is required (see 5.10-5.16).</p>
Hayward	Property freeholder at 83, Fordwych Road, London NW2 3TL	20/08/15	Notes N° 83 and other properties to have had historical problems with basement flooding and subsidence.	The issues of flooding and historical subsidence have been addressed in this audit (see 5.3, 5.6-5.8 and 5.16).
Scott	Ground Floor Flat, 101, Fordwych Road, London, NW2 3TL	21/08/15	States that the BIA has not taken account of the ongoing flooding of cellars on Fordwych Road.	The issue of flooding has been addressed in this audit (see 5.6-5.8).

Johnson	Leaseholder of Ground Floor Flat & 1 ST Floor Maisonette, 83, Fordwych Road, London NW2 3TL	22/08/15	<p>Notes history of subsidence and cracking to N° 81, with wide cracks appearing in the party wall with N° 83 in 2007/2008 necessitating a complete re-build of much of N° 83 and the underpinning of the house on all four sides.</p> <p>Notes flooding of the basement to N° 83 in 2012 as also occurred at other properties in Fordwych Road.</p> <p>Concern experienced at the prospect of serious damage to N° 83 as a result of the proposed basement construction.</p>	<p>The issues of historical subsidence and flooding have been addressed in this audit (see 5.3, 5.6-5.8 and 5.16).</p> <p>A revised damage assessment for N° 83 is required by this audit (see 5.14).</p>
Everett	73, Fordwych Road, London NW2 3TL	25/08/15	<p>Notes local ground to comprise soft clay.</p> <p>Notes nearby houses to have suffered subsidence.</p> <p>Notes post-2013 flooding in N° 71, N° 73 and N° 75 and damp problems in N° 83.</p>	<p>The local ground does not comprise soft clay but comprises firm to stiff London Clay with localised Made Ground over.</p> <p>The issues of historical subsidence and flooding have been addressed in this audit (see 5.3, 5.6-5.8 and 5.16).</p>
Measures	Ground Floor Flat, 73, Fordwych Road, London NW2 3TL	26/08/15	<p>Notes vegetation to not be as depicted in the cover photograph to the BIA.</p> <p>Notes the presence of trees in nearby properties which may be affected by the proposed basement.</p> <p>Notes a history of flooding to the cellar of N° 83 and that a number of nearby cellars were flooded in 2013 and the situation reported upon by the LBC.</p> <p>Notes a history of subsidence in Fordwych</p>	<p>Vegetation discrepancies noted in this audit.</p> <p>The issue of flooding has been addressed in this audit (see 5.6-5.8).</p> <p>N° 81 will be underpinned as part of the new basement works.</p> <p>Structural calculations and movement predictions are included in the BIA and other planning documents. Comments have been made in this audit on the scope of the structural calculations and the validity of the movement predictions, and recommendations</p>

			<p>Road.</p> <p>Expresses concern that the proposed basement represents a threat to the stability of both N° 81 and N° 83.</p> <p>Notes serious flooding in 2013 at N° 71, N° 73 and N° 75 and later N° 83 and also possibly to other properties.</p> <p>Refers to possible changes to the water table locally with dry weather cracking of the gardens and waterlogging in winter.</p>	made (see 5.10-5.16).
Olszewski	Councillor	26/08/15	<p>Concurs with comments by Earl above.</p>	<p>The site slopes are noted in the BIA to be relatively gentle at 2.5° or so.</p> <p>The issue of flooding risk has been addressed in this audit (see 5.7).</p> <p>Comments have been made in this audit on the scope of the structural calculations and the validity of the movement predictions and recommendations made. Further information is required (see 5.10-5.16).</p>

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Qualifications	The qualifications of the BIA reviewer should be confirmed.	Open.	
2	BIA	Only Stage (1) screening has been undertaken in the submitted BIA. The BIA is required to be re-submitted with all stages completed. There are also many mis-quoted references in the document and these should be corrected.	Open.	
3	BIA	The length of the basement to the rear of the building line requires confirmation.	Open.	
4	Hydrogeology	Existing groundwater monitoring information should be made available to ascertain likely groundwater flows towards and around the basement.	Open.	
5	Surface Water	The nature and extent of past flooding in the vicinity of N° 81 and N° 83 should be confirmed and the risk of flooding in the future re-evaluated.	Open.	
6	Surface Water	The increase in the area of impermeable surfacing arising from basement construction requires clarification.	Open.	
7	Stability	Structural calculations should be provided for the reinforced sections of underpinning and stability calculations for the light well walls and the underpinning walls. Consideration of historic subsidence and underpinning to be included.	Open.	

8	Stability	Information should be provided on the methods of excavation, construction and temporary wall support to be adopted for the light well and underpinning walls.	Open.	
9	External pumped drainage system to light well walls.	Justification required. The potential for settlement of the foundations to N° 83 arising from drainage induced groundwater lowering to be addressed.	Open.	
10	Stability	The predicted damage category should be re-assessed for worst case ground movements.	Open.	
11	Construction monitoring and contingency provisions	Construction monitoring is recommended to check predicted settlement values. Contingency measures are recommended to be put in place in case movements appear likely to exceed predicted values.	To be agreed with Party Wall Surveyor.	N/A
12	Pre-condition survey of N° 83	A full structural pre-condition survey (with photographs) is recommended to be undertaken of N° 83 to assess its vulnerability to the effects of sub-surface excavations at N° 81 before any basement works are commenced.	To be agreed with Party Wall Surveyor.	N/A
13	Soil shear strength testing during construction	It is recommended that hand shear vane and/or hand penetrometer testing of the London Clay is undertaken during excavation below the building footprint to confirm existing data.	To be completed prior to construction.	N/A

Appendix 3: Supplementary Supporting Documents

None