Reference from Section 4.0 of Campbell Reith Audit Report D1	Reference from Section 4.0 of Campbell Reith Audit Report D2	Campbell Reith Comment	GEA Comment / Response
4.5	4.5	A utility search is not provided and it is required	Before the commence of the sitework, we carried out a utility search, which we can include in our report.
4.12	4.11	The BIA has identified that Made Ground was encountered up to 1.50m bgl. The Claygate Member was encountered to 7.50m bgl and the London Clay was proven to a depth of 15.00m bgl. Ground water was struck between 1.00 and 9.80m bgl and monitored between 0.70 and 4.90m bgl. The BIA describes the Claygate Member as firm to stiff clay, however, reference to the exploratory hole records indicates it to be soft to firm to at least 3.00m bgl with a triaxial test result at 5m bgl also indicating it to be soft to firm. The formation level for the basement is anticipated to be at 3.50m bgl, consequently the strength of the bearing stratum requires confirmation.	In Borehole No 1 groundwater was struck at 5.40 m (3.48 m TBM) and after 20 mins rose to 5.30 m (3.58 m TBM). Then the water was sealed out by the casing and groundwater struck again at 10.00 m (-1.12 m TBM), which rose to 9.80 m (-0.92 m TBM). In WS1, the Claygate Member is described as soft, but this is considered to be due to the presence of water. The strata was initially soft and with depth became firm to stiff. As discussed in Section 5.4 of our report, the depths related to WS3 are not accurate due to faulty installation of the cover cap.
4.13	4.12	The GMA provides a design bearing resistance of the Claygate Member of 125kPa. Noting the comments above about soil strength, this should be justified.	Based on the results of the triaxial testing at depths of 3.00 m and 5.00 m, an average cohesion of 58 kPa was used in order to calculate the bearing pressure. Using Skempton's equation and assuming a strip foundation of 1 m width, 3.50 m depth and a Nc value of 7.5, the bearing capacity was calculated to be 125Kpa.
4.15	4.14	A ground movement assessment has been undertaken within and surrounding the excavation using X-Disp and P-Disp with P-Disp ground movement imported into X-Disp. The assessment has determined that ground movements will not affect the structural integrity of neighbouring buildings with a Burland damage scale category of not more than 1 (very slight) determined. However, it is considered that this is likely to underestimate vertical movements as it does not include settlement resulting from the ground yielding into the excavation, nor construction related settlement such as the shrinking of the drypack. Additionally the stiffness values adopted for the Claygate member are at the upper range of what might be expected and are not moderately conservative as required by the planning guidance.	It is unclear how the conclusion that the analysis does not include movements as a result of installation effects and deflection of the walls during excavation has been arrived at, given that the report clearly outlines how the X-Disp analysis has been undertaken adopting the CIRIA curves for the 'installation of a planar diaphragm wall' and 'excavation of a stiff wall in clay', which, in the absence of specific curves for underpinning, are well established and accepted methods of determining the likely vertical and horizontal movements for a basement constructed using underpinning techniques. Additionally, as vertical movements on the underpinning have also been imported from P-Disp, the analysis actually includes additional vertical movements than would be calculated by using X-Disp alone. The stiffness values adopted are based on the strength profile identified during the investigation, which typically comprised firm becoming stiff soils of the Claygate Member and underlying London Clay as further discussed in the responses above. The relationship used to estimate the stiffness values is consistent with that adopted on many recent projects in Camden and is considered entirely suitable for projects of this size and nature, where the degree of loading / unloading and resultant strains are relatively small.
4.16	4.15	Ground movements have been determined during underpinning installation (Stage 1), excavation (Stage 2), basement slab construction (Stage 3), and for the long term (Stage 4) total ground movements. It should be clarified whether these movements are cumulative and what ground movements have been adopted to derive the damage category.	The movements at each stage are cumulative (the progression of which is clearly shown by the output contour plots included in the appendix for each stage of the analysis) with the final stage representing the total (short- + long-term) movements that will occur as a result of all the stages; these movements should not therefore be added together in an attempt to reach a total. For example, during the first stage approximately 1.5 mm of horizontal deflection is predicted around the main excavation, as a result if installation the proposed underpinning. This increases during Stage 2, to a value of between 4 mm and 5 mm, due to an additional 2.5 mm to 3.5 mm of deflection from excavation movements. As no further excavation takes place during Stage 3, the horizontal movements remain unchanged during this stage and thus represent the total horizontal that will occur, as outlined by the results reported in Stage 4. The progression of the vertical movements is more complicated due to the interplay between downward settlement as a result of installation effects, wall deflection during installation and loading of the proposed underpinning and raft foundations, set against the upward (heave) movements from the bulk excavations; there is therefore a small amount of recovery of some of the previous short-term settlement on the underpinning between Stages 1 and 2, before increasing again following loading of the proposed raft foundation. Damage assessments have been carried out at each stage, to allow the most critical stage for any given structure to be identified and the tabular results for each assessment are included in the appendix. As per Section 11.2, the majority of the results for each of the nearby structures for each stage fall within Category 0, with a single elevation of No 6 Oakhill Avenue falling into Category 1, the results of which are highlighted within the report to demonstrate how the damage category for this

			structure progresses through the development and identify the most critical stage.
4.17	4.16	The site is located on a slope and a comment should be provided on how impacts to slope stability will be mitigated.	Although the Camden Geological, Hydrogeological and Hydrological Study Slope Angle Map shows that the area of land to the rear of the site, which is currently occupied by houses fronting onto Heath Drive, has a slope angle greater than 7°, the overall slope angle of the site itself is less than 7°. Based on the drawings provided by Price & Myers, the proposed basement is located at the middle of the site at a level approximately similar with the existing house and the back garden. The site is detached with low vertical retaining walls and therefore it is not likely there is a slope instability.
4.20	4.19	The development is remote from the Hampstead Heath Pond chain or other pond catchment areas. The site is close to a tributary of the "lost" River Westbourne and a spring line. The basement will be founding within the Claygate Member, a Secondary A Aquifer. The BIA states that the Claygate Member does not support significant volumes of water. However there are discrepancies in the details of groundwater monitoring installations and a third round of monitoring is absent from the report and should be provided. Further discussion should also be provided for the groundwater observations observed in BH1. Clarification is required to confirm whether the basement will impact on subterranean flows.	The latest report we issued to Price & Myers on 6th March 2020 included the third round of groundwater monitoring. During the third monitoring visit, Borehole No 1 was not accessible and based on the two previous visits, groundwater was found to be at depths between 3.80 m (5.08 m TBM) and 4.90 m (3.98 m TBM). During drilling Borehole No 1, groundwater struck at 5.40 m (3.48 m TBM) and after 20 mins rose to 5.30 m (3.58 m TBM). Then the borehole was sealed and groundwater struck again at 10.00 m (-1.12 m TBM), which rose to 9.80 m (-0.92 m TBM). Based on the monitoring results we don't consider that the basement construction will affect the subterranean flow, since groundwater was found below the formation level of the basement. Any groundwater encountered during the excavation is likely to be restricted to shallow inflows of perched water from within the made ground.