The following comments apply to the questions posed by the Basement Impact Assessment (BIA) Checking Engineer, Campbell Reith Hill, who also posed questions concerning the site specific Soils Report, soil sampling, basement design, and settlement.

Our reply comments are given below in the order they were posed by CRH.
12th. December2018. Project Number 1381.

1/ Question 13 in the BIA asks if the new basement will SIGNIFICANTLY increase the depth from existing foundations to the level of the new basement foundation. In this context, the levels from the underside of existing foundations (they vary from -0.9 metres to -2.5 metres to the existing basement level off the underside of the upper ground structural "slab" level) to the level of the new basement slab at -2.3 metres are a minimum of 1.4 metres. That the dig level may be slightly lower and the junction of underpin/retaining wall may have thickening / no thickening etc., is not important. The operating WORD is " significantly " and we claim that there is not a significant step down between the existing to the new.
Please note we have initially carried out a design for the underpins/ retaining walls at 2.5 metres height to ensure we are covered for any minor changes etc.

The original methodology, we would suggest, does not need to be altered and we do not feel that we have to change the answer given in Q13 as the additional information is just that. The answer we need to give is still - NO.

2/ We have nearly 50 years of structural design work behind us and 46 years of experience in working on sites and designing underpinning from 1972 onwards etc. when the writer worked on a double height underpinning scheme just off the law courts on Fleet Street for the new head office for the London Insurance Company.
Here, the SMALL, single storey basement will have a U shaped, substantial, concrete box as the principal structural element and, to tell us that the cross walls will suffer noticeable settlement or horizontal distortion within this box, is unacceptable.

The box, when checked as indicated by Peck and Bazaraa on calculation pages E35 to E37, indicated a pure design settlement value of 2.38 mm whilst we know that actual settlements will be in the order of 1/3 of these theoretical values, i.e. 0.8mm. In 46 years of finalising basements, underpinning to neighbours, temporary works and so on, WE HAVE NEVER MET an occasion where movement has occurred and been noticeable in substantial, properly formed, concreted frames in the ground nor to any spine walls needed to resist horizontal loading and, therefore, movement/ deflection. We have not observed substantial cracking caused by loading at these spines. We can assume that your worry is for slender walls and not 250 mm minimum thickness underpins / retaining walls.

The cross movement will be much less here as this is an 11.5 m x 5.75 m basement on plan, we would suggest. The value will probably be NEGLIGABLE and, so, we can state with confidence that the resultant movement will be below Burland Category 0.

3/ " The construction of a concrete box DOWN to 4.0 metres will not be affected by a water table at approximately - 6.0 metres " is the statement on page 5 of the Soils Report. The drawings, generally, give the basement level as - 2.3 metres BELOW the underside of the raised ground floor level BUT, in places, we have to take into account the possible formation of two drainage sumps where the dig level could drop to about - 3.2 metres level etc. So, at this level the safe bearing pressure on the underside of a sump could be taken as 170 kN/m2 etc., if needs be. This is why we have quoted lower levels than -2.3metres. The quoted figures will be interpreted in a linear range of the safe bearing pressure etc.
Your further comments under point 3 appear to us to be inapplicable if the above is understood.

We would ask you to note again that the underpinning and step down in the new basement will be as shown on the sketches in the calculations in your possession. You must accept that a maximum of 2.3m plus 0.25 m (structure) will give a basement to raised upper ground floor level dimension of 2.55 m. The outside ground level is approximately 600 mm below the upper ground floor level so the step down from ground to underside of underpins will be 1.95 metres. We can delete 900 mm for the existing underside level of founds to the underside level of the RAISED upper ground floor giving the 1.65 m underpins nominally to be founded at 2.2.metres below average soil level. This is generally shown on sketches C 19 to C 23 etc.

This is the worst case as much of the walling steps down to the level of the underside of the hall basement and party walls tend to follow these levels in Victorian houses.
So, once again, this is a nominal basement under a terraced house.....

4/ Yes. The soils report has been amended to include all of your observations etc. A revised copy to include changes to the above and to points raised below, is attached.

5/ It is noted that the soils classification summary shows the very stiff monolithic brown or blue LONDON CLAY to have a plasticity index of on average of 56 to 58 at the bearing levels. This is the Ip value and is not subject to modification (such as a modified Plasticity Index). Our report considered that the normal range of clay plasticity index in London should be 35 to 45. We have now been advised by Ashdown Investigation that our initial assessment will not be correct and that the material will be susceptible to swelling and shrinkage, as you say. BUT, we would ask you to note that the critical clay substrata is situated at -2.3 down to 3.2 metres level. At these levels the material would have to suffer severe exposure to high temperatures, massive water extraction and/ or violent water inflow. In monolithic London brown or blue clay at substantial depths, these actions will not take place if the clay is not exposed to LONG periods of underpinning digs left incomplete. The existing house has not suffered

significant damage in critical years such as 1976 and the period 2008 to 2018 when we have had drought summers!

But, we have to assume that there would be problems with such a soil if situated near original ground level for a raft. However, situated at such a low level, we must accept that our new basement will be founded at -2.2 to -3.2 metres level and soil not left exposed for long periods. As a raft, it will behave in a different way to a surface formed raft.

6/ The Kempton Park sand / gravel formation is shown on the Geological maps for nearby areas. This is why we have mentioned that the 4 metre deep very slight banding of sand gravels COULD come from the Kempton Park formation. We also state that this site COULD BE AT THE VERY EXTREMITY of the formation so we cannot understand your comment about screening as WE HAVE NOTED WE HAVE NEARLY 100 % MONOLITHIC CLAY AS SUB STRATA.

7/ We accepted and estimated from the soils report that the acceptable N values for the site will be 130 kN / m2 at 1.0 metre depth below original ground level going down to 170 kN / m2 at 4.0 metre depth. This is a reasonable statement and the values concur with our normal design strategy for London soils etc. In our design parameters shown on page A2, we accept a figure of 110 kN / m2 nett safe bearing capacity when the figure is generally quoted as an additional GROSS load put onto the existing sub strata.

When checking material at depth, we invariably start with the allowable safe bearing capacity at 900 mm down or1.2 metres or whatever, and add the overburden at 20kN/m2 here for saturated clay soil. This is shown on page E 44.
On this page and E45, we show clearly that the loading for the house is likely to be about 10% of capacity and not critical etc.

8/ We note your comment and will alter the calculations to suit and ISSUE to the Building Control Inspector in due course. This will show that the design is sensible for the conditions. We do not think that we have to revise and re-issue to you the design pages as these concern concrete thicknesses, reinforcement quantities and shear aspects of the design. You were more interested in settlements only.

[redacted]

Konstanty Zablocki B.Sc. (Hons.), C. Eng., MICE.
Director,
Soarbond Ltd.,
12th. December 2018.