		will result in a betterment as the surface water currently drains to the public network with no SuDS measures in place.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	No	No, the proposed basement will not exceed the footprint of the existing/proposed building, hence it will no change the amount of permeable and impermeable surface of the site.
4. Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?	No	No, the proposed basement will not exceed the footprint of the existing/proposed building, hence it will no change the amount of permeable and impermeable surface of the site./ Refer to 3.4.4
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	There will be no changes in the quality of surface water received by neighbouring properties of downstream watercourses.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature.	No	This has been taken into consideration and managed. Refer to 3.4.5, 3.4.7, and the SuDS Strategy report in Appendix 5.

4.4 **Non-Technical Summary of Screening Process**

4.4.1 The screening process identifies the following issues to be carried forward to scoping for further assessment:

- The site is located directly above an acquifer;
- The site is within 100m from a watercourse.

4.4.2 The other potential concerns considered within the screening process have been demonstrated to be not applicable or insignificant when applied to the proposed development.

5.0 **Scoping**

5.1 The following issues have been brought forward from the Screening process for further assessment:

5.2 **The site is located directly above an aquifer.**

5.2.1 The Bagshot Member and Claygate Formation are classed as Secondary A aquifer. Although no ground water strikes were observed in the Bagshot Formation, ground water might be present because of the water bearing characteristics of the strata. Some localised dewatering might be required during construction and this could be achieved with local sumps and pumps.

5.3 **The site is 100m from a watercourse**

5.3.1 The Kilburn is a river that originates at the Whitestone Ponds, at the north of 28 Redington Road, and runs down to Redington Gardens.

5.3.2 The river runs underground at 50m from the site.

5.3.3 There is no history of flooding related to it. Therefore, any flood risk in relation to the river Kilburn is considered negligible.

6.0 **Site investigation / additional assessments**

6.1 **Site Investigation**

6.1.1 A complete Site Investigation has been undertaken by ESG (now SOCOTEC); refer to Appendix 3.

6.2 **Ground Movement Assessment**

6.2.1 Following the results of the screening and scoping process, a Ground Movement Assessment has been undertaken by Card Geotechnics Limited (CGL); refer to Appendix 4.

7.0 **Construction methodology / engineering statements**

7.1 **Outline of Underground Utilities and Obstructions**

7.1.1 A full survey will be carried out prior to works beginning on site to map all existing underground utilities in and around the site. A full UXO Survey should also be carried out as this area was bombed during WWII.

7.2 **Outline Geotechnical Design Parameters**

7.2.1 The following outline, reasonably conservative geotechnical parameters have been determined, based on the site investigation data presented in Appendix 3 and relevant technical guidance (as referenced in paragraph 2.2 of this BIA).

7.3 **Outline Temporary and Permanent Works Proposals**

7.3.1 The works proposals include the construction of a new basement, the demolition of the existing rear extension including the conservatory and the construction of a new rear extension at ground floor.

7.4 **Design Proposals**

To form the new basement sequential reinforced concrete underpins will be used which is a well-known and frequently used technique to form subterranean structures. The use of temporary propping will ensure that the basement works do not cause any local ground movements whilst construction is taking place.

The underpinning sequence is proposed to be carried out in maximum 1.0m width bays to avoid undermining the adjoining properties.

Below the existing house

The existing masonry walls are to be underpinned to the proposed new basement floor level with new reinforced concrete slab. New RC retaining walls are to be constructed in underpinned sequence as shown on Symmetrys Drawings attached to this report in Appendix 1. The retaining walls are designed to resist both vertical and horizontal loads such as surcharge and soil pressure with the basement reinforced concrete slab designed to resist potential soil pressure due to heave, hydrostatic pressure and buoyancy forces. The RC slab works as a permanent prop at the base

The expected heave forces cause short and long-term deformation. Short term heave deformation occurs instantaneously and can be remediated by removing the expanded ground during the excavation.

The structural calculations attached to this report in Appendix 2 also demonstrate that the existing structure can be safely supported on the proposed retaining wall structure.

To ensure continuity between the RC retaining walls and the masonry walls, dowels will be drilled into the underside of the masonry walls and cast in with the RC walls.

Waterproofing

BS8102:2009 sets out guidance for the waterproofing of basement structures according to their use. With this in mind the use of tanked, integral and/or drained methods of waterproofing will have to be considered. All subject to Architect's/Contractor detailing.

Table 2 Grades of waterproofing protection

Grade	Example of use of structure [A]	Performance level
1	Car parking; plant rooms (excluding electrical equipment); workshops	Some seepage and damp areas tolerable, dependent on the intended use [B] Local drainage might be necessary to deal with seepage
2	Plant rooms and workshops requiring a drier environment (than Grade 1); storage areas	No water penetration acceptable Damp areas tolerable; ventilation might be required
3	Ventilated residential and commercial areas, including offices, restaurants etc.; leisure centres	No water penetration acceptable Ventilation, dehumidification or air conditioning necessary, appropriate to the intended use

[A] The previous edition of this standard referred to Grade 4 environments. However, this grade has not been retained as its only difference from Grade 3 is the performance level related to ventilation, dehumidification or air conditioning (see BS 5454 for recommendations for the storage and exhibition of archival documents). The structural form for Grade 4 could be the same or similar to Grade 3.

[B] Seepage and damp areas for some forms of construction can be quantified by reference to industry standards, such as the ICE's *Specification for piling and embedded retaining walls* [1].

Figure 8: Grades of waterproofing protection (BS8102:2009)

Proposed Sequence of Works

The structural method statement provided, (see Appendix 1), is for the purpose of the design team's design development and for the purpose of the client's planning application. The appointed contractor will be responsible for all temporary supports and for the stability of the structure during the works.

The method of construction adopted minimises the need for temporary works. However, propping during the underpinning sequencing will be required to minimise the risk of ground movement occurring.

To ensure that the retained engineer's intent is correctly interpreted by the contactor, they will be required to submit all temporary works proposals to review a minimum of 7 working days prior to commencing excavation. The contractor should also submit a dewatering strategy to ensure a strategy is agreed should water be encountered.

Below Existing Building

The basement works will be carried out side to side, starting at the boundary with No.26 Redington Road. The original side extension will be demolished following temrapory propping of the existing section of the boundary wall to be retained. Once build the new extension, the works will progress towards the boundary with No.28 Redington Road, underpinning the existing internal walls and perimeter walls.

Temporary propping to the newly formed retaining walls will be required until the ground floor has been formed. It is contractor's responsibility to take all the necessary steps to ensure that the structure is adequately propped, shored, and braced during the progress of the works and excess of deflections and deformations of structure do not occur. For further details please see Appendix 1 for Construction Sequence and Method Statements.

De-watering Strategy

As the site does lies above an acquirer and perched water has been found on site, a dewatering strategy should be considered.

Stability of Neighbouring Structures

Due to the robust engineering principles and construction method applied, the extent of movement is limited in accordance with British and European codes. We can confirm that the proposed structural design and method of construction of the basement has been developed with a view to ensuring structural safety, and that if constructed in accordance with this document the works will be completed without any adverse impact on the structural stability of the neighbouring properties, other adjacent structures, adjoining land and gardens or the adjoining Public Highway.

The reinforced concrete structure will be designed to accommodate surcharges from the neighbouring property, public highway and ground pressures. The structure will have adequate stiffness to ensure that the lateral deflections do not exceed the appropriate limits recommended by British Standards Codes of Practice in order to ensure that potential ground movements be kept to acceptable limits. The structures will be designed to withstand any uplift due to hydrostatic pressures as well as being designed to transfer vertical loads into the ground safely. Refer to Structural calculations in Appendix 2

7.5 **Ground Movement and Damage Impact Assessment**

7.5.1 A Ground Movement Assessment (GMA) has been carried out in accordance with CIRIA publication C760 'Guidance on embedded retaining wall design' and takes into account the construction methodology and site-specific ground and groundwater conditions presented in this report. This assessment is attached to this report in Appendix 4.

7.5.2 The results presented in this report describe the predicted ground movement to fall within Burland Category 0 (Negligible).

Category of damage	Description of typical damage	Approximate crack width (mm)	Limiting tensile strain ε_{lim} (per cent)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible	<0.1	0.0-0.05
1 Very slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection	<1	0.05-0.075
2 Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weathertightness. Doors and windows may stick slightly.	<5	0.075-0.15
3 Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable lining. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5-15 or a number of cracks > 3	0.15-0.3
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.	15-25 but also depends on number of cracks.	>0.3

Figure 9 – Burland Damage Category Chart (CIRIA C580)

7.6 **Control of Construction Works**

It is proposed that the structural stability of the surrounding/adjacent properties is safeguarded by a system of movement monitoring.

The Contractor shall monitor the position and movements of the elevations of the adjacent properties around the perimeter of the proposed excavation. The monitoring shall be undertaken by a specialist survey company. The monitoring system will have at least the following characteristics:

1. The existing facades of the neighbouring properties as well as the flank wall of the neighbouring building will be monitored near ground level and at roof level, at intervals not exceeding 3m centres horizontally and vertically.

2. Monitoring points (targets) shall be firmly attached, to allow 3D position measurement, for the duration of the work, to a continuous and uninterrupted accuracy of -/+ 1mm. A suitable remote reference base/datum unaffected by the works will be adopted, one located at least 50m from the site.

3. Points/targets shall be measured for 3D positioning on, at not less than the following intervals:

- Before any works commence (base reading)
- Weekly during the period of basement excavation/construction
- Monthly during the course of the remainder of the works.
- Six months after the completion of all construction works.

4. All measurements shall be plotted graphically, to clearly indicate the fluctuation of movement with time. The survey company shall submit the monitoring results to the Engineer (Symmetrys Ltd) and to the Adjoining Owners Party Wall Surveyors/Engineer within 24 hours of measurement, graphically and numerically.

5. The following trigger levels for movement are proposed for agreement. In the event of a trigger value being reached the Contractor will immediately stop any work that might cause further movement, assess the situation and propose alternative methods for proceeding, with definitive further movement limits for those later steps.

6. Trigger movement limits are proposed as follows:

Existing Buildings Horizontal/Vertical movement

Amber:	+/-7mm	All parties notified.
Red:	+/-10mm	Works reviewed

8.0 **Basement impact assessment**

8.1.1 A Conceptual Site Model (CSM) is presented in Appendix 4.

8.2 **Land Stability/Slope Stability**

8.2.1 The site investigation has identified the London Clay formation to be the founding stratum.

8.2.2 The risk of movement and damage to this development due to shrink and swell of the London Clay is manageable with the design of a new substructure sufficiently stiff to withstand the actions of the heave.

8.2.3 A Ground Movement Assessment has concluded that the Damage Impact to surrounding structures within the zone of influence will be within Category 0 in accordance with the Burland Scale.

8.2.4 The BIA has concluded that there will be no risks or stability impacts to the development and/or adjacent sites due to slope.

8.3 **Hydrogeology and Groundwater Flooding**

8.3.1 The BIA has concluded there is a low risk of groundwater flooding.

8.3.2 The BIA has concluded there are no impacts to the wider hydrogeological environment.

8.4 **Hydrology, Surface Water Flooding and Sewer Flooding**

8.4.1 The BIA has concluded there is low risk of flooding from sewers and surface water.

8.4.2 The BIA has concluded there are no impacts to the wider hydrological environment.

APPENDIX 1

PROPOSED DEVELOPMENT DRAWINGS

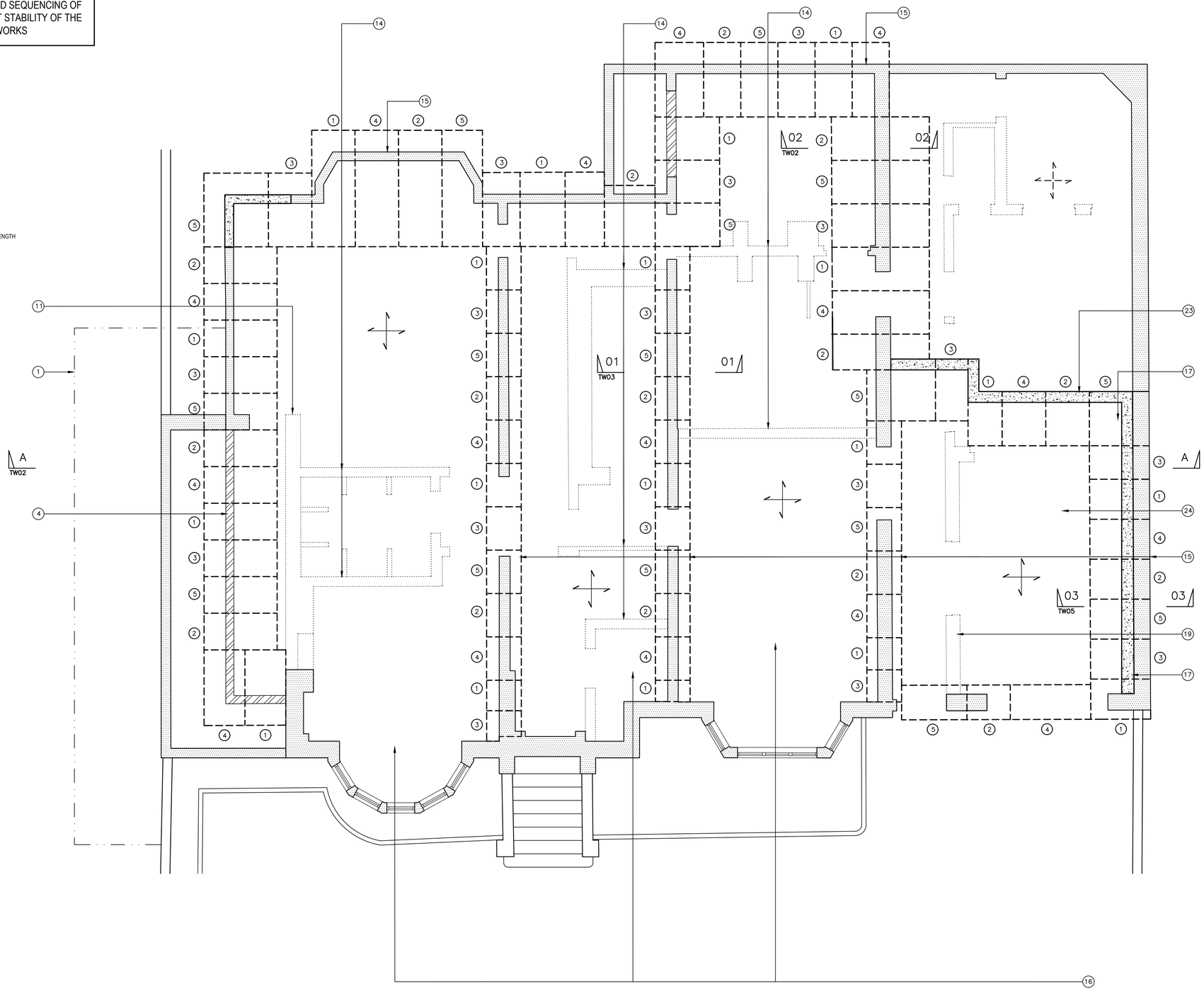
REFER TO ARCHITECTS DRAWINGS FOR ALL SETTING OUT DETAILS

THIS DRAWING TO BE READ IN CONJUNCTION WITH SECTION A - A ON DRG. No. 19117-TW02

SEQUENCE OF TEMPORARY WORKS TO BE CONSIDERED PRELIMINARY AND FOR INFORMATION ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, INSTALLATION AND SEQUENCING OF ALL TEMPORARY WORKS AND MUST ENSURE THAT STABILITY OF THE STRUCTURE IS NOT COMPROMISED DURING THE WORKS

LEGEND

- DENOTES WALL TO BE DEMOLISHED
- DENOTES STRUCTURE UNDER
- DENOTES DEBRIS FALL PROTECTION NET
- DENOTES EXISTING MASONRY OR TIMBER STRUCTURE
- DENOTES NEW MASONRY WALLS BUILT IN 15N/mm² COMPRESSIVE STRENGTH BRICKWORK AND GRADE iii MORTAR
- DENOTES NEW RC SLAB
- DENOTES EXISTING SLAB TO BE RETAINED



Notes

1. This drawing is to be read in conjunction with all relevant Architects & Engineers drawings and specifications
2. Do not scale from this drawing

TEMPORARY WORKS SEQUENCE

1. INSTALL SCAFFOLDING STRUCTURE /DEBRIS FALL PROTECTION NET
2. INSTALL STEEL WORK BELOW BASEMENT CEILING TO RESTRAIN THE EXISTING MASONRY WALL
3. DEMOLISH GROUND FLOOR (GF) FIRST FLOOR (1F) SIDE EXTENSION
4. CAST FOUNDATION AND ERECT NEW MASONRY WALL FROM BASEMENT LEVEL (BL) TO 1F CEILING LEVEL
5. INSTALL NEW STEEL BEAMS TO SPAN SIDE TO SIDE AT 1F CEILING LEVEL
6. INSTALL TEMPORARY PROPS ABOVE NEW STEEL BEAMS SUPPORTING THE ROOF STRUCTURE
7. INSTALL TEMPORARY PROPS AT BL, GF AND 1F TO SUPPORT EXISTING FLOOR STRUCTURE
8. DEMOLISH MASONRY WALL SUPPORTING THE ROOF STRUCTURE AT SECOND FLOOR (2F) LEVEL
9. CUT BACK EXISTING FLOOR JOISTS AT 2F LEVEL
10. INSTALL SECONDARY STEELWORKS AND RE-SUPPORT EXISTING FLOOR JOISTS ON IT
11. RE-BUILD MASONRY WALL ABOVE THE STEEL BEAM TO SUPPORT THE ROOF STRUCTURE
12. REMOVE TEMPORARY WORKS AT 1F AND 2F LEVELS
13. REPEAT WORKS AT POINTS 9, 10 AND 12 AT BL AND GF LEVEL
14. REMOVE INTERNAL NON-LOAD BEARING MASONRY WALLS FROM TOP TO BOTTOM
15. UNDERPIN EXISTING EXTERNAL AND INTERNAL LOAD BEARING MASONRY WALLS IN "HIT AND MISS" SEQUENCE
16. CAST RC SLABS AND LIFT PIT WITHIN THE AREA OF THE ORIGINAL BUILDING FOOTPRINT
17. CAST RETAINING WALL STEM AND BASE AGAINST MASS CONCRETE PINS IN "HIT AND MISS" SEQUENCE
18. INSTALL TEMPORARY PROPS TO SUPPORT WALL AT GF LEVEL
19. DEMOLISH MASONRY WALL AT BL LEVEL
20. INSTALL STEEL FRAME AT BL CEILING LEVEL
21. INSTALL SECONDARY STEEL BEAM TO SUPPORT MASONRY WALL ABOVE
22. REMOVE TEMPORARY WORKS
23. CAST RC RETAINING WALL WITH THE GARAGE SPACE IN "HIT AND MISS" SEQUENCE
24. CAST RC SLAB WITHIN GARAGE SPACE

Rev	Date	Drwn	Chkd	Amendments

Drawing Status: INFORMATION

SYMMETRYS
STRUCTURAL / CIVIL ENGINEERS
T 020 8340 4041 / E INFO@SYMMETRYS.COM / SYMMETRYS.COM / LONDON N8 8SL

Job Title
28 REDINGTON ROAD
LONDON
NW3 7RB

Drawing Title
BASEMENT PLAN
SUGGESTED TEMPORARY WORKS

Project	Company	Zones	Level	Type	Role	Number
19117	SYM	XX	B1	DR	S	TW01

Scale: 1:50 @ A1
Date: 26-11-19
Drawn by: SB
Checked: DS
Revision : P1