BROXWOOD VIEW, 29. ST. EDMUND'S TERRACE

LONDON NW8 7QH

Method Statement & Risk Assessment for Proposed Piling & Basement Construction Works Rev. 00

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BROXWOOD VIEW, 29. ST. EDMUND'S TERRACE LONDON NW8 7QH

METHOD STATEMENT & RISK ASSESSMENT FOR PROPOSED PILING & BASEMENT CONSTRUCTION WORKS

1.0 PROJECT BACKGROUND

Deep Foundations Specialists (DFS) Limited have been appointed by Broxwood View Limited as sub-structure & temporary works specialist consultants for the above development in Northwest London. The wider project is centred on the redevelopment of the site; this involves the complete demolition of the pre-existing 2 storey Porter's Lodge building on the site and the subsequent construction of a new 4 storey-extension adjacent to the northern wall of the existing Barrie House multi-storey block of residential apartments on the site, with an underlying single level-basement. The new 4 storey-structure would accommodate 9 No. residential apartments.

The approximate National Grid Reference for the approximately square-shaped 0.18 ha-site is 527495E, 183575N, while existing site topography generally slopes downwards from the northern boundary to the south, with an approximate gradient of 1:8. The site's reduced levels vary between (+48.600m OD) – (+42.000m OD). It is proposed to chiefly support the new structure on a 600mm thick reinforced concrete raft at lower ground floor level, while a number of bearing piles are also required as part of the proposed development.

A combination of secant bored pile retaining wall and segmental underpinning systems are required to support the deep excavation for the proposed subterranean components of the building, Maximum retained height is < 4.85m. The secant pile retaining wall and segmental underpinning systems would also function as permanent components of the new basement structure.

In essence the main components of the proposed sub-structure/basement construction works for the 4 storey-block of apartments include; temporary working platform construction, secant bored pile retaining wall installation, reinforced concrete capping beam construction on the bored pile wall, segmental mass concrete underpinning wall construction underneath the pad & strip footings of the existing/adjacent multi-storey Barrie House building, temporary works installation, bearing pile installation, reinforced concrete raft/basement slab construction, reinforced concrete liner wall construction in front of bored pile retaining

wall/segmental underpinning wall and the installation of water-proofing members of the proposed basement structure.

The detailed designs for the secant bored pile wall, RC capping beam on pile wall, segmental mas concrete underpinning walls, bearing piles, RC raft/basement slab, RC liner wall and the water-proofing systems for the proposed basement had been completed and issued under separate covers. This particular document mainly presents the method statement for the piling works, underpinning and basement construction works, as well as an appraisal of the associated risks.

An existing Thames Water underground asset/trunk runs outside the northern boundary of the site at off-set distances of between 4.1m – 5.0m from the centreline of the proposed secant pile retaining wall. The potential influence of the proposed works on the serviceability and stability of the adjacent underground trunk are duly accounted for in the method statements and risk assessments presented in the following sections of this report.

The report is presented under the following headings:

- GENERAL INFORMATION ON PROPOSED SUBTERRANEAN CONSTRUCTION & ASSOCIATED CONSTRUCTION SEQUENCING
- PROGRAMME & RESPONSIBILITIES
- METHOD OF START OF WORKS AND PROCEDURE ON COMPLETION
- ACCESS & METHODS
- WORKMANSHIP FOR INITIAL PILING/WORKING PLATFORM CONSTRUCTION FOR PILING RIG & OTHER CONSTRUCTION MACHINERY
- ENVIRONMENTAL CONTROLS
- PLANT & EQUIPMENT
- MATERIALS

2.0 GENERAL INFORMATION ON PROPOSED SUBTERRANEAN CONSTRUCTION & ASSOCIATED CONSTRUCTION SEQUENCING

The scope of subterranean works on the site includes the designs and construction of temporary working platform, secant bored pile retaining wall, reinforced concrete capping beam on the bored pile wall, segmental mass concrete underpinning wall underneath the pad & strip footings of the existing/adjacent multi-storey Barrie House building, temporary works, bearing piles, reinforced concrete raft/basement slab, reinforced concrete liner wall in front of bored pile retaining wall/segmental underpinning wall and water-proofing members of the basement structure.

The above sub-structure elements have been designed in accordance with the recommendations of the BS5975 (2019) – Code of Practice for Temporary Works Procedures, BRE Report No. 470 (2004) – Working Platform s for Tracked Plants, ICE Specification for Piling & Embedded Retaining Walls (2016), BS 8002 (1994), BS 8004 (1986), BS 8110 (1997), BS8102 (2009) and the London District Surveyors Association (LDSA)'s Guidance Note No. 1 for the Design of Straight Shafted Bored Piles in London Clay (2018).

The proposed construction sequencing for the piling & subterranean construction works is outlined below. Relevant construction drawings, which detail the proposed construction sequencing and associated temporary works are attached to the appendices of this document.

Proposed Sequence of Construction for Piling, Underpinning & Basement Construction for New-Build 4 Storey-Block of Apartments:

1. Strip the existing ground to a maximum depth of 300mm and subsequently place and compact carefully selected granular fill to form suitable working platform for piling rig and other construction machinery.
2. Install temporary guide wall prior to the commencement of secant pile wall construction.
3. Concurrently install ∅450 interlocking male and female piles, with male piles spaced @ 600mm c/c, by CFA drilling technique, which is essentially a noise-free & vibration-free drilling technique, from piling platform level (+45.500) to depths specified by DFS, to form secant pile wall, as we well as the ∅350 bearing piles required for the proposed underpinning works underneath the existing northern wall of

Barrie House; see DFS' pile wall construction schedule and bearing pile construction schedule for more detailed information.

4. Break down piles to 75mm above proposed soffit level of RC capping beam.
5. Construct RC capping beam on piles.
6. Carry out segmental underpinning of the existing pad footings and strip footings underneath the northern wall of the existing Barrie House building, as detailed by the Project Structural Engineer (see Richard Tant Associates' Drawing No's 5295-P02, 5295-P04, 5295-P13, 5295-P15, 5295-P17, 5295-P18, 5295-P19, 5295-PSM01 & 5295-PSM02).
7. Install temporary structural steel waling beam along the face of segmental underpinning retaining wall around crest level.
8. Install temporary props at capping beam level/waling beam level of pile wall and underpinning wall.
9. Carry out bulk excavation down to basement formation level; 4.85m maximum dig. A minimum stand-off distance of 2.5m between the excavator tracks and the edge of the excavation area shall be maintained at all times. Also, the tracks of the excavator shall always be orientated such that in the unlikely event of a collapse, the excavator would never collapse towards the location of the adjacent Thames Water asset. The bulk excavation for the basement area would be safely supported by the propped secant bored pile retaining wall and segmental underpinning wall; these have already been designed to support construction traffic loads and therefore, the failure of the deep excavation support system under excavator surcharge loading and associated collapse of excavator are highly unlikely.

   Localised excavations for underpins underneath the existing footings of the adjacent Barrie House shall be carried out manually by hand and safely supported with temporary works at all times.
10. Place blinding of 50mm minimum thickness at formation level.
11. Install/fix water-proof membrane on placed blinding, as well as face of pile retaining wall/segmental underpinning wall and around capping beam.
12. Construct 600mm thick reinforced concrete raft/lower ground floor slab with water-proof concrete and dowel into pile retaining wall/segmental underpinning wall, whilst making allowance for cavity drain in front of retaining walls.
13. Construct RC liner wall of 250mm minimum thickness with water-proof concrete, in front of pile retaining wall, from basement level, up to capping beam soffit level and connect same to capping beam.
14. Construct ground floor slab and connect same to capping beam.

15. Remove temporary props and structural steel walling beam.
16. Construct superstructure.

The proximity of the project site to an existing operational Thames Water infrastructure has been duly accounted for in all aspects of the designs for the sub-structure components of the proposed building on the site. The designs have been category 2-checked in line with good engineering practice. More detailed information on the designs for the sub-structure components of the proposed building, as well as associated temporary works are attached to the appendices of this document.

3.0 PROGRAMME & RESPONSIBILITIES

The works shall be completed in accordance with G & S Construction Engineering Limited's (Principal Contractor) programme of works. Anticipated programme period for the subterranean construction package is 6 months. Daily working hours are 08.00 – 18.00.

G & S Construction Engineering Limited (Principal Contractor) shall be responsible for ensuring that all necessary welfare, health & safety compliance facilities, as well as operational attendances are duly provided for all construction personnel & sub-contractors prior to the mobilization of plant and personnel to site.

G & S Construction Engineering Limited (Principal Contractor) will be responsible for ensuring that all the Federation of Piling Specialists' (FPS) attendances are provided prior to the mobilization of piling plant and personnel to site.

G & S Construction Engineering Limited's (Principal Contractor) designated Project Manager shall be responsible for ensuring that the operations completed by all construction personnel and sub-contractors on the site shall be in accordance with this method statement.

G & S Construction Engineering Limited's (Principal Contractor) appointed Project Manager shall also be responsible for ensuring that all construction personnel and sub-contractors on the site have all the necessary support for their works, at all times.

In addition, G & S Construction Engineering Limited's (Principal Contractor) Project Manager shall be responsible for ensuring that all work-specific Method Statement and Risk Assessment Registers are always in place during working hours. The Project Manager shall also ensure that site conditions are always consistent with those envisaged for every element of works.

4.0 METHOD OF START OF WORKS AND PROCEDURE ON COMPLETION

Prior to the commencement of works on the site, a solid hoarding will be erected along the perimeter of the site, while separate personnel and vehicular site entrance gates would be established at the front of the site along Broxwood Way. Security staff shall be responsible for the monitoring and control of pedestrian and vehicular access/egress through the front gates. The personnel entrance gate would be equipped with an electronic access control system.

The site hoarding shall be painted and kept in a clean and tidy condition throughout the works. The hoarding shall be regularly inspected and maintained, while clearly visible signage would be fixed at multiple points on the hoarding to warn members of the public of potential hazards associated with the site. The site's security personnel shall make regular inspections of the site boundary to ensure that no suspect packages are left within the vicinity of the site boundary.

The site accommodation/offices would be located within the site and thus leaving the pedestrian pavement access at the front of the site to remain clear at all times. The site shall be maintained in a safe and tidy manner, while the implementation of good house keeping procedures shall be regularly checked by the Principal Contractor's (G & S Construction Engineering Limited) Health and Safety Manager on a daily basis.

Also, before the commencement of works, initial structural movement monitoring works shall be carried out from 2 months before the commencement of site operations, in order to establish baseline readings and pre-construction movements, whilst following the reading frequencies stipulated in Richard Trant Associates' drawing No. 5295-PM01.

The site shall be set-up with temporary power supply system, water supply system and an efficient water and wastewater drainage system throughout the duration of the works. The Principal Contractor (G & S Construction Engineering Limited) would register the site under the Considerate Constructors Scheme and shall comply with the scheme's code of practice throughout the works duration.

Prior to any individual commencing work on the site, he/she shall receive a health & safety induction training/tool box talk, during which the site rules, as well as safety and environmental issues associated with the site shall be discussed. The induction programme shall explain the various safety procedures on site, emergency escape routes, emergency evacuation procedure during fire event and the site waste management

plan. Induction topics shall also include the identification of welfare facilities, details of the areas of risk on the project where the possibility of injury is higher, personal protective equipment (PPE), site-specific principles of good housekeeping, restrictions that would affect day-to-day operations. All operatives shall have their work-specific method statements explained to them by their site supervisor.

The Principal Contractor (G & S Construction Engineering Limited) will conduct training for all employees under the company's control, as well as all sub-contractors engaged by the Principal Contractor for the site. Thereafter, each sub-contractor shall be required to induct its own workforce. The Principal Contractor (G & S Construction Engineering Limited) shall continuously maintain a record of all induction training on site. All operatives associated with site activities that create significant risks of injury shall be specifically briefed on the hazards and control measures applicable to the safe system of work.

Suitably equipped first aid boxes, with eye washing solutions, shall be available on-site during site set-up. These shall be regularly stocked and maintained throughout the duration of the proposed works. At least 1 No. first aid box shall be available in the site office, while at least 1 No. first aid box shall be available on each floor of the proposed multi-storey structure, as building construction progresses upwards. Trained first aid providers must always be available on site during working hours. The first aid facilities shall be assessed and provided in line with the Health & Safety (First Aid) Regulations (1981). Under no circumstances should an element of works be executed on the site in the absence of a trained first aider on site.

At the end of each working day, the Principal Contractor's (G & S Construction Engineering Limited) Project Manager shall be responsible for ensuring that the site is secure, including the removal or locking-down of any access ladders/stairs to scaffolding and the gantry areas. All scaffolding systems shall be fully alarmed.

As construction works on the site near completion, the Principal Contractor (G & S Construction Engineering Limited) shall prepare an operational policy and migration strategy, which would set-out the management of the transition of the site into the safe operation of the finished development, such that the long-term use of the completed facility would be safe, with no associated detrimental/hazardous effects on the adjacent Thames Water assets, as well as the wider community. The operational policy/migration strategy shall account for inspections, commissioning, testing and client/facility manager's training on safe usage/management of the completed building.

After the completion of works on the site, the site shall be left in clean and tidy state. Completed works shall be inspected and approved/signed-off by the local building control authority's approved inspector. This would confirm that the works are practically complete and the inspector is satisfied that the works comply with the building regulations requirements.

5.0 ACCESS & METHOD

Information on personnel and vehicular access to the site have been provided in section 4.0 of this report. The plant and materials for every work element of the piling & sub-structure package will be delivered to site by low loaders, rigid eight-wheeler self-loading wagons and four-wheeler delivery vans. All plant, equipment and materials will be safely off-loaded in accordance with the recommendations of this document or otherwise, best industry practice and placed in the designated areas, as specified by the Principal Contractor's (G & S Construction Engineering Limited) Project Manager.

NOTE: Before piling & subterranean construction works can commence on the site, the following permits shall be completed and issued by the Principal Contractor (G & S Construction Engineering Limited):

- Underground Services Permit to Dig (before piling & before excavation)
- Avoidance of Overhead Services Permit to Work (before piling and before lifting operations)
- Permit to Lift (before lifting operations)
- Permit to Load (before loading any temporary works)
- Hot works permit (before any hot operations associated with the proposed works)

Once plant and equipment are safely offloaded, site operatives for the relevant subterranean work element shall undergo a site-specific health & safety induction. Upon the completion of site induction, they shall proceed to set up their plant/equipment, to execute their operations in accordance with the relevant sequence of construction, as stipulated in section 2.0 of this document.

The sequence of operation to be followed for each subterranean work element has been detailed in section 2.0 of this document and this shall be enforced/monitored by the Principal Contractor's (G & S Construction Engineering Limited) Project Manager at all times. The designated Project Manager shall also ensure that no unauthorised individual goes into the works area at any time, while every authorised personnel shall wear his/her complete PPE associated with the relevant operations at all times.

6.0 WORKMANSHIP FOR INITIAL PILING/WORKING PLATFORM CONSTRUCTION FOR PILING RIG & OTHER CONSTRUCTION MACHINERY

The site shall be primarily cleared of vegetation, rubbish, loose tipped material, wet soft unsuitable fill and topsoil down to a maximum depth of 300mm.

Formation and sub-formation shall be carefully inspected for potential hazards, with remedial action taken where applicable.

Formation and/or sub-formation shall not be allowed to soften/loosen due to exposure. Where possible, formation shall be inspected, approved and covered with the platform material on the same day. If formation does deteriorate, softened or loosened material shall be removed and replaced with carefully selected class 6F2 material.

Formation and/or sub-formation shall be levelled and proof rolled prior to the placement of overlying construction.

Piling/Working platform material shall comprise of carefully selected granular material of coarse grading (Class 6F2, specification for highway works, MCHW, 2016), which shall be placed in layers of 150mm maximum thickness. Each layer shall be compacted with a smoothed wheeled roller of 5400 kg/m width of roll, which would operate without vibration. For each layer, minimum required number of passes N shall be 16 (after MCHW, 2016).

A full-time engineering surveyor shall be in attendance on site, to continuously establish and monitor the specified levels of placed and compacted layers throughout the duration of the piling mat construction works. Each placed and compacted layer, as well as the finished piling mat surface shall have a surface level tolerance within +20mm and -30mm. Wherever these specified tolerances are exceeded, the Principal Contractor (G & S Construction Engineering Limited) shall determine the full extent of the area that is out of tolerance and the area shall be made good as follows:

- If the surface is too high, it shall be re-trimmed and re-compacted by following the same procedure as described above (after MCHW, 2016);

- If the surface is too low, it shall be corrected by the addition of acceptable material that has similar characteristics, engineering properties and strength to the underlain material; this shall be placed and compacted by similar procedure to the one described above.

Bi-axial geogrid shall be laid and lapped on formation, or sub-formation, as per manufacturer's instructions.

The rig shall have a 2.5m minimum stand off from the edges of the platform, if platform is raised above surrounding ground.

The piling platform is to be cleaned regularly of debris and dirt that could result from piling/excavation operations.

7.0 ENVIRONMENTAL CONTROLS

The skips, water bowser and licensed carriers will be provided by the Principal Contractor (G & S Construction Engineering Limited), unless otherwise stated in the contract.

- The Principal Contractor (G & S Construction Engineering Limited) are fully registered under the Considerate Contractors Scheme. G & S Construction Engineering Limited shall consistently demonstrate a positive attitude and commitment towards minimising environmental disturbance to the local community/residents, as well as the adjacent Thames Water asset. Impacts on the adjacent Thames Water asset and other local amenities due to the proposed subterranean construction works would be strictly controlled and managed by G & S Construction Engineering Limited.

- Prior to the commencement of underpinning/bulk excavation/drilling operations for the proposed sub-structure on the site, G & S Construction Engineering Limited (Principal Contractor) would primarily carry out detailed in-situ sampling and laboratory-based investigation of the ground, while comprehensive professional advice shall be obtained to ascertain the non-contamination or degree of contamination of the superficial soils on the site.

  If the ground is confirmed to be contaminated to any degree, G & S Construction Engineering Limited (Principal Contractor) would take appropriate precautions to minimise the impact of contaminated soil on operatives within the site, community residents and the environment. Adequate precautions would also be taken in respect of the disposal of the contaminated soils.

- The geostructural scheme for the sub-structure has been designed with due regard to maintaining the overall stability, serviceability and integrity of the adjacent Thames Water infrastructure, neighbouring buildings, services, public amenities and surrounding land. The structural forms of the subterranean components of the proposed building and the associated methods of construction have been developed to ensure that lateral & vertical deflections, as well as the associated ground movements would always lie within tolerable limits.

- Piling/groundworks and all other site operations shall only be carried out within the working hours

stipulated in section 3.0 of this document.

- The trimming-down of piles to cut-off levels prior to RC capping beam/RC cradle construction shall be undertaken by a 'clean' deconstruction method, so as to reduce noise, dust and vibration. In general, wherever applicable across the site, concrete elements shall be cut into manageable sections, by adopting a stitch drilling method, so as to reduce noise, dust and vibration.

- Noise, dust and vibration would be controlled by employing Best Practical Means (BPM), as prescribed in the following legislative documents, as well as the relevant codes of practice (BS 5228-1 (2009 & 2014) and BS 5228-2 (2009 & 2014)):

  (1) The Control of Pollution Act (1972);
  (2) The Health & Safety at Work Act (1974);
  (3) The Environmental Protection Act (1990);
  (4) Construction (Design & Management) Regulations (2015);
  (5) The Clean Air Act (1993).

- The proposed subterranean construction works would involve significant volume of bulk excavation. The excavation works would be undertaken in accordance with the legislative documents itemised above, as well as the guidelines provided within the Institution of Civil Engineers' Demolition Protocol, in order to mitigate the potential impacts of these works.

- General measures to be adopted by G & S Construction Engineering Limited (Principal Contractor) to reduce noise, dust and vibration during the subterranean works include the following:

  (1) Erection of site hoarding, to act as a minor acoustic screen;
  (2) Drop heights shall be minimised during operations;
  (3) Super-silenced plant shall generally be used when practicable;
  (4) The works shall generally be executed with well-maintained modern plant;
  (5) Effective noise and vibration instrumentation and monitoring shall be implemented;
  (6) Limited/restricted use of percussive and vibratory machinery;

(7) Vehicles shall not be left idling, with engines switched on;

(8) All loads entering and leaving the site shall be covered;

(9) Measures shall be adopted to prevent site runoff of water or mud;

(10) Regular use of water as dust suppressant;

(11) All cutting equipment shall use water as suppressant or alternatively, suitable local exhaust ventilation systems shall be provided;

(12) All skips shall be covered at all times;

(13) Use of agreed wet cleaning methods or mechanical road sweepers on all roads around the site.

(14) An efficient dust emission monitoring system shall be established and enforced on the site at all times.

- If and when practical, debris from the trimming-off/sawing-off/demolition of concrete and steel structural components across the site shall be taken to the nearest recycling plant.

- General waste shall be deposited into designated skips.

- Special waste, such as oil contaminated materials, used oil spill kits etc, shall be disposed of by an appointed licensed carrier.

- Metal waste generated shall be collected in designated skips.

- Fuel/oil spills shall be prevented. Drip trays and emergency oil spill kits shall be used to catch and clean the spills/leaks. Oil spill kits contain colour coded bags to contain any used spill equipment. These shall be disposed of by a licensed carrier.

- Arising will be collected in designated areas/skips and will be removed by the principal contractor (G & S Construction Engineering Limited), unless otherwise stated in the contract.

- No plant/equipment shall be run unnecessarily. Engines/tools shall always be turned off when not in use.

8.0 PLANT & EQUIPMENT

The Principal Contractor's (G & S Construction Engineering Limited) designated Project Manager, in conjunction with Sub-Contractors' Construction Managers shall make the necessary arrangements for the safe delivery of all required plant and equipment to the site. The plant and equipment that are proposed to be used for sub-structure construction on the site are itemised below:

- 13 Tonne-JCB JS130LC Excavator
- Smoothed Wheeled Roller (5400 kg/m Width of Roll) – to be operated without vibration
- 3 Tonne-Front Tip Dumper
- 15 Tonne-Techno Drill SRL Hydraulic CFA Piling Rig
- 5 Tonne-Stationary Concrete Drum
- 3 Tonne-Concrete Pump
- 10 Tonne-JCB JS100LC Excavator
- POTAIN HUP40-30 Self-Erecting Tower Crane with Telescopic Mast & R2500 Ballast System
- Mobile Concrete Wagons
- Concrete pouring bucket
- Pile Cropper
- 450mm diameter hollow stem augers
- 350mm diameter hollow stem augers
- Petrol disc cutter
- Petrol jet wash
- Site vehicles/delivery vans.
- Hitachi ZX29U-$_3$ 3 Tonne-Hydraulic Excavator
- Volvo EC140E 14 Tonne-Hydraulic Excavator
- Concrete pouring bucket
- Conveyor system

All equipment delivered to site shall have the CE label clearly shown on them, to confirm conformity with the relevant CEN standard.

All the equipment for the project shall be carefully selected with due regard to their operational histories and they would be supplied in serviceable conditions, with all relevant supporting documentation.

All plant and equipment would generally be less than 7 years old, with complete service records. They will be maintained in accordance with the Provision and Use of Work Equipment Regulations 1998 and Lifting Operations, Lifting Equipment Regulations 1998 and G & S Construction Engineering Limited's plant and equipment testing procedures.

All lifting equipment and associated accessories will be down-rated from their manufacturers' rated capacities to 75% of safe working loads.

Whenever there is a possibility of the arm of a lifting equipment encroaching within 3m of the adjacent Thames Water asset, such an equipment will be fitted with a slew restrictor as a preventive measure.

G & S Construction Engineering Limited's Project Manager shall always ensure that all plant and equipment are left in a safe and secure manner, at the end of each work shift.

Prior to the mobilization of the piling rig, ancillary equipment and all other construction machinery unto the site, an engineered working platform shall be placed and compacted over the area of proposed works. Plate loading tests or equivalent shall be conducted on the working platform, in order to confirm that the working platform can safely support bearing pressures in excess of 2.0 times the service bearing pressures expected from the tracks of the piling rig and all other construction machinery. In essence, the plate loading tests shall be based on a minimum factor of safety of 2.0, while the vertical displacements/settlements of the test plate must lie within serviceable limits.

9.0 MATERIALS

The working platform construction, piling, underpinning and basement construction works on the site would involve the use of the following materials;

- Selected granular fill for working platform; class 6F2 material in accordance with table 6/1 of the specification for highways works, MCHW, 2016.
- Biaxial geogrid for working platform; 1 No. layer of a separator/structural reinforcement in the form of TENSAR SS40 bi-axial geogrid or equivalent shall be laid and lapped on the subgrade in accordance with the manufacturer's instructions.
- Ready mix concrete
- Aggregates
- Hardcore
- Cement render
- Mortar/grout
- Resin anchor grouts
- Steel reinforcement bars
- Pre-fabricated steel reinforcement cages
- Spacers
- Cover blocks
- Structural steel frames
- Structural steel props
- Metal joists
- Timber formwork/falsework systems
- Wire ropes & cables

- Basement water-proofing materials
- Thermal protection/building insulation systems
- Plaster/gypsum board
- Water

10.0 LABOUR

The following site-based personnel will be involved in the execution of the subterranean construction works on the site:

- 1 No. Project Manager
- 2 No. Foremen
- 1 No. Piling Rig Operator
- 1 No. Mobile Crane Operator
- 1 No. Self-Erecting Tower Crane Operator
- 2 No. Excavator Operators
- 1 No. Telescopic Handler Operator
- 1 No. Roller Operator
- 1 No. Front Tip Dumper Operator
- 1 No. Concrete Pump Operator
- 4 No. Banksmen
- 16 No. Skilled Tradesmen
- 10 No. Labourers
- 2 No. Health & Safety Officers
- 1 No. Quality Control/Quality Assurance Officer
- 2 No. Security Operatives

11.0 TRAINING

Every operative/plant operator of the Principal Contractor (G & S Construction Engineering Limited) and appointed sub-contractors that would be working on the site shall be accredited under the Construction Plant Competence Scheme (CPCS). Relevant CPCS identification cards shall be presented by every operative/plant operator before access unto the site can be granted at any time. In addition, every plant operator shall have Plant Operator Safety Awareness Training and the Construction Training Academy's (CTA) Operators' tickets for the relevant plant.

12.0 TESTING

Proposed testing regimes for the working platform construction, piling and subterranean construction works on the site are outlined below:

Bi-Axial Geogrid for Working Platform

Where a BBA certificate exists, it will be provided and no tests would be required.

Where a BBA certificate does not exist, a manufacturer's data sheet will be provided and a wide strip tensile test will be undertaken at a rate of one test per 1,000m² of bi-axial geogrid laid, with each test sample obtained from a separate roll.

Selected Granular Fill for Working Platform

Tests for source approval and compliance:

- Particle size distribution – 1 sample weekly per source
- Moisture content – 1 sample weekly per source
- Density – moisture content (compaction) to determine OMC – 2 samples per source. Compaction 4.5kg modified proctor in CBR mould to BS1377.

The temporary working platform shall be installed in compliance with the above specification and signed copies of the Federation of Piling Specialists' Working Platform Certificate FPS/WPC/01 shall be issued to Arma Piling Limited (Piling Contractor) by G & S Construction Engineering Limited (Principal Contractor), prior to the commencement of piling operations on the site.

Other Testing/Quality Control Requirements

- Random sampling of steel reinforcement bars
- Off-site/laboratory-based testing of steel reinforcement bar samples to confirm tensile strength
- Concrete cube/cylindrical sampling during the concreting of all structural components of sub-structure (piles, retaining walls, RC capping beams & cradles, underpins, liner walls, basement raft, ground floor slab, etc.). **Concrete samples shall be stored in temperature-regulated tanks after sampling, so as to obtain reasonably accurate compression test results.**

- Laboratory-based compression tests on concrete cube/cylindrical samples
- Pile integrity testing on all piles, once piles achieve sufficient structural strength
- Plate load-testing on placed & compacted working platform/piling mat prior to the mobilization of construction plant unto the site
- Structural movement instrumentation and regular monitoring within the site, on neighbouring buildings and at the location of the adjacent Thames Water asset in accordance with the recommendations of the Project Structural Engineer; see Richard Trant Associates' drawing No. 5295-PM01 for detailed information.
- Vibration instrumentation and regular monitoring within the site.

Actual scope of each testing regime shall be agreed between the Principal Contractor (G & S Construction Engineering Limited) and the Project Structural Engineers.

13.0 PROTECTION

In addition to the controls detailed in the attached risk assessment, the following controls will be applied:

1. **Site Induction:**

   All operatives will be inducted by G & S Construction Engineering Limited (Principal Contractor) and advised of any specific risks relating to every aspect of the proposed works.

2. **PPE Requirements:**

   The following task-specific PPE shall be worn at all times, while on the site:

Working Platform Construction/Piling Works

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Suitable Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles to BS2092

Excavation Works

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Suitable Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles/Safety Spectacles to BS2092

Formwork Construction

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Suitable Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles to BS2092

Concreting Works

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Suitable Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles to BS2092

Steel Fixing/Steel Fabrication/Welding

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Heat-Resistant Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Visors/Welding Masks/Safety Goggles/Safety Spectacles/Face Screens/Face Shields to BS2092.

Sawing

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Suitable Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Full-face Masks/Safety Goggles/Respiratory Protection (FFP3-Rated Dust Masks) to BS2092.

Old Concrete Demolition with Pneumatic Drill

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Anti-Vibration Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles to BS2092

Labouring/Manual Handling of Sharp or Rough Objects

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Rigger Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles to BS2092

Brick/Mortar Handling

- Head Protection – Safety Helmets to BS EN 397
- Foot and Leg Protection – Safety Footwear with Steel Toe Caps & Steel Midsole Protection to BS EN 345, Knee Pads, Cargo Trousers
- Hand Protection – Close-Fitting Abrasion Resistant Gloves to BS EN 381.7
- Body Protection – High Visibility Jackets/Vests, Thermal Clothing, Waterproof Jackets/Vests
- Ear Protection Defenders/Plugs to BS EN 352
- Eye Protection – Safety Goggles to BS2092

3. COSHH

The construction works on the site would involve the following hazardous substances:

- Construction Dust/Fume-Laden Air/Smoke
- Cement/Concrete/Mortar
- Lead
- Solvents (Paints/Thinners/Resins/Glues/Lubricants)
- Isocyanates (Paints/Coatings/Foams/Glues/Lubricants)
- Carbon Monoxide (Gas Appliances & Engines)
- Harmful Micro-Organisms (Metalworking Fluids)

Assessment/data sheet for each hazardous substance shall be made available on site and COSHH briefings shall be given to all operatives before being allowed to work on the site. The COSHH briefings would clearly make operatives aware of the significance of the ill health effects that the above hazardous substances cause, the main risk factors behind them, as well as necessary precautionary measures to be followed.

4. Existing Services & Surfaces

Location and protection of all existing surfaces and services shall be carried out by the Principal Contractor

(G & S Construction Engineering Limited) prior to the commencement of works. Radiodetection RD8000/RD8100 PDL or similar CAT scanner shall be used for below ground cable detection. **A permit to dig form shall be completed prior to the start of excavation or drilling on the site.**

5. **Existing Structures & Adjacent Thames Water Assets**

Regular monitoring of structural movements and vibration levels on the site and within the vicinity of the adjacent Thames Water asset, as well as all existing adjacent buildings shall be carried out by the Principal Contractor's (G & S Construction Engineering Limited) Appointed Instrumentation & Monitoring Specialist Consultant throughout the duration of the proposed works.

In the unlikely event of ground/structural movements/vibration levels exceeding set threshold limits, an emergency site meeting shall be convened to discuss contingency measures and alternative operational methodologies, as outlined in Richard Trant Associates' drawing No. 5295-PM01.

14.0 POTENTIAL IMPACT OF WORKS ON ADJACENT THAMES WATER ASSETS & PROTECTION OF ASSETS

Noise & Vibration – Localised excavations for individual underpins shall be carried out manually by hand, with negligible magnitudes of noise and vibration. The bulk excavation and subterranean construction works would also generate minimal noise and vibration. In addition, the proposed piling technique; continuous flight auger (CFA) drilling is typically associated with low levels of noise and vibration. The working platform for the piling rig and other construction machinery is proposed to be compacted with a smoothed wheeled roller (5400 kg/m Width of Roll), which would be operated without vibration. Therefore, no additional precautionary measures would be required in respect of vibration impact on the adjacent Thames Water infrastructure.

Effects of Ground Displacement & Soil Loosening – The theoretical ground & structural movement analysis completed for the site through finite element numerical modelling by CARD Geotechnics Limited has already confirmed that the ground movements and associated structural movements that could result from the proposed drilling and bulk excavation on the site would be negligible and therefore, no serviceability issues are anticipated within the vicinity of the site (including the location of the existing Thames Water asset) during groundworks/subterranean construction works.

Initial stripping of the existing ground prior to the placement and compaction of working platform shall be limited to a maximum of 300mm depth. The working platform construction works would result in negligible or virtually non-existent ground movement. Also, as CFA piling technique is being proposed for the site, all drillholes would effectively be fully supported during drilling and concreting. In essence, no open bores would be formed during piling works and therefore, ground movement due to piling operations will be minimal, with negligible influence on the adjacent Thames Water infrastructure.

Protection of Adjacent Thames Water Infrastructure and other Neighbouring Assets – A suitable protection in the form of a fence/barrier will be erected between the area of sub-structure construction works and the neighbouring assets. Over-sailing of the site's boundary or encroachment within 3m of any neighbouring above-ground/below-ground asset by cranes and other construction machinery shall be prevented at all times. **Any oversailing of the site's boundary wall is not permitted without prior approval and with safety measures put in place.**

Positioning & Movement of Site Machinery/Piling Rig – The positioning and movement of all construction machinery (including piling rigs), as well as the associated work sequence, will be managed in such a way that repetitions in the orientation of the plant tracks are kept to the barest minimum. The piling rig shall always be positioned at a perpendicular orientation to the site's boundary wall, such that in the unlikely event of the rig falling over, the rig would topple parallel to the site's boundary wall/adjacent Thames Water trunk, rather than towards the boundary wall/adjacent Thames Water trunk.

Lifting – All lifting operations will be carried out in accordance with the Lifting Operations and Lifting Equipment Regulations (1998). Heavy objects will be lifted with mobile cranes/excavators or telescopic handlers. Whenever a lifted object could fall within 3m of the site's boundary/adjacent assets, a secondary restraint (e.g. back-up sling) will be provided. In addition, tag lines will be used for secondary load control.

Monitoring of Adjacent Assets – **The monitoring of the structural displacement and vibration levels within the vicinity of the site and adjacent assets/infrastructure shall be carried out by G & S Construction Engineering Limited (Principal Contractor) throughout the duration of works on the site.** Structural movement monitoring shall be carried out in accordance with the Project Structural Engineer's monitoring plan, as detailed in Richard Trant Associates' drawing No. 5295-PM01. No works shall be carried out on the site until all monitoring instruments/targets are in place and pre-construction baseline readings taken.

15.0 HAZARDS & RISK ASSESSMENT

Management of Health and Safety at Work Regulations (1999 & 2006)

Legal Requirements

Regulation 3 of the Management of Health and Safety at Work Regulations (1999 & 2006) requires employers to make suitable and sufficient assessment of the risks to the health and safety of their workers or any other person who may be affected by their undertakings and to record the significant findings of the assessments. This requirement also relates to the self-employed.

Recording

The recorded assessment is required to be an effective statement of hazards and risks, which then leads management to take the relevant action to ensure health and safety. It is required to be part of the employer's overall approach to health and safety.

Contents

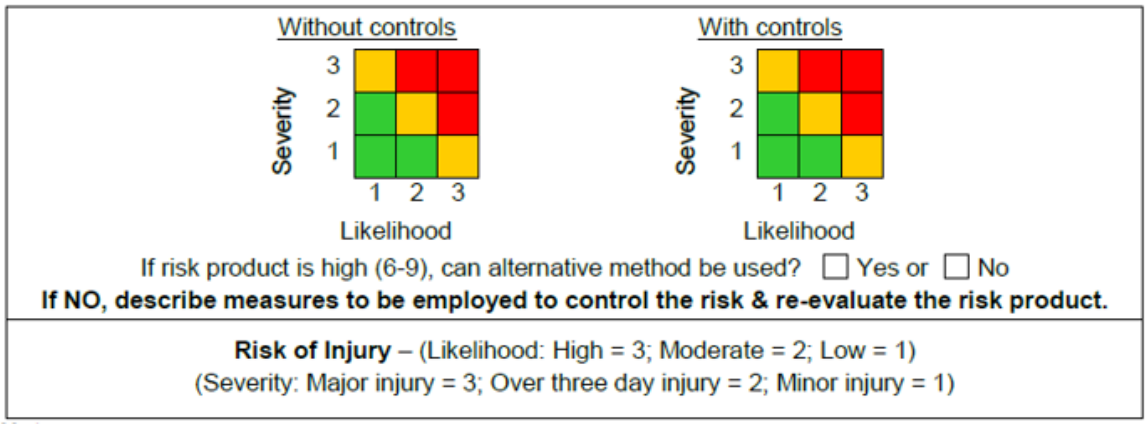
- All relevant hazards and risks are to be addressed
- What normally happens in the workplace or during work activity are to be given due consideration
- Whoever might be affected shall be considered
- Existing precautionary measures shall be duly accounted for
- Necessary control measures that are to be put in place, to ensure a safe system of work, shall be clearly identified.

Format

The form presented in the following pages has been formatted to meet the requirements outlined above, **with specific references to the operations and risks associated with the proposed piling/groundworks/subterranean construction works package. In essence, the relevant construction operations have been identified, together with the associated risks and hazards, as well as the relevant control measures.**

Quantitative Evaluation

This is obtained by expressing in numerical form, the **likelihood** of injury occurring during the proposed operation, as well as the probable **severity** of such injury (please see figure 1 below). The 'Without controls' risk matrix is typically marked with horizontal and vertical lines for the severity and the likelihood. Wherever the two lines cross, identifies the overall risk product. The risk product is obtained by multiplying the two numbers together. In consequence, the higher the number, the more serious the result becomes. Please see following pages for site-specific risk assessment results.



Note:

- HAZARD… is defined as "*the potential to cause harm*"
- RISK… is defined as *"the likelihood that the harm will occur"*

Figure 1 – Diagram Illustrating Risk Assessment Procedure (Quantitative Evaluation)

Lone Working

Under no circumstances shall 'Lone Working' be permitted during the piling/groundworks/subterranean construction works on the site, unless specific permission has been granted by the Principal Contractor's (G & S Construction Engineering Limited) Manager that is responsible for safety on the site.

Vibration

Vibration exposure limits and datasheets for all HAV plant shall be made available on site. HAV exposure levels for every individual shall be monitored on a regular basis.

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ASSESSMENT RECORD SHEET						
1	Hazard	Working Adjacent to Operational Thames Water Trunk & other Neighbouring Assets				
2	Harm Encountered	1. Ground Movement and Associated Displacement of Thames Water Trunk & Buildings 2. Ground-Borne Vibration 3. Piling Rig/Crane Collapse towards the Location of Thames Water Trunk and other Adjacent Assets 4. Boundary Wall Structural Movement/Collapse 5. Direct Impact of Construction Machinery on Existing Boundary Wall 6. Overhead Objects Falling unto Adjacent Land 7. Fatal Accidents 8. Disruption to Serviceability of Thames Water Trunk and Neighbouring Buildings				
3	Severity Rating 1-5 (tick box)	1	2	3	4	5 >
4	Persons at risk	Site personnel, surrounding local community and every individual within the vicinity of the site.				
5	Likelihood of Occurrence 1-5 (tick box)	1	2	3 >	4	5
6	Risk Rating prior to action (1-25)	1-8 Low ( )		9-16 Medium (>)		17-25 High ( )

7	**Can the hazard be eliminated?** **(tick yes or no. If Yes, describe procedure**	**yes**		**no**	**>**	
8	**Can the hazard be controlled? (tick yes or no). If Yes, describe procedure.**	**yes**	**>**	**no**		**1. Ground/structural displacement and vibration monitoring systems shall be installed within the site and on neighbouring assets before the commencement of works on the site. The instrumentation shall be monitored on a regular basis.** **2. All excavation on the site shall be adequately supported with excavation support systems/temporary works, which shall be designed & installed by suitably qualified specialists. No open excavation shall be allowed on the site at any time.** **3. Every pile shall be installed by continuous flight auger (CFA) drilling technique, in order to minimise noise & vibration, whilst also limiting ground displacement during piling works.** **4. A rigid barrier shall be erected between the areas of proposed works and the adjacent assets, so as to create a 3m-exclusion zone that shall be strictly enforced by the Principal Contractor.** **5. Oversailing of the site's boundary wall shall be avoided at all times. Any oversailing of the site's boundary wall is**

						not permitted without prior approval and with safety measures in place. **6. The working platform on the site shall be designed and installed by experienced and suitably qualified specialists.** **7. The orientation of every plant on the site shall be in such a way that every plant would potentially collapse away from the adjacent Thames Water trunk/neighbouring assets in the event of loss of overall stability.** **8. Under no circumstances should any site personnel go beyond the site's boundary. This restriction shall be strictly enforced by the Principal Contractor at all times.** **9. All plant operators must be fully qualified.**
9	**Will residual hazard remain? (tick yes or no)** **If ' Yes ' state hazard.**	**yes**	**>**	**no**		**But reduced.**
10	**Further action required**	**yes**	**>**	**no**		**Regular monitoring & strict enforcement of non-access to 3m-exclusion zone between the area of proposed works and neighbouring assets.**

11	**Risk rating (tick option)** **When controls are implemented**	**High**		**Medium**		**Low**	**>**

12	**Comments**	**No works shall commence on the site prior to the installation of structural movement monitoring instrumentation and establishment of pre-construction baseline readings.**

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ASSESSMENT RECORD SHEET						
1	Hazard	Mobile Crane/Excavator Lifting Operations; Falling materials, Materials incorrectly slung.				
2	Harm Encountered	1. Crushing 2. Impact				
3	Severity Rating 1-5 (tick box)	1	2	3 >	4	5
4	Persons at risk	Site personnel/excavator operator/mobile crane operator and every individual in the vicinity of the lifting operation.				
5	Likelihood of Occurrence 1-5 (tick box)	1	2	3 >	4	5
6	Risk Rating prior to action (1-25)	1-8 Low ( )		9-16 Medium (>)		17-25 High ( )
7	Can the hazard be eliminated? (tick yes or no. If Yes, describe procedure	yes		no	>	

8	**Can the hazard be controlled? (tick yes or no). If Yes, describe procedure.**	**yes**	**>**	**no**		**Lifting/unloading/loading must be done on firm, level ground. Barriers should be put in-place to prevent unauthorised access to lifting area. All operators must be fully qualified.**				
9	**Will residual hazard remain? (tick yes or no)** **If ' Yes ' state hazard.**	**yes**	**>**	**no**		**But reduced.**				
10	**Further action required**	**yes**	**>**	**no**		**Regular monitoring**				
11	**Risk rating (tick option)** **When controls are implemented**	**High**				**Medium**		**Low**	**>**	
12	**Comments**	**Always employ competent personnel.** **Area around lifting/unloading/loading must be isolated from personnel with rigid barriers.**								

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ASSESSMENT RECORD SHEET										
1	Hazard	Working with Moving/Heavy Plant								
2	Harm Encountered	1. Collision with Moving Plant 2. Impact with Moving Plant 3. Crushing 4. Plant Falling Over 5. Noise								
3	Severity Rating 1-5 (tick box)	1	2	3 >	4	5				
4	Persons at risk	Anyone in the vicinity of plant.								
5	Likelihood of Occurrence 1-5 (tick box)	1	2	3 >	4	5				
6	Risk Rating prior to action (1-25)	1-8 Low ( )		9-16 Medium (>)		17-25 High ( )				
7	Can the hazard be eliminated? (tick yes or no. If ' Yes ' describe procedure	yes		no	>					

8	**Can the hazard be controlled? (tick yes or no). If ' Yes ' describe procedure.**	**yes**	**>**	**no**		**1. All site personnel must wear full PPE (including high visibility vests/jackets, ear defenders, hard hat and steel-toed boots) whenever moving/heavy plants are in operation on the site.** **2. The working platform on the site shall be designed and installed by experienced and suitably qualified specialists.** **3. Plant shall only be operated by suitably qualified personnel.**
9	**Will residual hazard remain? (tick yes or no)** **If ' Yes ' state hazard.**	**yes**	**>**	**no**		**But reduced.**
10	**Further action required**	**yes**	**>**	**no**		**All site operatives/plant operators shall be trained in the area of safety awareness. Strict enforcement of safety rules on site.**

11	**Risk rating (tick option)** **When controls are implemented**	**High**		**Medium**		**Low**	**>**
12	**Comments**	**Only competent personnel shall be authorised to work on the project.** **All tasks shall be closely supervised.**					

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ASSESSMENT RECORD SHEET						
1	Hazard	Excavation & Underground Services				
2	Harm Encountered	1. Excavation Collapse 2. Serious/Fatal Effects of Striking Services while Excavating				
3	Severity Rating 1-5 (tick box)	1	2	3	4 >	5
4	Persons at risk	Anyone in the vicinity of plant.				
5	Likelihood of Occurrence 1-5 (tick box)	1	2	3 >	4	5
6	Risk Rating prior to action (1-25)	1-8 Low ( )		9-16 Medium (>)		17-25 High ( )
7	Can the hazard be eliminated? (tick yes or no. If ' Yes ' describe procedure	yes		no	>	

8	**Can the hazard be controlled? (tick yes or no). If ' Yes ' describe procedure.**	**yes**	**>**	**no**		**Excavation support system and associated temporary works shall be designed and installed by qualified/competent specialists.** **No open excavation shall be allowed on the site at any time.** **Ground & structural movement monitoring instrumentation shall be in-place prior to the commencement of groundworks and this shall be regularly monitored during the groundworks.** **Obtain service drawings and use detection equipment (e.g. RD8000 or similar CAT scanner) prior to excavation.** **Permit to dig policy shall always be followed.** **If possible, carry out initial hand-dug trial-pitting before mechanical excavation.**
9	**Will residual hazard remain? (tick yes or no)** **If ' Yes ' state hazard.**	**yes**	**>**	**no**		**But reduced.**
10	**Further action required**	**yes**	**>**	**no**		**All due diligence prior to work commencing.**
11	**Risk rating (tick option)** **When controls are implemented**	**High**		**Medium**	**>**	**Low**

12	**Comments**	**Use experienced and competent specialists for the design and installation of excavation support systems and associated temporary works.** **Use trained personnel for detection equipment. All personnel shall be instructed on safe procedures. No works shall commence prior to Permit to Dig being signed by the Principal Contractor.**

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Rig Overturning	9	2
☑ Falling spoil (augered)	6	2
☑ Burst hoses/pipelines.	6	4
☑ Failure of hose pipeline joints.	6	4
☑ Reinforcement	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Piling Platform must be design by a competent temporary works engineer
- ☑ Piling platform must be installed by a competent ground worker ensuring any soft ground has been removed and the piling platform is installed as the piling platform design.
- ☑ Piling platform certificate must be signed by site management and piling platform checked daily for it condition.
- ☑ Piling must always be kept perpendicular to the railway line and all turning / spragging to be carried out at the rear of each piling platform.
- ☑ Main contractor to ensure that the piling platforms on each plot are wide enough for the rig to work in lines working away from the railway line and therefore reducing the length of time the rig spends on each plot. The rig must be able to straddle the perimeter piles.
- ☑ Ensure at all times the auger cleaner is in working order and that all brushes are in place. Should spoil pass the auger cleaner then drill back down to allow second pass of the auger cleaner.
- ☑ All flexible hose joints used on CFA rigs to be fitted with safety whipcheck device.
- ☑ Regular inspection of hoses and pipelines for wear or damage.
- ☑ Ensure all Concrete hanging pipes are all in good order and no more than 1 year old.
- ☑ Carry out daily checks to ensure all concrete hoses and connections are in good order.
- ☑ When moving reinforcement within 7m of the Network Rail fence it must always be moved in a horizontal position until at the pile position where the lift point will be adjusted to lift vertically and then lowered into the pile bore.
- ☑ This risk assessment is an addition to all other risk assessments within this package and all other risks are relevant when working in proximity of Network Rail property.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Cement burns.	6	2
☑ Eye damage from splashes.	6	2
☑ Trapping by concrete lorries.	9	4
☑ Use of wheelbarrows.	6	4
☑ Use of dumpers see separate RA12.	9	4
☑ Unprotected holes for piles.	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ All reversing lorries to be controlled by a banksman.
- ☑ Lifting and pushing controls, slips, trips and falls.
- ☑ Ensure clear route for wheelbarrows.
- ☑ Adherence to the controls for the safe use of site plant (RA12).
- ☑ All pile openings to be clearly marked or covered.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Rig overturning.	9	4
☑ Tail swing trapping.	9	4
☑ Falling spoil (augered)	9	2
☑ Contact with underground services (see RA24).	9	4
☑ Arcing or contact with overhead cables.	9	4
☑ Materials or equipment falling from piling rig.	9	2
☑ Falls from piling rig.	9	2
☑ Shackles and ropes breaking.	9	4
☑ Vibration damage to adjacent structures.	6	2
☑ Striking by hammer when moving rig.	9	2
☑ Open hole causing trip hazard/fall.	6	2
☑ Entanglement with auger.	9	1

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat EN 397; Safety Footwear – Steel toe capped boots; Hand Protection – Suitable Gloves; High visibility Jacket or vest; Ear Protection – as relevant to the noise levels see COSHH Assessment; Eye Protection - Should comply with BS EN 166.
- ☑ Construction, inspection and maintenance of working platform to be controlled.
- ☑ Banksmen to control work area.
- ☑ 600 mm minimum clearances to be maintained.
- ☑ Adequate lighting in work area.
- ☑ Spoil not permitted to ride up auger.
- ☑ Only rig operatives permitted near the rig while it is working.
- ☑ A survey will be conducted of area to be piled to locate underground and overhead services, location of which will be marked, warning notices posted and necessary barriers erected.
- ☑ All hazards, which could affect stability of piling rig, will be identified, e.g. ground conditions, cellars etc. and necessary precautions taken.
- ☑ A method Statement will be prepared in writing, agreed and held on site.
- ☑ All operatives engaged in piling operations will be trained. Before commencement of work appropriate certificates of competence will be produced for inspection and retained on site.
- ☑ All lifting appliances and gear must have appropriate certificates of test and thorough examination, copies of which will be retained at site level. Inspections to be recorded in appropriate register.
- ☑ All operatives will wear head protection, safety footwear and use safety harness where necessary.
- ☑ Noise assessments should be carried out and if necessary ear protection provided for all affected persons.
- ☑ The work area should be defined and if necessary protected by barriers, signage, etc.
- ☑ Provide clear/unobstructed approach to area suitable for heavy plant.
- ☑ Check and inspection of all lifting equipment prior to use.
- ☑ Hammer to be secured to the mast when rig is tracking to new location.
- ☑ Protect all open holes with road pins and bunting or boards until concreted. Consider overnight situations.
- ☑ Spoil is only to be cleared as it falls out under the protection gate or with the gate open.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Falling cages.	9	4
☑ Injury to feet.	6	2
☑ Injury from fixing wire.	6	2
☑ Handling.	6	2
☑ Lifting.	6	2
☑ Tripping.	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Ensure compacted, level fixing area.
- ☑ Use correct fixing stands.
- ☑ Ensure that cages have enough ties and braces to allow safe slinging.
- ☑ Keep work area tidy and dispose of wire scraps into a container.
- ☑ Tails on ties to be bent over to reduce projection.
- ☑ Assistance/mechanical lifting aids.
- ☑ Protective caps to be fitted to rebars.
- ☑ Good housekeeping.

Job No: DFS221011 Rev. 00 Design Engineer: AA Date: 15 October 2022

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Doc Title: Method Statement & Risk Assessment for Proposed Piling & Basement Construction Works (Rev. 00) Page: 51 of 83

Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Failure of lifting equipment.	6	2
☑ Handling errors.	6	2
☑ Slips, trips and falls.	6	2
☑ Improper planning.	6	2
☑ Trapping.	6	2
☑ Falls.	9	4
☑ Crane overturn.	9	2
☑ Tail swing entrapment.	9	2
☑ Falls of equipment.	9	4
☑ Displaced/falling loads	9	4

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Detailed planning and preparation is essential.
- ☑ The most suitable lifting equipment must be selected.
- ☑ A safe system and method Statement must be implemented.
- ☑ Erection and dismantling must only be undertaken by trained and competent crew.
- ☑ Safety harnesses must be worn and clipped on for all work off the ground.
- ☑ All lifting equipment must be fully certified, regularly checked by a competent person.
- ☑ All lifting equipment must be capable of safely lifting the load.
- ☑ All operatives must be fully trained and aware of the operations around them.
- ☑ Qualified slinger/signaller to take overall control of the lift.
- ☑ Slinger/signaller to wear hi-visibility vest or jacket.
- ☑ All outriggers to be fully deployed in accordance with manufacturers recommendations.
- ☑ Pressure pads to be used under jack legs.
- ☑ 600 mm clearances to be maintained.
- ☑ Adequate lighting to be available in work area.
- ☑ Large or unwieldy loads to be controlled by tag line.
- ☑ All lifting equipment and accessories to comply with the Lifting Operations, Lifting Equipment Regulations 1998 (LOLER).
- ☑ Lifting operations must be carried out on a firm and level surface.

Additional controls considered necessary and further information:

- ☑ Refer to LOLER Regulations.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Truck movements.	6	2
☑ Falls.	6	2
☑ Entrapment.	6	2
☑ Falls of equipment.	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Manoeuvre all vehicles using a trained banksman.
- ☑ Use mobile scaffold towers fitted with handrails, toeboards, outriggers and safety harness.
- ☑ All site crew to be trained and competent.
- ☑ Maintain minimum 600mm clearance from adjacent plant, machinery and fixed objects.
- ☑ The work to be controlled by one person (i.e. Foreman/Ganger).
- ☑ All lifting equipment and accessories to comply with the Lifting Operations, Lifting Equipment Regulations 1998 (LOLER).
- ☑ Large or unwieldy loads to be controlled by a securely fastened tag line.
- ☑ Follow rigging procedures detailed in relevant rig manual.
- ☑ Observe site speed restrictions.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Risk of fractures, sprains and strains, mainly of the back/upper part of the body.	6	2
☑ Damage to the back from the initial lift.	6	4
☑ Damage to the back when manoeuvring, lowering.	6	4
☑ Cuts from bars and tying wire.	6	2
☑ Stability of load causing slips, trips and falls.	6	4
☑ Carrying of load to destination.	6	2
Persons at risk:	☑ Site personnel ☐ General public ☐ Client personnel ☐ Other	

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Use mechanical means wherever possible.
- ☑ Ask for assistance if the load is too heavy.
- ☑ Break the load down into manageable pieces.
- ☑ Adopt good handling techniques, use the legs rather than the back.
- ☑ Plan the lift, is help required.
- ☑ Ensure that the entire area is free from obstructions.
- ☑ Stand with the feet apart to give a balanced and stable base for lifting.
- ☑ Adopt a good posture, get a good grip on the load and keep the load close to the body.
- ☑ Work to be carried out on a firm and level surface.
- ☑ Refer to Manual Handling chart.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Dust inhalation.	6	2
☑ Pressure build up in pipelines.	6	2
☑ Eye damage from splashes.	6	2
☑ Cement burns.	6	2
☑ Wheelbarrows.	6	2

Persons at risk:	☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Wear face masks.
- ☑ Ensure all pipes joints have whipchecks.
- ☑ Ensure that route is clear of debris and unobstructed.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Head injuries.	6	2
☑ Eye injuries.	6	2
☑ Hearing loss.	6	2
☑ Foot injuries.	6	2
☑ Hand injuries.	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ PPE should be examined by properly trained people prior to use.
- ☑ All PPE should be carefully stored after use.
- ☑ Safety helmets should be worn on site at all times, they must be replaced if cracked or damaged.
- ☑ Helmets should comply with BS EN 397.
- ☑ Eye protection must be worn when using power tools, concreting etc to protect from splashes, dust and sparks.
- ☑ Eye protection should comply with BS EN 166. Goggles to BS EN 166 B (For Abrasive Wheels Work).
- ☑ Hearing protection to BS EN 352 must be worn when required.
- ☑ Protective footwear to BS EN 345 or BS EN ISO 20345 must be worn on site.
- ☑ Suitable gloves for the task should be worn to protect the hands from injury which conform to BS EN 388.
- ☑ Barrier creams must be available and used.
- ☑ Overalls should be worn to protect against dirt, dust, grease and oils.
- ☑ Specialist overalls to protect against contamination (i.e. disposable) with appropriate changing facilities.

NB: All PPE must be selected so that it is compatible with all other items in use

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Noise.	6	2
☑ Vibration.	6	2
☑ Compressors, hoses and connections.	6	2
☑ Electric shock.	9	4
☑ Hair or clothing becoming entangled in moving parts.	6	2
☑ Eye injuries from dust, swarf or other fragments.	6	2
☑ Wrist and hand injuries due to tool jamming or binding.	6	2
☑ Hand/arm vibration syndrome (HAVS).	6	2
☑ Air/hydraulic lines becoming detached or bursting due to damage.	6	2
☑ Trip hazards.	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Suitable RPE to be worn where there is a foreseeable dust hazard.
- ☑ All power feeds, electrical, pneumatic or hydraulic, to comply with European or British Standards and maintained in good condition.
- ☑ Where practicable only 110v electrical tools will be used.
- ☑ Loose clothing and long hair to be kept clear of moving parts of power tools.
- ☑ Operatives shall be trained in the correct use of portable tools.
- ☑ Silencers/sound reducing shrouds to be used.
- ☑ Regular rest/change over periods.
- ☑ Inspect plant and hoses before use.
- ☑ Regular maintenance and inspection of plant by a competent person.
- ☑ Pressure relief valves must be fitted where required.
- ☑ Compressor hose clamps must be secure and joints fitted with whipchecks.
- ☑ Correct, undamaged blades to be used.
- ☑ Blades to be changed by trained operative.
- ☑ Guards must be in place and operable.
- ☑ Vibration see RA15.
- ☑ Keep extension cables tidy.
- ☑ Trainees must be closely supervised.

Additional controls considered necessary and further information:

- ☑ See risk assessment number RA 15 for further controls to prevent hand/arm vibration syndrome.
- ☑ Refer to The Provision and Use of Work Equipment Regulations 1998.
- ☑ Refer to the Operator Manual.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Trapping of personnel.	6	2
☑ Collision with other plant or structures.	6	2
☑ Falls of equipment	6	2
☑ Collision with other vehicular traffic plant or pedestrians.	9	4
☑ Arcing or contact with power cables or other overhead obstruction.	9	4
☑ Overturning.	9	2
☑ Falls of materials from machine.	6	4

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Operators will be competent, trained, certificated and authorised to operate the plant and be responsible for daily checks and maintenance, reporting of defects and completion of registers.
- ☑ Plant must have evidence of a thorough examination, by a competent person, within the previous 12 months. This evidence is to be retained on site.
- ☑ All lifting operations to be planned by a competent person and controlled by a qualified slinger/signaller.
- ☑ Loads being transported must be stable and securely held.
- ☑ Large and unwieldy loads to be controlled by tag line.
- ☑ Outriggers, when required, to be fully deployed in accordance with manufacturers recommendations.
- ☑ All lifting equipment and accessories to comply with the Lifting Operations, Lifting Equipment
- ☑ Regulations 1998 (LOLER).
- ☑ Consideration will be given to terrain, loading requirements etc., in selecting suitable plant for use.
- ☑ All overhead obstructions including cables will be identified and if necessary fenced off, shrouded and protected in accordance with HSE Guidance Note GS 6.
- ☑ Operators will be in possession of information as to capabilities and restrictions placed on use of plant, particularly the safe working load, and must ensure limits are not exceeded.
- ☑ Access to all loading/off-loading points will be levelled, suitable and clear of obstruction.
- ☑ Provide safe route for movement of plant to avoid contact with other traffic, including pedestrians.
- ☑ Mirrors (including convex type) and/or other equipment (i.e. CCTV) must be in place to ensure maximum driver visibility.
- ☑ Dumpers to be equipped with hazard warning beacon.
- ☑ Provide a banksman to assist where visibility is restricted.
- ☑ Operators will be required to know the weight of materials to be raised before commencing a lift.
- ☑ Plant must be equipped with ROPS and driver seat restraint, which will be used.
- ☑ No passengers will be carried.

Additional controls considered necessary and further information:

- ☑ Refer to the Operator Manual.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Electrocution of operatives or other persons.	9	4
☑ Damage or misuse of supply.	9	2
☑ Arcing or contact with overhead cables by transport or equipment.	9	4
☑ Contact with underground electric cables.	9	4
☑ Trip hazards.	6	2
Persons at risk:	☑ Site personnel ☐ General public ☐ Client personnel ☐ Other	

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Electrical installations will only be made by qualified and competent persons who will issue certificates on completion of work, which will be retained on site.
- ☑ Qualified persons will test all portable electrical equipment at regular intervals i.e. annually in offices, six monthly in workshops and three monthly on sites. Certificates of test will be retained.
- ☑ Electrical equipment will be permitted to be used only if it complies with the above.
- ☑ Electrical equipment or supplies will not be used in such a manner so as to cause danger or injury.
- ☑ Electrical equipment will be suitable for the task and comply with the relevant standard.
- ☑ Electrical installations or equipment which may be exposed to mechanical damage, inclement weather or other harmful conditions will be constructed and protected, so as not to cause danger of injury to operatives or other persons (See HSE Guidance Notes).
- ☑ 110-volt electrical equipment will be used, so far as is practicable, on construction or civil engineering projects; unless requirement to use further reduced voltage equipment is specified.
- ☑ Where overhead power lines are likely to cause danger, the owners of the cable will be consulted and, if required, 'shrouds' fitted or suitable fencing and barriers erected, at least 6 m from power lines to prevent access, so as to comply with requirements HSE Guidance Note GS6.
- ☑ If required to work under or near overhead power lines a permit to work system should be implemented, if necessary.
- ☑ Routes of all underground electricity supplies will be traced, locations marked and notices posted.
- ☑ Excavators and power tools will not be used within 500 mm of underground cables, unless a safe system of work is established. Use of permits to work may be necessary in some cases.
- ☑ A competent person will supervise all work adjacent to overhead or underground electrical supplies.
- ☑ All portable generators will be used in accordance with the manufacturer's instructions.
- ☑ All site operatives should be aware of how to isolate the site supply in the event of an emergency.
- ☑ Cables to be routed overhead or around perimeter of working area.
- ☑ Fire extinguishers.
- ☑ If using existing supply ensure that it has been checked by a competent electrician and a certificate issued.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Clothing entanglement with auger.	9	4
☑ Falling into bored auger hole.	6	2
☑ Crushing by auger.	9	4
☑ Falling material from auger.	6	2
☑ Slip/trip on pile arising.	6	2
☑ Manual handling hazards.	6	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Ensure that correct lifting technique is applied when moving augers use lifting devices wherever possible.
- ☑ Clear auger of all spoil as it is brought from the ground, but only while auger is stationary.
- ☑ Rig to be set up on flat surface, free of obstructions.
- ☑ No loose clothing to be worn around auger.
- ☑ Sufficient operatives to be available to operate auger safely.
- ☑ All certification for rig to be valid, including chains, shackles and ropes.
- ☑ Pile holes to be covered or concreted while extracting auger to prevent falling.
- ☑ Spoil should not be allowed to build up around the working area or allowed to remain on the auger above waist height.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Collision with moving plant.	6	2
☑ Crushing.	9	4
☑ Impact with moving plant.	9	4
☑ Plant falling over.	6	2
☑ Noise.	6	2
Persons at risk:	☑ Site personnel ☐ General public ☐ Client personnel ☐ Other	

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ All plant to be certified and inspected as required.
- ☑ Operators to be trained and certified.
- ☑ Banksman to control moving plant.
- ☑ Other operatives to be made aware of working conditions.
- ☑ Only essential operatives to work with piling rig.
- ☑ Movement of the rig to be adequately supervised.
- ☑ Level piling mat to be provided.
- ☑ Speed restrictions to be in place and enforced.
- ☑ One designated operative to control/coordinate all plant movements.

Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Burst wheel/disc.	9	6
☑ Contact with wheel/disc.	6	6
☑ Entanglement with moving parts.	6	6
☑ Flying particles from fractured wheel/disc.	6	4
☑ Flying particles from cutting or grinding operations.	6	2
☑ Flying particles of dust.	4	2
☑ Noise.	4	2
☑ Vibration.	4	2

Persons at risk:	☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Respiratory protection must be worn when required.
- ☑ Adequate numbers of operatives should be trained and appointed to mount abrasive wheels and discs.
- ☑ Correct types of wheels/discs to be fitted for material being cut.
- ☑ Discs to be inspected for damage before being fitted.
- ☑ Loose clothing should not be worn.
- ☑ Restrictions on vibration exposure to be followed.
- ☑ Unauthorised persons to be kept away from cutting/grinding operations.
- ☑ Ventilation.
- ☑ All cutting discs are to be removed from cutting equipment while in vehicles.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Contact with underground power cables.	9	6
☑ Electrocution.	9	6
☑ Explosion.	9	6
☑ Rupturing of gas pipes leading to leaks, fire or explosion.	9	6
☑ Rupturing of water pipes causing flooding and damage.	6	4
☑ Cutting of underground telecommunications and interrupting services.	6	2
☑ Rupturing of drains, sewers, culverts etc., and causing health hazards.	6	2
☑ Collapse of manholes.	6	2
☑ Arcing, contact or damage to overhead services	9	4
Persons at risk:	☑ Site personnel ☑ General public ☑ Client personnel ☑ Other	
Controls Considered Necessary:		
☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.		
☑ Check with Management prior to any excavation, driving or boring.		
☑ Ensure that all services within the ground have been uncovered, disconnected or marked out clearly.		
☑ If a gas pipe is ruptured, persons in the area should be evacuated and steps taken to prevent ignition of gas.		
☑ Once a smell of gas/sewage stop work and seek advice.		
☑ If an electricity cable is struck everyone should be kept clear of the area until made safe. No person should touch any plant or equipment involved. If the operator is within the plant they must jump clear and NOT step down from the machine.		
☑ Any damage to buried services must be reported to the appropriate utility immediately.		
☑ Do not attempt to fix or touch damaged services.		
☑ Ensure that manhole covers are clearly visible and in good condition before and after operations.		
☑ Prior to commencement of excavation, all public and local utilities will be requested to provide information of services in the ground of the proposed work area, consult safety file if applicable.		
☑ Where services are believed to be present, steps will be taken to establish exact positions and routes (i.e. use cable locating equipment), which will be identified and marked with warning signs.		
☑ The depth at which the services are situated will be established by hand digging trial holes.		
☑ Excavators and power tools should not be used within 500mm of a known buried service.		
☑ Height restrictions to be in place, barriers/warnings to be erected around affected areas.		
☑ Establish communications with Utility Company before work commences.		
Additional controls considered necessary and further information:		
☑ Refer to HSG (SIA8 rev2)		

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Uncontrolled movement of the plant when under repair.	9	4
☑ Uncontrolled movement of hydraulics.	9	4
☑ Uncontrolled release of hot or pressurised liquids.	6	2
☑ Collapse of jacking equipment.	9	2
☑ Tyre explosion or fuel fire.	6	2
☑ Hair or clothing caught in moving parts.	6	2
Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other		
Controls Considered Necessary:		
☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.		
☑ Plant and equipment must be maintained in accordance with guidance contained in manufacturers / suppliers manuals or instruction leaflets.		
☑ Competent persons only will carry out maintenance work.		
☑ Mobile plant and equipment to be worked on will have the wheels chocked and hydraulically operated lifting arms at rest, before work commences on the braking system, hydraulics or wheels.		
☑ Where hydraulically operated equipment has to be elevated for work to be carried out it must be supported by rigid means, i.e. props or ram locks.		
☑ Where work involves engine-cooling systems, hydraulic systems and compressed air, arrangements must be made to depressurise them under controlled conditions.		
☑ When jacking is used to raise the equipment in order to facilitate access under the machine, the jacking must take place on firm level ground and packing placed under strong points, to prevent the collapse of the machine in the event of a jack failure.		
☑ Raised bodies will be propped.		
☑ No hot work to take place on wheels or fuel tanks unless the tyres are removed from the wheels and the fuel tanks drained, purged and filled with water.		
☑ Where work is to be carried out near moving parts, long hair and clothing must be kept clear.		
☑ All guards to power shafts, fans, fan belts and other moving parts to be replaced when work is complete.		
☑ COSHH assessments will be required in respect of any hazardous liquid/substance.		
☑ Assessments will be made as to the level of personal protective equipment to be used.		
☑ Plant should be examined by a competent person prior to use.		
☑ Results of weekly inspections will be entered in an approved register.		
☑ Spill kits must be available to mop up all spills.		
Additional controls considered necessary and further information:		
☑ Refer to the Operator Manual.		

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Trailing cables.	6	2
☑ Polythene/pallets.	6	2
☑ Obstructions on escape routes.	9	2
☑ Poor/lack of illumination.	6	2
☑ Accumulated rubbish causing fire risk.	9	4

Persons at risk: ☑ Site personnel ☑ General public ☑ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Avoid trip hazards, cables, boxes in alleyways, etc.
- ☑ Store materials in one area away from pedestrian routes.
- ☑ Keep empty pallets together, away from offices etc, ready for collection.
- ☑ Clean up spillages immediately.
- ☑ Take care when the weather is inclement, use grit or salt when appropriate.
- ☑ All combustible materials to be placed in a skip.
- ☑ 'Domestic' rubbish (such as food) to be placed in a lidded skip on site or removed from site and disposed of appropriately.
- ☑ Ensure adequate lighting for the task as well as compound areas when required.
- ☑ Highlight changes in level.
- ☑ Carry out regular inspections of the workplace.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Manual Handling	4	2
☑ Concrete burns – from exposure to alkali	4	2
☑ Collision with moving plant	9	2
☑ Cuts from steel and tie wire	3	1
☑ Operative struck by the jib or bucket of the excavator during insertion operation	9	2
☑ Falls into the bored pile or concrete	3	1
☑ Steel cage falls from excavator causing injury	6	2
☑ Hand Arm Vibration injuries	1	1
☑ Noise	2	1
☑ Other site workers or visitors come into the work area unaware of the risks.	2	1
☑ Bucket or debris falling from excavator	6	2
☑ Cage springing or collapsing under load or tension	4	1
☑ Entrapment or shearing force under load or compression from excavator	4	1

Persons at risk:	☑ Site personnel	☐ General public	☑ Client personnel	☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Operatives to wear gloves with high cut resistance.
- ☑ Steel cages to be lifted and carried across the site using an excavator machine, drop chain, and shackle fitted to the lifting eye.
- ☑ Operatives directing the excavator and working with the steel cages must be fully clothed (no shorts), wear gloves and be informed of the hazards of concrete burns.
- ☑ Plant drivers to be competent and hold CPCS qualification.
- ☑ Operatives must stand well clear of the steel cage when the excavator is used to drive the cage into the bored concrete pile.
- ☑ Lifting equipment to have current thorough examination certificate and be inspected before each days use. (recorded weekly).
- ☑ Signage – Danger deep holes; Danger Deep excavation; Danger Hole below to be displayed.
- ☑ When using a running cage vibrator operatives not to handle the cage.
- ☑ Operatives wear hearing protection at 85dB (mandatory). Issued to all operatives at and above 80dB.
- ☑ Bucket should always be removed when installing cages until the cages requires a final push from a low level.
- ☑ Operatives should always stay at a safe distance when either pulling or pushing cages in, Min 3m clear distance.
- ☑ No Operative should use feet on the helical to assist cage installation in case of sudden slumping.
- ☑ No other persons within the working area (within 3m).

Additional controls considered necessary and further information:

- ☑ Where applicable COSHH sheets to be reviewed with operatives (concrete).
- ☑ Operatives briefed regarding the NFS Revised Method Statement for Steel Cage Insertion to Concrete Piles. (21-01-2015).
- ☑ Operatives to be briefed regarding control measures.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Air entrapment in the delivery line.	9	4
☑ Blockages.	6	2
☑ Bursting of pipelines under pressure.	6	2
☑ Cleaning and dismantling the pipeline.	6	2
☑ Contact with moving parts.	6	2
Persons at risk:	☑ Site personnel ☑ General public ☑ Client personnel ☑ Other	

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ All pipe joints must be fitted with safety pins at all times.
- ☑ Ball catcher to be in place and secured before cleaning operation commences.
- ☑ Pipes must not be disconnected unless the ball has been recovered.
- ☑ Ensure that the delivery hose has no kinks.
- ☑ Only the pump operator is to release pipe clips.
- ☑ Regular inspection of the hoses for condition to ensure that they are replaced when showing signs of wear or damage.
- ☑ Ensure that flexible hoses are in manageable sections before trying to move them or use mechanical means.
- ☑ Steel pipe sections that are full of concrete will require at least two operatives to lift them.
- ☑ Only those operatives directly involved with the operation are to be allowed within 6m of the pump or pipelines.
- ☑ Please refer to detailed NFS Working Procedure document "Cleaning Concrete Pumps".

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Violent ejection of concrete from hose at moment of delivery.	9	4
☑ Delivery pipe joint failure.	9	4
☑ Contact with wet concrete causing burns, allergy and dermatitis.	6	4
☑ Air in pipeline causing hose to whip.	9	4
Persons at risk:	☑ Site personnel ☑ General public ☑ Client personnel ☑ Other	

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Eye protection to be worn at all times.
- ☑ Give warning prior to recommencing the pour.
- ☑ Check hoses for damage before commencing pour each day.
- ☑ Check concrete mix against specification.
- ☑ Be aware for potential for blowback in the line.
- ☑ Ensure connecting pipes adequately secured.
- ☑ Ensure that hopper remains full when discharging concrete.
- ☑ Only essential personnel to be within 20m of the pump or hose when dealing with a blockage.
- ☑ Ensure accurate reading from pressure gauge.
- ☑ Establish location of the blockage before attempting to clear it.
- ☑ Keep hands well clear of hopper while engine running.
- ☑ Turn off power before disconnecting hoses.
- ☑ Ensure that the pipes operating pressure is appropriate for the diameter of the pipe.
- ☑ Do not use and set aside any suspected damaged pipes for inspection by a competent person.
- ☑ Ensure joints are in good condition before use and fitted with safety pins and whip checks.
- ☑ Provide support to pipes where required.
- ☑ Ensure water supply to flush eyes.
- ☑ Release pressure in line before attempting to separate hoses, revers the pump to reduce the pressure.
- ☑ Never use compressed air to clear a blockage.
- ☑ Secure the open end of the hose and stand clear (behind significant structure or at least 20m away) while attempting to clear blockages.
- ☑ Please refer to detailed NFS Working Procedure document "Cleaning Concrete Pumps".

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Placing auger bung.	9	4
☑ Entrapment in moving auger.	9	1
☑ Falling material.	9	2
☑ Freshly concreted, open bores.	9	2
☑ Tripping/Impalement on reinforcement.	9	2

Persons at risk: ☑ Site personnel ☐ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Ensure rig is idle, brakes are on and no auger movement.
- ☑ Banksman to control work area.
- ☑ Piling Rig to have safety gate fitted and working at all times, unless given written authority from S Tapsell or N Miller.
- ☑ Clean auger mechanically wherever possible.
- ☑ Carry out visual check on auger to ensure that it is clear of debris, particularly when within 5m of the site boundary.
- ☑ Cover new, open bores as soon as practicable.
- ☑ Fit rebar caps as soon as cages in position.

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Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Cement burns.	6	2
☑ Eye damage from splashes.	9	2
☑ Trapping by concrete lorries.	9	4
☑ Penetrating wounds from reinforcement.	6	2
☑ Cutting of Pecafil Formwork.	6	2
☑ Placing steel hazards see RA05	9	4
☑ Breaking down pile see RA30	6	2
Persons at risk:	☑ Site personnel ☐ General public ☐ Client personnel ☐ Other	

Controls Considered Necessary:

- ☑ Correct use of PPE (as applicable): Head Protection - Hard Hat BS EN 397; Safety Footwear – Steel toe capped boots BS EN ISO 20345 or BS EN 345; Hand Protection – Suitable Gloves BS EN 388; High visibility Jacket or vest BS EN 20471; Ear Protection BS EN 352 – as relevant to the noise levels see COSHH Assessment; Eye Protection – Should comply with BS EN 166.
- ☑ Care when handling/placing formwork to avoid piercing injuries from sharp reinforcement wire, gloves to be worn when handling/placing.
- ☑ All reversing lorries to be controlled by a banksman.

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Job Name: BROXWOOD VIEW, 29 ST. EDMUND'S TERRACE LONDON NW8 7QH

Doc Title: Method Statement & Risk Assessment for Proposed Piling & Basement Construction Works (Rev. 00)

Hazards identified	Risk of Injury	
	Without Controls	With Controls
Tick boxes as appropriate		
☑ Driving on motorways A, B and unclassified roads.	9	2
☑ Driving off road.	9	2
☑ Manoeuvring and reversing.	6	2
☑ Driving in reduced visibility and at night.	9	4
☑ Loading of vehicles and carriage of passengers.	6	2
☑ Towing.	6	2

Persons at risk: ☑ Site personnel ☑ General public ☐ Client personnel ☐ Other

Controls Considered Necessary:

- ☑ All drivers will hold a full driving licence for the vehicle to be driven and will be at least 21 years of age.
- ☑ Adequate rest periods will be provided where passengers are carried at the commencement and end of the working day.
- ☑ Training will be provided where a need is identified.
- ☑ A system of recording accidents will be established to identify where training is required.
- ☑ Driving licences will be checked annually.
- ☑ All employees will be required to report any driving convictions or points on their licence.
- ☑ All employees who use their own vehicles on company business will be required to provide insurance to cover that use.
- ☑ Vehicles and trailers will be examined daily and weekly to ensure compliance with road traffic legislation and maintenance schedules.
- ☑ All vehicle defects will be reported immediately.
- ☑ No vehicle or trailer will be used in an unroadworthy condition.
- ☑ Obey speed controls on site.
- ☑ Smoking is NOT permitted in any Company vehicle.
- ☑ Mobile phones are not to be used while driving.

16.0 METHOD STATEMENT BRIEFING

The Principal Contractor's (G & S Construction Engineering Limited) appointed Project Manager shall be responsible for the organisation and delivery of briefing sessions to site operatives in relation to the procedures, responsibilities, risks, hazards and controls detailed in this method statement. In the absence of the Project Manager, the method statement briefing shall be delivered by the Principal Contractor's (G & S Construction Engineering Limited) appointed Health & Safety Officers.

All piling operatives, groundworkers, plant operators, banksmen, health & safety officers, quality control/quality assurance officers, labourers and security operatives shall be in attendance at the briefing. Considering the importance of workforce consultation to effective health and safety management on site, it is imperative that the Project Manager ensures that every attendee at the briefing is fully engaged. Attendees shall be encouraged to ask questions, make suggestions, report any potentially unsafe situations that could be associated with the proposed works and communicate their concerns and ideas regarding health and safety to the briefing Project Manager.

In addition, any reasonable request made by any attendee in relation to health and safety aspects of the proposed works shall be duly taken into account by the briefing Project Manager. The briefing Project Manager shall clearly inform all attendees that they are permitted to approach their superiors (including the Project Manager and other members of the site management team) to identify or flag-up any issues that could compromise the health and safety of any individual during site operations. Every new operative on the site shall be taken through same method statement briefing procedure, before he/she commences work on the site.

The Project Manager shall confirm that every attendee fully understands the method statement briefed, by asking them questions related to the instructions delivered during the briefing, whilst ensuring that each attendee responds to each question with a reasonably correct answer. Attendees shall also be asked to give illustration/demonstration of how they intend to carry out the proposed works safely, whilst making reference to this method statement.

At the end of each briefing, every attendee shall fill-out and sign a method statement briefing record sheet, which would confirm that the attendee has received a full briefing concerning the procedures, responsibilities, risks, hazards and controls contained in this method statement, whilst also confirming their agreement to comply fully with the safe procedures detailed. With the briefing record sheet, the attendee shall also confirm that he/she has been provided with all necessary personal protective equipment (PPE) required for the safe execution of the proposed works. The Project Manager and Health & Safety Officers shall continuously keep records of all method statement briefings throughout the duration of the project.

17.0 EMERGENCY ARRANGEMENTS

Address and contact details for the nearest A & E are:

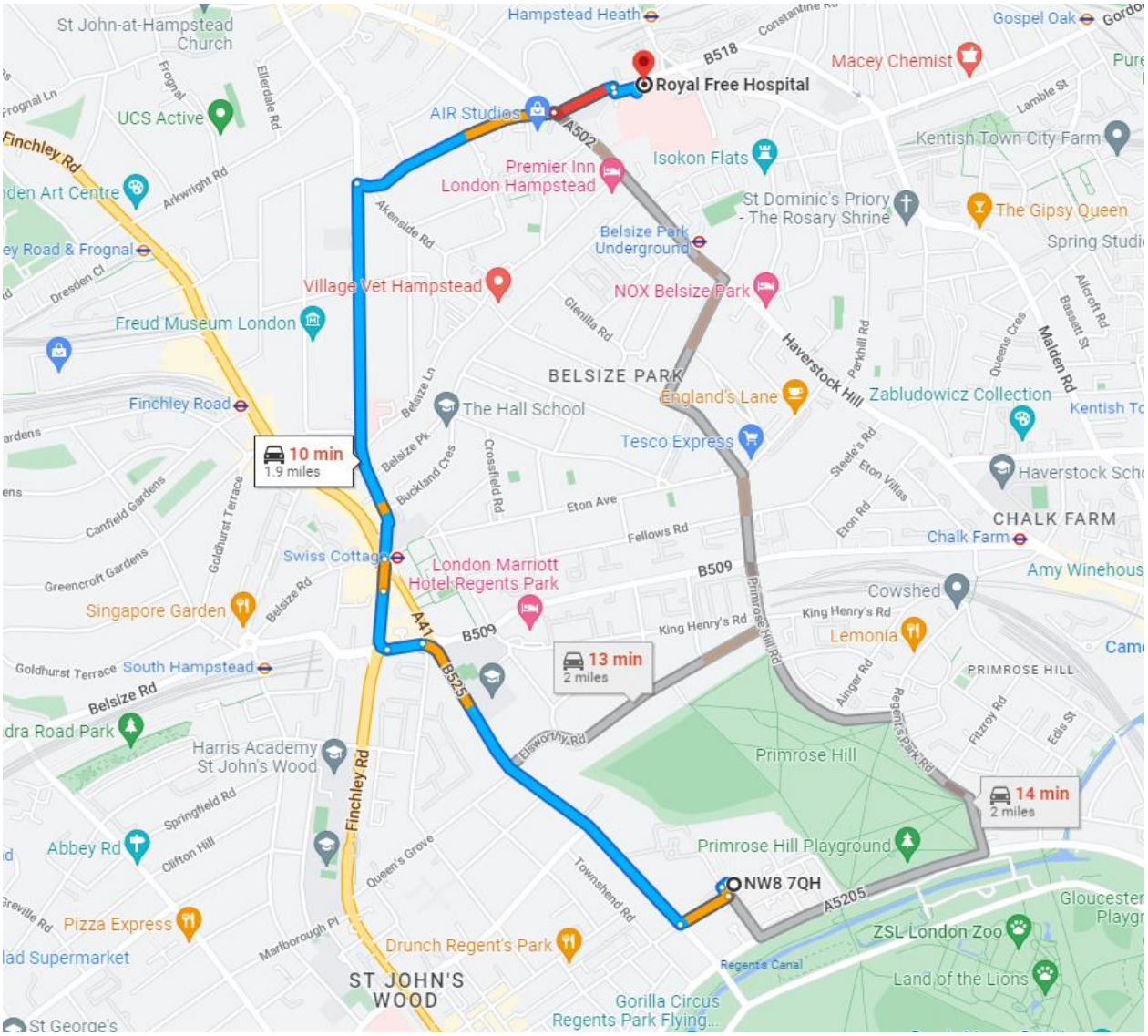
Royal Free Hospital

Pond Street

London

NW3 2QG

Tel: 020 7794 0500



A minimum of 2 No. trained first-aiders shall be present on site at all times during working hours.

First aid boxes shall be regularly stocked and positioned in all site offices.

First aid boxes shall be located in clearly identified and easily accessible areas of each site office.

Important emergency contact telephone numbers are provided overleaf.

Emergency Contacts	
Police	999
Fire	
Ambulance	
A&E Hospital	020 7794 0500
Environmental Agency	0800 80 70 60
Water	To be Confirmed Prior to the Commencement of Site Operations
Electricity	To be Confirmed Prior to the Commencement of Site Operations
Gas	To be Confirmed Prior to the Commencement of Site Operations
British Transport Police	109