5.2.2 Substructure

The existing vaulted arch structure in the basement of the Hope & Anchor currently supports the façade on the Bayham Street elevation and is consequently proposed to be retained in the proposed structure. The new steel frame will be supported on new piled foundations. The existing basement slab will be removed and replaced at the same level to avoid underpinning the existing masonry retaining walls.

5.2.3 Stability

The new concrete floor slabs will act as rigid diaphragms and will be connected to the new reinforced concrete core walls of the Bayham Place Members Club (refer to Section 4.3).

5.3 Bayham Place Members Club

5.3.1 Basement

Following demolition of the existing buildings at 1 Bayham Street and 65 Bayham Place, a new basement box is to be constructed to house a new lift and stair core. The new core joins the existing KOKO sub-basement level to the proposed new building. The new basement is proposed to be constructed from a 450 mm diameter secant pile wall with a 300 mm (nominal) thick water resistant concrete liner wall to the inner face. A reinforced concrete capping beam will be cast at ground level to connect the piles and provide vertical support to the new structure above.

A section of existing loadbearing masonry wall at the north side of the Hope & Anchor Pub is required to be underpinned in order to complete the basement box. Due to the depth of underpinning required, the pins will need to be constructed from reinforced concrete.

As the basement is required to be a Grade 3 space in accordance with BS 8102:2009 i.e. no water penetration acceptable, it is recommended that a cavity drain system is implemented in addition to the structurally integral waterproofing.

5.3.2 Superstructure

Similarly to the Hope & Anchor, the superstructure of the members club is proposed to be concrete metal deck slabs supported by a steel frame structure. The steel frames comprise non-composite universal column section beams with the concrete slab within the steel depth to minimise structural depth. Single spans are proposed to provide flexible open plan areas.

5.3.3 Substructure

The new perimeter steel columns are proposed to be supported on cantilever pile caps on 450 mm diameter piled foundations.

5.3.4 Stability

A new reinforced concrete lift and stair core will provide stability to the members club as well as the Hope & Anchor pub. The core is proposed to be supported on piled foundations.

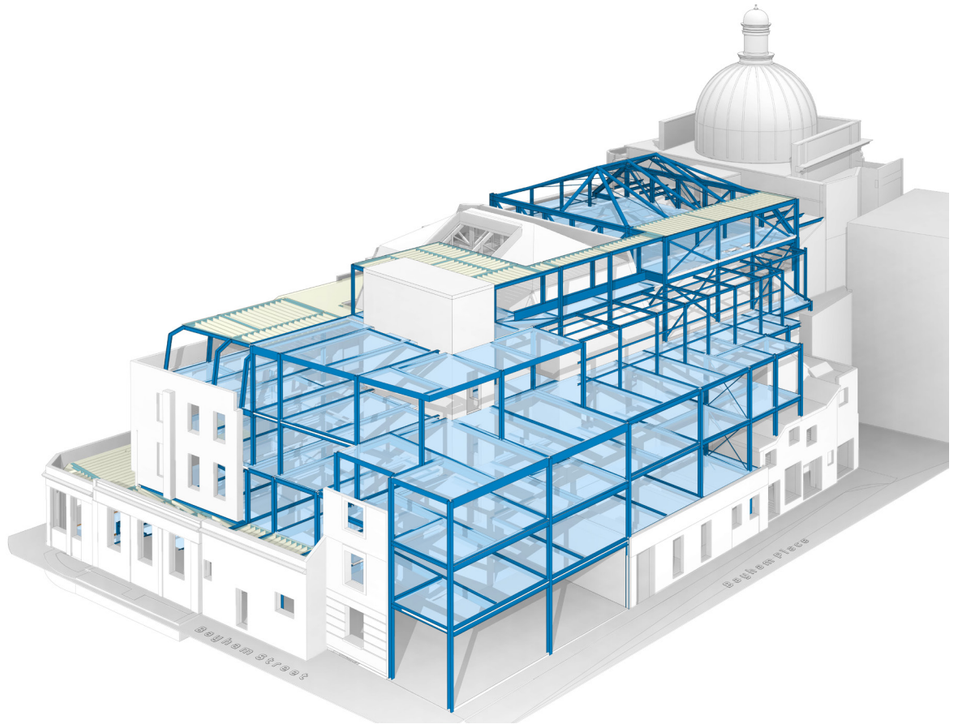
5.4 Dome

The existing timber dome is to be retained and refurbished to provide another entertainment space linked with the new 'Sky Lobby'. A new doorway is to be provided through the existing timber framed roof to join with the link structure. The existing concrete filler joist floor slab is to be modified to include an opening for a new staircase from below.

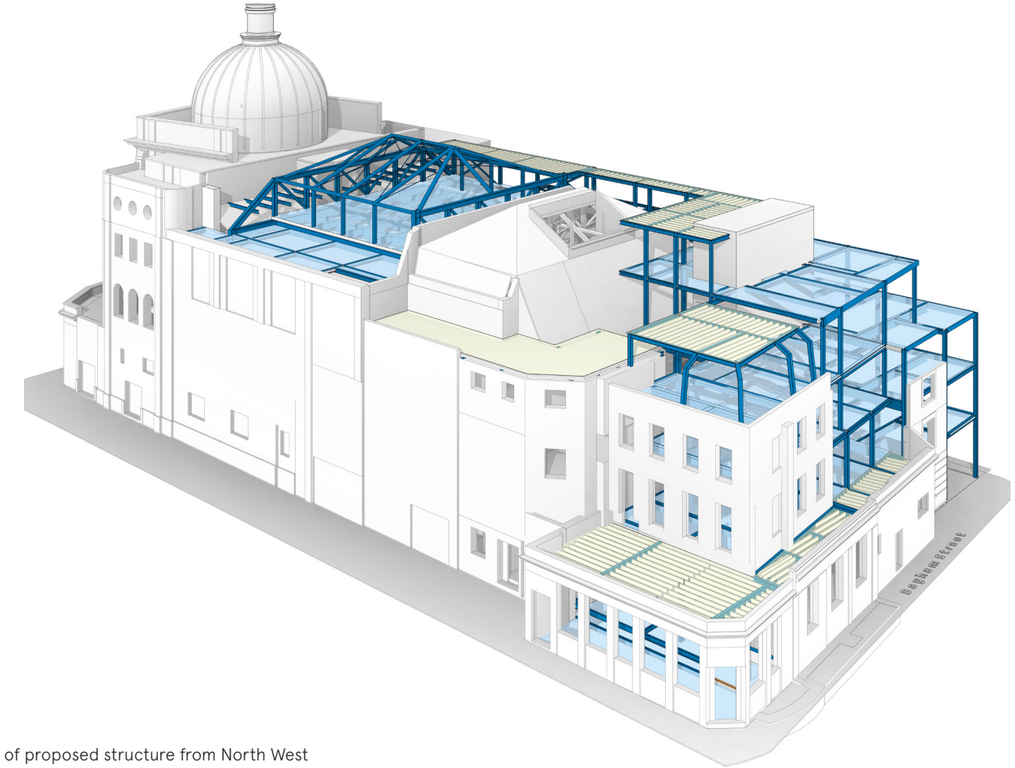
Initial investigations have shown that strengthening may be required to the secondary plate girder beams. Further investigations including the primary truss spanning between the north and south auditorium walls and the floor structure is being investigated at the next stage.

5.5 Terraces

The new roof terraces are proposed to be constructed from a combination of concrete metal deck floor slabs or timber framing, both supported by steel beams. The steel beams typically bear onto padstones embedded into the existing loadbearing masonry walls below.



View of proposed structure from North West



View of proposed structure from North West

HEYNE TILLETT STEEL

5.6 Structural Interventions to Historic Building Fabric

5.6.1 Column chasing

It is proposed to partially chase the western 'Sky Lobby' columns into the existing masonry walls over their full height.

The existing masonry walls vary in thickness, however it is proposed to chase out approximately 200mm of brickwork to enable the new columns to be tied into the existing structure using resin anchor fixings.
The width of the chased brickwork should allow for the steel column width plus the additional splice plates which will be required to join the vertical lengths of column.

The column chasing will begin bottom up as the column sections are installed sequentially.

An allowance should be made to reinstate any bricks which are broken or become loose during the column chasing. All reinstated brickwork is to be fully stitched and bonded to the existing.

5.6.2 Fly Tower Galleries

The existing timber galleries in the fly tower are planned to be used as viewing platforms/bar spaces in the proposed development. The crossover gallery at the rear of the stage is currently sloping at a gradient of 1 in 120. As such, the existing floor structure would need to be removed and re-levelled. The existing joists are planned to be reused, and to withstand the required loading demands for the proposed use will be bolstered by new joists between each of the existing. Preliminary analysis of the existing crossover gallery truss shows that this is likely to have sufficient capacity in the proposed condition. Detailed analysis will be carried out at the next stage.

The existing gallery floor joists on the south side are proposed to be removed, re-levelled and reused. The existing joists on the north side do not have sufficient capacity to withstand the proposed loading so will be replaced with new timber joists. Due to the existing ceiling and insulation, the existing trusses spanning in the east-west direction have not been able to be investigated. The trusses will require structural justification once the finishes are removed.

During the site investigation works several floor boards were observed to be damaged and/or suffering from decay. Across all galleries it is expected that the proposed works may expose frther damage or decay of the existing timber. Consequently, some joists and floorboards may require repairs and/or replacement.

5.6.3 Padstones and Resin Anchor Fixings

New padstones will be required within KOKO's existing loadbearing walls to provide support to new structure. The existing brickwork will be locally removed to enable mass concrete pockets to be cast within the walls. The new steelwork will bear onto the padstones and the masonry will be reinstated, ensuring that the surrounding brickwork is fully stitched and bonded.

Resin anchor fixings will be used to fix steelwork and timber to the existing structure where required. This requires holes to be drilled into the existing masonry. Steel bolts are then inserted into the holes and fixed with an epoxy resin.

5.6.4 Openings and Infills

New openings within the existing masonry walls will be supported using lintels or steel beams. The exposed brick reveals will be repaired with fully stitched and bonded masonry to match the existing fabric.

Infills to existing openings will be reinstated with fully stitched and bonded masonry to match the existing fabric.

5.7 Disproportionate Collapse

According to the Building Regulations Approved Document A, the building is Class 2B. Horizontal and vertical ties will therefore be detailed for all new structure.

The new columns supporting the Fly Tower structure and 'Sky Lobby' are to be designed as key elements.

5.8 Below Ground Drainage Strategy

The proposed / post development surface water drainage has aimed to meet the requirement of The London Plan Paragraph 5.13 that states that the preferred surface water run-off is to greenfield levels where practical. The local authority policies were also taken into account through the Camden Planning Guidance 3 (CPG3).

All Sustainable Drainage Systems (SuDS) methods have been assessed to establish whether they are feasible for the development in order to reduce the surface water run-off to the preferred rate.

Due to the size and nature of the site, and as well as the ground conditions, the use of wetlands, ponds, detention basins or infiltration structures are not feasible SuDS options for the development site. Therefore, the only alternative would be to formally restrict the surface water run-off via a form of attenuation with controlled discharge into an existing sewer network.

In the proposed scheme, the majority of the existing drainage will be retained with little, if any, alteration to existing roofs and catchment areas. The parts of the redevelopment described in this document, will sit within a new roof catchment area of approximately 312 m2. It is proposed that only this roof catchment area will be attenuated due to the constraints of the existing building that will be retained.

The peak surface water discharge rate for the proposed total catchment area (312 m2) will be restricted to 4.5 l/s. Attenuation will be provided in the form of a blue-roof containing a minimum capacity of 9 m3 (spanning through the roof areas) to manage up to a 1 in 100 year + Climate Change peak events. This attenuation will provide the 50% betterment for the part of the site being developed as per Camden Planning Guidance 3 (CPG3).

The Surface water drainage pro-forma for new developments required from Camden Planning Guidance 3 (CPG3) is attached in Appendix H3 with all the relevant information and rates. The outlined drainage strategy has been discussed and accepted with the LLFA officer at LB Camden and can be found in Appendix H4.

A pre-development enquiry has yet to be submitted to Thames Water. It is assumed that due to the decrease in surface water flows this will offset the proposed increase in foul water flows.

The foul water flows from the proposed development site is likely to slightly increase due to the introduction of new storeys. The foul water generated from the site is proposed to be conveyed into the below ground drainage network and discharged into the public sewer by gravity where possible. Flows generated at below ground level are proposed to benefit from a pumped device which will convey foul water via a rising main to the combined water outfall location for the site. A pump size and specification is to be confirmed however the design is to be carried out to incorporate any Building Regulation Part H requirements.

Existing Fly Tower Crossover Gallery Truss

6 Impacts of Subterranean Developments on Existing and Neighbouring Structures

6.1 Stage 1 - Screening

The LB of Camden guidance suggests that any development that includes a basement should be screened to determine whether or not a full Basement Impact Assessment (BIA) is required.

A screening assessment toolkit is included in the Arup document and for the basis of Section 3 of RSK's report. This forms the basis of the next 3 stages of any BIA and continues accordingly.

6.2 Stage 2 – Scoping

As defined in CPG4, the scoping stage is used to identify the potential impacts of the proposed scheme for each of the matters of concern identified in the previous screening stage.

6.2.1 Subterranean (Ground water) Scoping

No potential impacts were identified as part of the subterranean (groundwater) screening stage.

6.2.2 Surface Flow and Flooding Scoping

No potential impacts were identified as part of the surface flow and flooding screening stage.

6.2.3 Land stability Scoping

6.2.3.1

Is the London Clay the shallowest stratum at the site?

Potential Impact:

The London Clay is prone to seasonal shrink-swell (subsidence and heave).

The site is essentially fully occupied with buildings/hardcover with no vegetation/trees on site at present or proposed. The immediate surroundings are also covered by buildings/hard cover and also generally free from any significant vegetation/trees. Notwithstanding this, two small trees are located in the pavement of Crowndale Road adjacent to the existing KOKO building, but these are not to be removed as part of the development and foundations to the building are located below basement level and at such a depth as not to be influenced by any seasonal shrinkage/swell movement that could arise from the influence of these trees. Therefore seasonal shrink-swell effects are not considered to present a significant risk to the development.

6.2.3.2

Is the site within 5m of a highway or pedestrian right of way?

Potential Impact:

Excavation for a basement may result in damage to the road, pavement or any underground services buried in trenches beneath the road or pavement.

Bayham Place, Crowndale Road, Bayham Street and Camden High Street and are located to the immediate north, south, east and west of the site, respectively. There is the potential for ground movements associated with basement piled wall installation and basement excavation to impact the adjacent highways to Bayham Place and Bayham Street.

6.2.3.3

Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Potential Impact:

Excavation for a basement may result in structural damage to neighbouring properties/structures if there is a significant differential depth between adjacent foundations.

It is probable that nearby structures (Nos 2-4 Camden High Street, Nos 48-56 Bayham Place and No 3 Bayham Street) are founded on relatively shallow foundations. As noted above, KOKO shares a party wall with Nos 2-4 Camden High Street, whilst the remaining current buildings on site and that proposed, are detached from the remaining nearby structures and do not share any party walls. It should be noted that Nos 48-56 Bayham Place and No 3 Bayham Street are only approximately 6.5m from the site.

Where the site shares a party wall with Nos 2-4 Camden High Street, it is not proposed to lower the existing lower ground floor level; the proposed basement development is located on the eastern half of the site beneath Bayham Street property and The Hope & Anchor pub only.

Notwithstanding the above, potential damaging movements could occur due to basement construction. The identified hazards are associated with ground movements from perimeter retaining wall installation and ground excavation, and swelling of the London Clay in the basement excavation associated with stress release.

6.2.3.4

Is the site over (or within the exclusion zone of) any tunnels?

Potential Impact:

Increased loading on existing buildings may result in structural damage to neighbouring tunnels and tube stations if there is significant lateral ground movements associated with the increased loading.

Mornington Crescent LUL station is located approximately 10.0m west of the site at the junction of Camden High Street, Crowndale Road and Hampstead Road. The northern line tunnels enter the station from the north under Camden High Street and exits to the south beneath Crowndale Road, as shown in Appendix L. It is assumed that the tunnel exclusion zone is 15.0m wide and as such, could be affected by the proposed redevelopment of the site. However, the proposed basement construction is located at the opposing end of the site (east), such that it will be outside the limits of the tunnel exclusion zone. Additional loading to the KOKO club, which is closer to the LUL infrastructure is anticipated to be towards the middle and north of the site and supported on piles, such that any associated settlement from the additional load on the LUL infrastructure is likely to be minimal. An impact assessment is reported in Section 5.4 to confirm the above.

6.3 Stage 3 – Site investigation and Study

A full desk study, intrusive site investigation and monitoring programme was undertaken at the site by RSK in June/July 2016, as detailed in the report 'The Hope Project, Geo-environmental Site Assessment Report' (see Appendix E). The investigation was designed to be compliant with the data requirements as set out in Appendix E of 'Camden Geological, Hydrogeological and Hydrological Study' produced for Camden by ARUP in November 2010.

The results of the Geo-environmental Site Assessment Report have been utilised to inform the scoping stage of the BIA and the current assessment draws on the results of that report.

6.4 Stage 4 – Impact Assessment

The conclusions of RSK's BIA are as follows:

6.4.1 Building Damage Category Assessment

The results of the assessment demonstrate that all of the adjacent properties fall into 'Category 0' defined as 'Negligible Damage'. The results therefore fulfil the requirements of CPG4 in that they do not exceed the damage category of 'slight' (Category 2).

6.4.2 LUL Asset Assessment

The assessment predicts ground movements at the tunnel crown are less than +/-1mm and the impact of such small ground movements are considered to be negligible.

London Underground Infrastructure Protection have confirmed that the proposed works do not appear to be of concern to their assets due to the location, type and construction of the substructure works. LUL have recommended that an asset survey is undertaken prior to the commencement of works on site.

6.4.3 Highway/Pedestrian Right of Way Assessment

The assessment predicts a maximum of 9mm of horizontal movement to the immediate east of the site along Bayham Street and 3mm to the immediate north of the site along Bayham Place. The maximum predicted vertical movements were 1mm settlement along Bayham Place during basement construction. It is considered the impact of these relatively small ground movements on the adjacent highways is likely to be negligible.

6.4.4 Thames Water Utilities Assessment

The assessment concluded that the proposed development is unlikely to lead to any future damage to the Thames Water utilities surrounding the site providing that the construction works are carried out with due consideration to their presence.

7 Temporary Works & Construction Sequence

7.1 Site set up

It is noted that LB Camden require the contractor and subcontractors to be members of the Considerate Contractors Scheme. If approved, this will be a condition of all the tendering contractors and sub-contractors for the project.

There is access to the site from all elevations. Deliveries, removals and access for operatives will be explained within the Construction Management Traffic Plan.

- Erect scaffolding to all elevations as required.
- Erect site hoarding along the pavement boundaries to provide protection to the public.
- Set up site office, welfare and toilets.
- Install monitoring survey targets on retained structure / party walls / neighbouring properties to monitor any potential movement that may occur during the works, and begin monitoring to an agreed frequency and accuracy in line with a traffic light warning system.
- Terminate / protect existing services as required. Install temporary drainage as required for site facilities and drainage diversions.
- Check current groundwater levels via existing standpipes.
- Protect any trees and public amenities.

7.2 Erection of Temporary Works and Demolition of Existing Structure

- Install temporary foundations and temporary works structure
- to support the retained facades of the Hope & Anchor Pub on Crowndale Road and Bayham Street between ground floor façade and upper façades. Install temporary works structure to support the retained façade of 1 Bayham Street on pavement side of building. Install temporary works to existing KOKO walls at the boundary with The Hope & Anchor pub and Bayham Street properties as required. Temporary works to contractor design.
- Commence demolition of the existing superstructure as per the demolition drawings; sequentially demolished from top-down with care taken to avoid damage to retained structures.
- Existing foundations and sub-structures to be `grubbed-out' at location of new foundations and secant pile wall.
- Existing basement ground bearing slab in the Hope & Anchor to be demolished and constructed in a hit and miss sequence to retain passive soil resistance throughout the works.
- Removal of rubble and waste materials in accordance with the Site Waste Management Plan.

7.3 Piling

- Provide a piling mat and commence installation of the secant pile wall to form the new basement box and the new piles which will later support the foundations of the new members club.
- Locally remove existing floor finishes, provide a piling mat and commence installation of the new piles below the KOKO auditorium.

7.4 Underpinning of existing Hope & Anchor wall

- Commence installation of reinforced concrete underpinning to The Hope & Anchor pub wall.
- Allow for localised dewatering of perched water during foundation works.
- All excavations for underpins are to be constructed in an agreed sequence and to be a maximum of 1m wide.
- The underpinning will be completed using propped/ shored proprietary side shutters to protect operatives and retain stability of the excavation. All excavations to form underpins are to be constructed in an agreed sequence such that no two adjacent pins are cast within 48 hours of one another. Typically, underpins are cast in a 1-3-5-2-4-1 sequence.
- Dry-pack to be installed tight between the top of pins and underside of existing foundations at least 24 hours after casting.
- Upon completion of each underpin, the local excavation shall be backfilled to top of existing basement slab level prior to continuing.

7.5 Excavation of Basement

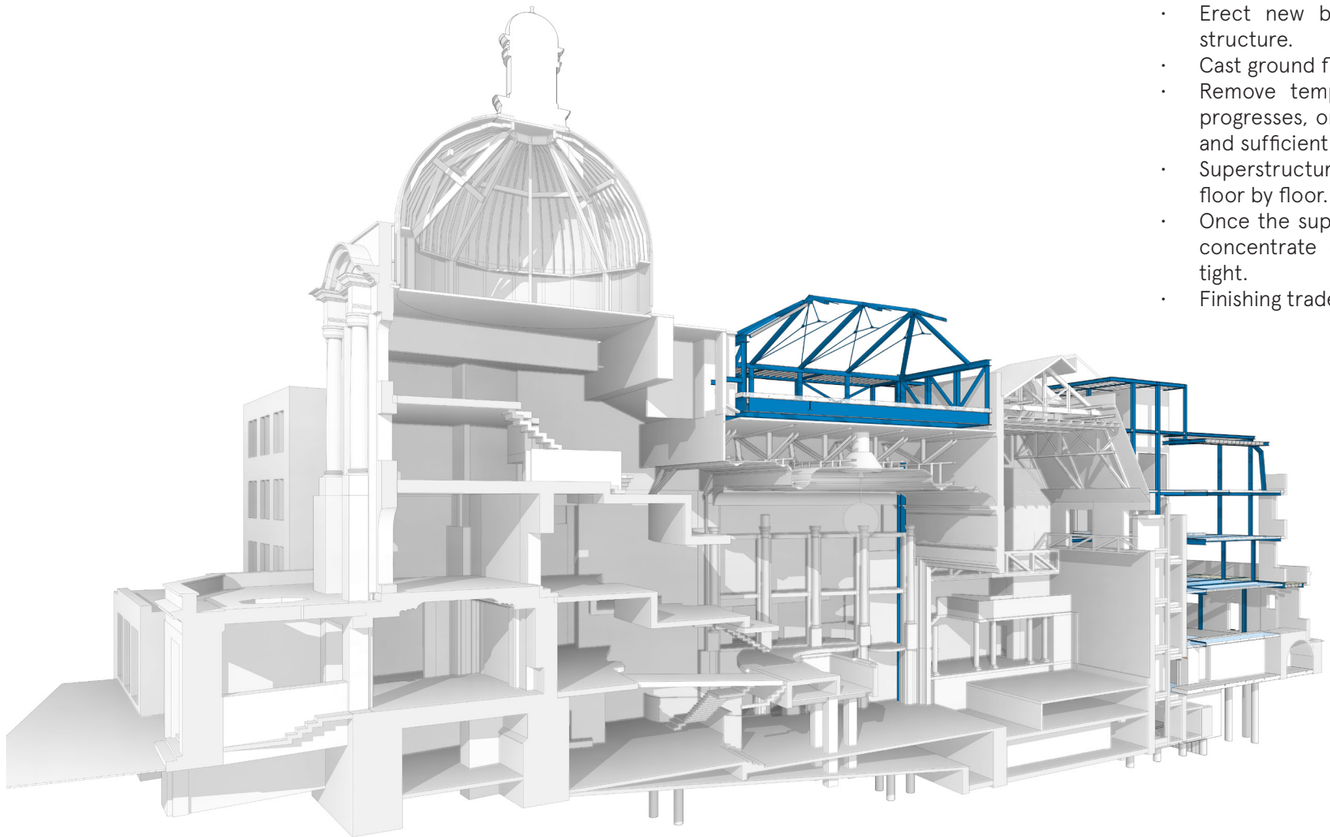
- Upon completion of piling and casting of capping beam, install temporary propping and shoring to restrain the top of the secant piled wall.
- Complete excavations to basement formation level installing additional temporary works as required. Temporary works to contractor design during construction phase.
- The principles for removal of spoil shall be agreed. Given the scope of the works it is likely that conveyors will be used to move the spoil from within the building to a holding skip outside the site in a suspended parking bay.
- Break out the remains of the existing basement slab below The Hope & Anchor pub.
- Complete underpinning to existing Hope & Anchor wall as required.
- Allow for localised dewatering during foundation and basement works due to perched groundwater.

7.6 Casting of foundations, RC wall and Basement Slab

- Break down piles to required cut off levels.
- Install all below ground drainage including pumps.
- Lay concrete blinding.
- Fix reinforcement and cast new pile caps and lift pits.
- Fix reinforcement and cast new basement slab with kicker to perimeter walls.
- Fix reinforcement and cast new RC retaining / liner walls to basement perimeter.

7.7 Complete Superstructure works

- Erect new basement walls and ground floor structure.
- Cast ground floor slab.
- Remove temporary propping as construction progresses, once permanent props are in place and sufficiently cured (to contractors design).
- Superstructure works to follow on, progressing floor by floor.
- Once the superstructure is complete, work can concentrate on making the building weather tight.
- Finishing trades to commence.



Proposed long section view

Appendix A

HTS Structural Drawings

HEYNE TILLETT STEEL

1. General Notes

All structural engineering drawings are to be read with the specification and with all relevant architect's and service engineer's drawings and specifications.

Do not scale from any structural engineer's drawing. All dimensions are in millimetres and levels in metres.

All water and damp proofing works to be to architect's details. Where drawings show waterproof or damp proof membranes, they are simply intended to indicate their position in relation to the structure. The membranes have been designed, specified and detailed by the architect or the manufacturers and are to be installed as shown on their drawings.

All fire protection and finishes are to the architect's details unless specifically noted otherwise.

All floor separation details and acoustic isolation are to the architect's details.

All external works, landscaping, paving etc. are to the architect's details.

Typically, all non-loadbearing partitions are omitted for clarity. Refer to the architect's drawings for details.

Abbreviations:-
CA - Contract Administrator
CJ - Construction Joint
crs - centres
EGL - Existing Ground Level
FFL - Finished Floor Level
max - maximum
min - minimum
MC - Mass Concrete
MJ - Movement Joint
MS - Mild Steel
NTS - Not To Scale
PC- Precast Concrete
RC - Reinforced Concrete
SOP - Setting Out Point
SSL - Structural Slab Level
TOC - Top of concrete
TOS - Top of steel
TOW - Top of wall
typ - typical
UNO - Unless Noted Otherwise
u/s - underside
Ø - diameter

The contractor is to ensure that all construction products used have the appropriate CE accreditation, including marking and/or paperwork confirming the same.

Checking - The engineer's comments on sub-contractors drawings will centre on compliance with the design intent and exclude dimensional checks.

TEMPORARY WORKS:

The contractor is responsible for the design, installation and maintenance of all necessary temporary works to ensure the strength and stability of the building throughout the course of the works.

The contractor should confirm details of the person responsible for all temporary works design (called the 'temporary works designer / co-ordinator') when returning the tender.

Full design details (drawings and calculations) are required for comment by the Engineer for all temporary support systems. Three copies of all details for comment are to be issued allowing ten working days for preparation of comments by the Engineer.

EXISTING STRUCTURE:

The existing structural information shown on these drawings is based on visual inspection of the building and upon limited opening up works. All details of the existing construction are subject to confirmation by the Contractor during the works on site. No materials are to be ordered until the relevant details and conditions are confirmed by the Contractor on site.

CONTRACTOR DESIGN:

The contractor is responsible for the design and installation of the following elements:
- All temporary works (see above)
- All steel connections (see section 7 STEEL notes)
- Piled foundation design
- Engineered timber, timber connections and secondary timber elements
- RC drawings and bending schedules
- All cladding design, including design of masonry façades, and all fixings and framework required to connect the cladding back to the primary structure
- Masonry support steelwork, both vertically (e.g. shelf angles, lintels) and laterally (e.g. windposts) and the fixings back to primary structure
- Architectural metalwork including handrails, balustrades and their associated fixings
- All staircase design including all structure required to support stair off primary structural frame
- Secondary steelwork/general metalwork, including all framing / supports / connections/fixing design into substrates for all non-structural secondary items including the following:
  - Access ladders / walkways
  - Builders work / supports to services
  - Lift equipment, guiderails, lifting hooks
  - Cleaning cradles
  - Ceilings
- Glazing design including all associated framework/fixings back to primary structure, including full height glazing, windows, roof lights and balustrades
- Non-load bearing walls / partitions
- Louvre design and fixings back to the primary structure

2. Foundations

All existing foundations and underground obstructions within the foundation areas are to be removed to avoid hardspots developing under the new works. Live services are to be identified, protected, redirected or terminated as required.

All foundation drawings to be read in conjunction with the Site Investigation Report No. by RSK No 371475-01 (05) dated October 2017

PILED FOUNDATIONS:

The selection of pile type, design and installation will be the responsibility of the piling sub-contractor subject to the following:

- Piles are to be designed to carry the working loads indicated in the piling table.
- Piles are to be cast to a level minimum 300 above the trimmed cut-off level shown on the piling schedule.

SPREAD FOUNDATIONS:

Pad and strip footings are to be founded in TBC with an assumed bearing capacity of TBC kN/m².

Foundation sizes and depths are based on interpretation of trial pit information and are subject to approval by the Local Authority Building Control Officer / Approved Inspector.

3. Underpinning

Before starting the work the contractor is to check for any services that could be damaged by the underpinning work, and shall be responsible for ensuring that his operations do not in any way impair the safety or condition of the building, both before and during the execution of the work. He should immediately inform the Engineer if he considers that more stringent procedures than those specified are necessary.

Underpinning is to be carried out in short sections of about 1.0m in length to the widths shown unless otherwise directed by the engineer, and to the satisfaction of the engineer and the Building Inspector. Projecting portions of the existing footings are to be carefully cut off where directed and the underside of the footings are to be cleaned and hacked free of dirt, soil or loose materials before underpinning. The sides of the previous underpinning bays are to be dowelled and / or roughened / keyed to the satisfaction of the Engineer.

The mass concrete is to be stopped off nominally 75mm below the underside of the existing wall / footing, and the final pinning over the whole width of the wall / footing is to be carried out with 1:3 mix cement to sharp sand dry-pack mortar, well-rammed in 24 hours after the mass concrete has been poured. Excavation to any section of underpinning shall not be started until at least 48 hours after completion of any adjacent sections, and excavation and concreting of any section of underpinning should ideally be carried out on the same day.

Sequence of underpinning to be as shown, or typically 1, 3, 5, 2, 4, 1, 3.... All sections marked 1 to be excavated, cast and dry-packed before starting excavation of sections marked 2, etc. The Contractor is to keep a record of the sequence and dimensions of the underpinning actually completed, including details of excavation, casting concrete and pinning up for each section.

Excavated material intended for backfilling is to be kept protected from drying-out or wetting, and is to be placed in maximum 150mm layers, carefully compacted with a pneumatic or electric percussion tool with compacting plate.

4. Loading

IMPOSED LOADING:

Structural floors have been designed to carry the following uniformly distributed imposed loads in accordance with BS EN 1991-1-1:

Floor level	Imposed load (kN/m²)	Partition load (kN/m²)
TBC	TBC	TBC

WIND LOADING:

The global wind load used for the design of the stability system has been calculated using BS EN 1991-1-4.

The fundamental value of basic wind velocity (vb0) for the site is 21.8 ms^{-1}.

The following factors from BS EN 1991-1-4 and the UK National Annex have been utilised in the generating the basic wind velocity (vb):
cdir = 1.0
cseason = 1.0

Cladding and roofing designers are to utilise BS EN 1991-1-4 to determine pressure coefficients and localised wind pressures for sheeting/glazing façade/masonry supports fixing to structure.

SNOW LOADING:

General snow loading has been included in roof design loadings uno additional allowance should be made for heaping in accordance with BS EN 1991-1-3.

5. Concrete

IN SITU

Concrete to be in accordance with the specification, BS 8500: Part 2 and BS EN 206.

Concrete Elements	Grade	Cover exposed to ground water or weather (mm)	Cover not exposed to ground water or weather (mm)
Blinding	GEN1	N/A	N/A
MC	GEN3	N/A	N/A
RC	RC32/40	40	30
LWC slabs	RC35/38	40	30

Concrete finishes to be as follows:

- All formed surfaces to be Ordinary to BS EN 13670 and in accordance with the National Structural Concrete Specification (NSCS) unless noted otherwise.
- All unformed surfaces to be Basic to BS EN 13670 and in accordance with the NSCS unless noted otherwise.

PRECAST:

All PC flooring, facade and stair units are to be designed by the sub-contractor in accordance with the specification & BS EN 1992-1. The system used shall be designed to carry the loadings as stipulated in the above tables.

The sub-contractor shall produce and submit dimensioned layout drawings and calculations to the engineer for comment and Building Regulations submission ten working days before manufacture. The sub-contractor is to indicate any areas of in- situ concrete required to complete the floors. The staircase subcontractor shall also indicate the lines of support of the staircase unit.

PROPRIETARY METAL DECKING:

All proprietary metal decking designed to span compositely with in situ concrete shall be fixed and trimmed in accordance with the manufacturer's recommendations and details. The Contractor shall produce and submit dimensioned layout drawings of the decking for the Engineer to comment upon, a minimum of 10 working days before installation. All metal decking requires reinforcement as detailed on the drawings. The contractor is not to exceed a construction loading in accordance with the manufacturer's recommendations.

6. Masonry

All loadbearing blockwork is to have a minimum characteristic strength of 7.0N/mm2.
All loadbearing brickwork is to have a minimum characteristic strength of 20N/mm2.

Refer to the architect's drawings and specification for setting out of masonry, mortar types, coursing and bonding requirements and jointing details.

Lintels, unless noted otherwise, to internal walls and internal skins to be:
- Up to 1500 span: 100 deep prestressed lintel.
- 1501 to 2500 span: 140 deep prestressed lintel.
- 2501 to 3500 span: 215 deep prestressed lintel.

Lintels to be typically 100 wide with multiple lintels supplied to suit width of wall. All lintels to have minimum 150mm bearing at supports, unless noted otherwise. Lintels to be supplied by Supreme or a similar approved manufacturer.

All new non-loadbearing masonry walls are to be fixed to adjoining new or existing masonry using 'Furfix' wall starters or similar approved. Head restraint to be provided by sleeved ties or galvanised MS angles fixed to the soffit.

New loadbearing masonry walls are to be fully toothed and bonded into existing masonry. Edges of all new openings are to be made good using fully bonded new brickwork.

Where new brickwork is to be stitched into existing, cut out brickwork, to the depth shown, where cracked and as indicated on the drawings or specified by the engineer. Stitch in new brickwork to match existing set in 1:1:6 mortar. New brickwork is to be toothed into the existing providing as many fully bonded stretchers as possible. Ensure that the new brickwork is completed such that all voids within the depth of the wall are filled completely with mortar.

Brickwork below and within 150mm of ground level to be laid in mortar using sulphate-resisting cement.

Where directed on site or indicated on the drawings, buried timber set in the thickness of brick walls is to be cut out and the resulting voids infilled with solid brickwork set in 1:1:6 mortar.

Pockets for padstones etc. in party walls to be formed by carefully removing stretchers and snapping off headers where required.

7. Steel

All steelwork to be grade S355 uno to BS EN 10025-2 and in accordance with the current edition of the National Structural Steelwork Specification (NSSS) CE Marking Version and structural engineer's specification and BS EN 1993. All Open sections and plates are to be to BS EN 10025-1. All Hollow sections (RHS / SHS / CHS / OHS) are to be "Celsius 355" sections by TATA or equivalently graded to BS EN 10210-1.

The Execution Class of the Steel Structure is EXC2 uno.

Setting out of steelwork is shown to the centre of symmetric sections and to the back face of PFCs and RSAs.

The steelwork fabricator shall produce and submit two copies of dimensioned fabrication drawings to the engineer. The engineer requires ten working days to comment. The engineer's comments on drawings will centre on compliance with the design intent and exclude dimensional checks.

The fabricator is to complete the design, drawings and calculations of all connections, using design connection forces given by the engineer. All steelwork connections to existing or new, steel or concrete are to be contractor designed.

All bolted connections are to include a minimum of 2No M16 bolts per member unless specifically indicated otherwise

All bolts are to be grade 8.8 sheradized to BS 7371-8, class 30. All bolts, nuts and washers are to be to in line with the requirements of the NSSS CE Marking version. Washers are to be placed beneath the rotated item.

All welds to be minimum 6mm leg length continuous fillet welds unless specifically noted otherwise. All full and partial penetration welds to be ground down smooth.

For steel sheet roofs the contractor is to detail all trimmer purlins required at penetrations, hips and valleys.

For paint finishes refer to table below (Sherwin-Williams Paints or similar approved):

Steel elements / exposure / locations	Paint system
Within Cavity	Macropoxy® C400V3 Zinc Phosphate primer to 175 microns
Internal	Macropoxy® C400V3 Zinc Phosphate primer to 75 microns
External	Hot dip galvanised to 100 microns

8. Timber

All timber members are to be grade C24 to BS EN 338 unless noted otherwise. Timber to be pressure-impregnated with preservative and cut ends brush treated.

Joists marked DJ are to be doubled joists, TJ are to be triple joists, bolted together using M12 grade 8.8 bolts at 600mm centres along span. Joists to be doubled-up under all partition walls parallel with span, or with solid blocking under where perpendicular.

All bolts into timber are to have 50sq x 3 thick MS washers below nut.

Solid blocking or herringbone strutting is to be provided between all timber joists or rafters as follows:

- 2.5m to 4.5m span: midspan and at each end support
- Spans longer than 4.5m: two rows equally spaced in span and at end supports
- Outer joists or rafters to be blocked solidly to perimeter walls.

Wall plates for roofs are to be tied down using 1200 long 30 x 2.5 galvanized MS straps at 1200 crs with 100 bob end. Straps are to be nailed to the top plate and plugged and screwed to the internal face of the wall. Refer to typical details.

Lateral restraint straps for floors are to be minimum 1200 long 30 x 5 galvanized MS straps at 1200 crs with 150 bob end. Straps perpendicular to joists to be nailed to tops of three joists + solid blocking infill using 5 No. 75 long, 3.8Ø nails. Straps parallel to joists are to be let-in to the top of the joists and nailed in place using 6 No. 50 long, 3.4Ø nails. Refer to typical details.

Composite ply layers to timber floors to be glued and screwed in accordance with BS EN 315 using min 50mm long galvanised screws @ 400crs. Laps in plywood to be staggered across floor area. Where joists supporting ply decking sit within the depth of steel beams the level of the top of the joists should be a minimum of 10mm above the level of the top of the steel to allow for shrinkage of the timber.

NOTCHES/HOLES IN TIMBER:

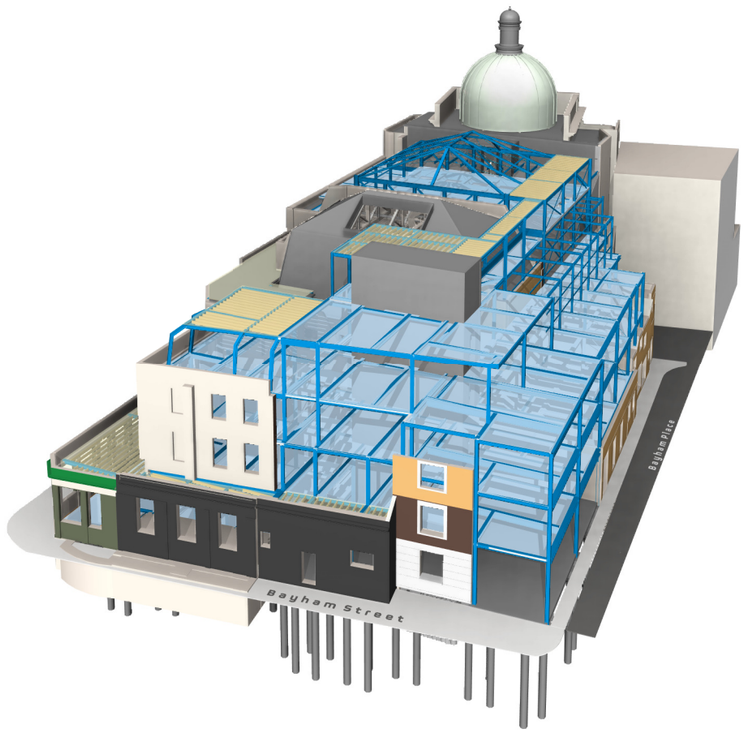
Notches / holes in timber should be avoided if possible. The contractor is to submit proposals for any holes and notches to the structural engineer for confirmation prior to works commencing on site, and allow for visual inspection by the engineer of any existing joists.

The following provides guidance on typical preferred locations of proposed holes/notches in new joists. These will be subject to review and confirmation by the structural engineer that they are applicable for each specific location:

Notches:
- Minimum 100mm spacing:
- Depth (maximum): 0.125 x joist depth.
- Distance from supports: Between 0.07 and 0.25 x span

Holes (Locate at centre of joist):
- Diameter (maximum): 0.25 x joist depth.
- Centres (minimum): 3 x diameter of largest hole.

Distance from supports: Between 0.25 and 0.4 of span.



9. Builders Work Notes

Holes less than 300mm square are generally not shown on structural drawings. Refer to services engineer's / sub-contractor's drawings.

All holes including those not shown on structural drawings must be agreed with the engineer.

Holes in slabs which have been cast:
All builderswork proposals to be submitted to the etructural engineer for checking prior to works commencing on site. Generally reinforcement and embedded structural steelwork will not be permitted to be cut, and holes greater than 300mm wide will generally not be allowed. Contractor to allow for scanning and exposing all areas in the vicinity of proposed builderswork to identify, locate, and avoid cutting reinforcement. Contractor to assume all openings are to be cored/saw cut.

No builder's work openings are to be cut without first obtaining agreement to proceed from the CA.

Openings in beams and load bearing walls will generally not be allowed, unless approved by the engineer.

Infilling of openings around services to architect's or services engineer's requirements. Where a load bearing infill is required this is to be designed by the contractor. Details to be submitted to the CA for comment.

Concrete plinths are to be provided to act as bases for mechanical plant where required by services engineer. Dimensions of plinths are to suit the mechanical plant used. Drawings are to be submitted to the structural engineer for checking of plant weights on floors.

10. Health And Safety

The key construction stage health and safety hazards on this project are:

Activity	Hazard	Mitigation
All works within the existing and proposed building fabric, generally.	Parts of the existing structure not as predicted at design stage. Collapse or damage to structure due to overloading. Disturbance of asbestos containing materials.	Limited opening up works have been undertaken on site. Contractor to confirm existing construction. If the contractor discovers any discrepancies between the assumed existing structure and what is found on site they should notify the Engineer immediately, and await further instruction. Contractor to review all available asbestos reports prior to starting works and to carry out any additional surveys as and when applicable. Contractor to use appropriate PPE and propose method statement prior to starting work.
All demolition and re-supporting of existing structure, generally including retention of facades.	Incorrect sequencing of demolition of existing structural elements and installation of new members leading to structural collapse.	Contractor to propose method statement including construction sequence, temporary works drawings and calculations for review and comment by the Engineer prior to start of works. All assumptions to be included in method statement and reviewed by the Engineer.
Excavations and groundworks	Contact and/or damage to existing buried services. Undermining/settlement of existing foundations. The geo-environmental site assessment found that the site falls into a Characteristic Situation 1 – no gas protection measures are required. However, it is possible that the groundworks encounter conditions different to those revealed during the site investigations.	Contractor to locate and identify all existing buried services prior to starting work. Upon exposing any retained foundations/buried structures, the Contractor should identify if any proposed excavations undermine the existing founding levels and notify the Engineer accordingly. Contractor to monitor groundworks for previously undetected suspect materials, and carry out additional testing if appropriate.

Note: the list above identifies certain risks which are deemed to be unusual, abnormal or unexpected to a competent contractor carrying out works of this nature. It does not cover all possible situations that may be encountered during the construction process. It is the responsibility of the main contractor to identify any further risks/hazards and take appropriate action.

Rev	Date	By	Eng	Amendments
P1	27.10.17	JH	AC	PLANNING

HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
The Hope Project

Drawing Title
General Notes

Purpose of Issue **Preliminary** Scale at A1

Drg No **1444 / 001-EC** Rev **P1**