

Network Rail

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**King's Cross Station  
Redevelopment  
Programme Package 6  
GRIP 5**

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Civil Specification  
Volume 2: Demolition  
and Façade Retention

**Job Number 123345-00**

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**Issue for Construction**

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Network Rail

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Volume 2: Demolition  
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Job number 123345

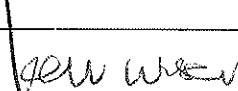
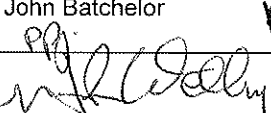

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## 1.0 DEMOLITION

### 1.1 GENERAL REQUIREMENTS

Read this specification in conjunction with the General Contract Preliminaries, the Technical Preliminaries, the Architectural Specifications relating to Demolition, Heritage Recording, Heritage Material, and all other Contract Documents.

#### 1.1.1 DESK STUDY/SURVEY

Before starting demolition work, examine all available information and carry out further survey of the structure(s), site and surrounding area as necessary.

The "Existing Structure Plans" record the assumed existing structure based on site survey and observation, record drawings, limited opening-up and testing work, and engineering judgement. Adopt these plans. Verify the assumed structural arrangement on site before proceeding with significant structural works. Report significant discrepancies to the Employer's Representative and await instruction to proceed in order that effects on temporary or permanent works proposals can be determined.

Allow for and undertake further opening-up and testing works to determine the arrangement, properties and condition of existing structures, including:

- Opening-up and inspection of existing timber work as described in the Structural Timber Specification
- Deep-drilling with a drill (less than 25mm dia) in four locations on four piers supporting the Main Trainshed Roof arches to probe for any steelwork built into the masonry pier not visible externally. Location details will be provided by the Employer's Representative. Probe holes are to be inspected with an endoscope as instructed by the Employer's Representative. Holes are to be made good in accordance with the Architects specifications for fabric repair.
- Removal and testing of bricks, mortar and concrete cores to establish strength and material content and type for elements where sufficient design information is not known.
- Undertake balustrade load testing and materials sampling and testing from retained heritage staircases in the West Range Buildings in accordance with the Employer's Representative's requirements

Types of tests and standards for testing are as required in the Specification for Structural Investigation Works.

Submit a survey report and Work Package Plans covering:

- Form, condition and demolition methods of the structure(s). Include in this a review and refreshing the structural condition surveys and the fabric condition survey.
- Form, location and removal methods of any toxic or hazardous materials
- Type and location of adjoining or surrounding premises which may be adversely affected by noise, vibration, dust or removal of structure
- Identification and location of services above and below ground, including those required for the Contractor's own use. Arrangements for disconnection and removal of services.
- Strategy for dealing with the Heritage/Conservation requirements of the architectural specification and the planning conditions applied to the project. Make submissions of method statements and other documents as required by English Heritage to secure their approval for the demolition works. Make submissions to London Underground as necessary to secure their approval for break-outs to the Northern Ticket Hall.
- Sequence and method of demolition including details of any specific pre-weakening

- Arrangements for protection of personnel and public including exclusion of unauthorised persons

### 1.1.2 VARIATIONS TO METHODS

- Do not vary methods on site from the agreed method statement without prior approval.
- Give 14 days' notice of any proposed variation to the method of work described in the Works Package Plans. Minor variations may from time to time be agreed as appropriate.
- Should the work on site expose any item which either requires or makes appropriate a variation from the agreed method, notify the Employer's Representative at once. Accept responsibility for any further work in such an area before approval.
- The submission to, and scrutiny by, the Employer's Representative of any programme or details of methods and any checking by the Employer's Representative of the stability and safety of the structures in all stages of demolition shall not relieve the Contractor of his obligations under the Contract and his sole responsibility for the temporary works and the safety of the structure in all stages of demolition.

### 1.1.3 EXTENT OF DEMOLITION

Subject to the retention of features, facades, structures, retaining walls etc. specified elsewhere, demolish the structure(s) as shown on the Architect's Drawings including

ENG-DWG-OAP-STS-CAP-0060 series

ENG-DWG-OAP-STS-CAE-0070 series

ENG-DWG-OAP-WRB-CAP-0020, 0030, 0040 series

ENG-DWG-OAP-WRB-CAE-0050, 0060, 0070, 0080 series

Cross-reference to the relevant structural drawings and details

### 1.1.4 GROUNDWORKS:

- Break out old foundations, slabs and the like where and to the extent indicated on the drawings. This will include:
  - Break-out of brick vaults backfilled with foam-cement around the north façade of the Great Northern Hotel to install ground-beams and slabs
  - Local break-out of brick vaults and basement structures backfilled with foam cement or mass concrete around the Suburban Train Shed to form foundations for remodelled STS south end and Pub Mezzanine foundations
  - Break-out and complete removal of the remains of the Old Parcels Tunnel where the new cut-and-cover tunnel is to be installed between the Northern Ticket Hall and the Western Concourse Roof Tree Column foundation on Gridline r15.
  - Form openings through the Northern Ticket Hall piled retaining walls at the interface with the Network Rail Plant Room and the two cut-and-cover tunnels at the north-east corner of the NTH.
- Remove contaminated earth and dispose as required by the Local Authority.
- Backfill as specified on drawings.

### 1.1.5 BENCHMARKS

Report any benchmarks and other survey information found on structure(s) to be demolished. Do not remove or destroy unless instructed.

### 1.1.6 FEATURE(S) TO BE RETAINED

Carry out protection, retention and salvage of features and material as required in the Architects specifications.



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## **1.2 SERVICES AFFECTED BY DEMOLITION**

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### **1.2.1 SERVICES REGULATIONS**

Any work carried out to or which affects new or existing services must be in accordance with the byelaws or regulations of the relevant Statutory Authority.

### **1.2.2 LOCATION OF SERVICES:**

- Locate and mark the positions of services affected by the work.
- Arrange with the appropriate authorities for the location and marking of the positions of mains services.

### **1.2.3 DISCONNECTION - ARRANGED BY EMPLOYER AND CONTRACTOR:**

- Refer to the Employer's Representative for details of disconnection of services and removal of fittings arranged by the Employer.
- Arrange with the appropriate authorities for the disconnection of remaining services and removal of fittings and equipment.
- Before starting demolition ensure that disconnections listed above have been carried out.

### **1.2.4 DISCONNECTION OF DRAINS**

- Locate and disconnect all disused drain connections.
- Seal within the site to approval of the Employer's Representative. Backfill with foam concrete any drains to be piled through or through which concrete elements such as pile-caps are to be installed.

### **1.2.5 DRAINS IN USE**

- Protect, manholes, gullies, vent pipes and fittings still in use and ensure that they are kept free of debris at all times.
- Make good any damage arising from demolition work. Leave clean and in working order at completion.

### **1.2.6 BYPASS CONNECTIONS**

- Provide as necessary to maintain continuity of services to occupied areas of the same and adjoining properties.
- Give a minimum 72 hours' notice to occupiers if shutdown is necessary during the changeover.

### **1.2.7 SERVICES WHICH ARE TO REMAIN**

- Notify the Service Authority or owner of any damage arising from the execution of the works.
- Make all arrangements for repair to the satisfaction of the Employer's Representative and service authority or owner. Bear any costs arising.

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## **1.3 DEMOLITION WORK**

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### **1.3.1 WORKMANSHIP GENERALLY**

- Demolish structures in accordance with BS 6187.
- Operatives must be appropriately skilled and experienced for the type of work and hold or be training to obtain relevant CITB Certificates of Competence.
- Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of demolition to be used.

### **1.3.2 TEMPORARY WORKS**

- Design and be responsible for all temporary works at all times and at all stages including subsequent dismantling where relevant, other than as may be specifically shown on the

Contract Drawings. All calculations and details in connection with the temporary works shall be submitted for comment.

- Allow 14 days from the date of receipt by the Employer's Representative for this.
- Design temporary works in accordance with relevant British Standards and Codes of Practice, particularly BS EN 12811-1 'Temporary works equipment. Part 1: Scaffolds. Performance requirements and general design' and in accordance with the requirements of the Local Bye-Laws. The design shall include foundations or other appropriate support. Accept responsibility for any inspection or opening-up required to enable the design of the temporary works to be carried out.
- Give the Employer's Representative reasonable opportunity to view such inspection or opening-up.

### **1.3.3 GAS OR VAPOUR RISKS**

Take adequate precautions to prevent fire or explosion caused by gas or vapour.

### **1.3.4 FLAME CUTTING**

- Where flame cutting of existing metal is required, take all necessary precautions to prevent the outbreak of fire(s) or causing explosion of noxious gases from any adjacent combustible or ignitable materials such as timber, paper, paint, or adjacent gaseous or flammable liquids in pipes, tanks, contaminated ground etc.
- Develop a management plan for all hot-works with the Employer's Representative to ensure that fire alarms in the operating station are not activated unnecessarily causing closure of the station.
- Remove petrol and oil storage tanks and tanks that have been used for the storage of gaseous, flammable or toxic liquids in conformity with statutory regulations.

### **1.3.5 DUST**

Allow for any measures for the control of dust such as periodically spraying demolition works with water. Make provision for more onerous control measures as required to prevent dust ingress into the working station areas.

### **1.3.6 HEALTH HAZARDS**

Take adequate precautions to protect site operatives and the general public from health hazards associated with dangerous fumes and dust arising during the course of the Works.

### **1.3.7 ADJOINING PROPERTY**

- When demolishing structure(s) against adjoining property leave adequate temporary support and protection at each stage. Maintain and alter temporary supports and protection as necessary as work progresses.
- Demolish structure(s) causing a minimum of damage to adjoining property
- leave no unnecessary or unstable projections
- make good to ensure safety, stability, weather protection and security
- Do not disturb support to foundations of adjoining property unless otherwise instructed.
- Report any defects exposed or becoming apparent.
- Promptly repair any damage caused to adjoining property by demolition work.

### **1.3.8 STRUCTURE(S) TO BE RETAINED**

- Adequately protect parts of existing structure(s) that are to be kept in place. Refer to the architect's specifications and fulfil any requirements set by English Heritage.
- Cut away and strip out with care to reduce the amount of making good to a minimum.
- Prevent debris from overloading any part of the structure that is not to be demolished.



**1.3.9 PARTLY DEMOLISHED STRUCTURE(S)**

- Leave in a stable condition with adequate temporary support at each stage to prevent risk of uncontrolled collapse. Keep safe outside working hours.
- Prevent debris from overloading the structure, scaffold platforms or other temporary works.
- Prevent access of unauthorised persons.

**1.3.10 DANGEROUS OPENINGS**

- Illuminate and protect as necessary.
- Keep safe outside working hours.

**1.3.11 ASBESTOS-BASED MATERIALS AND OTHER HAZARDOUS MATERIALS**

- Asbestos-based materials are known to be present in the structure(s) to be demolished. Anthrax has also been detected in loft spaces in the past and decontamination work has been undertaken. Paint containing lead is known to be present on existing steelwork. Biohazards such as pigeon carcasses and guano and contaminated syringes may also be encountered. Refer to the Asbestos and Anthrax Survey carried out by White Young Green, the Network Rail Hazard Directory for King's Cross Station and the Designer's Risk Register which are available from the Employer's Representative.
- Removal is to be carried out by a Contractor licensed by the Health and Safety Executive and prior to any other works starting in these locations.
- Unknown/unsuspected asbestos materials continue to be uncovered in the existing King's Cross Station Fabric. Ensure that competent personnel are on site to detect any possible asbestos material as work progresses. Give notice immediately of any suspected asbestos based materials discovered during demolition work.
- Avoid disturbing such materials.
- Submit details of methods for safe removal.

**1.3.12 LICENCES**

Provide copies of current licences, certificates etc. confirming the Contractor's registration with the Health and Safety Executive for asbestos removal where required.

**1.3.13 UNFORESEEN HAZARDS**

- Notify any unrecorded tanks, chemicals etc discovered during demolition work.
- Submit details of methods for safe removal, filling etc.

**1.3.14 OPEN BASEMENTS ETC**

- Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Make the remaining sections of any retaining and buttress walls safe and secure.
- Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10m<sup>2</sup>, or as agreed, not less than 600mm in diameter.

**1.3.15 FILLING OF BASEMENTS ETC**

- Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10m<sup>2</sup>, or as agreed, not less than 600mm in diameter.
- Remove all organic material and soil from basements and other voids. Fill and consolidate with C05FC foam concrete or GEN1 mass concrete as shown on the structural drawings.

**1.3.16 MAKING GOOD**

Agree methods of making good along with any sample areas required with the Employer's Representative before other areas are made good.

**1.4 MATERIALS ARISING**

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**1.4.1 EMPLOYER'S PROPERTY**

- Components and materials as directed in the Architect's specifications on heritage works and salvage are to remain the property of the Employer
- Protect until removed by the Employer, reused in the Works or the end of the Contract.

**1.4.2 CONTRACTOR'S PROPERTY**

- Components and materials arising from the demolition work not covered by recycling or salvage provisions outlined above are the property of the Contractor
- Remove from site as work proceeds.

**1.4.3 RECYCLED MATERIALS:**

- Materials arising from demolition work should be recycled or re-used elsewhere in the project subject to compliance with the requirements of the appropriate Architectural specifications.
- Submit full details and all supporting documentation as evidence of compliance

**1.4.4 RECYCLED MATERIALS**

Materials arising from demolition work should be retained on site for re-use where instructed by the Employer's Representative.

## 2.0 SHORING/FAÇADE RETENTION

### 2.1 INFORMATION TO BE PROVIDED FOR ACCEPTANCE PRIOR TO COMMENCING WORKS

Submit comprehensive Works Package Plans for retention schemes to the Employer's Representative for acceptance. Include:

- General Arrangement drawings as necessary to understand the proposals
- A design statement (Form A in accordance with Network Rail Standards) showing assumptions, design loads and a description of how the structures will be considered to act and how analysis will be undertaken.
- Check certificates, calculations etc as required by the Employer's Representative in accordance with Network Rail Standards.

Make all submissions of method statements, drawings and calculations required by English Heritage to secure their approval for the works.

### 2.2 GENERAL

#### 2.2.1 TERMS USED IN FAÇADE RETENTION

- Definitions: as CIRIA Report C579 'Retention of masonry facades – best practice guide', Glossary and as follows:
- Façade: the masonry structures, with any integral structural framing, that are to be kept in place, including external elevations, internal elevations and party walls identified as requiring support.
- Retention structure: the temporary façade retention structure.

#### 2.2.2 RECORDING HISTORIC BUILDINGS

Carry out recording as required in the Architect's specifications

#### 2.2.3 RETENTION STRUCTURE GENERALLY

Provide temporary restraint structures to internal and external masonry walls where existing cross-walls or floors are to be removed thereby removing lateral restraint against horizontal loads or buckling. Install the restraints prior to commencing removal of stabilising elements. Remove these once the permanent works shown on the drawings are effective (i.e. all necessary elements of the permanent works are in place and concrete has reached acceptable design strength, etc).

Refer to the structural drawings for requirements for specific areas including the south ends of the West Range Buildings and the Suburban Train Shed and the footbridge breakthrough in the West Range Building.

Connection to retained walls is to be by ties through openings, with walings/ ledgers on far face (see CIRIA Report C579, section 7.9.1), unless shown otherwise on the drawings.

Connection to existing supporting walls is to be by

- Wedging steelwork against existing protrusions off walls or the face of columns, chimney breasts etc if present; or
- Steelwork concreted into recesses formed in existing walls, to be made good afterwards; or
- Steel bearing plates and bonded anchors.

#### 2.2.4 TEMPORARY WORKS CO-ORDINATOR

- Appoint: Suitably qualified and experienced person to co-ordinate the temporary works.



- Responsibilities: To ensure that:
  - Relevant features of the façade, whether known at the outset or discovered in the course of the work, are fully considered in design and construction of retention structure.
  - Components of the design and detailing fit each other and the façade.
  - Required actions are only undertaken when it is safe to do so, and are carried out under supervision in accordance with design and relevant standards.
- Period of appointment: From commencement of Contract until temporary works structures are dismantled.

## **2.3 SYSTEM PERFORMANCE**

### **2.3.1 DESIGN LIFE**

Retention structures shall be designed to have a life not shorter than the intended period of support, but in no case less than two years.

### **2.3.2 RETENTION STRUCTURE DESIGN**

- Design, erect and maintain retention structure to hold façade in position without overstress or undue deflection of either.
- Design temporary works, including scaffolding, to minimise the extent of intervention into fabric of listed buildings and / or adjoining properties.
- Overall façade retention structure shall be designed for the following:

**2.3.2.1** Spacing of supports:  
Maximum spacing 2.5m

**2.3.2.2** Loads:  
Lateral loads:

- Wind loading over the gross area (to include loads on the façade, sheeting, support structure and any huts or hoarding supported by the support structure) plus an allowance for non-verticality.
- 2.5% of the dead load of the façade.
- -The worst likely horizontal impact load, but not less than 25kN applied 1.0m above ground level.
- Individual horizontal restraints shall be designed for a lateral load of 2.5% of the total dead load at that level of the façade plus the wind load acting on the particular restraint.

**2.3.2.3** Lateral deflection  
Under the wind load and 2.5% dead load shall not exceed  $H/750$  where H is the clear height of the façade above the level at which the retention system is assumed to be laterally restrained within the ground.

### **2.3.3 RESPONSIBILITY FOR FAÇADE AND RETENTION STRUCTURE**

- Requirement: Accept responsibility for adequacy, stability, integrity and rigidity of façade and retention structure for duration of works.  
Use this clause with permanent works contracts when contractor designs and erects retention structure.

**2.3.4 CONNECTIONS BETWEEN FAÇADE AND SUPPORT STRUCTURE:**

Requirements:

- Horizontal loads: To be transferred from façade to restraining structure without slip in compression or tension.
- Differential vertical movement: Accommodate between façade and retention structure, without connection binding.

**2.3.5 LOADING GENERALLY**

- Standard: To BS5975.
- Dead loads: To BS 6399-1, clause 4. Contractor to determine.
- Snow and ice loads: As BS 6399-3 and BS 5975, clause 4.5.4.
- Additional loads: Refer to the Technical Preliminaries for details of the thrust forces from the Main Trainshed Roof arches and discussion of how these are expected to be resisted.

**2.3.6 IMPACT LOAD ON STRUCTURE**

Either impose restrictions on movement of site plant, cranes etc. or allow for impact loads.

**2.3.7 SITE FEATURES AFFECTING CLIMATIC LOADS:**

- The site is located in Central London.
- Site altitude to Tunnel Datum: 116.600 (16.8mOD).
- Features affecting wind loads: The Main Trainshed roof, south façade, and East Range Buildings, the Great Northern Hotel and St Pancras Station provide shelter to the works. Refer to the Architect's 1:500 site plans for locations. The north end of the Main Train Shed and the Suburban Train Shed are open to the wind which will affect internal pressures inside these structures.
- Features affecting snow loads: There are "secret gutters" behind parapet walls on all the roofs and at the junction between the Main Trainshed Roof and the West Range Buildings where snow drifts could form.

**2.3.8 WIND LOADS:**

- Standard: To BS 6399-2, using factors and coefficients appropriate to location, exposure, altitude, shape and size of adjacent and/ or attached buildings.
  - Design method: Any permitted.
- Topographic increment: Before applying the same average topographic data in all directions, check whether actual topographic data gives a worse condition and use higher value.
- Shelter from upwind obstructions: Refer to section 2.3.7.
- Factors:
  - Seasonal (Ss): 1.0.
  - Probability (Sp): 1.0
- Condition of openings in façade: Contractors choice whether blocked or unblocked. Refer also to section 2.3.7.
- Working wind speed:
  - Definition: The wind speed at which site activities that could cause impact with the façade/ retention structure will cease.
  - Magnitude: Contractors choice. Advised in CIRIA Report C579 , clause 8.6.6 as 18 m/s.
  - Use: Defines maximum wind loads to be used in load combinations including impact.

**2.3.9 THERMAL RANGE AND PREDICTED FAÇADE MOVEMENTS**

- Thermal range: 0 to 30°C.

- Predicted movements at mid-point of façade coping:
    - Lateral:  $\pm 5\text{mm}$ .
    - Vertical:  $\pm 10$ .
- Design: Allow for predicted movements when calculating stability loads.

#### **2.3.10 PREDICTED FAÇADE FOUNDATION MOVEMENTS:**

Rotation of foundation: None.

Vertical:  $\pm 10\text{mm}$ .

Design: Allow for predicted movements when calculating stability loads.

#### **2.3.11 STABILITY LOADS:**

**2.3.12** Façade gravity load ( $W_f$ ): Self-weight of wall plus loads of existing roof and floors retained and supported on the walls. In addition, east wall of West Range Building supports vertical reactions from Main Trainshed Roof Arches – reactions are available from Package 2 designers via Employer's Representative.

Supporting structure gravity loads ( $W_s$ ): Self weight of structure plus all dead and imposed vertical loads supported thereon.

Design out-of-plumb dimensions: Façade dimensions measured immediately prior to erection of the retention structure, plus allowances for deflections due to façade foundation and thermal movements, plus calculated deflection due to movements of retention structure and its foundations.

Lateral load due to offsets/ out-of-plumb ( $H_p$ ): The force necessary to stabilise the façade vertical loads against movement due to offsets and out-of-plumb.

Design stability loads: The greater of ( $H_p$  plus 1.5% of  $W_s$ ) or 1.5% of ( $W_f + W_s$ ).

#### **2.3.13 LOADS ON CONNECTIONS**

- Gravity load ( $W_c$ ): The total gravity load due to self weight of façade and applied gravity loads above connection level.
- Lateral load due to offsets/ out-of-plumb ( $H_{pc}$ ): The proportion of load  $H_p$  carried by the row of connections.
- Wind load ( $H_{wc}$ ): The wind force on the area of façade supported by the row of connections.
- Maximum load on row of connections ( $H_r$ ): The greater of (2.5% of  $W_c$  plus  $H_{wc}$ ) or ( $H_{pc} + H_{wc}$ ).
- Maximum load on a connection: The proportion of  $H_r$  likely to be carried by the connection.

#### **2.3.14 VEHICLE IMPACT PROTECTION:**

May be required to the west and south-east wall of the Suburban Trainshed and the raking shores associated with its retention. Impacts will derive from movements of the Contractor's plant and equipment on site, so Contractor to assess risk and likely loads and make appropriate provision.



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**2.4 PRODUCTS**

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**2.4.1 STRUCTURAL STEEL****2.4.2** Steel grades: Submit proposals.

Protective coating: Protect steelwork and prevent rust staining of façade and other permanent or retained works.

**2.4.3 SCAFFOLDING AND ACCESSORIES:**

Standard: To BS EN 12811-1 and -2.

Protective coating for carbon steel tubes and fittings: Protect steelwork and prevent rust staining of façade and other permanent or retained works.

**2.4.4 TIMBER SCAFFOLD BOARDS:**

Standard: To BS 2482.

**2.4.5 CONCRETE**

Refer to the Structural Concrete specification for all concrete that will not be removed along with the rest of the temporary works.

**2.4.6 REINFORCEMENT**

Refer to Structural Concrete Specification.

**2.4.7 BONDED ANCHORS****2.4.8** Anchors: Stainless steel.

Bonding agent: Injected chemical conforming to requirements of Specification for Fixings to Existing Concrete and Masonry.

Internally threaded sleeves: Required, to allow making good to Heritage standards.

**2.4.9 THREADED STEEL STUDDING:****2.4.10** Material: Stainless steel.**2.4.11 LOADBEARING TIMBER WEDGES/ PACKS**

Species: Straight grained hardwood.

Density (minimum): 650kg/m<sup>3</sup>

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**2.5 EXECUTION**

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**2.5.1 WORKMANSHIP**

- Carry out work in accordance with the design brief, Health and Safety Executive Guidance Note GS51, BS 8004, section 9.7 and generally in accordance with BS 5975.
- Operatives must be appropriately skilled and experienced for the type of work and hold or be training to obtain relevant CITB Certificates of Competence.
- Site staff responsible for supervision and control of the work are to be experienced in the methods of erection and maintenance of support systems to be used: submit evidence to the Employer's Representative prior to commencement.

**2.5.2 DESK STUDY/SURVEY**

- Before starting work, examine available information. Carry out additional survey of the structure, site and surrounding area as required if not available from existing surveys provided by the Employer's Representative..
- Agree with the Employer's Representative the extent of any intrusive investigation
- Give reasonable notice of any opening up or inspection.
- Submit report and method statements, describing relevant matters raised in specification
- Obtain all necessary statutory notices and licences and approvals from English Heritage.

**2.5.3 SURVEY OF FAÇADE**

Survey façades to be supported to assess:

- The principal structural members, how they fit together and how they are connected to the façade
- The dimensions of the façade, including out-of-plumb and bow
- The form of the construction of the façade, and the materials used (facing and backing materials, decorative features)
- Defects in the façade which can be seen, with an indication of likely hidden defects
- Alterations to the façade during the life of the building (e.g. openings, extra storeys, new facing)
- Conditions below ground (e.g. basement level and foundations) including any earlier underpinning

**2.5.4 COMMENCEMENT CONDITION SURVEY**

- Before starting work, review the existing structural and fabric condition surveys and refresh as necessary.
- Review the schedule of defects in the Monitoring Specification and add any defects that could adversely affect structural adequacy of façade while temporarily supported.
- Agree the commencement condition survey record with the Employer's Representative.
- Check existing walls or foundations surcharged by the support structure for adequacy, taking due account of the ground conditions.
- Identify areas of variance with the information supplied and inform the Employer's Representative.

**2.5.5 MONITORING**

Refer to the Monitoring Specification ENG-SPE-G5-OAP-006-CSTR-0149.

**2.5.6 ENABLING WORK**

Scope:

- Before erection of retention structure:  
Remove hazardous materials, as section C20.  
Repair façade as agreed, to facilitate connection to retention structure.
- Before demolition commences: Ensure that ties across Main Trainshed Arches are in place and commissioned before commencing work to the areas of the West Range Building at the applicable arch positions (Grids W3 to W7, W19).

**2.5.7 FOUNDATIONS**

Refer to the results of opening-up work to existing foundations undertaken by others.  
Undertake further investigation works needed to complete the design of temporary works systems and to ensure problem-free installation.

**2.5.8 RETAINING WALLS**

Surcharge loadings: Provide barriers, etc. to enforce restriction of load behind retaining wall as specification/ calculations.

**2.5.9 ERECTING RETENTION STRUCTURE**

- Protect adjacent fabric to be retained, particularly where listed, before work starts
- Locate positions of existing and new services which may be affected by retention structure. Provide any necessary temporary diversions.
- Prevent excessive loadings from foundations of support systems being imposed onto foundations of structure to be kept in place.

- Erect retention structure and connect to structure to be kept in place taking all necessary precautions to prevent damage, and taking due account of movement of structure which may occur before, during and after demolition.
- Tighten/wedge connections to prevent slip under load.
- Protect jambs of openings and other vulnerable surfaces on the facade that could be knocked or rubbed

Method:

- Promptly repair using agreed methods any damage caused to adjoining property by erection or connection of retention structure. Make good to ensure safety, stability, weather protection and security.
- Report to the Employer's Representative any damage caused to retained façades by erection or connection of retention structure. Agree methods of repair with the Employer's Representative.
- Provide additional protection as necessary to adjacent fabric as work proceeds
- Check support systems at agreed stages during erection for compliance with design proposals.
- When retention structure and connections to facade are complete, obtain permission to load systems and give notice before commencing demolition.

#### **2.5.10 SUPPORT SYSTEMS**

- Complete erection and connection of the retention structures as described in section 2.2.3 before commencement of the demolition of adjoining structure:
- When retention structures are erected and all connections are made to structure to be kept in place, inform the Employer's Representative and obtain any required permission to load systems.

#### **2.5.11 SUPPORT SYSTEMS**

- Complete erection and connection of the following support systems before removal of temporary supports placed during localised demolition:
- When retention structures are erected and all connections are made to structure to be kept in place inform the Employer's Representative and obtain any required permission to load systems.

#### **2.5.12 UNFORESEEN HAZARDS**

- Inform the Employer's Representative of any unrecorded voids, flues, services, etc. discovered during erection of support systems. Refer to section 1.1.1.
- Agree with the Employer's Representative methods for infill, making good, relocation of support connections, etc.

#### **2.5.13 BONDED ANCHORS**

Refer to the specification for fixings to existing concrete and masonry.

#### **2.5.14 PLANNED MODIFICATIONS TO RETENTION STRUCTURE**

- Stability: ensure that the stability of façade and retention structure are maintained during modifications
- Permit for modifications: obtain agreement from the TWC before the modifications are carried out.

#### **2.5.15 RETENTION STRUCTURE MAINTENANCE**

- Provide safe access and safe places of work in the support systems for inspection and maintenance.
- Carry out daily visual inspection, looking for evidence of movement, distress or vandalism

- Regularly inspect and maintain support systems, making good ties, wedges, connections, corrosion protection, etc. as necessary.
- Prevent access of unauthorised persons onto support systems. Leave safe outside working hours.

#### **2.5.16 FAÇADE MAINTENANCE**

- Regularly inspect and monitor supported structure to ensure stability. Report any significant movement or deterioration of the fabric of supported structure to the Employer's Representative.
- Carefully examine the structure at the completion of each shift and trim or support as necessary to leave the work safe until resumption.
- Agree any necessary remedial work with the Employer's Representative.
- Identify any variations from the assumptions made in the design and in consents and notify the Employer's Representative of any necessary changes to the support system to cater for these. Obtain agreement of the Employer's Representative before proceeding.
- Adequately protect supported structure from damage by site operations and from staining due to corrosion of support systems.
- Protect any newly exposed surfaces which were previously in an internal environment from exposure to the elements.

#### **2.5.17 MOVEMENT MONITORING**

Carry out monitoring in accordance with *Civil Specification Volume 6: Structural Monitoring*, Document Ref ENG-SPE-G5-OAP-006-CSTR-0149

#### **2.5.18 MAINTENANCE CERTIFICATES**

- Submit:
- Include:
  - Inspection details: date, time and climatic conditions
  - monitoring results
  - Record of:
    - any variance from anticipated condition
    - any deterioration in façade condition
    - remedial work carried out to retention structure
  - Recommendations: action necessary to maintain condition of façade
  - Confirmation of current adequacy or otherwise of retention structure. Whether inspections have been carried out daily

### **2.6 COMPLETION**

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#### **2.6.1 DISMANTLING RETENTION STRUCTURE**

- When all permanent connections between supported structure and new construction have been made, give notice to the Employer's Representative.
- Obtain any required permission to disconnect and dismantle retention structure

#### **2.6.2 REMOVAL OF TEMPORARY FOUNDATIONS**

Where not shown on the structural drawings and assumed to remain in position, break out if required by Employer's Representative a depth of 0.5m below proposed finish level and backfill in accordance with the Earthworks Specification.

#### **2.6.3 COMPLETION CONDITION SURVEY**

- After disconnection of support systems, survey and record the state of structure kept in place.



- Ensure that all defects caused by or due to support systems have been remedied to the satisfaction of the Employer's Representative.
- Agree the completion condition survey record with the Employer's Representative.

**2.6.4****REPAIRS TO FAÇADE**

Coordinate the repairs to the façade required to make good retention system fixings and other results of temporary works with the general repairs scheduled to be done to the façade. Repairs are to be in accordance with the Architect's repairs specification.

**COMPLETION**

No specific completion is required for temporary works separately from the Main Works. Refer to the contract requirements for completion.