# STRUCTURAL INSPECTION
# AND
# REPAIR SPECIFICATIONS

**Document Reference**
8383-ADS-XX-XX-CA-S-001- Repair Specification

**Suitability**
S2 -ISSUED FOR INFORMATION

**Document Revision**
P01

**DATE**
07 February 2025

Document prepared on behlf of ADS Consult

# DOCUMENT CONTROL SHEET

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**Our Ref:** 8383-ADS-XX-XX-CA-S-001- Repair Specification

**Project:** Proposed Redevelopment, Bridgewater House

**Report:** Structural Inspection and Repair Specifications

**Status:** Preliminary

**Date:** February 2025

Document Production Record

| Issue Details | Name |
|---|---|
| Prepared by: | Nipin Azeez |
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Document Revision Record

| Issue No | Date | Revision Details |
|---|---|---|
| P1 | 07/02/25 | First Issue |

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# INTRODUCTION

The following are the structural repair specifications required for the above-mentioned project.

## DEMOLITION WORKS

### 1.0 EXCAVATION

#### 1.1 Specific Terms

1.1.1 In this Specification the term 'General Contractor' shall refer to the main contractor who will be responsible for all works associated with the demolition works, even where these works are sub-contracted.

1.1.2 The term 'Contractor' shall refer to the demolition sub-contractor where one is appointed. In such cases the General Contractor is to notify the Engineer of the Contractors details (i.e name, address, telephone number and contact name).

1.1.3 The term 'Engineer' shall refer to the authorised representative of the ADS Structural Ltd.

#### 1.2 Treatment of Arisings

1.2.1 All vegetation arising out of the execution of the Works is to be removed from the Site.

1.2.2 All compressible and deleterious matter arising out of the execution of the Works is to be removed from the Site (eg timber, metal, insulation, felt, plasterboard, etc).

1.2.3 All reinforced concrete, other than lightly reinforced concrete which can be suitably broken up/crushed and the reinforcement removed, is to be removed from the Site.

1.2.4 All brickwork and retained concrete (see clause 3.3) to be re-used as suitable fill on the Site is to be broken down/crushed to pass a 100 mm sieve size and shall form a reasonably well graded granular fill capable of being rolled/compacted to provide a well-bound compact fill, free from voids.

1.2.5 Clay arising out of the excavation works associated with the demolitions is deemed to be unsuitable as a fill material and is to be removed from the Site.

1.2.6 The Contractor is to take due account of all precautions necessary in connection with the handling and disposal of all materials which are a recognised heath and safety risk.

#### 1.3 Statutory Regulations And Working Practices

1.3.1 The Contractor shall be responsible for complying with any relevant Police Regulations and Restrictions.

1.3.2 The Contractor shall execute the Works in a proper and workmanlike manner and is accordance with all current Legislation and Documents relating to accepted good practice, including all relevant British Standards.

1.3.3 The Contractor is responsible for obtaining all necessary permits from the Local Authority in respect of the demolition works and is required to liaise closely with the Local Authority in respect of all necessary protective structures, etc.

1.3.4 The Contractor is responsible for ensuring that all health and safety issues are properly addressed to ensure compliance with the Health and Safety Plan and the CDM Regulations

**1.4 Services And Waterways**

1.4.1 The Contractor shall be responsible for carrying out his own checks with the various statutory authorities prior to commencement of the Works to satisfy himself regarding the location and condition of all services on the Site, live or otherwise. Where necessary the Contractor shall take appropriate action to isolate and/or protect such services against damage arising out of the execution of the Works during the Contract period.

The Contractor will be held financially responsible for making good any damage resulting from the execution of the Works or operations related thereto to the satisfaction of the appropriate Authorities concerned.

1.4.2 The Contractor shall afford facilities for properly accredited representatives of Statutory Authorities for access to their existing apparatus situated in, over or under the Site as may be necessary for inspecting, maintaining, removing, diverting, repairing, renewing or for any other purpose. The Contractor shall clear away, within such time as may be considered reasonable by the Engineer, any of his materials or spoil or other obstructions whatsoever which may lie in the way of or be a hindrance to such Authorities.

1.4.3 Where necessary the Contractor shall be responsible for protecting all existing waterways during the course of the Works and for ensuring that such waterways are not blocked/impeded as a result of the Works.

Any such blockages are to be cleared to the satisfaction of both the Engineer and the relevant Authority at the Contractors own expense.

**1.5 Safety/Protection**

1.5.1 The Contractor shall provide all necessary labour for, and maintain all warning notices, lights, barriers, signalling apparatus, temporary fencing and watching and any other things necessary for the protection of the public and others and for the regulation and control of vehicular and pedestrian traffic, both on the site and in all roads and streets affected by the execution of the Works. Any works in highways or public rights of way shall be provided with barriers and with lighting where appropriate.

1.5.2 The Contractor shall be responsible for ensuring that all vehicles leaving the Site are safely and not excessively loaded. The Contractor is to arrange for all vehicles leaving the Site to pass beneath a suitable solid barrier or to be otherwise checked individually on leaving the Site.

1.5.3 The Contractor shall protect against damage directly by the Works or by vehicles employed in connection with the Works, all public and private roads, temporary access roads, etc., on or adjacent to the Site or used in connection with the Works. Any such damage arising out of non-compliance with this clause shall be made good by the Contractor at his own expense.

1.5.4 The Contractor is responsible for providing adequate protection to adjoining structures and site features (e.g.

hedges, trees, paths, driveways, etc), both on and around the Site, throughout the duration of the Works.

**1.6 Noise**

1.6.1 The neighbourhood noise level is not to exceed 75DB(A) measured in accordance with BS 5228, Appendix E and restricted to the hours of 7am to 7pm Monday to Saturday inclusive, unless local bye-laws and regulations stipulate more stringent practices, in which case the latter should be adhered to.

**1.7 Cleanliness**

1.7.1 The Contractor shall take all reasonable precautions to ensure that roads and thoroughfares used by him are not made dirty as a result of his operations and in the event of them becoming thus dirtied the Contractor shall take all necessary action to clean them, without undue delay.

1.7.2 The Contractor shall take all reasonable precautions to minimise the dust arising out of the demolition works and if necessary wagons leaving the Site shall be wetted prior to doing so.

**1.8 Fires on Site**

1.8.1 The disposal of materials and rubbish by burning on the Site will not be permitted.

**1.9 Programme/Method Statement**

1.9.1 Prior to commencing the Works the Contractor shall provide the General Contractor and the Engineer with a programme for the Works, which shall include a method statement and details of all temporary support works and protective measures deemed necessary.

1.9.2 Approval by the General Contractor and/or Engineer in respect of this programme does not absolve the Contractor of any responsibility for the Works.

## CONCRETE (MINOR WORKS)

**1.1 Cement**

Cement shall be Ordinary Portland Cement to BS12 or Sulphate Resisting Cement to BS4027, to be delivered in sealed bags or approved bulk containers and to be stored in dry conditions. Any cement which becomes caked or otherwise adversely affected shall be removed from the Site.

**1.2 Aggregates**

Aggregates are to be naturally occurring sand, gravel or stone complying with BS882. Aggregates shall be stored and handled to prevent contamination, intermingling and segregation. Coarse aggregate is to be graded 20 mm - 5 mm unless stated otherwise.

**1.3 Water**

Water is to be from the mains supply or as otherwise shown to comply with BS3148. It shall be used only in sufficient quantity to achieve the minimum necessary workability.

**1.4 Admixtures**

Admixtures are not be used without the written permission of the Supervising Officer/Engineer.

**1.5 Reinforcement**

Steel reinforcement is to comply with the following British Standards:-

(a) Hot rolled grade 250.....BS4449
(b) Hot rolled grade 460/425 Type 2.....BS4449
(c) Cold worked grade 460/425 Type 2.....BS4461
(d) Welded steel fabric mesh.....BS4483

Reinforcement is to be free from loose scale and rust and shall not be contaminated in any manner.

Reinforcement is to be bent cold and must not be damaged or fractured. Bending tolerances are to comply with BS8666.

Reinforcement is to be held in the correct position to achieve the specified cover and spacing by using approved spacers which are to be securely fixed to the reinforcement to prevent displacement during concreting.

All reinforcement is to be adequately tied with soft iron wire to ensure that it is securely fixed in the correct position and to ensure that all cages are rigid. The ends of all the wire are to be bent inwards.

Reinforcement laps are to be as specified on the Engineers drawings and for fabric reinforcement shall not be less than 450 mm.

## 1.6 Mix Design

The mix proportions are to be such that the strength specified on the drawings is achieved with sufficient workability to enable the concrete to be adequately compacted.

The minimum mix proportions should not be less than those specified in BS8110 and should otherwise comply with the requirements specified on the drawings.

## 1.7 Mixing

All concrete (except ready mixed) is to be mixed in an approved mechanical mixer in accordance with BS1305. The mixing time and the volume of the mix is to be in accordance with the mixer manufacturers recommendations.

## 1.8 Ready-Mixed Concrete

If the Contractor proposes to use ready mixed concrete then he shall first obtain written approval from the Supervising Officer/Engineer for use of the proposed Supplier and this will not be given until details of the mix design are submitted to the Supervising Officer/Engineer.

Ready-mixed concrete is to be discharged from the truck mixer within 2 hours of the commencement of the mixing process.

The Contractor is to retain on site, for inspection by the Supervising Officer/Engineer, all delivery notes from the Supplier which are required to identify the following information:-

(a) Name of concrete depot
(b) Time of loading at depot
(c) Date and time of delivery
(d) Name of purchaser
(e) Serial number
(f) Concrete strength
(g) Minimum cement content and type of cement
(h) Workability
(i) Maximum nominal aggregate size.

## 1.9 Formwork

The design of formwork and its supports is to be the sole responsibility of the Contractor.

Formwork is to be made from sound properly seasoned timber and is to be securely fixed/supported to ensure that the structural members, when cast, are constructed to acceptable tolerances. Joints in the formwork are to be tight fitting to prevent grout loss from the fresh concrete.

All timber surfaces which are to be in contact with the concrete are to be coated with mould oil or an approved release agent.

All debris inside the formwork is to be removed immediately before placing of the concrete.

Striking times for formwork are to be in accordance with Table 6 of BS8110 or other relevant publications (ie Department of Environment Advisory Leaflet No.7: "Concreting in Cold Weather").

### 1.10 Placing Concrete

Concrete is to be placed in the Works within 30 minutes of leaving the mixer or the mixing drum of the concrete truck.

Where a polythene membrane has been specified on the Engineers drawings this is to be at least 1000g unless specified otherwise. Laps in membranes are to be not less than 250 mm.

Concrete is to be placed so as to avoid segregation or voids and is to be thoroughly compacted into all parts of the formwork and around all reinforcement by using an immersion type vibrator.

The position of all construction joints in the concrete are to be approved by the Supervising Officer/Engineer and such joints are to be treated as agreed with the Supervising Officer/Engineer.

### 1.11 Curing & Protection

Prior to commencing the works the Contractor is to notify and obtain approval from the Supervising Officer/Engineer for the proposed methods of curing the concrete. Curing is to commence within 30 minutes of placing the concrete and such protection is to remain in position for not less than 7 days.

Surfaces which will be exposed to frost and wearing surfaces of floors and pavements, regardless of weather conditions shall be covered for not less than 10 days. Other surfaces shall be covered for not less than 5 days. These times may only be varied with the agreement of the Engineer.

Surfaces are to be adequately protected from shock, indentation and physical damage during the course of the Works.

### 1.12 Finishes

All finishing operations are to be carried out at optimum times in relation to the setting and hardening of the concrete. Wetting or sprinkling of cement onto surfaces of concrete to assist surface working is not permitted.

The required surface finish is to be as specified on the Engineers drawings.

Smooth float finish to floor slabs is to be achieved using a hand float, skip float or power float to give an even surface with no ridges or steps.

Where a trowelled finish is required as a wearing surface the concrete is to be smooth float finished and then hand or power trowelled at intervals, applying sufficient pressure to close the surface, to give a uniform finish free from trowel marks and other blemishes.

### 1.13 Adverse Weather Conditions

In cold weather concrete is to be placed and cured in accordance with the Department of the Environment Advisory Leaflet No.7 "Concreting in Cold Weather".

Concrete is not to be placed at an initial air temperature of less than 7 degrees.

Concrete must not be placed against frozen or frost covered surfaces.

Concrete must not be placed in the open during periods of heavy rain.

### 1.14 Testing

Works test cubes are to be made, cured and tested in accordance with BS1881 from samples taken from the concrete at the time of placement in the Works.

Two sets of 3 cubes are to be taken from each batch of concrete made. One cube from each set is to be tested at 7 days and the remaining 2 cubes from each set are to be tested at 28 days.

Testing is to be carried out at an approved independent testing laboratory and arrangements are to be made by the Contractor for the test results to be sent direct to the Supervising Officer/Engineer.

Compliance with the specified 28 day strength will be assumed only if both the 28 day test cubes exceed or meet the specified strength. Otherwise that part of the Works which is represented by the test cubes will be classed as defective and is to be cut out and re-cast at the Contractors own expense.

## BRICKWORK & BLOCKWORK (MINOR WORKS)

### 1.1 Bricks

Clay bricks are to comply with BS3921 for the class appropriate to the works. Facing bricks are to be well mixed to obtain an even distribution of colouring.

Concrete bricks are to comply with BS6073, Part 1 for the class appropriate to the work.

Calcium silicate bricks are not to be used.

Facing bricks are to commence not less than 150 mm below finished ground level unless stated otherwise on the Engineers drawings.

All brick are to comply with the strength specified on the drawings.

Below dpc all bricks shall have a water absorption of less than 7% and between 7 and 12% above dpc level.

### 1.2 Blocks

Blocks are to comply with BS6073, Part 1 and are to be solid unless specified otherwise on the drawings.

All blocks are to comply with the strength specified on the drawings and below dpc shall be not less than 7N strength solid dense blocks.

**1.3 Mortar**

Mortar is to be as specified on the drawings. Below dpc all mortar is to be 1:3 cement:sand unless stated otherwise.

**Sand** for mortar mixes is to be clean river or pit sand, washed and sieved if necessary and free from silt, clay, chalk and organic matter.

The quality and recommended grading of the sand is to be as specified in BS1199 or BS1200 and details of the sieve analysis of the proposed sand is to be provided to the Supervising Officer/Engineer for approval if requested.

**Cement** for mortar mixes is to be obtained from an approved source and is to be Ordinary Portland cement to BS12 unless specified otherwise on the drawings.

**Lime** for mortar mixes is to be hydrated or other approved non-hydraulic lime and is to comply with the requirements of BS890.

**Ready-mixed mortar** is not to be used without the written approval of the Supervising Officer/Engineer and when used is to comply with BS4721.

**Additives** will not be permitted without the written approval of the Supervising Officer.

**1.4 Handling And Storage of Materials**

Bricks and blocks are to be stacked off the ground and must be protected from rain, frost and snow at all times. Sand, cement and lime are to be stored in a dry place, protected from the weather.

Bricks which are chipped, soiled or otherwise damaged in any way are not to be used in the Works.

**1.5 Laying Bricks And Blocks**

Bricks and blocks are to be laid on a full bed of mortar and all joints should be filled with mortar. Bricks with frogs are to be laid with the frogs upwards and completely filled with mortar.

Joints are to be of uniform thickness, normally 10 mm unless otherwise necessary to match existing work. Courses should be kept evenly spaced using gauge rods.

Joints are to be struck/pointed to match existing works or as otherwise agreed with the Supervising Officer/Engineer and appropriate to the location of the Work. Pointing is to be from the top of the works downwards and the joints are to be brushed to remove dust and loose material. Care should be taken with facing work so that no mortar encroaches onto the face of the units.

Courses are to be kept level by carrying out regular level checks and walling is to be regularly plumbed to ensure that the vertical tolerance of the work is acceptable.

Dimensions are to be checked for compliance with the drawings.

Bricks and blocks are to be coursed/bonded to match existing work. Otherwise for single leaf work stretcher bond is to be used and for thicker walls full English or Flemish bond is to be used.

**1.6 Adverse Weather Conditions**

Newly built work is to be protected from rain and is not to be left exposed/uncovered, if external, at the end of each working day.

In cold weather newly built work is to be covered with sacking, tarpaulins or other suitable material to protect the works from frost. Unless a minimum temperature of 5 degrees can be maintained until the work hardens no brick or block walling is to be built.

In periods of very dry and warm weather newly built work is to be wetted to prevent premature drying out of the mortar.

**1.7 Damp Proof Courses**

Damp proof courses are to be incorporated in the Works as shown on the drawings and as otherwise accepted as good building practice and to comply with the Local Authority building regulations.

Damp proof courses are to be laid in mortar in a continuous strip with 150 mm laps.

**1.8 Ties**

Ties are to be as specified on the drawings.

In the case of cavity wall ties, vertical twist type 3 stainless steel ties are to be used.

Unless specified otherwise all ties are to be stainless steel.

**1.9 Cavity Walls**

Both leaves of cavity walls are to be built together so that each leaf does not project above the other by more than 450 mm.

Cavities are to be kept free from mortar droppings and holes should be left at the base of the wall to remove any fallen debris. The holes should be filled/made good on completion of the work.

Weep holes in vertical joints should be formed at 900 mm centres at the base of the wall and where the cavity is bridged (ie above lintols).

No mortar is to be allowed to drop onto the wall ties and should be removed if this occurs.

## CRACK REPAIRS

**1.0 Type A Repair in Brickwork and Blockwork**

1.1 Where render or plaster has cracked the render or plaster is to be removed for a minimum distance of 75 mm to each side of the crack, to fully expose the underlying brickwork.

1.2 Cracked mortar joints are to be raked out squarely to a minimum depth of 20 mm or back to sound mortar, whichever is the greater, removing all traces of old mortar from the brick edges. If raking out is carried out by a mechanical means (eg angle grinder) then a dust extraction cleaning system should be provided.

1.3 All cracked bricks are to be cut out and replaced unless agreed otherwise with the Engineer. Replacement bricks are to match the existing bricks as closely as is practically possible. All cracked blocks are also to be replaced but using solid concrete bricks.

1.4 After raking out the joints should be thoroughly brushed out with a fine bristle brush, to remove all dust and loose particles.

1.5 When repointing commences the wall should be in a damp condition, particularly when carrying out repointing in hot dry weather conditions, the joints may be wetted with clean water but must not be soaked.

1.6 Unless specified otherwise a 1:2:9 (cement:lime:sand) mortar is to be use for repointing, coloured as necessary to match with the original pointing. Where colouring is necessary the mortar should preferably be ready-mixed in order to achieve the required colour consistency and the mortar should not be trowelled excessively as this can affect the colour.

1.7 Sand for repointing works should be a soft washed type.

1.8 Mortar should be mixed in small quantities and should be used immediately. Mortar which begins to harden before use should be discarded and no attempt should be made to reconstitute it by adding more water and re-mixing.

1.9 The repointed joints should be tooled or cut, according to the type of joint used, and all loose materials brushed away with a soft brush after each batch of mortar has been used.

1.10 On completion of the crack repair where walls are plastered or rendered, a minimum 125 mm wide strip of stainless steel expanded metal lathing is to be fixed along the former crack line by shot-firing nailing or screwing (as appropriate) onto a bed of plaster (if internal) or mortar (if external). Internal wall surfaces are then to be made good by replastering on basecoat and finishing coat to achieve a smooth level finished surface which is to be aligned with the adjacent wall surfaces and rubbed/sanded smooth. External wall surfaces are to be made good by re-rendering to match the original finish (level and texture) as closely as possible.

**2.0 Type B Repair in Brickwork and Blockwork**

2.1 Repair to be as Type A repair but after raking out the cracked mortar joints the crack is to be drilled out using a 6 mm diameter bit to a depth of at least 75 mm and it is then to be slate packed. Packing should be carried out under each individual brick and should penetrate the crack as far as possible (not less than 75 mm).

**3.0 Type C Repair in Brickwork and Blockwork**

3.1 Repair is to be as Type A repair but after raking out the cracked mortar joints the crack is to be drilled out using a 6 mm diameter bit to a depth of at least 75 mm and it is then to be injected with a 2-pack gun grade resin compound to achieve complete filling of the crack to as great a depth as is practically possible.

3.2 Where the repair is to be covered over by plaster or render the crack does not require raking out or repointing as the resin can be used to fill the crack to the face of the brickwork or blockwork.

**4.0 Type D Repair In Plaster (Walls or Ceilings)**

4.1 Rake out along crack line then brush out crack using a fine bristle brush to remove all dust.

4.2 Fill crack using a suitable flexible filling material.

4.3 Rub down filler to achieve a smooth surface finished level with the adjacent plaster finish.

**5.0 Crack Stitching**

5.1 Chase out along a mortar bed joint for the full thickness of the joint and for a length of not less than 800 mm (400 mm each side of the crack line) and for a depth of not less than 60 mm from the face of the brickwork.

5.2 Clean out all dust from the chase.

5.3 Inject the chase with a proprietory resin compound, ensuring that the deepest part of the chase is filled with at least a 10 mm depth of resin.

5.4 Insert a stainless steel 8 mm diameter threaded bar into the chase, pressing firmly into the resin compound.

5.5 Fill the remainder of the chase with the resin compound.

5.6 Where the wall has a brick finish the resin should be left at least 10 mm back from the face of the wall and the mortar joint then reinstated with mortar, coloured and struck to match the existing wall.

5.7 Where the wall has a plaster or rendered finish the above should be filled with resin up to the face of the brickwork and the plaster or render then reinstated to match the existing wall.

# REPOINTING WORKS

## 1.0 General Repointing

1.1 Before preparing the mortar joints for repointing all lichen and moss should be completely removed from the face of the brickwork by careful scraping, followed by a fungicidal wash as necessary. Care should be taken not to damage the brick face.

1.2 Where areas of brickwork are specified to be repointed the mortar joints are to be raked out squarely to a minimum depth of 15 mm or back to sound mortar, whichever is the greater, removing all traces of old mortar from the brick edges. If raking out is carried out by mechanical means (eg angle grinder) then a vacuum dust extraction cleaning system must be provided.

1.3 After raking out the joints should be thoroughly brushed out with a fibre bristle brush, to remove all dust and loose particles.

1.4 When pointing commences the wall should be in a damp condition, particularly when carrying out repointing in hot dry weather conditions. The joints may be wetted with clean water but must not be soaked.

1.5 Unless specified otherwise a 1:2:9 (cement:lime:sand) mortar is to be used for repointing, coloured as necessary to match with the original pointing. Where colouring is necessary the mortar should preferably be ready-mixed in order to achieve the required colour consistency and the mortar should not be trowelled excessively as this can affect the colour.

1.6 Sand for repointing work should be a soft washed type.

1.7 Mortar should be mixed in small quantities and should be used immediately. Mortar which begins to harden before use should be discarded and no attempt should be made to reconstitute it by adding more water and re-mixing.

1.8 The repointed joints should be tooled or cut, according to the type of joint used, and all loose material brushed away with a soft brush, after each batch or mortar has been used.

# TIMBERWORK

## 1.1.1 Generally

All new timberwork is to be fully cured and pressure impregnated with preservative. Strength classes are to comply with those specified in the Schedule of Repairs or on the Contract Drawings and shall not be less than SC3.

## 1.1.2 "Squaring" Door Openings

Where existing door openings are to be "squared" this is to be achieved by releasing the existing casing and architraving as necessary, adjusting, packing and refixing. All minor gaps are then to be filled with a proprietary wood prior to redecoration works.

Where picture rails occur adjacent to the door openings then the adjusted architraving is to match the level of the rails.

This work is to include any necessary making good of the surrounding plasterwork.

**1.1.3 Relevelling Picture Rails**

Where picture rails are to be relevelled the existing rails are to be carefully removed, the plaster cut back locally above and/or below the rails and the rail then refixed level. The plaster is then to be made good as necessary.

**1.1.4 Relevelling Timber Floors**

Relevelling of timber floors may be achieved in any one of the following ways unless specified on the Contract Drawings or in the Schedule of Works:-

(i) Release the existing joists at their bearings, enlarge the bearing pockets as necessary and jack up the floor to the required level. Re-pack the joist bearings and secure all loose floor boards and the ceiling finish.

(ii) Remove the existing floor boards, fix timber firrings onto the existing joists and relay the floor boards.

Both methods (i) and (ii) are to include removal and refitting of skirting boards and coving as necessary. Also for making good all adjacent plaster finishes as necessary.