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Kingsway House

Demolition and Enabling Works Specification of Structural Works

Project number: 213461

Status: Tender

Revision: T1

Date: August 2019

engineering a better society

Document Control

		remarks:	Tender Issue				
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Date:	20/08/19	Signature:	LGa	Signature:	JGa	Signature:	JGa

Temporary Works

1. The Contractor is entirely responsible for maintaining the stability of all existing buildings and structures, within and adjacent to the works, and of all the works from the date of possession of the site until practical completion of the works.
2. The Contractor shall design, install and maintain all necessary temporary works and shall submit proposals for the temporary supports and sequence of construction for the works, to the Structural Engineer and Contract Administrator at least 10 working days prior to starting on site. These proposals shall be supported by design calculations unless agreed otherwise by the Structural Engineer in writing.

Stability

1. The Contractor is to accept full responsibility for the stability and structural integrity of the works during the Contract and provide temporary support as necessary. They shall also prevent overloading of any completed, partially completed or existing elements.

Tolerances

1. All tolerances are to be agreed with the Architect and in accordance with their drawings and specifications, and the Contractor will be responsible for ensuring that sufficient tolerances are provided and integrated throughout all elements of the works.
2. The Contractor is to take account of tolerances detailed elsewhere in all relevant project drawings and specifications when complying with the above clause.
3. Unless otherwise indicated on the drawings and specifications provided by the Architect or Engineer the setting out dimensions and levels of the finished structural works shall be within the maximum tolerances given below.

Description	Maximum Tolerance
All dimensions of 3m and over	+/- 5mm
All dimensions less than 3m	+/- 3mm

Materials and Workmanship

1. All articles, materials and goods shall be new and of good quality, suitable for the required purpose and shall conform to the appropriate Eurocode, British Standard (if still applicable), or other applicable quality standard where such exists. Where references to the above are made it shall be inferred that the latest edition applies, together with subsequent amendments, unless otherwise specified.

Excavation and Filling

1. A site investigation has been carried out and the report is available from the Engineer unless already issued with the tender documents. Please refer to Geotechnical and Environmental Associates (GEA) report "J17049 Rep Issue 1".
2. Before beginning any excavation the Contractor must ensure that they have located any live services in the neighbourhood of the intended excavation.
3. No excavation within 3 metres of an existing foundation is to be taken below the level of the existing foundation unless a method statement has been agreed in writing with the Engineer.

4. The Contractor must not excavate below the level of the underside of a Party Wall foundation within 3 metres, or undermine the bearing of a Party Wall foundation within a 45 degree line from the edge of the base within 6 metres until all necessary Party Wall awards are in place and method statements have been agreed.
5. The Engineer and Building Control Officer shall be given the opportunity of examining all excavations, filling and hardcore before they are concreted or covered up. The Contractor shall give at least 24 hours' notice of when excavations will be ready for inspection. If a good foundation bearing is not obtained at the level shown, the Engineer is to be informed.
6. Excavations shall not be left exposed longer than necessary in order to avoid deterioration from the weather or other causes, and if necessary they should be protected. In clay formations the excavations shall not be left exposed for more than 24 hours. If the formation deteriorates it shall be cleaned out and reformed to the Engineer's satisfaction before any concrete is placed.
7. The Engineer is to be informed immediately if any significant change in strata occurs at formation level.
8. Hardcore for filling shall consist of selected clean broken stone, concrete, hard sound brick, slag or other approved materials, and shall be chemically inert. The materials shall be broken down to a maximum 75mm gauge with a sufficient proportion of fines for thorough compaction. Hardcore shall be well consolidated by means of roller, vibrating plate or mechanical punner. Care shall be taken to ensure that no damage is caused to any foundations, walls or services.

Foundations

1. New foundations have been designed to suit an allowable bearing pressure of 250kN/m². The Contractor is to ensure that all new foundations bear onto an even natural bearing formation of undisturbed subsoil and is to notify the Building Control Officer for their inspection before concreting.
2. If the Building Control Officer requests amendments to the foundations or if conditions differ from those noted above, the Contract Administrator and Structural Engineer are to be notified immediately. The Contractor shall not proceed without receiving instructions from the Contract Administrator.
3. Foundations are to be cast symmetrically about piers, stanchions, or walls, unless noted otherwise on the drawings.
4. In the absence of any detailed testing information for clay soils, depths of new foundations are to be designed in accordance with National House Building Council (NHBC) Standard Chapter 4.2 Building Near Trees, assuming a highly shrinkable clay soil.

Masonry

1. Workmanship is to comply generally with BS EN 1996-1-1, 2 & 3. Brickwork to be to BS EN 772-3 & 7 and BS EN 771-1. Blockwork to be to BS 6073-2.
2. New brickwork above the damp proof course (d.p.c.) is to be minimum class 3 set in 1:1:6 (cement:lime:sand) mortar, unless noted otherwise on the drawings.
3. New blockwork is to be minimum strength 7.0 N/mm² set in 1:1:6 (cement:lime:sand) mortar, unless noted otherwise on the drawings.
4. Brickwork and blockwork are to be laid properly bonded as agreed with the Architect and fully bonded into existing masonry. All junctions in structural walls are to be fully tooth bonded unless agreed otherwise.

5. All masonry below the d.p.c. is to be set in 1:3 (Cement:Sand with plasticiser) mortar with sulphate resisting cement.
6. New brickwork below the d.p.c. is to be Class B engineering bricks.
7. New blockwork below the d.p.c. is to be specified as suitable for such use by the manufacturer, and of minimum strength 7.0N/mm^2 , or as noted otherwise on the drawings.
8. Do not use frozen materials or lay masonry when the ambient air temperature is at or below 3°C and falling or unless it is at least 1°C and rising.
9. Unless noted otherwise on drawings or Architects specification, Cavity wall ties shall be Ancon Staifix RT2 stainless steel ties (or similar equivalent) to BS EN 845-1:2003 spaced at 450mm centres vertically, 900mm centres horizontally staggered, and at 225mm centres vertically at 225mm from all openings, corners and reveals. Minimum embedment to be 62.5mm into each masonry leaf.
10. Wall ties elsewhere are to be, to BS EN 845-1:2003, as noted on the drawings. Minimum embedment to be 62.5mm into each masonry leaf.
11. Bricks and blocks shall not be stored on any floor without first obtaining written consent from the Engineer. The Contractor shall ensure that the loadings imposed on the permanent works by the storage of materials does not overstress any part of the permanent works or cause excessive deflection.
12. In dry weather, bricks are to be soaked in water before being laid, and tops of walls to be raised are to be similarly soaked before work is recommenced.
13. Brickwork and blockwork is to be carried up in a uniform manner and is to be raked back and not toothed up, no section rising more than one metre above the remainder. Brickwork built with standard 65mm bricks shall rise at the rate of four courses to 300mm. No more than sixteen courses shall be built in a day without prior permission of the Engineer.
14. Crack control brick reinforcement is to be provided over doors, over and under windows and at changes in profile (e.g. where the building steps from two storeys to one storey), as follows: 2 layers of Bekeart Bricktor (or similar equivalent) in the two bed joint immediately adjacent to the opening. To extend 600mm beyond the opening on both sides and 600mm either side of the change in profile.
15. Vertical movement joints should be provided in masonry walls built with cementitious mortar to minimise the risk of major cracking, as shown in the following table:

Material	Joint Width (mm)	Normal Spacing
Clay brick	16	12m (15m maximum)
Calcium silicate brick	10	7.5 to 9m
Concrete block and brick	10	6m
Any masonry parapet wall	10	Half the above spacing and 1.5m from corners (double the frequency)

The spacing of the first movement joint from a return should not be more than half of the above dimension.

Provide flat straight stainless steel ties within the joint at 225mm vertical centres de-bonded with sleeves over one half. Joints to be filled with suitable compressible material with minimum 10mm deep weather proof sealant to the external leaf. In cavity walls, provide cavity wall ties (as clause 9), at 225mm centres vertically within 225mm of either side of the joint. Positions of joints to be agreed with the Architect prior to construction.

16. Steel columns, posts and proprietary windposts to be tied to internal block leaf within cavity walls using Halfen HTS framing cramps at 225mm vertical centres, or similar equivalent product, fixed to steel in accordance with manufacturers specification.
17. Proprietary wall starter systems such as Furfix (or similar equivalent) may be used to tie new masonry extensions to existing masonry in locations where approved by the Structural Engineer.
18. Use proprietary head restraints as detailed by Halfen or Ancon (or similar equivalent) to tie tops of internal block walls to the underside of concrete floor slabs.
19. All masonry walls to be restrained by timber floors and roofs with lateral restraint straps at 1200mm c/c as noted in the Timber specification section.

Concrete

1. Materials and workmanship are to comply generally with BS EN 1992-1-1 and BS EN 13670.
2. All reinforced concrete not in contact with the ground to be designated concrete C35/45 to BS 8500 and BS EN 206-1 with CEM1 OPC to BS EN 197 and 20mm max aggregate. All reinforced concrete in contact with the ground such as foundations or retaining walls to be constructed in designated concrete C35/45 using sulphate resistant cement and 20mm max aggregate to BS 8500 and BS EN 206-1.
3. The Contractor shall provide details of all admixtures to be used in the concrete and agree their use with the Engineer before any concrete is delivered to site.
4. Cement replacements such as Ground Granulated Blast furnace Slag (GGBS) or Pulverised Fuel Ash (PFA) may be used to replace up to 70% of the cement content of the concrete. Using these cement replacement products reduces carbon dioxide emissions as they are by-products of materials from other industries. The Contractor should send the mix specification to the Engineer for and obtain approval prior to ordering any concrete. If used, the Contractor must adjust their formwork strike times to suit any loss of early strength gain.
5. Concrete for padstones is to be 2:3:6 (cement:fine sand:coarse sand) nominal mix, with OPC and 10mm max aggregate.
6. Ready mixed concrete must be obtained from a plant which holds a current Certificate of Accreditation under the Quality Scheme for Ready Mixed Concrete.
7. Site-mixed concrete may be used when agreed with the Engineer. An agreed pre-batched and bagged proprietary concrete must be used unless an alternative site batched concrete has been agreed with the Engineer.
8. Do not place concrete when the ambient air temperature is less than 5°C and take all necessary measures to ensure that the temperature of the placed concrete will not fall below 5°C for the specified curing period.

9. Concrete Cubes to be tested for compressive strength for all reinforced concrete elements. 3 samples per pour or per 50m³. One 7 day test, one 28 day test and one sample for future testing if required. All tests to be carried out by UKAS accredited laboratory or equivalent. Testing to BS EN 206-1, annex B and BS 8500-1, annex B. Results are to be submitted to the Engineer within 5 working days of test.
10. The Contractor is to provide suitable curing for all concrete elements to comply with the requirements of BS EN 13670. The table below is an extract from BS 8110-1, which though no longer cited, is provided for guidance. For non-standard mixes including concrete with more than 50% GGBS or 30% PFA the Engineer should be consulted for guidance.

Table 6.1 - Minimum Periods of Curing and Protection

Type of cement	Ambient Conditions after casting	Minimum periods of curing and protection	
		Average surface temperature of concrete	
		5°C to 10°C	t °C (any temperature between 10°C and 25°C)
		Days	Days
CEM I 42.5 or CEM I 52.5 to BS EN 191-1	Average	4	$\frac{60}{t+10}$
	Poor	6	$\frac{80}{t+10}$
SRPC 42.5 to BS 4027	Average	6	$\frac{80}{t+10}$
	Poor	10	$\frac{140}{t+10}$
All	Good	No special requirements	
NOTE 1 Abbreviations for the type of cement used are as follows: CEM I 42.5 : Portland cement (class 42.5) (see BS 12); CEM I 52.5 : Portland cement (class 52.5) (see BS 12); SRPC 42.5 : Sulphate-resisting Portland cement (class 42.5) (see BS 4027). NOTE 2 Ambient conditions after casting are as follows: good : damp and protected (relative humidity greater than 80%; protected from sun and wind); average : intermediate between good and poor; poor : dry or unprotected (relative humidity less than 50%; not protected from sun and wind).			

11. All holes shall be formed and all inserts cast in at the time of pouring concrete. No part of the concrete works shall be drilled or cut away without the approval of the Structural Engineer.
12. Reinforcement shall be:
 - (i) deformed bars to BS 4449:2005, grade B500, prefix H (or T) on drawings and schedules
 - (ii) mesh to BS 4483
13. Reinforcement shall be fixed adequately using tying wire or steel clips. Concrete cover is to be as specified on the drawings. Reinforcement chairs and proprietary spacers are to be provided as necessary to maintain the specified cover. Broken bricks, tiles or other debris must not be used.

14. Unless noted otherwise on drawings, all reinforcement is to be lapped 40d (where d is diameter of the smaller bar).
15. All formwork and supporting members shall be sufficiently strong to resist the pressure of the wet concrete and to ensure that the specified tolerances for the finished work are achieved.

Unless otherwise specified by the Structural Engineer or Architect the formwork shall be such that the resulting concrete finish shall be Ordinary finish in accordance with the National Structural Concrete Specification (NSCS), clause 8.6.1.2 i.e. There are no special formwork requirements for this finish. Concrete should be thoroughly compacted and the formed surface should be free from major inherent blemishes and honeycombing.

16. The minimum period before striking formwork shall be in accordance with BS EN 1992-1-1. The table below is an extract from BS 8110-1:1997 table 6.2 which is suitable for most purposes and provided for reference.

Table 6.2 – Minimum period before striking formwork

Type of Formwork	Minimum period before striking	
	Surface temperature of concrete	
	16°C and above	t°C (any temperature between 0°C and 16°C)
Vertical formwork to columns, walls and large beams	12h	$\frac{300}{t} + 10$ h
Soffit formwork to slabs	4 days	$\frac{100}{t} + 10$ days
Soffit formwork to beams and props to slabs	10 days	$\frac{250}{t} + 10$ days
Props to beams	14 days	$\frac{360}{t} + 10$ days

NOTE: This table can be applied to CEM I and SRPC of higher cement strength classes.

Lintels

1. Prestressed concrete lintels to BS EN 845-2 by Supreme Concrete Ltd, Coppingford Hall, Coppingford Rd, Sawtry, Huntingdon PE28 5GP, Tel. 01487 833 300 . Sizes and types as indicated on the drawings. End bearing lengths are to be at least 150mm for spans up to 1.5m, and 225mm for spans up to 2m, unless noted otherwise on the drawings.
2. Galvanized steel lintels are to be to BS EN 10346 by Catnic, Pontypandy Industrial Estate, Caerphilly, Mid Glamorgan CF83 3GL, Telephone 029 2033 7900. Sizes and types as indicated on the drawings. End bearing lengths are to be at least 150mm for spans up to 1.5m, and 225mm for spans up to 2m, unless noted otherwise on the drawings.
3. The Contractor shall submit details to the Engineer and Contract Administrator for any alternative lintel type or manufacturer and obtain the Contract Administrator’s written approval, prior to commencement of the work.

Underpinning and Retaining Walls

1. The Contractor shall be responsible for ensuring that their operations do not in any way impair the safety or condition of the existing structure or the adjacent properties. They shall provide any temporary supports required for this purpose, and shall carefully inspect the condition of the structure both before and during the execution of the work and immediately inform the Engineer and Architect if they consider that any more stringent procedure than that specified is necessary.
2. Before starting the work the Contractor is to check for any services that could be damaged by the work and shall provide for the maintenance of drainage services during the works and for the reinstatement of any services interrupted or disturbed by the excavations.
3. Before completing the bulk excavation, the Contractor must install any temporary propping to the underpins and retaining walls in accordance with the temporary works design and sequence, and this temporary support shall remain in place until the drainage and permanent support structure has been installed.
4. Underpinning and retaining wall installation is to be carried out in short sections not exceeding 1000mm in length, in the numbered sequence shown on the drawings. Retaining walls may be installed in longer sections where agreed in the Contractors temporary design and sequence of works.
5. Before underpinning, projecting portions of the existing footings are to be carefully cut off as detailed and the underside of the footings are to be cleaned and hacked free of any dirt, soil or loose material.
6. The Engineer and Building Control Officer shall be given the opportunity of examining all excavations, prior to any underpinning or retaining walls being cast.
7. Unless noted otherwise on the drawings, reinforced concrete underpinning and retaining walls are to be constructed in designated concrete C35/45 using sulphate resistant cement and 20mm max aggregate in accordance with BS8500 and BS EN 206-1. Cover to reinforced concrete in contact with the ground to be a minimum of 75mm unless noted otherwise.
8. Underpinning and retaining walls are to be cast to the widths and depths shown on the drawings. As far as practicable excavation and concreting of any section of underpinning or retaining wall shall be carried out on the same day. Un-concreted sections shall be kept covered to prevent the ingress of water.
9. Concrete underpinning is to be stopped off approximately 100mm below the underside of the existing footing, and the final pinning up over the whole extent of the latter is to be carried out with a semi-dry fine concrete, well rammed in as soon as possible after the foundation has set hard. The pinning-up concrete is to consist of 1 part by volume of sulphate resistant cement to 3 parts of aggregate (well graded from 10mm maximum size down to fine sand) with a water/cement ratio by weight of 0.35.
10. Excavation to any section of underpinning shall not be commenced until at least 48 hours after completion of any adjacent section of the work.
11. The joint between adjacent sections of mass concrete underpinning is to be formed by creating a rough surface against which the first section is cast. Then, having thoroughly cleaned the exposed concrete face, the adjacent section may be cast. The joint between adjacent sections of reinforced concrete underpins or retaining walls should be prepared as above, however reinforced concrete underpins are to be dowelled together in accordance with the reinforcement detail drawings.

12. The Contractor shall prepare a Sequence of Work and submit it to the Contract Administrator for their comments prior to the commencement of the work.
13. The Contractor is to keep a record of the sequence and dimensions of the underpinning actually carried out, including details of excavation, casting concrete and pinning up for each section.
14. Holes and penetrations for services through underpins and retaining walls are to be set out and detailed by the Architect, including waterproofing details such as puddle flanges or hydrophilic strips, and installed prior to the pouring of concrete.



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Appendices

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