1.0 GENERAL

This Structural works specification is to be read in conjunction with all relevant Sage Design Services Ltd and specialist suppliers details, drawings and schedules. This specification is to be read in conjunction with Architect's and all other Consultants' drawings, which should be used to verify layout, setting out, finishes etc. Any discrepancies are to be brought to the attention of the Architect prior to construction.

Every material used and all workmanship shall comply with the current editions of the relevant British Standard unless alternative are authorised by Sage Design or specified herein. The British Standards referred to in this specification are to include all the amendments published before the time of tendering.

All structural work detailed on Sage Design Ltd construction drawings is to be to the satisfaction of the Local Authority Building Inspector and Sage Design Ltd. and shall be in accordance with the requirements of the relevant British Standards, Codes of Practices and Building Regulations to include all the amendments published before the time of tendering.

All existing details and dimensions indicated on the drawings are to be verified on the site by the main contractor prior to the commencement of any works. Any variations to be recorded and reported to Sage Design Services Ltd. to enable adjustments (if necessary) to be made to the structural scheme.

Materials are to be of a standard appropriate to the Works and suitable for the purposes stated in contract documents, and in accordance with good building practice. All materials to be new unless otherwise specified, and Contractor to ensure that the whole quantity of each product required to complete the work is of consistent kind, size, quality and overall appearance. Unless otherwise approved, do not use different colour batches where they can be seen together.

Handle, store, prepare, use and fix each product in accordance with its manufacturer's current printed or written recommendations/instructions. Prevent over–stressing, distortion and any other type of physical damage, keeping materials clean and free from contamination. Prevent staining, chipping, scratching or other disfigurement, particularly of products exposed to view in the finished work.

Keep different types and grades of products separately and adequately identified and ensure that protective measures are fully compatible with and not prejudicial to the products/materials.

Do not scale drawings. The Contractor is to check all dimensions on site before carrying out works.

The Contractor is to inform the Architect and Structural Engineer if the existing fabric, including foundations, is opened up and found to be inadequate, unsuitable to support the proposed works, or at variance from the details shown on the drawings.

Items noted on the drawings "to be verified on site" are to be exposed by the Contractor for inspection by the Structural Engineer at the earliest opportunity.

Do not cut any holes or chases through any structural members without first obtaining the written consent of the Structural Engineer.

2.0 EXISTING STRUCTURE

Existing structure including foundations, beams, walls and lintels carrying new and altered loads are to be exposed and checked for adequacy prior to commencement of work and as required by the Building Control Officer & set out on Sage Design Drawings.

3.0 TEMPORARY WORKS

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 for possession of the site until practical completion of the works.

The Contractor shall design, install and maintain all necessary temporary works and shall advise the Architect/Structural Engineer, before commencement of the works, of his proposals for temporary supports and sequence of construction for the works. These proposals shall be supported by design calculations if requested.
Adequate shoring where required, shall be sized and inserted by the Contractor to ensure the continuous stability of the structure. Such shoring shall be founded at a safe bearing level.

4.0 STABILITY

The Contractor is to accept full responsibility for the stability and structural integrity of the works during the Contract and provide support as necessary. He shall also prevent overloading of any completed or partially completed elements. Details of design loads may be obtained from the Architect/Structural Engineer.

5.0 TOLERANCES

All tolerances are to be agreed with the Architect, and the Contractor will be responsible for ensuring that sufficient tolerances are provided and integrated throughout all elements of the works.

The Contractor is to take account of tolerances detailed elsewhere in the drawings and appended Specifications when complying with the above clause.

6.0 STRUCTURAL STEELWORK

General. This Specification applies to the design, supply, fabrication, delivery and erection of the structural steelwork framing including all necessary members, fittings, welding, materials and workmanship all as indicated on the Sage Design Ltd drawings.

Materials and Workmanship. Materials and workmanship are to be of the best quality and unless otherwise specified are to be of British Manufacture in accordance with the latest British Standard Institution Specifications and Codes of Practice. All workmanship is to comply with BS 5950 Part 2

Specialist Sub–Contractor. All structural steelwork illustrated on the framing plans and sections is to be fabricated, delivered and erected by the specialist Sub–Contractor in accordance with BS5950.

Fire Protection. All structural steelwork to be half hour fire protected with 2 layers 12.5mm gypsum plasterboard or 1 layer 12.5 Gyproc Fireline board with staggered joists nailed to timber noggins. All joints to be staggered and taped. Boarding to have plaster skim with scrim joints.

Preparation and Painting. All structural steelwork to be mechanically cleaned to remove all rust, grease etc. and primed with 2 coats of zinc phosphate primer to minimum DFT 50 microns. On completion of erection on site, all areas where applied primer has been damaged together with unprimed components shall be cleaned by hand scraping, chipping and wire brushing and painted up without delay.

Fabrication Details and calculations. The Steelwork Contractor is to visit the site and fully acquaint himself with all conditions, details and dimensions relating to the contract prior to the fabrication of any steelwork. The contractor will be required to design the end connections to cater for the beam end loads shown in brackets shown on Sage drawings. All design calculations and fabrication drawings shall be sent to Sage Design at least 5 working days prior to commencement of fabrication

Grade. All structural steel sections are to be Grade S275 to the applicable code from the following list: BS 4–1, BS EN10210–2.

Connections – Unless noted otherwise assume all steelwork connections to consist of 4No minimum M16Ø grade 8.8 bolts to BS 4190. Provide 12mm end plates or angle cleats with full profile 6mm fillet welds.
All base plates to posts and stanchions to be 12mm thick with F/P F/W. Provide 4No M16Ø resin anchors to concrete base set in Hilti Hit C150 resin – minimum penetration to concrete to be 100mm. Provide 30mm grout and pack under base plate with non–shrink additive.

7.0 LINTELS

For uniformly distributed loads and standard 2 storey domestic loadings only lintel widths are to be equal to wall thickness. All lintels over 750mm sized internal door openings to be 65mm deep pre–stressed concrete plank lintels. 150mm deep lintels are to be used for 900mm sized internal door openings. Lintels to have a minimum bearing of 150mm on each end. Any existing lintels carrying additional loads are to be exposed for inspection at commencement of work on site. All pre–stressed concrete lintels to be designed and manufactured in accordance with BS 8110, with a concrete strength of 50 or 40 N/mm² and incorporating steel strands to BS 5896 to support loadings assessed to BS 5977 Part 1. For other structural openings provide proprietary insulated steel lintels suitable for spans and loadings in compliance with approved Document A and lintel manufacture standard tables. Stop ends, DPC trays and weep holes to be provided above all externally located lintels.

Precast concrete lintels are to be to BS 5877–2 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, unless noted otherwise on the drawings.

Galvanized steel lintels are to be to BS 5977:Part 2 by Caradon Catnic Ltd, Pontgwindy Industrial Estate, Daerphilly, Mid Glamorgan CF83 2WJ, Tel 01222 337 900. Sizes and types as indicated on the drawings. End bearing lengths are to be at least 150mm, unless noted otherwise on the drawings.

The Contractor shall obtain the Structural Engineers/Architect's written approval, prior to commencement of the work, to the use of lintels by alternative manufacturers to those listed above.

8.0 FIXINGS

Anchors. Anchor into brickwork to be HIT C50 resin anchors by Hilti or similar approved. Anchors into concrete to be HAS C100 resin anchors by Hilti or similar approved. Anchor rods shall be threaded steel rod (yield point 420N/mm²). Anchor rod, bolts and washers shall be hot–dipped galvanised to BS 729.

Ties, shoes, clips, straps etc. shall be hot–dipped galvanised to BS 729 and manufactured by BAT Buildings Products or similar approved, installed in accordance with the manufacturer's requirements. Substitutions to be made with the engineer's approval.

9.0 TIMBER

Materials. All timber components are to comply with the stress grading requirements of BS4978 and strength class to BS5628, and shall be delivered to site clearly marked with the grade stress, with a moisture content not exceeding the appropriate values noted in Table 1 of BS5268: Part 2.

Plywood for general and structural use to be to BS6566 grade II, WSP, 19mm nominal thickness.

Existing Timber. All existing timber is to be inspected at the beginning of the project by a specialist. Refer to specialist's report for all information in connection with timber treatment or replacement.

Workmanship Generally. Cross section dimension of timber shown on drawings are nominal sizes unless stated otherwise. Do not use scarf joints, finger joints or splice plates without approval.

Protection. Keep timber dry and do not overstress, distort or disfigure section or components during transit, storage, lifting, erection or fixing. Store timber and components under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Open pile to ensure free movement of air through the stack. Keep trussed rafters vertical during handing and storage.

Handling and Erection. All timber components are to be transported to and placed in their final position in a manner that will not cause deformation or damage to the timber or undue strain on joints and connections.

All common rafters, Jack rafters, ceiling ties etc. to be connected to purlins, wall plates etc. by use of galvanised metal connectors.

Moisture Content. Moisture content of timber at time to be not more than:
Under cover but in generally unheated spaces: 24%
Under cover in generally heated spaces: 21%
Internal in continuously heated spaces: 19%

Preservatives. All preservative treatment is to be in accordance with BS5268: Part 5 and applied before the timber is delivered to site.

Bolted Connections. Locate accurately and drill to diameters as close as practical to the nominal bolt diameter and not more than 2mm larger. Use washer plates under all bolt heads and nuts which bear directly on timber and 50mm square plate toothed connectors between the joists. Use spring washers in locations which will be hidden or inaccessible in the completed building. Tighten bolts so that washers just bite the surface of the timber and at least one complete thread protrudes from the nut.

Installing Joists. Position at equal centres not exceeding designed spacing and true to level. When installing joists on hangers, bed hangers directly on and hard against supporting construction. Do not use packs or bed on mortar. Cut joists to leave not more than 6mm gap between ends of joists and back of hanger. Rebate joists to lie flush with underside of hangers. Fix joists to hangers with a nail in every hole.

Tie–Down Straps. Provide 30 x 5mm cross section, 100 x 1000mm long. Position at not more than 1.2m centres and fix securely to timber plate with not less than two 30 x 3.75mm galvanized or sherardized nails and to masonry with four 50mm x 12 gauge sherardized screws evenly spaced.

Lateral Restraint Straps. Provide 30 x 5mm cross–section, 150mm cranked end and 900mm long. Position at not more than 1.2m centres and as shown on drawings. Ensure that cranked end is in tight contact with cavity face of wall inner leaf and is not pointing upwards.

Fix noggings and packs beneath joists/rafters/ties running parallel to wall. Noggings and packs to fit tightly and be not less than three quarters of joist/rafter/tie depth. Notch joists so that straps fit flush with surface. Do not notch rafters/ties.

Fix straps to joists/rafters, with not less than four 50mm x 8 gauge sherardized countersunk screws, evenly spread.
Strutting. Unless specified, securely fix strutting between joists as follows:

Joist spans of 2.5 to 4.5m: One at centre span.
Joist spans over 4.5 m: Two rows equally spaced.

Unless specified otherwise strutting to be one of the following:

Herringbone strutting, at least 38 x 38mm softwood and located clear of top and bottom edges, or solid strutting, at least 38mm thick softwood and at least three quarters of depth of joist, or proprietary metal strutting of approved type. Strutting to be blocked solidly to end walls.

Double Joists. All double joists and trimmers shall be bolted together with 12mm diameter bolts at 600 c/c staggered using 50mm square plate toothed connectors between the joists.

Grade/bearing/treatment. All new structural timber to be in accordance with BS 5268 to the sizes shown on the construction drawing and shall be minimum Grade C24 and to have 100mm bearing unless otherwise stated. All timber cut on site to be re–treated in accordance with BS 5268 Part 5.

Structural timber shall be delivered to the site factory treated and shall be Grade C24. It shall be stored on site undercover. Structural grade timber shall be free from knots, shakes, and excessive resin bleeding.

Plywood shall be 19mm flooring grade. M.D.F shall be high–density board. Plywood for flat roofs shall be moisture resistant 19mm thick or otherwise described on drawings.

Cutting and holes. Structural timbers may only be drilled or cut for services with the approval of the Structural Engineer.

Strapping for pitched roof. Gable walls should be strapped to roofs at 1.5m centres. All external walls running parallel to roof rafters to be restrained at roof level using 1000mm x 30mm x 5mm galvanised mild steel horizontal straps or other approved to BSEN 845–1 built into walls at max 2000mm centres and to be taken across minimum 3 rafters and screw fixed. Provide solid noggins between rafters at strap positions. All wall plates to be 100 x 50mm fixed to inner skin cavity wall using 300mm x 5mm x 1000mm galvanised metal straps or other approved to BSEN 845–1 at maximum 2 m centres.

Strapping of floors. Provide lateral restraint where joists run parallel to walls; floors are to be strapped to walls with 1000mm x 30mm x 5mm galvanised mild steel straps or other approved in compliance with BSEN 845–1 at max 1.5m centres, straps to be taken across minimum of 3 joists. Straps to be built into walls. Provide 38mm wide x ¼ depth solid noggins between joists at strap positions.

Flat roof restraint. 100mm x 50mm C24 grade timber wall plates to be strapped to walls with 1000mm x 30mm x 5mm galvanised mild steel straps at maximum 1.5m centres fixed to internal wall faces.

10.0 CONCRETE

Materials and workmanship are to comply with BS 8110–1.

Concrete for new foundations to be designated concrete GEN 3 and ground slabs to be designated concrete RC25 to BS 8500 and BS EN 206–1 with OPC and 20mm max aggregate. This assumes Class 1 sulphates only.

Concrete for padstones and lintels is to be 2:3:6 (cement:fine sand:coarse sand) nominal mix, with OPC and 10mm max aggregate.

Ready mixed concrete must be obtained from a plant which holds a current Certificate of Accreditation under the Quality Scheme for Ready Mixed Concrete.

Do not place concrete when the ambient air temperature is less than 5°C.

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.

Reinforcement shall be:

(i) plain bars to BS 4449, grade 250 (mild steel), prefix R on drawings and schedule or
(ii) deformed bars to BS 4449, grade 460 (high yield) type 2, prefix T on drawings and schedules
(iii) mesh to BS 4483

Reinforcement shall be fixed adequately using tying wire or steel clips. Concrete cover is to be as specified on the drawings. Chairs and spacers are to be provided as necessary to maintain the specified cover.

Unless noted otherwise on drawings, all reinforcement is to be lapped 40d (where d is diameter of the larger bar).

11.0 FOUNDATIONS

New foundations have been designed to impose a bearing pressure not exceeding 150kN/m². The Contractor is to ensure that all new foundations bear onto firm virgin soils and is to notify the Building Inspector/District Surveyor for his inspection before concreting.

If the Building Inspector/District Surveyor requests amendments to the foundations or if conditions differ from those noted above, the Architect and Structural Engineer are to be notified immediately. The Contractor shall not proceed without receiving instructions from the Architect.

Foundations are to be cast symmetrically about new steel beams and columns, stanchions, or walls, unless noted otherwise on the drawings.

Trench Foundation. Trench fill foundations, concrete mix to conform with BSEN 206–1 and BS 8500–2. All foundations to be a minimum of 1000mm below ground level, exact depth to be agreed on site with Building Control Officer to suit site conditions. All constructed in accordance with 2004 Building Regulations A1/2 and BS 8004:1986 Code of Practice for Foundations. Ensure foundations are constructed below invert level of any adjacent drains. Base of foundations supporting internal walls to be min 600mm below ground level. Sulphate resistant cement to be used if noted on the construction drawings. Please note that should any adverse soil conditions or difference in soil type be found or any major tree roots in excavations, the Building Control Officer and Sage Design are to be contacted and the advice of a Structural Engineer should be sought.

12.0 MASONRY

Workmanship is to comply generally with BS 5628:Parts 1 & 3. Brickwork to be to BS 3921. Blockwork to be to BS 6073.

New blockwork below DPC is to be specified as suitable for such use
by the manufacturer, and of minimum strength 3.5N/mm² , or as noted
otherwise on the drawings.

New brickwork above DPC is to be minimum Class 3 set in 1:1:6 mortar, unless noted otherwise on the drawings.

New blockwork is to be minimum strength 7N/mm² set in 1:1:6 mortar,
unless noted otherwise on the drawings.

Brickwork and blockwork are to be laid properly bonded as agreed with
the Architect and fully bonded into existing work.

Wall ties elsewhere are to be stainless steel flat double triangle ties, to
BS 1243, as noted on the drawings. Minimum embedment to be 50mm
into each masonry leaf.

Do not lay masonry when the ambient air temperature is less than 5°C.

13.0 SUSPENDED BLOCK AND BEAM FLOOR

Remove top soil & vegetation, apply weed killer .
The underside of beams no less than 150mm above the top of the ground PCC beams to be supplied and fixed to beam manufacturer's plan, layout and details (details and calculations to be sent to Building Control and approved before work commence). Minimum bearing 100mm into DPC course and load bearing walls. Provide concrete blocks to BS6073 Part 1, wet and grout all joints with 1:4 cement/sand mix. Provide double beams below non–load bearing partitions. Lay 1200g DPM/radon barrier, with 300mm laps double welted and taped at joints and service entry points using radon gas proof tape, over beam & block floor. Lay floor insulation over DPM, 75mm Celotex GA4000 applied as rigid material.
Lay 500g separating layer over insulation and provide 75mm sand/cement screed over and prepare for floor finishes as required. The top surface of the ground cover under the building shall be above the finished level of the adjoining ground.
Ventilation – Provide cross–ventilation of the under floor to outside area by ventilation in at least 2 opposite external walls of the building. Ventilation openings having an opening area of 1500mm² per metre run of perimeter wall of 500mm² per square metre of floor area, whichever is the greater. Sleeper walls shall be of honeycombed construction or have provision for distribution of ventilation.

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A	19.06.14	Issued for Construction	CB	LG

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Title: Specifications of structural works to ground floor rear

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