SPECIFICATION AND SCHEDULE OF WORK

For

Internal and External Repair and Refurbishment

At

Upper Floors at 43/44 High Street

Wellingborough

For and on behalf of

The Borough Council of Wellingborough

Dated

13th June 2019

Prepared by
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Underwoods LLP, Shire House, Pyramid Close, Northampton, NN3 8PH

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MW16 Prelims

13th June 2019

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A10 PROJECT PARTICULARS

110 The Project
Name: Repair and Redecoration of Former HMO / Retail Space
Nature: Repair and Redecoration
Location: 43a & 44a High Street, Wellingborough, NN8 4HL
Length of contract: Approximately 8 weeks.

120 Employer (Client)
Name: The Borough Council of Wellingborough
Address: Swanspool House, Doddington Road, Wellingborough, NN8 1BP
Telephone: 01933 229777

130 Principal contractor (CDM)
Name: TBC
Address: TBC
Telephone: TBC

140 Contract Administrator (herein referred to as 'CA')
Name: Underwoods LLP
Address: Shire House, Pyramid Close, Northampton, NN3 8PH
Telephone: 01604 404060

150 Principal Designer
Name: Underwoods LLP
Address: Shire House, Pyramid Close, Northampton, NN3 8PH
Telephone: 01604 404060

200 Consultants
- Description: Mechanical & Electrical Consultants
- Name: CJR (Midlands) Limited
- Address: 14 Brookfield, Duncan Close, Moulton Park, Northampton, NN3 6WL

200 Consultants
- Description: Structural Engineer
- Name: BCAL Consulting
- Address: Orient House, Church Way, Wellingborough, Northamptonshire, NN8 4HJ

A11 TENDER AND CONTRACT DOCUMENTS

110 Tender drawings
The tender drawings are: As indicated in Drawing Issue Sheets

120 Contract drawings
The Contract Drawings: The same as the tender drawings.

160 Preconstruction information
Format: The Preconstruction information is described in these preliminaries in Section A34. It refers to information given elsewhere in the preliminaries and other tender documents.

A12 THE SITE/ EXISTING BUILDINGS

110 The site
Description: Office areas above Retail Area in Wellingborough

120 Existing buildings on/ adjacent to the site
Description: Commercial & Retail Units

140 Existing mains and services
Drawings: (Information shown is indicative only): N/A
Other information: N/A

180 Health and safety file
Availability for inspection: The Health and Safety File for the site/ building has not been provided by the Client and so is not available for review.
Other documents: N/A
Arrangements for inspection: To be arranged via Bill Crowther, 01604 783003 or Ben Alders, 01604 783 000

200 Access to the site
Description: Entered via High Street. Former rear access to the site has been removed.
Limitations: N/A

210 Parking
Restrictions on parking of the Contractor's and employees' vehicles: There is no facilities for parking at the site. Use of local public parking and on nearby on road parking will be required.

220 Use of the site
General: Do not use the site for any purpose other than carrying out the Works.
Limitations: N/A

230 Surrounding land/ building uses
General: Adjacent or nearby uses or activities are as follows: Retail and other commercial space.

240 Health and safety hazards
General: The nature and condition of the site/ building cannot be fully and certainly ascertained before it is opened up. However, the internal areas are in poor condition and special care should be taken when working on each floor until such time that floors, walls and ceilings can be reinstated.
Site staff: Draw to the attention of all personnel working on the site the potential risks associated with accessing the rear of the site. The use of existing fire escapes will also need reviewing given the condition of some existing escape routes.

250 Site visit
Before tendering: Ascertain the nature of the site, access thereto and all local conditions and restrictions likely to affect the execution of the Works.
Arrangements for visit: Via Bill Crowther, 01604 783003 or Ben Alders, 01604 783000

A20 JCT MINOR WORKS BUILDING CONTRACT (MW)

JCT MINOR WORKS BUILDING CONTRACT
The Contract: JCT Minor Works Building Contract 2016.
Requirement: Allow for the obligations, liabilities and services described therein against the headings following:

THE RECITALS

First The Works and the Contract Administrator
The work comprises: Repair and Redecoration of existing HMO
Architect/ Contract Administrator: See clause A10/140.

Second Contract documents
Contract drawings: As listed in clause A11/120.

THE ARTICLES

3 Architect/ Contract Administrator
Architect/ Contract Administrator: See clause A10.

4 and 5 Principal Designer/ Principal Contractor
Principal Designer: See clause A10
Principal Contractor: See clause A10

Fourth Recital and clause 4.2Construction industry scheme (CIS)
Employer at the Base Date
a 'contractor' for the purposes of the CIS.

Fifth Recital CDM Regulations
The project is notifiable.

Article 7Arbitration
Article 7 and Schedule 1 apply.

Clause 1.1 CDM planning period
Shall mean the period of 2 weeks

Clause 2.2 Commencement and Completion
Date for Commencement of the Works: TBC
Date for Completion: TBC

Clause 2.8 Liquidated damages
At the rate of £500 per week.

Clause 2.10 Rectification period
Period: 12 months

Clause 4.3Percentage of the total value of the work etc.
Percentage: 95

Clause 4.5Percentage of the total amount to be paid to the Contractor
Percentage: 97.5

Clause 4.8.1Supply of documentation
Period: 1 month

Clause 5.3.2 Contractor's insurance - injury to persons or property
Insurance cover (for any one occurrence or series of occurrences arising out of one event): £5 million

Clauses 5.4A, 5.4B and 5.4C Insurance of the works etc. - alternative provisions
Clause 5.4A applies.

Clauses 5.4A.1 and 5.4B.1.2 Percentage to cover professional fees
Addition: 15 per cent.

Clause 7.2Adjudication
The Adjudicator is: RICS
Nominator of Adjudicator: President or a Vice president or Chairman or Vice Chairman of the: RICS

Schedule 1 paragraph 2.1Arbitration
Appointor of Arbitrator (and of any replacement): President or a Vice president of the: RICS

THE CONDITIONS

Section 1: Definitions and Interpretation

Section 2: Carrying out the Works

Section 3: Control of the Works

Section 4: Payment

Section 5: Injury, Damage and Insurance

Section 6: Termination

Section 7: Settlement of Disputes

A30 TENDERING/ SUBLETTING/ SUPPLY

110 Scope

General: These conditions are supplementary to those stated in the Invitation to Tender and on the form of tender.

130 Partnering

Process: Comply with the principles set out in JCT Practice Note 4 (Series 2) 'Partnering'.
Charter: Complete the relevant sections of the JCT 'Non-binding partnering charter for single project'.

145 Tendering procedure
Arithmetical errors: Tendered total is dominant.

160 Exclusions
Inability to tender: Immediately inform if any parts of the work as defined in the tender documents cannot be tendered.
Relevant parts of the work: Define those parts, stating reasons for the inability to tender.

170 Acceptance of tender
The Employer and Employer's representatives:
- Offer no guarantee that any tender will be recommended for acceptance or be accepted.
- Will not be responsible for any cost incurred in the preparation of any tender.

190 Period of validity
Period: After submission or lodgment, keep tender open for consideration (unless previously withdrawn) for not less than 13 no. weeks
Date for possession/ commencement: See section A20.

PRICING/ SUBMISSION OF DOCUMENTS

210 Preliminaries in the specification
The Preliminaries/ General conditions sections (A10-A56 inclusive) must not be relied on as complying with SMM7.

250 Priced schedules of work
Alterations: Do not alter or qualify the priced schedules of work without written consent.
Tenders containing unauthorised alterations or qualifications may be rejected.
Measurements: Where not stated, ascertain from the drawings.
Deemed included: Costs relating to items, which are not priced, will be deemed to have been included elsewhere in the tender.

310 Tender
General: Tenders must include for all work shown or described in the tender documents as a whole or clearly apparent as being necessary for the complete and proper execution of the Works.

440 Schedule of rates
Schedule of rates (unpriced): Included with the tender documents. The Contractor may insert additional items. All items must be fully priced.
Fully priced copy: Submit

500 Tender stage method statements
Method statements: N/A

510 Alternative method tenders

General: In addition to and at the same time as tendering for the Works as defined in the tender documents, alternative methods of construction/ installation may be submitted for consideration. Alternatives, which would involve significant changes to other work, may not be considered.
Alternative tenders: Such alternatives will be deemed to be alternative tenders and each must include a complete and precise statement of the effects on cost and programme.
Safety method statement: Carry out a health and safety risk assessment for each alternative and where appropriate provide a safety method statement suitable for incorporation in the Health and Safety Plan.
Full technical data: Submit for each alternative together with details of any consequential amendments to the design and/ or construction of other parts of the Works.

515 Alternative time tenders

General: In addition to and at the same time as tendering based upon the date or period specified in section A20, an alternative tender based upon a different date for completion or period may be submitted.
Date for completion: If any such tender is accepted the date for completion inserted in the Contract will be the date stated in the alternative tender or determined from the period stated in the alternative tender.

530 Substitute products

Details: If products of different manufacture to those specified are proposed, submit details with the tender giving reasons for each proposed substitution. Substitutions, which have not been notified at tender stage may not be considered.
Compliance: Substitutions accepted will be subject to the verification requirements of clause A31/200.

550 Health and safety information

Content: Describe the organisation and resources to safeguard the health and safety of operatives, including those of subcontractors, and of any person whom the Works may affect.
Include:
- A copy of the contractor's health and safety policy document, including risk assessment procedures.
- Accident and sickness records for the past five years.
- Records of previous Health and Safety Executive enforcement action.
- Records of training and training policy.
- The number and type of staff responsible for health and safety on this project with details of their qualifications and duties.

Submit: select from list

570 Outline construction phase health and safety plan

Content: Submit the following information within one week of request:
- Method statements on how risks from hazards identified in the pre-construction information and other hazards identified by the contractor will be addressed.
- Details of the management structure and responsibilities.
- Arrangements for issuing health and safety directions.
- Procedures for informing other contractors and employees of health and safety hazards.
- Selection procedures for ensuring competency of other contractors, the self-employed and designers.
- Procedures for communications between the project team, other contractors and site operatives.
- Arrangements for cooperation and coordination between contractors.
- Procedures for carrying out risk assessment and for managing and controlling the risk.
- Emergency procedures including those for fire prevention and escape.
- Arrangements for ensuring that all accidents, illness and dangerous occurrences are recorded.
- Arrangements for welfare facilities.

- Procedures for ensuring that all persons on site have received relevant health and safety information and training.
- Arrangements for consulting with and taking the views of people on site.
- Arrangements for preparing site rules and drawing them to the attention of those affected and ensuring their compliance.
- Monitoring procedures to ensure compliance with site rules, selection and management procedures, health and safety standards and statutory requirements.
- Review procedures to obtain feedback.

SUBLETTING/ SUPPLY

630 Domestic subcontracts

General: Comply with the Construction Industry Board 'Code of Practice for the selection of subcontractors'.

A31 PROVISION, CONTENT AND USE OF DOCUMENTS

DEFINITIONS AND INTERPRETATIONS

110 Definitions
Meaning: Terms, derived terms and synonyms used in the preliminaries/ general conditions and specification are as stated therein or in the appropriate British Standard or British Standard glossary.

120 Communication
Definition: Includes advise, inform, submit, give notice, instruct, agree, confirm, seek or obtain information, consent or instructions, or make arrangements.
Format: In writing to the person named in clause A10/140 unless specified otherwise.
Response: Do not proceed until response has been received.

130 Products
Definition: Materials, both manufactured and naturally occurring, and goods, including components, equipment and accessories, intended for the permanent incorporation in the Works.
Includes: Goods, plant, materials, site materials and things for incorporation into the Works.

135 Site equipment
Definition: All appliances or things of whatsoever nature required in or about the construction for completion of the Works but not materials or other things intended to form or forming part of the Permanent Works.
Includes: Construction appliances, vehicles, consumables, tools, temporary works, scaffolding, cabins and other site facilities.

160 Terms used in specification
Remove: Disconnect, dismantle as necessary and take out the designated products or work and associated accessories, fixings, supports, linings and bedding materials. Dispose of unwanted materials. Excludes taking out and disposing of associated pipework, wiring, ductwork or other services.
Fix: Unload, handle, store, place and fasten in position including all labours and use of site equipment.
Supply and fix: Includes all labour and site equipment for unloading, handling, storing and execution. All products to be supplied and fixed unless stated otherwise.
Keep for reuse: Do not damage designated products or work. Clean off bedding and jointing materials. Stack neatly, adequately protect and store until required by the Employer or for use in the Works as instructed.
Make good: Execute local remedial work to designated work. Make secure, sound and neat. Excludes redecoration and/ or replacement.
Replace: Supply and fix new products matching those removed. Execute work to match original new state of that removed.
Repair: Execute remedial work to designated products. Make secure, sound and neat. Excludes redecoration and/ or replacement.
Refix: Fix removed products.
Ease: Adjust moving parts of designated products or work to achieve free movement and good fit in open and closed positions.
Match existing: Provide products and work of the same appearance and features as the original, excluding ageing and weathering. Make joints between existing and new work as inconspicuous as possible.
System: Equipment, accessories, controls, supports and ancillary items, including installation, necessary for that section of the work to function.

170 Manufacturer and product reference

Definition: When used in this combination:
- Manufacturer: The firm under whose name the particular product is marketed.
- Product reference: The proprietary brand name and/ or reference by which the particular product is identified.

Currency: References are to the particular product as specified in the manufacturer's technical literature current on the date of the invitation to tender.

200 Substitution of products

Products: If an alternative product to that specified is proposed, obtain approval before ordering the product.
Reasons: Submit reasons for the proposed substitution.
Documentation: Submit relevant information, including:
- manufacturer and product reference;
- cost;
- availability;
- relevant standards;
- performance;
- function;
- compatibility of accessories;
- proposed revisions to drawings and specification;
- compatibility with adjacent work;
- appearance;
- copy of warranty/ guarantee.

Alterations to adjacent work: If needed, advise scope, nature and cost.
Manufacturers' guarantees: If substitution is accepted, submit before ordering products.

210 Cross references

Accuracy: Check remainder of the annotation or item description against the terminology used in the section or clause referred to.
Related terminology: Where a numerical cross-reference is not given the relevant sections and clauses of the specification will apply.
Relevant clauses: Clauses in the referred to specification section dealing with general matters, ancillary products and execution also apply.
Discrepancy or ambiguity: Before proceeding, obtain clarification or instructions.

220 Referenced documents

Conflicts: Specification prevails over referenced documents.

230 Equivalent products

Inadvertent omission: Wherever products are specified by proprietary name the phrase 'or equivalent' is to be deemed included.

250 Currency of documents

Currency: References to published documents are to the editions, including amendments and revisions, current on the date of the Invitation to Tender.

260 Sizes

General dimensions: Products are specified by their coordinating sizes.
Timber: Cross section dimensions shown on drawings are:
- Target sizes as defined in BS EN 336 for structural softwood and hardwood sections.
- Finished sizes for non-structural softwood or hardwood sawn and further processed sections.

DOCUMENTS PROVIDED ON BEHALF OF THE EMPLOYER

410 Additional copies of drawings/ documents
Additional copies: Issued free of charge.

440 Dimensions
Scaled dimensions: Do not rely on.

450 Measured quantities
Ordering products and constructing the Works: The accuracy and sufficiency of the measured quantities is not guaranteed.
Precedence: The specification and drawings shall override the measured quantities.

460 The specification
Coordination: All sections must be read in conjunction with Main Contract Preliminaries/ General conditions.

DOCUMENTS PROVIDED BY CONTRACTOR/ SUBCONTRACTORS/ SUPPLIERS

630 Technical literature
Information: Keep on site for reference by all supervisory personnel:
- Manufacturers' current literature relating to all products to be used in the Works.
- Relevant British, EN or ISO Standards.

640 Maintenance instructions and guarantees
Components and equipment: Obtain or retain copies, register with manufacturer and hand over on or before completion of the Works.
Information location:
Emergency call out services: Provide telephone numbers for use after completion. Extent of cover:

A32 MANAGEMENT OF THE WORKS

GENERALLY

110 Supervision
General: Accept responsibility for coordination, supervision and administration of the Works, including subcontracts.
Coordination: Arrange and monitor a programme with each subcontractor, supplier, local authority and statutory undertaker, and obtain and supply information as necessary for coordination of the work.

115 Considerate constructors scheme
Registration: Before starting work, register the site and pay the appropriate fee:
Contact:
- Address: Considerate Constructors Scheme Office, PO Box 75, Great Amwell, Ware, Hertfordshire, SG12 0YX.
- Tel. 01920 485959.
- Fax. 01920 485958.
- Free phone 0800 7831423
- Web. www.ccscheme.org.uk
- E mail. enquiries@ccscheme.org.uk

Standard: Comply with the Scheme's Code of Considerate Practice.

120 Insurance
Documentary evidence: Before starting work on site submit details, and/ or policies and receipts for the insurances required by the Conditions of Contract.

130 Insurance claims
Notice: If any event occurs which may give rise to any claim or proceeding in respect of loss or damage to the Works or injury or damage to persons or property arising out of the Works, immediately give notice to the Employer, the person named in clause A10/140 and the Insurers.
Failure to notify: Indemnify the Employer against any loss, which may be caused by failure to give such notice.

140 Climatic conditions
Information: Record accurately and retain:
- Daily maximum and minimum air temperatures (including overnight).
- Delays due to adverse weather, including description of the weather, types of work affected and number of hours lost.

150 Ownership
Alteration/ clearance work: Materials arising become the property of the Contractor except where otherwise stated. Remove from site as work proceeds.

210 Programme
Master programme: Immediately when requested and before starting work on site submit in an approved form a master programme for the Works, which must include details of:
- Planning and mobilisation by the Contractor
- Subcontractor's work.
- Running in, adjustment, commissioning and testing of all engineering services and installations.
- Work resulting from instructions issued in regard to the expenditure of provisional sums.
- Work by others concurrent with the Contract.

245 Start of work on site
Notice: Before the proposed date for start of work on site give minimum notice of 1 week

250 Monitoring
Progress: Record on a copy of the programme kept on site.
Avoiding delays: If any circumstances arise which may affect the progress of the Works submit proposals or take other action as appropriate to minimize any delay and to recover any lost time.

260 Site meetings
General: Site meetings will be held to review progress and other matters arising from administration of the Contract.
Frequency: Weekly
Location: Site
Accommodation: Ensure availability at the time of such meetings.

290 Notice of completion
Requirement: Give notice of the anticipated dates of completion of the whole or parts of the Works.
Associated works: Ensure necessary access, services and facilities are complete.

310 Extensions of time
Notice: When a notice of the cause of any delay or likely delay in the progress of the works is given under the contract, written notice must also be given of all other causes which apply concurrently.
Details: As soon as possible submit:
- Relevant particulars of the expected effects, if appropriate, related to the concurrent causes.
- An estimate of the extent, if any, of the expected delay in the completion of the Works beyond the date for completion.
- All other relevant information required.

420 Removal/ replacement of existing work
Extent and location: Agree before commencement.
Execution: Carry out in ways that minimize the extent of work.

430 Proposed instructions
Estimates: If a proposed instruction requests an estimate of cost, submit without delay and in any case within seven days.

440 Measurement
Covered work: Give notice before covering work required to be measured.

450 Daywork vouchers
Before commencing work: Give reasonable notice to person countersigning daywork vouchers.
Content: Before delivery each voucher must be:
- Referenced to the instruction under which the work is authorised.
- Signed by the Contractor's person in charge as evidence that the operatives' names, the time daily spent by each and the equipment and products employed are correct.
Submit: By the end of the week in which the work has been executed.

460 Interim valuations
Applications: Include details of amounts requested under the Contract together with all necessary supporting information.
Submission: At least seven days before established dates.

470 Products not incorporated into the Works
Ownership: At the time of each valuation, supply details of those products not incorporated into the Works which are subject to any reservation of title inconsistent with passing of property as required by the Conditions of Contract, together with their respective values.
Evidence: When requested, provide evidence of freedom of reservation of title.

A33 QUALITY STANDARDS/ CONTROL

STANDARDS OF PRODUCTS AND EXECUTIONS

110 Incomplete documentation

General: Where and to the extent that products or work are not fully documented, they are to be:
- Of a kind and standard appropriate to the nature and character of that part of the Works where they will be used.
- Suitable for the purposes stated or reasonably to be inferred from the project documents.

Contract documents: Omissions or errors in description and/ or quantity shall not vitiate the Contract nor release the Contractor from any obligations or liabilities under the Contract.

120 Workmanship skills

Operatives: Appropriately skilled and experienced for the type and quality of work.
Registration: With Construction Skills Certification Scheme.
Evidence: Operatives must produce evidence of skills/ qualifications when requested.

130 Quality of products

Generally: New. (Proposals for recycled products may be considered).
Supply of each product: From the same source or manufacturer.
Whole quantity of each product required to complete the Works: Consistent kind, size, quality and overall appearance.
Tolerances: Where critical, measure a sufficient quantity to determine compliance.
Deterioration: Prevent. Order in suitable quantities to a programme and use in appropriate sequence.

135 Quality of execution

Generally: Fix, apply, install or lay products securely, accurately, plumb, neatly and in alignment.
Colour batching: Do not use different colour batches where they can be seen together.
Dimensions: Check on-site dimensions.
Finished work: Without defects, e.g. not damaged, disfigured, dirty, faulty, or out of tolerance.
Location and fixing of products: Adjust joints open to view so they are even and regular.

140 Compliance

Compliance with proprietary specifications: Retain on site evidence that the proprietary product specified has been supplied.
Compliance with performance specifications: Submit evidence of compliance, including test reports indicating:
- Properties tested.
- Pass/ fail criteria.
- Test methods and procedures.
- Test results.
- Identity of testing agency.
- Test dates and times.
- Identities of witnesses.
- Analysis of results.

150 Inspections

Products and executions: Inspection or any other action must not be taken as approval unless confirmed in writing referring to:
- Date of inspection.
- Part of the work inspected.
- Respects or characteristics which are approved.
- Extent and purpose of the approval.
- Any associated conditions.

160 Related work

Details: Provide all trades with necessary details of related types of work. Before starting each new type or section of work ensure previous related work is:
- Appropriately complete.
- In accordance with the project documents.
- To a suitable standard.
- In a suitable condition to receive the new work.

Preparatory work: Ensure all necessary preparatory work has been carried out.

170 Manufacturer's recommendations/ instructions

General: Comply with manufacturer's printed recommendations and instructions current on the date of the Invitation to tender.

Changes to recommendations or instructions: Submit details.

Ancillary products and accessories: Use those supplied or recommended by main product manufacturer.

Agrément certified products: Comply with limitations, recommendations and requirements of relevant valid certificates.

180 Water for the works

Mains supply: Contractor to provide own supply.

210 Samples

Products or executions: Comply with all other specification requirements and in respect of the stated or implied characteristics either:
- To an express approval.
- To match a sample expressly approved as a standard for the purpose.

220 Approval of products

Submissions, samples, inspections and tests: Undertake or arrange to suit the Works programme.
Approval: Relates to a sample of the product and not to the product as used in the Works. Do not confirm orders or use the product until approval of the sample has been obtained.
Complying sample: Retain in good, clean condition on site. Remove when no longer required.

230 Approval of execution

Submissions, samples, inspections and tests: Undertake or arrange to suit the Works programme.
Approval: Relates to the stated characteristics of the sample. (If approval of the finished work as a whole is required this is specified separately). Do not conceal, or proceed with affected work until compliance with requirements is confirmed.
Complying sample: Retain in good, clean condition on site. Remove when no longer required.

320 Setting out

General: Submit details of methods and equipment to be used in setting out the Works, where required.
Levels and dimensions: Check and record the results on a copy of drawings. Notify discrepancies and obtain instructions before proceeding.
Inform: When complete and before commencing construction.

330 Appearance and fit

Tolerances and dimensions: If likely to be critical to execution or difficult to achieve, as early as possible either:
- Submit proposals; or
- Arrange for inspection of appearance of relevant aspects of partially finished work.

General tolerances (maximum): To BS 5606, tables 1 and 2.

360 Record drawings

Site setting out drawing: Record details of all grid lines, setting-out stations, benchmarks and profiles. Retain on site throughout the contract and hand over on completion.

410 Services regulations

New or existing services: Comply with the Byelaws or Regulations of the relevant Statutory Authority.

420 Water regulations/ byelaws notification

Requirements: Notify Water Undertaker of any work carried out to or which affects new or existing services and submit any required plans, diagrams and details.
Consent: Allow adequate time to receive Undertaker's consent before starting work. Inform immediately if consent is withheld or is granted subject to significant conditions.

430 Water regulations/ byelaws contractor's certificate

On completion of the work: Submit (copy where also required to the Water Undertaker) a certificate including:
- The address of the premises.
- A brief description of the new installation and/ or work carried out to an existing installation.
- The Contractor's name and address.
- A statement that the installation complies with the relevant Water Regulations or Byelaws.
- The name and signature of the individual responsible for checking compliance.
- The date on which the installation was checked.

440 Gas, oil and solid fuel appliance installation certificate

Before the completion date stated in the Contract: Submit a certificate stating:
- The address of the premises.
- A brief description of the new installation and/ or work carried out to an existing installation.
- Any special recommendations or instructions for the safe use and operation of appliances and flues.
- The Contractor's name and address.
- A statement that the installation complies with the appropriate safety, installation and use regulations.
- The name, qualification and signature of the competent person responsible for checking compliance.
- The date on which the installation was checked.

Certificate location:

445 Service runs

General: Provide adequate space and support for services, including unobstructed routes and fixings.

Ducts, chases and holes: Form during construction rather than cut.

Coordination with other works: Submit details of locations, types/ methods of fixing of services to fabric and identification of runs and fittings.

450 Mechanical and electrical services

Final tests and commissioning: Carry out so that services are in full working order at completion of the Works.

All works to be in accordance with CJR (Midlands) Limited Mechanical and Electrical specifications and associated drawings

Building Regulations notice: Lexicon Approved Inspectors have been appointed to deal with all Building Control matters.

525 Access

Extent: Provide at all reasonable times access to the Works and to other places of the Contractor or subcontractors where work is being prepared for the Contract.

530 Overtime working

Notice: Prior to overtime being worked, submit details of times, types and locations of work to be done.

Concealed work: If executed during overtime for which notice has not been given, it may be required to be opened up for inspection and reinstated at the Contractor's expense.

540 Defects in existing work

Undocumented defects: When discovered, immediately give notice. Do not proceed with affected related work until response has been received.

Documented remedial work: Do not execute work which may:
- Hinder access to defective products or work; or
- Be rendered abortive by remedial work.

560 Tests and inspections

Timing: Agree and record dates and times of tests and inspections to enable all affected parties to be represented.

Confirmation: One working day prior to each such test or inspection. If sample or test is not ready, agree a new date and time.

Records: Submit a copy of test certificates and retain copies on site.

610 Defective products/ executions

Proposals: Immediately any work or product is known, or appears, to be not in accordance with the Contract, submit proposals for opening up, inspection, testing, making good, adjustment of the Contract Sum, or removal and re-execution.

Acceptability: Such proposals may be unacceptable and contrary instructions may be issued.

710 Work before completion

General: Make good all damage consequent upon the Works.
Temporary markings, coverings and protective wrappings: Remove unless otherwise instructed.
Cleaning: Clean the Works thoroughly inside and out, including all accessible ducts and voids. Remove all splashes, deposits, efflorescence, rubbish and surplus materials.
Cleaning materials and methods: As recommended by manufacturers of products being cleaned, and must not damage or disfigure other materials or construction.
COSHH dated data sheets: Obtain for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
Minor faults: Touch up in newly painted work, carefully matching colour and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.
Moving parts of new work: Adjust, ease and lubricate as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances, valves and controls.

720 Security at completion

General: Leave the Works secure with, where appropriate, all accesses closed and locked.
Keys: Account for and adequately label all keys and hand over to Employer with itemized schedule, retaining duplicate schedule signed by Employer as a receipt.

730 Making good defects

Rectification: Give reasonable notice for access to the various parts of the Works.
Completion: Notify when remedial works have been completed.

A34 SECURITY/ SAFETY/ PROTECTION

110 Preconstruction information

Location: Integral with the project Preliminaries, including but not restricted to the following sections:
- Description of project: Sections A10 and A11.
- Client's consideration and management requirements: Sections A12, A13 and A36.
- Environmental restrictions and on-site risks: Section A12, A35 and A34.
- Significant design and construction hazards: Section A34.
- The Health and Safety File: Section A37.

130 Product hazards

Hazardous substances: Site personnel levels must not exceed occupational exposure standards and maximum exposure limits stated in the current version of HSE document EH40: Occupational Exposure Limits.
Common hazards: Not listed. Control by good management and site practice.
Significant hazards: Specified construction materials include the following:

140 Construction phase health and safety plan

Submission: Present to the Principal Designer/ Client no later than 1 week before works commencement.
Confirmation: Do not start construction work until the Principal Designer/Employer has confirmed in writing that the Construction Phase Health and Safety Plan includes the procedures and arrangements required by the CDM Regulations.
Content: Develop the plan from and draw on the Outline Construction Phase Health and Safety Plan, clause A30/570, and the Pre-Construction information.

150 Security

Protection: Safeguard the site, the Works, products, materials, and any existing buildings affected by the Works from damage and theft.
Access: Take all reasonable precautions to prevent unauthorised access to the site, the Works and adjoining property.

160 Stability

Responsibility: Maintain the stability and structural integrity of the Works and adjacent structures during the Contract.
Design loads: Obtain details, support as necessary and prevent overloading.

330 Noise control

Standard: Comply generally with the recommendations of BS 5228-1, clause 9.3 to minimize noise levels during the execution of the Works.
Equipment: Fit compressors, percussion tools and vehicles with effective silencers of a type recommended by manufacturers of the compressors, tools or vehicles.
Restrictions: Do not use:
- Radios or other audio equipment or permit employees to use in ways or at times that may cause nuisance.

340 Pollution

Prevention: Protect the site, the Works and the general environment including the atmosphere, land, streams and waterways against pollution.
Contamination: If pollution occurs inform immediately, including to the appropriate Authorities and provide relevant information.

350 Pesticides

Use: Not permitted.

360 Nuisance

Duty: Prevent nuisance from smoke, dust, rubbish, vermin and other causes.
Surface water: Prevent hazardous build-up on site, in excavations and to surrounding areas and roads.

370 Asbestos containing materials

Duty: Report immediately any suspected materials discovered during execution of the Works.
- Do not disturb.
- Agree methods for safe removal or encapsulation.

375 Antiquities

Duty: Report immediately any fossils, antiquities and other objects of interest or value discovered during execution of the Works.
Preservation: Keep objects in the exact position and condition in which they were found.

380 Fire prevention

Duty: Prevent personal injury or death, and damage to the Works or other property from fire.
Standard: Comply with Joint Code of Practice 'Fire Prevention on Construction Sites', published by the Construction Confederation and The Fire Protection Association (The 'Joint Fire Code').

390 Smoking on site

Smoking on site: Not permitted.

400 Burning on site

Burning on site: Not permitted.

410 Moisture

Wetness or dampness: Prevent, where this may cause damage to the Works.
Drying out: Control humidity and the application of heat to prevent:
- Blistering and failure of adhesion.
- Damage due to trapped moisture.
- Excessive movement.

430 Waste

Includes: Rubbish, debris, spoil, containers and surplus material.
Minimize: Keep the site and Works clean and tidy.
Remove: Frequently and dispose off site in a safe and competent manner:
- Non-hazardous material: In a manner approved by the Waste Regulation Authority.
- Hazardous material: As directed by the Waste Regulation Authority and in accordance with relevant regulations.

Voids and cavities in the construction: Remove rubbish, dirt and residues before closing in.
Waste transfer documentation: Retain on site.

440 Electromagnetic interference

Duty: Prevent excessive electromagnetic disturbance to apparatus outside the site.

510 Existing services

Confirmation: Notify all service authorities, statutory undertakers and/ or adjacent owners of proposed works not less than one week before commencing site operations.
Identification: Before starting work, check and mark positions of mains/ services. Where positions are not shown on drawings obtain relevant details from service authorities, statutory undertakers or other owners.
Work adjacent to services:
- Comply with service authority's/ statutory undertaker's recommendations.
- Adequately protect, and prevent damage to services: Do not interfere with their operation without consent of service authorities/ statutory undertakers or other owners.

Identifying services:
- Below ground: Use signboards, giving type and depth;
- Overhead: Use headroom markers.

Damage to services: If any results from execution of the Works:
- Immediately give notice and notify appropriate service authority/ statutory undertaker.
- Make arrangements for the work to be made good without delay to the satisfaction of service authority/ statutory undertaker or other owner as appropriate.
- Any measures taken to deal with an emergency will not affect the extent of the Contractor's liability.

Marker tapes or protective covers: Replace, if disturbed during site operations, to service authority's/ statutory undertakers recommendations.

520 Roads and footpaths

Duty: Maintain roads and footpaths within and adjacent to the site and keep clear of mud and debris.
Damage caused by site traffic or otherwise consequent upon the Works: Make good to the satisfaction of the Employer, Local Authority or other owner.

530 Existing topsoil/ subsoil

Duty: N/A

540 Retained trees/ shrubs/ grassed areas

Protection: Preserve and prevent damage, except those not required.
Replacement: Mature trees and shrubs if uprooted, destroyed, or damaged beyond reasonable chance of survival in their original shape, as a consequence of the Contractor's negligence, must be replaced with those of a similar type and age at the Contractor's expense.

560 Existing features

Protection: Prevent damage to existing buildings, fences, gates, walls, roads, paved areas and other site features, which are to remain in position during execution of the Works.

570 Existing work

Protection: Prevent damage to existing work, structures or other property during the course of the work.
Removal: Minimum amount necessary.
Replacement work: To match existing.

625 Adjoining property restrictions

Precautions:
- Prevent trespass of workpeople and take precautions to prevent damage to adjoining property.
- Pay all charges.
- Remove and make good on completion or when directed.

Damage: Bear cost of repairing damage arising from execution of the Works.

630 Existing structures

Duty: Check proposed methods of work for effects on adjacent structures inside and outside the site boundary.
Supports: During execution of the Works:
- Provide and maintain all incidental shoring, strutting, needling and other supports as may be necessary to preserve stability of existing structures on the site or adjoining, that may be endangered or affected by the Works.
- Do not remove until new work is strong enough to support existing structure.
- Prevent overstressing of completed work when removing supports.

Adjacent structures: Monitor and immediately report excessive movement.
Standard: Comply with BS 5975 and BS EN 12812.

640 Materials for recycling/ reuse

Duty: Sort and prevent damage to stated products or materials, clean off bedding and jointing materials and other contaminants.
Storage: Stack neatly and protect until required by the Employer or for use in the Works as instructed.

A36 FACILITIES/ TEMPORARY WORK/ SERVICES

GENERALLY

110 Spoil heaps, temporary works and services
Location: Give notice of intended siting.
Maintenance: Alter, adapt and move as necessary. Remove when no longer required and make good.

340 Name boards/ advertisements
Name boards/ advertisements: Not Permitted.

420 Lighting and power
Supply: Electricity is available onsite but should be tested prior to use by a qualified electrical engineer. Please refer to CJR (Midlands) Limited Mechanical and Electrical tender package for further detail.
Continuity: The Employer will not be responsible for the consequences of failure or restriction in supply.

430 Water
Supply: The contractor will need to supply water and facilities on site for staff

440 Telephones
Direct communication: As soon as practicable after the Date of Possession provide the Contractor's person in charge with a mobile telephone.

570 Personal protective equipment
General: Provide for the sole use of those acting on behalf of the Employer, in sizes to be specified:
- Safety helmets to BS EN 397, neither damaged nor time expired.
- High visibility waistcoats to BS EN 471 Class 2.
- Safety boots with steel insole and toecap to BS EN ISO 20345.
- Disposable respirators to BS EN 149.FFP1S.
- Eye protection to BS EN 166.
- Ear protection – ear muffs to BS EN 352-1, plugs to BS EN 352-2
- Hand protection - to BS EN 388, 407, 420 or 511 as appropriate.

A37 OPERATION/ MAINTENANCE OF THE FINISHED WORKS

115 The Health and Safety File
Responsibility: Principal Contractor

A41 CONTRACTOR'S GENERAL COST ITEMS: SITE ACCOMMODATION

110 Site accommodation
Details: Site accommodation required not made available by the Employer, and as such the contractor will need to provide as necessary:

A42 CONTRACTOR'S GENERAL COST ITEMS: SERVICES AND FACILITIES

110 Services and facilities
Details: Services or facilities required or made/ not made available by the Employer: and as such the contractor will need to provide as necessary:

D1 BRICK/BLOCK WALLING

TYPE(S) OF WALLING

D1.1 CLAY FACING BRICKWORK
- Bricks: To BS 3921.

D1.2 CALCIUM SILICATE FACING BRICKWORK
- Bricks: To BS 187

D1.3 CONCRETE FACING BRICKWORK
- Bricks: To BS 6073:Part 1.

D1.4 SECOND HAND FACING BRICKWORK _
- Bricks: Second hand bricks free from deleterious matter such as mortar, plaster, paint, bituminous materials and organic growths. Bricks to be sound, clean and reasonably free from cracks and chipped arrises.

D1.5 CONCRETE FACING BLOCKWORK
- Blocks: to BS 6073:Part 1.

D1.6 CLAY COMMON BRICKWORK
- Bricks: To BS 3921.

D1.7 CALCIUM SILICATE COMMON BRICKWORK
- Bricks: To BS 187,

D1.8 CONCRETE COMMON BRICKWORK
- Bricks: To BS 6073:Part 1.

D1.9 CONCRETE COMMON BLOCKWORK
- Blocks: to BS 6073:Part 1.

D1.10 ENGINEERING BRICKWORK
- Bricks: To BS 3921,

D1.11 DAMP PROOF COURSE BRICKWORK:
- Bricks: To BS 3921,

WORKMANSHIP GENERALLY

D1.12 RELATED WORK is specified in the following sections:

D1.13 SITE STORAGE: Store bricks/blocks in stable stacks clear of the ground and clearly identified by type, strength, grade, etc. Protect from adverse weather and keep clean and dry.

D1.14 CONDITIONING OF BRICKS:
- Do not use clay bricks or calcium silicate bricks when still warm from the manufacturing process.
- In dry warm weather wet the surfaces of very absorbent bricks slightly to reduce suction. Do not soak.

D1.15 CONDITIONING OF CONCRETE BRICKS/BLOCKS:
- Do not use autoclaved concrete bricks/blocks when still warm from the manufacturing process.
- Do not use nonautoclaved concrete bricks/blocks until at least four weeks after casting.

- Do not wet concrete bricks or blocks before laying; use an approved water retaining admixture in the mortar to counteract suction.

D1.16 LAYING GENERALLY:
- Lay bricks/blocks on a full bed of mortar; do not furrow. Fill all cross joints and collar joints; do not tip and tail.
- Build walls in stretching half lap bond when not specified otherwise.
- Plumb perpends of facework every third or fifth cross joint along a course and even out the joint widths in between.

D1.17 HEIGHT OF LIFTS:
- Rack back when raising quoins and other advance work.
  Do not use toothing.
- Raise no portion of the work more than 1.2 m above another at any time.
- In facework, complete each lift in one period of operation.
- Do not carry up any one leaf more than 1.5 m in one day unless permitted by the CA.

D1.18 LEVELLING OF SEPARATE LEAVES: Bring both leaves of cavity walls to the same level at:
- Every course containing vertical twist type ties or other rigid ties
- Every third tie course for double triangle/butterfly ties
- Courses in which lintels are to be bedded.

D1.19 COURSING: Gauge brick courses four to 300 mm including joints.

D1.20 COURSING: Arrange brick courses to line up with existing work.

D1.21 SUPPORT OF EXISTING WORK: Where new lintels or walling are to support existing structure, completely fill top joint with semidry mortar, hard packed and well rammed to ensure full load transfer after removal of temporary supports.

D1.22 BRICKWORK TO RECEIVE ASPHALT DPC: Finish flush with mortar to give a smooth level bed.

D1.23 BLOCK BOND new walls to existing, by cutting pockets into existing walls, not less than 100 mm deep, the full thickness of the new wall, and vertically as follows:
Brick to brick: 4 courses high at 8 course centres.
Block to block: Every other course.
Bond new walling into pockets with all voids filled solid with mortar.

D1.24 JOINTING: When not specified otherwise, finish joints neatly to the specified profile(s) as the work proceeds.

D1.25 UNEXPOSED JOINTS: As the work proceeds, strike off joints that will not be exposed to view in the finished work.

D1.26 JOINTS IN MASONRY TO BE PLASTERED OR RENDERED: Unless keyed units or metal lathing are used, rake out joints as work proceeds, to a depth of approximately 15 mm.

D1.27 POINTING: Where specified, rake out joints to a depth of 12-15 mm as the work proceeds. Subsequently, remove loose debris from the joints using a dry brush, dampen the work, and neatly point to the specified profile in a continuous operation from the top of the wall downwards as the scaffolding is taken down.

D1.28 FIRE STOPPING: Fill joints around joist ends built into cavity walls with mortar to seal cavities from interior of building.

D1.29 FIRE STOPPING: Ensure a tight fit between brickwork and cavity barriers to prevent fire and smoke penetration.

D1.30 ADVERSE WEATHER:
- Do not use frozen materials.
- Do not lay bricks/blocks when the air temperature is at or below 3 degC unless mortar has a minimum temperature of 4 degC when laid and walling is protected. Do not lay mortar on frozen surfaces.
- Maintain temperature of the work above freezing until mortar has fully hardened.
- Rake out and replace mortar damaged by frost. When instructed, rebuild damaged work.
- Protect newly erected walling against rain and snow by covering when precipitation occurs, and at all times when the work is not proceeding.

ADDITIONAL REQUIREMENTS FOR FACEWORK

D1.31 THE TERM FACEWORK, where used in this specification, applies to all brick/block walls finished fair. Where any facework is to be painted, the only specification requirement to be waived is that relating to colour.

D1.32 REFERENCE PANEL(S): Prepare panel(s) as set out below and, after drying out, obtain approval of appearance before proceeding. Construct panels in an approved location using randomly sampled bricks/blocks but rejecting any that are damaged.

D1.33 COLOUR MIXING:
- Agree with manufacturer and CA methods for ensuring that the supply of facing bricks/blocks is of a consistent, even colour range, batch to batch and within batches.
- Check each delivery for consistency of appearance with previous deliveries and with approved samples or reference panels; do not use if variation is excessive.
- Mix units from different packs and deliveries which vary in colour to avoid patches, horizontal stripes and racking back marks in the finished work.

D1.34 APPEARANCE:
- Select bricks/blocks with unchipped arrises. Cut with a masonry saw where cut edges will be exposed to view.
- Set out and lay bricks to match appearance of relevant approved reference panel(s).
- Keep courses evenly spaced using gauge rods. Set out carefully to ensure satisfactory junctions and joints with adjoining or built-in elements and components.
- Protect facework against damage and disfigurement during the course of the works, particularly arrises of openings and corners.

D1.35 GROUND LEVEL: Facework to start not less than 150 mm below finished level of external paving or soil except where shown otherwise.

D1.36 PUTLOG SCAFFOLDING to facework will not be permitted.

D1.37 TOOTHED BOND: Except where a straight vertical joint is specified, new and existing facework in the same plane to be bonded together at every course to give a continuous appearance.

D1.38 BRICK SILLS/CAPPINGS: Bed solidly in mortar with vertical joints completely filled. Press mortar firmly into exposed joints and finish neatly.

D1.39 CLEANLINESS: Keep facework clean during construction and thereafter until Practical Completion. Turn back scaffold boards at night and during heavy rain. If, despite precautions, mortar marks are deposited on the face of masonry units, leave to dry then remove with a stiff brush. Rubbing to remove marks or stains will not be permitted.

D1.40 CRACKED BRICKS in existing facework to be cut out and replaced with matching bricks bedded incement: lime:sand mortar, before repointing adjacent cracked joints as specified.

D1.41 CRACKED JOINTS in existing facework which is not to be repointed: joints with cracks to be cut out to form a square recess of 15-20 mm depth. Remove dust, lightly wet and neatly point in cement: lime:sand mortar to match existing work.

D1.42 REPOINTING: Where specified carefully rake out existing joints by hand to form a square recess of 15-20 mm depth. Remove dust, lightly wet and neatly point in cement:lime: sand mortar in a continuous operation.

D6 ACCESSORIES/SUNDRY ITEMS FOR BRICK/BLOCK/STONE WALLING

CAVITIES

D6.1 CONCRETE FILL: Fill cavities with concrete up to 225 mm below ground level dpc. Concrete mix to BS 5328, Designated mix GEN 3 or Standard mix ST4, high workability.

D6.2 CLEANLINESS: Clean off surplus mortar from joints on cavity faces as the work proceeds. Keep cavities, ties and dpcs free from mortar and debris with laths or other suitable means.

D6.3 WEEP HOLES:
- Form with plastics perpend units colour to match brickwork to manufacturer's recommendations at 900 mm centres immediately above base of cavity, external openings and stepped dpcs. Provide not less than two weep holes over openings.

D6.4 FULL FILL CAVITY INSULATION:
- Insulation: Mineral fibre batts to BS 6676:Part 1 or Agrément certified.
  Size to suit wall tie spacing,
- Store, handle and install to BS 6676:Part 2, clauses 4 and 5, ensuring that no gaps are left in the insulation layer. Keep insulation dry and free from mortar droppings, grout and other debris during the course of construction.

D6.5 PARTIAL FILL CAVITY INSULATION:
- Insulation Size to suit wall tie spacings,
- Fix securely to inner leaf, ensuring that:
  - edges are not damaged
  - boards are close butted at horizontal and vertical joints and at closures
  - joints between boards are kept clean and dry and free from mortar droppings, grout and other debris
  - the residual cavity is not blocked or bridged by offcuts of insulation
- Place and secure each course of insulation before building up inner leaf above level of previous course of insulation.

D6.6 AIR BRICKS:
- To BS 493, Class 1, built in as the work proceeds.

D6.7 VENTILATION DUCTS:
- Install across cavity, sloping away from inner leaf, bedding fully in mortar to seal cavity.
- Form a stepped dpc cavity tray above duct, extending 150 mm on each side and with stop ends.

REINFORCING/FIXING ACCESSORIES

D6.8 WALL TIES
To BS 1243,
- Fitted with plastics insulation retaining clips recommended by manufacturer for this type of tie.

D6.9 FIXING TIES IN MASONRY CAVITY WALLS:
- Bed not less than 50 mm into bed joint of each leaf.
- Slope slightly downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing.
- Evenly space at 900mm horizontally, staggered in alternate courses, and at 450mm centres vertically, unless specified otherwise.
- Provide additional ties within 225 mm of reveals of unbonded openings

D6.10 FIXING TIES IN MASONRY CAVITY WALLS WITH FULL FILL CAVITY INSULATION:
- Bed not less than 50 mm into bed joint of each leaf.

- Slope downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing.
- Evenly space at 900mm centres horizontally, staggered in alternate courses, and at 450mm centres vertically, unless specified otherwise.
- Provide additional ties beneath the lowest row of insulation batts, and within 225 mm of reveals of unbonded openings

D6.11 FIXING TIES IN MASONRY CAVITY WALLS WITH PARTIAL FILL CAVITY INSULATION:
- Bed not less than 50 mm into bed joint of each leaf.
- Slope downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing.
- Evenly space in horizontal and vertical rows (i.e. not staggered) at 900mm centres horizontally, and 450mm centres vertically, unless specified otherwise.
- Provide additional ties within 225 mm of reveals of unbonded openings

D6.12 FIXING TIES IN MASONRY CLADDING TO TIMBER FRAMES:
- Fix ties securely to the timber frame with 50 mm x 11 gauge stainless steel annular ringed shank nails, and bed not less than 50 mm into bed joint of the masonry leaf. Do not bend ties to suit coursing.
- Slope downwards away from the timber frame.
- Space horizontally to suit stud centres and at 450 mm centres vertically, unless specified otherwise.
- Provide additional ties within 225 mm of sides of openings, at not more than 300 mm centres vertically.
- Repair any damage to the breather membrane before erecting the masonry skin.

D6.13 JOINT REINFORCEMENT
Width: Approximately 40-50 mm less in width than wall or leaf.
- Lay on an even bed of mortar in a continuous strip with 225 mm laps at joints and full laps at angles. Keep back 20 mm from face of external work, 12 mm back from face of internal work and finish mortar joint to normal thickness.

FLEXIBLE DAMP PROOF COURSES/CAVITY TRAYS

D6.14 DAMP PROOF COURSE:
Bitumen based to BS 6398,

D6.15 DAMP PROOF COURSE:
Polyethylene to BS 6515.

D6.16 FLEXIBLE SHEET CAVITY TRAYS:
Bitumen based dpc material to BS 6398,

D6.17 GAS RESISTANT DPCS/CAVITY TRAYS:
Bitumen based dpc material incorporating an aluminium core.

D6.18 PREFORMED DPC/CAVITY TRAY JUNCTION CLOAKS/STOP ENDS:
Types as shown on drawings.
- Seal all laps with dpcs and/or cavity trays using adhesive/mastic/torching in accordance with manufacturer's recommendations to ensure a fully watertight installation.

D6.19 JUNCTIONS/STOPENDS FORMED IN SITU:
- Where preformed junction cloaks/stop ends are not specified form three dimensional changes of shape in dpcs and/or cavity trays carefully and neatly to ensure a fully watertight installation, using folds wherever possible to achieve the required shape.
- Seal all laps using adhesive/mastic/ torching in accordance with manufacturer's recommendations.
- Preformed junction cloaks/stop ends may be used in lieu, subject to approval.

INSTALLATION OF DPCS/CAVITY TRAYS

D6.20 COLD WEATHER WORKING: In cold weather warm dpc rolls before unrolling, to avoid cracking.

D6.21 HORIZONTAL DPCS:
- Lay in continuous lengths on a full even bed of fresh mortar, with 100 mm laps at joints and full laps at angles.
- Width of dpc to be at least full width of masonry leaf unless otherwise specified. Do not cover edges of dpc with mortar.
- Where there are separate dpcs in each leaf of a cavity wall, ensure that edges do not project into the cavity.
- Immediately lay at least one further course of masonry on a thin even bed of fresh mortar. Keep finished joint thickness as close to normal as practicable.

D6.22 GROUND LEVEL DPCS: Ensure continuity of dpc with damp proof membrane.

D6.23 STEPPED DPCS: Where dpcs are installed in external walls on sloping ground, ensure that they are never less than 150 mm above finished ground level.

D6.24 SILL DPCS to be in one piece and turned up at the back if the sill is in contact with any part of the inner leaf.

D6.25 COPING/CAPPING DPCS:
- Bed dpcs and copings/cappings in one operation to ensure maximum bond between masonry units, mortar and dpc.
- Provide rigid support for dpcs in cavity walls.

D6.26 CAVITY TRAYS FORMED IN SITU: Dpcs which span cavities to prevent the downward ingress of water to be:
- Accurately formed to the profiles shown on drawings, and firmly secured.
- In unjointed lengths wherever possible, otherwise lapped at least 100 mm and sealed using adhesive/mastic/torching in accordance with manufacturer's recommendations to ensure a fully watertight installation.
- Fully supported over the cavity, when horizontal, by a cavity closer.
- Prevented from sagging when stepped up towards the inner leaf.
- Carefully cleaned to remove debris and mortar droppings before they set.
- Carefully protected from perforation and other damage.

D6.27 CAVITY TRAYS OVER OPENINGS AND OTHER CAVITY BRIDGINGS to extend not less than 150 mm beyond ends of lintels/bridgings.

D6.28 GAS RESISTANT DPCS/CAVITY TRAYS:
- Overlap joints in dpc/cavity tray not less than 150 mm and heat seal to form a gas and watertight joint.
- Ensure that dpc/cavity tray overlaps damp proof membrane by not less than 150 mm.

D6.29 FACEWORK: Keep leading edge of dpcs/cavity trays flush with face of wall
Do not bridge with mortar.

D6.30 FACEWORK: Keep leading edge of dpcs/cavity trays 5 mm back from face of wall
Rake back mortar to fully expose edge of dpc/cavity tray.

D6.31 FACEWORK: Leading edge of dpcs/cavity trays to project 5 mm from face of wall

D6.32 VERTICAL DPCS to be in one piece wherever possible; otherwise overlap by not less than 100 mm with upper piece outermost.

D6.33 JAMB DPCS: Ensure that dpcs to jambs of openings:
- Fully lap behind cavity tray/lintel at head and over horizontal dpc at sill.
- Project not less than 25 mm into cavity.

- Are in full contact with frames.

D6.34 JAMB DPCS: Fix to back of timber frames which are to be built in, using galvanized clout nails or staples.

JOINTS

D6.35 MOVEMENT JOINTS WITH SEALANT
Build in as the work proceeds ensuring no projections into cavities and correct depth of joint to receive sealant system. Thickness of filler to match design width of joint.

D6.36 MOVEMENT JOINTS WITHOUT SEALANT
Build in as the work proceeds, completely filing the joint but without projecting into cavities. Thickness of filler to match design width of joint.

D6.37 MOVEMENT JOINTS WITHOUT SEALANT
Compress, insert and slide into place in open joint. Install with accessories or adhesives where recommended by manufacturer.

D6.38 POINTING IN FLASHINGS: Remove dust, lightly wet and neatly point with mortar specified for walling. Ensure joint is completely filled and finish flush.

D6.39 PINNING UP TO SOFFITS: Completely fill joint at top of loadbearing walls with mortar, well rammed into position using temporary shuttering.

D6.40 TOPS OF NONLOADBEARING WALLS:
- Securely fix restraints to soffit and completely fill space between wall and soffit leaving no gaps to ensure compliance with design requirements.

PROPRIETARY SILLS/LINTELS/COPINGS/DRESSINGS

D6.41 SILLS:
- To BS 5642:Part 1.
  Finish, colour and texture to match approved sample.
- Leave bed joints open under one piece sills except under end bearings. On completion point with mortar to match adjacent work.

D6.42 PRECAST CONCRETE LINTELS:
- To BS 5977:Part 2.
  Bed on mortar used for adjacent work with bearing of not less than 150 mm unless specified otherwise. Use slate packing pieces.

D6.43 PREFABRICATED STEEL LINTELS:
- To BS 5977:Part 2.
  Bed on mortar used for adjacent work with bearing of not less than 150 mm unless specified otherwise.

D6.44 COPING UNITS:
- To BS 5642:Part 2.
  Finish, colour and texture to match approved sample.
- Lay on a full bed of mortar, accurately to line and level, with all joints filled and neatly finished flush.

D6.45 CAST STONE DRESSINGS:
- Generally to BS 1217 except that initial surface absorption may be either to BS 1217, grade A, or to the UK Cast Stone Association 'Specification for cast stone,' clause 4.7.2.
  Lay on a full bed ofmortar, colour matched to approval. Fill all joints and neatly finish flush.

MISCELLANEOUS ITEMS

D6.46 TILE SILLS:
- Plain clay tiles to BS 402:Part 1,
  Lay two courses as detailed, to break joint, true to line and level, fully bedded in 1:¼:3 cement:lime:sand mortar, with all joints filled and neatly finished flush.

D6.47 TEMPLATES: Where frames are not to be built in (specified elsewhere) form openings using rigid templates accurately fabricated to the required size.

D6.48 FLUE LINING SYSTEM:
- Linings: Clay to BS 1181,
- Mortar: 1:2:8-9 cement:lime:sand.
- Fully bed linings in mortar with socket or rebate uppermost and neatly finish joints flush, to provide an unrestricted flueway with smooth interior surfaces. Fill void between lining and surrounding work with mortar. Use correct starters, adapters, bends, etc.
- On completion, carry out a core ball test and smoke test in the presence of the CA. If any obstructions or leaks are revealed, submit for approval proposals for making good.

D6.49 FLUE BLOCK SYSTEM:
Mortar: 1:4-5 cement:sand.
- Position blocks accurately and finish joints flush to ensure a smooth, unrestricted flueway. Use correct starter, offset and transfer blocks.
- Seal joints between blocks
- On completion, carry out a core ball test and smoke test in the presence of the CA. If any obstructions or leaks are revealed, submit for approval proposals for making good.

D6.50 FIREPLACE COMPONENTS:
To BS 1251.

D6.51 CHIMNEY POTS:
Bed solid in mortar specified for chimney stack.

D7 PRECAST CONCRETE SILLS/LINTELS/COPINGS/FEATURES

To be read with Preliminaries/General conditions.

TYPE(S) OF COMPONENT

D7.1 CONCEALED PRECAST LINTELS:

- Concrete: To BS 5328, Designated mix not less than RC30 or Designed mix not less than C30, maximum nominal size of aggregate 20 mm.

Clear span	Section	Bearing	Reinforcement
Up to 900 mm	150 mm deep x width of wall	150 mm at both ends	1 no. 12mm mild steel bar for each 105 mm of wall thickness.
900 to 1800 mm	225 mm deep x width of wall	225 mm at both ends	1 no. 16mm mild steel bar for each 105 mm of wall thickness

- Minimum nominal cover to reinforcement: 20 mm.
- For greater spans and/or greater than normal loadings see detailed drawings or obtain instructions.

D7.2 CONCEALED PRECAST

- Concrete: To BS 5328, Designated mix not less than RC30 or Designed mix not less than C30, maximum nominal size of aggregate 20 mm.

GENERAL REQUIREMENTS

D7.3 MOULDS must be:

- Constructed accurately to give straight, square and true components. Permissible deviations on length +0, -6 mm, other dimensions +/-3 mm.
- Maintained in clean, sound condition and inspected carefully for defects before each reuse.
- Damaged moulds must not be repaired and reused if this would impair the surface appearance of the components.
- Constructed to prevent loss of grout.
- Designed to permit demoulding without damage to the components.
- Coated evenly with a suitable release agent, which must not be allowed to touch the reinforcement.

D7.4 CONCRETE GENERALLY: Constituent materials, composition of mixes, production of concrete, information to be provided, sampling, testing and compliance to be in accordance with BS 5328 unless otherwise specified.

D7.5 CHLORIDES: The total chloride ion content of the constituents of each mix, expressed as a percentage by weight of cement (including GGBS or PFA if used) in the mix, must not exceed 0.4. Do not use admixtures containing calcium chloride.

D7.6 REINFORCEMENT:

- In addition to reinforcement required for structural purposes, precast units must be reinforced as necessary to resist shrinkage and handling stresses.
- Type of reinforcement, unless otherwise specified: To BS 4449 and/or BS 4483, cut and bent to BS 4466.
- Galvanized reinforcement: Galvanized to BS 729 after cutting, chromate treated.
- Stainless steel reinforcement: To BS 6744, type 304 or 316.
- Ensure that the metal of the reinforcement is compatible with the metal of any fixings and accessories that may make contact.

- At time of placing concrete, reinforcement to be clean and free of corrosive pitting, loose mill scale, loose rust, ice, oil and other substances which may adversely affect the reinforcement, concrete, or bond between the two.
- Fix accurately and securely using tying wire, approved steel clips, or tack welding if permitted. Wire or clips must not encroach into the concrete cover.

D7.7 CASTING AND CURING: Thoroughly compact concrete by vibration.
- Do not demould components prematurely.
- Prevent damage to and distortion of immature components from movement, vibration, overloading, physical shock, rapid cooling and thermal shock.
- Ensure that components are protected from sun and drying winds until they are at least 5 days old.
- Do not deliver components to site until at least 14 days after casting.

FAIR FACED COMPONENTS

D7.8 AGGREGATES FOR EXPOSED WORK: To BS 882, of consistent colour, free from absorbent particles which may cause 'popouts', and other particles such as coal and iron sulphide which may be unsightly or cause unacceptable staining. Obtain from one source, and ensure that adequate supplies can be maintained throughout the contract.

D7.9 FACING MIXES:
- Use exactly the same ingredients and batch proportions for all components required to have the same finish.
- Materials, batching and mixing must be carefully controlled to ensure consistency of colour and appearance.

D7.10 FACING MIXES: Different mixes may be used for facing and backing provided:
- The difference in cement content is not more than 80 kg/cu m.
- The thickness of the facing mix is at least 10 mm greater than the nominal maximum size of aggregate, and in no case less than 25 mm.
- Reinforcement is not less than 20 mm away from the junction between mixes.
- The backing mix and facing mix are placed and compacted within one hour of each other so that they are effectively monolithic.

D7.11 QUALITY OF FINISHES must match the approved samples and be consistent throughout the contract. Components having arrises or faces which are broken, chipped, cracked, crazed, honeycombed, irregular, inconsistent, stained or otherwise marred such that their appearance or performance is significantly impaired will not be accepted.

D7.12 GRADE AND COVER FOR EXTERNAL COMPONENTS:
- Concrete grade: RC50 or C50.
  Minimum cement content with 20 mm aggregate: 400 kg/cu m.
  Minimum cement content with 10 mm aggregate: 440 kg/cu m.
  Maximum free water/cement ratio: 0.45.
- Minimum nominal cover to reinforcement on exposed faces in the finished work:
  Different mixes for facing and backing work (see clause 341): 50 mm.
  Single mix: 35 mm.
- Nominal cover to reinforcement on bedded faces: 20 mm.

D7.13 COVER SPACERS must not be used to concrete faces which will be exposed in the finished work.

D7.14 UNIFORMITY OF METHOD: All exposed faces which are specified to be of the same finish must be identical in appearance. If different methods of producing such faces are proposed, submit evidence that there will be no difference in appearance and obtain approval; otherwise all such faces must be produced in the same way.

INSTALLATION

D7.15 PROTECTION:
- Prevent overstressing of components during transit, handling, storage and fixing.
- Store components on level bearers clear of the ground and separate with resilient spacers.
- Prevent damage to components and any chipping, staining, marking or dirtying of surfaces which will be visible in the completed work.

D7.16 LAYING:
- Unless specified otherwise, lay components on a full bed of mortar used for adjacent work. If packing is required use slate.
- Position components accurately, true to line and level.
- Faces which will be exposed to view in the finished work to be kept clean with no mortar encroachment. Rubbing to remove marks or stains will not be permitted.

D7.17 SUPPORT OF EXISTING WORK: Where new lintels are to support existing structure, completely fill top joint with semidry mortar, hard packed and well rammed to ensure full load transfer after removal of temporary supports.

D7.18 ONE PIECE SILLS/THRESHOLDS: Leave bed joints open except under end bearings. On completion point with mortar to match adjacent work.

E3 CARPENTRY/TIMBER FRAMING/FIRST FIXING

To be read with Preliminaries/General conditions.

TYPE(S) OF TIMBER

E3.1 STRESS GRADING OF TIMBER:
- To be carried out by companies currently registered under a third party quality assurance scheme operated by any of the certification bodies approved by the UK Timber Grading Committee.
- Timber of a basic thickness less than 100 mm and not specified for wet exposure to be stress graded at an average moisture content not exceeding 20% with no reading being in excess of 24% and clearly marked as 'DRY' or 'KD' (kiln dried).
- Timber graded undried (green) and specified for wet exposure conditions to be clearly marked as 'WET' or GRN'.
- Structural timber members cut from large graded section to be regraded to approval and marked accordingly.

E3.2 GRADED SOFTWOOD
- Stress graded to BS 4978 or other national equivalent and so marked.
  Strength class to BS 5268:Part 2:
- Preservative treatment: As section V3 and British Wood Preserving and Damp-proofing Association Commodity Specification C
- Moisture content at time of erection: As clause E3.11.

E3.3 UNGRADED SOFTWOOD
- Free from decay, insect attack (except pinhole borers) and with no knots wider than half the width of the section.
- Preservative treatment: As section V3 and British Wood Preserving and Damp-proofing Association Commodity Specification C
- Moisture content at time of erection: As clause E3.11

E3.4 WROT TIMBER
- Quality of timber and fixing: To BS 1186:Part 3.
  Moisture content at time of fixing: 13 to 19%.
- Preserving treatment: As section V3 and British Wood Preserving and Damp-proofing Association Commodity Specification C5.

E3.5 PLYWOOD
- Manufactured to an approved national standard.
  Bond type: WBP to BS 6566:Part 8 or equivalent.
  Preservative treatment: As section V3 and British Wood Preserving and Damp-proofing Association Commodity Specification C

E3.6 TRUSSED RAFTERS:
- Designed and fabricated to BS 5268:Part 3.
  Manufactured by a firm currently registered under a third party quality assurance scheme.

WORKMANSHIP GENERALLY

E3.7 CROSS SECTION DIMENSIONS OF TIMBER shown on drawings are basic sizes unless stated otherwise.
Maximum permitted deviations from basic sizes to be as stated in BS 4471 for softwoods and BS 5450 for hardwoods.

E3.8 REDUCTION TO FINISHED SIZES of planed/regularized timber to be to BS 4471 for softwoods and BS 5450 for hardwoods.

E3.9 SELECTION AND USE OF TIMBER:
- Do not use timber members which are damaged, crushed or split beyond the limits permitted by their grading.
- Ensure that notches and holes are not so positioned in relation to knots or other defects that the strength of members will be reduced.
- Do not use scarf joints, finger joints or splice plates without approval.

E3.10 PROCESSING TREATED TIMBER:
- Carry out as much cutting and machining as possible before treatment.
- Retreat all treated timber which is sawn along the length, ploughed, thicknessed, planed or otherwise extensively processed.
- Treat timber surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

E3.11 MOISTURE CONTENT of timber at time of erection to be not more than:
Under cover in generally unheated spaces: 24%
Under cover in generally heated spaces: 20%
Internal in continuously heated spaces: 20%

E3.12 PROTECTION:
- Keep timber dry and do not overstress, distort or disfigure sections 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.
- Arrange sequence of construction and cover timber as necessary during and after erection to ensure that specified moisture content is not exceeded.
- Keep trussed rafters vertical during handling and storage.

E3.13 SEAL exposed end grain

E3.14 PAINTED FINISHES:
Structural timber which is to be painted to be primed as specified before delivery to site.

E3.15 CLEAR FINISHES:
Structural timber which is to be clear finished to be kept clean and first coat of specified finish applied before delivery to site.

E3.16 EXPOSED TIMBER:
Prevent damage to and marking of surfaces and arrises of planed structural timber which will be exposed to view in completed work.

JOINTING TIMBER

E3.17 JOINTING/FIXING GENERALLY:
Where not specified otherwise, select fixing and jointing methods and types, sizes and spacings of fastenings in compliance with section V4. Fastenings to comply with relevant British Standards.

E3.18 FRAMING ANCHORS:
- Fix anchors securely using not less than the number of nails recommended by the anchor manufacturer.
- Nails to be not less than 30 x 3.75 mm galvanized or sherardized square twist unless recommended otherwise.

E3.19 BOLTED JOINTS:

- Locate holes accurately and drill to diameters as close as practical to the nominal bolt diameter and not more than 2 mm larger.
- Place washers under all bolt heads and nuts which bear directly on timber. 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.
- Check at agreed regular intervals up to Practical Completion and tighten as necessary to prevent slackening of joints.

ERECTION AND INSTALLATION

E3.20 ADDITIONAL SUPPORTS:
- Where not shown on drawings, position and fix additional studs, noggings or battens for appliances, fixtures, edges of sheets, etc., in accordance with manufacturers' recommendations.
- All additional studs, noggings or battens to be of adequate size and have the same treatment, if any, as adjacent timber supports.

E3.21 WALL PLATES:
Ensure that wall plates are:
- Positioned and aligned to give the correct span and level for trusses, joists, etc.
- Fully bedded in fresh mortar.
- In lengths of not less than 3 m with half lap joints.

E3.22 INSTALLING JOISTS GENERALLY:
- Position at equal centres not exceeding designed spacing and true to level.
- Install bowed joists with positive camber.
- Position end joists approximately 50 mm from masonry walls.

E3.23 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 6 mm 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.

E3.24 JOIST HANGERS
Size: To suit joist, design load and crushing strength of supporting construction.

E3.25 TRIMMING OPENINGS:
When not specified otherwise, trimmers and trimming joists to be not less than 25 mm wider than general joists.

E3.26 TRUSSED RAFTERS:
- Carefully inspect each truss before erection to ensure compliance with shop drawings and specification, including:
  Grades and sizes of members.
  Types, sizes and positions of nail plates.
  Gaps between ends of members at joints.
  Full penetration of nails.
- Erect trusses plumb, at equal centres not exceeding designed spacing and in accordance with BS 5268:Part 3, clause 30 and Appendix B.
- Do not use damaged trusses and do not modify without approval.
- Fix securely with truss clips ensuring that rafters do not bear on wall plates.
- Do not fix ceiling chords to internal walls until roofing is complete and cisterns installed and filled.

E3.27 TRUSS CLIPS:
- Fix securely with 32 x 3.5 mm galvanized or sherardized square twisted nails in every hole.

E3.28 PERMANENT BRACING OF TRUSSED RAFTERS:

- Set out as shown on drawings unless approved otherwise.
- Fix bracing and binders to every rafter, strut or tie with not less than two 75 x 3.35 mm galvanized round wire nails.
- Any lap joints must be side by side extending over and nailed to at least two truss members.
- Where a binder crosses a brace, interrupt and plate the binder.

E3.29 LATERAL RESTRAINT STRAPS:

Size: Not less than 30 x 5 mm cross section, 150 mm cranked end

- Fix straps to top of joists/rafters/ties
- 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 straps which span joists/rafters/ties running parallel to wall. Noggings and packs to fit tightly, be not less than three quarters of joist/rafter/tie depth and at least 38 mm thick. Notch joists so that straps fit flush with surface. Do not notch rafters/ties.
- Fix straps to joists/rafters/ties with not less than four 50 mm x 8 gauge sherardized countersunk screws, evenly spread.

E3.30 STRUTTING:

- Unless specified otherwise, securely fix strutting between joists as follows:
  Joist spans of 2.5 to 4.5 m: One row 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 38 mm softwood and located clear of top and bottom edges.
- Solid strutting, at least 38 mm thick softwood and at least three quarters of depth of joist.
- Outer joists to be blocked solidly to perimeter walls.

E3.31 EAVES SOFFIT VENTILATORS:

- Fix ventilators in accordance with manufacturer's recommendations to provide the equivalent of a continuous opening
- Ensure that ventilators are not blocked by insulation at eaves.

E3.32 EAVES SOFFIT VENTILATION:

- Fix soffit board(s) to leave a continuous ventilation opening
- Fix a 3 to 4 mm mesh screen across the opening to prevent large insect entry.
- Ensure that the ventilation path is not blocked by insulation at eaves.

F1 PATENT GLAZING

To be read with Preliminaries/General conditions.

F1.1 PATENT GLAZING
- Patent glazing system: To be to BS 5516, and as specified in this section.

F1.2 GENERALLY: Requirements specified in this section apply to the entire patent glazing assembly, including flashings and junctions with adjacent parts of the building. Full allowance must be made for deflections and other movements.

F1.3 WATER PENETRATION onto internal surfaces, or into cavities not designed to be wetted, must not occur under site exposure conditions.

F1.4 THERMAL SAFETY: Glazing panes or units must have adequate resistance to thermal stress generated by orientation, shading, solar control and construction.

F1.5 SECURITY: Patent glazing bars must have internally fixed caps/wings, or externally fixed caps/wings with non-removable fasteners.

F1.6 WORKMANSHIP GENERALLY:
- Fabricate and install in accordance with BS 5516 and specified requirements.
- All fixings must be concealed unless indicated on detailed drawings.
- Machine cut and drill all components in the workshop wherever possible.
- Site drill or cut into structure only in approved locations.

F1.7 GLASS:
- To BS 952 and the relevant parts of BS EN 572, free from scratches, bubbles, cracks, rippling, dimples and other defects.
- Panes to be accurately sized with clean, undisfigured and undamaged edges and surfaces.

F1.8 HEAT TOUGHENED GLASS must be subjected to a heat soaking test designed to remove 90% of nickel sulfide inclusions which may otherwise cause spontaneous breakage in situ:

F1.9 INSULATING GLASS UNITS:
- Double glazed units to BS 5713 and Kitemark certified.
- Any perimeter taping must be transparent to permit inspection of unit edge condition.

F1.10 PLASTICS GLAZING:
- Sheets to be accurately sized with clean, undisfigured and undamaged edges and surfaces.
- Glazing bars must provide adequate edge cover to sheets to prevent displacement due to thermal movement and flexing under load.
- Sealing and glazing materials must be compatible with sheets.

F1.11 INFILLING must be:
- Accurately sized with undisfigured and undamaged edges and surfaces.
- Adequately rigid to comply with all design/performance requirements.

G10 SINGLE LAP ROOF TILING

TILING GENERALLY

G10.1 BASIC WORKMANSHIP: Set out to give true lines and regular appearance, fitting neatly at all edges, junctions and features. Fix tile roofing to make the whole sound and weathertight at the earliest opportunity. Repair any defects as quickly as practicable to minimise damage and nuisance. Keep gutters and pipes free of debris and clean out at completion.

G10.2 EXISTING TILING: Carefully remove tiles, battens, underlay, etc. the minimum necessary to carry out alterations, ensuring minimum disturbance of adjacent tiles. Set aside undamaged tiles for reuse.

G10.3 UNDERLAY:

- Handle carefully to prevent tears and punctures and repair with adhesive tape any which do occur.
- Lay parallel to eaves, maintaining consistent tautness to minimise gaps.
- Vertical laps not less than 100 mm wide, coinciding with supports. Horizontal laps of the dimensions specified. Fix with galvanized steel, copper or aluminium extra large head felt nails.
- Where pipes and other components penetrate the underlay, use proprietary underlay seals or cross cut neatly and accurately and turn flanges up to give a tight, watershedding fit.
- Ensure that underlay does not obstruct roof ventilation.

G10.4 BATTENS/COUNTERBATTENS:

- Sawn softwood, species to BS 5534:Part 1, clause 11.3.
  Grading: To BS 4978, clause 5 or 9.
  Moisture content: not more than 22% at time of fixing.
- Preservative treatment: CCA or OS double vacuum as section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C8.
- Fix as specified below.

G10.5 COUNTERBATTENS ON RIGID SARKING:

- Fix at centres coinciding with rafters/trusses, marking positions of latter at top edges and eaves before laying underlay.
- Fix through rigid sarking into rafters/trusses at not more than 300 mm centres.

G10.6 BATTENS ON TIMBER SUPPORTS:

- To be in straight horizontal lines, aligned on adjacent areas, with no batten less than 1200 mm long.
- Joints to be square cut, butted centrally on supports and must not occur more than once in any group of four battens on any one support.
- Provide an additional batten where an unsupported lap in the underlay occurs between battens.
- Fix each batten to each support, splay nailing at ends.

G10.7 TILE FIXING:

- Lay each course with tails aligned.
- Use special tiles as necessary at ends of courses to maintain bond and ensure that cut tiles are as large as possible.
- Fix tiles as specified, but in any case the last tile at the end of every course, and every tile in the course adjacent to both eaves and top edges must be fixed, using nailing and/or clipping as appropriate.
- Nail tiles where specified through every hole, using tile manufacturer's recommended nails or, if none, aluminium nails to BS 1202:Part 3, size as recommended by manufacturer.
- Clip tiles where specified using clips and clip nails recommended by manufacturer.

G10.8 LOCAL AND GENERAL FIXING AREAS, as referred to in the type of tiling clause, are defined as follows:

- Local areas: the bands of tiling around all edges of each plane of the roof, including around chimneys, etc. The width of each such band is to be not less than 15% of the plan width of the building, measured up, down or across the roof slope, at right angles to each relevant edge.
- General areas: the remaining areas of roof tiling.

G10.9 MORTAR BEDDING/POINTING:

- Mortar: either 1:4 cement:sand with air entraining agent, or 1:3 masonry cement:sand.
- Do not use in wet or frosty weather or when imminent.
- Tiles to be bedded must be wetted and surface water allowed to drain before fixing.
- Finish neatly as work proceeds and remove any residue.

EDGES/JUNCTIONS/FEATURES

G10.10 GENERALLY:

- Form using the specified and manufacturer's recommended fittings and accessories: do not improvise without approval.
- Fittings and accessories to be supplied by the tile manufacturer to match tile colour and finish unless specified otherwise.
- Cut tiles only where necessary, with an appropriate tool, to give straight, clean edges.
- Fix edge tiles and fittings securely to neat, true lines.
- Ensure that all flashings (specified in another section) are fixed with or immediately after the tiling, and are neatly dressed down.

G10.11 FIRE SEPARATING WALLS:

- Ensure that separating wall is cut on the rake 25 mm to 50 mm below top of adjacent rafters.
- Fill space over top of wall with layer(s) of mineral fibre quilt so that, when underlay and battens are laid it is lightly compressed. Tuck edges of quilt between edges of wall and adjoining rafters.
- Lay 300 mm wide pads of mineral fibre quilt thick enough to seal all gaps and cut to fit snugly between battens. Fix in position with continuous self-adhesive tape from ridge to eaves before tiling.
- At boxed eaves completely seal air paths in the plane of the separating wall with wire reinforced mineral fibre, 50 mm thick, nailed to rafter and carefully cut to shape.

G10.12 EAVES:

- Ensure that top of fascia board is at correct level.
- Fix a 325 mm width of BS 747 type 5U felt underlapping first width of underlay and dress down into gutter.
- Fix eaves fillers to suit profiled tiles.
- Fix eaves tiles with clips recommended by tile manufacturer and project tails to align with centre of gutter.

G10.13 EAVES:

- Ensure that top of fascia board is at correct level.
- Fix continuous support for underlay at eaves to prevent water retaining troughs.
- Rafter ventilator trays: Before fixing, lay pieces of 100 mm mineral fibre quilt between rafters, over and behind the wallplate.
- Fix a 325 mm width of BS 747 type 5U felt underlapping first width of underlay and dress down into gutter.
- Fix eaves fillers to suit profiled tiles.
- Fix eaves tiles with clips recommended by tile manufacturer and project tails to align with centre of gutter.

G10.14 DRY VERGE:

- Ensure that gable wall is brought up to level of underside of tiling battens.
- Carry underlay over full width of gable wall.
- Project tiling battens as recommended by dry verge manufacturer.

G10.15 CLOAKED VERGE:

- Ensure that gable wall is brought up to correct level.
- Bed undercloak of 6 mm fibre cement sheet of approved colour, sloping away from and projecting beyond face of wall on mortar identical to that used in gable walling, and point neatly. Undercloak to be level with underside of tiling battens.

- Carry underlay and battens over full width of verge. Project underlay 50 mm to turn down behind cloak.
- Fix verge tiles with clips and nails to give overhang.

G10.16 MORTAR BEDDED VERGE WITH BEDDED UNDERCLOAK:
- Ensure that gable wall is brought up to correct level.
- Carry underlay 50 mm onto outer leaf of gable wall and bed in mortar.
- Bed undercloak of 6 mm fibre cement sheet of approved colour, sloping away from and projecting beyond face of wall on mortar identical to that used in gable walling, and point neatly. Undercloak to be level with underside of tiling battens.
- Carry tiling battens over undercloak and finish 100 mm from verge edge.
- Fix verge clip to every tiling batten.
- Bed edge of verge tiles flush with undercloak on 75 mm wide bed of mortar, ensuring that mortar is not displaced or cracked by mechanical fixing of tiles.

G10.17 MORTAR BEDDED VERGE WITH NAILED UNDERCLOAK:
- Ensure that gable wall is brought up to level of underside of tiling battens.
- Nail undercloak of 6 mm fibre cement sheet of approved colour on top of underlay, sloping away from roof and projecting beyond face
  Undercloak to be level with underside of tiling battens.
- Carry tiling battens over undercloak and finish 100 mm from verge edge.
- Fix verge clip to every tiling batten.
- Bed edge of verge tiles flush with undercloak on 75 mm wide bed of mortar, ensuring that mortar is not displaced or cracked by mechanical fixing of tiles.

G10.18 DRY HIP:
- Ensure that top of hip rafter is at the correct level as recommended by hip tile manufacturer.
- Lay a strip of underlay at least 600 mm wide over hip, overlapping general underlay.

G10.19 MITRED HIP:
- Lay a strip of underlay at least 600 mm wide over hip, overlapping general underlay.
- Cut double width tiles to rake of hip and to a neat mitre and fix through weathering unit supplied by tile manufacturer.

G10.20 MORTAR BEDDED HIP:
- Lay a strip of underlay at least 600 mm wide over hip, overlapping general underlay.
- Hip irons: To BS 5534:Part 1, clause 12 but of stainless steel, fixed to hip rafters with stainless steel screws.
- Cut tiles to fit closely at junction. Make weathertight with edges and joints of hip tiles solidly bedded in mortar.
- Shape first hip tile neatly to align with corner of eaves and fill end with mortar and slips of tile finished flush.
- Bed tile slips of same size as those used on ridge in each roof tile pan to form dentil course projecting a consistent approved dimension.

G10.21 GRP VALLEY:
- Ensure that valley board provides full support for gutter.
- Cover valley board with a strip of underlay 1 m wide, underlapping general underlay.
- Cut tiles neatly to form a gap centred on gutter.
- Bed on mortar 290 on GRP gutter.

G10.22 LEAD VALLEY:
- Ensure that valley board, plywood valley sheathing and tilting fillets provide full support for lead gutter (specified in another section).
- Cut underlay to rake and dress over tilting fillets to lap onto lead gutter. Ensure that underlay is not laid under lead.
- Cut tiles neatly to form a gap centred on gutter.

- Bed in mortar on 6 mm fibre cement undercloaks laid loose on each side of gutter.

G10.23 TROUGH VALLEY:
- Ensure that valley board provides full support for troughs.
- Cover valley board with a strip of underlay 1 m wide, underlapping general underlay.
- Fix valley battens to raise tiling battens and lift roof tiles clear of trough tiles.
- Cut roof tiles neatly and bed on mortar on trough tiles to form a gap centred on trough. Keep tile interlocks and water channels free of mortar.

G10.24 SIDE ABUTMENT:
- Turn underlay at least 100 mm up abutment.
- Cut or fit tiles closely to abutment.
- Ensure that single strip stepped lead cover flashing (specified in another section) is dressed closely over tile profile by not less than 150 mm.

G10.25 TOP EDGE ABUTMENT:
- Turn underlay at least 100 mm up abutment.
- Fit tiles closely to abutment.
- Ensure that lead apron flashing (specified in another section) is dressed closely over tile profile by not less than 150 mm.

G10.26 TOP EDGE VENTILATED ABUTMENT:
- Ensure provision of air gap at abutment in accordance with ventilator manufacturer's recommendations.
- Ensure that lead apron flashing (specified in another section) is dressed closely over abutment ventilator.

G10.27 DRY VENTILATED RIDGE:
- Ensure that top of ridge board is at correct level as recommended by ridge tile manufacturer.
- Ensure provision of air gap at apex in accordance with ridge manufacturer's recommendations.

G10.28 DRY RIDGE:
- Ensure that top of ridge board is at correct level as recommended by ridge tile manufacturer.
- Lay a length of underlay over ridge overlapping general underlay by not less than 150 mm.

G10.29 MORTAR BEDDED RIDGE:
- Lay a length of underlay over ridge overlapping general underlay by not less than 150 mm.
- Make weathertight with edges and joints of ridge tiles solidly bedded in mortar.
- Fill ends of ridges at gables with mortar and slips of tiles finished flush.
- Bed tile slips of constant size in each roof tile pan to form dentil course projecting a consistent approved dimension.

G10.30 DRY VENTILATED MONO-RIDGE:
- Ensure provision of air gap at apex in accordance with mono-ridge tile manufacturer's recommendations.

G10.31 DRY MONO-RIDGE:
- Carry underlay over apex by at least 150 mm.

G10.32 MORTAR BEDDED MONO-RIDGE:
- Carry underlay over apex by at least 150 mm.
- Mono-ridge tiles: to be approved.
- Make weathertight with sloping edge and joints solidly bedded in mortar, vertical face fixed to ridge batten with stainless steel screws with neoprene washers.
- Fill ends of ridges at gables with mortar finished flush.
- Bed tile slips of constant size in each roof tile pan to form dentil course projecting a consistent approved dimension.

G10.33 JUNCTIONS: Fix a lead saddle (specified in another section) to provide a weathertight detail at each:

G10.34 SNOWGUARDS:

- Fix suitable stainless steel brackets to rafters with stainless steel screws on a line 100-150 mm above the roof edge to receive 150 mm timber snowboard (specified in another section) with 50 mm clearance over surface of roof.
- Cut tiles as necessary, fit lead flashing (specified in another section) and dress over roof finish.

J1 PLASTERBOARD DRY LININGS/PARTITIONS/CEILINGS

To be read with Preliminaries/General conditions.

GENERALLY/PREPARATION

J1.1 ADDITIONAL SUPPORTS FOR PARTITION HEADS: Provide or ensure provision of accurately positioned and securely fixed framing to receive partition heads running parallel with, but offset from main structural supports.

J1.2 ADDITIONAL SUPPORTS FOR FIXTURES AND FITTINGS: Provide or ensure provision of accurately positioned and securely fixed framing to support fixtures, fittings and services. After fixing boards, mark positions of framing for following trades.

J1.3 ADDITIONAL SUPPORTS FOR BOARD EDGES AND PERIMETERS:
Provide or ensure provision of additional framing, accurately positioned and securely fixed, to give full support to board edges and lining perimeters in accordance with board manufacturer's recommendations.

J1.4 NEW WET LAID BASES: Provide or ensure provision of a continuous strip of bituminous felt dpc or other approved material under partitions/freestanding wall linings, cut to the full width of the partition/lining.

J1.5 PLASTERBOARD GENERALLY: To BS 1230:Part 1, types 1 to 5 with exposed surface and edge profiles suitable to receive the specified finish.

FIXING/FINISHING

J1.6 DRY LINING GENERALLY:
- Fixing, jointing and finishing materials and accessories, where not specified otherwise, to be as recommended by the board manufacturer.
- Handle and store materials in accordance with BS 8212, section 5. Do not use damaged boards.
- Use operatives properly trained for dry lining work and who have attended a recognised training scheme.
- Fix boards only in areas which have been made weathertight. Prevent frost damage.
- Cut boards neatly and accurately without damage to core or tearing of paper facing. Keep cut edges to a minimum and position at internal angles wherever possible. Mask with bound edges of adjacent boards at external corners.
- Fix boards securely and firmly to suitably prepared and accurately levelled backgrounds. Set heads of fastenings in a depression; do not break paper or gypsum core. Finish neatly to give flush, smooth, flat surfaces free from bowing and abrupt changes of level.

J1.7 METAL STUD FRAMING:
- Install using components, accessories and methods recommended by the board manufacturer.
- Set out floor/head channels and perimeter studs to give a framework which is accurately aligned with a true vertical plane. Fix securely at all perimeters at not more than 600 mm centres.
- Position studs at equal centres to suit specified linings, maintaining sequence across openings. Provide additional studs as necessary to ensure support to all vertical edges of boards.
- Accurately form openings to receive doorsets using sleeved/ boxed metal studs and/or suitable timber framing as necessary to achieve the strength grade requirements of the framing assembly and adequately support the weight of the door.

J1.8 METAL FURRINGS FOR WALL LININGS:
- Install using components, accessories and methods recommended by the board manufacturer.
- Set out furrings vertically, at specified centres and adjacent to angles, openings, movement joints, etc. Maintain centres of furrings across openings. Bed in 200 mm long dabs of adhesive at each end of furring and thereafter at 450 mm centres. Bed short lengths of furring horizontally to provide continuous support to top and bottom edges of boards.
- Accurately align all furrings to a true, vertical plane.

- Install additional furrings where necessary to accept junctions with partitions. Use a continuous line of adhesive to ensure there are no gaps across the cavity.

J1.9 METAL SUSPENDED CEILING FRAMING:
- Install using components, accessories and methods recommended by the board manufacturer.
- Set out perimeter channels, hangers and sections to give a framework which is accurately aligned and level. Fix securely with additional framing and stiffening at upstands, partition heads, access hatches, etc. to give a stable ceiling.

J1.10 MINERAL WOOL INSULATION TO METAL STUD PARTITIONS/LININGS:
- Fit securely with closely butted joints, leaving no gaps. Unless the insulation is of a self supporting slab type fitted between studs, fix at head of frame using timber battens or proprietary clips.

J1.11 MINERAL WOOL INSULATION ACROSS METAL SUSPENDED CEILING FRAMING:
- Use widest practical widths of insulation. Fit securely with closely butted joints, leaving no gaps.
- Cut and fit neatly around any electrical fittings, etc. Do not cover electrical cables (unless they have been sized accordingly).

J1.12 ACOUSTIC SEALANT:
- Sealant: A type recommended by the board manufacturer.
- Location: To perimeter junctions with walls, floors, ceilings and around openings.
- Before fixing boarding, apply as a continuous bead to clean, dry, dust-free surfaces, leaving no gaps.
- After application of sealant, fill gaps greater than about 6 mm with jointing compound recommended by plasterboard manufacturer.

J1.13 AIR PRESSURE SEALANT
- Sealant: A type recommended by the board manufacturer.
- Location: To perimeter junctions with walls, floors and ceilings, air gaps around openings, and other potential air leakage points including frame members prior to fitting core boards and around fire stops to horizontal joints.
- Apply as a continuous bead leaving no gaps.

J1.14 CAVITY BARRIERS WITHIN CEILING VOIDS:
- Fire resistance to BS 476:Part 20:
- Fix securely at perimeters and joints, ensuring permanent stability and continuity with no gaps, to provide a complete barrier to smoke and flame.

J1.15 FIRE STOPPING: Seal any gaps at junctions of linings and cavity barriers with perimeter abutments, service penetrations, etc. using tightly packed mineral wool or approved intumescent sealant, to prevent penetration of smoke and flame.

J1.16 JOINTS BETWEEN BOARDS:
- Tapered edged plasterboards: Lightly butted. Leave a 3 mm gap where cut/unbound edges occur.
- Square edged plasterboards to be finished with textured plastic compound: 3 mm gap.
- Square edged fibre reinforced gypsum boards: 5 mm gap.

J1.17 VERTICAL JOINTS:
- Centre joints on studs. For partitions, ensure that joints on opposite sides of studs are staggered.
- For two layer boarding, stagger joints between layers.

J1.18 HORIZONTAL JOINTS:
- Horizontal joints will not be permitted in surfaces exposed to view except where the height of partition/lining exceeds the maximum available length of board. Agree positions of joints where not specified.
- For two layer boarding, stagger joints between layers by at least 600 mm.

- Ensure that edges of boards are supported by additional framing. For two layer boarding framing must support the outer layer.

J1.19 FIXING PLASTERBOARD TO METAL SUPPORTS:

- Fix securely to all supports, working from the centre of each board using proprietary drywall screws at the following maximum centres:
- Partition/wall linings: 300 mm centres (reduced to 200 mm at external angles where recommended by the board manufacturer).
- Ceilings: 230 mm centres (reduced to 150 mm at board ends and at lining perimeters where recommended by the board manufacturer).
- Position screws not less than 10 mm from the edge of the board. Set heads in a depression; do not break paper or gypsum core.
- Type and length of screws as recommended in BS 8212, section 2.2.3, unless specified otherwise.

J1.20 FIXING PLASTERBOARD TO TIMBER SUPPORTS:

- Fix securely to all supports working from the centre of each board using the specified method of fixing at the following maximum centres:
  Nails: 150 mm centres.
  Drywall screws: 300 mm centres for partitions/wall linings (reduced to 200 mm at external angles where recommended by the board manufacturer) and 230 mm centres for ceilings.
- Position fixings not less than 10 mm from bound edges, 13 mm from cut/unbound edges and not less than 6 mm from the edge of the timber support.
- Type and length of fixings as recommended in BS 8212, section 2.2.3, unless specified otherwise.

J1.21 FIXING PLASTERBOARD WITH ADHESIVE DABS:

- Apply grid of adhesive dabs to the background for each board as follows:
  Horizontally: One row of dabs along the top edge and one continuous dab along the bottom edge.
  Vertically: One row of dabs along each edge and thereafter at intermediate spacings to suit size of board:

Thickness (mm)	Width (mm)	Dab centres (mm)
9.5	1200	400
9.5/12.5	900	450
12.5	1200	600

- Dabs: About 50 - 75 mm wide x 250 mm long positioned not less than 25 mm from edges/ends of board. Adjust thickness as necessary to ensure boards are accurately aligned to a true vertical plane.
- Press boards firmly against dabs to give a secure fixing. Provide temporary support under bottom edge of each board until dabs have set.

J1.22 FIXING INSULATION BACKED PLASTERBOARD WITH ADHESIVE DABS:

- In addition to the requirements of clause 620, secure boards with proprietary nailable plugs in locations recommended by the board manufacturer.
- Include proprietary metal clips/plates to edges of each board where recommended by the board manufacturer.

J1.23 FIXING INSULATION BACKED PLASTERBOARD WITH ADHESIVE SPOTS:

- Apply adhesive on a 300 mm grid to background or back of boards. Position perimeter spots about 25 mm from edges of boards. Size of spots to be about 25 mm diameter.
- Press boards firmly into position and secure with proprietary nailable plugs in locations recommended by the board manufacturer and to suit the specified finish.

J1.24 TAPED SEAMLESS FINISH TO PLASTERBOARD:

- Lightly sand cut edges of boards to remove paper burrs. Apply PVAC sealer to exposed cut edges of boards and any other plaster surfaces to which tape is to be applied.
- Fill all joints, gaps and internal angles with joint compound and cover with continuous lengths of paper tape, fully bedded. Reinforce external angles, stop ends, etc. with the specified bead/corner tape.
- When set, cover with joint finish, feathered out to give a flush, smooth, seamless surface.

- Spot nail/screw depressions with joint filler to give a flush surface.
- Fill minor indents. After joint, angle and spotting treatments have dried, lightly sand to remove any minor imperfections.
- Apply specified primer/sealer to give a continuous consistent texture to surface of boards.

J1.25 SKIM COAT PLASTER FINISH:
Thickness: 2 - 3 mm.
- Fill and tape all joints except where coincident with metal beads.
- Trowel/float to a tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks.

J1.26 MINOR DAMAGE IN EXISTING PLASTERBOARD: Where not specified otherwise, repair small areas of broken board by cutting away the paper, removing loose core material and filling with joint filler. Apply PVAC sealer to exposed plaster and cut edge of paper before filling. Finish off to give a flush, smooth surface ready for redecoration.

J1.27 MAJOR DAMAGE IN EXISTING PLASTERBOARD: Where not specified otherwise, repair large damaged areas of board by cutting out and replacing with an identical piece of board. Form a neat hole with sides vertical and horizontal. Fix the patch using the same method as the existing dry lining, ensuring full support to all edges of existing and new board. Fill joints, apply tape and finish off to give a flush, smooth, seamless surface ready for redecoration.

J2 RIGID SHEET FLOORING/SHEATHING/SARKING/LININGS/CASINGS

To be read with Preliminaries/General conditions.

WORKMANSHIP

J2.1 INSTALLATION GENERALLY:
- In the absence of manufacturers recommendations store, prepare and fix sheets in accordance with the recommendations of the relevant trade association.
- Keep sheets dry and do not fix to timber supports which have a moisture content greater than 18%.
- Do not fix sheets internally until the building is weathertight.
- Set out sheets with joints accurately aligned, of constant width and parallel to perimeter edges.
- Methods of fixing and fastenings to be as section V4 unless specified otherwise.
- Protect sheets from dirt, stains and damage until Practical Completion.

J2.2 FLOATING FLOORS: Where to be laid on a new concrete or screed base:
- Ensure that drying aids have been turned off for not less than 4 days, then
- Test for moisture content using an accurately calibrated hygrometer in accordance with BS 8201, Appendix A.
- Take readings in all corners, along edges, and at various points over the area being tested.
- Do not lay flooring until all readings show 75% relative humidity or less.

J2.3 ADDITIONAL SUPPORTS: Where specified ensure that studs, noggings or battens as specified in clause G20/770 and not less than 50 mm wide are provided as follows:
- Tongue and groove jointed rigid sheet areas: To all unsupported perimeter edges.
- Butt jointed rigid sheet areas: To all unsupported sheet edges.

J2.4 CONDITION HARDBOARD sheets by stacking in room in which they are to be fixed with separators between each sheet for not less than 48 hours before fixing.

J2.5 CONDITION STANDARD HARDBOARD sheets by sponging mesh side of each 1200 x 2400 mm sheet with 0.25 litre of water, then stack horizontally mesh side to mesh side for 24-48 hours before fixing.

J2.6 CONDITION TEMPERED HARDBOARD sheets by sponging mesh side of each 1200 x 2400 mm sheet with 0.25 litre of water per 3 mm of thickness, then stack horizontally mesh side to mesh side for 48-72 hours before fixing.

J2.7 FIXING GENERALLY:
- Securely fix sheets to each support without distortion and true to line and level.
- Fastenings to be evenly spaced in straight lines, in pairs across joints and sufficient distance from edge of sheet to prevent damage.
- Remove surplus adhesive as the work proceeds.

J2.8 OPEN JOINTS: Keep perimeter joints, expansion joints and joints between boards free from plaster, mortar droppings and other debris. Remove all temporary wedges and packings on completion of fixing.

J2.9 FIXING HARDBOARD/MEDIUM BOARD/INSULATING BOARD:
- Do not tack corners first.
- Fix one long edge, working outwards from centre.
- Fix to intermediate supports working downward and outward.
- Finally fix remaining three edges.

J2.10 ACCESS PANELS: Agree size and position with CA before sheets are fixed. Provide additional noggings, battens, etc., as necessary.

J5 TIMBER BOARD FLOORING/SARKING/LININGS/CASINGS

To be read with Preliminaries/General conditions.

WORKMANSHIP

J5.1 WORKMANSHIP GENERALLY:
- Keep boards dry and do not fix to timber supports which have a moisture content greater than 18%.
- Do not fix boards internally until the building is weathertight.
- Methods of fixing and fastenings to be as section Z20 unless specified otherwise.
- Protect boards from dirt, stains and damage until Practical Completion.

J5.2 MOISTURE CONTENT OF BASE: Where floating floors are to be laid on a new concrete or screed base:
- Ensure that drying aids have been turned off for not less than 4 days, then
- Test for moisture content using an accurately calibrated hygrometer in accordance with BS 8201, Appendix A.
- Take readings in all corners, along edges, and at various points over the area being tested.
- Do not lay flooring until all readings show 75% relative humidity or less.

J5.3 MOISTURE CONTENT OF TIMBER: During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit specified moisture content(s). When instructed by CA, test timber with an approved moisture meter to manufacturer's recommendations.

J5.4 VAPOUR CHECK MEMBRANE: Fix carefully and neatly with taped joints to provide a fully sealed barrier free from tears and punctures.

J5.5 TREATED TIMBER: Treat surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

J5.6 ACCESS PANELS: Agree size and position with CA before boards are fixed. Provide additional noggings, battens, etc. as necessary.

J5.7 FIXING BOARDS:
- Fix each board securely to each support to give flat, true surfaces free from undulations, lipping, splits and protruding fastenings.
- Allow for movement of timber when positioning boards and fastenings to prevent cupping, springing, excessive opening of joints or other defects.
- Heading joints to be tightly butted and positioned centrally over supports, not less than two board widths apart on any one support.
- Neatly punch all exposed nail heads below surface and plane off any proud edges.

J10 SUSPENDED CEILINGS

TYPE(S) OF SUSPENDED CEILING

GENERALLY/PREPARATION

J10.1 SUSPENDED CEILINGS GENERALLY: Unless specified otherwise, comply with the relevant recommendations and performance requirements of BS 8290 for the selection and assembly of components and materials.

J10.2 SAMPLE(S): Before placing orders submit representative sample(s)
Ensure that delivered materials match samples.

J10.3 ENVIRONMENTAL CONDITIONS:
- Areas for storage and installation must be clean, dry, well ventilated and free from excessive and/or rapid variations of temperature and humidity.
- Do not install membrane material until the building is weathertight and wet trades have finished their work. Before, during and after installing, ensure that temperature and humidity are maintained at levels similar to those which will prevail after building is occupied.
- Notwithstanding the above, delivery of materials and installation of the suspended ceiling will be taken as joint acceptance by the Main Contractor and Ceiling Contractor of the suitability of the environmental conditions.

INSTALLATION

J10.4 WORKMANSHIP GENERALLY:
- Handle, store and fix suspended ceiling materials and accessories in accordance with manufacturers' recommendations, BS 8290:Part 3 and design/performance requirements.
- Set out accurately to give level soffits free from undulations, lipping and distortions in grid members.
- Fix securely with additional bracing and stiffening as necessary at upstands, access hatches, partition heads, etc. to give a stable system resistant to wind induced uplift and other specified design loads and pressures.
- Do not use cartridge or powder activated methods for top fixings or rivets for bottom fixings of hangers.

J10.5 PROTECTION:
- No part of the suspension system must be subjected to loads for which it is not designed, including lateral loads from ladders, tower scaffolds, etc.
- Membrane materials must be handled carefully, kept clean and removed and replaced correctly using special tools and clean gloves, etc. as appropriate.

J10.6 SETTING OUT: Unless shown otherwise, set out ceilings so that:
- Edges of tiles/panels are never less than half in width or length. Position grid to suit tile/panel size(s), allowing for permitted deviations from nominal size(s).
- All lines and joints are straight and parallel to walls unless specified otherwise. Where surrounding walls or other building elements and features to which the suspended ceilings relate are not square, straight or level, obtain instructions on setting out.

J10.7 FIXING BOARDS TO CONCEALED GRIDS:
- Fix and join boards using methods, materials and accessories recommended by the board manufacturer.
- Cut boards neatly and accurately. Do not use damaged boards.
- Screw boards securely and firmly to grid members at recommended centres and edge distances, to give a flat surface free from bowing and lipping. Set heads of screws below surface of boards and fill flush with surface.
- Where not shown otherwise, provide movement joints as appropriate for the area of ceiling and/or to coincide with movement joints in surrounding structure.

- Stagger joints of boards applied in two or more layers. Ensure that edges and ends of each board are fully supported and screwed to grid members.

J10.8 WIRE HANGERS:
- Straighten before use and install vertically without bends or kinks. Do not allow hangers to press against any fittings within the void.
- Tie securely at top and bottom with tight bends to loops to prevent any vertical movement.

J10.9 JOINTING OF PERIMETER TRIMS to be carried out neatly and accurately without lipping or twisting using:
- Mitred joints at all external and internal corners.
- The longest lengths of trim available from manufacturer to keep intermediate butt joints to a minimum.

J10.10 OPENINGS IN MEMBRANE MATERIALS to be formed accurately and neatly to suit sizes and edge details of fittings, using methods recommended by the manufacturer and without causing damage or distortion.

J10.11 SUPPORT OF SMALL FITTINGS VIA MEMBRANE MATERIALS:
- Fittings must be adequately supported without causing damage or distortion to the membrane, by the use of rigid backing boards or other suitable means.
- Surface spread of flame rating of additional supporting material must match that of the ceiling membrane material.

J10.12 INSULATION:
- Fit accurately and firmly with no gaps so that specified performance levels are achieved.
- Insulation within individual tiles, trays, etc. must be fitted closely and secured to prevent displacement when tiles are installed or subsequently lifted. Reseal any cut dustproof sleeving.
- Lay out insulation over the membrane in the widest practical widths to suit spacings of grid members, with closely butted joints.
- Do not cover electrical cables (unless they have been sized accordingly). Cut insulation carefully around electrical fittings, etc.
- On sloping and vertical areas of ceiling, fastenings must be used to prevent displacement.

J10.13 FIRE STOPPING TO FIRE RESISTING SUSPENDED CEILINGS: Seal any gaps at junctions of ceiling with perimeter abutments, service penetrations, etc. using tightly packed mineral wool or approved intumescent sealant to prevent penetration of smoke and flame.

J10.14 CAVITY FIRE BARRIERS:
- Fire resistance to BS 476:Part 20:
- Fix securely at perimeters and joints, ensuring permanent stability and continuity with no gaps, to provide a complete barrier to smoke and flame.
- Fixing to the ceiling must not impair free expansion of grid system or otherwise affect fire resisting performance.

J10.15 ELECTRICAL CONTINUITY AND EARTHBONDING:
- All substantial conductive parts of the suspended ceiling system including integrated electrical equipment and fittings, are to be electrically continuous and fully earth bonded in accordance with BS 7671 (The IEE Wiring Regulations).
- Ensure that earth bonding is completed as soon as possible after completion of each independent area of suspension system.
- After completion of the ceiling installation, associated services and fittings, arrange for tests to demonstrate that the ceiling is electrically continuous and fully earth bonded in accordance with BS 8290:Part 3.
- Notify the CA to enable the testing to be witnessed. Submit a test report to the CA.

J10.16 INSTRUCTIONS AND TOOLS: Provide the Main Contractor with duplicate sets of user instructions and access tools recommended by the suspended ceiling/access panel manufacturer. One for the use of contractors requiring access to the void and the other for handing over to the CA at Practical Completion.

K1 WINDOWS/ROOFLIGHTS/SCREENS/LOUVRES

To be read with Preliminaries/General conditions.

PRELIMINARY INFORMATION/REQUIREMENTS

K1.1 EVIDENCE OF PERFORMANCE: Provide independently certified evidence that all specified variants of components comply with specified performance requirements.

INSTALLATION

K1.2 PROTECTION OF COMPONENTS: Do not deliver to site components which cannot be put immediately into suitable clean, dry, floored and covered storage. Stack near vertical on level bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

K1.3 MOISTURE CONTENT OF TIMBER COMPONENTS: During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit specified moisture content(s) of components. When instructed by CA, test components with an approved electrical moisture meter used in accordance with manufacturer's recommendations.

K1.4 PRIMING/SEALING: Before fixing components ensure that surfaces of timber which will be inaccessible after installation are primed or sealed as specified.

K1.5 BUILDING IN will not be permitted except where specifically stated on the drawings.

K1.6 INSTALL PVC-U WINDOWS in accordance with clause K1.11 and the British Plastics Federation window installation guide, reference COP2.

K1.7 WINDOW INSTALLATION:
- Install windows into prepared openings, maintaining a maximum gap of 10mm between the frame edge and the surrounding construction.
- Install windows without twist or diagonal racking.

K1.8 FIXING OF TIMBER FRAMES:
- When not predrilled or specified otherwise, position fixings not more than 150 mm from each end of jamb, adjacent to each hanging point of opening lights, and at maximum 450 mm centres.

K1.9 FIXING OF STEEL FRAMES:
- When not predrilled or specified otherwise, position fixings not less than 50 mm and not more than 190 mm from each end of jamb, adjacent to each hanging point of opening lights, and at maximum 900 mm centres.

K1.10 FIXING OF ALUMINIUM FRAMES:
- When not predrilled or specified otherwise, position fixings not more than 250 mm from each end of jamb, adjacent to each hanging point of opening lights, and at maximum 600 mm centres.

K1.11 FIXING OF PVC-U FRAMES:
- When not predrilled or specified otherwise, position fixings 150-250 mm from each end of jamb, adjacent to each hanging point of opening lights, but no closer than 150 mm to a transom or mullion centre line, and at maximum 600 mm centres.

K1.12 FIXING OF COMPOSITE FRAMES:
- Fix vertical jambs of frames
- When not predrilled or specified otherwise, position fixings not more than 150 mm from each end of jamb, adjacent to each hanging point of opening lights, and at maximum 600 mm centres.

K1.13 BACKFILLING OF STEEL FRAME SECTIONS: After fixing, fill the back of steel frame sections with a waterproof cement fillet.

K1.14 SEALANT JOINTS:

- Prepare joints and apply sealant as section V6.

K1.15 IRONMONGERY: Assemble and fix carefully and accurately using fastenings with matching finish supplied by ironmongery manufacturer. Prevent damage to ironmongery and adjacent surfaces. At completion check, adjust and lubricate as necessary to ensure correct functioning.

K2 DOORS/SHUTTERS/HATCHES

To be read with Preliminaries/General conditions.

PRELIMINARY INFORMATION/REQUIREMENTS

K2.1 EVIDENCE OF PERFORMANCE: Provide independently certified evidence that all specified variants of components comply with specified performance requirements.

K2.2 FIRE RESISTANCE: The specified performance is to be the minimum period attained when tested for integrity in accordance with BS 476:Part 8 or BS 476:Part 22.

INSTALLATION

K2.3 PROTECTION OF COMPONENTS: Do not deliver to site components which cannot be put immediately into suitable dry, floored and covered storage. Stack on bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

K2.4 MOISTURE CONTENT: During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit specified moisture content(s) of timber components. When instructed by CA, test components with an approved electrical moisture meter used in accordance with manufacturer's recommendations.

K2.5 PRIMING/SEALING: Before fixing components ensure that surfaces of timber which will be inaccessible after installation are primed or sealed as specified.

K2.6 CORROSION PROTECTION: Before fixing, apply two coats of bitumen solution to BS 6949 or an approved mastic impregnated tape

K2.7 BUILDING IN will not be permitted except where specifically stated.

K2.8 BUILDING IN TIMBER FRAMES: Fix dpcs with galvanized clout nails to backs of frames which are to be built into external openings.

K2.9 FIXING CENTRES FOR TIMBER FRAMES: When not predrilled or specified otherwise, position fixings 150 mm from each end of jamb, adjacent to each hanging point and at 600 mm maximum centres.

K2.10 SEALANT JOINTS:
- Prepare joints and apply sealant as section V6.

K2.11 IRONMONGERY: Assemble and fix carefully and accurately using fastenings with matching finish supplied by ironmongery manufacturer. Prevent damage to ironmongery and adjacent surfaces. At completion check, adjust and lubricate as necessary to ensure correct functioning.

K3 STAIRS/WALKWAYS/BALUSTRADES

To be read with Preliminaries/General conditions.

PRELIMINARY INFORMATION/REQUIREMENTS

K3.1 BASIS OF DESIGN:
- The supplier/subcontractor must complete the design and detailing to ensure compliance with the structural and safety requirements of BS 5395.
- Occupancy class for dead and imposed loadings on stairs and landings (as specified in BS 6399:Part 1
- Building use category for balustrades and handrail loadings (as specified in BS 6180)

INSTALLATION

K3.2 MOISTURE CONTENT: During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit specified moisture content(s) of timber components. When instructed by CA, test components with an approved moisture meter to manufacturer's recommendations.

K3.3 CORROSION PROTECTION: Before fixing, apply two coats of bitumen solution to BS 6949 or an approved mastic impregnated tape

K3.4 FIXING GENERALLY:
- Methods of fixing and fastenings to be as section V4 unless specified otherwise.
- Do not modify, cut, notch or make holes in structural members except as shown on drawings or as approved.
- Do not use stairs, walkways, balustrades, etc. as temporary support or strutting for other work.

K4 GENERAL GLAZING

To be read with Preliminaries/General conditions.

K4.1 REMOVAL OF GLAZING FOR REUSE:
- Carefully remove existing glazing and glazing compound, beads, etc., avoiding damage to the frame, to leave clean smooth rebates free from obstructions and debris.
- Report to CA any signs of deterioration of the surround revealed by removal of glazing, compounds, etc. Do not reglaze affected surrounds until instructed.
- Clean glazing, beads and other components that are to be reused.

K4.2 WORKMANSHIP GENERALLY:
- Glazing generally: to BS 6262.
- The glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
- Panes/sheets to be accurately sized, with clean, undisfigured surfaces and undamaged edges.
- Avoid contact between glazing panes/units and alkaline materials such as cement and lime.
- Keep materials dry until fixed. Keep insulating glass units and plastics glazing sheets protected from the sun and away from heat sources.
- Ensure that glass/plastics, surround materials, sealers primers and paints/clear finishes to be used together are compatible. Comply with glazing and sealant manufacturers' recommendations.

K4.3 PREPARATION: Clean surrounds, rebates, grooves and beads, and prepare as specified before installing glazing.

K4.4 GLASS: Generally to BS 952 and the relevant part(s) of BS EN 572, free from scratches, bubbles, cracks, rippling, dimples and other defects.

K4.5 HEAT TOUGHENED GLASS to be fixed in the following locations must be subjected to a heat soaking regime. All panes must be heat soaked. Provide certified evidence of treatment.

K4.6 EDGE TAPES TO INSULATING UNITS: Report to CA any damage to edge tapes. Obtain approval of proposed method of repair.

K4.7 BEAD FIXING WITH PINS: Space pins evenly at not more that 150 mm centres, and within 50 mm of each corner. Punch pins just below the timber surface.

K4.8 BEAD FIXING WITH SCREWS: Space screws evenly at not more that 225 mm centres, and within 75 mm of each corner.

L8 RUBBER/PLASTICS/CORK/LINO/CARPET TILING/SHEETING

GENERALLY

L8.1 WORKMANSHIP GENERALLY:
- All bases must be rigid, dry, sound, smooth and free from grease, dirt and other contaminants before coverings are applied.
- Finished coverings must be accurately fitted, tightly jointed, securely bonded, smooth and free from air bubbles, rippling, adhesive marks and stains.

L8.2 LAYOUT: Agree setting out of seams before ordering materials for sheeting type(s)

L8.3 COMMENCEMENT: Do not lay materials until building is weathertight, wet trades have finished their work, the building is well dried out, all paintwork is finished and dry, and floor service outlets, duct covers and other fixtures around which the materials are to be cut have been fixed. Inform CA not less than 48 hours before commencing laying.

L8.4 CONDITIONING: Before laying commences thoroughly condition materials by unpacking and spreading out in the spaces where they are to be laid. Minimum time and temperature to be as recommended by manufacturer.

L8.5 ENVIRONMENT: Before, during and after laying, maintain temperature and humidity approximately at levels which will prevail after the building is occupied.

PREPARING BASES

L8.6 SUITABILITY OF NEW BASES AND CONDITIONS: Laying of coverings will be taken as joint acceptance by the Main Contractor and Subcontractor of the suitability of the bases and conditions within any given area.

L8.7 SUITABILITY OF EXISTING BASES AND CONDITIONS:
- Before commencing work the subcontractor must confirm (through the Main Contractor) that existing bases will, after the specified preparation, be suitable to receive the specified coverings.
- Laying of coverings will be taken as further acceptance of the suitability of the bases and also of the conditions within any given area.

L8.8 DAMPNESS: Where coverings are to be laid on new wet-laid bases:
- Ensure that drying aids have been turned off for not less than 4 days, then
- Test for moisture content using an accurately calibrated hygrometer in accordance with BS 5325, Appendix A or BS 8203, Appendix A.
- Take readings in all corners, along edges, and at various points over the area being tested.
- Do not lay coverings until all readings show 75% relative humidity or less.

L8.9 SUBSTRATES: The specification for trowelled finishes to receive thin floor coverings require:
- A uniform, smooth surface free from trowel marks and other blemishes, and suitable to receive the specified floor finish material.
- Adequate protection from construction traffic.
- Allowance for making good by application of a smoothing compound by and to the satisfaction of the flooring subcontractor in the event of the surface being unsuitable due to inadequate finishing or protection.

L8.10 SMOOTHING COMPOUND: as recommended for the purpose by the manufacturer. Mix and lay in accordance with manufacturer's recommendations.

L8.11 EXISTING FLOOR COVERING TO BE REMOVED: Completely remove covering and as much adhesive as possible. Skim with smoothing compound to give a smooth, even surface.

L8.12 EXISTING FLOOR COVERING TO BE OVERLAID: Make good by local resticking and patching or filling with smoothing compound to give a smooth, even surface.

L8.13 WOOD BLOCK/PARQUET FLOORING: Ensure that the surface is clean and free from wax, and all blocks are sound and securely bonded. Replace missing blocks and reset loose blocks in adhesive to match existing. Sand or plane to make level. Fill hollows with smoothing compound to give a smooth, even surface.

L8.14 TIMBER BOARDING (NO UNDERLAYMENT): Ensure that all boards are securely fixed and acceptably level. Punch in or countersink protruding fastenings and plane, sand or apply smoothing compound as necessary to provide a smooth, even surface.

L8.15 HARDBOARD UNDERLAYMENT:
- To BS 1142.
  Sheet size: 1200 x 1200 mm.
- Ensure that existing floor boards are securely fixed and acceptably level. Remove or fill any gross irregularities. Punch in any protruding fastenings.
- Condition sheets by stacking in room in which they are to be fixed for not less than 72 hours with separators between each sheet.
- Lay sheets with smooth side uppermost, cross joints staggered and a 1 to 2 mm gap between boards.
- Fix with 24 mm divergent staples, commencing at the centre of each sheet, at 150 mm grid centres over the area of each sheet and at 100 mm centres along perimeter, set in 12 mm from edge. Ensure that fastenings do not protrude.

L8.16 HARDBOARD UNDERLAYMENT:
- To BS 1142.
  Sheet size: 1200 x 1200 mm.
- Ensure that existing floor boards are securely fixed and acceptably level. Remove or fill any gross irregularities. Punch in any protruding fastenings.
- Condition sheets by sponging mesh side of each 1200 x 1200 mm sheet with 0.5 litre of water at least 24 hours but not more than 72 hours before fixing.
- Lay sheets with smooth side uppermost, cross joints staggered and a 0.5 to 1 mm gap between boards.
- Fix with 24 mm divergent staples, commencing at the centre of each sheet, at 150 mm grid centres over the area of each sheet and at 100 mm centres along perimeter, set in 12 mm from edge. Ensure that fastenings do not protrude.
- Do not lay coverings until hardboard is dry.

L8.17 PLYWOOD UNDERLAYMENT:
- To BS 6566 or other equal and approved national standard.
  Appearance grade: II or BB.
  Sheet size: 1200 x 1200 mm.
- Ensure that existing floor boards are securely fixed and acceptably level. Remove or fill any gross irregularities. Punch in any protruding fastenings.
- Lay sheets with cross joints staggered and a 0.5 to 1 mm gap between boards.
- Fix with 24 mm ring shank or twisted shank nails or divergent staples, commencing at the centre of each sheet, at 150 mm grid centres over the area of each sheet and at 100 mm centres along perimeter, set in 12 mm from edge.
- Ensure that fastenings are driven well in, with heads set flush with surface.

LAYING COVERINGS

L8.18 SET OUT TILES from centre of space/room unless specified otherwise, so that wherever possible:
- Tiles along opposite edges are of equal size, and
- Edge tiles are more than 50% of full tile width.

L8.19 ADHESIVE FIXING GENERALLY:

- Adhesive: when not specified otherwise, type to be as recommended by covering manufacturer or, in the absence of such recommendation, type to be approved.
- Use a primer where recommended by adhesive manufacturer. Allow to dry thoroughly before applying adhesive.
- Spread adhesive evenly and lay covering, pressing down firmly and rolling (if recommended) to ensure full contact and a good bond overall.
- Remove all surplus adhesive from exposed faces of coverings as the work proceeds.
- Trowel ridges and high spots caused by particles on the substrate will not be accepted.

L8.20 DOORWAYS: Make joint on centre line of door leaf unless specified otherwise.

L8.21 EDGINGS/COVER STRIPS:
- Fix securely (using matching fastenings where exposed to view) ensuring that edge of covering is firmly gripped.

L8.22 STAIR NOSINGS/TRIM:
- Fix securely and level with neatly mitred joints, adjusting to suit thickness of covering with continuous packing strips of hardboard or plywood. Both packing strips and nosings must be fully bedded in gap-filling adhesive recommended by the nosing manufacturer. Screw fixing with matching plugs.

L8.23 SKIRTINGS:
- Securely bond with top edge straight and parallel with floor. Accurately mitre at corners.

L8.24 TRAFFIC: Keep floor covering type(s) free from traffic for at least seven days after laying.

COMPLETION

L8.25 CLEANING GENERALLY: Remove all scrap, dust and dirt. Carefully remove adhesive and other marks from coverings and adjacent surfaces, using approved cleaning agents and methods.

L8.26 FINISHING FLOORING:
- Wash floor using mops dampened with water containing neutral detergent. If necessary, lightly scrub heavily soiled areas using a brush or synthetic fibre web pad.
- Thoroughly rinse with clean water, removing surplus to ensure no damage to adhesive, and allow to dry.
- Apply two coats of emulsion polish of a type recommended by covering manufacturer.

L8.27 FINISHING RIBBED/STUDDED RUBBER FLOORING: Apply dilute emulsion polish of a type recommended by covering manufacturer by spray buffing, using a rotary cleaner with a soft fibre brush.

L8.28 FINISHING PLAIN RUBBER FLOORING:
- Wash floor using mops dampened with water containing neutral detergent. Thoroughly rinse with clean water and allow to dry.
- Apply two coats of buffable or semibuffable polish of a type recommended by covering manufacturer.

L8.29 FINISHING CORK TILE FLOORING:
- Lightly sand joints to remove any lipping, taking care to match original finish.
- Remove dust by vacuum cleaning and wash, using mops dampened with water containing a neutral detergent.
- When dry, apply a solvent based seal of a type and number of coats recommended by cork manufacturer. Allow each coat to dry thoroughly and dry burnish using a fine-grade synthetic fibre web pad or brush.
- Apply two coats of emulsion polish of a type recommended by cork manufacturer, dry burnishing each coat as before.

L8.30 PROTECTION: Cover flooring with clean dust sheets, hardboard or other suitable material to prevent damage from dirt and traffic prior to Practical Completion.

L8.31 WASTE: Retain spare covering material suitable for patching. On completion hand over to Employer pieces selected by CA.

L9 EDGE FIXED CARPETING

GENERALLY/PREPARATION

L9.1 WORKMANSHIP GENERALLY: Finished carpeting must be tightly seamed, accurately fitted, neatly and securely fixed, smooth, evenly tensioned and clean. Protect adjacent surfaces as necessary to prevent damage and marking during installation of carpeting.

L9.2 LAYOUT: Agree setting out of seams and pattern before ordering carpet.

L9.3 COMMENCEMENT: Do not lay carpets until building is weathertight, wet trades have finished their work, the building is well dried out, all paint work is finished and dry, and floor service outlets, duct covers and other fixtures around which the carpet is to be cut have been fixed. Inform CA not less than 48 hours before commencing laying.

L9.4 ENVIRONMENT: Before during and after laying, maintain temperature and humidity approximately at levels which will prevail after the building is occupied.

L9.5 SUITABILITY OF BASES AND CONDITIONS: Carpet laying will be taken as acceptance by the Main Contractor and Subcontractor of the suitability of the bases and conditions within any given area.

L9.6 DAMPNESS: Where carpet is to be laid on new wet-laid bases:
- Ensure that drying aids have been turned off for not less than 4 days, then
- Test for moisture content using an accurately calibrated hygrometer as in BS 5325, Appendix A.
- Take readings in all corners, along edges, and at various points over the area being tested.
- Do not lay carpet until all readings show 75% relative humidity or less.

L9.7 TIMBER BOARDING/STRIP FLOORING: Ensure that all boards are securely fixed and acceptably level. Punch in or countersink protruding fastenings and plane, sand or apply smoothing compound as necessary to provide a smooth, even surface.

L9.8 TILE/SHEET/BLOCK/SCREED FLOORING which is to be retained: make good as necessary by local rebedding, sanding or applying smoothing compound to give a smooth, even surface. Allow to dry thoroughly before laying carpet.

LAYING CARPETING

L9.9 LAYING CARPET:
- Ensure that all pieces of carpet of one type, colour and pattern which will be visible together when laid, are from the same batch and with the pile lying in the same direction to ensure consistency of appearance.
- Accurately and closely fit carpet at perimeter leaving no gaps and ensuring that edges are well turned down and secured to grippers.
- Stretch carpet to ensure that it is flat, evenly tensioned and will not ruck, ripple or become slack.
- Cut in at doorways and recesses. Do not piece in unless unavoidable and approved by CA.

L9.10 POWER STRETCH carpets longer than 7 m.

L9.11 DOORWAYS: Make joint on centre line of door leaf unless specified otherwise.

L9.12 EDGINGS/COVER STRIPS:
- Fix securely to base (using matching fastenings where exposed to view) ensuring that edge of carpet is firmly gripped.

L9.13 LAYING STAIR CARPET WITH GRIPPER:
- Provide a minimum additional length of carpet equivalent to one tread and riser to allow for shifting. Conceal by substituting for underlay at top or bottom of stairs.

- Fix carpet gripper at intersection of each tread and riser and along all landing and winder edges which abut a wall and exceed 300 mm.
- Lay carpet with pile lying towards bottom of stairs and perpendicular to nosings.
- Stretch carpet with a knee kicker and fit to each tread, riser and landing.

L9.14 LAYING STAIR CARPET WITH ADHESIVE: After fixing nosings, neatly cut and fit carpet, fully bonding with a suitable permanent bond adhesive. Smooth flat, ensuring that no air is trapped and all traces of adhesive are removed, leaving no marks.

L9.15 STAIR NOSINGS/TRIMS:

- Fix securely and level with neatly mitred joints, adjusting to suit thickness of carpet with continuous packing strips of hardboard or plywood. Both packing strips and nosings must be fully bedded in gap-filling adhesive recommended by the nosing manufacturer. Screw fixing with matching plugs.

L9.16 COMPLETION:

- Remove stay tacks and cut away partly loose warp and face yarns with sharp napping scissors.
- Check for lumps, surface irregularities, signs of inadequate or uneven tension and adjust as necessary.
- Remove scraps and vacuum clean carpet.
- Cover carpet with clean dust sheets, hardboard, etc. as necessary to prevent damage and soiling.

L9.17 WASTE: Retain spare carpet suitable for patching. On completion hand over to Employer pieces selected by CA.

L10 DECORATIVE PAPERS/FABRICS

To be read with Preliminaries/General conditions.

L10.1 WORKMANSHIP GENERALLY: Comply with BS 8000: Part 12, Sections 2 and 3.1.

L10.2 EXISTING VINYL COVERINGS: Where these are to be stripped, the paper backing may be retained as a lining if in good condition and firmly adhering. Stick down any lifting edges and corners.

L10.3 JOINTS formed by overlapping and cutting:

- Cut with a straightedge and proprietary cutter (where recommended by covering manufacturer). Ensure background is not damaged by cutting.
- Overlap and cut stable coverings as the work proceeds.
- Where coverings are liable to shrink, peel back overlap, allow adhesive to dry and all shrinkage to take place before cutting in and bonding joints.

L11 PAINTING/CLEAR FINISHING

To be read with Preliminaries/General conditions.

GENERALLY

L11.1 COATING MATERIALS Inform CA of selected manufacturer at an early date if using approved alternative other than manufacturer specified.

PREPARATION

L11.2 PREPARATION GENERALLY:
- Comply with BS 8000:Part 12, Section 2 and additional requirements in this specification.
- When removing or partially removing coatings, use methods which will not damage the substrate or adjacent surfaces or adversely affect subsequent coatings.
- Materials used in preparation to be types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Apply oil based stoppers/fillers after priming. Apply water based stoppers/fillers before priming unless recommended otherwise by manufacturer. Patch prime water based stoppers/fillers when applied after priming.
- Ensure that doors and opening windows, etc., are 'eased' as necessary before coating. Prime any resulting bare areas.

L11.3 SUITABILITY OF SURFACES AND CONDITIONS: Application of coatings will be taken as joint acceptance by the Main Contractor and Subcontractor of the suitability of surfaces and conditions within any given area to receive the specified coatings.

L11.4 FIXTURES: Before commencing work, remove fixtures and fittings, set aside and replace on completion:

L11.5 IRONMONGERY: Remove all old paint and varnish marks from existing ironmongery. Thoroughly clean and polish before refixing.

L11.6 STEEL - MANUAL CLEANING: In addition to general preparation and at an appropriate stage, remove residual rust with suitable chemical treatment, applying primer or patch primer as soon as it has cured.

L11.7 GALVANIZED SURFACES to receive lead free primer: Pretreat with mordant solution. Retreat nonblackened areas to achieve blackening of whole of surface.

L11.8 NEW PLASTERBOARD - TO RECEIVE TEXTURED COATING: Joints to be filled, taped and feathered out using materials recommended by textured coating manufacturer.

L11.9 ALKALI AFFECTED COATINGS: Completely remove from affected surfaces. The extent of such treatment to be as instructed or approved.

L11.10 EXISTING PAINTED WINDOWS:
- Remove existing paint to the extent specified or instructed.
- Thoroughly clean junctions between previously painted surfaces and glass.
- Remove old paint splashes and old paint encroaching beyond the sight line.
- Remove loose and defective putty.
- When dry, patch prime, reputty and paint as soon as sufficiently hard.

L11.11 POINTING TO EXISTING FRAMES:
- Remove defective sealant pointing.

- Thoroughly clean the joint recess, remove all dust and seal joint surfaces as recommended by sealant manufacturer.
- Check that depth of joint is approximately half its width, and adjust using recommended backing strip if necessary.
- Repoint neatly using mastic gun during dry conditions when the ambient temperature is above 5 degC.
- Sealant manufacturer and reference: to be approved

L11.12 EXISTING GUTTERS: Clean all dirt and debris from inside of gutters before preparing and painting. Clean out defective joints and seal with approved jointing material.

APPLICATION

L11.13 PAINTING GENERALLY: Comply with BS 8000:Part 12, Section 3.2 and additional requirements in this specification.

L11.14 CONCEALED JOINERY SURFACES: Where one or more additional coats are specified to be applied in the factory, they must be applied to all surfaces, including those which will be concealed when incorporated into the building.

L11.15 VARNISHING: Thin first coat with white spirit in accordance with manufacturer's recommendations. Brush well in avoiding aeration and lay off. Apply further coats of varnish, rubbing down lightly between coats along the grain.

L11.16 EXTERNAL DOORS: Prime and paint bottom edges before hanging.

L11.17 BEAD GLAZING: Joinery which is to be stained must have the first two coats of the staining system applied to rebates and beads before glazing.

L11.18 BEAD GLAZING: Joinery which is to be varnished must have the first two coats of varnish applied to rebates and beads before glazing.

L11.19 BEAD GLAZING: Joinery which is to be painted must have the primer and one undercoat applied to rebates and beads before glazing.

L11.20 PUTTY GLAZING: Allow putty to set for 7 days then, within a further 14 days, seal with an oil based primer. Ensure that putty is fully protected by coating system as soon as it is sufficiently hard.

L11.21 COMPLETION: Ensure that opening lights and other moving parts move freely. Remove all masking tape and temporary coverings.

M1 GENERAL FIXTURES/FURNISHINGS/EQUIPMENT

To be read with Preliminaries/General conditions.

INSTALLATION

M1.1 INSTALLATION GENERALLY: Methods of fixing and fastenings to be as section V4 unless specified otherwise.

M1.2 SEALANT POINTING:
- Sealant: Silicone based to BS 5889, Type B with fungicide.

M1.3 TRIMS: Wherever possible to be in unjointed lengths between angles or ends of runs. Where running joints are unavoidable obtain approval of location and method of jointing. Mitre angle joints unless otherwise specified.

M1.4 COMPLETION:
- Ensure that doors and drawers are accurately aligned and do not bind. Adjust as necessary to ensure smooth operation.
- Check, adjust and lubricate ironmongery as necessary to ensure correct functioning.

M2 SANITARY APPLIANCES/FITTING

To be read with Preliminaries/General conditions.

WORKMANSHIP

M2.1 INSTALLATION GENERALLY:
- Assemble and fix appliances and accessories so that surfaces designed to falls, drain as intended.
- Use nonferrous or stainless steel fastenings unless specified otherwise.
- When not specified otherwise, use jointing and bedding compounds recommended by the manufacturers of the appliances, accessories and pipes being jointed or bedded.
- Prevent use of appliances for any purpose until Practical Completion.
- On completion, check for damage and defects and test for satisfactory operation. Replace damaged or defective components and accessories. Clean thoroughly.

M2.2 NOGGINGS/BEARERS: Ensure that noggings, bearers, etc. required to support sanitary appliances and fittings are accurately positioned and securely fixed.

M2.3 TILED BACKGROUNDS (other than splashbacks): Ensure that:
- Tiling is complete before fixing appliances.
- Fixings do not overstress tiles.

M2.4 SLAB URINALS:
- Ensure that walls and floor slab are fully waterproofed, as specified elsewhere, before fixing urinal components.
- Assemble channels and slabs dry in correct sequence and check fit. Report any discrepancies to CA.
- Fix components with a 3 mm gap between.
- Completely fill space behind channels and slabs with 1:5 cement:sand grout.
- Rake out all joints to a depth of 10 mm and point flush with waterproof jointing compound recommended by urinal manufacturer.

M2.5 CISTERNS:
- Unless specified otherwise obtain cistern operating components from cistern manufacturer. Ensure that ballvalve matches pressure of water supply.
- Fix at the height recommended by manufacturer unless otherwise specified or shown on drawings.
- Ensure that overflow pipe is fixed to falls, and located to give visible warning of discharge. Agree position with CA where not shown on drawings.

M2.6 TAPS: Fix securely, making a watertight seal with the appliance. Place hot tap to left of cold tap as viewed by user of appliance.

M2.7 WASTES/OVERFLOWS: Bed in waterproof jointing compound and fix with resilient washer between appliance and backnut.

M2.8 SEALANT POINTING:
- Sealant: silicone based to BS 5889, Type B with fungicide.
  Application: As section V6.

N4 IRONMONGERY

To be read with Preliminaries/General conditions.

GENERALLY

N4.1 IRONMONGERY RANGES:
- Unless specified otherwise, select ironmongery from one coordinated range so far as possible. Where particular items are unavailable within the range, alternatives compatible in performance, design, style, material, colour and finish may be submitted for approval.
- Inform CA of selected range, manufacturer and/or supplier.

N4.2 IRONMONGERY FOR FIRE DOORS: Unless specified otherwise, select ironmongery to comply with the recommendations of the Association of Builders' Hardware Manufacturers Code of practice 'Hardware essential to the optimum performance of fire resisting doorsets'.

N4.3 DURABILITY: Unless specified otherwise, select ironmongery components to suit the following level(s) of use as defined in BS 7352

N4.4 DOOR PARAMETERS: When selecting ironmongery, the following values may be assumed for tendering purposes. Check suitability of ironmongery when actual values are known and before fixing.

HANGING DEVICES

N4.5 HINGES:
- To BS 7352 and marked accordingly. Unless specified otherwise, select strength class to suit door weight, duty, number of hinges and other factors as recommended in BS 7352, Appendix C.
- Corrosion protection: Unless specified otherwise:
CP 24 for internal use
CP 48 for damp internal and unpolluted external use
CP 96 for polluted atmospheres.

N4.6 NUMBER OF HINGES: Provide three butt hinges to fire doors, external doors and doors with closers, unless specified otherwise.

N4.7 TRACK AND RUNNING GEAR
Designed to operate smoothly, quietly and safely. Door(s) must not be able to come off track when in use.

OPERATING DEVICES

N4.8 OVERHEAD CLOSERS GENERALLY:
- To BS 6459:Part 1,
- Closers must:
  - Be matched to the sizes and weights of doors
  - Override latches and/or door seals when fitted
  - Hold unlatched doors shut under normal working conditions.

N4.9 OVERHEAD CLOSERS FOR FIRE DOORS: In addition to the general requirements for closers, overhead closers for fire resisting doors must:
- Be types included in successful tests to BS 476:Part 22 of door assemblies similar to those for which the closers are proposed. Submit evidence of testing by an approved laboratory.
- Be fixed on the opening face of the door unless specified otherwise.
- Have no mechanical hold open facility.

- Close positively against smoke seals where fitted.
- Have arms of iron, steel or other metal with melting point not less than 800 degC.

N4.10 OVERHEAD CLOSERS FOR FIRE DOORS: In addition to the general requirements for closers, overhead closers for fire resisting doors must:
- Hold a current Certifire certificate.
- Be fixed on the opening face of the door unless specified otherwise.
- Have no mechanical hold open facility.
- Close positively against smoke seals where fitted.
- Have arms of iron, steel or other metal with melting point not less than 800 degC.

N4.11 FLOOR SPRINGS GENERALLY:
- Must comply with the mechanical performance requirements of BS 6459:Part 1.
- Floor springs must:
  - Be matched to the sizes and weights of doors
  - Override latches and/or door seals when fitted
  - Hold unlatched doors shut under normal working conditions.

N4.12 FLOOR SPRINGS FOR FIRE DOORS: In addition to the general requirements for floor springs, floor springs for fire resisting doors must:
- Be types included in successful tests to BS 476:Part 22 of door assemblies similar to those for which the floor springs are proposed. Submit evidence of testing by an approved laboratory.
- Have no mechanical hold open facility.
- Close positively against smoke seals where fitted.

N4.13 FLOOR SPRINGS FOR FIRE DOORS: In addition to the general requirements for floor springs, floor springs for fire resisting doors must:
- Hold a current Certifire certificate.
- Have no mechanical hold open facility.
- Close positively against smoke seals where fitted.

N4.14 ELECTROMAGNETIC HOLD OPEN DEVICES:
- The device must be activated by the alarm system and/or failure of the power supply to release the door and allow it to close.
- A test switch must be located in a convenient position adjacent to the door.

N4.15 DOOR SELECTORS must be fitted to all single swing double doors with rebated meeting stiles fitted with self closers. Provide types that:
- Require the minimum amount of material to be removed from the door and frame
- Are suitable for the size of rebates
- Are from the same range as the closers and are of matching finish and colour.

N4.16 MIDDLE RAIL CLOSERS must:
- Suit the size and weight of doors to which they are fitted.
- Hold unlatched doors closed under normal conditions.

SECURING

N4.17 LOCKS
- To BS 3621 and Kitemarked.

N4.18 LATCHES:
- To BS 5872.
- Latch springs must be strong enough to prevent unsprung lever handles drooping.

N4.19 LOCKS/LATCHES FOR FIRE RESISTING DOORS:

- Must not compromise the fire performance of the door and must be approved for the purpose by the door leaf manufacturer.
- Components critical to the retention of the door in a closed position must not have a melting point lower than 800 degC.

N4.20 ESCAPE LOCKS: Locks specified for security purposes on escape routes must be fitted with a means of withdrawing the bolt without use of a key.

N4.21 EMERGENCY EXIT DEVICES:
- Unless specified otherwise, to be panic bolts/latches to BS 5725:Part 1.

N4.22 EMERGENCY EXIT DEVICES FOR FIRE DOORS:
Type included in successful tests to BS 476:Part 22 of door assemblies similar to those for which the closers are proposed. Submit evidence of testing by an approved laboratory.

N4.23 BOLTS GENERALLY: Unless specified otherwise, provide bolts:
- To match door furniture and sized to suit height, weight and function of door.
- To secure the first closing leaf on double doors.

N4.24 PRIVACY BOLTS must incorporate an external emergency release facility.

FURNITURE

N4.25 LEVER HANDLES:
- To BS 4951.

N4.26 DOOR KNOBS:
- To BS 4951.

N4.27 KNOBSETS: To the performance requirements of BS 4951 and BS 5872.

N4.28 ESCUTCHEONS: Provide separate escutcheons to keyholes where not part of a back plate.

N4.29 STOPS: Unless specified otherwise, are required for doors opening against walls other than those fitted with closers with a back check facility.

N4.30 LETTER PLATE(S):
- To BS 2911,

N4.31 INTERNAL LETTER FLAP(S): To match material, finish and size of letter plate.

R1 HOT AND COLD WATER

To be read with Preliminaries/General conditions.

GENERAL INFORMATION/REQUIREMENTS

R1.2 ELECTRICAL WORK in connection with the installation is not included, and will be carried out by the Electrical Contractor. Provide all information necessary for the completion of such work.

R1.3 ELECTRICAL WORK in connection with the installation will be included in the plumbing contractor's work and must be in accordance with BS 7671 'Requirements for Electrical Installations' (The IEE Wiring Regulations).

R1.4 SERVICE CONNECTIONS are covered elsewhere by a Provisional Sum.

R1.5 FUEL FOR TESTING: Costs incurred in the provision of fuel for testing and commissioning the installation are covered elsewhere by a Provisional Sum.

GENERAL TECHNICAL REQUIREMENTS

R1.6 CENTRALISED HOT WATER STORAGE: Design the system to meet the following requirements:
- Storage capacity, where not specified, to be sufficient to meet the assessed needs of the building and its occupants.
- Primary heat source, where not specified, to be capable of raising temperature of water from 10 degC to 60 degC within 1 hour.

R1.7 PIPELINE SIZES: Calculate sizes to suit the probable simultaneous demand for the building and to ensure:
- A water velocity of not more than 1.3 m/s for hot water and 2.0 m/s for cold water.
- Suitable discharge rates at draw off points.

R1.8 INSTALLATION GENERALLY:
- Install, test and commission the hot and cold water systems so that they comply with BS 6700, water supply byelaws, and the requirements of this section to provide a system free from leaks and the audible effects of expansion, vibration and water hammer.
- All installation work to be carried out by qualified operatives.
- Store all equipment, pipework components and accessories in original packaging in dry conditions. Protect plastics pipework from prolonged exposure to sunlight. Wherever practicable retain protective wrappings until Practical Completion.
- Securely fix equipment, components and accessories in specified/approved locations, parallel or perpendicular to the structure of the building unless specified otherwise, using fixing brackets/mountings, etc. recommended for the purpose by the equipment manufacturer.
- In locations where moisture is present or may occur, use corrosion resistant fittings/fixings and avoid contact between dissimilar metals by use of suitable washers, gaskets, etc.
- All equipment, pipework, components, valves, etc. forming the installation to be fully accessible for maintenance, repair or replacement unless specified or shown otherwise.
- Installation to be fitted with vents at high points and draining taps at low points to facilitate purging and draining.

R1.9 BUILDER'S WORK: Comply with restrictions on the cutting of holes, chases, notches, etc. and methods of attachment to the building fabric specified in section P31.

R1.10 DEZINCIFICATION: All brass fittings used below ground to be DZR alloy CZ 132 and so marked, or gunmetal.

R1.11 DEZINCIFICATION: All brass fittings which are in contact with water to be DZR alloy CZ 132 and so marked, or gunmetal.

EQUIPMENT

R1.12 HOT WATER BOILER/CIRCULATOR:
- Gas fired to BS 5258:Part 1 and BS 6332:Part 1.

R1.13 INSTANTANEOUS WATER HEATER(S):
- Gas fired to BS 5386.

R1.14 INSTANTANEOUS WATER HEATER(S):
- Electric, BEAB approved.

R1.15 INSTANTANEOUS SHOWER UNIT(S):
- Electric, BEAB approved.

R1.16 STORAGE WATER HEATER(S):
- Gas fired to BS 5258:Part 7.

R1.17 STORAGE WATER HEATER(S):
- Electric to BS 3456:Part 102:Section 102.21.

R1.18 FLUE PIPE:
- size to suit appliance, with all fittings necessary to provide a complete installation.
  Set out with the minimum number of joints and bends and a slope not more than 30 degrees from the vertical. Do not locate joints within the depth of floors.
- Install with sockets uppermost, fully supported and fixed securely with brackets supplied for the purpose at locations and centres recommended by pipe manufacturer.
- Seal joints, completely filling with approved jointing materials, to give a gas tight installation.
- Ensure that joints and supports adequately accommodate thermal movement.
- Ensure that flue pipe is not less than the required minimum distance from combustible materials.
- Fit terminal and flashings, collars, etc. to weatherproof junction at roof.

R1.19 BALANCED FLUE TERMINAL: Agree position with CA before forming any openings in external wall.

R1.20 AIR SUPPLY TO APPLIANCE: Inform CA of air supply requirements and agree/confirm size(s) and location(s) of vent(s).

R1.21 CISTERN(S):
- Moulded plastics to BS 4213, Kitemark certified, with removable cover.
  Valve: Float operated diaphragm type to BS 1212 with plastics float to BS 2456, size to suit water pressure.
- Lowest point of outlet(s) to be not less than 30 mm above bottom of cistern.
  Fix securely to sides and top of cistern(s) using tape/ adhesive recommended by the insulation manufacturer, leaving no gaps but allowing removal of access cover with minimum disturbance to insulation. Insulate underside of cistern where exposed in unheated spaces.

R1.22 CISTERN(S):
- Moulded plastics to BS 4213, Kitemark certified, and complying with the additional requirements of BS 7181 unless specified otherwise.
  Valve: Float operated diaphragm type to BS 1212 with plastics float to BS 2456, size to suit water pressure.
- Lowest point of outlet(s) to be not less than 30 mm above bottom of cistern.

R1.23 HOT WATER STORAGE CYLINDER:
- Direct type to BS 699, Kitemark certified.

R1.24 HOT WATER STORAGE CYLINDER:
- Double feed indirect type to BS 1566:Part 1, Kitemark certified.

R1.25 HOT WATER STORAGE CYLINDER:

- Single feed indirect type to BS 1566:Part 2, Kitemark certified.

R1.26 INSULATED COMBINATION UNIT:
- Direct type to BS 3198, Kitemark certified.

R1.27 INSULATED COMBINATION UNIT:
- Double feed indirect type to BS 3198, Kitemark certified.

R1.28 INSULATED COMBINATION UNIT:
- Single feed indirect type to BS 3198, Kitemark certified.

R1.29 UNVENTED HOT WATER STORAGE:
- To BS 7206.
  Installation: To be carried out by a Registered Installer/ Operative.
- Discharge pipe:To be sized to suit the outlet on the safety device and the length and configuration of the pipe, laid to a fall not less than 1 in 80 and to discharge via an air break and tundish

R1.30 IMMERSION HEATER(S)
- To BS 3456:Section 2.21, BEAB Approved:

R1.31 WATER SOFTENER:
- Provide unsoftened supply
- Fit bypass pipe and stop valves to ensure continuity of water supply if softener is inoperable or removed.
- Connect overflow/drain line(s) to trap and waste specified in section R11.
- Ensure that there is provision to prevent back siphonage of brine during regeneration process.

PIPELINES

R1.32 COPPER PIPELINES
- Tube: To BS 2871:Part 1, Kitemark certified.
- Jointing generally: Integral lead free solder ring capillary fittings to BS 864:Part 2, Kitemark certified.
- Connections to equipment and fittings: Compression fittings to BS 864:Part 2, Kitemark certified.

R1.33 PLASTICS COATED COPPER PIPELINES
- Tube: To BS 2871:Part 1, Kitemark certified, with seamless polyethylene coating to BS 3412.
  Jointing generally: Integral lead free solder ring capillary fittings to BS 864:Part 2, Kitemark certified.
- Connections to equipment and fittings: Compression fittings to BS 864:Part 2, Kitemark certified.

R1.34 CHROMIUM PLATED COPPER PIPELINES.
- Tube: To BS 2871:Part 1, Kitemark certified, with chromium plated finish to BS 1224, service condition 2.
- Jointing: Type A compression fittings to BS 864:Part 2, Kitemark certified, with chromium plated finish to BS 1224, service condition 3.

R1.35 STAINLESS STEEL PIPELINES
- Tube: To BS 4127, Kitemark certified.
- Jointing:Do not use fluxes containing chlorides or borides.

R1.36 THERMOPLASTICS PIPELINES
- Pipes and fittings: to BS 7291:Parts 1 Agrement certified.
-

R1.37 POLYETHYLENE PIPELINES FOR USE BELOW GROUND:
- Tube: Blue polyethylene to BS 6572, Kitemark certified.
- Jointing: Compression fittings to BS 864:Part 5, Kitemark certified.

R1.38 PIPE SIZES: As shown on drawings.

R1.39 PIPE RUNS:

- Where not shown accurately on drawings, obtain approval of routes before commencing work.
- Runs to be straight and parallel or perpendicular to walls, floors, ceilings, etc. as appropriate.
- Locate runs to facilitate installation of equipment, accessories and insulation and allow access for maintenance.
- Run hot pipes above cold where routed together horizontally; space well away from pipes containing drinking water.
- Do not run pipes through electrical enclosures or above switch gear distribution boards or the like.
- Allow sufficient space around pipes to fit insulation without compression.

R1.40 PIPE FIXING:

- Fix pipes securely and neatly with the minimum number of joints, bends and offsets.
- Allow for thermal movement of pipelines and isolate from structure where necessary to prevent noise or abrasion of pipe caused by movement. Pipes passing through walls to be sleeved as specified in section P31.
- Temporarily seal open ends of pipes with purpose made plugs or blanking caps to prevent ingress of dirt during installation.
- Completed pipelines to be of smooth, consistent bore, clean and free from external scratching, toolmarks, distortion, wrinkling, cracks, and other defects.

R1.41 SUPPORTS FOR COPPER/STAINLESS STEEL PIPELINES: Fix securely and true to line at not more than the following centres:

Pipe o.d. (mm)	Horizontal (mm)	Vertical (mm)
15 and 22	1200	1800
28 and 35	1800	2400
42 and 54	2400	3000

Provide additional supports as necessary within 150 mm of connections, junctions and changes of direction.

R1.42 SUPPORTS FOR EXPOSED THERMOPLASTICS PIPELINES: Fix securely and true to line at not more than the following centres:

Pipe o.d. (mm)	Horizontal (mm)	Vertical (mm)
Up to 16	300	500
17 to 25	500	800
26 to 32	800	1000

Provide additional supports as necessary within 150 mm of connections, junctions and changes of direction.

R1.43 BENDS IN THERMOPLASTICS PIPELINES:

- All bends to be cold formed.
- Support large radius bends at the maximum centres specified in clause 580.
- Minimum unsupported cold bend radii for 90 degree bends to comply with manufacturer's recommendations. Fix pipe clips either side of bend.
- Use cold form bend fixtures to fully support small radius 90 degree bends.
- Do not use 90 degree elbow fittings as substitutes for bends.

R1.44 PIPE SPACING: Minimum clearance to face of wall-fixed pipes or pipe insulation:

From floor:	150 mm
From ceiling:	50 mm
From wall:	15 mm
Between pipes:	25 mm
From electrical conduit, cables, etc:	150 mm

R1.45 JOINTS IN COPPER/STAINLESS STEEL PIPELINES:

- Cut pipes square using a wheel cutter, remove burrs and make neat, clean, fully sealed joints, ensuring that pipe ends enter joint fittings to full depth.
- Do not use formed bends on exposed pipework except for small offsets. Form changes of direction with radius fittings unless otherwise approved.

- Use purpose designed adaptors for connecting dissimilar materials: do not improvise.
- Protect background and plastics pipes and fittings from heat damage when forming soldered joints. Clean off all flux residue. Do not use 'self-cleaning' fluxes.

R1.46 CAPILLARY JOINTS IN PLASTICS COATED PIPES: Follow manufacturer's recommendations to avoid damage to plastics coating from direct or indirect heat. Wrap completed joint when cool with PVC tape of matching colour, half lapped.

R1.47 JOINTS IN THERMOPLASTICS PIPELINES:
- Use purpose designed fittings and accessories for all joints, do not improvise.
- Cut pipes square using cutter recommended by the manufacturer. Do not use hacksaws.
- Remove burrs and make neat, clean, fully sealed joints, ensuring that pipe ends enter joint fittings to full depth.
- Do not overtighten compression fittings.

R1.48 GAS PIPELINES:
- Install in accordance with BS 6891 and the requirements of British Gas.
- Ensure that gas supply meter and distribution pipelines are adequate for the maximum anticipated demand.
- Fit service cocks to permit removal of appliances.

R1.49 WARNING PIPES TO CISTERNS:
Bore to be twice that of inlet pipe but not less than 32 mm.
- Difference between normal water level and overflow level to be:
For cold water storage cisterns - not less than 32 mm or equal to the bore of the warning pipe if greater.
For feed and expansion cisterns - sufficient to allow 20% increase in the volume of water in the tank plus 25 mm.
- Vertical distance of water supply inlet above overflow level to be not less than the bore of the warning pipe.
- Fall to be not less than 1 in 10 with sufficient supports to prevent sagging, discharging separately in approved prominent positions with turned down ends.
- Turn down within the cistern, terminating 50 mm below normal water level.
- Fit with insulation within the building where the pipe is in an uninsulated space and subject to freezing.

R1.50 VENT PIPES to be open with no restrictions or valves and to rise continuously from system connection to discharge over cistern. Internal diameter not less than 20 mm.

R1.51 PIPELINES ENTERING BUILDINGS:
- To be laid not less than 750 mm below finished ground level.
- If rising into building within 750 mm of the external face of the external wall or if passing through a ventilated void below floor level, fit insulation extending from finished floor level to 600 mm beyond external face of building.
- Seal both ends of pipeducts with an approved nonhardening, noncracking, water resistant compound to a depth of not less than 150 mm.

R1.52 EXTERNAL SUPPLY PIPELINES to be insulated where exposed to air and where less than 750 mm below ground level.

R1.53 INSULATION TO PIPELINES:
- Material: Preformed flexible closed cell or mineral fibre split tube with thermal conductivity not exceeding 0.045 W/mK.
Thicknesses:
Hot water pipelines: Equal to the outside diameter of the pipe up to a maximum of 40 mm.
Cold water pipelines:
Internal: 25 mm
Roof space: 32 mm
External: 38 mm.

Fire performance: Class 1 spread of flame when tested to BS 476: Part 7.
- Fit insulation to cold water pipelines in uninsulated spaces.
- Notwithstanding the requirements of BS 6700, clause 2.3, fit insulation to hot water pipelines in all locations other than short lengths in prominent positions adjacent to appliances.
- Fix securely and neatly in accordance with manufacturer's recommendations, ensuring continuity over fittings and at supports, leaving no gaps and with the split on 'blind' side of pipeline.
- Do not fit insulation until completion of testing.

CONTROLS

R1.54 TIMER:
To the relevant parts of BS 3955, BS EN 60730 and BS EN 61058, BEAB approved.

R1.55 THERMOSTAT(S):
To the relevant parts of BS 3955, BS EN 60730 and BS EN 61058, strap-on type.

R1.56 VALVES GENERALLY:
- Types approved for the purpose by the local water company and of the appropriate pressure/temperature ratings.
- Provided for isolation and regulation of all equipment and subcircuits.
- Located where they can be readily operated and maintained and adjacent to equipment which is to be isolated.
- Fitted with joints to suit the pipe material.
- Fitted with handwheels where required for control purposes and lockshields where required for isolation or regulation of circuits or equipment.

R1.57 STOP VALVES AND DRAW-OFF TAPS for above ground use:
Copper alloy to BS 1010:Part 2, Kitemark certified.

R1.58 STOP VALVES for below ground use:
DZR Copper alloy CZ 132 to BS 5433.

R1.59 GATE VALVES:
Copper alloy to BS 5154, Series B, Kitemark certified.

R1.60 DOUBLE CHECK VALVE ASSEMBLIES:
Copper alloy check valves to BS 6282:Part 1 with intervening test cock to BS 2879.

R1.61 FLOW REDUCING VALVES:
Ball type, screw operated.

R1.62 DRAINING TAPS:
Copper alloy to BS 2879, Type 1, hose connection pattern, Kitemark certified.

R1.63 GAS PLUG COCK(S)
To BS 1552 and Gas Company approval.

COMPLETION

R1.64 TESTING:
- Give at least 3 days notice to CA of intention to commence testing.
- Carry out before fixing pipework insulation. Ensure that all pipework and equipment is secure and clean and cistern/ tank covers are fitted.
- Thoroughly flush out all parts of the system, fill with water, remove all air and check for leaks.
- Start boiler and run the system until all parts are at normal operating temperatures and then allow to cool to cold condition for a period of three hours. At both hot and cold conditions all joints, fittings and

components must be free from leaks and signs of physical distress when tested for at least one hour as follows:
Systems fed directly from the mains - Apply a test pressure equal to either the full mains water pressure or, where fitted, the pressure control valve setting.
Systems fed from storage - Apply a test pressure equal to the pressure produced when the storage cistern is filled to its normal maximum operating level.
Inaccessible or buried pipelines - Carry out hydraulic pressure test to twice the working pressure.
If leaks are evident, repair and repeat test.

- Check and adjust operation of all equipment, controls and safety devices.
- Check operation of all outlets for satisfactory rate of flow and temperature.

R1.65 TESTING SERVICE PIPELINE: Disconnect from the mains, fill with potable water, excluding all air, and test by applying at least twice the working pressure for one hour, during which there must be no leakage.

R1.66 DISINFECTION:

- Disinfect the installation within the building after completion of testing for leaks and after ensuring that the mains water system has been cleaned and disinfected.
- Fill water storage cistern(s), tank(s) and pipework with clean fresh water and thoroughly flush out. Refill and close off supply.
- Add sodium hypochlorite to cistern(s) to give a free residual chlorine content of 50 mg/litre.
- Leave for one hour, then open each outlet in sequence commencing with the closest to the cistern(s). Close each outlet as soon as the run off smells of chlorine. Do not allow the cistern to empty; top up and rechlorinate as necessary.
- Leave system charged for at least one hour, then test for residual chlorine. If less than 30 mg/litre, repeat disinfection.
- Leave the installation charged with chlorinated water for at least 16 hours, then drain and thoroughly flush out before final filling.

R1.67 GAS SUPPLY PIPELINES: Test and purge to BS 6891 and the requirements of British Gas.

R1.68 DOCUMENTATION: Hand over to the CA before Practical Completion:

- Copies of manufacturers' operating and maintenance instructions for all equipment and controls.
- Operating instructions for the system as a whole giving optimum settings for all controls (operating instructions for boilers/circulators must be permanently attached to the casing).
- As installed drawings showing the location of all circuits and operating controls.

R1.69 OPERATING TOOLS: Provide all necessary tools for operation, maintenance and cleaning purposes, including keys for valves and vents. Hand over to CA on completion.

R1.70 LABEL all isolating and regulating valves on primary circuits, stating their function.

T1 GENERAL LIGHTING AND POWER

To be read with Preliminaries/General conditions.

T1.1 **GENERAL INFORMATION/REQUIREMENTS**

T1.2 REGULATIONS: Comply with:
- BS 7671 'Requirements for Electrical Installations', (The IEE Wiring Regulations).
- Requirements of the Electricity Supply Company.

T1.3 ELECTRICITY SUPPLY:
- Liaise with the Electricity Supply Company as necessary to confirm or determine:
- The maximum demand of the installation.
- The nature of the supply, its suitability for the installation and the type of earthing arrangement
- The location of the incoming supply.
- Space requirements for the Company's switches, fuses and meters.
- A provisional sum for connection of a supply and earthing by the Electricity Supply Company is included elsewhere. Make all necessary arrangements at the earliest opportunity to ensure connection when required.

T1.4 ARRANGEMENT OF CIRCUITS: Divide the installation into separately controlled circuits as described below, further subdividing where necessary to ensure compliance with BS 7671 (The IEE Wiring Regulations):

T1.5 EQUIPOTENTIAL BONDING: Install main and supplementary bonding conductors in accordance with the requirements of BS 7671 (The IEE Wiring Regulations).

T1.6 INSTALLATION GENERALLY:
- Install, test and commission the electrical work in accordance with BS 7671 (The IEE Wiring Regulations), ensuring compliance with design and performance requirements, to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.
- Installation work to be carried out by qualified electricians fully conversant with BS 7671 (The IEE Wiring Regulations).
- Fastenings, bushes, glands, terminals, connectors, clips, clamps and all other minor accessories necessary to complete the installation to be types recommended for the purpose by relevant equipment, accessories, etc. manufacturer.
- In locations where moisture is present or may occur, use corrosion resisting fastenings and avoid contact between dissimilar metals.

T1.7 BUILDER'S WORK: Comply with restrictions on the cutting of holes, chases, notches, etc. and methods of attachment to the building fabric specified in section P31.

CONDUIT/TRUNKING/DUCTING

T1.8 STEEL CONDUIT AND FITTINGS:
- To BS 4568:Parts 1 and 2.
  Type: Seam welded with plain threadable ends.
  Size: In accordance with BS 7671 (The IEE Wiring Regulations).
  Use maximum practical lengths to minimise number of joints. Form bends by machine and remove burrs from cut ends.
- Use bends and/or junction boxes at changes of direction. Do not use elbows or tees of any sort without approval.
- Fix securely with boxes fixed independently of conduit.
- Tightly screw all joints to ensure electrical continuity, with no thread showing. Use expansion couplings where conduit crosses movement joints in structure.
- Make secure connections to boxes, trunking, etc. with screwed couplings and provide rubber bushes at open ends.

T1.9 PVC CONDUIT AND FITTINGS:
- To BS 6099:Part 1, BS 6099:Part 2, Section 2.2 and BS 4607:Parts 1 and 5:
  Use maximum practical straight lengths to minimise number of joints.
- Use proprietary bends and/or junction boxes at changes of direction. Do not use elbows, tees or site formed bends without approval.
- Fix securely with boxes fixed independently of conduit.
- Form secure joints, using expansion couplings where recommended by manufacturer, and connectors at equipment, terminal fittings, etc.

T1.10 INSTALLING CONDUIT IN CONCRETE: Fix securely to reinforcement and fix boxes to formwork to prevent displacement. Depth of concrete cover to be not less than specified for reinforcement.

T1.11 DRAINAGE OF CONDUIT: Provide drainage outlets at lowest points in conduit installed externally and in locations where condensation may occur.

T1.12 STEEL SURFACE TRUNKING SYSTEM:
- To BS 4678:Part 1.
  Size: In accordance with BS 7671 (The IEE Wiring Regulations).
  Use proprietary units to form junctions and changes of direction wherever possible.
- Use mechanical fastenings/fixings; do not weld.
- Fit a copper link at each joint to ensure electrical continuity.
- Fit grommets, bushes or liners to holes through which cables pass.

T1.13 PVC SURFACE TRUNKING SYSTEM:
- To BS 4678:Part 4.
  Use proprietary units to form junctions and changes of direction wherever possible.

T1.14 FLUSH FLOOR TRUNKING SYSTEM:
- Size: In accordance with BS 7671 (the IEE Wiring Regulations).
  Fix securely to prevent displacement during screeding.
- Accurately position trunking and outlet units in plan and in relation to finished floor level.
- Fit temporary blanking plates at service outlet locations and ensure that trunking and outlet units are adequately protected to prevent damage and ingress of screed and other extraneous materials.

T1.15 STEEL UNDERFLOOR DUCTING SYSTEM:
To BS 4678:Part 2.
Size: In accordance with BS 7671 (The IEE Wiring Regulations).
Fix securely to prevent displacement during screeding.
- Accurately position outlet units in plan and in relation to finished floor level.

- Fit temporary blanking plates at service outlet locations and ensure that ducting is adequately protected to prevent damage and ingress of screed and other extraneous materials.
- Fit service outlet units when cables are installed.

T1.16 PVC UNDERFLOOR DUCTING SYSTEM:
Size: In accordance with BS 7671 (The IEE Wiring Regulations).
Fix securely to prevent displacement during screeding.
- Accurately position outlet units in plan and in relation to finished floor level.
- Fit temporary blanking plates at service outlet locations and ensure that ducting is adequately protected to prevent damage and ingress of screed and other extraneous materials.
- Fit service outlet units when cables are installed.

T1.17 FIRE STOPPING OF TRUNKING/DUCTING: Seal internally where they pass through fire resisting floors, ceilings, cavity barriers and the like.

CABLING

T1.18 CABLES to be BASEC certified. Select types and sizes to suit operating conditions, ensuring compliance with BS 7671 (The IEE Wiring Regulations). Obtain approval before proceeding with installation.

T1.19 CABLES to be BASEC certified and of the types listed below. Where not specified, select types and sizes to suit operating conditions, ensuring compliance with BS 7671 (The IEE Wiring Regulations). Obtain approval before proceeding with installation.

T1.20 CABLE ROUTES to be:
- Straight, vertical or horizontal and parallel to walls unless shown otherwise.
- In approved locations where exposed to view. When not specified otherwise, conceal cables wherever possible.
- Positioned at least 150 mm clear of other services. Cables running parallel and adjacent to heating pipes to be located below the pipes.
- Concealed horizontal runs in walls, if unavoidable, to be located within 150 mm of ceiling or between 150 and 300 mm of floor.
- Concealed cable runs to wall switches and outlets to be vertically in line with the accessory.

T1.21 INSTALLING CABLES GENERALLY:
- Do not commence internal cabling until the building is sufficiently enclosed to ensure permanently dry conditions.
- Install cables neatly and securely, adequately protected against accidental damage, adverse environmental conditions, mechanical stress and deleterious substances.
- Install cables without joints other than at equipment and terminal fittings. Do not use junction boxes without approval.
- Sleeve cables passing through masonry walls with conduit bushed at both ends.
- Do not run cables in spaces where they will be surrounded or covered by insulation. Where this is not practical, size cables accordingly and inform CA.

T1.22 PROTECTIVE CONDUCTORS: Use cable conductors throughout; do not use conduit or trunking as protective conductors.

T1.23 ARMOURED CABLE:
- Handle and install carefully to prevent damage to sheath and armouring.
- Do not install if cable and ambient temperature are, or have been for the previous 24 hours, below 0 deg C.
- Fit galvanized steel guards where cables are liable to mechanical damage.
- Bond armour to equipment and main earthing system.
- Make moisture proof connections to apparatus using sealed glands and PVC shrouds.

T1.24 PVC SHEATHED CABLES:
- Do not install cables when the temperature is near or below freezing.
- Do not install in cavities of external walls.
- Fit insulating cable glands at entries to equipment.
- Terminate cable sheaths within boxes.

T1.25 MICC CABLES:
- Neatly and carefully dress cable into position using tools recommended by cable manufacturer. Avoid corrugating sheath when bending.
- Connect to equipment and boxes with PVC shrouded glands.
- Fix cables with clips recommended by manufacturer ensuring that cable is fixed within 150 mm of bends and connections.
- As soon as a length of cable has been installed, fit permanent seals and immediately carry out an insulation test between conductors or between any conductor and cable sheath. Repeat test between 24 and 48 hours later. Only infinity readings will be accepted. Replace any cable which fails and repeat tests.

T1.26 CABLES LAID DIRECTLY IN THE GROUND:
- Before laying cables, ensure that bottom of trench is even and free from sharp stones, roots, etc.
- Lay cables on a 75 mm bed of sand.
- Where two or more cables are laid in the same trench, set 150 mm apart.
- Cover each cable with 75 mm of sand overlaid with cable covers to BS 2484.
- Mark each change in direction of cables with a precast concrete slab, size 300 x 300 x 150 mm thick, impressed with 'LV CABLE' and laid level with finished ground level.

T1.27 CABLES ENTERING BUILDING(S) FROM BELOW GROUND: Seal both ends of pipeduct to a depth of not less than 150 mm, with an approved nonhardening, noncracking, water resistant compound. Alternatively, fit a proprietary moulded pipeduct seal.

T1.28 CABLES IN PLASTER: Cover with galvanized steel channel nailed to background.

T1.29 CABLES IN VERTICAL TRUNKING/DUCTS:
- Support with pin racks or cleats at each floor level or at 5 m vertical centres, whichever is less.
- Provide and fix heat barriers at not more than 5 m centres where fire resisting barriers are not specified.

T1.30 CABLES IN ACCESSIBLE ROOF SPACES: Cables running across ceiling joists to be fixed to timber battens nailed to joists.

EQUIPMENT/ACCESSORIES

T1.31 CONSUMER CONTROL UNIT(S):
- To BS 5486:Part 13.
  Rating: To suit maximum demand.
  Each way to be permanently labelled to identify circuit and rating.
- Circuit protection:
  Miniature circuit breakers to BS EN 60898.

T1.32 DISTRIBUTION BOARDS:
- To BS 5486:Part 12.
  Rating: To suit maximum demand.
  Each way to be permanently labelled to identify circuit and rating.
- Circuit protection:
  Miniature circuit breakers to BS EN 60898.

T1.33 ELECTRICAL ACCESSORIES: Types shown on drawings, complete with mounting boxes and, unless specified otherwise,

T1.34 ELECTRICAL ACCESSORIES: Types shown on drawings, complete with mounting boxes and, unless specified otherwise,

T1.35 THERMAL STORAGE HEATERS:
To BS 3456:Part 2:Section 2.26. BEAB approved.

T1.36 ROOM HEATER(S):
To BS 3456:Part 102:Section 102.30. BEAB approved.

T1.37 WARM AIR HEATING UNIT(S):
To BS 3456:Part 102:Section 102.30. BEAB approved.

T1.38 ROOM AIR CONDITIONER(S):
To BS 3456:Part 2:Section 2.34. BEAB approved.

T1.39 ROOM HUMIDIFIER(S):
To BS 3456:Part 2:Section 2.39.

T1.40 FAN(S):
To BS 3456:Part 102:Section 102.342.

T1.41 VENTILATING FAN(S):
To BS 3456:Part 102:Section 102.342. BEAB approved.

T1.42 CLOCK(S):
To BS EN 60335-2-26.

T1.43 HEATING PROGRAMMER:
To BS 3955, BEAB approved.

T1.44 TIMER:
To BS 3955, BEAB approved.

T1.45 THERMOSTAT(S):
To BS 3955, BEAB approved.

T1.46 FIXING ELECTRICAL ACCESSORIES/EQUIPMENT:
- Position accurately and square to vertical and horizontal axes.
- Where not shown otherwise, align adjacent accessories on the same vertical or horizontal axis as appropriate.

T1.47 MULTIGANG SWITCHES: Connect switches so that there is a logical relationship with luminaires. Fit blanks to unused switch spaces.

SPECIAL SYSTEMS

T1.48 EMERGENCY LIGHTING SYSTEM:
To BS 5266:Part 1.

T1.49 FIRE DETECTION AND ALARM SYSTEM:
To BS 5839.

T1.50 SMOKE ALARMS:
Self-contained type to BS 5446:Part 1, Kitemark certified.
Operation: Mains with D.C. battery back-up.

COMPLETION

T1.51 INSPECTION AND TESTING:
- To BS 7671 (The IEE Wiring Regulations:Part 7).
- Give not less than 24 hours notice before commencing tests.
- In addition to items required to be inspected or tested, ensure that labels and signs required by the Regulations are securely fixed in the correct locations.
- After satisfactory completion of tests submit two copies of inspection and completion certificates to CA.

T1.52 INSPECTION AND TESTING OF EMERGENCY LIGHTING SYSTEM:
- To BS 5266:Part 1.
- Give not less than 24 hours notice before commencing tests.
- After satisfactory completion of tests submit two copies of certificate to CA. Certificate to be as BS 5266: Part 1, Appendix B.

T1.53 INSPECTION, INITIAL TESTING, COMMISSIONING AND CERTIFICATION OF FIRE ALARM SYSTEM:
- To BS 5839:Part 1, clause 26.
- Give not less than 24 hours notice before commencing tests.
- After satisfactory completion of tests submit two copies of certificates to CA. Certificates to be as BS 5839:Part 1, Appendices B and C.

T1.54 DOCUMENTATION: Hand over to the CA at Practical Completion:
- Copies of manufacturers' operating and maintenance instructions for all fittings and apparatus.
- As-installed drawings showing all circuits and their ratings and the locations of all fittings and apparatus.

V4 FIXINGS/ADHESIVES

To be read with Preliminaries/General conditions.

V4.1 FIXING GENERALLY:
Use fixing and jointing methods and types, sizes, quantities and spacings of fastenings which are suitable having regard to:
- Nature of and compatibility with product/material being fixed and fixed to,
- Recommendations of manufacturers of fastenings and manufacturers of components, products or materials being fixed and fixed to,
- Materials and loads to be supported,
- Conditions expected in use,
- Appearance, this being subject to approval.

V4.2 FASTENINGS for materials and components forming part of external construction to be of corrosion resistant material or have a corrosion resistant finish.

V4.3 FASTENINGS for materials and components:
- Forming part of external construction but not directly exposed to the weather to be of corrosion resistant material or have a corrosion resistant finish.
- Directly exposed to the weather to be of corrosion resistant material.

V4.4 FIXING THROUGH FINISHES:
Ensure that fastenings and plugs (if used) have ample penetration into the backing.

V4.5 CRAMP FIXING:
- Fix with stainless or galvanized steel strip cramps as BS 1243 vertical twist ties except with no twist, split one end only and once bent.
- Position cramps 150 mm from each end of jambs and at 600 mm maximum centres.
- Secure cramps to frames with two sherardized screws and fully bed in mortar.

V4.6 PELLETING:
Countersink screw heads 6 mm below timber surface and glue in grain-matched pellets not less than 6 mm thick, cut from matching timber. Finish off flush with face.

V4.7 POWDER ACTUATED FIXING SYSTEMS:
- Do not use without approval.
- Tools to be to BS 4078:Part 2 and Kitemark certified.
- Fasteners, accessories and consumables to be types recommended by the tool manufacturer.
- Tools to be used in accordance with BS 4078:Part 1. Operatives to be trained and certified as competent by tool manufacturer.
- Ensure that operatives take full precautions against injury to themselves and others.
- Remove all unspent cartridges from the site when no longer required.
- Apply zinc rich primer to heads of fasteners used externally, in external walls or in other locations subject to dampness.
- Use top hat section plastics washers to isolate cartridge fired nails from stainless steel components fixed externally, in external walls or in other locations subject to dampness.

V4.8 ADHESIVES:
- Adhesive types: As specified in the relevant section.
- Surfaces to receive adhesive to be sound, unfrozen, free from dust, grease and any other contamination likely to affect bond. Where necessary, clean surfaces using methods and materials recommended by adhesive manufacturer.

TRADE PREAMBLES

- Surfaces to be of sufficient smoothness and evenness to suit gap filling and bonding characteristics of adhesive. Adjust as necessary.
- Ensure that operatives observe manufacturer's and statutory requirements for storage and safe usage of adhesives.
- Do not use adhesives in unsuitable environmental conditions or beyond the manufacturer's recommended time period.
- Apply adhesives using recommended spreaders/applicators to ensure correct coverage. Bring surfaces together within recommended time period and apply pressure evenly over full area of contact surfaces to ensure full bonding.
- Remove surplus adhesive using methods and materials recommended by adhesive manufacturer and without damage to affected surfaces.

V5 MORTARS

To be read with Preliminaries/General conditions.

V5.1 MORTAR MIX PROPORTIONS and other particular requirements are specified elsewhere.

V5.2 SAND FOR MORTAR:
- To BS 1200 unless specified otherwise.
- Sand for facework mortar to be from one source, different loads to be mixed if necessary to ensure consistency of colour and texture.
- When a range is specified (e.g. 1:1:5-6) use lower proportion of sand for Grade G sands and higher proportion for Grade S.

V5.3 READY-MIXED LIME:SAND:
- Unless specified otherwise, use ready-mixed lime:sand to BS 4721.
- Coloured mortar, where required, to be made using a proprietary coloured ready-mixed lime:sand, colour to approval where not specified.

V5.4 SITE PREPARED LIME:SAND MIX:
- Use lime putty to BS 890, either ready prepared from quicklime or site prepared Thoroughly mix lime putty with sand, store in airtight bins and prevent from drying out.
- Before gauging with other constituents, thoroughly ram, beat and chop the mix.

V5.5 PUTTY PREPARED FROM SLAKED QUICKLIME:
- Ensure that operatives are experienced in the safe handling and slaking of quicklime and are thoroughly protected against contact with it.
- Use fresh quicklime to BS 890 and store in cool, dry and secure noncombustible containers.
- Slake quicklime in suitable sound metal tanks. Add quicklime to clean water whilst stirring and raking continuously. Do not add water to quicklime.
- Sieve putty to remove any lumps and run into a suitable storage tank or lined pit. Cover the putty with water and store for at least six weeks. Prevent access with a strong, well secured cover over the tank or pit.

V5.6 PUTTY PREPARED FROM HYDRATED LIME:
- Mix fresh hydrated lime to BS 890 with clean water to form a putty of creamy consistency.
- Store putty in airtight containers for not less than 24 hours before using.

V5.7 HYDRAULIC LIME:SAND MORTAR:
- Thoroughly mix eminently hydraulic hydrated lime powder with sand, first in the dry state and then with water. Add only sufficient water to produce a workable mix.
- Do not use mortar which has begun to stiffen.

V5.8 CEMENT FOR MORTAR: When not specified otherwise, to be Portland cement or Portland blastfurnace cement, to class 42.5 or 52.5, manufactured and supplied under the BSI Kitemark scheme for cement. All cements must comply with the appropriate British Standard.

V5.9 ADMIXTURES: Do not use in mortar unless specified or approved. Do not use calcium chloride or any admixtures containing calcium chloride. Admixtures, if specified, to be to BS 4887.

V5.10 SITE STORAGE:
- Store different sands and aggregates in different stockpiles on hard clean bases which allow free drainage.
- Store factory produced premixed lime:sand for mortars and ready-to-use retarded mortars in covered containers to prevent excessive drying out or wetting.
- Store bags of cement and hydrated lime in dry conditions, raised off the ground and not touching damp surfaces. Do not use cement or hydrated lime affected by damp.
- Avoid intermixing and contamination between stored materials and other building materials, debris or other deleterious matter.

V5.11 MAKING MORTAR:

- Keep plant and banker boards clean at all times.
- Measure materials accurately by volume using clean gauge boxes. Proportions of mixes are for dry sand; allow for bulking if sand is damp.
- Mix ingredients thoroughly to a consistence suitable for the work and free from lumps. Mortars containing air entraining admixtures must be mixed by machine, but do not overmix.
- Do not mix mortar when the air temperature is at or below 3 degC and falling or below 1degC and rising.
- Use mortar within about two hours of mixing at normal temperatures. Use retarded mortar within the time and site temperatures recommended by the manufacturer. Mortar may be retempered to restore workability, but only within these time limits.

V6 SEALANTS

To be read with Preliminaries/General conditions

V6.1 SEALANT TYPES: As specified in the relevant section.

V6.2 SUITABILITY OF JOINTS: Before commencing, check that:
- Joint dimensions are within limits specified for the sealant.
- Surfaces are smooth and undamaged.
- Preparatory work which must be done before assembly of the joint has been carried out

Inform CA if joints are not suitable to receive sealant and submit proposals for rectification

V6.3 PREPARING JOINTS:
- Clean surfaces to which sealant must adhere using methods and materials recommended by sealant manufacturer.
- Remove all temporary coatings, tapes, loosely adhering material, dust, oil, grease and other contaminants which may affect bond.
- Keep joints clean and protect from damage until sealant is applied.
- Backing strip, bond breaker, primer: Types recommended for the purpose by sealant manufacturer.
- Insert backing strips and/or bond breaker tape into joint leaving no gaps.
- Cover adjacent surfaces with masking tape to prevent staining and protect surfaces which would be difficult to clean if smeared with primer or sealant.

V6.4 APPLYING SEALANTS:
- Ensure that operatives observe manufacturer's and statutory requirements for storage and safe usage of sealants.
- Use equipment and methods recommended by sealant manufacturer and apply within the recommended application life of primer and sealant, and the recommended air and substrate temperature ranges.
- Do not apply to damp surfaces (unless recommended otherwise), to surfaces affected by ice or snow or during inclement weather. Do not heat joints to dry them or raise the temperature.
- Fill joints completely, leaving no gaps, excluding all air and ensuring firm adhesion of sealant to required joint surfaces. Tool the sealant to a neat, slightly concave profile unless specified otherwise.
- Protect until cured.

V7 POWDER COATINGS

To be read with Preliminaries/General conditions.

V7.1 WORKING PROCEDURES: Unless specified otherwise, comply with all relevant requirements and recommendations of:
- BS 6496 for aluminium alloy backgrounds.
- BS 6497 for galvanized steel backgrounds.
- British Coatings Federation: Code of safe practice - Application of powder coatings by electrostatic spraying.

V7.2 APPLICATOR REQUIREMENTS:
- Powder coatings must be applied by an applicator approved by the powder coating manufacturer. Provide evidence of approval to the CA on request.
- Use only one plant of the applicator wherever practical.
- Ensure that the applicator complies with all quality procedures, standards and tests required by the powder coating manufacturer.
- Ensure that the applicator issues a certificate to the CA on request and before delivery of work to site, confirming that coatings are in accordance with this specification.
- Ensure that copies of the powder coating manufacturer's and/or applicator's guarantees are issued to the CA on completion of work.

V7.3 PRETREATMENT:
- All components to be powder coated are to be free from corrosion and damage, and suitable for and compatible with the pretreatment and powder coating process.
- Clean, conversion coat, condition, drain and dry all components in accordance with the powder coating manufacturer's requirements and the pretreatment supplier's recommendations.

V7.4 EXTENT OF POWDER COATINGS:
- Obtain approval of drawn proposals or schedules for component surfaces to receive powder coatings.
- All approved surfaces will be deemed 'significant surfaces' for relevant BS 6496/BS 6497, performance requirements.

V7.5 APPEARANCE OF POWDER COATINGS:
- The quality of finish must be consistent and in accordance with BS 6496/BS 6497, clause 10.2. A slight degree of 'orange peel' texture may be acceptable, subject to approval of the CA and the powder coating manufacturer.
- The gloss level of finish must be consistent and when tested in accordance with BS 6496/BS 6497, clause 4.3 must be within the relevant range given in the powder coating manufacturer's literature.

V7.6 ALUMINIUM ALLOY FABRICATIONS: Units may be assembled:
- Before powder coating.
- From components powder coated after cutting to size.
- From components powder coated before cutting to size, subject to approval of the CA and the powder coating manufacturer.

Assembly of components resulting in exposure of background metal will not be acceptable.

V7,7 STEEL FABRICATIONS: Wherever practical units must be assembled before powder coating.

V7.8 FIXINGS: All exposed metal fixings must be powder coated together with components, or coated with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.

V7.9 FABRICATION DAMAGE REPAIR/REPLACEMENT:

- Check all components before delivery to site for powder coating damage. Report findings and proposed method of repair or replacement to the CA and obtain approval before commencing remedial work.
- Repair components with minor damage as soon as possible by cleaning, abrading and coating with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.
- Replace components with major damage considered unacceptable for repair.
- Stripping and recoating of components will only be acceptable by prior agreement of the powder coating manufacturer. Stripping, pretreatment and powder coating are to be in accordance with manufacturer's requirements.
- Overcoating of components will not be acceptable.

V7.10 PROTECTION:

- All powder coated surfaces of components vulnerable to damage during handling and installation, or by subsequent site operations, are to be fully protected throughout the course of these works.
- Protective coverings are to be resistant to all weathers, removable from areas inaccessible after installation, and partially removable and replaceable for access to fixing points during installation or subsequent site operations.
- Any protective tapes used in direct contact with powder coatings are to be low tack, self adhesive type and light in colour. Their use for application to powder coatings must be approved by the tape manufacturer. Apply and remove in accordance with the tape manufacturer's requirements and the powder coating manufacturer's recommendations.
- Carry out monthly inspections of protective coverings and promptly repair any deterioration or deficiency.
- Remove protective coverings only when instructed by the CA.

V7.11 SITE DAMAGE REPAIR/REPLACEMENT:

- Any damage to powder coatings caused during handling and installation, or by subsequent site operations, is to be rectified immediately. Obtain approval before commencing extensive repairs or replacements.
- Repair components with minor damage by cleaning, abrading and coating with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.
- Replace components with major damage considered unacceptable for repair.

V7.12 MAINTENANCE: After removal of protective coverings, clean and maintain all powder coated surfaces at regular intervals until Practical Completion. All maintenance is to be in accordance with procedures detailed in the powder coating manufacturer's technical literature and the guarantee.

Specification of Works for

Internal and External Repair and Refurbishment

of

43a & 44a High Street, Wellingborough

Prepared by:

Underwoods Surveyors Limited

3.1 EXTERNAL AREAS

3.1.1 Cut back and remove all overgrown vegetation to the rear yard including climbing plants that have penetrated the ground floor roof; clear all debris and dispose off site; sweep all paths and leave tidy.

Allow a Provisional Sum of £500.00 for repairs to paths to make safe and level.

3.1.2 Carry out repairs to existing painted rear braced and ledged gate and frame; replace ironmongery as required and leave gate in good working order and secure; prepare for redecoration.

3.2 MAIN ROOFS

3.2.1 Once all vegetation has been removed, inspect the single storey rear roof structure/covering and assess the damage caused; carry out repairs to at least one pitch to include re-setting of roof tiles, reinstating cement fillets, and renewing any failed structure timbers. This roof is to be returned in good condition, wind and watertight.

3.2.2 Allow for thoroughly cleaning down, preparing and redecorating the soffit and fascia boards to the front and rear elevations with 1 No. undercoat and 2 No. coats of suitable external quality paint. Colour to be approved by the contract administrator.

3.2.3 Allow a Provisional Sum of £1,000.00 for repairs to the main pitched roof, once access has been achieved; repairs to be agreed with contract administrator prior to any works being carried out.

3.2.4 Sweep off rear asphalt flat roof and check all timber rolls, upstands and main covering for evidence of splits or other failures in the covering; allow for removal of redundant penetrations and subsequent patch repairs to covering to leave watertight.

3.2.4.1 Option – Allow for stripping back existing flat roof covering back to decking substrate and inspect for defects and replace as necessary; supply and install new warm deck flat roof covering with suitable rigid insulation, vapour layer and new built up felt or similar flat roof covering to comply with current Building Regulations.

3.2.5 Confirm proposals for safe high level working methodology with tender and include price here.

3.2.6 The contractor is to allow to gain access to each roof space and to carry out an inspection of the existing roof structures for sign of defect.

Allow the Provisional Sum of £250.00 per roof space for repairs to be agreed with the Contract Administrator.

3.2.7 Carefully remove all existing insulation within each roof space and dispose off site; supply and lay between / over joists, circa 280mm of suitable quilt insulation to comply with Part L Building Regulations; exact requirement to be agreed with the approved inspector prior to installation.

3.3 RAINWATER GOODS

3.3.1 Carry out programme of repair and reinstatement of rainwater goods to the rear elevation including replace missing or failed sections, re-aligning gutter runs and ensuring all downpipes are secure and discharge into open gullies or below ground; re-seal joints as required and leave all free flowing and clear of debris.

3.3.2 Prepare, prime and repaint all cast iron or other previously painted rainwater goods ensuring coverage to all sides and brackets etc. to the front and rear elevations; Colour: tbc.

3.4 ELEVATIONS

3.4.1 Front Entrance Door – Allow to overhaul existing partially decorated timber door to 44a High Street; the repairs to include new ironmongery incorporating hinges and letterplate, removal of redundant fixtures, cleaning of glazing leaving the door in good working order.

3.4.2 Safely remove existing final escape door and glazed panels to the first floor rear elevation, where redundant and dispose off site; prepare opening and reinstate wall construction generally comprising brick external and block internal skins to depth of existing wall with cavity between skins; internal and external skins are to be stitched into existing structure and tied appropriately prior to providing new internal linings ready for redecoration.

Form opening within new structure to take new timber framed, double glazed sash window to match existing rear elevation units; install window at circa 1200mm above finished floor level whilst remaining consistent with existing window heights.

All works to be in accordance with current Building Regulations and FENSA or similar certification to be issued upon completion of the works.

Provide safe access to undertake works prior to commencement.

3.4.3 Allow for removing all redundant pipework, bracketry, fixings, cabling etc., to the rear elevation and make good all fixing holes or other disturbed areas using suitable mortar repairs.

3.5 EXTERNAL WINDOWS

3.5.1 External Windows – All remaining sash windows are to receive a programme of repairs which is to include the careful removal of all secondary glazing which is to be set aside for reinstatement if deemed salvageable;

3.5.2 New Secondary Glazing – The contractor is to provide an option for renewing all secondary glazing within No 43 and No 44 High Street; glazing to comprise new balanced vertical sliders installed to suit each window opening.

3.5.3 Sash Window Repairs – All existing sash windows are to be eased into operation including stripping of excess paint to allow operation; repairs to or renewal of sash cords, renewing putty, localised timber splice repairs and general overhaul of all mechanisms to ensure all windows are left in good working order; new latches are to be fitted where necessary.

3.5.4 Where windows are present within En-Suites and WC's, the contractor is to provide frosted window film to glazing; film to be cut to size and applied to prepared glass to provide smooth finish without bubbles or other imperfections.

3.5.5 All glazing is to be cleaned both side on completion of the works.

INTERNAL WORKS

4.1 GENERALLY

4.1.1 The contractor is to include for all builders work in connection with mechanical and electrical works as specified within CJR (Midlands) Limited including but not limited to making good to disturbed linings and finishes, stripping out and disposing of existing cabling, controls, sockets etc., re-routing or re-positioning equipment.

4.1.2 The Contractor is to fully digest all mechanical and electrical requirements and ensure that all works are included prior to issue of the tender return.

4.1.3 The works detailed within the specification are to be read in accordance with Underwoods Surveyors drawings:

- Drawings BS1974 – 001, 002, 101a & 102a
- All documents as shown on the CJR Midlands Document Register dated 14.05.19
- BCAL Consulting Structural Engineers design (Ref: 6192-STR-C001A)

4.2 STRIPPING OUT

4.2.1 The contractor is to include for stripping out of all internal fixtures and fittings, doors and frames, soft and loose plasterwork, internal walls, lightweight partitions, finishes, kitchen installation, sanitaryware etc., and repair all surfaces and structure as required, in advance of the refurbishment works.

The contractor is to refer to Underwoods Surveyors existing and proposed drawings when identifying which internal walls are to be removed.

4.2.2 In accordance with CJR (Midland) Limited mechanical and electrical specifications, leave all service connections ready to receive new fittings or stripped back to source as required.

4.3 INTERNAL LININGS & PARTITIONING

4.3.1 Take down existing basic stud wall with sliding door between bedrooms 1 and 3; prepare the opening and supply and install new 100mm timber stud partitioned wall to fit opening suitably fixed; install new rigid insulation to provide improved thermal and sound deadening properties; enclose partition with layers of 12.5mm plasterboard with staggered joints and skim finish prepared ready to receive decoration.

4.3.2 In accordance with drawing BS1974-102a, take down all existing walls/partitions throughout the first and second floors to accommodate the changes in internal layout and dispose of all arisings off site,

4.3.3 Supply and construct new partitioned walls as identified; new 100mm timber stud partitioned wall to be suitably secured; install new rigid insulation to provide improved thermal and sound deadening properties; enclose partition with layers of 12.5mm plasterboard with staggered joints and skim finish prepared ready to receive decoration.

Supply and fit insulation fill, noggins, fixings etc., as necessary to ensure all partitions comply with Building Regulations providing a minimum of 30 minutes fire protection in accordance with AD Part B; and to complete the installation of all internal walls/partitioning.

4.3.4 Where openings have been formed through existing walls, prepare the opening including new 203UC supporting beam to Party Wall; form new plasterboard and skim linings enclosing structure and create new opening; prepare ready to receive decoration.

Please refer to BCAL Consulting Structural Engineers design (Ref: 6192-STR-C001A) for specific structural design calculations.

4.3.5 Existing plastered walls – Each existing room displays various areas of blown, loose, soft or damp affected plaster especially around window openings and areas where moisture has penetrated the structure; allow for carefully hacking off damaged plaster back to sound finish; prepare the substrate and apply suitable plaster finish to walls leaving ready for redecoration.

For tendering purposes, allow 50 sq.m of plaster repairs to localised areas throughout the property.

The contractor is to provide a reasonable rate for additional plaster repairs as instructed by the Contract Administrator.

Supply and install new flush faced timber door and ironmongery which is in keeping with the remainder of the internal doorsets throughout the property.

4.3.6 Where necessary, allow for taking off existing skirtings, architraves, covings or other fixed materials to ensure plastered finishes are continuous and that no lips or other irregularities are present to wall and ceiling finishes.

4.3.7 The existing partition wall to the basement of 44 High Street which forms electrical cupboard is to be carefully taken down and disposed of off site; supply and construct new timber stud partition to match previous wall but positioned a minimum of 1800mm from electrical incoming installation.

The contractor is to allow for reinstating all sockets, switches, fixtures & fittings etc., fixed to original wall, as directed by the CA.

4.4 STAIRCASES

4.4.1 Allow for opening up each staircase to inspect the structure and undertake repairs as directed by the Contract Administrator.

Allow the Provisional Sum of £500.00 per staircase of repairs.

4.4.2 On completion of any repair works re-board and underline each staircase using timber batten and 12.5mm plasterboard and skim linings; prepare ready for decoration.

4.4.3 Check and re-secure all handrailing to staircases including any adjustments required to arrangement of handrailing and leave all secure and in compliance with Building Regulations.

4.4.4 In accordance with BCAL Consulting design calculations, infill staircase as identified using design timbers sizes as stated taking into account the existing trimmer detail and installation of new timber joists. The contractor is to include for all fixings, timbers, hangers etc., to complete the works.

4.5 INTERNAL DOORS, IRONMONGERY & JOINERY

4.5.1 Internal Lobby Door – Overhaul the existing aluminium internal lobby door and leave in good working order; repairs to include easing of all latches, hinges and other moving parts so that door opens smoothly on completion.

4.5.2 Carefully take out existing glazing to slated over light and internal frame; infill opening as per section above over light using suitable boarding and prepare to receive decoration.

4.5.3 Internal Doors – Take out all existing internal doors and frames and dispose off site; suitably prepare each existing opening to receive new door set; new openings to be formed and prepared for new doorsets.

4.5.4 Supply and install new certified FD30 fire door sets to each opening to comply with Part B of Building Regulations in all respects; seal and secure as required and leave all door sets ready to receive decoration.

4.5.5 Supply and install fire rated ironmongery to complement each new door sets including 1.5 pair hinges, door closer, lever or pull action handles, push/kickplates and appropriate fire signage.

All door specifications are to be agreed with the approved inspector prior to installation and should meet standards required under AD Part B and AD Part Q – PAS 24: 2012.

For tender purposes, allow a PC Sum of £175 per door for fire rated door ironmongery to be agreed with Contract Administrator.

4.5.6 Supply and fit new non-fire rated flush faced softwood door sets to all other openings which are in keeping with remaining fire doors to keep a uniform look throughout; ironmongery to include lever action handles and thumb turn locks to be fitted to En-Suite and WC's.

4.5.7 The contractor is to allow for mechanical keypad or similar security locks to store and office doors to provide extra security; include for supplying and installing locks as agreed with CA.

4.5.8 All door sets to receive new softwood or MDF chamfered rounded architrave to both sides of door with mitred joints and prepared ready for decoration.

4.5.9 Supply and fit all new softwood or MDF chamfered rounded skirtings to rooms throughout each floor with mitred joints; all skirtings to be prepared ready to receive decoration.

4.6 SANITARYWARE

4.6.1 In accordance with Underwoods Surveyors proposed layout, supply and install new sanitaryware as indicated on plan.

4.6.2 Sanitaryware to generally comprise Ideal Standard Concept Air range or similar approved; the contractor is to include for all valves, pipework, fittings, pumps, washers etc., necessary to complete the installation of each bathroom.

4.6.3 The contractor should refer to CJR (Midlands) Limited mechanical and electrical specifications when works within En-Suites and WC's with CJR's specification taking precedent, where conflicts exist.

4.6.4 Allow to supply and fit splashback tiling in 2 No. rows of 200mmx100mm white gloss smooth brick tiles with white grout; splashback tiling to be fitted over wash hand basins and around bath; full height tiling to be provided to the shower facility; white mastic seals are to be applied at junctions between tiling and appliance.

4.6.5 Supply and fit new 400mmx700mm unframed mirrors centrally over wash hand basins to En-suites and WCs; mirrors to have hidden fixings.

4.7 KITCHEN INSTALLATIONS

4.7.1 In accordance with Underwoods Surveyors proposed drawings, supply and install new kitchen facilities to generally comprise wall and base units to fit the space allowed, 1.5 bowl stainless steel sink, mixer taps; include for all plinths, handles, worktops, hinges, caps etc. necessary to complete the works.

4.7.2 The kitchens are to be from the Howdens Greenwich Light Oak or similar approved range.

4.7.3 Allow to supply and fit splashback tiling in 2 No. rows of 200mmx100mm white gloss smooth brick tiles with white grout over worktop and set into window reveals; white mastic seals are to be applied at junctions between tiling and worktop.

4.7.4 Allow the Provisional Sum of £1000 per kitchen for supply and installation of kitchen appliances.

For tender purposes, the contractor is to allow for a built in oven and hob only.

4.7.5 The contractor is to include for positioning of white goods which comprise fridge freezer and dishwasher to each kitchen.

4.8 FLOOR STRUCTURE

4.8.1 Take out existing hatch opening between first and second floors including metal staircase; make good to all disturbed surfaces and prepare opening; reinstate floor structure including timber joists, joist hangers, trimming pieces as required; introduce new floor boards or similar to close opening and leave ready to receive new floor finish.

4.8.2 Allow for closing off other penetrations or openings through floor structure using new floor boards or chipboard, securely fixed to joist and ready to receive new floor finishes; check all other existing floor boards and secure all prior to laying floor finishes.

4.8.3 Supply and fix new plywood to floors within En-suite's, WC's and kitchen areas; fix boards with suitable floor screws every 300mm and prepare ready for vinyl floor application.

4.8.4 Once the extent of fire compartmentation within floor structures is agreed with the Approved Inspector, design, supply and install mineral wool or similar fire retardant material between joists to the floors structure between ground and first floors to provide 60 minute fire rated protection as required within AD Part B; on completion of the designed works, provide all appropriate certification or warranty information relating to the installation.

For tendering purposes, allow the Provisional Sum of £10,000.00 for floor fire compartmentation to be expended in part or full as directed by the Contract Administrator. The contractor is to ensure that the Approved Inspector has signed off the design prior to any installation.

4.9 FLOOR FINISHES

4.9.1 Supply and fit new Gradus barrier matting system Esplanade 1000, closed scraper construction matting or similar to the front entranceway between lobby doors; matting to be fully adhered and doors are to operate without binding.

4.9.2 Carpeting – Supply and install new carpeted finishes to bedrooms, and living room; include all grippers, underlay, carpet, threshold trims necessary to complete the works.

Allow a PC Sum of £25/sq.m for the supply of Cormar Carpet contract grade carpeting or similar approved and fitted in accordance with manufacturers recommendations. Colour: tbc.

4.9.3 Carpet Tiling - Allow to take up the existing floor finishes to main stairs and corridors; include all adhesive and threshold trims necessary to complete the works.

Allow a PC Sum of £25/sq.m for the supply of Duraflor contract grade carpet tiling or similar approved and fitted in accordance with manufacturers recommendations. Colour: tbc.

4.9.4 Replace stair nosing's with aluminium MS1-30 Duraflor nosing to suit profile of tread. Colour: tbc.

4.9.5 Vinyl Flooring - Supply and install new vinyl flooring to En-Suites, WC and kitchen areas; include all adhesive, vinyl, threshold trims and mastic joints necessary to complete the works.

Allow a PC Sum of £25/sq.m for the supply of Altro flooring or similar approved and fitted in accordance with manufacturers recommendations. Colour: tbc

4.9.6 Laminate Flooring – Supply and install new laminate to the office; include all underlay, laminate, threshold trims necessary to complete the works.

Allow a PC Sum of £20/sq.m for the supply and fit Balterio contract grade timber effect laminate or similar approved and fitted in accordance with manufacturers recommendations. Colour: tbc.

4.10 DECORATIONS

4.10.1 Prepare all external windows to the front and rear elevations including thoroughly rubbing down and filling leaving all windows units ready to receive redecoration; new windows or timber splices to be primed prior to coating; all windows to receive 1 No undercoat and 1 No gloss coat of good quality paint; colour: white.

4.10.2 Allow to prepare all new and previously decorated plastered finishes including all filling of redundant fixing holes, plaster repairs and removal of all vinyl paper where required, allow for fine filling, rubbing down and generally preparing as necessary and carry out full redecoration programme with at least 2 coats of good quality trade emulsion or similar approved in accordance with manufacturers recommendations. Colour - to be agreed.

4.10.3 All prepared timber doors and joinery are to receive 1 no undercoat and 1 No gloss coat to provide a complete solid finish; new joinery is to be primed prior to receiving top coats. Allow to prepare all previously existing and new window boards, skirtings, architraves, handrails and posts etc.; rub down and decorate with 2 coats of good quality gloss paint or similar approved in accordance with manufacturers recommendations. Colour - to be agreed

4.10.4 Decorations to En-suites, WC's and kitchen areas should be in suitable moisture resistant emulsion paint.

4.11 FIREPLACES

4.11.1 The contractor is to open up all existing fireplaces and inspect and assess the chimney breast behind for defect; the Contract Administrator is to confirm any repairs necessary prior to any closing up works commencing.

4.11.2 the contractor is to strip out all fireplace mantlepieces, fireboxes etc., and to board up the openings to each to provide a flush wall finish; new plastic ventilation grilles with mesh backing are to be fitted to each location to provide ventilation to each stack.

4.12 SMOKE CONTROL

4.12.1 The contractor is to design, supply and install a suitable smoke control system to corridors and other areas as required by the Approved Inspector and AD Part B; the contractor is to provide design drawings/calculations/specifications necessary to fully identify the works.

4.13 COMPLIANCE WITH STATUTE

4.13.1 On completion of the works, instruct a suitably qualified EPC Assessor to prepare and issue an Energy Performance Certificate for the property.

4.13.2 The contractor is to compile a complete Health & Safety file / Operation & Maintenance Pack and issue a draft copy of the file for approval by the Contract Administrator.

4.13.3 All works are to comply with Building Regulations in all respects with a completion certificate to be issued on completion of the works.

The contractor is to liaise with the Building Control Approved Inspector throughout the works ensuring that all requirements are met so that the project can be signed off.

COLLECTION

		£	p
	COLLECTION		
A	SECTION 1 - CONTRACT PRELIMINARIES		
B	SECTION 2 - PREAMBLES		
C	SECTION 3 SCHEDULE OF WORKS		
D	SECTION 4 – MECHANICAL & ELECTRICAL WORKS		
	SUB TOTAL		
	TOTAL OF SUMMARY CARRIED TO FORM OF TENDER £		

APPENDIX A
MECHANICAL AND ENGINERRING SPECIFICATION

43/44 High Street
Wellingborough

Particular Mechanical and Electrical Specification

May 2019

CJRMIDLANDS.CO.UK

CJR

Innovation through Experience

Document Control

Initial Author(s):	PB	**Date:**	May 2019
Reviewer:	MP	Date:	May 2019

Issue	Date	Status	Checked
S4.01	May 2019	Tender Issue	PB

CONTENTS

1 PROJECT OVERVIEW

The project comprises the major adaptation and alteration of a currently empty property on High Street Wellingborough, into accommodation comprising of 7 bed flats complete with en-suite facilities, for Wellingborough District Council. The property is located at 43/44 High Street, Wellingborough NN8 4HL.

This specification reflects a fully designed approach to RIBA Stage 4 Technical Design, which the Contractor shall take through to RIBA STAGE 5/6.

2 GENERAL REQUIREMENTS

2.1 Introduction

This specification is intended to indicate the minimum standard of workmanship required for the internal and external electrical services installation associated including; incoming electricity supply, electrical distribution, fixed and small power, lighting and emergency lighting, fire alarms, security systems, structured wiring, and external services.

The information provided is to assist with the Contractor in providing all elements for the electrical services, as such the sizes and any equipment selections will require verification by the Contractor. This is a Contractor design delivery.

The contents of this specification shall be read in conjunction with all Standard Specifications, the Conditions of Contract and all architectural information.

The details within this specification shall take precedence over the standard documentation clauses where these are found contradictory to each other.

The work described in this specification shall be carried out in accordance with good working practice and shall comprise the furnishing of full working drawings, all labour, equipment and materials necessary to provide a complete installation in accordance with the overall construction programme.

It shall be noted that the drawings accompanying this specification are for tender purposes only to RIBA stage 4. The Contractor shall make allowances to prepare, and where required, cause his specialist suppliers to prepare, construction issue and mechanical and electrical installation working drawings for the works.

All the installation drawings shall be submitted to the Project Manager for checking and comment prior to any installation works commencing.

All work associated with the electrical installation shall be co-ordinated and integrated with the building structure, general finishes and with all other installation Contractors, with regard to the mechanical services and building structure etc.

The Contractor shall make allowances to carry out all works involving disruption or possible danger to staff/public at suitable times when disruption and risks can be minimised, i.e. outside of normal working hours at pre-programmed times approved by the Project Manager and the site.

The successful Contractor shall attend a pre-contract site meeting at which they will be required to submit a full method statement for the works (including Health and Safety considerations of the site).

The Contractor shall also provide a detailed programme of the works proposed, with due account of other Contractor's programmes and activities, preliminary builders work requirements and any relevant technical queries.

2.2 Definitions

The following key descriptions are used throughout this document. Alternative descriptions are used in some Forms of Contract, and these are indicated on the right-hand side of the page: -

Title	Definition
Client	Purchaser, Employer, End User
Supervising officer	The persons appointed by the employer to inspect or monitor the progress of the works. Architect, Engineer, Contract Administrator.
Engineer	CJR Midlands Ltd.
Contractor	Principle Contractor entering into the formal contract. *For the benefit of Building Services Contractors Tendering against these documents, please note that it is the "Contractor" who is responsible for inclusion in their Tender of all necessary building services costs based on these Tender documents. Please ensure that full Tendering co-ordination has taken place.*
Trade Contractor	The company employed to undertake the works described in this Specification and indicated on the drawings.
Trade contract	Trade contract between the Contractor and the trade Contractor.
Installer	The trade Contractor, or the company, firm or person appointed to execute that installation.
Tenderer	Any company, firm or person invited to submit a Tender for the trade contract works.
Works	The supply, delivery installation, testing, commissioning and setting to work of the building services and associated trades described in this Specification and indicated on the drawings.
Clerk of works	The person or persons appointed by the employer to act as their inspector.
Site	The land and/or buildings in which the works are to be executed.
Provide/ install	Obtain, deliver, fix into position, make all connections, test and commission, - unless any part of this is specifically excluded.
Equal/ Equivalent	Be equal as specified in all respects and, except where stated by the Tendering Contractor at time of Tender, only where approved - **approval will NOT normally be given unless proof of performance and quality is given. Where alternatives are offered after acceptance of the Tender price, a saving at least equal to the difference in list price between the named components or supplier and the alternative will be expected.**

Specified	As specified in this document and/or elsewhere in any other contract document including where indicated on drawings.
Approved/ **for approval**	Submit for written approval from the supervising officer and, if not approved, submit such alternative as will obtain approval, which will not unreasonably be with-held.

2.3 Site

Prospective Tenderers shall visit the site during the Tender period to establish and verify all design parameters, cable routes, incoming main supplies and all other relevant information required for the formulation of an accurate price for undertaking the work. No variations or additional costs will be entertained due to failure to comply with this clause.
The site address is:

43/44 High Street
Wellingborough
NN8 4HL

Any areas where there is a lack of information or concern relating to the extent of existing services shall be highlighted to the Project Manager within the Tender period.
Access to the site is strictly by prior arrangement with Wellingborough District Council, Project Manager and the current tenant. Refer to the contract preliminaries for further details of access arrangements.

Particular attention should be paid to general site access. Special arrangements may be required to facilitate the works at the site. It shall be the responsibility of the Contractor to ensure that site access is provided for all his sub-Contractors throughout the course of the works.

2.4 Scope of Works

The Contractor shall familiarise themselves with the extent of the whole development to gain a full understanding of the scope of works.

The Contractor shall be wholly responsibly for the design and supply of all materials and labour, manufacture, delivery to site, off-loading, erection, installation, connection, setting to work, testing and commissioning, of all equipment, preparation of design, co-ordination, construction, installation and as-fitted record drawings, details and design, operation and maintenance manuals, input to the production of the health and safety information such as designers risk assessment and health and safety files.

The Contractor shall be responsible for all works indicated within this Specification, Standard Specification and the Contract Drawings which shall generally comprise: -

- Production of all working drawings, diagrams and charts
- Strip Out/Enabling Works
- LV Supply and Distribution
- Fixed and Small Power
- General Lighting and Associated Controls
- External Lighting and Associated Controls
- Fire Detection and Alarm System
- Earthing and Bonding
- Power Supplies for Mechanical Services, Inc., final connections
- Electric Heat Emitters
- Hot & Cold-Water Services inc Hot Water Cylinder
- Electric Showers
- Above Ground Drainage
- Production of Operation & Maintenance Manuals & As Installed Record drawings
- Demonstration of Installed Systems to the End Users
- All Other Works described within this specification or indicated within the Electrical Services Drawings
- Any Attendances Required by Specialist Contractors.
- Builders Work

2.5 Programme of Works

The programming of contract works shall be as indicated in the main contract documentation. It is essential that full coordination between all disciplines takes place to ensure the programme is followed correctly.
It is the responsibility of the Contractor to liaise with the Client and all other disciplines to allow the programme of the work to be implemented and followed correctly.

2.6 Removal of Debris

The Contractor shall be responsible for removing all scrap / debris from site caused by the works as it accumulates, and on completion shall leave all parts of the site clean, tidy and ready for use.

All waste shall be disposed of in accordance with the Waste Regulations 2015, with particular attention to the segregation of debris as detailed within the Regulations.

2.7 Design Information

This specification is based on the following design parameters:

A new 69kVA Three Phase supply shall be required (Western Power Distribution). A quotation is in the process of being obtained for this.

The new incoming supply is assumed to have a maximum earth fault loop impedance level, (Ze) of 0.35 ohms;

The method of protection against electric shock shall be by insulation of the live parts, together with earthed protective bonding and automatic disconnection of the supply; (ADS)

Miniature circuit breakers and RCBO's to BS EN 60898 and BS 61009 shall be used for circuit protection of final circuits.

Additional short circuit protection may be required for MCB distribution boards.

The values indicated for Prospective Short Circuit (PSCC) and External Earth Fault Loop Impedance (Ze) shall be verified by the Contractor through measurement prior to commencement of the works on site. The Contractor shall be responsible for notifying the Project Manager/ Electrical Engineer in writing of the actual measured values.

2.8 Design Criteria

The design life of the new Engineering Services systems, assuming a normal standard of plant maintenance, will be as defined in BS 7543 and as follows:

- All Engineering Services (major components) will be suitable for a service life of not less than 25 years before the replacement of any parts.
- Electrical switchboards & gear, electrical control panels, fire alarm systems, cabling and cabling containment systems will be suitable for a service life of not less than 25 years before replacement of any parts.
- Luminaires and their components will be suitable for a service life of not less than 15 years before replacement of any parts.
- Colour temperature selection of LED luminaires shall be 3000K
- LED luminaires shall be selected to meet the 4-MacAdam ellipse range and ensure typically good LED modules are produced and limit the visual difference between LED modules.
- External components exposed to outside elements will be designed to require no maintenance against corrosion for at least the first 5 years.

2.9 Regulations

The installation shall comply in all respects with all relevant statutory requirements and regulations current at the date of issue, with regard to, but not be limited to, the following: -

- All related British Standard Specifications and British Standard Codes of Practice
- Health and Safety at Work Regulations
- Electricity at Work Regulations 1989
- Standard Specification for Electrical Services
- BS7671 18th Edition IET Wiring Regulations
- BS 5839-1 2017 Fire detection and Alarm Systems
- Building Regulations
- Regulations and requirements of the Local Fire Officer
- Any special regulations and/or requirements of the local Supply Authority
- Recommendations of the Health and Safety at Work Executive
- Particular Conditions of Contract
- Construction, Design and Management (CDM) Regulations 2015
- Equality Act 2010

The Contractor shall be responsible for ensuring the installation meets the latest requirements of all relevant British Standard (including amendments) and reporting any deviations immediately in writing to the Project Manager/Electrical Engineer.

2.10 Health and Safety at Work Act

In carrying out the works the Contractor shall ensure that all requirements of the Health and Safety at Work Act and the Councils Guidelines for Health and Safety on construction sites are fully complied with.

2.11 Schedule of Rates and Variations

The Contractor shall supply a detailed quantified schedule of rates based on the Tender summary to provide a rate for each item. The schedule of rates will be used to assess the predicted costs for compensation events which occur during the contract.
Where there is no directly applicable rate, a rate having the same Tender additions is to be produced with evidence to prove the method of calculation. The priced schedule of quantities will have no other use and no adjustment will be made to the Tender price in respect of any alleged inaccuracies or exclusion in the priced schedules.

2.12 Named Products/ Suppliers

The reference to a named product or to a named supplier shall be construed as setting the standard for an article, system or material required.
Where an alternative article, system or material of equivalent standard is available, the Contractor shall submit details in the Schedule of Alternatives within the appendices of this specification and shall indicate the cost variance on the Tendered sum by comparison with the named product or supplier.
Under no circumstance shall an alternative product to that specified be used without the written approval of the Project Manager/ Electrical Engineer.

2.13 Interruption of Services

The Contractor shall not, without the permission of the relevant Statutory Authorities or Project Manager, interrupt or interfere with the operation of any existing utilities services such as sewers, drains, gas, water, telecommunications or electricity cabling / supplies.
The Contractor shall be responsible for any damage caused by the Electrical Contract works to any existing services and shall make good such damage to the satisfaction of the Statutory Authorities and the Project Manager.

2.14 Protection of Unfinished Work

The Contractor shall be responsible for leaving unfinished work forming part of the Contract Installation in a safe condition and shall include for any temporary works necessary to give reasonable protection from unauthorised interference.

2.15 Site House Keeping and Provision of Storage Facilities

The site is at all times, to be kept free from obstruction and all surplus materials, temporary works, packing cases, drums, etc., are to be removed from the site as soon as they are no longer required. On completion, the site is to be left in a thoroughly clean and tidy condition. For the purpose of this clause, the word 'site' is to mean each and every area of the premises, yards, passageways and any other means of access to or egress from the work area.

2.16 Asbestos Register

The Contractor must check if an asbestos report has been issued under a separate cover. If so the Contractor shall ensure that this is obtained and reviewed prior to submitting the final Tender.

2.17 Removal of Debris

The Contractor shall be responsible for removing all debris caused by the works as it accumulates, and on completion shall leave all parts of the site clean, tidy and ready for use.

All waste shall be disposed of in accordance with the Waste Regulations 2015, with particular attention to the segregation of debris as detailed within the Regulations.

2.18 Co-ordination of Services

The Contractor shall be responsible for liaison with all associated sub-Contractors to ensure sufficient co-ordination throughout, particularly regarding the provision of electrical supplies, the data system and services to items of mechanical plant, including final connection of equipment.

2.19 Site Meeting and Reports

The Contractor shall be represented at all site meetings and prepare written report for presentation at said meeting, outlining the progress of the work and the work completed to date and issue copies as directed.

2.20 Cases, Containers etc.

Unpack all cases, containers, and such like in which materials are delivered to the site and return empty cases, containers, etc. No cases, containers or packaging shall remain on site.

2.21 Completion Procedure

On completion of the works notify in writing to this effect and provide a list of any outstanding matters together with draft record documents. An inspection will then be made, and instructions issued for remedial action to such defects as are apparent. Take remedial action as necessary, commission all of the installations not already in operation, fully adjust, regulate and test these and submit detailed test results.

When the Engineer is satisfied that the design performance has been obtained, he will advise the employer who may carry out a further examination, at which time all installations must be in fully regulated and adjusted operation. Any further defects becoming apparent will be made known for remedial action. The employer will not accept handover or provide any operating staff until the works are in full tested operation, which must therefore be before the completion date of the building as a whole.

2.22 Defects Liability Period

During the defects liability period, stated in the Trade Contract documents, replace any part which is proven defective through bad workmanship or faulty materials. The defects liability period will commence from the date of certification of practical completion of the contract irrespective of whether the whole or any portion of the works have been completed prior to the completion of the contract.

3 STRIP OUT

The Contractor shall allow to isolate, disconnect and remove the entire existing electrical installation back to source to facilitate a complete new installation as indicated on the drawings. This shall include the removal and disposal of all wiring and accessories.

4 INCOMING ELECTRICAL SUPPLY AND DISTRIBUTION

4.1 Incoming Supplies

A new proposed 69kVA three phase incoming supply, electricity meter and cut out shall be procured from Western Power Distribution. This shall serve the proposed new distribution boards, via new meter tails.

4.2 Meter Tails

The Contractor shall allow to supply and install new 35mm^2 meter tails from the new triple pole isolating switch within the meter enclosure, to the new distribution system. The Contractor shall allow for all necessary 'splitter' devices to allow for the connection of the 2No. proposed distribution boards. The Contractor shall install either double insulated single core cables or steel wire armoured multicore cable for the meter tails.

The Contractor shall allow for all steel wire armouring to be fully bonded back to the earth provision of the installation using purpose made terminations, earth tag with brass nuts and bolts along with supplementary bonding leads between the earth tag and the consumer unit's earth bar. CW glands shall be used for all external connections.

The Contractor shall include all costs associated with providing a complete installation including all outlets, cabling, terminations and containment.

The Contractor shall carry out all testing and commissioning on completion of the system in accordance with all the relevant Regulations, Standards and this specification.

All cables shall be designed to operate at 70°C.

4.3 Metering

New dual tariff (Economy 7) meter shall be supplied.

4.4 Distribution Boards

2 No. new single phase, distribution boards shall be installed in the location shown on the drawings. The distribution boards shall supply the fixed/small power and lighting.

The distribution boards shall be complete with earth and neutral bars with dedicated terminals for each circuit with a test link.

The circuits shall be so designed so that a circuit fault on one floor does not affect the remaining floors. Generally, the protective devices shall be type B.

The distribution boards shall be sized to provide a minimum of 25% spare ways, at completion, for future use.

Connections to the distribution boards shall be via the manufacturers approved entries and sealed to maintain the rating. Under no circumstances shall any other method be acceptable.

Cable entries to the distribution boards shall have all burrs and sharp edges removed so as not to damage the sheathing of the cables.

5 GENERAL WIRING

5.1 General

The Contractor shall include within their Tender to supply, install and commission a complete new electrical installation from the incoming supply point in accordance with the details in this specification and as indicated on the drawings.

In general, the small power provision shall be wired in two core and earth LSF/LSF (twin and earth) type cabling (ref:-6242B OHLS) supplied from the proposed new consumer unit. All final circuit cabling associated with the small power installation shall be carried out in full accordance with the Electrical Standard Specification.

In general, the lighting provision shall be wired in a combination of two core and earth LSF/LSF (twin and earth) type cabling (ref:-6242B) and/ or Three core and earth (ref:-6243B) supplied from the proposed new consumer unit. All final circuit cabling associated with the lighting installation shall be carried out in full accordance with the Electrical Standard Specification.

Minimum cable sizes shall be 1.5mm^2 for lighting, and

Minimum cable sizes shall be 2.5mm^2 for small power.

All final connections to equipment, e.g. boilers and pumps, etc., shall be completed using heat resistant flexible cables and where appropriate these shall be terminated directly to each item of equipment by the Electrical Contractor.

All cable drops shall be concealed within the fabric of the building and mechanically protected through the use of galvanised steel ‘capping’.

All wiring associated with the fire detection system shall be carried out in red fire resistant cabling, such as FP200.

Following the installation of all cables, any penetrations through walls, floors, ceilings or any part of the building fabric shall be made good by the Contractor to suit each application. Where penetrations are through fire compartmentation, the penetrations shall be sealed with a suitable fire-resistant material in order to maintain the fire performance of the compartmentation.

5.2 Wiring Accessories

Generally, all wiring accessories shall be manufactured by **MK** and be from the Logic Plus range, with dual earth terminals. A mixture of accessories shall not be allowed. No other manufacturer of accessories will be considered.

All light switches shall be 10A and be from the Logic Plus wide rocker.

All fused connection units/ 20A double pole switches shall be engraved to indicate their use. Note that ‘stick on film labels’ are not acceptable.

Fused connection units shall have correctly rated fuses fitted and be engraved to indicate their use.

Wall mounted wiring accessories, equipment and boxes shall be mounted at the following dimensions above finished floor level to the top of the accessory plate unless stated otherwise on the contract drawings: -

- Light switches - 1200mm (to top)
- Socket outlets (general) - 1200mm (to top)
- Socket outlets/FCU's/DP switches (kitchen) - 150mm (above worktop)
  450mm elsewhere in the kitchen
- TV outlet - 1200mm (to top)
- Telephone outlet - 1200mm (to top)
- Extract fan isolator - 1900mm (to top)

All socket outlet and light switch colours are to take account of Part M of the Building Regulations and have colour contrast e.g. charcoal grey if a white background.

6 FIXED POWER INSTALLATION

The Contractor is to include for all necessary tools, labour, materials and equipment to, design, supply, install, test, commission and put into operation a small power system, which shall include but not limited to the following: -

- Fixed power supplies for equipment.
- Socket outlets and fused connection units for general power.
- Power supplies for mechanical services.
- All cabling necessary for the small power installation.
- Liaison with other trades on site.
- Preparation of builders works details and working drawings necessary for the power installation.
- Preparation of the operation and maintenance documentation c/w 'As fitted' drawings.

6.1 General

Refer to the Tender Drawings.

The fixed power installation shall conform to the requirements of this specification, CJR drawings and the latest edition of BS7671:2018.

The Contractor shall allow to wire all new circuits back to the proposed new consumer units.

Circuits are to be configured in a combination of ring and radial circuits and designed to minimise disruption on failure of a circuit.

Equipment shall be selected from the **MK** Logic Plus range of accessories.

The power supply distribution system shall be complete in all respects such as all of the systems and installations requiring electrical power are served with electrical supplies of sufficient capacity to suit the electrical demand required.

The Contractor shall be wholly responsible for making an assessment of the quantity and rating of connections throughout the facility by liaising with the employer. However, preliminary indications of quantities have been indicated on the tender drawings.

Power supplies directly serving systems and equipment shall be terminated in a suitably fused, fused connection unit/double pole switch disconnector mounted directly adjacent to the equipment being served.

No more than 8No. twin sockets outlets shall be connected to a single ring main or radial circuit. Circuits shall not cross between floors.

All accessories within 'damp' or 'wet' locations or external to the building shall be IP65 rated.

7 HEATING INSTALLATION

7.1 General

The heating provision for the development shall be an all-electric solution comprising of electric panel heaters and towel rails in bathroom areas.

The Electrical Contractor shall be responsible for the supply and installation of the heaters as per the drawings and positioned in the locations as shown on the electrical services drawing.

Panel Heaters are to be provided complete with 24 hour digital timer and Thermostats.

8 HOT AND COLD-WATER SERVICES INSTALLATIONS

8.1 New Mains Cold Water Service

A new Mains Cold Water Service shall be supplied to the building to replace the existing Lead water main. All existing lead pipe work shall be made redundant and removed.

The new main cold water service shall be complete with a new pulsed meter, double check valve, stop cock and drain cock.

The service shall extend through the basement to a suitable riser position to serve the residential spaces above via the roof space.

8.2 Domestic Hot Water Generation

Hot water shall be provided from the 2 No. 200L direct electric hot water cylinders and distributed to all draw offs as indicated on the ground and first floor level as indicated. Heaters shall be Telford or Heatrae Sadia Slimline type with integral expansion.

The contractor must note that there is a requirement for a structural platform within the roof space for the new water heaters. Weight when full approx 600Kg. Base to be spanned across structural brickwork to staircase. Details to be provided by structural engineer.

The proposed 200L unvented cylinders to be provided by the mechanical contractor, complete with all necessary ancillary packs for unvented systems. The cylinder shall be provided with 4 No. 3kW Immersion Heaters, and 2 No. timeclocks for controlling a pair of immersion heaters each. The timeclocks shall be 24 hour digital units.

The Contractor shall provide new interconnecting pipework and insulation, testing, commissioning, and water treatment.

The cylinder will be provided manufacturers unvented kits with a secondary return and secondary return bronze circulator.

8.3 Flow Regulators and Solenoid Isolation valves

All draw offs shall be fitted complete with flow regulators/strainers/Ballofix as per RWC, as follows.

WC's: 4 L/min

Basins: 6 L/min

Sinks 8 L/min

Showers: 6 L/Min.

The installation must comply fully to Part G of the Building Regulation guide.

8.4 Showers

Showers shall be Mira Relate EV Thermostatic Shower Mixer.

8.5 New Circuits and Thermostatic Mixing Valves

Thermostatic mixing valves shall be provided where indicated and shall be commissioned and recorded within the operating and maintenance manuals. As a minimum this shall include all baths and wash hand basins.

Mixing valves are to be TMV 3 scheme approved.

The mixing valves shall comply with the following:

All wash hand basins, showers and baths must be protected with TMV 3 mixing valves. The contactor shall include for supply and fixing these valves initially, but shall check against the Brassware schedule to determine if the fitments have TMV protection

The thermostatic mixing valves shall be as manufactured by Reliance Water Controls, Contact: 01623 655000.

8.6 Pipework Distribution Systems

All domestic services pipework shall be installed in copper pipework system complete with copper press-fit fittings. Pipe work will generally distribute via floor voids and rise to each area to serve appliances as indicated on the services drawings. All pipe work risers are to be insulated and boxed in. Main service runs are to be supported on propriety support systems such as Unistrut or equivalent utilising Rubber lined Munsen rings / Standard Munsen rings where possible. Service drops into boxing may utilise plastic clips with wrap over covers BUT the contractor must ensure that thermal insulation can be fitted to the pipework risers.

Whilst every effort has been made to facilitate natural expansion in the mains identified, the contractor is responsible for identifying Anchor and expansion points if required.

8.7 Valves and Ancillaries

Underground - MCWS Stopcocks –-Yorkshire 771/772DZR/GM (MDPE/MDPE) or Pegler PL59. 65mm and above Crane FM52 c/w stem adapter. Located into underground pits with CI Grade A covers and frames set upon brickwork chambers.

Hydrant valves shall be Saint Gobain or equal, type 80mm FH1 wedge type fire hydrant valves with duck-foot outlet elbow, located into underground pits with CI Grade A covers and frames set upon brickwork chambers.

Above Ground - Yorkshire YP 551 GM or Pegler GM59 the main stopcock into the building. Provide a Traffolyte label 150mm sq. to describe the function of the valve.

Stopcocks in the pipeline – Yorkshire YP501GM or 787GM.

DHWS & MCWS isolation ball valves – Crane D171AC or D171A ball valves. Lockshield valves fitted on DHWS returns – Crane D255C compression ended gate valve.

Check valves – Crane D120W / D120CW up to DN50 and 16bar, Double Check valves – Crane D220W / D220CW up to DN50 and 16bar. Over DN50 to be Crane D230W

Double Check valves over DN50 – Arrow Valves EC453 up to 16bar. Over DN150 up to 10bar only.

Drain Cocks - 15mm, BOSS 371LS.

All other internal valves shall be BOSS servicing valves ball or mini ball valve range. A service valve is to be fitted to the hot and/or cold inlet to each W.C, basin, and sink unit as appropriate.

All valves used must be at least of DZR material and must carry the recognised stamp. Valves with components in contact with the water that are not either stainless steel, bronze or DZR will be rejected.

Manufacturers are equal or approved.

8.8 Sterilisation of Systems

Upon completion of the installation, all domestic services pipework shall be chlorinated in accordance with the requirements of the latest edition of the Water Supply Regulations. Upon completion of chlorination a minimum of 3 samples shall be taken 24 hours later - TVC, Pseudomona and Legionella. Further samples may need on specific projects, such as hospitals and schools which should be agreed with the Project Manager and the CJR engineer.

The whole of the cold-water service shall comply fully with the requirements of the latest Water Supply Water Fittings) Regulations 1999, Water Regulation Advisory Scheme (WRAS), BSEN806 and BS8558 for potable water installations.

The contractor must ensure compliance with the relative documents:

BS EN 806 called BS 8558 must be referred to

BS EN 806-1:2000 – General

BS EN 806-2:2005 – Design

BS EN 806-3:2006 – Pipe Sizing

BS EN 806-4:2010 – Installation

BS EN 806-5:2012 – O&M

BS 8558:2011 – Guide to BS EN 806

8.9 Thermal Insulation

Thermal Insulation must be carried out in accordance within the standard specification which effectively covers all pipework systems in Roof Spaces, Ceiling voids and Boxings, high level pipework and beneath sinks.

Thermal insulation shall be Class O Armaflex, taped and jointed in accordance with manufacturers recommendations.

9 GENERAL VENTILATION SYSTEMS

9.1 Extract Ventilation Systems

Internally mounted extract fans shall be installed as detailed on the services layouts. Extract fans are proposed to handle extract air from the respective rooms.

Fans shall be inline centrifugal units with run on timers, as per Vent Axia ACM range.

Extract fans shall be supplied complete with:

- High efficiency direct drive EC fans
- Integrated motor protection
- Low sound levels – to BB101 standards
- Flexible connections and clamps

Extract ductwork will be rigid duct to be located within ceiling voids and shall be supplied and installed with necessary clamps/brackets and adaptors to convert to external wall grilles as indicated.

Toilet/Bathroom fans shall be supplied with integral run on timers with trickle ventilation and humidistat control/override.

The kitchen is being provided with a cooker hood by the fitout contractors, however the mechanical contractor shall include for the provision of extract duct and air termination grille external to the building.

Where required condensate drain traps shall be provided to the extract ductwork from the fans systems within bathroom areas.

9.2 Ductwork

The contractor shall include for rigid ductwork systems to each fan system, incorporating and necessary ancillaries and fixings, installed to manufacturers recommendations.

Ductwork shall be insulated to prevent condensation forming.

10 ABOVE GROUND DRAINAGE SYSTEMS

10.1 General

The soil and ventilation systems shall be designed and installed in accordance with Document H for the current building regulations for England and Wales. Systems shall be designed to conform to the Code of Practice BS EN 12056:2:2000, 'Sanitary pipework, layout and calculation.

All above ground systems shall be solvent weld type and must be provide with suitable access and ventilation points as required.

Fire Collars must be provided where passing through Fire Compartmentation.

All traps shall be anti-syphon type.

There is a condensate drainage system required from the fans, which will require a local condensate drainage solution.

11 TELECOMMUNICATIONS INSTALLATION

11.1 General

The Contractor shall include within their tender to design, supply, install and commission secondary telephone outlets in positions as shown on the drawing. The secondary outlets shall be wired in 'daisy chain' format back to the incoming Master Socket.

The incoming telecommunications service shall be procured by the Client.

All connections/terminations to be made by the Electrical Contractor.

12 TV AND SATELLITE INSTALLATION

The Electrical Services Contractor shall design, supply, install and test a digital TV aerial and satellite ready system to all the points indicated on the drawings.

12.1 Design

The Electrical Contractor must employ a specialist in satellite and TV installations at an early stage to work through the final designs and agree with the Client the final positions of all aerials and satellite dishes. The location of these items may have a direct effect on the planning conditions and as such will need signing off with the team at an early stage.

12.2 Aerial / Satellite Dish

The Electrical Contractor shall with their appointed specialist shall install and set to work a high gain multi-element UHF multi-beam array suitable for reception of digital terrestrial channels from the local transmitter.

The aerial (or satellite dish) shall be mounted in an agreed position after consultation with the Engineer and Client. The Electrical Services Contractor shall allow for a suitable amplifier as is considered necessary to ensure that the reception signal is satisfactory at all points.

12.3 Amplifier

Provide and install suitable mains powered, high gain integrated circuit channel or ultra-wide band distribution amplifier and splitter system covering the frequencies 40-800 MHz, the system must also have the compatibility of a communal satellite connection.

The amplifier shall be capable of serving the number of points indicated on the drawings with the capability to be expanded.

The Electrical Services Contractor shall supply and install all required power supplies for the TV distribution system. Exact positions for power supplies and amplifiers etc. shall be agreed on site with the Engineer.

Wiring from the amplifiers and splitter units shall be carried out using Black co-axial cabling of an appropriate size and type and a Webro WF100twin satellite coax (75 ohm). The size and type of cabling shall be chosen to ensure that signal strength at any outlet point is sufficient for a clear sharp picture without loss.

12.4 Outlets

At each position indicated on the drawings, the Electrical Services Contractor shall supply and install a co-axial and satellite outlet plate on a quad plate. The plate shall be engraved ‘TV’. TV plates shall be of the same manufacturer as per the general power accessories.

12.5 Testing

On completion of the TV aerial distribution system, the Electrical Services Contractor shall provide all required testing instruments to prove that the signal at each outlet is acceptable.

The tests shall verify the following :–

- the output at each point exceeds 1.5mV on all channels

- spurious signal rejection of at least 40dB is provided.

The installer shall make allowance to connect a television set to all TV outlets as chosen by the Engineer and verify the picture quality. It is anticipated that all outlets will require verification.

The Electrical Services Contractor shall give the Engineer 5 working days' notice of their intention to test and verify the system.

A completion certificate indicating the range of signal strengths measures on all channels at each outlet point shall be submitted to the Engineer at practical completion and forming part pf the handover documentation.

13 LIGHTING INSTALLATION

The Contractor is to include for all necessary tools, labour, materials and equipment to supply, install, commission and put into operation the new lighting scheme as indicated within the Tender drawings, which shall include but not be limited to the following: -

- New lighting to rooms detailed on the tender drawings.
- Lighting controls.
- All cabling necessary for the general lighting installation.
- Liaison with other trades on site.
- Preparation of builders works details and working drawings necessary for the lighting/emergency lighting installation.
- Preparation of the operation and maintenance documentation c/w 'As Fitted' drawings.

13.1 General

The Contractor shall supply, install, wire and connect new low energy LED luminaires as indicated on the Tender drawings and/ or detailed within this specification. The provisions shall include all associated switching, cabling and luminaires unless otherwise stated. Details of the different luminaire types are indicated on the Tender drawings accompanying this specification.

The Contractor shall supply and install all luminaires complete with fixings, suspensions, glassware, louvers, diffusers, reflectors, control gear and lamps together with all ancillary components, accessories and attachments as indicated/ implied on the Tender drawings.

The lighting installation shall be wired in flat multicore LSF cables concealed within the building fabric and mechanically protected by galvanised steel 'capping'.

13.2 Fixing of Luminaires

In general, the majority of the luminaires installed within this scheme shall be surface fixed.

The Contractor shall be responsible for installing additional supports capable of withstanding the applied luminaire weights, where required.

13.3 Connections to Luminaires

Final connections to luminaires will be direct or via ceiling roses using the loop in wiring method.

13.4 Control of Luminaires

Control of luminaires shall generally be by wall mounted manually operated switches.

All switches shall comply with DDA standards for visually impaired persons; this will require all switch plates to contrast with the surrounding wall finish. All switches will need to be mounted to 1200mm above finished floor level or as agreed with the project manager. Switches shall be of the wide rocker type.

Final coordination will need to be carried out with the Project Team to ensure these requirements are fulfilled.

13.5 LED Technology

The Contractor shall supply and install LED technology luminaires with a colour temperature of 3000K.

- 50,000 hours rated at L70 F10 where Lx represents lumen and Fx represents the failure fraction.
- A colour temperature tolerance shall be a maximum of a 4 step MacAdam ellipse, as defined in 'Guidelines for Specification for LED lighting Products – 2011'

13.6 Lighting Manufacturers

Dextra Lighting

14 FIRE DETECTION AND ALARM SYSTEM

14.1 General

The Contractor shall allow to supply, install, test and commission a fire alarm and detection system as shown on the drawings.

14.2 Installation

All works carried out on the fire detection and alarm system shall be in full compliance with BS5839 Part 1 2017 (including all current amendments).

The Contractor together with his appointed specialist shall be responsible for the supply, delivery, erection, wiring, fitting, setting to work, testing and commissioning of the new fire alarm equipment. The installation of the associated fire detection and alarm equipment shall conform to, but not limited to BS 5839 (all parts) and the manufacturers recommendations.

The overall system within the scope of works shall comply with: -

- BS. 5839 -1/3/6/8/9 - Fire detection and alarm systems
- BS 7671 – Requirements for electrical installations - IET Wirings Regulations
- BS EN 54 2/3/4/5/7/10/11/12 - Fire detection and fire alarm systems
- Due consideration is given to the Fire Safety Order 2005

14.3 Location of Equipment

All positions indicated on the tender drawings are indicative only. The exact final locations of equipment shall be confirmed through design development and on site to suit the existing conditions.

Positions of all equipment shall comply with the latest recommendations of BS5839 Part 1.

14.4 Commissioning

Upon completion, the system shall be fully tested and commissioned in accordance with BS 5839 and left fully working and ready for use by the Client.

14.5 Heights of devices

Although the positions of equipment as indicated on the drawings is indicative and subject to alteration, the heights of equipment shall be strictly adhered to. Any variation from the below heights shall require written permission from the Engineer.

Devices shall be mounted at the following heights, measured from finished floor level –

- Detection Devices Ceiling Mounted

15 MECHANICAL SERVICES ELECTRICAL REQUIREMENTS

The Contractor shall allow for all power supplies for the mechanical services as detailed within this specification and as shown on the mechanical services tender drawings. Allow for full liaison with the Mechanical Services Contractor to fully ascertain and understand the electrical requirements for the mechanical services.

Ventilation extract fans as shown on the Mechanical Services drawing shall be supplied, installed and set to work by the Mechanical Services Contractor. The fans shall be wired from the local lighting circuit via a 3 pole fan isolator by the Electrical Services Contractor.

All mechanical services controls wiring shall be carried out by the Mechanical Services Contractor/Controls specialist.

The Contractor shall allow to make all final connections to items such as boilers, hot water cylinders, heaters, extract fans etc., etc.

16 EARTHING AND BONDING REQUIREMENTS

16.1 General

The Contractor shall further allow to verify and ensure that the whole installation is effectively bonded to earth as required by the IET 18th Edition Wiring Regulations (including all current amendments). Where applicable this shall include, but not be limited to:-

All main protective bonds, including suitable earthing conductors taken to structural steelwork are existing.

All supplementary bonds, including all pipe work associated with sinks, toilets, and all bonds across non-metallic pipe work Clauses (minimum 4mm² CSA).

All protective bonding to mechanical plumbing services, metallic components and equipment shall be done in a neat, workmanlike and discrete manner. Where possible, all bonding shall be located within plant rooms, service ducts and cupboards and routed to the point of connection in a flush or surface conduit/trunking system. The cables shall be clamped onto the respective metalwork in accessible positions.

All earth bonds shall be complete with lugs and earth clamps as necessary and labelled to read “SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE”.

The Contractor shall allow to provide a suitably sized earth bar at the origin of the installation complete with test link and labelling.

The Contractor shall provide all necessary earthing and bonding to satisfy the 18th Edition of the IET Wiring Regulations and local Electricity Supply Company requirements.

All metalwork of the installation and all accessories are to have a continuous earthing arrangement as required for installation conformance to the IET Wiring Regulations.

Every lighting point and lighting switch box must contain an earthing terminal which is to be connected to the earth continuity conductor.

All metallic pipework and plant shall be bonded to the earthing system in accordance with the IET Wiring Regulations. Flexible connections between fixed metallic pipework shall be electrically bonded across the connections.

The bonding arrangement shall be complete with all-necessary clips and labels in accordance with the IET Wiring Regulations.

17 LABELLING

17.1 General

Accessories for specific purposes are to have their front plates engraved to indicate their usage.

A list of circuits, type written in Word Processing format, giving the number, duty, type of circuit (ring/radial etc) size of cable, MCB, RCBO or fuse for each circuit, together with the consumer unit specification, Ze, prospective s/c, size of incoming feeds and the position of the nearest control shall be supplied on white laminated paper contained within the O&M manual.

Each way of the consumer unit shall be clearly identified with the circuit details it is serving.

An electronic copy of the circuit lists shall be forwarded to the Contract Administrator at completion.

18 BUILDERS WORK

18.1 General

The Main Contractor together with his appointed Structural Contractor, Contractor and System Specialists shall provide all necessary builders work associated with the project and shall be responsible for the overall co-ordination of the works as a whole.

The Contractor shall allow to provide all builders work information associated with the Building Services Works necessary for a functionally complete installation, including openings in structure, holes, penetrations, bases, plinths, support steelwork, pits, trenches, floor ducts bunds etc.

The Contractor shall allow to:

- Weather seal services penetrations in particular ducts to outside that could be prone to water ingress and flooding.
- Seal services penetrations to prevent unwanted air leakage.
- Seal services penetrations to prevent noise transfer.
- Provide items, accessories or apparatus which are necessary for the fabrication handling during installation, or to achieve and maintain the performance requirements and safe operation.
- Provide platform within roof space for new water heater. Weight when full approx 600Kg. Base to be spanned across structural brickwork to staircase. Details to be provided by structural engineer.

The Main Contractor shall be responsible for any cutting away of major holes and chases in brickwork, concrete or other building materials, and the subsequent 'making good'. In these circumstances, the Contractor must always include for fixing cable trunking, cables and conduits, etc., the boring and fitting of all plugs, bolts and other fixings, the final trimming and adjustment of depth for accessory boxes.

Minor holes for conduits and other items shall be drilled or cut by the Contractor. All holes through walls, etc., must be cut as carefully as possible and made up solid after completion. The cost of all unnecessary cutting and making good occasioned by faulty marking out shall be borne by the Contractor.

The Contractor shall make a note of the individual fire compartmentation of the building and where electrical services pass within these areas shall be fire stopped in accordance with the Building Regulation and Fire Officer's recommendations. Fire stopping shall have a minimum rating to that of the fire compartment being breached and shall be made good through the use of a combination of fire batts, intumescent blocks, fire rated expandable foam and fire rated sealant and appropriate plaster finish to make good.

19 TESTING, INSPECTION AND COMMISSIONING

19.1 General

The whole of the electrical works undertaken as part of this project shall be tested by the Contractor in accordance with Part 6 of BS7671:2018, BS 5839 and CJR Standard Specification (available upon request).

A minimum of two weeks before contract handover, the Contractor shall make allowances to undertake an inspection of the installation and record any outstanding items or items requiring attention.

A written copy of this record shall be forwarded to the Project Manager/Electrical Engineer.

Any items recorded under the above procedures shall be attended to prior to handover of the contract.

The Project Manager or his representative may wish to be present during the testing process, and therefore the Contractor is to give written notification to the Project Manager/Electrical Engineer 10 days in advance of the testing process commencing.

Following completion, all test results shall be recorded and forwarded to the Engineer together with all commissioning literature and completion certificates. This documentation shall be presented in the as-fitted operation and maintenance manuals in the form of typed schedules.

As part of the testing process the Contractor shall test and record the voltage, earth loop impedance and prospective, short circuit level at each distribution board.

20 AS FITTED DRAWINGS AND O&M MANUAL

20.1 General

Two weeks prior to the end of the contract the Contractor shall hand to the Project Manager a complete set of ″As Installed″ drawings as detailed in the Standard Electrical Specification, enclosed. The record drawings must be completed within 14 days prior to practical completion and the following information shall be included:

- A layout of lighting arrangements which shall include the location of luminaires and switch locations and consumer unit circuit references;
- A layout of all small power circuits indicating outlets and equipment and consumer unit circuit references;
- A layout of consumer unit and equipment and circuit references;
- A schematic and building layout of all fire alarm equipment, indicating their type;
- A layout of all telecommunications and television aerial systems and equipment, indicating their operation and control as appropriate;
- All bonding and supplementary bonding conductors that have been installed.

The Contractor shall also compile, and hand to the Consulting Engineer, three copies of the operation and maintenance manuals, 14 days prior to practical completion. These manuals shall include all of the information detailed within the Standard Specification, with particular regard to the following:

The manufacturer and type of each lighting fitting used in the installation together with details of the lamps used;

The manufacturer and type of all accessories used in the installation;

The installation together with complete operating instructions and details of all equipment supplied and installed by the Contractor;

Copies of all completion and testing certificates;

Recommendations for periodic test or maintenance of the installation or any item of equipment used in the installation;

A list of vulnerable items of equipment together with the precautions that need to be taken to protect such items from damage (e.g. items of electrical equipment that may not tolerate a 500 Volt d.c., insulation test).

Copies of test figures necessary to provide compliance with the installation’s design.

The Contractor shall produce ‘as fitted’ drawings using the current version of the Auto-Cad computer aided design package.

The Contractor shall submit draft copies of the required documentation for comment prior to the required dates for final documentation and shall incorporate all comments required by the Project Manager/Electrical Engineer into the final document issue.

21 LOCATION OF ACCESSORIES AND EQUIPMENT

21.1 General

Where there are a number of items that are located in close proximity, a regular layout shall be formed, being mounted in a vertical formation with one edge of the accessory near to the block brickwork edge or architrave being in line.

Care is to be taken by the Contractor to check the positions of equipment and accessories in relation to fixed furniture/radiators, etc., to avoid clashes before installations commence. No additional costs will be considered where this has not been done.

The Contractor shall set out all services and ascertain all levels and locations to avoid conflicts and clashes of services prior to setting out.

Prior to any cutting out, the Contractor is to mark out all accessory positions for approval by the Project manager/ Contractor.

The Contractor is to familiarise himself with the building construction when on site and will be held financially responsible for any excessive damage caused by cutting away.

22 ASBESTOS

It is not known if any asbestos containing materials have been installed in the building forming this project. The Contractor shall request sight of the asbestos register/survey and familiarise himself with the content within.

Under no circumstances shall any ceiling tiles be removed or walls/ceilings drilled without first consulting with the survey, when available, and responsible engineer.

Although every effort will have been made to identify materials which contain

Asbestos, should during the project any additional material which is believed to contain Asbestos be found, then the following procedure shall be adhered too –

- Immediately stop work – do not disturb the material
- Clear the work area of operatives and staff and pupils leaving all tools behind
- Seal off the area to avoid any personnel re-entering it
- Notify the responsible engineer for further instruction

All fixing methods should be reviewed by the appointed Asbestos survey contractor and advice shall be taken before Pattresses or items of equipment are installed

Should the Electrical Services Contractor be in any doubt about Asbestos, then they should contact the Engineer for further advice.

DO NOT TAKE RISKS!

• APPENDIX A: SCHEDULE OF MANUFACTURERS

Cabling LSF	-	Prysmian
Consumer Unit	-	Hager/MEM/MK
Electrical Accessories	-	MK Logic Plus
Lighting	-	Dextra Lighting/Contractors Choice
Heaters	-	Dimplex
Hot Water Cylinder	-	Heatrae Sadia
Fans	-	Vent Axia / Nuaire

• APPENDIX B: SCHEDULE OF TENDER DRAWINGS

Schedule of Tender Drawings:

P3035-CJR-ZZ-ZZ-DR-E-2100	Ground Floor, First Floor & Second floor Proposed Lighting & Fire Alarm Layout
P3035-CJR-ZZ-ZZ-DR-E-2200	Ground Floor, First Floor & Second floor Proposed Small Power Layout
P3035-CJR-ZZ-RF-DR-E-2100	Roof Proposed Lighting, Fire Alarm & Small Power Layout
P3035-CJR-ZZ-ZZ-DR-M-4200	First Floor, Second Floor and Roof Proposed Hot & Cold Water Services Layout
P3035-CJR-ZZ-ZZ-DR-M-4300	First Floor, Second Floor and Roof Proposed Mechanical Ventilation Layout

• APPENDIX C: CIRCUITING INFORMATION AND RULES

Where indicated, circuits shall be installed as per the drawings and/or the accompanying specification. Where circuits are not indicated then the Electrical Contractor shall price for / install circuits as per the rules listed below:

Circuitry Rules

Lighting
Minimum 1.5mm² LSF Twin and Earth Cable wired as radial
1 No. large room per circuit (12 fittings max) or
2 No. small rooms per circuit or
A cluster of small rooms i.e. WC's
10 Amp RCBO per circuit

General Socket Outlets
Minimum 2.5mm² LSF Twin and Earth Cable wired as ring
1 No. large room per circuit
1 No. per cluster of small rooms
32 Amp RCBO per circuit
No more than 8No. socket outlets on one circuit

Hand Dryers
Minimum 4mm² LSF Twin and Earth wired as radials (where fitted)
2 No. units per circuit (max)
20 Amp RCBO per circuit

Water Heaters/ Fan Convectors
Minimum 2.5mm² LSF Twin and Earth wired as radials
1 No. unit per circuit if unit rated above 2kW
16 Amp RCBO

Supplies for Mechanical Services (where relevant)
Minimum 2.5mm² Twin and Earth wired as ring
1 large room per circuit or
2 No. small rooms per circuit or
A cluster of small rooms i.e. toilets

Supplies for Alarms / Specialist Services
Minimum 2.5mm² Radial circuit for Fire Alarm (MICC cable)
Minimum 2.5mm² Radial circuit for Intruder Alarm (LSF T+E)
Minimum 2.5mm² Ring for others (LSF T+E)

If any doubt exists then please consult the Engineer for advice

• APPENDIX D: SUMMARY OF TENDER

Summary of Tender

THE FOLLOWING SHEET TO BE RETURNED WITH THE TENDER DOCUMENTS.

PROJECT: **43/44 High Street, Wellingborough**

TENDER: **Mechanical and Electrical Services**

Ref	Description	
	PRELIMINARY CLAUSES	
1	Installation (working) Drawings	£
2	As Installed Drawings	£
3	Building Log Book	£
4	User Instruction	£
5	All other general conditions	£
	Sub Total	**£**
	STRIP OUT	
6	Strip Out	£
	Sub Total	**£**
	GENERALLY	
7	Low Voltage Connection	£
	Sub Total	**£**
	Sub Total Carried Forward	**£**

Ref	Description	
	Sub Total Brought Forward	**£**
8	Meter Tails	£
9	Distribution	£
10	Small Power Installation	£
11	Telephone Installation	£
12	TV Installation	£
13	Lighting Installation	£
14	Fire Detection and Alarm System	£
15	Mechanical Services Electrical Requirements	£
16	Earthing and Bonding	£
17	Domestic Hot Water Services including Cylinder	£
18	Thermostatic Electric Showers	£
19	New Heating Emitters	£
20	Extract Ventilation	£
21	Above Ground Drainage	£
22	Thermal Insulation to All Services	£
23	Builders Works	£
24	Inspection, Testing, and Commissioning	£
25	Production of Operation and Maintenance Manuals	£
26	Production of all Working Drawings, Diagrams and Charts	£
	Sub Total Carried Forward	**£**

Ref	Description	
	Sub Total Brought Forward	**£**
	Provisional Sums	**£**

TOTAL CARRIED TO FORM OF TENDER FOR THE PROJECT **£**

Dated this day of 2019

Signature

For and behalf of

Address
Telephone Number:

Only significant risks are recorded. Under CDM Guidance, these are: "not necessarily those that involve the greatest risk, but those (including health risks) that are not likely to be obvious, are unusual, or likely to be difficult to manage effectively"

Description of Activity & Hazard	Description of Hazard and Risks	Risk scored at INHERENT LEVEL			Measures (Measures undertaken to reduce risk from hazard)	Risk scored at RESIDUAL LEVEL				
		Likelihood 1 Low to 5 Certain	Severity 1 Safe to 5 Death	Risk Factor (L x S)	Format: Responsible Party, Measures to be Undertaken, Evidence Required	Likelihood 1 Low to 5 Certain	Severity 1 Safe to 5 Death	Residual Risk Factor (LxS)	Who is affected	C/F
		1 to 5	1 to 5	1 to 25	Severity Factor to be 5 or lower. Method Statement required from Competent Person	1 to 5	1 to 5	1 to 25		
Working at height - Persons, plant, materials falling	Plant and services located at high level and ceiling voids	2	5	10	1. Provide safe means of access via steps, access platforms or podiums. 2. Provide safe permanent access to the ceiling void for personal. 3. RAMS to be prepared prior to any works to equipment at high level or in the ceiling void.	1	5	5	**CP/GP**	**S/H**
Removal of existing roof top plant and installation of new roof top plant	Craneage of old plant from the roof and craneage of new plant onto the roof	2	5	10	1.Ensure the crane is of adequate size and lifting capacity for the loads being handled. 2. Ensure the craneage activities are carried out during non-busy periods and when the building is not occupied. 3. Ensure that a 'banksman' is present during the lifting activities and that the area is adequately cordoned off and adequately signed. 4. Ensure a contract lift is in place.	2	5	10	**CP/GP**	**S**
Dangerous substances	Presence of asbestos or asbestos containing materials. (ACM)	2	5	10	1. For all existing premises and externally obtain the Register of Asbestos Containing Materials; if the report is not available identify to the Principle Designer who shall act as a CDM Inspector. 2. Should ACM's be suspected during the course of the work, cease work immediately and report it to the Main Contractor/site agent and ultimately the client.	1	5	5	**CP/GP**	**H**
Deliveries to site	Members of public and staff working and visiting the library	3	5	15	1. Ensure that the occupants are fully informed of activities that are taking place. Arrange for deliveries for within a 'quiet' period during the day when occupiers are not moving entering/leaving the building as much.	1	2	2	**CP/GP**	**H**

NOTE: ALL CONSTRUCTION HAZARDS ARE ASSESSED ON THE BASIS OF COMPETENT CONTRACTORS BEING APPOINTED TO CARRY OUT THE WORK INVOLVED. THIS DRA IS NOT A METHOD STATEMENT.

Key:	Who is affected:	Key:	C/F
CP	Construction Personnel	S	Significant risk to be highlighted in Pre-Construction information/on drawings
MP	Maintenance Personnel	H	Include within H&S File
GP	General Public/Client	E	Hazard Eliminated

Issued By	**MP**
Checked By	**DJG**

CJR (Midlands) Ltd

Project No: **P3035**

Northampton Office: 01604 493577 Nottingham Office: 0115 6979090

43-44 High Street, Wellingborough

Document Issue Register

Key: S1 - Feasibility S2 - Concept Design S3 - Developed Design S4 - Technical Design S5 - Construction

Purpose of Issue			CURRENT	**S4**																
OUTGOING	Date	Day		**14**																
		Month		**05**																
		Year		**19**																

Drg. No	Title	Size	Revision (* = Original)															
Electrical																		
P3035-CJR-ZZ-ZZ-DR-E-2100	Ground Floor, First Floor & Second floor Proposed Lighting & Fire Alarm Layout	A1	**S4.01**															
P3035-CJR-ZZ-ZZ-DR-E-2200	Ground Floor, First Floor & Second floor Proposed Small Power Layout	A1	**S4.01**															
P3035-CJR-ZZ-RF-DR-E-2100	Roof Proposed Lighting, Fire Alarm & Small Power Layout	A1	**S4.01**															
Mechanical																		
P3035-CJR-ZZ-ZZ-DR-M-4200	First Floor, Second Floor and Roof Proposed Hot & Cold Water Services Layout	A1	**S4.01**															
P3035-CJR-ZZ-ZZ-DR-M-4300	First Floor, Second Floor and Roof Proposed Mechanical Ventilation Layout	A1	**S4.01**															
Documents																		
P3035-CJR-XX-SP-E-0001	M&E Particular Specification	A1	**S4.01**															
P3035-DRA	P3035-DRA	A1	**S4.01**															
Total This Issue:			**7**															

Distribution (E: Email U:Upload)

Recipient	Company	Email																
Bob Crowther	Underwoods	bc@underwoods.co.uk	**E**															
Issued by:			???															

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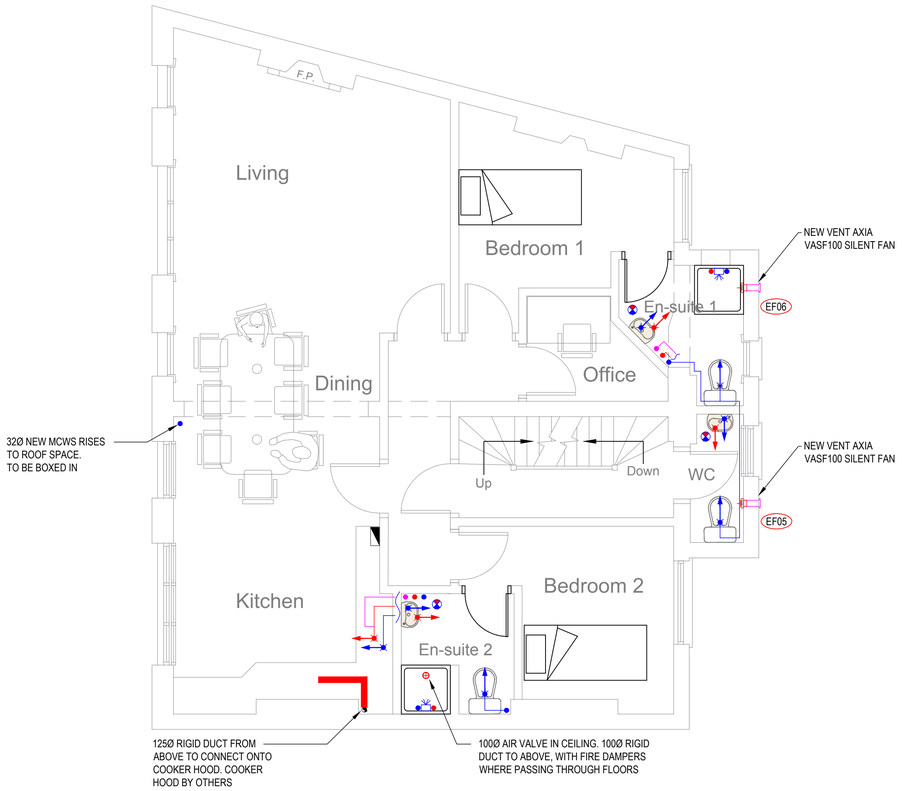
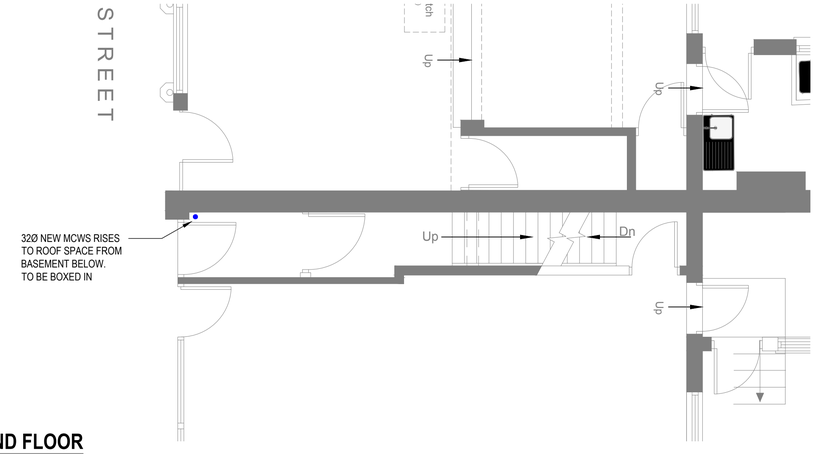


SECOND FLOOR

PROPOSED HOT WATER
CYLINDERS
SLIMLINE
200L DD
2No. IMMERSION

FIRST FLOOR



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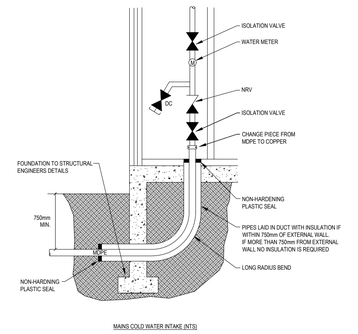

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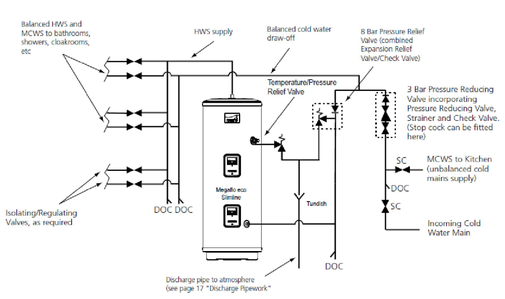

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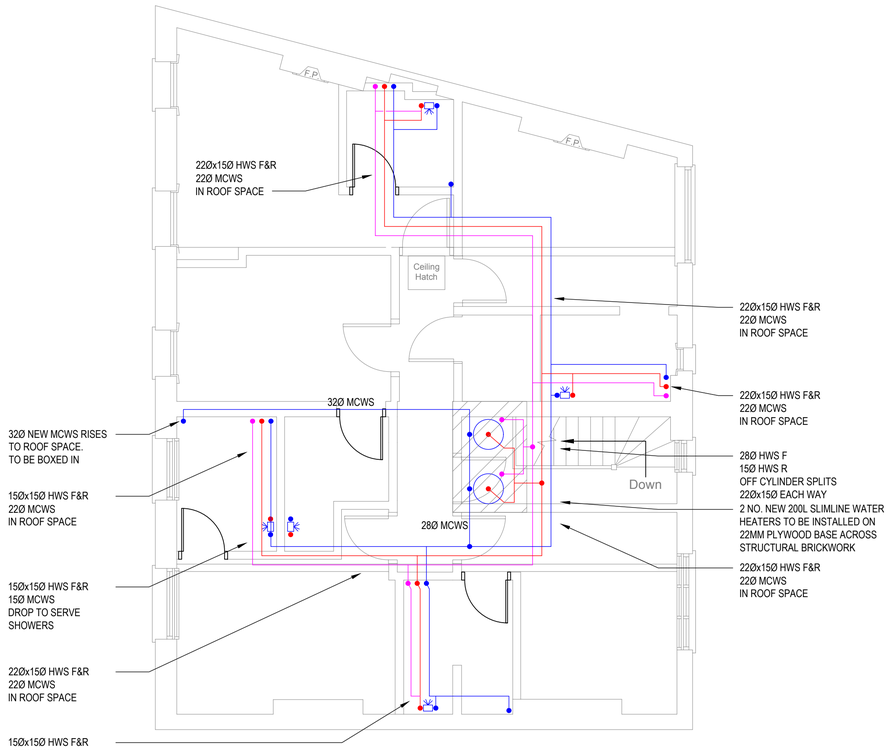

ROOF SPACE

Do Not Scale

Use only written dimensions. All dimensions must be verified prior to the works being put into hand and any discrepancies reported to the originator.

Sheet Version: 1.32

M&E Designer Risk Assessment

Reference should be made to the specific Design Risk Assessment document which provides details of significant risks which could not be fully designed out or mitigated. Document reference as below;

Document: **P3035-DRA**
Engineer: **DRA-ENG**
Dated: **28/02/2018**

General Notes

MECHANICAL SERVICES

This drawing shall be read in conjunction with all other documentation relating to this project.

Installation shall be in-line with CJR Standard Specification and Particular Specification for this project.

Regulations & Standards

The works shall conform to all Regulations and Industry Standards, the following are bought to the contractor's attention as relevant to this project;

Standards:
- British Standard Codes of Practice.
- All associated CIBSE Codes, Guides, Application Manuals and Technical Memoranda.

Regulations:
- Health & Safety at Work Act 1974
- Construction (Design & Management) Regulations 2015.
- Building Regulations - Requirements of Building Control and the Local Fire Officer; Regulatory Reform (Fire Safety) Order 2005.
- Water Supply (Water Fittings) Regulations 1999.
- Gas Safety (Installation and Use) Regulations 1998 including 2018 amendment.
- Local authority Byelaws and Planning Regulations.
- Control of Pollution Act 1974 (in particular noise).
- Equality Act 2010

The Contractor is to familiarise themselves with the site, in order to determine quantity/volume of the services requirements and methods of work in order to fulfil their duties under this project.

The Contractor(s) shall include for all necessary works, including supply, delivery, off-loading, positioning, installation, and commissioning to provide complete installations as indicated on the layout drawing and described.

All symbols are indicative positions only and final locations shall be confirmed on by detailed design and on site.

This drawing must be read in colour.

Rev.	Details of Revision	Date	Sign
S4.01	Stage 4Tender Issue	14/05/2019	JP

Client:
Underwoods
Real Estate Consultants

Project:
43/44 High Street
Wellingborough

Title:
First Floor, Second Floor and Roof
Proposed Hot & Cold Water Services
Layout

Drawing No:			Revision:
P3035-CJR-ZZ-ZZ-DR-M-4200			S4.01
Scale: 1:50	Drawn: AC	Designed: JB	Checked: DG
Original Size: A1	Date: 14/01/19	Date: 28/02/2019	Date: 28/02/2019

Status: Stage 4 - Technical Design

Originated By:

CJR
Innovation through Experience
www.cjrmidlands.co.uk

CJR Midlands Ltd.
(Head Office)
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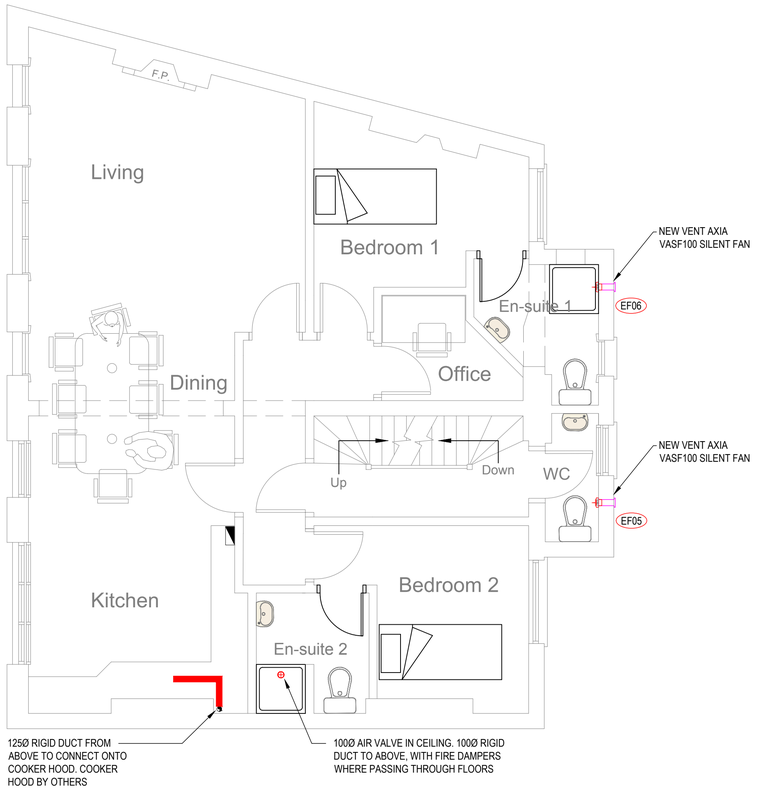
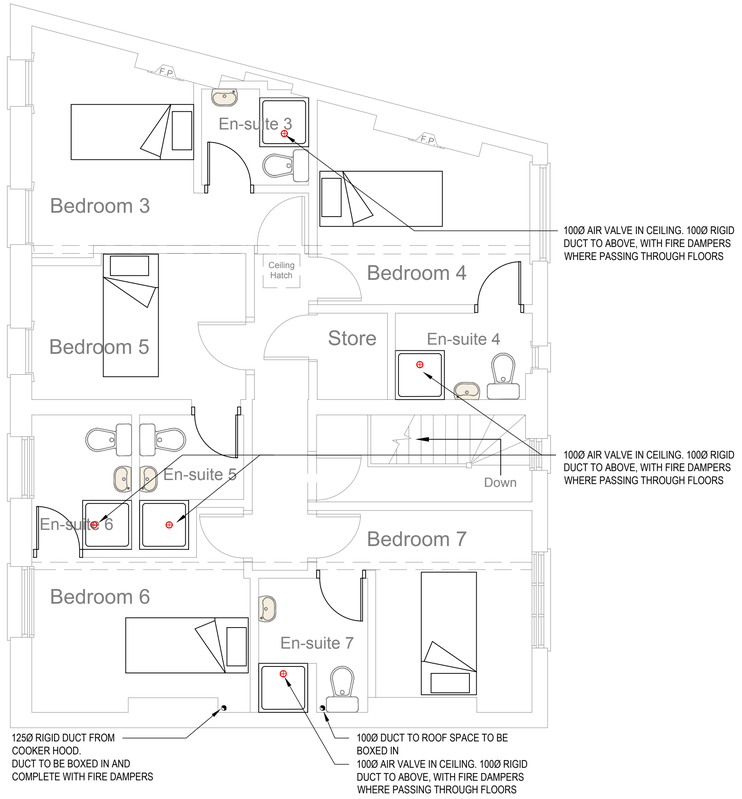
CJR Midlands Ltd.
(Nottingham Office)
11 Salisbury Street, Long Eaton,
Nottingham. NG10 1BA
t: 0115 697 9090

Base Drawing:Architect Drawing Number



FIRST FLOOR



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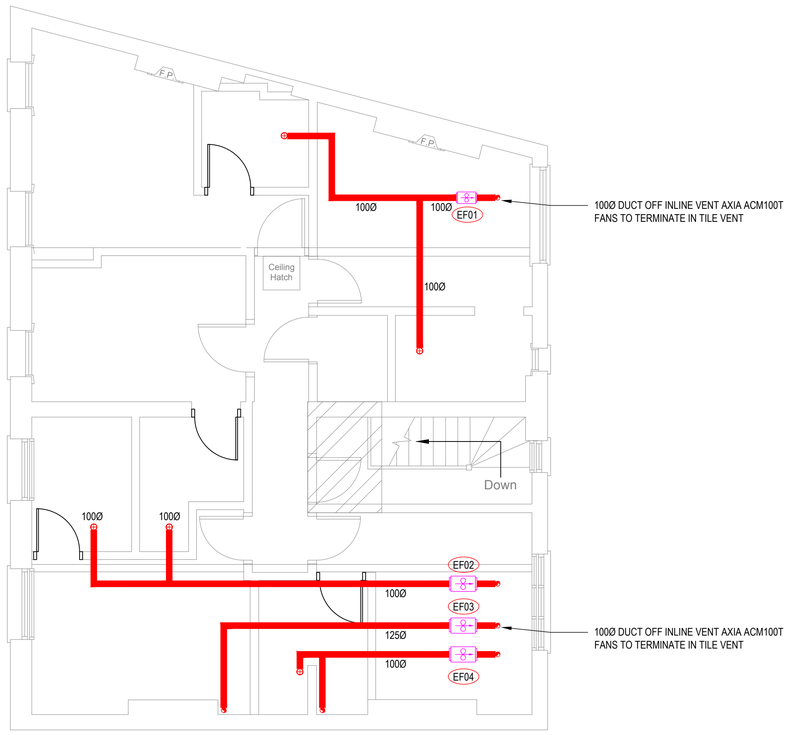

ROOF SPACE

Do Not Scale

Use only written dimensions. All dimensions must be verified prior to the works being put into hand and any discrepancies reported to the originator.

Sheet Format: A1

M&E Designer Risk Assessment

Reference should be made to the specific Design Risk Assessment document which provides details of significant risks which could not be fully designed out or mitigated. Document reference as below;

Document: **P3035-DRA**
Engineer: **DRA-ENG**
Dated: **28/02/2018**

General Notes

MECHANICAL SERVICES

This drawing shall be read in conjunction with all other documentation relating to this project.

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All symbols are indicative positions only and final locations shall be confirmed on by detailed design and on site.

This drawing must be read in colour.

Rev.	Details of Revision	Date	Sign
S4.01	Stage 4 Tender Issue	14/05/2019	JP

Client:
Underwoods
Real Estate Consultants

Project:
43/44 High Street
Wellingborough

Title:
First Floor, Second Floor and Roof
Proposed Mechanical Ventilation
Layout

Drawing No: P3035-CJR-ZZ-ZZ-DR-M-4300
Revision: S4.01

Scale:	Drawn:	Designed:	Checked:
1:50	AC	JB	DG
Original Size:	**Date:**	**Date:**	**Date:**
A1	14/01/19	28/02/2019	28/02/2019

Status: Stage 4 - Technical Design

Originated By:
CJR
Innovation through Experience
www.cjrmidlands.co.uk

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Base Drawing:Architect Drawing Number

Fire Alarm Legend

Symbol	Description
S	Smoke Detector
S	Smoke Sounder
FAP	Fire Alarm Panel

Lighting Legend

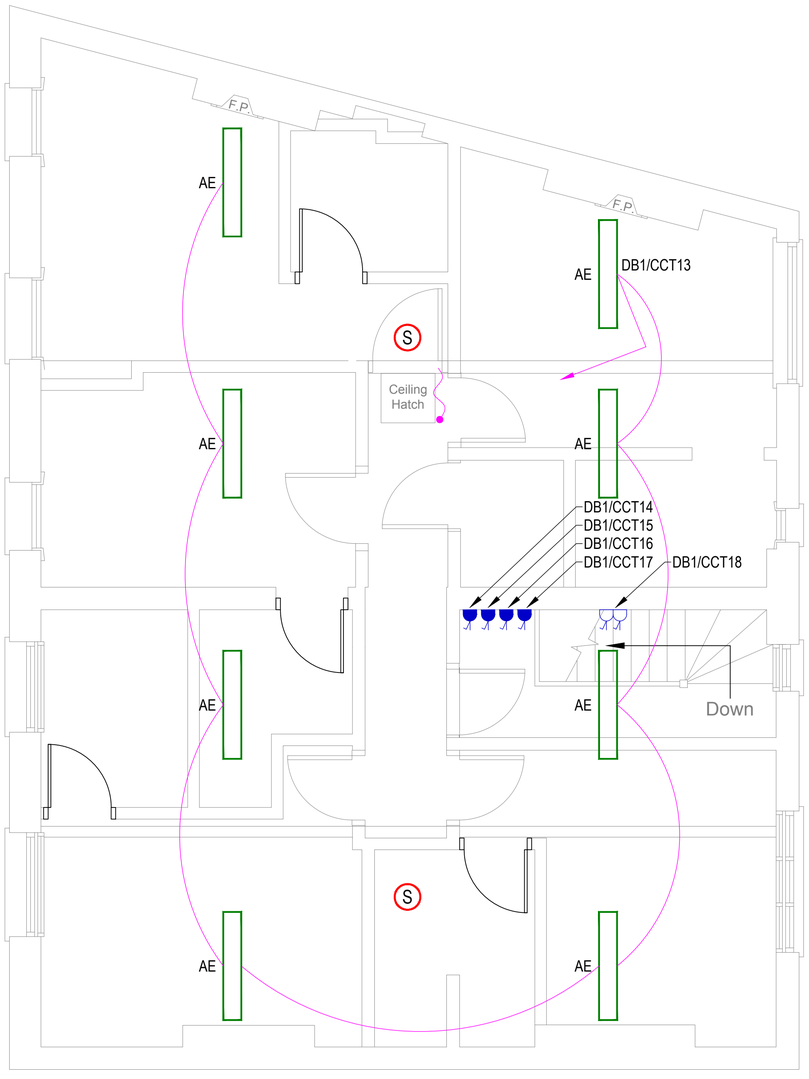
Symbol	Description
P	Dextra Discalo LED 10W Circular Luminaire
A	Dextra Hydra LED 26W Linear Luminaire
NME	Non-maintained Emergency Bulkhead
	1-Way Light Switch
	Pull Cord
E	Indicates Luminaire is Emergency Type c/w 3hr Battery Back Up

HYDRA LED

DEXTRA AMED LED

Small Power Legend

Symbol	Description
D	Double Data Point
D	Single Data Point
TV	Single TV Point
	Switched Double Socket
	Switched Single Cleaners Socket
	Switched Fused Connection Unit
	Unswitched Fused Connection Unit
DB	Single Phase Distribution Board
	45A Shower DP
M	Incoming Suppy
	Electric Heater



Do Not Scale

Use only written dimensions. All dimensions must be verified prior to the works being put into hand and any discrepancies reported to the originator.

Sheet Format: A1

M&E Designer Risk Assessment

Reference should be made to the specific Design Risk Assessment document which provides details of significant risks which could not be fully designed out or mitigated. Document reference as below;

Document: **P3035-DRA**
Engineer: **DRA-ENG**
Dated: **28/02/2018**

General Notes

ELECTRICAL SERVICES

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Regulations & Standards

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This drawing must be read in colour.

Rev.	Details of Revision	Date	Sign
S4.01	Tender Issue	14/05/2019	JP

Client:
Underwoods
Real Estate Consultants

Project:
43/44 High Street
Wellingborough

Title:
Roof
Proposed Lighting, Fire Alarm and Small Power Layout

Drawing No:	Revision:
P3035-CJR-ZZ-RF-DR-E-2100	S4.01

Scale:	Drawn:	Designed:	Checked:
1:50	AC	JB	DG
Original Size:	**Date:**	**Date:**	**Date:**
A1	14/01/19	28/02/2019	28/02/2019

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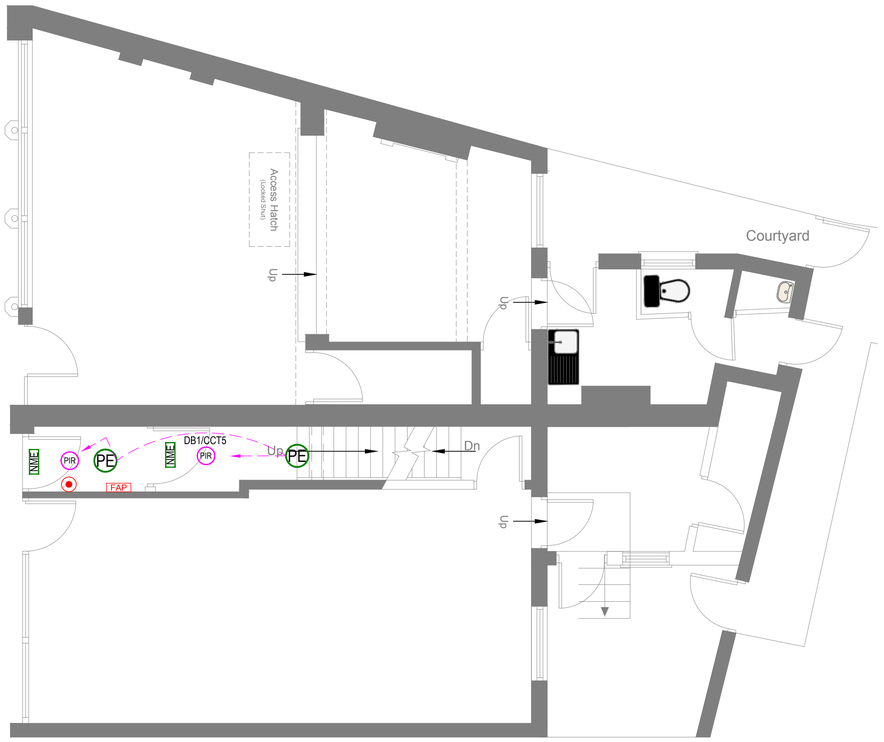
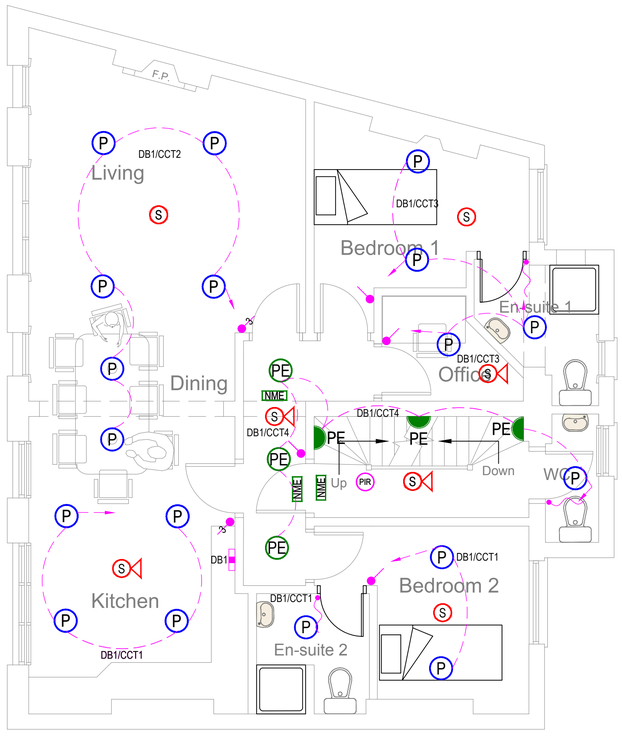
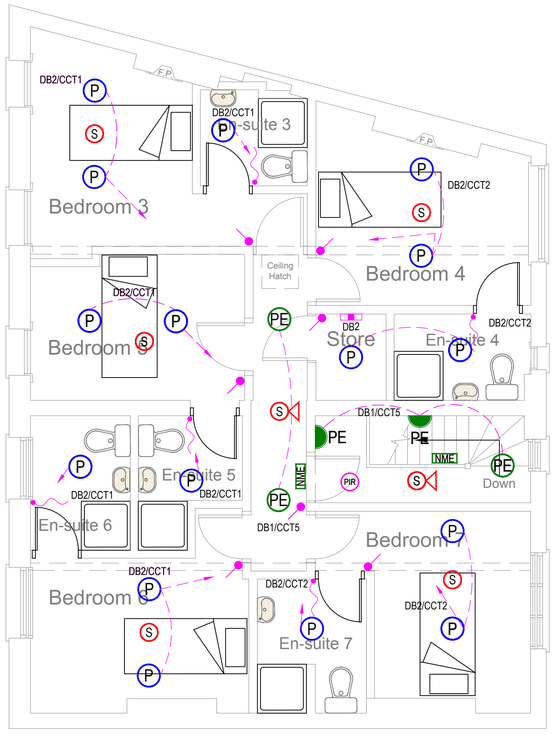
Base Drawing:Architect Drawing Number

HIGH STREET







Fire Alarm Legend

Symbol	Description
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S	Smoke Sounder
FAP	Fire Alarm Panel

Lighting Legend

Symbol	Description
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	Pull Cord
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HYDRA LED

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Engineer: **DRA-ENG**
Dated: **28/02/2018**

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Rev.	Details of Revision	Date	Sign
S4.01	Tender Issue	14/05/2019	JP

Client:
Underwoods
Real Estate Consultants

Project:
43/44 High Street
Wellingborough

Title:
Ground Floor, First Floor & Second Floor
Proposed Lighting & Fire Alarm Layout

Drawing No:			Revision:
P3035-CJR-ZZ-ZZ-DR-E-2100			S4.01
Scale: 1:50	Drawn: AC	Designed: JB	Checked: DG
Original Size: A1	Date: 14/01/19	Date: 28/02/2018	Date: 28/02/2019

Status: Stage 4 - Technical Design

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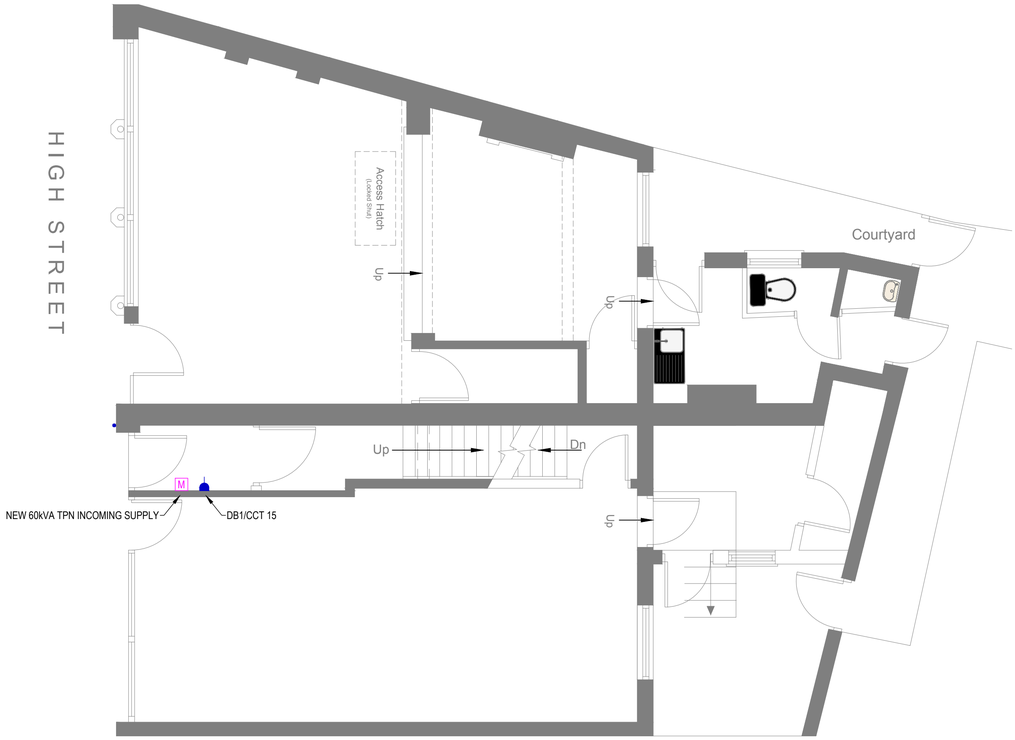

Heat Emitter Schedule

Ref	Location	Height (mm)	Length (mm)	Output (watts)	Model	Manufacturer
R01	Living Room	430	860	1500	LST150	Dimplex
R02	Living Room	430	860	1500	LST150	Dimplex
R03	Kitchen	430	860	1500	LST075	Dimplex
R04	Bedroom 2	430	688	1500	LST100	Dimplex
R05	Stairs	430	688	1500	LST075	Dimplex
R06	Hallway	430	860	1500	LST150	Dimplex
R07	Bedroom 1	430	688	1500	LST075	Dimplex
R08	Bedroom 3	430	688	1500	LST075	Dimplex
R09	Bedroom 5	430	688	1500	LST100	Dimplex
R10	Bedroom 6	430	688	1500	LST100	Dimplex
R11	Bedroom 7	430	860	1500	LST150	Dimplex
R12	Stairs	430	860	1500	LST150	Dimplex
R13	Bedroom 4	430	860	1500	LST150	Dimplex
R14	Office	430	688	500	LST050	Dimplex
TR01	En-Suite 1	660	368	150	CPTSW	Dimplex
TR02	En-Suite 2	660	368	150	CPTSW	Dimplex
TR03	En-Suite 3	660	368	150	CPTSW	Dimplex
TR04	En-Suite 4	660	368	150	CPTSW	Dimplex
TR05	En-Suite 5	660	368	150	CPTSW	Dimplex
TR06	En-Suite 6	660	368	150	CPTSW	Dimplex
TR07	En-Suite 7	660	368	150	CPTSW	Dimplex

Small Power Legend

Symbol	Description
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D	Single Data Point
TV	Single TV Point
	Switched Double Socket
	Switched Single Cleaners Socket
	Switched Fused Connection Unit
	Unswitched Fused Connection Unit
DB	Single Phase Distribution Board
	45A Shower DP
M	Incoming Suppy
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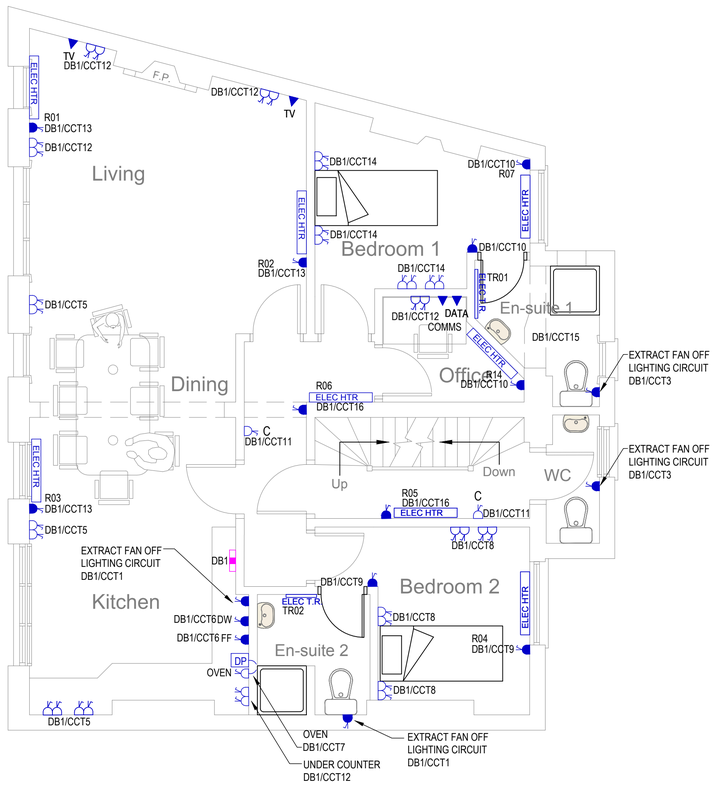

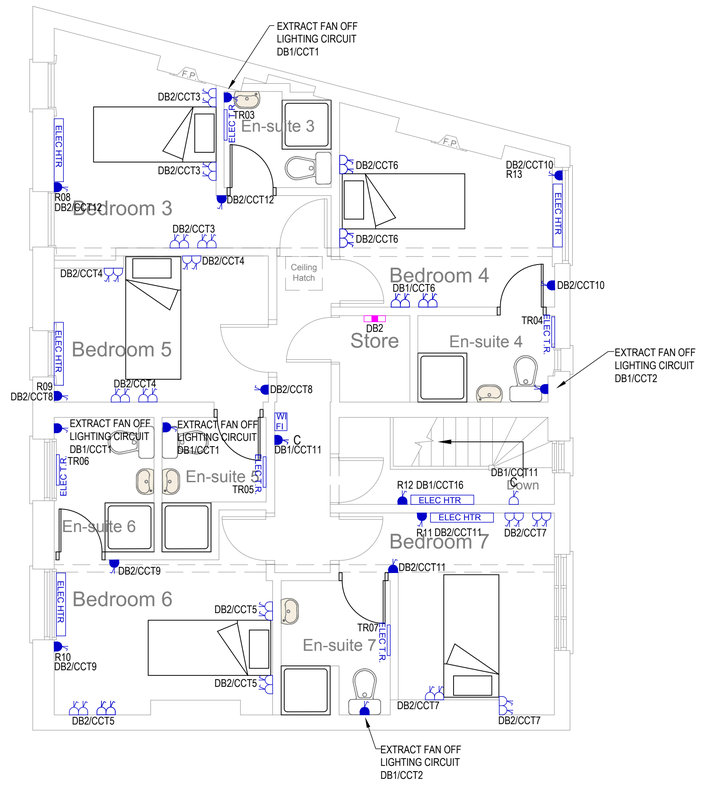

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Engineer: **DRA-ENG**
Dated: **28/02/2018**

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Rev.	Details of Revision	Date	Sign
S4.01	Tender Issue	14/05/2019	JP

Client:
Underwoods
Real Estate Consultants

Project:
43/44 High Street
Wellingborough

Title:
Ground Floor, First Floor & Second Floor
Proposed Small Power Layout

Drawing No:			Revision:
P3035-CJR-ZZ-ZZ-DR-E-2200			S4.01
Scale: 1:50	Drawn: AC	Designed: JB	Checked: DG
Original Size: A1	Date: 14/01/19	Date: 28/02/2019	Date: 28/02/2019

Status: Stage 4 - Technical Design

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Base Drawing/Architect Drawing Number

APPENDIX B
STRUCTURAL ENGINEERING SPECIFICATION

STRUCTURAL CALCULATIONS

BCAL CONSULTING

Project:

43/44 High Street, Wellingborough

Client:

Underwoods Commercial Northampton

Prepared by

Stuart Hollyman BEng(Hons.).MSc.CEng.MICE.

Report Reference: 6192-STR-C001A

Date: March 2019

REVISION RECORD Report Ref: 6192-STR-C001				
Rev	**Description**	**Date**	**Originator**	**Checked**
-	First Issue	8th March 19	JH	SJH
A	Party wall support calculation added	1st April 19	SJH	

Disclaimers

This report has been prepared for the sole use of the named client and, consequently, is confidential to the client and his professional advisors. The Contracts (Rights of Third Parties) Act 1999 does not apply, nothing in this report confers or purports to confer on any third party any benefit or right. No responsibility whatsoever is accepted to any other person than the named client and, consequently, the contents of this report should not be relied upon by third parties for the whole or any part of its contents.

This report is made on behalf of BCAL, no individual is personally liable, and by receiving this report and acting upon it, the client - or any third party relying on it - accepts that no individual is personally liable in contract, tort, or breach of statutory duty (including negligence).

1.0 Design Commentary

The property is an existing three storey, terraced, commercial building located on the High Street in Wellingborough. The building is of traditional masonry construction with timber floors.

This calculation document covers the following areas:

- Stair infill
- Support beam for party wall removal

2.0 Codes of Practice & Sources of Reference

Building Regulations England and Wales, 2010

Construction (Design & Management) Regulations, 2015

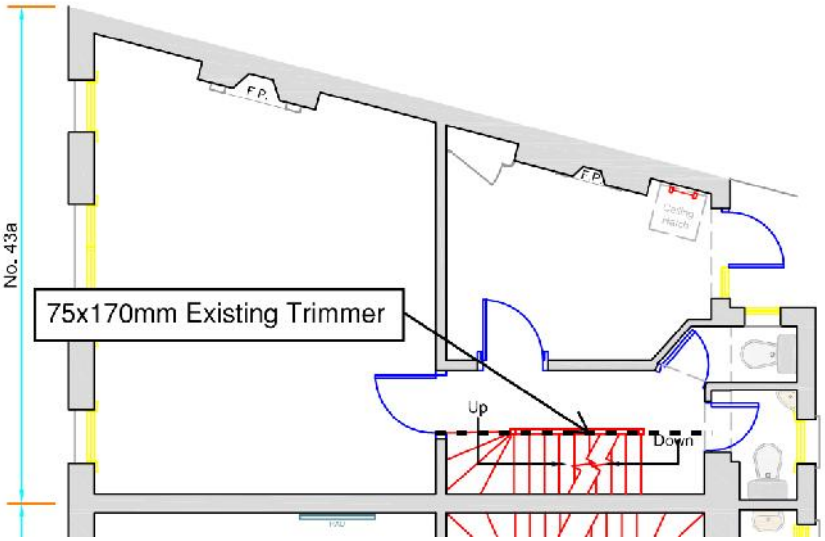
Basis of structural design	BS EN 1990:2002
Actions on structures (loading)	BS EN 1991-1-(1-7):2002-2006
Design of concrete structures	BS EN 1992-1-(1-2):2004, 1992-3:2006
Design of steel structures	BS EN 1993-1-(1-3,5):2005-2006
Design of composite structures	BS EN 1994-1-(1-2):2004-2005
Design of timber structures	BS EN 1995-1-(1-2):2004-2008
Design of masonry structures	BS EN 1996-1-(1-2):2005
Geotechnical design	BS EN 1997-1:2004

3.0 Loading Summary (Table)

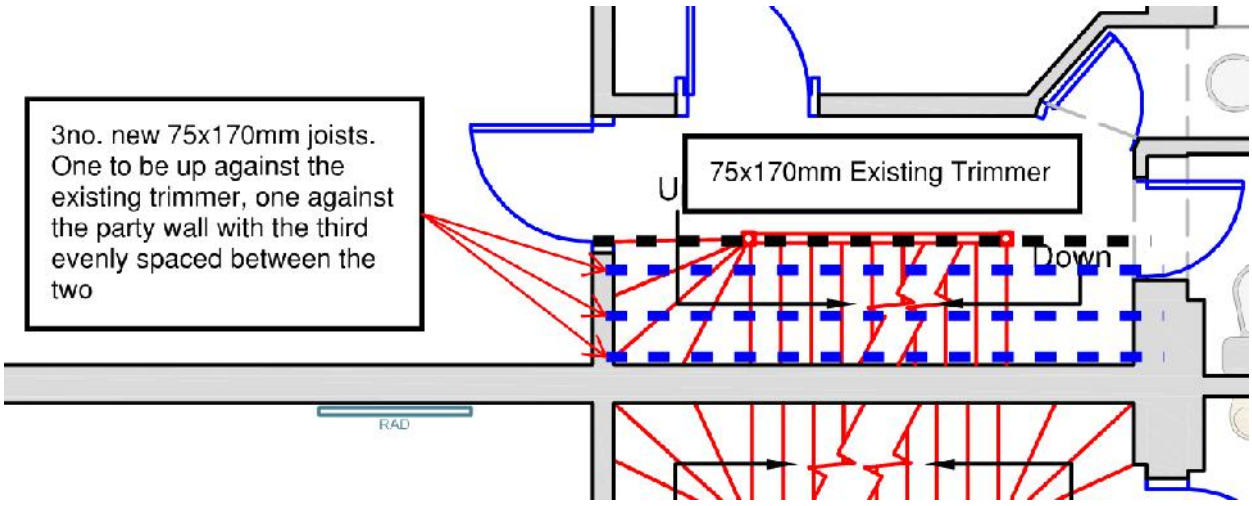
g_{k1} (perm)	**[01]** Timber floor and decking	= 0.40 kN/m^2
g_{k2} (sdl)	**[11]** Roof	= 1.20 kN/m^2
g_{k2} (sdl)	**[12]** Suspended Ceilings & Services (general)	= 0.25 kN/m^2
q_k (live)	**[31]** Imposed – Residential	= 1.50 kN/m^2
q_k (live)	**[36]** Imposed – Lightweight roof areas (flat maintenance access)	= 0.75 kN/m^2
g_{k2} (sdl)	**[41]** Lightweight Internal Walls	= 0.50 kN/m^2
g_{k2} (sdl)	**[42]** Masonry Walls (215mm Brick)	= 3.50 kN/m^2

4.0 Stair Infill

The current stair opening in unit 43 is to be infilled, the existing stair trimmer a 75x170mm timber.



The trimmer was checked for additional load through trimmers spanning onto it, the existing trimmer failed in bending and deflection (see calculation 4.1). Due to this new infill trimmers are required parallel to the existing trimmer.



4.1 Existing Trimmer – Proposed Condition

Span: 3.5 m.

		Load name	*Loading w1*	*Start x1*	*Loading w2*	*End x2*	*R1comp*	*R2comp*
U	G		0.7*0.6	0		L	0.73	0.73
U	QA		1.5*0.6	0		L	1.57	1.57
U	G	o.w.	0.1	0		L	0.17	0.17
						Total load (unfactored): 4.97 kN	**2.48**	**2.48**
						Dead/Permanent (unfactored): 1.82 kN	0.91	0.91
						Live/Variable (unfactored): 3.15 kN	1.57	1.57
						(6.10): 7.18 kN	3.59	3.59

Load types: U:UDL; Load positions are measured in m. from R1 Load durations: G: Dead; Qx: Imposed: QA: Residential

Maximum B.M. = 3.14 kNm (6.10) at 1.75 m. from R1

Maximum S.F. = 3.59 kN (6.10) at R1

Mid-span deflections: Dead: 1.02 x 10^8 /EI *(E in N/mm^2 , I in cm^4)*
Live: 1.76 x 10^8 /EI
Total: 2.77 x 10^8 /EI

Timber beam calculation to BS EN1995-1-1 using C16 timber

Use 75 x 170 C16 *4.7 kg/m approx*

$W_{el,y}$ = 361.3 cm^3 I_y = 3,071 cm^4

Timber grade: C16

Grade bending strength, $f_{m,k}$ = 16.0 N/mm^2 [BS EN 338: 2009 Table 1]

Grade shear strength, $f_{v,k}$ = 3.2 N/mm^2 [BS EN 338: 2009 Table 1]

$E_{0.05}$ = 5,400 N/mm^2 ; $E_{0,mean}$ = 8,000 N/mm^2 [BS EN 338: 2009 Table 1]

Material partial factor, γ_M = 1.3 [EC5 UK Table NA.3]

Loading modification factor, k_{mod} = 0.6 (Service class 1; Live load duration: Permanent) [EC5 Tables 2.2/3.1]

Load sharing factor, k_{sys} = 1.0

Deflection modification factor, k_{def} = 0.60 (Service class 1, solid timber/glulam/LVL) [EC5 Table 3.2]

Bending

Height factor, k_h = 1.0 [EC5 3.2(3)]

Design bending strength, $f_{m,y,d} = f_{m,k}.k_{mod}.k_h.k_{sys}/\gamma_m$ = 16.0 x 0.60 x 1.00 x 1.0/1.30 = 7.38 N/mm^2

Design bending stress, $\sigma_{m,y,d}$ = 3.14 x 1000/361 = 8.70 N/mm^2 **FAIL**

Bending resistance = 7.38 x 361/1000 = 2.67 kNm

Shear

Effective width for shear, $b_{ef} = k_{cr}.b$ = 0.67 x 75 = 50.3 mm. [A1:2008 (6.13a)]

Design shear strength, $f_{v,d} = f_{v,k}.k_{mod}.k_{sys}/\gamma_m$ = 3.20 x 0.60 x 1.0/1.30 = 1.48 N/mm^2

Design shear stress, $\tau_{v,y,d}$ = 3.59 x 1000 x (3/2)/(50.3 x 170) = 0.63 N/mm^2 OK

Shear resistance = 1.48 x 50.3 x 170 x (2/3)/1000 = 8.41 kN

Deflection

Final deflection limit = L/250 = 14.00 mm
Final deflection, $u_{fin} = \phi u_{inst}(1 + \psi_2.k_{def})$ [EC2 Eq.2.29/2.30]

Instantaneous mid-span shear deflection, $u_{inst,v} = 1.2M_{unf}/(G_{mean}A)$ where (G = E/16)
$u_{inst,v}$ = 1.2 x 2.17 x 10^6 /((8,000/16) x 75 x 170) = 0.41 mm

Final shear deflection is assumed to increase in proportion to total bending deflection

Mid-span deflections:	x 1e^8 /EI	Inst. mm	ψ_2	k_{def}	Fin. mm	
Dead:	1.02	4.14	1.00	0.60	6.62	
Live QA:	1.76	7.16	0.30	0.60	8.45	
Shear deflection:		0.41			0.55	
Total mm.		11.70			15.61	**FAIL**

Member fails: Bending and deflection

4.2 New Infill Joists

Span: 3.5 m.

		Load name	*Loading w1*	*Start x1*	*Loading w2*	*End x2*	*R1comp*	*R2comp*
U	G		0.7*0.5	0		L	0.61	0.61
U	QA		1.5*0.5	0		L	1.31	1.31
U	G	o.w.	0.1	0		L	0.17	0.17
						Total load (unfactored): 4.20 kN	**2.10**	**2.10**
						Dead/Permanent (unfactored): 1.58 kN	0.79	0.79
						Live/Variable (unfactored): 2.63 kN	1.31	1.31
						(6.10): 6.06 kN	3.03	3.03

Load types: U:UDL; Load positions are measured in m. from R1 Load durations: G: Dead; Qx: Imposed: QA: Residential

Maximum B.M. = 2.65 kNm (6.10) at 1.75 m. from R1

Maximum S.F. = 3.03 kN (6.10) at R1

Mid-span deflections: Dead: 0.88 x 10^8 /EI *(E in N/mm^2 , I in cm^4)*
Live: 1.47 x 10^8 /EI
Total: 2.34 x 10^8 /EI

Timber beam calculation to BS EN1995-1-1 using C16 timber

Use 75 x 170 C16 *4.7 kg/m approx*

$W_{el,y}$ = 361.3 cm^3 I_y = 3,071 cm^4

Timber grade: C16

Grade bending strength, $f_{m,k}$ = 16.0 N/mm^2 [BS EN 338: 2009 Table 1]

Grade shear strength, $f_{v,k}$ = 3.2 N/mm^2 [BS EN 338: 2009 Table 1]

$E_{0.05}$ = 5,400 N/mm^2 ; $E_{0,mean}$ = 8,000 N/mm^2 [BS EN 338: 2009 Table 1]

Material partial factor, γ_M = 1.3 [EC5 UK Table NA.3]

Loading modification factor, k_{mod} = 0.6 (Service class 1; Live load duration: Permanent) [EC5 Tables 2.2/3.1]

Load sharing factor, k_{sys} = 1.0

Deflection modification factor, k_{def} = 0.60 (Service class 1, solid timber/glulam/LVL) [EC5 Table 3.2]

Bending

Height factor, k_h = 1.0 [EC5 3.2(3)]

Design bending strength, $f_{m,y,d} = f_{m,k}.k_{mod}.k_h.k_{sys}/\gamma_m$ = 16.0 x 0.60 x 1.00 x 1.0/1.30 = 7.38 N/mm^2

Design bending stress, $\sigma_{m,y,d}$ = 2.65 x 1000/361 = 7.34 N/mm^2 OK

Bending resistance = 7.38 x 361/1000 = 2.67 kNm

Shear

Effective width for shear, $b_{ef} = k_{cr}.b$ = 0.67 x 75 = 50.3 mm. [A1:2008 (6.13a)]

Design shear strength, $f_{v,d} = f_{v,k}.k_{mod}.k_{sys}/\gamma_m$ = 3.20 x 0.60 x 1.0/1.30 = 1.48 N/mm^2

Design shear stress, $\tau_{v,y,d}$ = 3.03 x 1000 x (3/2)/(50.3 x 170) = 0.53 N/mm^2 OK

Shear resistance = 1.48 x 50.3 x 170 x (2/3)/1000 = 8.41 kN

Deflection

Final deflection limit = L/250 = 14.00 mm
Final deflection, $u_{fin} = \phi u_{inst}(1 + \psi_2.k_{def})$ [EC2 Eq.2.29/2.30]

Instantaneous mid-span shear deflection, $u_{inst,v} = 1.2M_{unf}/(G_{mean}A)$ where (G = E/16)
$u_{inst,v}$ = 1.2 x 1.84 x 10^6 /((8,000/16) x 75 x 170) = 0.35 mm

Final shear deflection is assumed to increase in proportion to total bending deflection

Mid-span deflections:	x 1e^8 /EI	Inst. mm	ψ_2	k_{def}	Fin. mm	
Dead:	0.88	3.58	1.00	0.60	5.73	
Live QA:	1.47	5.97	0.30	0.60	7.04	
Shear deflection:		0.35			0.46	
Total mm.		9.89			13.23	OK

5.0 First Floor Beam

A portion of the first floor party wall is to be removed to create an open kitchen / living room space. The wall is 215mm wide so a 203UC has been recommended to provide support to the whole width.

Beam: **Party Wall Support** **Span: 4.0 m.**

		Load name	*Loading w1*	*Start x1*	*Loading w2*	*End x2*	*R1comp*	*R2comp*
U	G	o.w.	0.5	0		L	1.00	1.00
U	G	Party Wall	4*5	0		L	40.00	40.00
U	G	Upper Floor	1*0.6	0		L	1.20	1.20
U	QA	Upper Floor	1.5*0.6	0		L	1.80	1.80
U	G	Roof	1.2*4	0		L	9.60	9.60
U	QA	Roof	0.6*4	0		L	4.80	4.80
					Total load (unfactored): 116.80 kN		**58.40**	**58.40**
					Dead/Permanent (unfactored): 103.60 kN		51.80	51.80
					Live/Variable (unfactored): 13.20 kN		6.60	6.60
					(6.10): 159.66 kN		79.83	79.83

Load types: U:UDL; Load positions are measured in m. from R1
Load durations: G: Dead; Qx: Imposed: QA: Residential

Maximum B.M. = 79.8 kNm (6.10) at 2.00 m. from R1

Maximum S.F. = 79.8 kN (6.10) at R1

Mid-span deflections: Dead: 86.3 x 10^8 /EI *(E in N/mm^2 , I in cm^4)*
Live: 11.0 x 10^8 /EI
Total: 97.3 x 10^8 /EI

Beam calculation to BS EN1993.1.1 using S355 steel

SECTION SIZE : **203 x 203 x 46 UC** S355 (Class 2, compact)

D=203.2 mm B=203.6 mm t=7.2 mm T=11.0 mm I_y=4,570 cm^4 i_z=5.13 cm $W_{pl,y}$=497 cm^3 $W_{el,y}$=450 cm^3

Classification: Flange: c/t = 88.0/11.0 = 8.00 <= 10א(8.14): Class 2, compact
EC3 Table 5.2 Web: c/t = 160.8/7.2 = 22.3 <= 72א(58.6): Class 1, plastic

Shear

Design shear force, V_{Ed} = 79.83 kN

Shear area, A_v = A - 2bt_f + (t_w + 2r)t_f = 58.7 x 100 - 2 x 204 x 11.0 + (7.20 + 2 x 10.2) x 11.0 = 1,694 mm^2 [EC3 6.2.6 (3)]

Shear resistance, $V_{pl,Rd}$ = A_v.(f_y/ 3)/↑$_{M0}$ = 1,694 x (355/ 3)/(1.0 x 1000) = 347.28 kN (>=79.83) OK [EC3 6.2.6]

Shear buckling: h_w/t_w = 181.2/7.2 = 25.17 <= 72א(58.58): check not required [EC3 6.2.6(6)]

Bending

Moment resistance

Design moment, M_{Ed} = 79.8 kNm

Moment resistance, $M_{c,y,Rd}$ = f_y.$W_{pl,y}$ = 355 x 497/1000 = 176.4 kNm OK

Lateral-torsional buckling check

Beam is laterally restrained at supports only

Support conditions R1/R2: Compression flange laterally restrained. Nominal torsional restraint. Both flanges free to rotate on plan (1.0L)

Design buckling resistance moment, $M_{b,Rd}$ = ℜ$_{T,mod}$.$M_{c,Rd}$

ℜ$_{T,mod}$ = ℜ$_T$/f (but <=1/$\overline{\lambda}_{LT}^2$ and <=1.0) [Eq.6.58]

$f = 1 - 0.5(1-k_c)[1 - 2(\bar{\lambda}_{LT} - 0.8)^2]$ 6.3.2.3(2) $k_c = 1/C_1$ [NA2.18]

Use buckling curve b: $\Im = 0.340$ [EC3 Tables 6.3/6.4 NA 2.17]

$\Re_{LT} = 1/[\leftarrow_{LT} + (\theta_{LT}^2 - \wp\bar{\lambda}_{LT}^2)<'>]$ [EC3 (6.57)]

$\theta_{LT} = 0.5[1 + \Im_{LT}(\bar{\lambda}_{LT} - \bar{\lambda}_{LT,0}) + \wp\bar{\lambda}_{LT}^2]$

$\bar{\lambda}_{LT,0} = 0.4$ $\wp = 0.75$ [EC3 UK NA 2.17]

$\bar{\lambda}_{LT} = (f_y.W_{pl,y}/M_{cr})$

$M_{cr} = C_1(\Leftrightarrow^2 EI_z/L_e^2)\ (I_w/I_z + L_e^2\, GI_T/\Leftrightarrow^2 EI_z)$ [SN003: k and k_w taken as 1.0, conservative]

$W_y = 497.0\ cm^3$ $I_w = 0.143\ dm^6$ $I_T = 22.2\ cm^4$ $I_z = 1{,}550\ cm^4$ $G = 81{,}000 N/mm^2$

Segment	L_e	M_{Max}	C_1	k_c	M_{cr} <- >	λ_z <- >	λ_{LT}	$\leftarrow_{LT}$	$\Re_{LT}$	$\Re_{LT,mod}$	$M_{c,Rd}$	$M_{b,Rd}$	
0.00-4.00	4.00	79.8	1.13*	0.94	306.0	1.020	0.759	0.777	0.839	0.865	176.4	152.6	OK

* $C1 = 4M_{max}/(M_{max}^2 + 4M_a^2 + 7M_b^2 + 4M_c^2) <= 2.5$ [$M_{a,b,c}$ quarter pt moments] [Wong & Driver, AISC Eng. Journal, Q1 2010]

Combined bending and shear

$V_{Ed} <= 0.5\ V_{c,Rd}$: Check for bending/shear interaction not required [EC3 6.2.8(2)]

Web capacity at bearings

Resistance of web to transverse forces, $F_{Rd} = f_{yw}.L_{eff}.t_w/\uparrow_{M1}$

$f_{yw} = 355\ N/mm^2$ $L_{eff} = \Re_F I_y$

$\Re_F = 0.5/\bar{\lambda}_F <= 1.0$ $\bar{\lambda}_F = (I_y.t_w.f_{yw}/F_{cr})$

$F_{cr} = 0.9k_f.E.(t_w^3/h_w)$ $k_F = 2 + 6((S_s + c)/h_w)^2 <= 6$

Type (c) load application assumed:

Effective loaded length, l_y = min $S_s + 2t_f(1 + (m_1 + m_2))$ [EC3-1-5 Eq.6.10],

$l_e + t_f\ (m_1/2 + (l_e/t_f)^2 + m_2)$ [Eq.6.11]

or $l_e + t_f\ (m_1 + m_2)$ [Eq.6.12]

$l_e = k_F.E.t_w^2/(2.f_{yw}.h_w) <= s_s + c$ [Eq.6.13]

$m_1 = f_{yf}.b_f/(f_{yw}.t_w)$ $m_2 = 0.02(h_w/t_f)^2$ if $\bar{\lambda}_F > 0.5$ else 0.0

Reactions R1 & 2: 79.83 kN

Required minimum stiff bearing length, S_s = 0 mm

c (end of beam to stiff bearing) taken as 0.0

$m_1 = 28.3$ $m_2 = 0.00$ $F_{cr} = 779$ kN $k_F = 2.00$ $l_e = 0.00$ $l_y = 41.36$ $\bar{\lambda}_F = 0.368$ $\Re_f = 1.00$ $L_{eff} = 41.36$

Resistance of web to transverse forces, $F_{R,d} = 355 \times 41.36 \times 7.2/(1000 \times 1.0) = 106$ kN OK

Deflection

LL deflection = 11.0 x 1e8/(210,000 x 4,570) = 1.1 mm (L/3490) OK

TL deflection = 97.3 x 1e8/(210,000 x 4,570) = 10.1 mm (L/394)

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