



HAMDON GATE
developments

**Base Specification
For
Proposed Warehouse Development
Coton Park, Plot 2**

1.0 Introduction

1.01 Project

The works as indicated on the drawings comprises the construction of a single storey warehouse of square feet gross internal area, having a clear height to underside of haunch of 12.5 metres. External site works including hardstandings, car parking, landscaping and drainage.

1.02 Specified Items

Where reference is made in this specification to specific products or manufacturers, alternatives of similar quality and performance may be substituted subject to prior written approval of the Employer, Fund, and Tenant Representative.

1.03 Standards

All elements of the works, materials and workmanship will be designed and constructed in accordance with all relevant 'Standards' current at the time of commencement of the works, not confined to those scheduled below:

- a) The 17th Edition of the IEE Wiring Regulations with amendments (BS 7671);
- b) Health and Safety at Work Act;
- c) Water supply regulations;
- d) The Gas Safety Regulation;
- e) The Clean Air Acts;
- f) The Building Regulations
- g) Specific requirements of the Utility Supply Local Authorities and Local Planning Authorities;
- h) The British Standards and Codes of Practice;
- i) The requirements of the Building Control Officer;
- j) The CIBSE Guides including Technical Memorandums;
- k) The Factories Act;
- l) Local Authority Byelaws;
- m) The Electricity Supply Act;
- n) Construction (Design and Management) Regulations (CDM) 2007;
- o) HVCA Ductwork Standard DW144;
- Disability Discrimination Act.

1.04 Drawings

Insert Drawings No.s

1.05 Schedule of Areas

Insert Schedule of Areas

1.06 Exclusions

- a) All fire fighting equipment, sprinkler installations tanks and pumphouse, hose reels, smoke ventilators, hand held extinguishers, and any other fire fighting equipment as a requirement of the Local Authority Building Regulations and/or Bye Laws, the Fire Officer, or the specific requirements of the tenant's insurer.
- b) Mechanical, heating and electrical installations within the warehouse/production unit.

- c) Burglar alarm, telephone and data systems, CCTV.
- d) Any external signage.
- e) Supply and metering agreements for permanent supplies.
- f) Canteen/kitchen catering equipment, servery and fittings.
- g) Furniture, furnishings, blind fittings, lockers, shelving, process machinery of any type, racking, skips, vehicle wash equipment, steam clean, fuel facility, VMU equipment and fittings.
- h) Comfort Cooling to Office
- i) Standby Generators and modifications to switch panel.
- j) Any other item which has not been expressly detailed in this document.

1.07 Building Environmental Assessment Method

The project is to be designed and constructed to achieve a minimum 'Very Good' rating in the Building Research Establishment Environmental Assessment Method (BREEAM).

1.08 Compliance of the Building Envelope

The whole building envelope is to be tested to validate a maximum air leakage of 5.0m³/hr/m² at 50Pa positive air pressure.

1.09 Spares

As a minimum, one box of carpet tiles, ceramic wall and floor tiles and suspended ceiling tiles shall be provided.

1.10 Maintenance Requirements

Any item requiring periodic maintenance of five years or less shall be positioned to allow safe access for servicing staff. Items requiring all round access to be provided with a service gantry or similar to provide safe means of access.

All plant installed to be provided with clear safe access to areas requiring servicing.

1.11 Building Log Book

The Building Log Book shall be provided in accordance with Building Regulations and to CIBSE TM Guidance incorporating all requirements of the BREEAM assessment.

The Building Log Book shall be provided on completion of the project in accordance with Approved Document Part L2 of the Building Regulations and to CIBSE TM31 Guidance / Templates An additional Building User Guide shall be provided, as outlined under Man4 Building User Guide of the MANAGEMENT Section of the BREEAM Assessment. The Building User Guide will contain the necessary details about the everyday operation of the building in a form that is relevant to the 'non-technical' building user 1 stakeholder(s) that will occupy the building.

2.0 Substructure

2.1 Geotechnical Report

A Borehole/Trial Pit Site Investigation including contamination testing in accordance with ICRCCL recommendations will be undertaken and the recommendations/results used in the subsequent substructure and foundation design.

2.2 Site Clearance

The site to be covered by the new building and pavings will be cleared of all undergrowth, buildings, hardstandings and the like and the site reduced in level to ground floor formation level.

Site clearance, where necessary, will be carried out including removing to Contractor's tip off site. The formation level will be graded, trimmed and compacted prior to laying the hardcore bed.

2.3 Earthworks

Excavation will be carried out to formation level over the area of the building, as shown on the drawings.

Traditional stanchion and post bases and strip foundations will be constructed and reinforced in accordance with the Structural Engineer's details.

2.4 Ground Improvement

Any necessary ground improvement works shall be carried out in full accordance with the requirements of the Structural Engineer and to the approval of Building Control.

2.5 Hardcore

Sub-base material will be a minimum granular type II material to Clause 8.04 of 'Specification for Road and Bridge Works' and to the approval of the Structural Engineer. Recycled aggregates to be utilised where practical.

All necessary hardcore and filling will be carried out from the subsoil contours to the formation levels of the building in material approved by the Structural Engineer.

2.6 Concrete Foundations

The whole of the substructure work will be carried out to the Structural Engineer's design and approved by the Building Control. Concrete work will comply with BS 8110 'The Structural Use of Concrete'.

Concrete stanchion bases, retaining walls, and strip footings to the sizes indicated on the Structural Engineer's Schedules, in 35N/mm² 28 day strength OPC concrete or such other concrete as specified by the Structural Engineer, including all necessary reinforcement and supplying and fixing of all holding down bolts, as required.

2.7 Ground Floor Slab

The warehouse floor slab shall be a mesh reinforced concrete slab to specialist design, minimum design thickness 170 mm with a power floated finish will be provided to all ground floor areas within the building. The slab will be designed in accordance with the recommendations of TR34 (2003), for a maximum loading of 50kN/m² and the rack loadings stipulated in the following table placed in a back to back situation (with centre line base plates 100mm x 100mm size, placed a minimum 300mm apart and a minimum distance 150 mm away from floor joints) anywhere on the floor.

Clear Height to Underside Haunch	Rack Leg Load
12.5 metres (Warehouse)	7.00 tonnes

Where joints are provided in the construction of the floor, they should be generally detailed in accordance with TR34 and designed so that no vertical movement occurs across the joint. Where possible the number of joints should be kept to a minimum. Joint location should be co-ordinated with a notional racking layout, unless a fixed layout is available, and agreed with the Project Manager. Where a final racking layout has been provided (a minimum 6 weeks prior to pouring floor slab) joint location will be co-ordinated with this layout and agreed with Tenants Representative. Day joints should be tied or reinforced with 10mm minimum thickness arris protection e.g. Permaban Alpha Joint or equal approved.

The concrete is to be in accordance with BS EN206 and have a minimum compressive strength of 35N/mm^2 at 28 days. The concrete will have a minimum cement content of 325kg/m^3 of a maximum cement content of 450kg/m^3 with a maximum water cement ratio of 0.50. The concrete shall be designed to have a maximum slump of 75 mm due to water, the use of super-plasticizers will be permitted to obtain the workability required by the subcontractor for placing the concrete.

Prior to construction of the slab, the proposed concrete mix is to be tested to show that its coefficient of drying shrinkage is less than 0.045%. Tests are to be in accordance with BS EN 1367 pt 4.

The ground floor slab will be constructed so that the top surface tolerances comply with FM2 (Special) as defined in Concrete Society Technical Report 34, for free movement areas of the slab. The floor is to be surveyed to prove its acceptance within fourteen days of construction.

The ground floor slab wearing surface shall have a minimum abrasion resistance of AR1 in accordance with BS 8204 part 2 tables 3 & 4 or TR34 (2003) 3rd Edition Table 5.1. One abrasion test is to be carried out for each $10\,000\text{m}^2$ of slab or part thereof, in accordance with BS 8204 to confirm that appropriate abrasion resistance has been achieved.

After the final power floating operation, the floor slab is to be sprayed with an acrylic based, curing sealing and hardening membrane, with a curing efficiency of 90%. The floor shall not be trafficked by any vehicles for a minimum of four days following the sealing operation. Fully laden vehicles will not be allowed on the floor until the concrete has reached its design strength.

The ground slab is to be constructed on a 1200 gauge PIFA polythene damp proof membrane laid on a layer of hardcore with a minimum thickness as stipulated on the engineer's drawings.

The hardcore is to be laid to the specific minimum thickness in layers and compacted to provide a stable, smooth surface. Where necessary, the hardcore layer can be blinded with a fine material to close the surface, sand must not be used. The surface tolerance of the hardcore will be +0 mm and -10 mm.

Prior to concreting the slab, all roof and wall sheeting and loading doors must be fixed to provide protection from wind and rain. If due to programme restraints this cannot be achieved, then temporary sheeting must be used to seal all openings.

All saw cut joints are to be sealed prior to practical completion with Arboseal MP20. These joints are to be inspected at three monthly intervals during the defects liability period and checked for arris damage. Any significant arris damage must be repaired with an epoxy mortar placed in accordance with the manufacturer's recommendations. Armoured day joints are to be left unsealed.

All efforts should be made in the construction and detailing of the floor to reduce the possibility of random cracking. If cracks do occur, they are to be pressure grouted with a low viscosity epoxy if they are wider than 1.0 mm.

The office ground floor slab to be designed to take an imposed loading of $5\text{kN/m}^2 + 1.00\text{kN/m}^2$ for partitions with a surface tolerance and finish appropriate to the specified floor finishes.

2.8 Ground Beams

Concrete ground beams will be insitu or precast to Structural Engineer's details. Galvanised steel channels may be used as an alternative.

2.9 External Steps

Where applicable the external steps to the dock level area will be constructed in pre-cast concrete or galvanised steel, with a slip resistant finish. Handrails and balustrading will be provided in circular hollow, hot dipped galvanised mild steel sections. Steel staircases shall be provided with drilled drainage holes to prevent standing water.

2.10 Retaining Walls

Pre-cast retaining walls including dock leveller pits and tailgate slots will be provided to the dock area of the building all to the Structural Engineer's details.

External retaining walls to the sides of the dock access will be also of fair faced concrete all to the Structural Engineer's details.

Dock leveller pits bridging biscuits, where used, are to be manufactured from reinforced concrete and have a minimum loading of 50Kn/m^2 .

Armco or similar barrier galvanised mild steel and handrailing is to be provided adjacent to the retaining wall to level access ramps, to prevent HGV damage and to protect personnel from falling. The barrier uprights are to be surface fixed to the concrete.

3.0 Warehouse Superstructure

3.01 Steel Frame

The steel frame will be a portal frame with a minimum clear height to underside of haunch of warehouse of 12.5m, designed in accordance with BS 5950: Part 1: 2000 and BS 5950: Part 2: 2001 with dead and superimposed loading to BS 6399: Part 1: 1996 and BS 6399: Part 3: 1988, wind loading to BS 6399: Part 2: 1997, and all relevant codes of practice in force at the time of construction and generally to the satisfaction of the Building Regulations Authority. Steel sections to BS4: Part 1: 1993 and to BS EN10025: 1993 and BS EN10210: Part 1: 1994 for weldable structural steel. All work will be carried out in compliance with the current edition of the National Structural Steelwork Specification.

Bracing is to be CHS and is to be kept free from open areas/ internal stanchions, door, window openings and the like.

The frame and purlins will be capable of supporting a service loading arising from mechanical and electrical installation plant, equipment and fittings of 0.25kN/m² over the whole area of the roof. The office floor will be designed for a superimposed loading of 4.0kN/m² and an additional loading of 1.0kN/m² for partitions.

All columns will be designed with pinned bases, except where required for Fire Collapse by Technical Standards, where the bolts and baseplates will be partially fixed in accordance with the "Steel Construction Institute" guidance SC1-P-087.

The steelwork will be designed and constructed to allow the building envelope to achieve compliance to Technical Standards 6.1. In particular, a substantial steelwork member will be provided in hipped roof areas to directly support the roof sheets. All purlins and rails will be fixed in accordance with manufacturer's recommendations and will have a minimum thickness of 1.45 mm to assist a positive cladding fixing. All sheeting rails within 2.0m of FFL to be installed 'toes down' to prevent build up of debris.

All steelwork will shotblasted to BS 7079, second quality, before painting with one coat of epoxy 2 pack high build zinc phosphate to a nominal dry film thickness of 75 microns to give 10 years life to first maintenance, finished colour to be light grey. Cold formed sections will be manufactured from hot dipped galvanised coil to BS EN10147: 1992 and BS EN10143: 1993. Where steelwork is to be encased in masonry, it will receive two coats of bituminous paint. Where remedial works are required to webs, flanges, beams, columns or other steelwork that is visible in the completed building the whole area of the affected steelwork will be coated to provide a uniform appearance.

3.02 Fire Protection

Where protection of steel stanchions and frames is necessary fire proof sheeting or similar cladding or intumescent paint treatment, all to the satisfaction of the Building Inspector and as required by the Building Regulations.

3.03 Roofing

The external roof will be covered with 0.70 mm thick galvanised steel coated with Colorcoat HPS200® from Tata (colour from the standard range) with Confidex Guarantee.

The external profile is to be CA Building Products to trapezoidal panel reference CA32 1000R.

The roof cladding will be a non-fragile Twin-Therm™ system assembly, fixed in accordance with the recommendations of CA Building Products. The system incorporates CA Building Products CA LT17/1000

liner panel, minimum 200 mm non-combustible Therma-quilt and all related CA components, to achieve a designed thermal 'U' value of 0.25 W/m²°C.

Stainless steel fixings will be used throughout to provide a guarantee on the installed system of up to 25 years.

The minimum designed roof pitch will be 4.5° (3.0° after deflection).

The internal lining to the main roof will be Class 'O' rating for surface spread of flame, as tested to BS 476: Part 7 and LPS 1181 Class 'B'. All insulation to be classified by LPC as non-combustible.

The internal lining panel must be sealed at the side laps using 50 mm Therma-Foil Plus tape. The installer is to ensure that the tape is installed as the work proceeds.

Rooflights will be triple skinned, Therma-Light tested to BSD 4154 and will be provided to approximately 5% of the floor area, as detailed in CA Building Products instructions and are to be non-fragile for a period of 25 years.

Rooflights will be triple skin GRP, with an 8 oz (2.44kg/m²) inner and a 6 oz (1.83kg/m²) outer skin, with a tessellated central core and will comply with the 'U' values specified in the revision to Building (Scotland) Regulations Section 6, and are to achieve an actual 'U' value of 1.80 W/m²°C.

Annex "C" from the HSE Document ACR(CP)001:2003 "Recommended Practice for work on Profiled sheeted Roofs" is to be completed and submitted by the roofing contractor as part of the tender package for approval and acceptance by the Architect.

The disposition of rooflights over the warehouse/production area will be as even as possible, subject to constraints imposed by any applicable Fire and Boundary Conditions.

Any rooflight disposition shown on the drawings is notional only and may be varied by the Roofing Sub-Contractor, subject to approval, prior to construction so as to achieve the most economical and practical layout, provided that the disposition is fully in accordance with the requirements of the Building Regulations.

Roof Access

A permanent roof access hatch, access ladder and mansafe system will be provided to allow safe roof access and maintenance to all roof areas, including two sets of harnesses and lanyards. A landing will be provided below the access hatch such that the hatch can be opened/ closed without use of ladder.

The roof hatch is to be orientated to allow safe exit from the access ladder and co-ordinated with Mansafe system. Unauthorised use of access ladders to be prevented by ladder clamp or similar.

3.04 Rainwater Goods

The rainwater from the roof will be collected in 1.2 mm thick membrane lined pre-galvanised mild steel boundary wall and valley gutters. All gutters to achieve a minimum 25 year guarantee to match the roof. Gutters will be the wrap-over type, factory insulated using rigid 50 mm thick Rock-fibre insulation.

All gutters to be membrane lined.

The water will be taken from the gutters by a syphonic drainage system.

The roof drainage system shall be designed and constructed to comply with BS EN12056-3:2000 and the following criteria:

- The geographical location of the building;
- A building design life of 25 years;
- A 'Category 3' risk.

The system will be designed for a rainfall intensity which is the greater of:

- The amount properly calculated in accordance with the above;
- 0.056 1/s/m².

All pipework shall be installed above the portal haunch level to maintain minimum clear height as stated in clause 3.1.

All components of the system shall be in accordance with any relevant British or European standards.

Siphonic pipework shall be firmly attached to an engineered continuous railing system, using appropriate pipe clamps at a maximum of 2 m centres and at the ends of the pipework sections, to provide adequate and proper restraint against thermal movement of the pipe. Additional bracing will be provided at branch connections and where required. All outlet tail pipes are to be suitably insulated.

The railing system shall be fixed within 100 mm of the closest edge of the pipework and shall be securely fastened back to the main structure at appropriate intervals.

Both primary and secondary siphonic systems will be provided. The primary system shall drain 50% of the design rainfall intensity and the secondary system shall drain the balance.

The primary system will be connected to the storm drainage system. The secondary system will discharge external to the building. The main contractor shall provide suitable protection to any parts of the building or landscaping that might be damaged by the flow of water from the secondary system.

The secondary system rainwater outlets will be evenly distributed along the total gutter length and secondary discharge points shall be located at either end of the gutter and will generally be located approximately 300 mm above FFL. Discharge locations to be agreed with the Employer/Architect. Secondary eaves downpipes intermittently spaced along the eaves are not acceptable.

The external drainage will be designed with regard to the peak flows from the primary siphonic system and connection between the siphonic system and the underground pipework will provide a break at atmospheric pressure.

Indicative weir outlets will be provided to the ends of valley gutters and at 50 m intervals on perimeter gutters to provide advance warning of blockage of the siphonic system. This requirement applies to both single and dual pipe systems.

3.05 Vertical Cladding

The vertical cladding shown on the elevation drawings will be Twin-Therm™ from CA Building Products, incorporating either the CA32 1000W and/or CA45 1000W and/or PMF EP3 profiles finished in Colorcoat Prisma® on substrate to BSEN 10326:2004 Grade S220GD +ZA265.

The cladding will be designed to comply with wind loads calculated in accordance with BS 6399 and will be insulated to give a designed 'U' value of 0.30 W/m²°C using Therma-quilt 110 mm thick non-combustible insulation with Therma-Bars and CA Building Products CA LT17/1000 liner panel within the CA Building Products Twin-Therm™ system.

Stainless steel fixings will be used throughout to provide a guarantee on the installed system of up to 25 years.

Finishes at drip cap corner abutment door jamb/head will be provided in accordance with standard details attached.

Where required, under the Building Regulations, to provide a fire protection to an external wall, then the non composite construction will be upgraded to a firewall status as required by Twin-Therm™ system.

OR

The external skin will be Kingspan Microrib or Trimotherm, insulated composite panels laid horizontally (as shown on the elevation drawings), with a LPC / FM approved core. This cladding is to provide a designed 'U' value of 0.30 W/m²°C.

Where required, under the Building Regulations, to provide a fire protection to an external wall, the cladding system will achieve a two hour rating over one metre from a boundary.

The internal lining to any cladding is to be Class 'O' rating for surface spread of flame, as tested to BS 476: Part 7.

Internal lining material to be 0.6 mm thick and must only be manufactured from Tata material.

The External sheet shall be either 0.6 mm or 0.7 mm (dependant upon profile) Colorcoat HPS200® from Tata.

3.06 Air-Tightness

An air-tightness test is to be carried out by the Main Contractor prior to the Client obtaining access. This test must conform to all current legislative requirements and Building Regulations. The Main Contractor is to allow for all works in association with this test as required by BSRIA90. The air test should, as a minimum, comply with BS EN 13829:2001 and be to a minimum requirement of 5.0m³/hr/m² @ 50 Pa. A copy of the resultant report is to be provided to the Client. Any defects, etc., highlighted by the test are to be rectified by the Main Contractor prior to practical completion. When attending site to carry out the air-tightness test, the testing house are to bring with them all equipment to carry out a smoke test, thus aiding the rectification of any defects. This test, if required, can be carried out on the same day as the air-tightness test, therefore, causing minimum disruption to progress on site. This test is to be carried out whether or not required by the Building Control Officer.

3.07 Level Access Doors

The external level access doors indicated on the drawings will be as manufactured by Hörmann UK Ltd, reference SPU 40, and are to be A445 electrically operated insulated, sectional panel, vertical lift doors with spring support beam by door supplier at low level for ease of maintenance and 25 mm thermal movement provision on door tracks. Size 4800mm high x 4000 mm wide with 2 no neutral acrylic double-glazed vision panels in the 3rd door section. Also fitted with sliding bolts electrically interlocked and anti-fall devices.

The doors will be of composite construction comprising galvanized steel sheet inner and outer faces with nominal 42 mm x 625 mm deep laminated door panels with micro rib profile to give optimum 'U' value of 0.4W/m²°C.

Doors to be tested to European standard pr EN 12424 class 3 for high wind resistance offering a minimum 700 N/m².

Panel joints to be tested to European standard pr EN 12425 class 3 offering 70PA resistance to water ingress.

For personnel safety the door panels have an integral finger pinch protection on both sides built in at each moving joint. The bottom edge has a safe edge which will stop the door and return 150 mm in case of meeting an obstruction.

Door tracks and moving components at the jambs are to be fully encased with side- track covers. Both of the above comply with new directives to eliminate crushing, shearing and cutting risks to personnel from the door.

The surface finish to the external face of the doors will be RAL 9006 silver with internal finish of RAL 9002 off white.

3.08 Dock Access Doors and Equipment

DOCK ACCESS DOORS

Where shown on the drawings as manufactured by Hörmann reference SPU40 and are to be A445 electrically operated, insulated, sectional panel, vertical lift doors with spring support beam by door supplier at low level for ease of maintenance and 25 mm thermal movement provision on door tracks. Size 2860 mm wide x 3000 mm high (structural size 3000 mm wide x 3070 mm high) with 2 no neutral acrylic double-glazed vision panels in the 3rd door section. Also fitted with sliding bolts electrically interlocked & anti-fall devices.

The doors will be of composite construction comprising galvanized steel sheet inner and outer faces with nominal 42 mm x 600 mm deep laminated door panels with micro rib profile to give optimum 'U' value of 0.4 W/m² °C.

Doors to be tested to European standard pr EN 12424 class 3 for high wind resistance offering a minimum 700N/m².

Panel joints to be tested to European standard pr EN 12425 class 3 offering 70PA resistance to water ingress.

For personnel safety the door panels will have an integral finger pinch protection on both sides built in at each moving joint. The bottom edge is to have a safe edge which will stop the door and return 150 mm in case of meeting an obstruction.

Door tracks and moving components at the jambs are to be fully encased with side- track covers. Both of the above comply with new directives to eliminate crushing, shearing and cutting risks to personnel from the door.

The surface finish to the external fact of the doors will be RAL 9006 silver with internal finish of RAL 9002 off white.

DOCK LEVELLERS

All dock access door locations will be fitted with a Hörmann HLS-2-FR-20-25 fully hydraulic dock leveller of 6000 kg single axle load capacity 3000 mm x 2000 mm x 600 mm deep (+305 & -285 inclination) with TWIN hydraulic rams and 400 mm hinged curved swing lip. Platform to be 8/10 mm steel thickness complete with an EPDM rubber draught seal and 'T' type adjustable integral pit frame for suspended type dock levellers. Finish to be RAL 9017 black. Dock levellers operation to be interlocked with doors.

Dock Doors and Dock Levellers to be operated from a combined single control panel.

Dock height to be 1200mm.

Doors and dock levellers to be CE Marked to meet European Directives.

Tailgate slots are to be provided to all dock levellers.

DOCK SHELTERS

All dock access door locations will be fitted at Hörmann type DTSS heavy duty scissor type retractable dock shelter with crash resistant side frames with front side flaps reinforced, 1200 mm deep top flap and self adjusting top frame with rain channel for drainage purposes. Size 3500 mm wide x 4500 mm high x 600 mm projection with a secondary electrically operated roller blind with 2000mm drop. The external building line (external face of cladding) should be 100 mm – 125 mm set back behind the face of the front retaining wall.

Below each door location, two moulded rubber bumpers (450 mm x 250 mm x 100 mm) will be bolted to concrete dock with 15 mm thick steel front plates to the front of the buffer to give 115 mm projection.

3.09 Fire Exit Doors

The personnel fire escape doors will be galvanised mild steel in steel frames including ironmongery appropriate to location and use, and site applied paint finish to an approved colour. Door assembly is to achieve the required thermal performance. Door threshold to be designed to prevent ingress of water.

3.10 Fire Precautions

The requirements of all relevant and current legislation at the time the works will be undertaken, including compliance with the Building Regulations, Local Authority Inspector and/or Approved Inspector and the Fire Precautions Act will be incorporated, as indicated on the production information drawings, in respect of means of escape, fire resisting doors and partitions, fire exit doors and fittings and all associated signs and notices. Based on the assumption that a sprinkler system will be fitted as part of the works.

Signs and notices will comply with Associated Signs and BS 5499: 2000 (or the equivalent standard at the time of the works) 'Fire Safety Signs, Notices and Graphic Symbols, Specification for fire safety signs'.

Any other requirements of the Local Authority Building Control Department with regard to provision of Sprinkler installations, smoke ventilators, hose reels, heat sensors, extinguishers and other firefighting equipment are specifically excluded.

3.12 Warehouse Compartment Walls

Compartment walls between the warehouse storage areas, goods in, goods out and production area will be built in Rockwool filled composite panels such as Firemaster Premium to achieve a fire resistance of 1 Hour

4.0 Office Superstructure

4.01 Structure

The office block structural frame will be constructed in structural steelwork as shown on the Structural Engineer's drawings. The frame designed to BS 5950: Part 1 and 2 will be fire protected to achieve a fire resistance as required under the Building Regulations. All generally in accordance with clauses 3.01 and 3.02.

4.02 Roofing

All as Clause 3.03 except that rooflights will not be provided.

4.03 Rainwater Goods

1.2 mm thick pre-galvanised steel boundary membrane lined wall gutters from the CA Building Products single skin gutter range, with 3 mm polyester powder coated aluminium, secretly fixed fascia soffit and capping.

4.04 External Walls

The external skin will be Kingspan Microrib or Trimotherm, composite insulated panels laid vertically (where shown on the elevation drawings), with a LPC and FM approved core. This cladding is to provide a designed 'U' value of 0.30 W/m²°C. Where required, under the Building Regulations, to provide a fire protection to an external wall, the cladding will achieve a 2 hour rating over one metre from a boundary.

The internal lining to any cladding is to be Class "O" rating for surface spread of flame, as tested to BS 476: Part 7.

The Internal lining material to be 0.6 mm thick and must only be manufactured from Tata material.

The External sheet shall be either 0.6 mm or 0.7 mm (dependant upon profile) in Colorcoat HPS200® from Tata.

4.05 Curtain Walling/Windows

The curtain walling and glazing system shown to the office elevations will utilise a, fully thermally broken system comprising polyester powder coated aluminium mullions and transoms complete with factory sealed double glazed units with glazed and insulated spandrel panels, where necessary.

Glazing will be in 6 mm Antisun or body tinted glass (colour to be agreed) on clear glass outer pane or similar approved, 16 mm argon filled space and 6 mm 'low e' clear inner pane. Spandrel panels, where necessary, will be in ultra warm Permawall or similar, insulated panels.

Opening windows are to be provided on the basis of 1 in 3 glazed units (excluding the curtain walling). Opening lights will be 'top hung' with lockable handles. All windows to be in compliance with the CDM Regulations relating to access for cleaning and maintenance of windows and curtain walling all in accordance with British Standards recommendations.

4.06 External Doors

The front entrance and all office external doors and frames will be manufactured in polyester powder colour coated aluminium sections with concealed overhead door closers. All doors will be glazed to the recommendation of BS 952 and BS CP 6262 in laminated or safety glass to match windows and curtain walling.

Front entrance doors are to be provided with full height brushed stainless steel door handles to both sides of door leaf.

A letter plate is to be provided in or adjacent to the main entrance doors.

4.07 Upper Floor Construction

The upper floors of the offices to be constructed in prestressed concrete floor units, or insitu concrete on metal decking, designed in accordance with BS 8110 and BS 6399: Part 1 to carry a superimposed load of 4.00kN/m², with an additional 1.00kN/m² for lightweight partitions.

The plant areas above the office are to be constructed using prestressed concrete floor units, or insitu concrete on metal decking, designed in accordance with BS 8110 and BS 6399: Part 1 to carry a superimposed Plant room loading of 7.5 kn/m² .

Pre – cast units will be grouted in position and sealed to receive proprietary raised floor.

Areas not specified with a raised floor will have a minimum 50 mm thick fine concrete screed laid over the floor and include a layer of D49 structural fabric reinforcement. The top surface of the screed will be trowelled to receive floor finishes.

4.08 Internal Walls

Internal core walls to be constructed in proprietary stud partitioning using high density board such as Lafarge Megadeko or similar.

Where shown on the drawings, compartment walls between the offices, warehouse and production areas will provide 'minimum' 1 hour fire resistance. Any door or window openings within the wall will offer the degree of fire protection as required to satisfy Building Regulations.

Compartment walls between the offices, warehouse and production area will be built in Rockwool filled composite panels such as Firemaster Premium.

Partitions generally throughout the other office areas to be proprietary, gypsum and steel stud partition system, partitions to be upgraded as applicable in wet/moisture susceptible areas.

4.09 Staircase

The staircase and landings from upper floor offices will be designed and constructed in precast concrete to the Structural Engineer's details.

Balustrades will be formed in circular brushed stainless steel hollow section with matching handrails.

American light oak stringers will be provided to the exposed edge of the staircases, landings and as a skirting detail to adjacent walls.

4.10 Ceilings

Suspended ceilings will be provided as follows:

- a) Generally throughout the single storey offices and ancillary areas, Armstrong Dune Plus 600 mm x 600 mm Tegular tiles in lay-in grid system with a stove enamelled finish on wire hangers;

- b) Male and female works/warehouse toilets will have Armstrong Dune Plus 600 mm x 600 mm or similar moisture resistant tiles in lay-in grid system;
- c) A 25/50 mm shadow edge trim will be included to all office/circulation areas. The suspended ceiling system is to be earth bonded in accordance with IEE regulations and the suspended ceiling manufacturers recommendations;
- d) The floor to ceiling height to the ground and first floor office and ancillary areas will be 2.70 m and 2.40 m in the welfare and toilet areas. A consistent level floor will be provided throughout the office and ancillary areas.

Ceilings to stairwells or lobbies to be suitable clipped or incorporate suitable means of accommodating fluctuations in wind pressure.

4.11 Wall Finishes

- a) All internal walls unless otherwise specified throughout the offices, ancillary and circulation areas will be plastered/dry lined and fully sealed and then painted with one mist coat and two coats vinyl matt emulsion paint.
- b) All walls to the office toilets, cleaners store and ancillary lobbies will be tiled full height ceramic tiles with feature band. Feature band to be set nominally 1600mm above FFL or nearest whole tile. Disabled toilet walls to be suitably strengthened, as necessary, to accept grab rails.
- c) The internal walls to the main reception area will be finished as cl 4.11a
- d) The tea rooms will have a ceramic tiled splashback.

4.12 Floor Finishes

- a) Generally throughout the ground and first floor main office areas a raised access floor medium grade system as Hewitson RMG600 or similar, to MOB Construction and installation standards to provide a minimum 150 mm clear void. The standard medium grade 600 mm x 600 mm panels to receive carpet tile covering.
- b) Main entrance reception area, the stores and generally throughout the Ancillary, Amenity and Welfare areas will be power floated concrete or screed finish to receive carpet tile, vinyl or ceramic floor coverings.
- c) Generally throughout the office areas and unless specified, carpet floor tile coverings will be provided.
- d) The office toilets, ancillary lobbies, kitchenettes, tea rooms and cleaner's store will be tiled with 200 mm x 200 mm ceramic floor tiles with matching proprietary 200 mm x 100 mm coved skirtings. Shower floors to – non slip ceramic tiles.
- e) The ground floor reception area will have an enhanced feature ceramic 400 mm x 400 mm with feature inlay border and skirtings.

Feature band to be a full tile width, layout to be agreed.

4.13 Doors and Joinery

Internal doors throughout the offices will be solid core flush doors with non-tropical American light oak hardwood veneers and concealed lipped. Frames and architraves to be hardwood, to match door

veneers. The source of all hardwoods to be incorporated within the works is to be disclosed and approved and shall be procured from well managed and regulated sources.

Where required by the Building Control Officer, doors will have an appropriate fire rating and be fitted with intumescent strips, smoke seals, door closers and vision panels of size 150 mm x 750 mm in accordance with BS 8300 and Scottish Technical Standards Section 4.

Ironmongery will be appropriate to the location of the door and will be Grade 316 stainless steel door furniture with ancillary fittings.

Locks will be suited as follows:

Master key to all doors;
Submaster key to all ground floor doors;
Submaster key to all first floor doors.

Three sets of all keys to external doors shall be provided.

The ironmongery will be of a high quality commercial standard:

Toilet partitions will be manufactured by Total Laminates Limited or similar and approved, to be fully coordinated to vanity units and laminated faced boxing. All access panels within the WC areas will be hinged and lockable.

4.14 Fire Precautions

The requirements of the Building Control Officer will be incorporated, as indicated on the drawings, in respect of means of escape, fire resisting doors and partitions, fire exit doors and fittings and all associated signs and notices.

Signs and notices will comply with Associated Signs and BS 5499: 2000 'Fire Safety Signs, Notices and Graphic Symbols'.

Any other requirements or recommendations of the Local Authority Building Control Department, incorporating the Fire Prevention Officer with regard to provision of hose reels, sprinkler systems, heat sensors, smoke ventilators, extinguishers and other fire fighting equipment are specifically excluded.

4.15 Finishings General

In the main entrance lobby area to the full width of the reception area a matwell and frame consisting of an aluminium frame fixed into the concrete sub floor will be provided together with a barrier mat or good quality proprietary mat consisting of aluminium runners and brushes.

Internal cill boards to be hardwood veneered MDF board or similar complete with biscuit joints.

Ex 100 mm x 25 mm hardwood to match the door veneer, splayed skirtings for clear finishing will be provided throughout except where ceramic or vinyl skirtings have been specified.

750 mm x 400 mm (minimum size) mirrors with concealed fixings to the walls above the wash hand basins in all toilet areas.

Toilet roll holders and coat hooks will be provided in each toilet cubical.

4.16 Plumbing and Sanitary Ware

All toilet areas and cleaner's store will have Armitage Shanks or similar white vitreous china sanitary wear. All horizontal and waste pipework within toilet areas are to be concealed with suitable maintenance access.

Armitage Shanks 'Back to Wall' WC suites or similar will be provided with plastic seat and cover and dual flush plastic cistern located behind plastic laminate covered boxing and shall be complete with overflow indication, cisterns shall be 6/3 litre dual flushing.

Armitage Shanks china single bowl urinals with concealed traps and cistern within IPS panel system will be provided with matching high level cistern and stainless steel flush pipes and fittings.

Washbasins to toilets will be 585 mm x 420 mm Armitage Shanks self rimming basins or similar with push taps with aerated outlet will be fitted into plastic laminate covered blockboard vanity units. Captive basin wastes to be utilised.

Cleaner's sink, with bucket stand, will be provided with hot and cold water services.

A toilet compartment will be provided for the use of disabled persons, all in accordance with the Building Regulations (Doc M). The disabled alarm shall be provided adjacent to the toilet and will be both visual and audible.

4.17 Kitchenette/Tea Room

The Kitchenette/Tea Room areas (2 no.) will be fitted with Howden Joinery Co. Greenwich range or similar base units with worktops over and wall cupboards. A single drainer stainless steel sink top with mixer taps will be provided.

Layout to incorporate suitable space for refrigerator and dishwasher under worktop.

4.18 Shower/Changing Facilities (for Cyclists)

Showers and changing facilities including space for lockers (by Tenant) are to be provided for staff and visitors as indicated on the drawings.

4.19 Passenger Lift

The lift to facilitate disabled access to the upper floors will be a ten person/800kg capacity hydraulic or electric traction passenger lift to meet the requirements of EN81-2 and Part M2 Building Regulations for disabled access.

Each landing will have stainless steel lift entrance doors and surround. Stainless steel push button controls will be located adjacent to the lift entrance doors. Should the building layout be such that fire resistant landing doors are required to the lift, the doors will meet the fire resistance required by the Local Authority. Jamb protection by way of a hardwood lining will be provided to the lift opening on all floors.

The lift car will have plan dimensions of 1350 mm x 1400 mm deep, constructed of steel and complete with stainless steel car doors carpeted floor, decorative laminate or stainless steel walls, stainless steel ceiling and half height rear mirror. A full set of car controls incorporating floor selection buttons will be fitted at a height to comply with Part M2 Building Regulations.

The electrical contractor shall supply and install a local distribution board suitable for the size of lift and shall carryout lighting to the lift motor room. It shall be the lift manufacturer's responsibility to connect to this board for all necessary supplies and lighting to the lift shaft.

The lift will be installed but not commissioned until the fit-out works being undertaken by the client are completed. It will be the Tenants responsibility to install the 'Redcare' emergency phone line.

5.0 External Works

5.01 Service Yard Area

The service yard and associated access areas will be excavated to the required formation level, trimmed and compacted with a layer of hardcore to the engineer's details blinded with fine chippings or clinker ash.

Sand or rock sand will not be acceptable material for finishing the hardcore layer.

Where the slabs are constructed in phases, the compacted hardcore layer must be constructed at least 1m beyond the relevant shutter lines to ensure that infill bays can be adequately compacted and finished.

The surface tolerances to the sub-base layer should be +5 mm or -30 mm.

A minimum 190 mm thick slab of concrete will be laid on 1000 gauge polythene or similar using an entrained concrete with a minimum cube strength of 35N/mm² at 28 days, reinforced with one layer of structural fabric to the engineer's details.

Bay sizes and all longitudinal, contraction, induced expansion and isolation joints will be formed in accordance with the recommendations of the structural engineer. All external joints to be sealed at Practical Completion. The slabs will be laid to maximum falls of 1:30 (except for localised access ramps) and minimum falls of 1:80 with the gradients generally sloping away from the building.

The surface of the concrete is to be 'brush' finished, to provide grooves parallel to the slope of the pavement, with 100 mm trowelled margins adjacent to the shutters.

The surface tolerance for the concrete pavement should be ±10 mm.

As soon as excess moisture has evaporated from the surface of the concrete a resin curing compound should be sprayed uniformly over the still plastic concrete. During hot sunny periods a curing compound containing a suspension of fine particles of aluminium or other white pigment should be used.

During adverse weather conditions including hot sunny periods, winds in excess of 10 mph, and rain, the slabs should be protected with suitable tents of polythene or similar, in addition to the curing compound.

Bollard protection will be provided externally to the warehouse level access doors.

5.02 Car Parks

- a) Macadam surfacing to car parking areas, where indicated on the drawings, will be laid on a prepared hardcore bed minimum 150 mm thick with a 100 mm consolidated thickness of two course bituminous macadam, consisting of a 75 mm base course with a 25 mm wearing course (all as Engineers details).
- b) White linings to car parking areas will be to a total width of 75 mm.
- c) Car parking spaces will be of a size 2.4 m x 4.8 m minimum and the road width between bays will be 6.0 m minimum. Disabled car parking spaces will be to a size of 3.6 m x 6 m and 5% of the total number of spaces or to meet current legislation.

5.03 Kerbs

Where indicated, 254 mm x 127 mm half battered precast concrete kerbs to BS 340 bedded onto a 325 mm x 150 mm concrete base and haunches with concrete will be laid. Dropped kerbs to be provided at pedestrian cross overs and cycle routes (all as Engineers details)

5.04 Footpaths

Footpaths will be excavated to formation level, trimmed and compacted and provided with a minimum 100 mm thick stone hardcore base blinded with fine stone sand or clinker ash and finishes as:

- a) 60 mm thick contrast colour concrete block paving, to the office elevations and entrances will be laid on a maximum 50 mm bed of sand, well vibrated, with joints filled with dry wash sand;
- b) 50 mm thick precast concrete paving slabs to ancillary paths and margins around the warehouse (where indicated on drawings) will be laid on a maximum 50 mm sand lime bed, well vibrated, with joints filled with dry wash sand.

5.05 Landscaping

The soft landscape scheme is to be designed and constructed during the earliest planting season.

The scheme prepared will include design, ground cultivation, compost, planting, forest bark and twelve months maintenance. The scheme prepared will obtain the approval of the Planning Authority. Topsoil, to be provided by the contractor, and will be a minimum of 150 mm thick to turfed areas, 450 mm thick to shrubs and planting beds and 1.00m³ to tree pits.

An external watering point positioned to suit the landscaping design will be provided in accordance with clause 7.04.

5.06 Drainage

- a) General

Connections from the site boundary to main foul and surface water sewers will be made in accordance with the requirements of the Local Authority.

The drainage system generally will be in accordance with:

- | | |
|---------|---|
| BS 65 | Specified for Vitriified Clay Pipes, Fittings and Joints; |
| BS 6367 | Code of Practice for Drainage of Roofs and Paved Areas; |
| BS 8301 | Code of Practice for Building Drainage. |

Upon completion of the drains but after cleaning, a CCTV survey shall be carried out on all below ground drainage and a copy of the video included within the Health & Safety File and a copy handed to the Employers Agent before Practical Completion.

- b) Pipework

Foul and surface water drainage will be constructed to the details shown on the drainage drawings. Drainage pipework internal to the building areas will have a concrete bed and surround.

Where required, pipework will be protected in accordance with the 'Simplified Tables of External Loads on Buried Pipelines'.

All necessary bends, junctions and other fittings required to complete the work will be provided. Flexible joint collars will be provided to drainage pipework when leaving the building areas.

c) Manholes

Manholes will be constructed to the depths required using either precast concrete rings or heavy duty cover slabs or in Class B engineering brickwork. The bases of manholes will incorporate all necessary clayware channels and junction fittings and will be benched in fine granolithic concrete.

Galvanised step irons will be included in the walls of manholes and the manhole covers will be of galvanised steel or cast iron of an appropriate load bearing capacity.

d) Gullies

Gullies to forecourt and car park areas will generally be precast concrete road gullies 150 mm outlet, trapped with rodding eye to BS 5911 fitted with heavy duty cast iron gully grate and frame to BS 497: Part 1.

e) Petrol Interceptors

An alarmed petrol/oil interceptor will be installed and ventilated to serve the surface water drainage system to external paved areas. Alarm panels to be located in gatehouses, where applicable, or reception.

5.07 Ramps

Where ramps are required to be provided for access into the building for disabled persons or for trolley access, these will be designed in accordance with BS 8300 and surfaced as shown on the drawings, complete with handrails as applicable.

5.08 Fencing

Where indicated on the site layout drawing to the perimeter of the site (excl. car park) 2.0 m high 'paladin' fencing, complete with 1 pair of manually operated lockable gates and necessary pedestrian gates will be provided. Fences to be suitably set back from vehicular areas to reduce risk of accidental impact. Fencing/ landscaping to be co-ordinated such that maximum gap beneath fence does not exceed 100mm.

5.09 Cycle Shelter and Storage

Sheltered cycle storage is to be provided for staff and visitors as indicated on the drawings.

6.0 External Services

The Mechanical and Electrical Contractor shall carryout all necessary calculations and liaison with Utility Authorities and Shippers. In order to obtain necessary supplies for the continuation of the works and the subsequent operation of the entire premises.

Meters shall be ordered by the Main Contractor.

All meters shall be capable of being monitored by a future BMS system.

6.01 Electric

An incoming electric service of kVA is to be provided to the building

An incoming service duct shall be provided for the Local Electricity Board to lay in a HV supply to a ring main unit located at the boundary with HV metering.

The electrical contractor shall provide a suitable transformer, earth mat and LV cables.

6.02 Gas

A gas service is to be provided based onKW Gas Peak (.....million kWh per year) The trench will extend from the site boundary to the intake position.

6.03 Water

A metered domestic water supply will be provided from the site boundary/public supply to serve the building.

A dedicated client pulse meter will be provided capable of being monitored from a BMS, the meter shall be complete with high flow and duration alarms to an alarm panel located at reception.

A hydrant main shall be provided if required to satisfy building control including any necessary hydrants.

6.04 External Ducts

2 ducts will be provided from the site boundary to a designated intake point to serve the communications requirements of BT. 2 no additional duct systems shall be provided for use by others. Each set of ducts will enter the building and pass below ground to provide a system to cater for the future.

2 no vacant ducts not less than 75mmØ will be provided from the corners of the building to external locations within the soft landscaping to suit the required wire ways of a possible future CCTV installation and external signage provision.

1 no 75mmØ duct shall be provided from the building to any remote utility meter.

2 no 100mmØ shall be provided from the building to any pumping stations, interceptors or other items requiring power/monitoring which are remote from the building.

All ducts will be left clear with drawcords.

7.0 Mechanical Services

7.01 General

The mechanical services works will be designed and installed in compliance with the recommendations of the CIBSE Guide, current British Standards and Codes of Practice, Building Control Officer's requirements, Clean Air Act, Gas Safety Regulations, Local Water Board requirements and Health and Safety at Work Act.

7.02 Design Conditions

The following design parameters shall be employed in the carrying out of all design works.

External °

Winter -5°C minimum

Internal (Heating Only)

Office:

Winter 21°C ± 20C

Toilets 19°C ± 2°C

Stairs 18°C ± 2°C

Frost 12°C ± 2°C

Occupancy

Office 1 person/7.5m²

Meeting Rooms 1 person/4.5m²

Ventilation

Offices 12L/S/person

Toilets 10Ac.Hr extract

Tea Rooms & Kitchenettes 10Ac.Hr extract

Infiltration

Offices 1 Ac/Hr

Noise Criteria

Offices 40 – 45 db Laeq 20

Toilets 45 – 50 db Laeq 20

Plant Room NR50

External NR65 at 1m

System Parameters

LPHW

Flow and Return 82°C – 71°C

Flow Velocity 2.5m/s maximum

Pressure Drop 300Pa/m maximum

7.03 Main Office Heating

A gas fired low pressure hot water radiator heating system will be afforded throughout the office areas, toilets and ancillary/welfare areas, staircases, landings and reception. The main plant will comprise a gas fired atmospheric sectional cast iron boiler, duplicate heating circulating pumps in a duty and standby arrangement, twin wall metal flue to above roof, wall mounted control panel, pipes, valves, fittings and thermal insulation.

The boiler shall be fully condensing low NO_x type with maximum CO₂ emissions of 0.4kg/KWH and an efficiency greater than 85% at full output.

The main distribution pipework will be extended, where possible, in concealed void spaces to serve radiators of the pressed steel flat fronted panel type located generally below windows. All pipework within the voids will be thermally insulated to BS 5422.

Any pipework exposed to view will be chromium plated and run in a neat manner to serve radiators with thermostat radiator valves on the flow and lockshield valves on return connections.

7.04 Domestic Water Services

A mains cold water service will be extended from the intake point of the offices to serve all tanks and the tearoom.

All outlets will be directly mains fed with all control devices, including back siphonage, as required to comply with water regulations.

No water storage will be provided.

Distribution pipework will be extended to serve all draw off points in the toilets, all pipework within voids will be thermally insulated to BS 5422 where pipework is exposed within fully tiled toilet areas it will have a chrome plated finish with matching fittings and brackets.

Domestic hot water to the toilets, cleaner's sink and tearoom will be provided by an energy efficient, not less than 85% at full output, gas fired hot water generator. Automatic timed operation will be afforded the generator and hot water service circulating pump serving flow and return copper pipework extending to all draw offs.

The complete system shall be sterilised and tested as required for a fully portable system and the prevention of Legionella regulations.

A single external watering point will be provided, comprising a WRC approved outlet complete with hose union tap. The supply shall be taken from the metered MCWS and shall be compliant with the relevant water byelaws.

7.05 Ventilation

A mechanical ventilation system will be provided to the open plan offices.

Generally, the system will comprise a supply air handling unit with fresh air intake, filter (F5), LPHW heater battery, supply air fan, galvanised ductwork to DW144, attenuators and ceiling diffusers.

A mechanical supply and extract ventilation system will be provided to the male and female toilets and cleaner's room comprising grilles, galvanised ductwork, crosstalk attenuators and twin fan extract unit with discharge through roof. A system of supply fresh air will be arranged to the lobby areas of the

toilets and transferred into the toilets via an undercut door or via air transfer grilles as approved, to provide a degree of make-up air.

The kitchenette and lift motor room shall be served by separate extract ventilation systems; the kitchenette system will be operated by interconnection with the lighting circuits, whilst the lift motor room will operate from a room thermostat. The lift motor room system shall be sized to meet the lift manufacturer's requirements, a shaft vent shall be provided.

7.06 Controls

A central control panel will be provided within the plant room having the following:

- a) Weather compensation to radiator circuits;
- b) Optimisation;
- c) Boiler – timed start/stop, lockout;
- d) Pump – start/stop, select, trip;
- e) AHU – timed start/stop, filter dirty, fan failure, supply temperature control;
- f) Toilet extract – timed start stop, fan selection, trip;
- g) Water heater – start;
- h) Pressurisation alarm;
- i) Lamp test.

All plant will have controls of a suitable type to allow for the future connection of BMS system (BMS provided by others). The building will have electronic controls including an optimiser for the heating system. A remote panel with buzzer, mute switch and indicator lamp will be provided within the reception area to indicate any main mechanical plant failure.

All lamps shall be transformer type and the panel will be complete with door interlock isolator.

Hot and Cold water services.

Max. velocity: 1.5m/s (2.0m/s for mains water only)
Pressure drop: To suit available head requirements
Temperature drop on secondary return circulation: 10°C max

Ductwork

General Supply and Extract Systems: -

Max. duct velocities Main Ducts: 5m/s
 Branch Ducts: 4m/s
 Final connections: 3m/s

Max. louver face velocities Air Intakes: 1.7m/s
 Air Exhausts: 2.0m/s

Max. duct pressure drop 1Pa/metre

7.07 Offices Ventilation

General Office's Ventilation - Winter Months

Full Supply and Extract Mechanical Ventilation shall be provided in accordance with the Design Standards to all office areas during the winter months with the building effectively being sealed, i.e. windows remaining closed.

Mechanical ventilation shall be provided from air handling units located on the designated plant deck (as described in 4.01) (one per each office) distributing air at room temperature for fresh air and general ventilation purposes, via galvanised ductwork installed to the requirements of DW144 through to ceiling mounted diffusers and grilles to enclosed spaces.

Supply and Extract fans incorporated within the air handling unit (s) shall be inverter driven such that fans may ramp up and down to the dictates of the control system and reduce energy consumption accordingly.

Attenuators shall be installed as part of the installation in order to maintain noise levels below those detailed within the "Design Conditions".

Extract air shall be drawn from the offices spaces and exhausted to atmosphere via the heat exchanger section of the air handling unit so that maximum use is made of "free" heating from the return air.

Heat Recovery systems employed must be included on the ECA Scheme 'Energy Technology list'.

Fresh air inlets shall be positioned so that entrainment of exhaust air from either general extract or the toilet extract systems is not possible. Where possible fresh air inlets and exhaust outlets shall be provided at building roof level via roof cowls or at high level on the building via louvres, dependent upon air volume requirements.

In connection with the above, the spacing between exhaust air and inlet air shall be provided to be compliant and satisfy the following BREEAM Credits:-

Title	Credit Reference
Indoor Air Quality	HEA 8

The supply air shall be heated via heating coils within the supply sections of the Air Handling Unit drawing constant temperature L.PHW from the main boiler plant. Frost coils shall be provided in air handling units to protect Air Handling Unit components (filters, etc) from freezing.

Supply air shall be filtered within air handling units with a final grade of filtration of EU6 provided. A panel type pre-filter shall be provided to protect the main filter.

Tempered air shall enter each zone at room temperature allowing perimeter radiators to deal with the fabric loss.

Supply air diffusers shall be located in sufficient numbers so that down draughts and noise will not be a problem and that there is a complete distribution of supply air throughout the office areas.

Extract grilles shall be in sufficient number and positioned accordingly to extract air from each zone, whilst also ensuring their positioning takes full advantage of the mixed mode design solution for summertime where proven necessary.

Branches shall be taken from the main supply ductwork to feed make up air to the toilets as described below.

The complete system shall have all necessary fire dampers and VCDs for balancing purposes, and each of the fans shall be suitably attenuated at source.

All ductwork will be thermally insulated to BS 5422 and identified in accordance with BS 1710.

Insulation shall be installed accordingly to achieve compliance and satisfy the following

BREEAM Credits:-

Title	Credit Reference
Insulation	MAT 6

Mechanical Ventilation to Toilet Areas

Extract ventilation shall be provided within each of the toilet areas. Toilet systems shall be independent and shall comprise of duty & standby extract fans drawing air via galvanised sheet metal ductwork installed to DW144 and ducted from ceiling mounted egg crate grilles. Attenuators shall be installed as part of the installation in order to maintain noise levels below those detailed within the "Design Conditions". Cross talk attenuation shall be incorporated within the design to prevent noise transfer from one space to another.

A system of supply fresh air will be arranged to the lobby areas of the toilets and transferred into the toilets via an undercut door or via air transfer grilles as approved, to provide a degree of make-up air.

Extract fans shall be installed on the designated plant decks (as described in 4.01) with discharge to outside in a location where entrainment in any of the building supply air inlets or openings (windows/doors) is not possible.

The Spacing between exhaust air and inlet air shall be provided to be compliant and satisfy the following BREEAM Credits:-

Title	Credit Reference
Indoor Air Quality	HEA 8

Each system shall have all necessary fire dampers, VCDs and shall be controlled from the main control panel also located on the designated plant deck with auto-change over and duty sharing.

Kitchenette and Lift Ventilation

The kitchenette and lift motor room shall be served by separate extract ventilation systems; the kitchenette system will be operated by interconnection with the lighting circuits, whilst the lift motor room will operate from a room thermostat. The lift motor room system shall be sized to meet the lift manufacturer's requirements, a shaft vent shall be provided.

7.09 Energy Metering Monitoring

In accordance with the requirements of Part L2 and CIBSE TM39:2006, energy and utility metering monitoring shall be provided.

The systems for monitoring shall include but not be limited to:

- Rainwater Systems
- Cold Water Systems
- Hot Water Systems
- Heating Systems
- Gas Systems
- Lighting
- Electric

Each of the meters and sub meters shall have the M-bus AMR built in.

The M-bus AMR shall linked to the dedicated energy monitoring control panel located within the building to enable the utility and energy usage to be monitored, providing real time information, trend logging, data management, etc.

The dedicated energy monitoring control panel shall be interfaced via the internet to a dedicated TREND iMAT on line monitoring and targeting package.

The Contractor shall supply, install, test, commission and set to work the dedicated M-bus Automated Meter Reading (AMR) System along with the TREND iMAT package.

The Sub Metering provided shall be compliant and satisfy the following BREEAM Credits:-

Title	Credit Reference
Sub Metering of substational energy Uses	ENE 2

7.10 Building Management System - Controls

A central Mechanical Control Panel shall be provided on the dedicated plant deck (as described in 4.01).

The Mechanical Control Panel shall monitor and control the offices heating, ventilation, domestic hot and cold water systems.

The Mechanical Control Panel shall incorporate the latest TREND IQ display screen.

Heating

The Mechanical Control Panel shall directly monitor and control the following:

- Heating Pressurisation Unit Alarms (Control: Hand/Auto/Off) (Monitor: Run/Trip Lamps)
- Thermal Link (s)
- Gas Safety Knock Off Button

- Gas Solenoid Valve (Open/Closed Lamps)
- Boiler Interface and status (Control: Hand/Auto/Off) (Monitor: Run/Trip Lamps)
- Weather Compensation via internal and external temperature sensors and 3 port valve
- Integral Optimisation
- Timed Start/Stop of Variable Speed Variable Temperature Heating Pumps (Control: Hand/Auto/Off) (Monitor: Run/Trip Lamps)
- Timed Start/Stop of Variable Speed Constant Temperature Heating Pumps (DHW and Ventilation) (Control: Hand/Auto/Off) (Monitor: Run/Trip Lamps)
- Primary Heating 3 port control valve to Domestic Hot Water Cylinder(s)
- Temperature and Pressure Sensors
- Time zone control

Domestic Cold Water

The mechanical Control Panel shall directly monitor and control the following:

- Constant Speed Cold Water Booster Set (Control: Hand/Auto/Off) (Monitor: Run/Trip Lamps)
- Temperature and Pressure Sensors.
- High/Low Level alarms from internal rain water storage tank (s) (Monitor: High/Low Lamps)

The Mechanical Control Panel shall monitor only the following from the dedicated Rainwater Control Panel:

- Dirty I blocked filter alarm (Monitor: Run/Trip Lamps)
- Zero flow (Monitor: Run/Trip lamps)
- Pump run/trip/fail (Monitor: Run/Trip lamps)
- Flow detection (Monitor: Run/Trip Lamps)
- Mains water meter readout for consumption monitoring (via dedicated energy monitoring panel)
- Rainwater meter readout for consumption monitoring (via dedicated energy monitoring panel)
- Tank low level warning
- UV disinfection unit monitoring

Ventilation

The Mechanical Control Panel shall directly monitor and control the following:

- Main AHU Fan Failure (Monitor: Run/Trip Lamps)

- Main AHU Filter Status (Monitor: Dirty/Clean Lamps)
- Main AHU Supply Temperature Control
- Main AHU Time zone control
- Main Toilet Extract Fan Failure (Monitor: Run/Trip Lamps)
- Main Toilet Extract Fan Time zone control

All lamps shall be of the LED type located on the mechanical control panel and shall enable a Lamp test to take place. The panel will be complete with door interlock isolator.

Testing and Commissioning

All services will be tested and commissioned in accordance with CI85E technical memoranda and guides.

Services shall be left fully operational

Seasonal commissioning shall take place over a period of 12 months and generally to the requirements outlined within BREEAM 2008 to satisfy the following BREEAM Credits

Title	Credit Reference
Commissioning	MAN 1

Two working weeks prior to Practical Completion a draft copy of the Operational Maintenance Manual will be issued. Following Practical Completion, two sets of complete operating and maintenance manuals including the Health and Safety File will be provided incorporating "as installed" drawings, test and commissioning certificates, manufacturers literature and emergency telephone numbers.

Note that the system will not be accepted as practically complete until a Test / Completion Certificate is presented unless otherwise agreed with the project manager.

7.13 Health and Safety Files/Operating and Maintenance Manuals

The Health and Safety Files/Operating and Maintenance Manuals are to be in the format as detailed within the Employers Requirements.

A draft copy is to be made available two working weeks prior to Practical Completion and two hard copies at Practical Completion. An electronic version of the file is also to be provided to follow the same format as the hard copies following Practical Completion. The electronic version is to be provided by Camryn Designs Limited tel. 01789 491591 (contact Sadie Reeve.)

Compliance with the issuing of this information generally to the requirements outlined within BREEAM 2008 to satisfy the following BREEAM Credits:-

Title	Credit Reference
Building User Guide	MAN 4

7.14 Consultants Witnessing

The Contractor shall nominate a suitable person to monitor the commissioning on behalf of the client in accordance with BSRIA and CIBSE Regs and ensure the system achieves the BREEAM accreditation MAN 1 referenced in the "testing and commissioning" section above.

8.0 Electrical Services

8.01 Testing and Commissioning

The electrical services work will be designed and installed in compliance and the recommendations of the 17th Edition of the IEE Wiring Regulations plus amendments, current relevant British Standards and Codes of Practice, Building Control Officers' requirements, the Electricity Supply Regulations and Health and Safety at Work Act.

8.02 Electricity Supply

The electricity supply to the building will be drawn from the Electricity Board supply network and will be metered at LV with a capacity to be determined in conjunction with the Client in the order ofkVA. The main intake and meter will be located within the switch room together with the main building panel board.

8.03 Panel HV switchgear and Distribution Boards

The Contractor shall supply LV switch panels as detailed below and suitable switchgear for the connection of the 11kv supply to the test area.

MCCB devices shall be used.

The main switch panel shall conform to BS EN 60439 Form 4 Type 2 with Form 4 type 3 offered as an alternative cost.

All Switch panels shall be tested and ASTA certified to withstand a short circuit fault level of 50kA for 3 seconds.

Switch panels shall offer a degree of protection against the ingress of dust and liquid to at least IP42 classification.

Busbars shall be copper, tin plated and fully braced and supported. All neutral and earth bars shall be pre-drilled.

Switch panels shall have long life enclosures fabricated from corrosion resistant zinc coated sheet steel with durable electrostatically deposited epoxy powder paint finish.

Hinged cable gutter covers shall be provided together with adequate cable space and removable gland plates.

The main switch panel shall be sized to allow for the maximum power demand of the office and production areas and shall be modular such that it is fully extendable to allow for additional MCCB's to be fitted for future fit out requirements.

A minimum 25% spare capacity of outgoing devices or 4 spare 3 phase (100A) ways shall be provided on all switch panels whichever is greater.

All auxiliary cables shall be provided with wire numbers at each end to facilitate ease of identification.

The Contractor shall include for providing MCB distribution boards within the office areas and where required within the warehouse, in order to serve final sub circuits throughout the building. Separate distribution boards are to be provided for lighting and power in accordance with the building regulations on sub metering.

All distribution boards shall comply with the following: -

- a) Distribution boards for final sub-circuits shall comply with BS 5486, part 12 and shall be of the miniature circuit breaker type using suitably selected BS EN 60898 circuit breakers.
- b) All distribution boards shall have hinged lockable front covers to prevent unauthorised access.
- c) Provide 2 No. Spare keys for every lock provided on the distribution board.
- d) RCBO's shall be provided to all power circuits serving cleaners sockets, plant rooms corridor/lobby areas. Where an RCBO occupies two ways this shall not encroach into the provision if spare ways within the distribution board.
- e) All miniature circuit breaker distribution boards shall be complete with Integral on load Isolators.
- g) Distribution board circuit reference charts shall be typed and contained within a plastic protective wallet. This wallet shall be secured affixed to the inside of a hinged lockable cupboard of the distribution board.
- h) 25% spare capacity shall be provided in all distribution boards. The 25% spare capacity shall be fitted with one spare MCB of each size used. The remainder of the spare ways shall be fitted with blanks.
- i) Where cable containment systems connect to distribution boards, the maximum capacity shall be maintained whether needed for the works envisaged under this contract or not. It shall therefore be possible to add cables at a later date to utilise the 25% spare ways without altering access into the distribution boards.

8.06 Lighting Installations

The Contractor shall ensure that all lighting is designed and installed in compliance with the following criteria.

The maintained luminance for each area shall be: -

Area	Lux Level
General Offices	500 Lux dimmable, set at 400 Lux (0.75m working plane)
WC's	200 Lux
Reception Area	300 Lux
Main Entrance	300 Lux
Corridors, Staircases and Circulation Areas	150 Lux
Plant rooms & Riser Cupboards	200 Lux to suit plant layout
Production Area	300 Lux
External Lighting Plant Areas	100 Lux to suit plant area
External Lighting to Lorry Yard and other areas	As CIBSE Lighting Guide 6 and as fully outlined below within external lighting description.

Illuminance levels shall be treated as being at floor level unless otherwise stated.

Reference should also be made to the appropriate CIBSE Guides, including the latest amendments to LG3, LG7 and to British Standard BS EN 12464-1 in reference to the above areas and areas which may not be listed.

The emergency lighting levels for each area shall be: -

Area	Lux Level
Centre line of escape routes	1 Lux (minimum)
Windowless accommodation	1 Lux
Open plan areas of more than 60m ²	1 Lux

Illuminance levels shall be treated as being at floor level unless otherwise stated. The system shall satisfy the requirements of a NM3 system.

Reference should also be made to BS 5266, where applicable.

The Lighting systems detailed within this section above shall also be compliant and satisfy the following BREEAM Credits:-

Title	Credit Reference
External Lighting	ENE 4
High Frequency Lighting	HEA 4
Internal and External Lighting Levels	HEA 5
Lighting Zones and Controls	HEA 6
Reduction of Night Light Pollution	POL 7

Lighting uniformity levels of 0.7 or better shall be achieved by all installations where the working plane is taken as floor level. For areas where the working plane is taken as being work surface height a uniformity of 0.8 or better shall be achieved.

The glare indices must not exceed 19.

Maintenance factor for luminaires shall be considered to be 0.80

In the absence of actual room finishes data then reflectances shall be assumed to be 70%, 50%, 20%, for ceilings walls and floors respectively. Production area reflectance shall be assumed to be 30%, 30% and 20% for ceilings, walls and floors respectively.

The lighting type shall comprise the following:

Offices General	600 mm x 600 mm square fluorescent recessed high frequency lay-in modular luminaires with low brightness diffusers consistent with LG7 as per Thorlux or equal and approved. Lamps TS or PL colour 840 long life; Marshalling boxes shall be used so that 2 spare ways are available in each 8 gang box.
Tea Room/Kitchen	600 mm x 600 mm square fluorescent recessed high frequency lay-in luminaires with FR dished prismatic controller. Lamps TS or PL colour 840 long life;

Toilets and Ancillary	Compact florescent recessed downlights with spill ring with supplementary LED GU10 spotlights to mirrors;
Production Area	Production area lighting shall be linear fluorescent luminaries incorporating high frequency control gear. Control shall be arranged into zones, minimum 5 no and switched from one single point of staff entry. Daylight sensors shall be incorporated to each zone, to consist of 2 N° averaging sensors adjustable in level to allow dimming to 10% of normal lamp output. Each zone will be fitted with PIRs at every point of entrance. The PIR's will be adjustable for time and shall work in conjunction with the daylight sensing.
Reception/Main Entrance	Uplighter/downlighter type feature lighting to give an enhanced effect.
Emergency Lighting	<p>Self contained non-maintenance three hour emergency luminaries to all fire exits, corridors, toilets, staircases both internal and external, reception and to the office areas all in accordance with Fire Officers' requirements and BS 5266: Part 1 and 2.22 emergency lighting will be integrated into the main lighting fittings. All emergency lighting will be provided with test key switches adjacent to distribution boards;</p> <p>Exit signage will be Thorlux scanlight, LED or equal and approved.</p>
External Lighting	<p>Reference will be made to CIBSE Lighting Guide LG6 - The Outdoor Environment and the following description when designing the external lighting. Metal Halide Floods, Kingfisher Q3/Q5 series to building periphery and on columns to provide a minimum average of 30 lux with 40% uniformity within service yard as per BS EN 13201 - 2:2003, Table 2 #Class CEI. For local lighting above loading bays Metal Halide Floods, Kingfisher Stellar 1 Asymmetric Reflector with zero tilt mounted flat to ground. Car Parking and Road Areas from 4 - 6 metre high columns with Kingfisher Kaos 1 lantern with Cosmopolis White lamps to provide an average of 15 lux with a minimum of 5 lux at kerb lines all controlled by photocells/timeswitch located in the gatehouse. Local increase to 50 lux at the staff entrances and loading bay area.</p> <p>A minimum efficiency of 50 lamp lumens/circuit watt will be achieved to access way and pathway lighting. Flood lighting shall achieve a minimum 70 lamp lumens/circuit watt.</p>

All lamp columns adjacent to service yards/ access roads to be set back from kerbs or protected by Armco type barriers. All lamp columns in car parks to be located in landscaped areas or alternatively protected by a barrier system.

Lighting Control

All internal lighting shall be controlled via PIR's with a maximum of 6 fitting/PIR. Daylight override shall be provided to the main offices consisting of perimeter zones to the windows 4m deep by 6m long maximum with adjustable level sensing to provide dimming to 10% of maximum.

8.08 Fire Alarms

A fire alarm system will be provided to the offices of the fully automatic and fully addressable analogue type, all in accordance with the requirements of BS 5839 and the Building Control Officer. It shall include detection in all ceiling voids over 800mm. The equipment will incorporate a flush fitting main fire alarm panel located in the reception area, location to be agreed, break glass manual contacts on all escapes to provide a complete system with zones being arranged to generally suit the Client's requirements.

Spare zones will be provided to permit the future addition of warehouse areas. Sounders will be provided throughout the offices to accord with the standard.

Cabling shall be carried out in either Delta Firetuff, FP200 Gold or an approved equivalent, with cables having a red LSF over sheath. Conductors shall be sized in accordance with the manufacturer's recommendations.

Enhanced cables shall be used where required by BS5839 fire alarm standards. Cabling shall be fully concealed within the office areas.

In all plant rooms and WC's flashing red beacons shall be provided to identify an evacuate status.

As a minimum a P1 system shall be installed.

In addition, a call point based fire alarm system shall be provided to the production area, incorporating specific inputs from specialist plant and equipment.

8.09 Lightning Protection

The Contractor shall allow for following the requirements of BS EN 62305 and the clients insurer to calculate the LPS (structural and electronic) grade/level of protection required via risk assessment method. The building shall be suitably zoned (LPZ) as detailed within BS EN 62305, with surge suppression installed as to reflect such requirements. The class of LPS shall fully consider the building layout, high location use, incoming services, utilities and all other loss factors as appropriate. The Contractor shall provide class of LPS calculations for comment prior to placing orders.

The design, supply and installation of the complete structural LPS and Electromagnetic Surge Protection Measures (LPMS) shall conform to the following: -

- i) 85 EN 62305 Protection Against Lightning (all sections)
- ii) 85 7430 Code of practice for Earthing.
- iii) 85 EN 50164 Lightning Protection Components (all sections)

- iv) BIP 2118 A UK Guide to the Practical Application of 8SEN 62305
- v) 8S EN 61663 Lightning Protection -Telecommunication Lines and Fibre Optic installations.
- vi) 85 6746C Colour Chart for Insulation and Sheath of Electric Cables.
- vii) 85 7884 Copper and Copper Cadmium Stranded Cables
- viii) PD IEC/TR 61400-24 Wind Turbine Lightning Protection.
- ix) BS 5252 Framework for Colour Co-ordination for Building Purposes.
- x) 85 EN 13601Copper and Copper Alloys,Rod and Bar.
- xi) 85 EN 12163 Copper and Copper Alloys,Rod
- xii) BS EN 755 Aluminium and Aluminium Alloys
- xiii) BS EN 60228 Conductors of Insulated Cables
- xiv) BS EN 61643 Surge Protection Device
- xv) 85 6004 PVC Insulated Electric Cables
- xvi) BS 7671IEE Wiring Regulations 17th Edition.
- xvii) Construction (design and management) Regulations

Full system to be retested 9 months after Practical Completion and any necessary remedial works undertaken.

8.10 Metering

Sub meters shall be provided as per the building regulations but not less than the following:

- Office Lighting;
- Office Small Power;
- M & E Plant;
- Operational Areas;
- Ancillary Areas.

The Sub Metering provided shall be compliant and satisfy the following BREEAM Credits:-

Title	Credit Reference
Sub Metering of Substantial energy Uses	ENE 2

8.11 Bonding and Earthing

All necessary bonding and earthing in compliance with the requirements of the 17th Edition of the IEE Wiring Regulations will be provided with particular note to Incoming gas and water services.

An independent earthing system for the test area will be provided.

At switch panels and other metallic electrical enclosures, reliance shall not be placed on the enclosure to form part of the protective conductor. Earthing tags or clamps and continuity conductors in conjunction with a suitable earthing bar shall be employed.

The resistance between any point of the conduit/trunking installation and the local distribution board shall not exceed 0.1 Ohm. Conduits shall be earthed by means of earth continuity sockets to the distribution gear.

Where a Lightning Protection system forms part of the scheme such systems are to be connected to the building earthing system at the main earth bar.

The Contractor will be responsible for advising the Supply Authority of this requirement and provide any information requested by the Supply Authority.

8.12 Testing and Commissioning

The complete electrical installations will be tested and commissioned to give correct working. A Completion Certificate in conformance with NICEIC, record drawings, protective device charts and details of installed plant and equipment will be incorporated into an Operating and Maintenance Manual.

Seasonal commissioning shall take place where applicable over a period of 12 months and generally to the requirements outlined within BREEAM 2008 to satisfy the following BREEAM Credits:-

Title	Credit Reference
Commissioning	Man 1

8.13 Consultants Witnessing

The Contractor shall nominate a suitable person to monitor the commissioning on behalf of the client in accordance with BSRIA and CIBSE Regs and ensure the system achieves, the BREEAM accreditation MAN 1 referenced in the "testing and commissioning" section above.