2.2.8 As Built Development Specification

PANATTONI

BASE BUILD SPECIFICATION
For
PROPOSED DEVELOPMENT
Unit 2, Aylesford

Tesco

Version 9 dated 25 April 2023

Note:
Base Specification Rev_9, Unit 2, Aylesford 25.04.2023

1.0 Introduction

1.01 Project

The Base Build works, as indicated on the drawings and as described in this Specification, comprise the design and construction of a shell and core frozen, chill and ambient warehouse, offices and ancillary buildings.

The building areas are as follows:

SHELL GROSS INTERNAL AREAS	
FROZEN CHAMBER	9,644 SQ.M / 103,808 SQ.FT
CHILL CHAMBER	31,785 SQ.M / 342,134 SQ.FT
AMBIENT CHAMBER	11,587 SQ.M / 124,722 SQ.FT
BATTERY CHARGE	159 SQ.M / 1,711 SQ.FT
GI POD	785 SQ.M / 8,450 SQ.FT
GO POD	341 SQ.M / 3,671 SQ.FT
RSU POD	30 SQ.M / 323 SQ.FT
GI MEZZANINE	1,319 SQ.M / 14,198 SQ.FT
VMU GROUND FLOOR	1,201 SQ.M / 12,928 SQ.FT
VMU FIRST FLOOR	182 SQ.M / 1,959 SQ.FT
TSB GROUND FLOOR	333 SQ.M / 3,584 SQ.FT
TSB FIRST FLOOR	333 SQ.M / 3,584 SQ.FT
TOTAL GIA	**57,699 SQ.M / 621,072 SQ.FT**

Refer to the drawings for schedule containing numbers of docks, parking spaces for different uses etc.

Site and external works including all roadways, service yards, car parks and other hardstandings, paths, pavings, hard and soft landscaping, drainage and services will be as indicated on the drawings and as described in this specification.

Where 'Contractor's Engineer' is referenced in this Specification this will be BWB Consulting Ltd acting as both Civil and Structural Engineer and who will either be Novated by the Employer to the Contractor or directly Appointed by the Contractor to carry out this role.

1.02 Base Build Works Summary

Base Build Scope of Works	
Element/Area	**Item**
Warehouse	Foundations (including to central cooler gantry)
	Roof Drainage - Gravity system draining through parapet to external hoppers/RWP's to temperature-controlled areas. Internal Gutters with Siphonic system to Ambient warehouse area
	Floor Slabs - excluding the top slab to the frozen chamber
	Reduced Level Sub Slab to the frozen chamber (FFL -500mm)
	Structural Frames (inc. fully separated structure between the frozen chamber & chilled and chilled & ambient RSU areas). Steel frame suitable for frozen chamber with thermal blocks to base plate connections. Roof to have design allowance for future PV installations. Any required structural bracing to be portalised where future dock levellers (including to the freezer) are indicated on the drawings.

	Cladding rails to be positioned to allow for ease of breaking out for future dock doors. Goal post frames to support future dock doors to be installed within the frozen chamber. Cooler gantry steelwork columns and beams
	External wall cladding, vertical composite cold store panels with enhanced insulation, vapour and air sealing for single envelope, frozen and chilled temperature-controlled solutions.
	Internal chamber walls between frozen store & chill and chill to ambient Asset store/RSU.
	Fully cantilevered parapet edge protection to all roof areas is to be provided. The use of mansafe systems is not acceptable.
	2 degree dual pitch (propped portal) roof formed with specialist composite roof panels suitable for chilled and frozen warehouses with fully bonded single ply membrane with fleece backing with appropriate vapour sealing. Rubber bonded walkways to roof providing perimeter access to RWP outlets.
	Composite profiled roof at 5 degrees to ambient RSU area with rooflights as indicated on drawings.
	External Roof Access (not internally through temperature-controlled areas). Full external staircase access is to be provided.
	External doors (including specialist insulated cold store and chiller escape doors to the Chilled Area), painted steel doors and insulated sectional level access doors as indicated on the drawings. Doors to the Freezer area are to be installed by the Tenant's Fitout Contractor.
	External dock leveller pods excluding docks to frozen chamber - Door trimming steelwork to be provided.
	Precast perimeter retaining/dock walls with integrated fixing points for external dock levellers. Reduced level dock walls to align with sub slab to frozen chamber (-500mm).
	Incoming mains services (electricity, water, gas and ducts for fibre and telecoms)
	Fire Signage as detailed in this Specification
	Builders work in connection to tray wash / RSU fit out Stainless steel / GRP floor drainage to tray wash areas (suitable for chemicals/caustic soda used in cleaning process). Pits for baler conveyors
	Structural supporting steelwork & electrical connections for building mounted signage
Ancillary Structures	Technical Services Block including all builders work to in connection with the Tenant's refrigeration installation (plinths, drainage etc.)
	Transformers
	LV Switch rooms and feeder pillars
	Vehicle Maintenance Unit
	RSU Plant room
	Smoking / Vaping shelters
Offices	Main office/Goods in and Goods out transport offices are to be detached structures, independent to the warehouse. The reduced Base Build works consist of external envelope including walls & roof, windows & doors, lift shaft with pit, main access stair and external access/MOE stairs. The warehouse compartment walls are to be constructed (using composite chill panels) with necessary access door openings formed with trimming steelwork.
	Drainage foul pop-up connections are to be provided. See drawings for requirements.
	Entrance lobby and stepped access with space allocated for a platform lift to be installed under the fit out works.

	Lift shaft, including pit serving the external yard level, ground floor and first floor area to be provided to allow a through car combined personnel & goods lift to be installed under the fit out works.
	Limited M&E services with capped services as indicated on MBA drawings.
	Service riser 'holes' as illustrated on drawings,
	Roof plant support steelwork structure for the Tenant's installation, access stair and suitable MOE
	Fire signage in the offices will be by the Tenant's Fitout Contractor
	Adequate drainage provision for the proposed fit out design. Drainage requirements illustrated on drawings provided
External Areas	Below ground drainage including foul water & surface water networks, sprinkler drawdown, foul water connection to sprinkler area for drain down, SUDs features, as required in the approved Drainage Strategy & storm water attenuation (below ground). Petrol Interceptor(s) with alarm connection to security room. Power to be supplied to interceptor(s)
	Incoming services around the site
	Fire hydrant ring main around the building
	Below ground service ducts and draw pits for CCTV, HGV security barriers, fuels island, turnstiles, vehicle wash, VMU. See drawings for details
	Plinths and bases for Tenant plant and equipment as indicated on drawings are to be provided excluding items in 'fallow' areas
	Foundation slab for external dock levellers to suit ground conditions and control differential settlement between dock pod and main building.
	Cast in reinforced concrete wheel stops to HGV trailer parking bays (with intermittent gaps along their length for drainage purposes) as per the detailed drawings provided.
	Concrete service yards and islands; including all lineage, hatching, symbols etc. as indicated on the drawings
	Tarmac/concrete speed bumps/tables to HGV areas as indicated on the drawings
	Car parking - including lineage/ symbols etc., bollards, walkways, any required impact barriers
	External lighting to yards and car parks
	Fencing - security fencing, entrance turnstiles and access gates. Access control systems system to be installed by the Tenant's fit out Contractor. Duct requirements are included in the Base Build
	Smoking / Vaping shelters
	Pedestrian access
	Covered cycle parking and motorcycle hoops within secure enclosed areas with access gates (access control fitted under fit out)
	External protection to protect the Base Building, where identified on the drawings.
External Services	Mains power, gas and water supplies
	Resilient/Diverse comms network ductwork infrastructure connected back to source as shown on the drawings
	Sprinkler tank infill main Sprinkler system feed main
	EV charging points to car parking to comply with planning requirements & ducting for future charging points as indicated on the drawings and in this Specification.

1.03 Tenant Fit-Out to be carried out by the Tenant's Contractor (For information purposes only)

The following is a non-exhaustive list of the fit out works which are by the Tenant and to be excluded from the Base Build Works. Early access will be provided by the Contractor to enable the Tenant to commence fit out enabling works at agreed dates in accordance with the Agreement for Lease. This list is provided to allow the Contractor to make adequate allowances in their Base Build works for the follow-on works by the Tenant.

Fit out items - by Tenant	
Internal	Internal fit out of all office and welfare areas including all partition walls, doors, screens, carpentry, sanitaryware, floor finishes, internal linings to external walls ceilings and M&E installation.
	All warehouse internal dividing walls within the 3 separate chambers that are not illustrated on the Base Build drawings will be constructed under fit out by Tenant.
	All firefighting equipment, hose reels, smoke ventilators and extinguishers and any other firefighting 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
	Electrical installations throughout the Warehouse Building (except where noted to be provided as Base Build Works)
	Security alarm, CCTV, telephone and data systems
	All internal signage not required for health and safety reasons at handover stage on Base Build (including fire escape)
	Cooler gantry secondary steel, mesh flooring, galvanised steel balustrade, internal access and MOE stairs/ladders (cold store gantry access via external stairs installed under the Base Build works).
	Internal floor lineage throughout the warehouse areas
	All internal warehouse protection, low level angle/ armco/ handrails/ bollards/goal posts
	Rapid rise doors between areas within walls constructed under Base Build (Union bull doors & Eiger doors).
	Frozen chamber glycol heater mat and screed to floor, glycol pipe manifolds and any other trace heating required
	Frozen chamber floor insulation build up with necessary vapour barriers/slip membranes to specialist details. Concrete floor top slab to Frozen chamber to be flush with +1 Chamber finished floor level
	Sprinkler systems - below ground pipework and necessary infrastructure to be completed under the Base Build works
	Mechanical installation throughout
	Refrigeration installation including frozen store, chilled and produce insulated chambers.
	Furniture, furnishings, blind fittings, lockers, shelving, process machinery of any type, racking, cages, skips, or any other item, which has not been
	Access control requirements
	Internal Data cabling (other than shown on MBA Base Build drawings) to warehouse areas
	Standby generation (ducts included in the Base Build as identified on the drawings)
	Compactor and Balers
	Electric vehicle charging and reefer socket power connections to docks and trailer bays; ducts as per the Base Build scope of works drawings provided
	Additional external protection in yards to suit lineage and operational requirements, pallet store areas, walkways etc.
	Telecoms installation to accommodate diverse routing. Applications for incoming telecom lines will be by Tenant.
	PV Installation to roof - (No PV is to be included in the Base Build to meet any required sustainability and planning obligations).
	All below ground works and finished surfacing to areas marked as "Fallow" on the Base Build drawings.

1.04 Specified Items

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

1.05 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 British Standards and Codes of Practice;
b. Health and Safety at Work Act;
c. The Factories Act;
d. The Clean Air Acts;
e. Construction (Design and Management) Regulations (CDM) 2015;
f. Equality Act 2010;
g. The Building Regulations;
h. The requirements of the Building Control Officer or Approved Inspector;
i. The requirements of the Local Authority, Local Planning Authority, and Local Authority Byelaws;
j. The requirements of the utility network operators and suppliers;
k. 18th Edition of the IET Wiring Regulations with amendments (BS 7671 : 2018);
l. The Electricity Supply Act;
m. Water Supply Regulations;
n. Gas Safety Regulations;
o. The Building Engineering Services Association Ductwork Standards incl DW144;
p. CIBSE Guides including Technical Memorandums;
q. Joint code of practise for fire prevention on construction sites
r. Material and/or product manufacturer recommendations
s. Concrete Industrial Ground Floors - A Guide to Design and Construction (TR34 - 4th Edition) published by the Concrete Society
t. External In-situ Concrete Paving - Report of a Concrete Society Working Group (TR66) published by the Concrete Society
u. SCI Publication P300 "Composite Slabs and Beams Using Steel Decking: Best Practice for design and Construction" (2009 Edition)

1.06 Drawings

22049-ASA-27-ZZ.ZZ-D-A-2700_(S0-P6)	Proposed Roof Plan – Shell
22049-ASA-30-ZZ.ZZ-D-A-3000 (S0-P10a)	Proposed Site Plan – Shell
22049-ASA-30-ZZ.ZZ-D-A-3001_(S0-P6)	Proposed Warehouse Plan - Shell
22049-ASA-30-ZZ.ZZ-D-A-3002_(S0-P5)	Proposed Building Elevations
22049-ASA-30-ZZ.ZZ-D-A-3003_(S0-P5)	Proposed Goods In Office Details
22049-ASA-30-ZZ.ZZ-D-A-3004_(S0-P5)	Proposed Goods Out Office Details
22049-ASA-30-ZZ.ZZ-D-A-3005_(S0-P4)	Proposed Warehouse Sections - Shell
22049-ASA-30-ZZ.ZZ-D-A-3006_(S0-P5)	VMU Details - Shell
22049-ASA-30-ZZ.ZZ-D-A-3007_(S0-P6)	TSB Details – Shell
22049-ASA-30-ZZ.ZZ-D-A-3008_(S0-P9a)	Proposed Site Lineage and Protection - Shell
22049-ASA-30-ZZ.ZZ-D-A-3009_(S0-P1)	Indicative Freezer Racking Layout For Information Only
22049-ASA-30-ZZ.ZZ-D-A-3010_(S0-P1)	Proposed Fencing Requirements
22049-ASA-52-ZZ.ZZ-D-A-5200_(S0-P4)	Proposed Foul Drainage
22049-ASA-90-EX.SI-D-A-9000_(S0-P9a)	Proposed External Works
22049-ASA-V1-00-DR-A-SK40_(S0-P5)	Shell GIA
22256-MBA-EX-SP-DR-ME-0001 P3	Indicative External Lighting Layout;
22256-MBA-EX-SP-DR-ME-0002 P4	Indicative External Main HV Cable Route Layout;
22256-MBA-EX-SP-DR-ME-0003 P3	Indicative External Mains & Small Power Duct Layout
22256-MBA-EX-SP-DR-ME-0005 P4	Indicative External Fire Hydrant and Sprinkler Main Layout;
22256-MBA-EX-SP-DR-ME-0006 P3	Indicative External Mechanical Services Layout;
22256-MBA-EX-SP-DR-ME-0010 P3	Indicative External Roof PhotoVoltaic Array Layout;
22256-MBA-WH-00-DR-ZR-0800 P2	Indicative Refrigeration Site Layout
22256-MBA-WH-00-DR-ZR-0809 P2	Freezer Steel Column Thermal Block Details
153081-FRH-XX-EX-DR-C-0001 P03	Standard Details.

1.07 Exclusions

a) All fire fighting equipment, sprinkler installations, 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, the Tenant's fire risk assessment or the specific requirements of the Tenant's insurer unless specifically identified in this Specification.

b) Mechanical, heating, electrical, lighting and fire alarm installations within the unit unless specifically identified in this Specification.

c) Intruder alarm, CCTV, access control, telephone, and data systems.

d) Any external signage.

e) Supply and meter 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, fuel facility.

h) Any other item which has not been expressly detailed in this document.

i) Any PV on the building including any requirements under Planning or Legislation. The Tenant will install roof mounted PV in accordance with the Planning Approval, BREEAM requirements and any other legislation or Building Control requirements.

1.08 BREEAM

The Contractor will procure BREEAM "Excellent" certification for the development on a "shell and core" basis. The Contractor will clearly identify any assumptions for credits which impose restrictions or obligations on the Tenant in order to achieve the 'Excellent' rating.

1.09 Energy Performance

The target Energy Performance Certificate (EPC) CO2 Index rating for the building shall be EPC A, if possible, given the nature of the building use, for the warehouse unless otherwise noted based on the necessary assumptions in respect of the Fit-out works (including Tenant PV installation).

The building will be modelled sufficiently and accurately by a Registered EPC Assessor using appropriate industry software to produce the EPC and supporting Recommendation Report.

This will be based on a non 24-hour operation and will also be on the assumption that LED lighting will be installed throughout the warehouse along with notional warehouse heating.

Dynamic energy modelling will be used to demonstrate sufficient solar PV can be installed (by the Tenant) to cover the annual base build electrical load (excluding tenant operations, warehouse lighting and warehouse heating). Dynamic modelling to target whole building energy intensity of 45kWh/m2/yr.

Note: An EPC Certificate may not be able to be provided at PC due to the Shell and Core nature of the building and, if this is the case, the Contractor will only need to demonstrate by the EPC Assessor's model and the Tenant's Fit-out contractor will complete the Assessment and produce the EPC Certificate on completion of the works.

1.10 Fire Strategy

The Tenant's Architect will provide the Fire Strategy to comply with the requirements of Building Regulations, be approved by Building Control/Approved Inspector. The Contractor is to provide the Means of Escape stairs/ladders and doors as indicated on the drawings unless specifically excluded elsewhere in this Specification (e.g. the freezer area doors).

1.11 Submittals and Approvals

The Contractor shall provide to the Employer full and detailed design information including calculations where appropriate or requested for all elements of the project in good time to permit their review and comment and all issues highlighted.

The Contractor shall allow 15 (Fifteen) full working days for the review and comment by the Employer/ Tenant on reports, drawings, specifications, materials, shop drawings etc. and shall ensure that this process is timed so that the programme is maintained at all times.

The following is a list of the submittals that shall be made throughout the project:

Architectural Related Submittals

- All construction issue drawings and specifications
- Dimensioned external works site plan
- Dimensioned warehouse clear internal plan measurements
- Dimensioned building sections
- Cladding and roofing details with vapour sealing details for temperature-controlled environments
- External loading bay docks, including cold store and chilled loading bay details
- Building Regulations tracker, compliance and approval
- Finishes samples boards
- Ironmongery samples
- Door samples and swatches
- Building envelope swatches
- Drawings and details of all sub-Contractor designed elements
- Air tightness tests

Civil & Geotechnical Engineering Related Submittals

- Drainage & Maintenance Strategies for the Base Build Works
- Assessment of settlements for both foundations and floor slabs under the design loading
- Environmental Reports (including Remediation Strategy if applicable) with particular emphasis on measures to manage any landfill gases
- Any proposed ground improvement proposals.
- In-situ testing results and interpretive report of any filled areas in accordance with the Contractor's Engineer's requirements
- Surface Water Drainage general arrangement and detail drawings
- Foul Water Drainage general arrangement and detail drawings (including any pumping installations)
- CCTV Survey of all drainage on completion on which the Contractor clearly identifies any deviations or displacement from the designed works and obtains the Contractor's Engineer's sign off that these deviations within the pipework are of a minor nature and will not be detrimental to the system
- As built drawings of all underground services
- Proposed service yard slab joint general arrangement and details, including allowance for future hard surfacing installed by the Tenant in areas left fallow.
- Earthworks Validations and Remediation Verification Reports
- Gas Protection Design, Installation and Validation Reports (where applicable)

Structural Engineering Related Submittals

- Foundation Layout drawings including precast or insitu concrete retaining wall solutions.
- Floor Slab Drawings including joint layouts and details.
- Floor tolerance surveys in accordance with the specification.
- Independent floor slab monitoring surveys final sign off report. Interim reports to be shared upon request
- Abrasion Resistance Survey report

Mains Incoming Services Related Submittals

- Detailed Stats tracker to be developed and monitored by the Contractor and their supply chain.
- Provide full detailed copies of all applications made.
- Full copies of all quotations received.
- Provide proof of full co-ordination of the mains incoming site utilities along with evidence of the interface to the site wide services.

Insulated Envelope Related Submittals

- Independent Envelope Inspectors sign-off report
- All necessary structural calculations for the installation[s].
- A full suite of Construction drawings including details of how the planning elevational treatment will be achieved.
- Drawings identifying any openings requested by the Tenant for the Tenant Fit-out co-ordinated with the main structure or identifying where the openings need to be moved to avoid clashes with the Base Build works.
- Project Specific details for Base Build works penetrations through insulated structure and external envelope to prove that cold bridging and condensation will be eliminated.
- Copy of all pressure test certificates.
- Copy of all lightning protection test certificates.

O&Ms to be covered separately.

1.12 Maintenance Requirements

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

All maintenance arrangements will be covered in the Base Build H&S file to be provided by the Contractor.

1.13 BIM Requirements

The Base Build Architect will create the Base Build Building Model (in Revit) for comment by the Tenant's team and in order for the Tenant to coordinate with the Tenant's Fit Out Model (in Revit). A BIM execution plan will be developed between both parties to agree the framework, workflow and processes of the design information based on the Employer's Information Requirements (EIRs).

2.0 Substructure

2.01 Geotechnical Report

The recommendations/results of the ground investigation report shall be used for the design of sub-structure and ground works. The Contractor shall undertake any additional ground investigation including contamination testing necessary for planning condition discharge and design purposes; such investigation and testing is to be in accordance CLR11 (Environment Agency, 2004a), BS5930:2015 Code of Practice for Ground Investigations and BS 10175:2011+A22017 Investigations of Potentially Contaminated Sites - Code of Practice (BSI, 2011) and guidance on land contamination reports issued by the Environmental Agency (EA) (2010a).

2.02 Site Clearance

The entire site to be covered by the new building and hardstandings will be cleared of all existing undergrowth, buildings, structures, ground slabs, foundations and other substructures, hardstandings, drainage and services, underground storage tanks and the like, and the site reduced in level to ground floor formation level, unless otherwise agreed with the Contractor's Engineer and the Employer.

All materials arising from site clearance works are to be cleared away from Site by licensed waste contractor unless otherwise specified by or agreed with the Employer. Any contamination encountered during site clearance is to be dealt with in accordance with the Contractor's Engineer's requirements (and any site specific Remediation Strategy) and relevant statutory requirements. Any asbestos-containing materials encountered during site clearance are to be removed by licensed specialist contractor in accordance with the Contractor's Engineer's requirements, the Control of Asbestos Regulations and all other relevant statutory requirements. All instances are to be recorded and accompanying documentation shared.

All clearance works to be fully coordinated with any necessary ecological mitigation measures including any allowance for the attendance of an ecologist to oversee the clearance works.

2.03 Earthworks

Excavation will be carried out to formation level over the area of the building and external pavement, as shown on the drawings. Any unsuitable material at formation level will be replaced or treated to the satisfaction of the Contractor's Engineer and in accordance with Contractor's Engineer's Earthworks Specification.

The formation level will be graded, trimmed and compacted prior to laying the hardcore bed.

2.04 Ground Improvement

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

Maximum permissible ground settlement for slabs is as follows;

- Maximum permissible ground settlement: 25mm
- Maximum permissible differential settlement: 20mm over a 10m length

2.05 Sub-base Aggregate

Aggregate for pavement/slab sub-bases shall be Highways Agency type 1 or type 2 material in accordance with the Specification for Highway Works clauses 803 or 804 and in accordance with the Contractor's Engineer's requirements.

Crushed Concrete can be used for capping material and in lieu of Sub-base if approved by the Contractor's Engineer.

All necessary earthworks and filling will be carried out from the subsoil contours to the formation levels in material approved by the Contractor's Engineer.

2.06 Concrete Foundations

All sub-structures will be constructed in accordance with the Contractor's Engineer's design, and all relevant standards, statutory and local authority requirements.

2.07 Ground Floor Slab

Chilled and Ambient Internal Asset Store & RSU Floor Slab Areas

Reinforced steel fabric mesh concrete ground slabs with a power floated finish will be provided to all ground floor areas within the buildings. The slabs will be designed in accordance with the recommendations of TR34, and the more onerous of the following loading criteria:

- Loadings to be based on a rack height of 1.75m level and 1.25 tonne pallet loads, subject to Part A, based on 150 x 150mm base plates set at a minimum back-to-back distance of 300mm.
- General UDL required of 35 kN/m2

Where joints are provided in the construction of the floor, they should be generally detailed in accordance with TR34, coordinated with the racking leg positions and designed so that no vertical movement occurs across the joint. The number of joints should be kept to a minimum, and generally not less than 30m x 30m spacing. Day joints should be tied or reinforced with "Permaban" type edge plate reinforcement or similar.

The concrete is to be in accordance with BS5328 and have a minimum compressive strength of 40N/mm² at 28 days and a minimum flexural strength of 5.0N/mm². The concrete will have a minimum cement content of 325kg/m³ of a maximum cement content of 450kg/m3 and a maximum water cement ratio of 0.55. The use of super-plasticisers will be permitted.

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 ASTM C 157. Any proposed cement replacement within the floor slab mix design is to be submitted to the Tenant for approval well in advance of the commencement of installation works.

The ground floor slab will be constructed so that the top surface is within the tolerances as defined in Concrete Society Technical Report No. 34 of FM2. The floor is to be surveyed, by an independent specialist, to prove its acceptance within fourteen days of construction and copy supplied to the EA and Tenant for review.

The ground floor slab wearing surface shall have a minimum abrasion resistance of AR2 in accordance with table 2 of BS 8204. One abrasion test is to be carried out for each 2000m² 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 for a minimum of four days following the sealing operation.

The Contractor's Engineer shall review the ground conditions and determine the most appropriate form of construction for the ground floor slab, which shall be in any event constructed to the following standard as a minimum (only applicable in the event that ground conditions are suitable and permit the use of a non-piled or otherwise improved solution).

The ground slab is to be constructed on a minimum (dependent upon ground conditions) 1200-gauge P.I.F.A. polythene damp proof membrane laid on a layer of hardcore with a minimum thickness of 175mm where ground bearing, unless a higher figure is stipulated on the Contractor's Engineer's drawings. Should the GI dictate the requirement for a gas membrane, this needs to be incorporated and its installation validated by an independent specialist.

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 joints are to be sealed prior to practical completion with sealing compounds having a minimum shore hardness of 50. 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. At the end of defects liability period, the joints in the aisles or free movement areas of the floor slab are to be resealed using a sealant with a minimum shore hardness of 80.

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 mortar if they are wider than 0.8mm. The Contractor's Engineer shall inspect all such incidents and produce a report confirming the suitability of any proposed remedial solution.

The warehouse floor slab shall be designed such that any movements caused by any form of ground consolidation or settlement shall not generate a gradient in excess of 1 in 500 between any two points, and no physical steps shall be permitted that present a health and safety hazard to users.

The ground floor slab to the RSU will generally conform to the same specification and construction as the main RDC chilled warehouse ground floor slab save that it will be constructed to provide the specific loadings as indicated on the Drawings.

Within the RSU, the Contractor shall construct two number 'Baler Pits' in accordance with the Architect's and Engineer's drawings and specifications. Cast in floor drainage equipment will also be provided and installed to the requirements of the Drawings. The Contractor shall make allowance for all necessary civil engineering works, including excavation, concrete bases, pits and the like, as detailed on the drawings and including the "Elephant shed" area in the South East corner of the building. The floor slab and its jointing arrangement shall be designed to take account of these potential hard spots.

The chilled warehouse shall be designed to operate at +1C and +12C and the joint layout and design shall consider the effects of thermal movements.

At the door locations between the frozen chamber and the +1 chamber localised 'cut outs' of the +1 chamber slab will be formed to allow the Tenant's MHE/Refrigeration contractor to install underfloor trace heating. These localised sections of the floor slab will be installed by the Tenant's flooring contractor when they are installing the finished floor slab to the freezer chamber.

Frozen Chamber Sub-Slab

The sub-slab to the frozen chamber is to be installed under the Base Build.

- Ground bearing traditional mesh reinforced concrete floor slab 500mm below the Chilled/RSU finished floor level.
- A reinforced concrete ground slab with a power floated finish will be provided to all ground
- floor areas within the building. The slab will be designed by a specialist sub contractor in accordance with the recommendations of TR34, for loadings as indicated on the drawings. Rack leg loadings, where specified shall quote a point load which shall be placed in a back to back situation (with centre line base plates placed a minimum distance 150mm away from floor joints), and base plates not less than 180mm x 100 x 6mm thick anywhere on the floor. General UDL required of 50 kN/m2. The design will also allow for forklift truck loading.
- The flooring Contractor shall inspect and test as necessary the formation to the floor slab prior to proceeding with construction, to verify conformance with his design requirements.
- The ground slab above the sub-slab in the freezer chamber will be of built up construction and form part of the Tenant fit out works. The sub-slab will be detailed and constructed under the Base Build works for ease of installation of the top slab. This shall include detailing at door and chamber wall positions etc.
- The freezer area shall be designed to operate at -25C, and the joint layout and design shall consider the effects of thermal contraction.
- Loadings based on a rack height of 1.75m level and 1.25 tonne pallet loads.
- 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. Large bays with minimal floor joint are required (Jointless construction with not less than 30m x 30m spacing). Day joints should be tied or reinforced with "Permaban" type edge plate reinforcement. Joint positions shall be coordinated with the racking layout prior to construction.
- The concrete is to be in accordance with BS 8500 and have a minimum compressive strength of 40N/mm^2 at 28 days and a minimum flexural strength of 5.0N/mm^2. The concrete will have a minimum cement content of 325kg/m^3 of a maximum cement content of 400kg/m^3 and a maximum water cement ratio of 0.50.
- 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 ASTM C 157.
- The ground floor slab will be constructed so that the top surface is within the tolerances as defined in Concrete Society Technical Report No. 34 of FM2. The floor is to be surveyed by an independent party to prove its acceptance within 28 days of construction and copy supplied to the Employer's Agent for review.
- 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 for a minimum of 4 days following the sealing operation.
- 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 joints are to be sealed prior to practical completion with sealing compounds having a minimum shore hardness of 50.
- All efforts should be made in the construction and detailing of the floor to reduce the possibility of random cracking. If cracks do occur, remedial proposals shall be submitted by the Contractor and be subject to agreement of the EA.
- The warehouse floor slab shall be designed such that any movements caused by any form of settlement shall not generate a gradient in excess of 1 in 500 between any two points, and no physical steps shall be permitted that present a health and safety hazard to users.

- For avoidance of doubt the only related works to be undertaken by the Base Build Contractor under this Base Build Specification are those detailed on the Section entitled "Extent of Base Build Works to Freezer Columns & Vapour Barriers - Base Build Requirements" on MBA Drawing Nr 22256-MBA-WH-00-DR-ZR-0809 entitled Freezer Steel Column Thermal Block Details (as listed in Section 1.06) which includes the thermal blocks and thermal washers to steel columns, vapour barriers & seals and forming holes through the top of the gable end pre-cast concrete retaining wall for the Tenant to install heater mat pipework under Tenant Fit Out Works. All other works detailed on this drawing are for information only and not works to be carried out by the Base Build Contractor.

Floor Slabs to Other Areas

The ground floor offices, plant room and other ancillary areas to the warehouse shall be designed to take the imposed loading conditions of a uniformly distributed load of 15kN/m2 (300lbs/ft2) and point loading appropriate to the usage class of the area, throughout the entire areas with a surface tolerance and finish appropriate to the specified floor finishes. Isolation joints are to be hidden under wall construction wherever practicable. Where the concrete will be left exposed (i.e. no applied floor finishes) the concrete must be power floated and joint layout designed to minimise surface cracking.

Drainage to RSU slab is as indicated on the Drawings and is to include the drainage to the specialist installations and equipment.

Pits and recesses are required within the RSU for baler conveyors and installation of equipment. Refer to drawings for details.

2.08 Ground Beams

Ground beams will be insitu or precast concrete, or galvanised steel channels to Contractor's Engineer's details.

Where steelwork used below or at ground level in lieu of concrete ground beams, such steelwork shall be to have suitable treatment to suit its location.

2.09 External Steps

Where applicable the external steps to the dock level areas will be constructed in insitu or pre-cast concrete with a slip resistant finish. Contrasting (yellow) slip resistant finish to be provided to stair tread nosings. Handrails and balustrading will be provided in circular hollow, hot dipped galvanised mild steel sections.

Fire exit or access stairs within the dock pits will be provided with steel bollard protection cast into/ core drilled & fixed into concrete yards as noted on the drawings.

2.10 Retaining Walls

Fair faced pre-cast retaining walls will be provided to the dock areas of the buildings and yard wing walls all to the Contractor's Engineer's details. The retaining walls (and supporting foundations) shall project below the external ground level by sufficient depth to allow for full future maximisation of docks. All appropriate edges to the precast are to have a chamfer. The Contractor is to minimise any out of plumb difference between adjacent units. Any damage to the surface of the units or aspects relating to installation such as lifting points are to be made good in a way to blend in with surrounding undamaged areas. Wing walls are to be designed to allow post-fixing of handrails by the Contractor.

Galvanised steel angles will be cast in along the top exposed edges of retaining walls where docks are to be installed or could be installed in the future. These are to be provided to allow the installation of external dock levellers/pods which require spot welding externally and internally, the angle internally provides robust threshold for MHE loading trailers.

Retaining walls to the frozen chamber will be reduced in height to align with the sub slab FFL (approx. 500mm below final finished floor level) no requirements for cast in angles are required to the retaining walls for HGV Docks as these angles will be cast into the floor slab installed under fit out. External retaining walls to the sides of the dock access will be also of fair faced concrete all to the Contractor's Engineer's details.

Armco galvanised steel bolt-down post and beam barrier system with handrail extension, including RAL 1007 Yellow fish-tail ends to beams and RAL 1007 Yellow plastic end bungs to handrails, or equal and approved, is to be provided adjacent to the retaining wall to level access ramps, to prevent HGV damage and to protect personnel from failing.

All other retaining structures, which form part of the earthworks to the site, are to be fully in accordance with the Contractor's Engineer's details and comply with Planning approvals.

3.0 Warehouse Superstructure

3.01 Steel Frame

The steel frame will be a propped portal frame with a minimum clear height to underside of haunch of 6.5m to the chilled chamber and 14.5m to the frozen cold store, designed in accordance with BS5950: Part 1, with dead plus super loading to BS6399: Part 1 and BS6399: Part 3, and wind loading to BS6399: Part 2, and all relevant Codes of Practice applicable to the Contract in force at the time of erection and generally to the satisfaction of the Local Authority.

The Ambient Asset Store and RSU areas are to be multi pitch portal frames with a minimum clear height to underside of haunch of 6.5m. The frame shall be designed to resist all loadings required to comply with British Standards recognising the potential for dominant openings to occur in wind loadings.

The frame will be capable of supporting a maximum general superimposed service loading arising from mechanical and electrical installation plant, equipment and fittings of 0.45kN/m² over the whole area of the roof. This loading criteria for the roof includes a provision of 0.2kN/m2 to support future installation of 100% PV roof coverage by the Tenant. (Stacking of PV panels during the installation of these by the Tenant is not to be considered in the roof loading calculations) All purlins will be capable of supporting 0.25kN/m2.-

In addition, the frame will be designed to support refrigeration pipework, coolers and associated electrical services equipment. Where refrigeration pipework is supported on the roof secondary steel (either hot or cold rolled) will be installed to support the underside of the roof panels beneath the pipework so that the pipe loading does not cause deflection of the roof panel beyond the manufacturer's recommendations.

The roof over the Goods In/ First Floor Mezzanine Area and Goods Out offices and any connecting ancillary area will be designed to externally support services plant to a maximum imposed loading of at least 7.5kN/m2.

The high-level cooler gantry within the chilled and frozen warehouse is to be constructed as indicated on the drawings, the primary steelwork will be provided for the gantry and part of the Base Build main building structure. All secondary steel, access stairs/ladders, galvanised open metal grating and balustrading for the high-level cooler gantry will be constructed by the Tenant's fit out works Contractor.

The steel frame shall be designed such that the deflection of the roof under full loading will not reduce the pitch below the manufacturer's recommendations for water tightness. The horizontal deflection of the steel frame under full loading shall be limited to an amount which the suppliers of all component parts of the walls accept in writing as being suitable for the proper performance of their products, and the Contractor's Engineer considers is satisfactory for the overall performance of the building.

All steelwork will be shotblasted Swedish Sa2.5 and primed prior to delivery to site and will be touched up where required. Warehouse steelwork will receive factory applied coat of 1 pack zinc phosphate to a nominal DFT of 75 microns, colour to be agreed (semi-gloss finish). Galvanised surfaces of purlins and sheeting rails will be left un-coated. 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, in full elevations, will be coated to provide a uniform appearance. Any remedial works must be warranted by the Contractor's Steel work sub-contractor.

The structural steel frame to the freezer chamber shall be suitably specified for the use within cold stores at - 25 Degrees Celsius.

The steel frame shall be designed to meet the following standards: -

1. All frame bolts are to be zinc plated or galvanised finish.
2. The roof and wind loads shall comply with BS 6399: Part 3 and 5 including allowance for drifting snow on the valley of the structure and against parapets if provided.
3. All doors shall be fully framed in steelwork, including all frame extensions necessary to support sectional door fittings and canopies.
4. Sag rods and tension wires shall be free from distortion, properly adjusted.
5. The structure must be capable of carrying signage and door frames in positions to be agreed with the Tenant including provision of all necessary support frames.
6. Fire protection where required will be provided. Where fire protection of the steel frame is necessary it must be resistant to impact damage up to 2m above finished floor level.
7. Stub columns, including thermal break measures, required to support roof plant
8. The Contractor shall make allowance and provision for the supply of reinforced walkways, compatible with the roof system, to provide safe designated access to all items of plant located on all roof levels. This shall include where necessary, suspended metal platforms and handrails around roof mounted plant

All cold rolled steel work shall have the standard manufacturer's galvanised finish to BS EN 10143 (2006) or better.

3.02 Fire Protection

Where protection of steel stanchions and frames is necessary, this will be carried out internally in intumescent paint treatment, all to the satisfaction of Building Control / Approved Inspector and as required by the Building Regulations. Intumescent paint treatment must be free from blistering, bubbling or flaking.

3.03 Roofing

The following sets out the key performance obligations to be undertaken as part of the Base Build works:

The low pitch roof to the single envelope temperature-controlled warehouse areas (chill and frozen areas) will be constructed using cold store composite cladding panels Kingspan KS1100CS Quadcore. The roof will be a dual pitch roof with a single central ridge. The roof will be finished with a 1.5mm single ply membrane with fleece backing as required (2.4mm overall), this membrane shall be Sikaplan PVC or similar and approved and will be fully bonded and not mechanically fixed to the roof panels. No mechanical fixings to the external roof surface will be permitted. The Contractor's specialist will provide details for additional vapour sealing to panel joints and fixings below the membrane. The membrane will be lapped up the parapet walls and fully lined RWP outlets through the parapet walls to external hoppers. Cantilevered parapet walls will be lined internally with rigid insulation and profiled steel sheeting.

The ambient warehouse (RSU) roof will be a multi pitch portal roof with internal insulated gutters with primary and secondary siphonic drainage. Roofing will be LPCB certified Grade B factory assembled trapezoidal composite roof panels achieving a "U" value in compliance with the current Building Regulations (Kingspan KS1000RW Quadcore or equivalent). External coating, colour goosewing grey or similar for light reflectance, is to provide a minimum 30 year guarantee, with a manufacturer's Confidex' or equal level of guarantee The roof area is to include translucent, triple skinned, non-fragile, factory assembled GRP roof lights to approximately 15% of the roof area, to a regular linear layout, complying as a minimum with the "U" values specified in Part L of the Building Regulations and with a minimum 30 year certified non-fragility.

The agreed form of roofing is to be fixed in accordance with the manufacturer's recommendations and the NRFC Guide to Good Practice. The roof and drainage are to be totally watertight. The roof system is to be constructed to meet the following standards and requirements:-

- All internal linings to composite panels are to be coloured Brilliant White.
- The internal lining to the main roof will be Class O rated for surface spread of flame as tested to BS 476: Part 7:1997
- Roof deflection shall not exceed L/150
- Tests shall be carried out at a positive and negative pressure of + 50pa
- The roof system is to be non-fragile in accordance with HSE Materials Standard ACR[M]001:2000 'Test for Fragility of Roofing Assemblies.'
- The roof system to be an LPCB certified Grade B construction in accordance with LPS1181 Test for Resistance to fire.
- The Contractor shall manage the cladding Sub-Contractor to attend and seal any penetrations through the roof and wall cladding, at the Tenant's cost, in connection with building services and the Tenant's Direct fit out items so as not to invalidate the Sub-Contractor's warranty. **A Provisional Sum of £50,000 shall be allowed in the Base Build costs.**
- The Contractor is to provide a copy of the manufacturer's 25-year warranty covering the entire roof system (including roof lights) to the Tenant assignable to any Purchaser and Occupier.
- The installers of the roofing systems must be approved installers and registered members of the Metal Cladding and Roofing Manufacturers Association, Metal Roof Deck Association, Metal Roofing Contractors Association or National Federation of Roofing Contractors.
- The installers of the single envelope system must be recognized in the industry and have a proven track record of installing insulation systems of this nature. The use of standard cladding Contractors will not be accepted.
- Access to all office and building roofs to be provided via external staircases as indicated on the drawings (final details to be agreed with the Tenant but stairs to be provided by the Contractor) for maintenance of Tenant's roof mounted plant with gates at ground level.

The following maximum U values shall be achieved by the Contractor:

Building "U" Values		
Area	**Walls w/m²k**	**Roof w/m²k**
Freezer Chamber	0.09 *Thickness* 200mm	0.1 *Thickness* 175mm
Chill Chambers	0.12 *Thickness* 150mm	0.12 *Thickness* 150mm
Other areas - 2021 Building Regulations	0.26 *Part L Building Regs*	0.16 (pitched roof) 0.18 (Flat roof) *Part L Building Regs*

Roof Access

Access to all roof areas will be via external stairs, cat ladders and ships ladders with landings as indicated on the drawings and design of these to be in accordance with Building Regulations and CDM requirements. The stairs, cat ladders, ships ladders & landings will be constructed in hot dipped galvanised steel to the Contractor's Engineer's details.

The staircases between the TSB and the Frozen chamber, will be designed so that this not only acts as a personnel access and means of escape but also forms a support structure for the refrigeration pipework (to be fixed to the stair structure by the Tenant's Fit-out Contractor using unistrut or similar) to go from the TSB ground, first and roof levels and to both the Frozen chamber roof and the Chill chamber roof.

The ships ladder with landings from the Frozen chamber roof to the Chill chamber roof will be designed so that this acts as a personnel access and means of escape to & from the roof level and internal gantry level.

3.04 Rainwater Goods

Single Envelope Chilled and Frozen Chambers

The rainwater from all roof areas will be discharged through the parapet walls to hoppers on the external wall face and thereafter by rainwater downpipes to external underground drainage.

All rainwater disposal installations shall comply with BS EN 12056-3:2000 based on life expectancy of the building of a minimum 25 years.

Downpipes are to be positioned externally on perimeter walls of building only (and the colour matched to the cladding). There are to be no rainwater pipes within the chilled & frozen warehouse areas.

There shall be no permanent below ground drainage beneath the warehouse footprints, unless required for condensate drainage etc. (chilled areas only, not within the freezer slab areas)

Asset Store, RSU area & VMU Building

Guttering to be factory assembled membrane lined by Sika Sarnafil or equal approved, insulated gutter system with internal white powder coated steel lining on the interior. All outlets/overflows to be factory installed. Gutter system to provide a 25 year guarantee.

The siphonic roof drainage system shall be designed in accordance with BS8490:2007 and BS EN12056-3:2000 and the following design criteria;

- The geographical location of the building
- A building design life of 30 years
- A 'Category 3' risk protection.

All pipework to be installed above the portal haunch level to maintain minimum clear height and internal rainwater pipes are to be located within the web of the steel and suitably protected to prevent against accidental damage. All components of the system shall be in accordance with any relevant British or European standards. The rainwater outlets will be distributed evenly along the total gutter length and where practically possible outlets should be at the mid bay position of the gutter with quantity and size to suit siphonic design. Discharge locations to be agreed with the Tenant. Secondary eaves downpipes intermittently spaced along the eaves are not acceptable.

Siphonic pipework shall be firmly attached to an engineered continuous railing system, using appropriate pipe clamps it shall be securely fastened back to the main structure at a maximum of 2m centres, to provide adequate and proper restraint against thermal movement. Additional bracing will be provided within 100mm of the closest edge of the pipework, end branch connections and where required. 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 to hard paved areas external to the building. The 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 Tenant and must avoid risk of damage to external finishes due to the water discharge. 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 50m intervals on perimeter gutters to provide advance warning of blockage.

All outlet tail pipes are to be suitably insulated.

3.05 Wall Cladding

The form of cladding is as indicated on the Drawings & this Base Build Specification. The elevations shall be generally white to minimize solar heat gain. The cladding is to be designed to comply with wind loads calculated in accordance with BS6399. The wall system maximum 'U' value shall be in accordance the following table:

Building "U" Values		
Area	**Walls w/m²k**	**Roof w/m²k**
Freezer Chamber	0.09 *Thickness* 200mm	0.1 *Thickness* 175mm
Chill Chambers	0.12 *Thickness* 150mm	0.12 *Thickness* 150mm
Other areas - 2021 Building Regulations	0.26 *Part L Building Regs*	0.16 (pitched roof) 0.18 (Flat roof) *Part L Building Regs*

The wall system to be classified a Grade B, LPCB approved construction in accordance with LPS1181 Test for Resistance to fire.

The walls to all chill and frozen warehouse areas will be constructed using vertical cold store composite cladding with horizontal sheeting rails at 3.5m centres. Kingspan KS1100 CS Quadcore.

Where required, under the Building Regulations, to provide fire protection to an external wall, then a system is to be an LPCB certified Grade A construction in accordance with LPS1181 Test for Resistance to fire. The firewall must comply with the requirements of BS476 Parts 4 and 22. The external cladding is to be designed so there is no obvious 'step' in the façade.

The cladding is to be Class O rating for surface spread of flame and tested to BS 476: Part 7:1997. Panels will be finished with a factory-applied polyester coating to a minimum thickness of 22 microns and galvanised to be minimum coating weight of 275g/m2.

Equivalent production from countries outside the EU will not be accepted. The wall cladding system will be covered by a 25-year warranty.

3.06 Signage Support

The Contractor shall allow two locations (to be agreed with the Tenant) for signage supports to be provided in accordance with the wall cladding manufacturer's recommendations and any secondary steelwork supporting the internal side of the wall cladding.

3.07 Air-Tightness

An air-tightness test is to be carried out by the Contractor prior to the Employer or Tenant obtaining access. This test is to be carried out by BSRIA Limited and must confirm to all current legislative requirements and Building Regulations. The 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 –

- Temperature controlled Chilled areas shall achieve an air leakage rate of maximum 1.0 m^3/hr.m2 @ 50Pa
- Temperature controlled Freezer areas shall achieve an air leakage rate of maximum 0.25 m^3/hr.m2 @50Pa
- Ambient areas in line with Building Regulations ideally shall achieve an air leakage rate of maximum 3.0 m^3/hr.m2 @50Pa

A copy of the resultant report is to be provided to the Employer.

Any defects, etc., highlighted by the test are to be rectified by the Contractor prior to practical completion.

When attending site to carry out the air-tightness test, BSRIA Limited 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.

3.08 Independent Cladding Inspector

One of the independent cladding inspectors listed below will be appointed to inspect and review the installation of the cladding at appropriate intervals during installation and at completion of the cladding.

The cladding inspection reports are to be made available to the Employer.

Any defects or deviations from the requirements of this Specification are to be rectified to the satisfaction of the Cladding Inspector as soon as possible and in any event prior to Practical Completion.

Charnwood Roofing, Cladding & Building Specialists
8 Chambers Close
Markfield
Leicestershire
LE67 9NB
Principal: (Lewis) Spencer Jones
Mobile: 07875 516989
Email: info@charnwoodroofing.com

David Hicks Consultants Ltd
28 Orwell Drive
Aylesbury
Buckinghamshire
HP21 9JN
Principal: David Hicks
Mobile: 07980 432848
Email: david@dhc-ltd.co.uk

Lampos Metal Roof & Cladding Inspections
12 Redruth Drive
Darlington
Co Durham
DL3 0ZU
Principal: Brian Watson
Mobile: 07889 162620
Email: brian@lampos.uk

3.09 Level Access Doors

Manufactured double-skinned steel section of composite construction comprising galvanized steel sheet with high-adhesion primer coating with deep laminated door panels with stucco texture finish. The door should include a double-glazed vision panels 33mm thick with Scratch Resistant Duratec Coating within the 3rd door section.

Size 4500mm wide x 5000mm high (5300mm to RSU), with 3 no neutral acrylic double-glazed vision panels 33mm thick with Scratch Resistant Duratec Coating within the 3rd door section.

The surface finish to the external face of the doors will be a choice of Ten Standard RAL colours with internal finish of RAL 9002 off white.

Corrosion Protection - The fibre glass reinforced plastic frame shoe prevents the frame from coming into direct contact with moisture on the floor and provides lasting protection against corrosion.

Fitted with a Seal to all Four Sides of the door, which is in addition to the intermediate seal between the door sections.

Integral finger pinch protection on both sides built in at each moving joint, together with side trap guards and safety catch. Fitted with sliding heavy-duty bolts, anti-fall devices and security Anti-Lift Kit Devices.

Safety edge as standard at the bottom of the door, 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. Performance characteristics according to the European Safety Standard 13241, which include the following.

Wind Load
Doors tested to European standard EN 12424 Class 3 for high wind resistance offering a minimum 700N/m².

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

Air Permeability
Class 2 According to EN12426

Acoustic
Tested to EN ISO 717-1 providing a 25 R(db) rating.

Electrically Operated
Doors to include a three-phase operator with integrated Open / Stop / Close Operation with an emergency handchain. Insulated, sectional panel, vertical lift doors with spring support beam at low level for ease of maintenance and 25 mm thermal movement provision on door tracks. LED indicator display to indicate the door status.

3.10 Dock Access Doors and Equipment

The Tenant will fit all Dock Access doors and equipment to the Freezer chamber under the Fit-out contract and these are not to be included in the Base Build Works.

Level Access Door Pods to be provided as indicated on the drawings

Loading Bay Load Houses (Pod)

All Loading Bay dock pods should be built and installed in accordance with the following requirements:-

Standard Pod Structure: 6436mm high x 3550mm w x 2590mm projection

Moving Deck Double Deck Pod Structure: 6436mm high x 3550mm w x 3590mm projection

The load house main structure is manufactured from galvanised steel frame construction and bolted into place complete with welding to the steel angle provided by the Contractor located at the top of the loading dock retaining wall.

The load house lower structure comes with 4 No. support legs. The support legs and any other load bearing element of the structure shall be constructed from standard, fully welded, steel stock sections to BS or EN standards with all load bearing steelwork to be grade S355.

Static calculation according to EN 1090. Max. roof load bearing capacity 3 kN/m² Max. wind load 0.65 kN/m²

The platform made of moulded, anti-slip steel, 6/8mm thick, galvanised.

The load house structure will be clad in 60mm thick sandwich insulated panel.

The load house is clad down to ground on each side with front steel mesh curtain fitted to front of pod below dock leveller.

Adequate guttering and drainpipes should be fitted to ensure effective drainage.

The structure shall be constructed and installed to resist the unseen spread of fire and smoke within any concealed spaces in its structure and fabric are inhibited.
Colour: Inside Standard White/Exterior RAL 9002

The load house will have yellow steel guide rails to each side of the dock leveller to help prevent internal damage to the dock pod structure.

Loading Bay Load Houses (Pod), where necessary, will contain the following loading bay accessories:

Electro-Hydraulic Dock Levellers

All Dock Levellers should be built and installed in accordance with the following specification:

Type: Electro-Hydraulic 0.75 kw, 415V, 50Hz 3 Phase plus neutral and earth

Lip Operation: the operation of the lip or Bridge plate should ensure there is a minimum of 0.1m on to the vehicle bed. This would require use of either telescopic bridge plate / lip or swing lip of an adequate length. Final design solution to be agreed with Tenant prior to procurement & install.

Operation: 12.5% gradient as stated by the EN 1398 Twin rams
are used to operate the platform
Standard 6/8mm durbar pattern deck - Colour Blue RAL 5002 or Black RAL 9017 as standard
For greater stability twin rams are used to operate the platform.
Allowable Loading: withstand loading of 6000kg single axle load as defined by EN1398
Side seal and foot protection panels manufactured from galvanised steel sheets.
Maximum pressure valve. The Platform and Lip are manufactured in Durbar anti-slip steel
A maintenance prop shall be provided as part of the leveller structure.
Standard Leveller: 2500mm long x 2000mm wide x 600mm high (Range +250mm/-250mm)
Moving Deck Dock Leveller: 3500mm x 2000mm x 745mm high (Range +380mm/-320mm)

Loading Bay Control Panel Standard Equipment

Composite Integrated Control Panel to inter-lock and operate all loading bay equipment.

Electric Sectional Door/Dock Leveller/Traffic Lights/LED Dock Light. Includes Internal Mimic Lights and Safety E Stop Button

The control panels to have the facility to be linked with Castell Salvo System and Traka loading bay management system which help prevent drive aways from loading bay.

Yellow Nylon Sliding Dock Bumpers (H Type Reversible)

Size: 762mm x 254mm x 110mm as an example, supplier dependant.

Specification: consists of 450mm H section hard wearing nylon rubber bumper which can be reversed to give a pro longed shelf life.

Bumper system complete with mild steel backing brackets and moulded black rubber bumper packer which allows some compression when vehicles dock
The smooth nylon face of the buffer and the ability to raise upwards mean that when the vehicle moves up and down throughout the loading/unloading cycle the buffer simply moves with the vehicle.

Note: Depending on trailers visiting the bays, the above bumpers may be required to be installed 200mm above dock height with a nom 75mm x 100mm cut out in each corner to facilitate last row loading. If fitted above dock height additional steel bumper brackets would be required.

Note: Steelwork trimming for the cold store / frozen dock doors only under the Base Build works. The load houses, internal and external doors, docks, seals and interface with floor slab and heating pipework will be carried out under the Tenant fit out works.

Chilled / Ambient Dock Doors

Loading Bay Door Face Fix Externally Against Building

The loading bay doors should be double-skinned steel section of composite construction comprising galvanized steel sheet with high-adhesion primer coating outer faces with nominal 42 mm x 750/625 mm deep laminated door panels with stucco texture finish to ambient docks and nominal 67 mm x 750/625 mm deep laminated door panels with stucco texture finish to chill docks. The door should include neutral acrylic double-glazed vision panels 33mm thick with Scratch Resistant Duratec Coating within the 3rd door section.

The surface finish to the external face of the doors will be a choice of Ten Standard RAL colours with internal finish of RAL 9002 off white.

Corrosion Protection - The fibre glass re-enforced plastic frame shoe prevents the frame from coming into direct contact with moisture on the floor and provides lasting protection against corrosion.

Fitted with a seal to all four sides of the door, which is in addition to the intermediate seal between the door sections.

Safety as standard within each door includes integral finger pinch protection on both sides built in at each moving joint, together with side trap guards and safety catch provided. Fitted with sliding heavy-duty bolts, anti-fall devices and security anti-Lift kit devices.

Safety edge as standard at the bottom of the door, which will stop the door and return 150mm in case of meeting an obstruction, this safety edge system is current sensing with power limit in the ‘open’ and ‘close’ direction, without curly cable to reduce maintenance costs for the user.

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. Performance characteristics according to the European Safety Standard 13241, which include the following.

Wind Load
Doors tested to European standard EN 12424 Class 4 for high wind resistance offering a minimum 700N/m².

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

Air Permeability
Class 2 According to EN12426

Acoustic
Tested to EN ISO 717-1 providing a 25 R(db) rating.

Electrically Operated
Door includes a single-phase operator with Impulse 'soft start' and 'soft stop' operator with an emergency release mechanism, insulated, sectional panel, vertical lift doors with spring support beam at low level for ease of maintenance and 25 mm thermal movement provision on door tracks.

Internal Freezer Doors (supplied & fitted under the Fit Out works)

Allowance for door trimming and support only under Base Build. The freezer loading dock doors, insulated reveals, threshold and flashing details will be installed under the Tenant fit out works along with the external dock pods, external doors and services.

Dock Shelters / Seals

Collapsible Dock Shelter with White Guide Stripes
Standard Dock Shelter: Width: 3500mm, Height: 3500mm, Projection: 600mm
Head Curtain: 1000mm, Side Curtain: 650mm (Seal Vehicles from 3700mm - 4200mm from yard FFL)

Double Deck Dock Shelter: Width: 3500mm, Height: 4500mm, Projection: 900mm Head Curtain: 1600mm with splits and rear pleats, Side Curtain: 650mm
(Seal Vehicles from 4100mm - 5200mm from yard FFL)

The curtains are manufactured from Heavy Duty P.V.C coated fabric 3.5 mm thick which has in-built stabiliser that prevents the need for stiffeners to help prolong the life of the shelter.

The frames are manufactured from a steel box profile.

Foam Pad Dock Seals

Foam Dock Seals timber backed and covered with fire retardant high-density foam and black P.V.C coated fabric. Side pads complete with full yellow guide stripe and armoured pleats.

LED Dock Spotlights

LED dock lights, steel construction mounting, finished in safety yellow. The LED unit with features as listed below:

- LED life min 40,000 hours
- Light output - 440 Lumen, operates in temperatures -20 to 60 degrees
- Die cast aluminium base
- Heat and impact resistant

LED Traffic Lights

Red/Green Arrowed Led Traffic Light Units complete with Warning Signage Board (100mm Twin Lights)
Twin 100mm Red + Green: 40 LED Arrays (24vDC) Ultra bright
LED technology

Wheel guides

Hormann wheel guides will be provided to all Chilled and Ambient dock locations. (Freezer dock locations wheel guides will be installed by the Tenant) Wheel guides will be 1900mm long, 140mm diameter x 5mm thick steel tube, cast in/sleeved or core drilled to the concrete yard and yellow powder coated. Wheel guides must not straddle joints and the wheel guide should be positioned a minimum of 150mm away from joints.

3.11 Fire Exit Doors

Number and size of doors to be provided as indicated on the drawings.

Doors to be designated and installed to meet the following requirements:

Ambient / RSU Area
- Painted galvanised mild steel frames - primed off site.
- Painted steel personnel doors (double or single as required) - primed off site
- Panic bar, hinges and all other associated ironmongery.
- External colours to be confirmed, internal face to be green.

Specialist composite Insulated doors to chilled chambers (escape doors to frozen chambers all part of Tenant fit out)

3.12 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 in respect of the scope of the Base Build works as detailed in this Specification.
Fire exit doors to the Warehouse will be fitted with all associated signs, notices and emergency lighting.

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 or Approved Inspector with regard to provision of Sprinkler installations, smoke ventilators, hose reels, heat sensors, extinguishers and other firefighting equipment are specifically excluded.

3.13 Warehouse Fire Compartment Walls

All Compartment walls between the warehouse and ancillary structures (not the walls being provided by the Contractor between the Frozen/Chill/Ambient compartments) are to be designed to achieve a 2 hour fire separation. A fire spreader / umbrella detail, is to be provided at the head of the wall.

4.0 Office and Ancillary Building Superstructure

4.01 Structure

The office accommodation blocks structural frames will be constructed in structural steelwork. The frame designed to BS.5950: Part l and 2 will be fire protected to achieve a fire resistance as required under the Building Regulations and the Fire Strategy for the Project. All generally in accordance with Clause O.

The goods in office block is to have a first floor over which will partially be located above an external service yard area; the minimum clearance shall be 6.0m to underside of the finished building envelope in its deflected position, and from the lowest services position.

Column positions shall be as indicated on the drawings based upon minimum interference with the operational layout beneath. Minimum required column grid below mezzanine structure is 16 x 16m externally within the loading bay area, 8m x 8m within the Goods In office areas.

Service risers as indicated on the drawings shall be incorporated into the detailed design of the offices and staff areas to accommodate the Tenant fit-out requirements, located to minimise impact on the operational layout beneath.

4.02 Roofing

The roofs to the Goods In and Goods Out office areas shall be reinforced concrete designed to carry 7.5kN/m2 service load over the whole of the roof and will slope at approximately 2 degrees to one side of the offices. The roof will be an 'upside' down roof with bitumen waterproof layer and insulation (either internal or external to the roof as detailed by the Architect) covered in paving slabs on spacer blocks to all areas that do not have Tenant's plant and machinery (assumed to be approximately 50% of the roof area).

A Provisional Sum of £50,000 will be allowed for forming plinths to accommodate the Tenant's plant and equipment and any roof service 'holes' - not already indicated on the drawing - to be formed in the roof to allow services from the roof into the office areas.

All roof areas are to have parapets providing full perimeter edge protection.

4.03 Rainwater Goods

The rainwater from the roof will be collected via weir outlets formed on the edge of the concrete slab. Passing through the external cladding into external rainwater hoppers (or as otherwise agreed) and discharging through external gravity downwater pipes into gullies at ground level.

4.04 External Walls

External wall cladding to all ancillary ambient areas is to be Kingspan composite panels to match the appearance of the main warehouse envelope and is to meet the requirements of building regulation. These ancillary areas are designed to have minimal abutment with the external single envelope construction of the main warehouse areas (where the vapour seal is external).

4.05 Curtain Walling/Windows

The curtain walling and glazing system shown to the office elevations will utilise recycled aluminium (minimum 35% by volume) and will be Schuco, APA, or Senior Architectural Systems SF52, or similar approved 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.

Transoms and mullions to be limited in number and profile as far as possible to maximise areas of glazing.

Glazing will be in 6 mm Antisun (colour to be agreed with Tenant) on clear glass outer pane or similar approved, 16 mm argon filled space and 6 mm 'low e' clear inner pane to achieve a U value of 1.5W/m^2K. Spandrel panels, where necessary, will be in ultra warm Permawall or similar, insulated panels. In all instances glazing will be designed to recognise all safety and acoustic constraints necessary.

Double glazing units (thermally broken) and infill panels (with thermal check) are to be fitted to facilitate replacement externally.

Where toughened glass is used the complete design / performance specification for the toughened glass as well as the specification of the toughened glass actually supplied is to be provided. If toughened glass is to be used it should be Heat Soak Tested (HST). A full audit trail of the toughened glass will be required from the supplier, including as a minimum the date, batch number of the panes of glass. Details of the ovens in which the toughened glass was toughened and heat-soak tested, including dates of calibration and temperature logs of the toughening of the panes, along with the number / percentages of failures that occurred in testing from nickel sulphide (NiS) inclusions within the glass.

No opening windows are required. 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.

Where applicable brise soleil will be provided integrated with the curtain walling and will be powder coated aluminium.

4.06 External Doors

The front entrance and all office external doors and frames will be manufactured in Schuco, APA, or Senior Architectural Systems SF52, or similar approved 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.

Goods In Office main entrance doors to comply with Building Regulations Part M.

All doors to be fitted with security locks to comply with British Standard 3621 and five lever mortice deadlocks.

A cantilevered glazed canopy is required to the main entrance area to staff facilities as shown on the drawings with consideration to be given to prevent the ingress of driving rain.

4.07 Upper Floor Construction

The upper floors of the offices to be constructed in insitu concrete on permanent metal decking or pre-cast concrete floor units with screed topping, designed in accordance with BS.8110 and BS.6399: Part 1 to carry a superimposed load of 4kN/m², with an additional 1kN/m² for lightweight partitions. The floor slab shall be designed to provide suitable fire resistance to comply with Building Regulations.

All floors and roofs shall be designed to resist a suspended services and ceiling-imposed loading of 0.5kN/m2. In designated archive or plant areas, loading in accordance with BS6399: Part 1 shall be designed for.

Floor construction in the archive area to be designed to carry a superimposed load of 7.5kN/m2 - approximately 13m x 3.5m on the first floor of the Goods In office.

Where precast concrete units are used, they will be grouted in position and sealed to receive proprietary raised floor. Areas not specified with a raised floor will have a minimum 50mm thick fine concrete screed laid over the floor and include a layer of D.49 structural fabric reinforcement. The top surface of the screed will be trowelled to varying levels to accommodate floor finishes which will be installed by the Tenant.

Contractor to allow for the service riser penetrations shown on the drawings through the slab for future fit out services.

A Provisional sum of £25,000 is to be allowed for other slab penetrations not yet identified.

4.08 Internal Walls

There are no internal walls to be constructed under the Base Build except for the warehouse/ office main subdivision walls which will be designed to achieve a minimum 2hr fire separation and a minimum sound reduction value of 40db.

4.09 Staircases

The staircase and landings to upper floor offices will be designed and constructed in galvanised steel to the Contractor's Engineer's details. The staircase and balustrades will, generally have limited finishes, with chequer plate treads and galvanised tubular steel handrails (fully welded - not key clamp). Yellow contrasting nosings and kick plates are required.

4.10 Ceilings

There are no ceilings to be installed in the Base Build.

4.11 Wall Finishes

There are no wall finishes to be installed in the Base Build.

4.12 Floor Finishes

There are no floor finishes to be installed in the Base Build.

4.13 Doors and Joinery

There are no internal doors to be fitted in the Base Build.

4.14 Fire Precautions

This not applicable to the Base Build.

4.15 Finishings General

There are no Finishes to be installed in the Base Build.

4.16 Plumbing and Sanitary Ware

There is no plumbing or Sanitary Ware to be installed in the Base Build, however the Contractor shall design and install under-slab foul drainage in locations as indicated on the drawings to suit the tenant's fit out layouts.

4.17 Passenger Lift Shaft

The lift shaft in the Goods in office is to be constructed as indicated on the drawings and to the Architect's details for the Tenant's future fit-out contractor to install a lift. The lift shaft is to extend from the external yard level (with lift pit below this level) and have openings for lift doors at Yard Level, Ground floor Level and 1st Floor Level.

4.18 Avoidance of Thermal Bridging

The Contractor shall ensure no cold bridging occurs in his design particularly at junctions between the RDC warehouse and ancillary accommodation.

5.0 Technical Service Block (TSB)

5.1 General Requirements

The following clauses set out the requirements of the TSB area which forms part of the Base Build works. Individual sections are provided for the various design disciplines and shall be read in conjunction with the drawings. The completion of the TSB will be phased to allow for the installation of plant etc and so the Contractor will be required to return to during the Fitout programme to complete the outstanding works in two stages. The Contractor shall allow for this out of sequence working in their Base Build costs.

As part of the design and construction of the TSB area of the project, the following will be complied with:-

- Plant loadings at ground level shall be designed to support a 7.5kN/m2 service load. In addition, allow for 8no compressor bases each at 3500mm x 2500mm x 1000m recessed into the floor slab protruding 150mm above the finished floor level. Weight of each compressor will be approx. 6000kg.
- Allow for 3 no floor gullies approx. 1000mm long discharging to foul.
- First Floor shall be designed to support a 7.5kN/m2 service load.
- Roof level plant loadings shall be designed to support a 7.5kN/m2 for service load. In addition, allow for 4 no concrete plinths at 6500mm x 3500mm x 150mm deep. Equipment loadings will be towards the edge of the plinths requiring roof steelwork below the slab to support the plant equipment. Estimated loads for each plinth approx. 20,000kg.

5.2 External Personnel & Fire Escape Doors

Fire escape and personnel doors will be galvanised mild steel fixed within steel frames and shall include all relevant ironmongery appropriate to location and use. Paint finishes internally and externally. Door thresholds to be designed to prevent the ingress of water.

5.3 Building Envelope

Upper floors will be a concrete deck laid flat.

The roof will be a concrete deck laid flat with insulated waterproof membrane system laid to nominal falls (inverted roof).
Concrete paving slabs to form designated walkways shall be provided. Roof access via external access stairs with suitable access point. Support for roof mounted plant shall be accommodated under the Base Build Works where indicated on the drawings with final details to be confirmed.
A Provisional Sum of £25,000 will be allowed for other BWIC for plant and equipment not identified on the drawings.
A Provisional Sum of £30,000 will be allowed for the first-floor removable composite infill panel for installing/ removing plant & equipment – exact location tbc.
The wall of the TSB building (excluding the top louvre section) facing onto the Frozen chamber will be 2 hour fire rated.

Acoustic insulation requirements to be determined and agreed with the client and the Local authority. Any acoustic attenuation - in addition to the louvres in section 5.4 - will be at the Tenant's cost.

A Provisional Sum of £50,000 is to be allowed for any increases in specified requirements in this document so that the building complies with insurer requirements throughout Inclusive of pressure relief panels in any areas containing pressure vessels.

5.4 Refrigeration Requirements

The Refrigeration package is a direct appointment to the Tenant, the Base Build Contractor shall note that they will be required to liaise and assist in the coordination with the refrigeration Contractor in design phase and accommodate any early access dates agreed in the Agreement for Lease.

The Contractor, prior to appointing any of their sub-contract supply chain will be required to fully demonstrate that they have integrated the requirements of the proposed refrigeration Contractor. The Base Build Contractor and their supply chain shall perform a series of workshops with the client direct refrigeration Contractor which shall be fully recorded to ensure that all BWIC, Support steelwork and attendances are fully actioned.

A full height 140mm fair faced blockwork wall to the ground floor of the TSB (approximately 16m long x 6m high) with any necessary wind posts will be constructed with minimum 2hr fire rating). A single 2hr fire rated solid core paint quality ply faced personnel door in a timber frame will be provided in this wall. Stainless steel ironmongery will be fitted to include kick plates both sides, door closer, lever handle and 5 lever mortice lock. The door, frame and architrave will be decorated with white eggshell paint.

The Tenant will require access to the TSB in stages before the full external envelope is completed on two occasions. Two out of sequence cladding visits to complete the cladding to this building are to be allowed.

A 5m high (3.9m above the 1.1m parapet formed by the composite cladding) louvered enclosure is to be provided above the plant deck to the full circumference of the TSB building. The louvres are not to be to a specific noise attenuation level but will provide a degree of noise attenuation. Bracing or support over the plant area will not be permitted.

6.0 Vehicle Maintenance Unit (VMU)

6.1 VMU General

The Vehicle Maintenance Unit (VMU) as indicated on the site layout shall be constructed as shown on the Drawings. The building shall be designed and constructed to matching appearance of the main office areas.

6.2 VMU Structural Requirements

The VMU steel frame will be a portal frame with a minimum clear height to underside of haunch (and/or siphonic drainage) of 5.80m. The frame shall be designed to resist all loadings required to comply with British Standards recognising the potential for dominant openings to occur in wind loadings. In addition, the frame shall be designed to support a suspended services allowance of 0.5kN/sqm, in addition to any lifting beams as indicated on drawings.

The floor slab shall be designed for vehicle loadings. Any storage areas shall be designed in accordance with their class.

Through bays shall be of a minimum 5.5m width with doors of no less than 4.50m width. Each bay shall be of a length as indicated.

The VMU is to include within the total no of bays indicated on the Drawings, with the requisite number of MOT standard bays, again as indicated on the Drawings.

MOT standard bays shall include all necessary cast in floor equipment, including an inspection pit which shall be designed to have a removable floor to allow two alternative working depths (to VOSA & the Tenant's standards).

The MOT bays should be in accordance with VOSA Documentation V.01 latest revision with all requirements of the Vehicle Inspectorate & local Vehicle Inspectorate achieved for HGVs. The Contractor shall liaise with the local VOSA representatives to ensure the design meets their requirements. All designs are to be approved by the Tenant prior to construction.

Cast in floor equipment will be provided and installed by VL Test Systems Ltd, and or other named Direct (all TBC). The Contractor should make allowance for all necessary civil engineering works, including excavation, concrete bases, pits and the like, and finishing the VMU floor slab around the installed equipment.

All pits shall be performed pits supplied and installed by Premier Pits (MBE Fabrications Ltd) as a Tenant Direct Contractor (the Tenant will free issue pits to the Contractor), in accordance with the Tenant design standards and other agreements. Premier Pits will carry out civil engineering works associated with the pit installation, including excavation, pit installation and backfilling.

The Contractor is to liaise with Premier Pits to co-ordinate forming temporary bases for the pit installation, to co-ordinate the floor slab with the pit installation, and is to allow for any ground preparation work (e.g. piling, etc) that may be required prior to the commencement of the Premier Pits installations. The Contractor shall provide all ducting and drainage works in connection with the pit installations. All pit equipment, such a step, gratings, and the like will be supplied and installed by Premier Pits.

Lifting beams with 2.5 tonne electrically operated cranes, at positions to be agreed with Tenant will be provided to cover all bay locations. Each beam shall be tested and stamped to certify its safe working load by the Contractor. The Contractor's steelwork designer shall liaise with the crane supplier appointed by the Tenant to determine suitable loading and deflection criteria to allow the steel frame to be designed.

Within the VMU there will be two storey stores & offices (ground & first floor levels) with staircase as shown on the Drawings. The storage area shall be designed to support four oil storage tanks.

Note: The Contractor shall carry out all builders work in connection with and in accordance with the specific Tenant and site requirements including building services and BWIC all ready to receive all Tenant Direct works.

Access door(s) will be minimum height of 5.30m.

6.3 VMU Roofing & Cladding

The VMU roof will be a portal frame at 5 degree roof pitch. The roofing will be LPCB certified achieving the "U" value in compliance with the current Building Regulations.

External coating is to provide a minimum 30 year guarantee, with a manufacturer's Confidex' or equal level of guarantee. The roof area is to include translucent, triple skinned, non-fragile, factory assembled GRP roof lights to approximately 15% of the roof area, to a regular linear layout, complying as a minimum with the "U" values specified in Part L of the Building Regulations and with a minimum 30 year certified non-fragility. The roof light sheets will meet with the roof lights to be non-fragile in accordance with HSE Materials Standard ACR[M]001:2000 'Test for Fragility of Roofing Assemblies.'

The cladding is to be designed to comply with wind loads calculated in accordance with BS6399. The wall system to a designated 'U' values as required by Approved Document L (2022) of the Building Regulations.

The liner panel assembly is to be sufficiently sealed and may form a vapour control layer. The wall system to be classified a Grade B, LPCB approved construction in accordance with LPS1181 Test for Resistance to fire. Where required, under the Building Regulations, to provide fire protection to an external wall, then a system is to be an LPCB certified Grade A construction in accordance with LPS1181 Test for Resistance to fire. Firewalls must comply with the requirements of BS476 Parts 4 and 22. Any boundary firewall is to be designed to ensure there is no 'step' along the overall elevation.

7.0 External Works

7.01 Service Yard Area

The service yards are to be designed to withstand 10,000,000 standard II tonne axle passes prior to any major maintenance work being necessary.

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 Contractor's 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 in-fill bays can be adequately compacted and finished.

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

A minimum 190mm thick bed of concrete will be laid on 1000-gauge polythene or similar using air entrained concrete with a minimum cube strength of 40N/mm2 at 28 days, reinforced with one layer of structural fabric to the Contractor's Engineer's details.

Bay sizes and all longitudinal, contraction, induced expansion and isolation joints will be formed in accordance with the recommendations of the Contractor's Engineer. All external joints to be sealed at Practical Completion. The slabs will be generally laid to maximum falls of 1:30 and minimum falls of 1:80. Access ramps will be laid to maximum falls of 1:20 and localised transitions laid to maximum gradient of 1:12 as compliant with FTA's Guidance '*Designing for Deliveries*'. The gradients should generally fall away from the building. Where gradients would potentially cause water ingress into doorways, positive drainage measures to be incorporated.

The surface of the concrete is to be finished using a serrated float or wire brush, to provide grooves parallel to the slope of the pavement, with 100mm trowelled margins adjacent to the shutters.

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

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 10mph and rain, the slabs should be protected with suitable tents of polythene or similar, in addition to the curing compound.

Construction will generally comply with the recommendations of the Concrete Society publications TR66.

Bollard protection will be provided externally to the warehouse level access doors and means of escape staircases. Bollards are to be metal sleeved to facilitate easy replacement. Armco protective barriers will be provided in the service yard areas to protect vulnerable areas of the building from vehicular or similar impact damage.

Drainage channels with steel gratings will not be used in areas of the service yards where they can be trafficked by turning vehicles. All slot drainage channels shall be positioned to avoid jockey wheel positions.

Concrete wheel stops (with suitable gaps to allow surface water drainage flow) will be provided by the Contractor in all trailer parking bays. Heights and setting out positions are to be agreed with Tenant prior to installation.

The Contractor shall have produced, and provided to the Tenant, such tracking layouts as are necessary to demonstrate the suitability of the proposed layout but shall always remain responsible for ensuring the layout is workable.

Yard lineage/ hatching /symbols/ markings etc required as part of the Base Build Works will be installed as indicated on the Site Lineage & Protection drawing. Docks and HGV/trailer parking bays will be delineated in extruded MMA cold plastic line markings 100mm wide in Traffic Yellow RAL1023. Concrete surface shall be prepared and primed, and line markings applied in accordance with line marking product manufacturer's recommendations.

Service yards to be structural concrete up to trailer wheel stop upstand. Paving grade concrete slab is to be provided beyond the wheel stop and up to the security fence line. The use of gravel and landscaping is to be avoided within the secure service yard areas to minimise maintenance. Agreement required from Tenant if any landscaping is required within the service yard for planning.

Raised "speed restriction table" sections will be provided in front of the goods in and goods out offices as indicated on the layout and detail drawings.

Steel bollard protection will be provided externally to the warehouse level access doors as indicated on the drawings.

Drainage channels with steel gratings will not be used in areas of the service yard where they can be trafficked by turning vehicles. Slot drains (Gatic, or equal and approved) will be provided.

The service yard on the West side of the TSB is to be designed to be suitable for the loadings of a 200T crane. The Engineer is to identify the area of yard affected and enhance the general yard design to cater for any additional load that could be imposed by the Crane.

The service yard on the southern elevation of the main building is to be designed in Macadam to Adoptable Highways Standards suitable for HGV traffic to accommodate the Southern Water Easement requirements of not allowing reinforced concrete slabs over their assets. This area of yard is to be built in accordance with the Contractor's Engineer's alternative details.

7.02 Car Parks

The car parking areas indicated on the site plans will be designed and constructed to the Contractor's Engineer's requirements and any related Planning conditions (e.g. permeable paving etc)

Thermoplastic white lining and car parking lining will be provided, including hatched islands, crossings, disabled parking symbols & hatching to disabled parking spaces, and all stop / give-way markings as shown on the drawings.

No kerbing or landscaping is to be allowed within the main body of the car park unless otherwise required under the planning approval. The car park design is to avoid the use of any upstand kerbs, or level changes by other means.

The car park shall be accessed separately from the service yards and no cars shall be permitted to gain access to the car park via the delivery entrance area. The car park will be securely separated from the service yard to other operational areas.

a) Marshall Keyblock 80 mm thick Brindle coloured concrete block paving or equal and approved to car parking areas laid herringbone, on a maximum 50 mm bed of sand, on a minimum 300 mm hardcore bed, well vibrated with joints filled with dry washed sand (all in accordance with the manufacturer's recommendations and Engineer's details). Where Porous paving is required to comply with planning approval the paving will be to the Engineer's details and finished with Marshall porous paving, or similar approved, Brindle coloured concrete blocks.

b) Macadam surfacing to, roadways serving and within the car park areas, where indicated (All as Engineers details)

c) White linings to car parking circulation areas will be to a total width of 75 mm.

d) Car parking spaces will be of a size 2.5m x 5.0m minimum and the road width between bays will be 6.0m minimum.

e) Car parking spaces will be delineated by the use of 'hit and miss' Marshalls Colourtop White Keyblock contrasting marker block paviors, or equal and approved

f) 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 and planning approval. Symbols to disabled car parking spaces will be suitably executed using Marshalls Colourtop White Keyblock contrasting block or equal and approved.

g) Symbols to EV car parking spaces will be suitably executed using Marshalls Colourtop White Keyblock contrasting block or equal and approved.

h) Foundations to be provided by the Contractor for the Tenant's openable height restriction barrier at the car park entrance and exit.

Ducts will be provided from the building to each foundation of the height restriction barrier for future installation of access control / comms, ducts to be PVC rigi-duct with smooth interior, spare ducts will be left clear with draw cords.

i) The car park is to be designed with emergency HGV access, allowing access to the service yard if the main HGV entry/exit is obstructed. This section of car park road will be constructed in Macadam to Adoptable Highways Standards.

7.03 Kerbs

Where indicated, 254 mm x 127 mm half battered precast concrete kerbs and areas of high-level protection Trief kerbing shall be provided as indicated on the drawings. All to BS EN 1340: 2003 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)

7.04 Footpaths and Maintenance

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 Marshall Keyblock 60 mm thick Natural coloured concrete block paving or equal and approved laid on a maximum 50 mm bed of sand, well vibrated, with joints filled with dry wash sand.

Maintenance access will be provided around the warehouse building and constructed to provide suitable regular access and hardstanding for MEWPs without deformation, rutting, erosion etc.

7.05 Landscaping

The soft landscape scheme as per the planning approval is to be designed and constructed by Whiting Landscape Limited during the earliest planting season, except for planting to site entrance and car park areas which is to be completed prior to Completion.

Whiting Landscape Limited
Wildmore Lane
Bromsgrove
Worcestershire
B61 0RG

Tel: 01527 836292

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, will be approved by Whiting Landscape Limited and will be a minimum of 150 mm thick to turfed areas, 450 mm thick to shrubs and planting beds and to landscape architect's design to tree pits. Topsoiled slopes for planting should be graded so as to retain soil, allow for maintenance and provide for a flat zone of minimum 300mm behind kerbs.

Any testing of topsoil in relation to a site Verification report is to be allowed for.

Any reinstatement of existing landscaping will be designed and approved by Whiting Landscape Limited.

7.06 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 will be designed and constructed fully in accordance with BS EN 752, BS EN 1295, BS EN 12056 and all other relevant standards and codes of practice in force at the time of construction.

All pipe velocities shall be set such that self-cleansing is achieved in lesser more moderate storm intensities.

Undertake a CCTV survey of all drainage four weeks prior to Practical Completion and provide report to the EA to demonstrate that all drains are intact, clean, clear and free flowing. Allow for further CCTV survey at end of defects period, where appropriate.

There shall be no drainage running under the building ground slabs except where specifically shown on the Drawings. Internal Inspection chambers/manholes are to be avoided within the warehouse No drainage shall be installed under the frozen chamber floor slab.

Alarms to be connected to ATG console - so can be visible to the Tenant nominated 'wetstock management' Contractor. Refer to the site ducting drawing in the electrical package.

b) Pipework

Foul and surface water drainage will be constructed to the details shown on the Contractor's Engineers drawings.

The following pipe material strengths and classifications represent the minimum standard to be used. For adoptable drainage the pipes must be in accordance with the adopting authority's requirements.

	Vitrified Clay	Concrete	PVC-U	Thermoplastic
≤150mm dia.	28 kN/m min crushing strength to BS EN 295 & BS 65	-	To BS EN 1401	To BS EN 13476 & WIS 4-35-01
225mm dia.	Class 160 to BS EN 295 & BS 65	-	To BS EN 1401	To BS EN 13476 & WIS 4-35-01
300mm dia.	Class 160 to BS EN 295 & BS 65	Class M to BS EN 5911 & 1916	To BS EN 1401	To BS EN 13476 & WIS 4-35-01
>300mm dia.	-	Class M to BS EN 5911 & 1916	To BS EN 1401	To BS EN 13476 & WIS 4-35-01

Drainage pipework generally to be laid on Class B granular stone bed, except all drainage internal to the building which 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 and 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.

The locations of manholes where reasonably possible are to be located to be outside of the main thoroughfare areas of the service yard and to the entry/exit to the site. Manhole covers are to be colour-coded to distinguish surface water and foul water manholes.

Where manholes are located in concrete block paving areas the manhole covers will be recessed 'inset' covers orientated to suit block paving layout, and block paving will be bedded in a sand/cement mix to avoid waterlogging in the manhole cover.

No manholes are to be located within 5m of any office entrance.

Where manholes have connections from the siphonic drainage system the covers will be vented to the Engineer's details.

d) Gullies & Drainage Channels

The drainage of the yard areas to be laid to falls to heavy duty drainage channels. Decathlon or equivalent approved and standard heavy duty gulley outlets where appropriate. The yards shall slope away from the building in all cases. Drainage channels with steel gratings will not be used in areas of the service yards where they will be heavily trafficked or where vehicles are turning. All drainage channels shall be positioned to avoid jockey wheel positions.
Gullies to road 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 EN 124 - 1.

e) Petrol Interceptors

An alarmed petrol/oil interceptor, required by the Environment Agency, will be installed and ventilated to serve the surface water drainage system to external paved areas, but all ventilation to be beyond the boundary of the service yards. Alarm panels to be located in Goods In or Goods Out office locations with a repeater panel in the other office and to be network enabled for remote monitoring with I-Bank system. Class 1 system include provision of drainage to receive waste from fuel island, vehicle wash, trailer wash, steam clean ramp, battery charge area; MHE repair area, compactor, VMU pits, chassis wash and any other relevant facilities indicated on the drawings.

f) Drainage Pumps & Alarms

Alarm panels for drainage pumps (and any other such equipment) are to be monitored in the Goods In Office. Ducts and cables to run in similar routes to all such ducts installed, and to be co-ordinated with such ducts/cables.

g) Future Fit-Out Drainage

As indicated on the drawings the following drainage will be installed under the Base Build contract to suit the future fit-out by the Tenant:

Ambient Warehouse (Asset Store & RSU)

- Drainage connections within the Ambient areas as indicated on the drawings provided. Note wash down area laid to falls/central gully with external filter tank installed below the yard slab - all connected to the foul drainage system.
- RSU tray wash drainage and associated silt traps/filters requirements. Design intent drawings provided are illustrative suitable for costing purposes and are subject to final detail design - all connected to the foul drainage system. MHE Area
- Floor scrubber wash down points floors laid locally to falls into drainage gully to Contractor's Engineer's details. Road type gully to be drained into filtration tank externally prior to discharge into the foul system.
- Foul drainage pop up for WHB and stainless steel sink (installed under fit out)

h) Sprinkler Test Drainage Provision -

A foul drainage connection will be provided to the future sprinkler pumphouse and external sprinkler manifold locations where indicated on the drawings. If a gravity connection is not possible then a pump rising main will be installed connecting to suitable gravity manhole.

7.07 Pedestrian Ramps and Steps

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.

At the Good-In offices steps will be provided from the yard to the main entrance. Adjacent to this a recess will be formed to suit the future installation of a pedestrian and goods lift by the Tenant. Suitable ducting for electricity supply will be provided to this area to power the lift. A lift pit is not required.

7.08 HGV Barrier islands

Trief kerbs islands will be constructed as indicated on the HGV entrances and exit locations to suit the installation of electrically operated barrier by the Tenant. Ducting will be provided to each island to facilitate the installation of power and comms supplies to each island location.

Ducts will be left clear with draw cords.

7.09 Fencing

Where indicated on the site layout drawing to the perimeter of the service yards 2.40 m high paladin fencing, complete with manually operated lockable gates. Provision shall be made for gates to be secured in the open and closed positions. Gates in the open position should not restrict the roadway width. Roadway levels should be designed such that there is a consistent gap beneath gates when closed not exceeding 250mm.

Where indicated on the site layout drawing a pedestrian access will be provided into the car park via turnstiles and a pass gate adjacent to the main warehouse offices, suitable ducting and power will be provided for access control to be installed by the occupier. Ducts to be PVC rigi-duct with smooth interior, ducts to be left clear with draw-cords.

Fencing colour to be green in accordance with the drawings and Planning consent.

Fences to be suitably set back from vehicular areas to reduce risk of accidental impact.

Fencing and finished ground levels to be co-ordinated to avoid gaps beneath fencing and such that maximum gap beneath fence is 100mm.

7.10 Cycle Shelter and Storage; Smoking & Vaping Shelters

Sheltered cycle storage is to be provided as indicated on the drawings and in accordance with BREEAM requirements. Cycle shelters to be a wave cycle shelter by Turvec Solutions which match other plots on the Development or equal and approved.

Smoking & vaping shelters are to be installed with bus stop style benching as indicated on drawings, the design of the shelter is to complement the cycle parking shelter – as per the Harrowby range by Broxapp Limited or equal and approved.

7.11 Armco Barriers and Building Protection

Where indicated on the drawings the building will be protected by Armco galvanised steel post and beam barrier system, including all internal and external corners and RAL 1007 Yellow fish-tail ends.

7.12 BWIC Fuel, Axel Weigher and Vehicle Wash Installation

Builders work in connection with the future installation of a fuelling facility and a recycling, moving vehicle wash will be provided and shall comprise drainage outfall and provision of 2 no 100 underground ducts with drawcords from the building to external location as indicated on the Site Layout. Ducts to be PVC rigi-duct with smooth interior, ducts to be left clear with draw-cords.

The yard areas for these items will not be surfaced with concrete yard but instead will be left at sub-base level for the Tenant to complete the installation of this equipment and surface the area to be left 'fallow' as shown on the drawings.

7.13 BWIC Future HGV and Car Park Electric Vehicle Charging Installation

Builders work in connection with and to facilitate the future installation by others of electric vehicle charging points (EVCPs) within the car park will be provided comprising of suitable underground ductwork infrastructure from the building to one end of each block of car parking spaces in the car park in location(s) to be agreed.

As shown on the drawing, underground ductwork infrastructure is to be provided to the HGV parking spaces on the East Service Yard on the outside edge of this yard.

Ducts to be 100mm diameter PVC rigi-duct with smooth interior, ducts to be left clear with draw-cords.

This is in addition to the installation of the EV Charging to the Car Park which is required under the planning requirements which is to be installed under the Base Build contract.

8.0 External Services

The Contractor shall carry out all necessary calculations and liaison with the relevant utility companies, system operators, network operators, suppliers and meter operators in order to apply for and obtain the necessary connections, supplies and meters for the continuation of the works and the subsequent operation of the entire premises.

The Contractor shall obtain the MPAN and MPRN and procure the supply and installation of the electric and gas meters. All meters shall be capable of being monitored by a future BMS system.

The Tenant will enter into the supply agreements at the time requested by the Contractor. The Contractor shall ensure that supply agreements are made available to the Tenant in good time to suit the Base Build programme. Furthermore, the Contractor shall coordinate with Tesco for shipper details in good time to achieve PC and Contractor's obligations for PC including testing and commissioning for PC.

8.1 Electricity

A 6000KVA 11KV HV metered supply to service the site will be provided. From the Regional Electricity Company high voltage distribution network, an 11KV electricity supply will be provided to the site, terminating at the Regional Electricity Company (REC) metering HV cut-out, within an REC approved housing. This housing will be sited in the location shown on the site layout drawing giving suitable paved external access for the REC. The Contractor is to make the necessary space allowances directly next to the DNO's Ring Main Unit to accommodate the Tenant's HV switchgear.

A high voltage metered supply will be taken from the Tenant's switchgear and taken to multiple on site substation/transformer locations, as identified on the MBA Drawings, where it will terminate on suitably rated RMU's/transformers. These shall then supply Wilson E3 Amorphous ultra low loss transformers.

The capacity of each transformer is identified on the MBA drawings.

The entire electrical installation shall be carried out in accordance with the requirements of BS 7671 (IET Wiring Regulations 18th Edition).

The Contractor will install LV Panels as identified on the MBA drawings to provide power to the External Lighting, Base Build Emergency Lighting, Chill and Ambient dock and Level Access Equipment, Planning required EV Car Charging, Stormwater Pumping and (if required) Foul Water Pump station. The Contractor is to provide details of any LV panels to be installed and, if the Tenant requests, increase the size of these LV panels to facilitate the future fit-out at the Tenant's cost.

The low voltage distribution for the building shall be derived from the packaged substation.

The package substation shall consist of an RMU supplying a 11,000v/415v Wilson E3 Amorphous ultra-low loss transformers with low voltage tails to the main low voltage panels, ALL Final locations are to be agreed between the Contractor and the Tenant. The transformer shall be fitted with an outgoing ACB/MCCB if more than 10m from the main LV panel.

The Low voltage panels shall be form 4 type 5, front access and shall have main incoming ACB and busbars rated for the transformer capacity, with MCCB outgoing supply protection devices fitted. The LV panels will be provided with MCCB units to suit the Base Build work requirements and the panels shall be of a sectional type to allow the Tenant's fit out contractor to extend the LV panels as part of the fit out works phase.

The LV panel and shall be provided with a main multi-function meter on the incoming ACB and kWh sub-meters on all required outgoing ways. The metering shall be designed and operated in line with part L2 of the building regulations and TM 39 (guidance for sub-metering new build premises published by CIBSE). All meters shall be connected to energy data loggers within the panel. The data logger's energy consumption kWh data (this half hourly data) shall then be stored on the logger in secure memory as an industry standard CSV log file. The data logger shall have the ability to connect to the Tenants portal and building energy management system (both forming part of the Tenant's Fit Out Contract) for energy monitoring.

For the purpose of the Contractor's Base Build obligations, the main LV Panels to be connected to transformer TX-01 and TX-02 located within the TSB are to be rated at 3000Amps each and TX-03, TX-04 and TX-05 are to be rated at 2500Amps each to suit the Tenant's fit out requirements.

The Contractor shall ensure that all Base Build Electrical and Mechanical Services, i.e, external lighting, emergency lighting, EV charging points (including e-bike charging posts), LV Panels, transformers and pipework are to be tested, commissioned and witnessed in conjunction with the EA and invite the Tenant's representatives to attend all witnessing having given at least 10 days notice to the Tenant in writing.

All other low voltage distribution for the building will be carried out by the Tenant's Fit-out Contractor.

8.2 Gas

The incoming gas supply of 1750 KW will be positioned in an external ventilated meter kiosk as identified on the drawings. The Contractor is to make the necessary space allowances for a gas booster kiosk will be provided to be located next to the incoming gas kiosk. A capped gas main is to be installed between the gas kiosk and the incoming building point.

The Contractor will provide a suitable chamber and lid for the GDN/IGT company's emergency valve and the meter/governor base to suit the requirements of the gas supplier/meter operator. The Contractor shall ensure that a chatterbox unit is provided as part of the meter installation.

The Contractor will include trenching and a private gas main from the public meter/governor unit to the building gas intake position, along with steel upstand pipe arrangement and final connection pipework onto the public meter/governor. This main will be sized to service the gas load indicated above, and will include if necessary gas pressure booster units to ensure delivery of the stated pressure above.

A spare duct is to be provided from the intake position to the location of the gas meter/governor. Duct to be 100mm dia PVC rigi-duct with smooth interior, left clear with drawcord.

8.3 Water Cold Water Service Systems

The mains cold water services shall commence at the metered site service entry point in a purpose-built meter pit. The meter pit shall be fitted with a pulsed output (for future connection to Building Energy Management System).

A potable water supply will be provided to serve the domestic water requirements of the offices and ancillary buildings.

The capacity of the service shall be 8 l/s and locations as identified on the MBA Drawings.

The Contractor shall design, supply, install, test, disinfect and commission the mains cold water service system to all locations as identified on the MBA drawings.

The work shall consist of, but not be limited to, the following main elements of work:

- Incoming mains potable cold-water supply shall be extended from the site boundary (water meter location) into the building and capped off.
- Provide all necessary pipe work, insulation, valves, supports, fixings etc. for a compliant installation.
- All necessary testing, balancing, commissioning and water treatment.

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 temporarily fixed (to be permanently fixed by the Tenant) located at ground floor of the Goods In Office.

The Contractor is to provide a min 100 mm dia duct from the external water meter to the building. Ducts to be PVC rigi-duct with smooth interior. All ducts will be left clear with drawcords.

A minimum of a 100mm OD Polyethylene supply from the boundary to the future sprinkler pumphouse position (as indicated on the drawings ~~Site Layout~~) shall be installed complete with a hydrant and washout valve in the future sprinkler tank location connected on a flanged joint so that the Tenant's contractor can remove the hydrant and connect the pipe to the tanks as necessary.

A 180mm OD (150mm NB) HDPE Fire hydrant ring main to comply with BS-750: 2012 shall be provided and connected to the towns water main in the estate road, complete with underground Fire Hydrants (at approximately 90m c/c) in suitable preformed pits with heavy-duty cast-iron covers clearly marked 'FH' and painted bright yellow as indicated on the drawings. The Fire Hydrant Ring Main will have a minimum pressure rating of 10 bar (SDR17) and will not be connected at any point to the Sprinkler Tank supply. The pipe will be fully tested to the requirements of BS 9990: 2015.

An underground Sprinkler System Feed Main will be provided as indicated on the drawings complying with BS-EN 12845: 2015 and current LPC Rules. The Sprinkler System Feed Main shall terminate with flanges at 300mm AFFF, at the sprinkler pump house and three manifold locations for future use by the Tenant. The Sprinkler System Feed Main shall be Installed using 355mm (300mm NB), Polyethylene (PE 100) fusion welded pipework. Risers to internal locations shall be installed using Ductile pipework and terminate with 300mm NB PN-16 flanges. The Sprinkler System Feed Main shall have a minimum pressure rating of 16 bar (SDR 11). For indicative routing, see MBA drawings. The Sprinkler System Feed Main shall be a dedicated feed, without connection to other water supply pipework on the site. Prior to final backfill and completion of the yard, the Sprinkler System Feed Main shall be capped at the tank site location and future manifold terminations and fully hydrostatically tested to the requirements of BS-EN 12845: 2015 and current LPC Rules. All underground pipework shall be installed with the required level of ground cover to prevent freezing.

8.4 External Ducts

Two ducts will be provided from each of the furthest North West and South East corners of the site boundary to a designated intake point to serve the communications requirements of BT. Two additional ducts shall be provided for use by others. Each set of ducts will enter the building and pass below ground and rise to terminate 150mm AFFL in locations to be agreed with the Employer.

2 no vacant ducts not less than 100Ø 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 (see also any requirements for HGV barriers).

1 no 100 duct shall be provided from the building to any remote utility meter connecting back to the Goods In office.

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

All other additional ducts indicated on the drawings will be installed.

Ducts to be PVC rigi-duct with smooth interior. All ducts will be left clear with drawcords.

All ducts terminating within the building are to be designed and installed neatly, in locations to be agreed with the Employer, arranged and set-out so as to allow the floor to be properly constructed and finished around, and fitted with proprietary caps. Other than telecoms ducts, all ducts will be cut flush with the floor.

9.0 Mechanical Services

9.1 General

There are no mechanical services works in the Base Build Specification but any incoming services to be installed under the Base Build will be designed and installed in compliance with the recommendations of the CIBSE Guides, 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.

9.2 Protection of Services

Service entry points, meters, pipework and control panels within the warehouse area are to be protected from vehicle impact by suitable Armco barriers or bollards.

The Contractor is to submit a proposed Internal Protection drawing for approval by the Employer & Tenant.

9.3 Design Conditions

Not Applicable

9.4 Main Office & Hub Office Heating and Cooling

Not Applicable

9.5 Domestic Water Services

All Cold Water Services installations are detailed in Section 8 of this Specification.

9.6 Ventilation

Not Applicable

9.7 Controls

Not Applicable

9.8 Meters

Only the meters in Section 8 are to be installed under the Base Build - all other metering is to be installed by the Tenant's Fit-out Contractor - will comply with the following:

Meters will facilitate 2 types of measurement, utility and usage.

utility meters must provide a calibration led or a pulse output. Sub meters for usage measurement can be with a pulse output for the energy or a modbus output (RS 485: 2 wires) allowing measurement of energy or power.

The gas and water meters must provide the necessary equipment to have a pulse output.
Typical usage for gas is:

- heating

Typical usages for water are:

- total consumption
- split by tenants

Pulse output specifications:
In order to support any kind of emitters the pulse width must be greater or equal than 100ms.
The maximal closed state load resistor is defined as Rc = 1kΩ
The minimal open state load resistor is defined as Ro = 1MΩ
Meters available in 3 different versions, Indoor, Outdoor and ATEX Outdoor, sensors with pulse input capability for Reed contact pulse transmitters (dry contact).

The Metering provided shall satisfy the following BREEAM Credit:

Title	Credit Reference
Energy Monitoring	Ene 02

9.9 Services Pipework

Pipework and fittings associated with the mechanical services installation will be as follows:

Pipework

Heating	Not applicable.
Gas internal	Not Applicable
Mains cold water, hot water and cold services	Not Applicable.
Mains cold	Blue polyethylene medium density to BS EN 12201-1 : 2003, BS EN 12201-2 : 2003 and BS EN 12201-5 : 2003 unless specified more onerously in Section 8 water external
Gas external below ground	Yellow polyethylene high density type SDRII Series to BGC/PL2: Part 1.
Overflows and Grey water	Not Applicable.

Fittings

Heating and gas	Not Applicable.
Mains water, hot and cold services	Not Applicable.
Gas and mains water external	Heat fusion welded joints below
ground. Overflows & drain lines	Not Applicable

Alternative materials/methods may be offered for approval.

9.10 Testing and Commissioning

All services will be tested and commissioned in accordance with CIBSE technical memoranda and guides. The Contractor shall nominate a suitable person to monitor the commissioning on behalf of the client in accordance with BSRIA and CIBSE Guidance.

Services shall be left fully operational where possible at Practical Completion

10.0 Electrical Services

10.1 General

The electrical services work will be designed and installed in compliance and the recommendations of the 18th Edition of the IET Wiring Regulations (BS 7671:2018) 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.

All electrical services installations within the warehouse other than on the plant deck are to be above the minimum clear haunch height.

10.2 Electricity Supply

As detailed in Section 8

10.3 LV Switchboard and Distribution Boards

As detailed in Section 8.

10.4 Sub Main Cables and Cables

Sub main cables will be provided from the LV panel board to sub distribution boards and busbar trunking feed points, extended in XLPE/SWA/LSF copper cables to BS 5467: 2016. All distribution systems will be continually rated and designed in accordance with BS 7671: 2018 - 18th Edition IET Wiring Regulations.

Sub main cables will be supported on proprietary ladder rack and/or hot dipped galvanised steel medium return flange tray all secured on purpose made unistrut metal brackets at intervals not more than two metres. All cables will be evenly spaced and securely clipped to the cable tray and identified where necessary with cable markers.

10.5 System of Wiring

Emergency lighting and any Base Build power installations will, in general, be carried out in LSF/LSF insulated cable run within ceiling voids and where necessary into galvanised steel cable tray/trunking/conduit to provide a rewireable system that is concealed and flush with plug in roses at termination points for final connection to fittings.

All cabling in ceiling void shall be either run on cable containment systems, or as minimum fixed to the building structure with proprietary fire-resistant cable clipping systems. Cabling shall be run in a neat, regimented fashion following common cabling route where possible.

External lighting supplies will be extended in XLPE/SWA/LSF cables run in ducts as necessary.

To the warehouse area the power installations serving the dock doors and levellers, will generally be carried out with XLPE/SWA/PVC/LSF cables to distribution boards, high level bus bar to doors and docks with tap-offs to suit.

10.6 Lighting Installations

The lighting will comprise the following:

Offices	Not Applicable
Circulation/Corridors	Not Applicable
	Not Applicable
Stairs	Not Applicable
Cleaners Store	Not Applicable
Plantrooms/Risers	Not Applicable
Toilets	Not Applicable
Reception/Main Entrance	Not Applicable
Emergency Lighting	Emergency lighting shall be provided to all fire exits to Chill, Ambient, TSB & VMU areas and will comprise LED down lighters with a 3hr battery pack and self-contained emergency exit signs shall be provided over final exit doors, complete with appropriate running man legend. Each emergency LED fitting shall be provided with an intelligent wireless sensor to enable automatic testing/recording via the Smartscan Portal in line with requirements of BS 5266.
External Lighting	

Lighting for external roadways, service yards and lorry parking areas shall be provided by Thorlux from the Smart Scan range, these 'silver' LED luminaires are to be mounted on the building and/or on galvanised columns. All building elevations shall be provided with security lighting to the lux levels identified on the drawings.
Lighting for car park shall be provided by Thorlux from the smart Scan Range. These 'silver' LED luminaries are to be mounted on the building and/or on galvanised columns. Where lighting columns cannot be located in the footpath and verge areas then galvanised tubular protection shall be provided.
Where light fittings are fixed to the building exterior, type, locations and finishes of mounting plates, brackets etc. are to be co-ordinated with and matched to the cladding to ensure satisfactory appearance.

The lighting systems shall be controlled by local time clock and photocell, with a local overdrive facility provided adjacent to the external lighting control panels. Each luminaire shall be provided with intelligent wireless sensor to enable individual control via sensor technology system portal.

External lighting shall be designed in accordance with CIBSE lighting guide be 6: 1992 'The Outdoor Environment'. Luminaries utilised for external lighting shall ULOR in line with ILE Guideline 2005 and shall be suitable for mounting direct to the outside façade of the building or mounting on free standing columns.

The external lighting design shall be compliant with ILE guidance notes 2005 (including table 1) for reduction of obtrusive light, 2005.

Lighting shall be designed to give the following average maintained levels:

	Eavg (Lux)	**Emin (Lux)**	**Emin/Eavg (Uo)**
Access Road	20	8	0.40
Building Entrance	50	20	0.40
Building Perimeter	10	2.5	0.25
Car Parking	20	5	0.25
Cycle Store	20	5	0.25
Fuel Filling Island	150	60	0.40
Gatehouse	50	20	0.40
HGV Parking	20	8	0.40
Loading Bays	50	20	0.40
Pedestrian Crossings	100	60	0.60
Service Yard	20	8	0.40

10.7 Power Installations

Electrical power supplies will be provided generally as follows:

Mechanical Services	All power and control supplies associated with mechanical services that are included in the Base Build Specification including any pumping stations. Local isolation to be provided to all items of equipment;
BT	Not Applicable;
Office Areas and Meeting Rooms	Not Applicable
Reception	Not Applicable
Tea Room/Kitchenettes	Not Applicable.
Toilets	Not Applicable
Stairways	Not Applicable;

Corridors	Not Applicable;
Chilled and Ambient Areas (RSU & Internal Asset Store) - All Warehouse doors, loading dock pods and dock levellers, etc - all TP&N supplies	
All Other Office/Ancillary Areas	Not Applicable;
External Power	As necessary to complete the Base Build works

10.8 Fire Alarms

All Fire Alarm installation is to be done by the Tenant's Fit-out Contractor. There is no Fire Alarm installation in the Base Build.

10.9 Lightning Protection

The Contractor will 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 2011, with surge suppression installed as to reflect such requirements.

Lightning protection system earth inspection pits to be flush fitted and square to the building.

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

10.10 Metering by the Tenant to comply with BREEAM and Energy Monitoring

The Base Build works will only include the metering specifically noted in earlier sections of this Specification as being specifically included. For the purposes of BREEAM the Base Build Contractor is to note that Sub meters shall be provided by the Tenant's Fit-out Contractor as per the building regulations including the following: -

- Office Lighting
- Office Small Power
- M & E Plant including renewables
- Operational Areas
- Ancillary Areas

- Any supply from the mains switchgear with a protective device that exceeds 32A, single or three phase.

Provision shall also be made for the future connection of warehouse lighting and heating.

The Sub Metering provided shall satisfy the following BREEAM Credit:

Title Credit Reference Energy Monitoring Ene 02

The Tenant's Fit-out Contractor shall supply, install, test, commission and set to work the dedicated MODBUS Automated Meter Reading (AMR) Systems for the above meters, along with the Contractor's nominated Energy Monitoring supplier's platform.
In order to provide a compliant solution and allow for extension to facilitate future expansion and revision by the tenant, it has been decided to standardise on a modular solution as: -

- Manufacturer Norther Digital Metering
- Model Multicube Modular
- Protocol MODBUS

The above must be linked, by way of cellular modem, to the specified building optimisation platform and configured to transfer the meter readings via MQTT to the specified platform broker.

Each meter reading should be delivered to the platform by way of an MQTT packet transmission containing the time stamp of the reading, the value of the reading, and the Unit of the reading.

The publishing topic of the data will consist of a main, building specific topic, with the meter reference as a sub-topic.

The MQTT publisher must be able to connect to the specified broker using an SSL secured connection.

The supplied cellular modem must include a data subscription for a minimum of 12 months following handover of the building, and details for renewing the data connection should be provided to the optimisation platform operator.
To facilitate the dissemination of the optimisation platform data to the occupier the design must include a suitable flat-screen dashboard display screen in the main entrance lobby of a minimum of 42" in a 16:9 widescreen format mounted prominently in a landscape configuration with internet connectivity and the ability to display a specified website address indefinitely.

Pulse output specifications:
In order to support any kind of emitters the pulse width must be greater or equal than 100ms.
The maximal closed state load resistor is defined as Rc = 1kΩ
The minimal open state load resistor is defined as Ro = 1MΩ

Meters available in 3 different versions, Indoor, Outdoor and ATEX Outdoor, sensors with pulse input capability for Reed contact pulse transmitters (dry contact).

10.11 Bonding and Earthing

All necessary bonding and earthing in compliance with the requirements of the 18th Edition of the IET Wiring Regulations (BS 7671: 2018) will be provided with particular note to incoming gas and water services.

10.12 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.

The Contractor shall nominate a suitable person to monitor the commissioning on behalf of the client in accordance with BSRIA and IET Wiring Regs.

10.13 Photovoltaic System

There is no PV system & equipment to be installed under the Base Build contract.

All PV required under planning approved documents, Building Regulations, BREEAM or any other legislation will be installed by the Tenant.

For the purposes of energy calculations, Building Regulations and BREEAM applications the Contractor can assume that a minimum of 1.0 MWp PV installation will be installed on the roof of the Chilled and Frozen chambers of the building. The Tenant will confirm the exact size of the PV installation to be installed at a later date.

10.14 Electric Vehicle Charging Points

Electric vehicle chargers will be provided in line with the Planning requirements.

The chargers will be in the form of a dual socket ground mounted post and located

behind the kerb in line with the white line/space between the vehicles, whilst

maintaining sufficient access on the footpath. Each charger and socket will be type 2 to BS EN 62196 rated at 7.2kW single phase. They will be key activated non communicating type with the ability to be upgraded to intelligent type by the end user without the need to replace the entire unit. Chargers will be manufactured by Pod point, BP Chargemaster, Rolec, or equal and approved.

Separate buried data cable ducts will be provided to the chargers to enable the end user to install intelligent metering or billing systems. All external wiring will be concealed.

Integral RCD's, earth rods and impact protection will be provided in line with the manufacturer's requirements and the requirements of the local electricity DNO.

Charging equipment and the Contractor's specialist installer will be approved by and eligible for the OLEV Workplace charging scheme grant scheme, and the Contractor's specialist installer is to apply for the OLEV Workplace Charging Scheme grants on behalf of the Employer.

(Please see Section 7.13 in respect of future EV duct provisions)

11.0 Health and Safety File/Operating and Maintenance Manuals

The Operating and Maintenance Manuals are to include the Health & Safety File in accordance with the Construction Design & Management Regulations along with all the information required for the operation, maintenance, refurbishment, decommissioning and demolition of the works.

The manuals should be complete and accurate, fully indexed, (electronic versions should be interative and searchable), and organised into volumes -

1. General - incl H&S File
2. Building Fabric
3. External Works
4. Mechanical
5. Electrical

The Manuals content should include the following as a minimum:

- Project Description, Scope and Design Principles
- Pre-Construction Information
- H&S File
- Ground Investigation, Remediation and Residual Hazards
- Statutory And Underground Services Information
- Statutory Approvals (incl Applications and Approved Documents)
- Contract Directory
- Document Registers
- For each and every discipline / element / works package -
    - Scope of works / description of system(s), plant and equipment
    - Suppliers and Manufacturers Directory
    - Manufacturers Information
    - As-built Drawings
    - Testing and Commissioning results and certificates
    - Operation
    - Maintenance Procedures and Planned Maintenance Schedule
    - Spares information
    - Guarantees and Warranties
    - Replacement strategy
    - Demolition, decommissioning or disposal information

A draft electronic copy is to be made available a minimum of ~~two~~ four working weeks prior to Practical Completion.

The final H&S File and Manuals will be provided within two weeks following Completion and shall be provided in an agreed electronic soft copy format and two no complete hard copies delivered to and stored safely in the completed building in location to be agreed.

QR codes will be provided to each element of the project linking to documentation, service and maintenance records.

11.1 Building Log Book

The Building Log Book will be provided in accordance with Building Regulations and to CIBSE TM31 Guidance incorporating all requirements of the BREEAM assessment.