Project Specification

V10

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Reviewed by: TC

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V06: Early Access Criteria introduced

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- Annex 07: new scheme
- Annex 09: scheme attached
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- Escape door
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A. INTRODUCTION & GENERAL

A.1. Terms of Reference

i. This document forms part of the Developer's Requirements for P3 Italian Projects.

ii. **Annex 01 - List of Deviations** reports all deviations to P3 Technical Specifications agreed upon and discussed between the Employer and the General Contractor on the specific project. It is understood that for anything not expressly stated in the present document, P3 Technical Specifications fully remain in place.

A.2. General Conditions / Insurances

A.2.1. P3 Silver based FIDIC Contract

i. See Conditions for Bonds, Retentions, and other commercial conditions.

A.2.2. Construction All Risk (C.A.R) insurances

i. GC shall have a C.A.R insurance carrying all liabilities and responsibilities. In the event of a claim the GC will notify P3. The GC will be liable for the first Euros [5000] excess (first payment). The insurance shall cover damage while the project is under construction and prior to the full acceptance thereof by the Developer. Cover shall be for full amount of the contract and a full reinstatement basis. The expert if required shall approve the expenses latest 7 days after the event. Insurance company to be rated 'A' or better by A M Best.

ii. The GC will offer P3 a reduction within the contact sum for eliminating the C.A.R cost from their scope.

iii. If required by Developer, the C.A.R will be co-insured between Developer's and GC's insurers.

A.2.3. 10yr Decennial insurances

i. GC will insure with P3 Decennial Insurances.

ii. P3 will appoint an approved technical inspector that meets the insurer's requirements.

A.2.4. Professional Indemnity Insurance

i. GC shall provide a PI insurance in value of TWO MILLION EUROS (€2,000,000) each and every occurrence or provide a parent company guarantee.

A.2.5. Technical warranties

i. Please refer to **Annex 03 - Warranty lengths** for any other informations regarding the Technical Warranties of each element (i.e. structures, roof, slabs, walls).

A.3. Scheme Design

i. The design has had minimal engineering input and is based on the Technical and Environmental Due Diligence shared by P3. Actual site ground conditions and site utility services shall be deepened by the GC and are considered as accepted, as per P3 Group / Silver FIDIC Contractual requirements.

ii. P3 will share with the GC the Building Permit and the Technical Environmental Due Diligence which the GC shall analyze and acknowledge to develop the Detailed Design, in compliance with ASHRAE, NFPA, Local Regulations (ASL, Firebrigades Indications, etc) and P3 request where applicable. The GC must guarantee the most stringent quantities or performance among those required by local law/regulation, those listed in this document

iii. The Design shall be wholly and singularly the responsibility of the General Contractor. Where the Developer's Requirements contain elements of design or specification, the General Contractor shall take full responsibility for them as if they were the Developers design.

iv. Any references in these Employer's Requirements to the Design shall include any design which the General Contractor shall cause to be prepared by others in connection with the Works. When the Employer's Requirements contain elements of design or specification, the General Contractor shall take full responsibility for them as if they were the Contractor's design. Such reference shall equally include any amendments made by the Developer to such design for any reason. Any approval or rejection by the Employer's Agent of any proposal for Design put forward by the Developer shall not relieve the General Contractor of his responsibilities in respect of Design contained in the Building Contract and these Employer's Requirements, including ensuring that uncompleted structures shall be structurally sound at all stages of their construction and the warehouse is fit for purpose at completion and for the duration of its design life. The Developer shall not be responsible for the accuracy, content and completeness of any investigative reports supplied to the General Contractor.

v. This document shall be read in conjunction with all Annexes scheduled within.

A.4. Specified Items

i. Where reference is made within this specification to specific products and manufacturers, equal and approved alternatives may be used subject to prior written approval from the Developer.

ii. ANY DEVIATIONS FROM THIS P3 GROUP SPECIFICATION MUST BE APPROVED BY P3 AND CLEARLY IDENTIFIED SEPERATELY.

A.5. Building Standards

i. The following specification is based on European Codes of practice. However, the General Contractor shall also ensure compliance with Italian building standards and codes of practice in conjunction with the following hierarchy.

   a. If applicable Italian standards / Regional or Local authority standards / Industrial-zone standards / exist, they shall take precedence if they are more onerous than this specification.

   b. If applicable Italian standards / Regional or Local authority standards / Industrial-zone standards do not exist, the European Standard shall be adopted.

   c. It is understood that local rules shall be taken into consideration (i.e. PRGC of the Municipality, NTA or Regolamento edilizio).

ii. The General Contractor shall notify the Client of any changes to Italian / Industrial-zone standards or National regulations, which are introduced after the base date.

iii. The design and construction of the project, ancillary works, external works and all associated works will be undertaken with all due care and diligence with best quality workmanship, materials and components suitable for a building of this nature. Particular attention will be paid by the Client, in the acceptance of the quality and finish of workmanship.

iv. The construction of the Project, ancillary works, external works and all associated works will be undertaken with all due care and diligence with regards to Health & Safety standards (81/08 e smi).

v. All new works and materials shall be designed and constructed in full compliance with current planning requirements, Italian Permit standards, European Standards, Approved Codes of Practice and Regulations current at the time of the commencement of the works and where no such standards exist shall be in accordance with good building practice. In particular the sprinkler installation shall be designed and installed in accordance with the NFPA Codes and Standards or the FM standards as required elsewhere in the specification current at the time of the commencement of the works.

vi. Where clauses within this document refer to ASHRAE / American standards and those standards prove to provide a higher standard than the equivalent country specific or European standard, then the former higher standard shall apply. In all other cases the country specific or European standard shall apply.

vii. Where possible all Concrete works are to be "pre-fabricated", with exception of structural warehouse slabs; to avoid "in-situ wet works". Materials to be of similar standard / life cycle, subject to availability within country.

viii. All proprietary products are to be used and installed in strict compliance with the manufacturers requirements and recommendations.

A.6. Preliminaries

i. Refer to **Annex 04 Preliminaries** for detailed requirements in regards Preliminaries and Reporting.

A.7. Close-out & Building User Guide

i. Refer to **Annex 05 Closeout Requirements** for detailed requirements in regards Closeout documents and activities, Practical Completion, Demonstration and Training, System Start-up etc.

ii. Refer to **Annex 010 - BUG and BOM Standards** for detailed requirements relating to the Building User Guide.

A.8. Environmental certification

i. The Building shall be certificated as BREEAM EXCELLENT, in accordance with **Annex 08 - BREEAM Standards** and the pre assessment shared by the Developer. General contractor will share the strategy with the Developer, where not clearly highlighted in the pre assessment for approval.

A.9. Natural Environment Assessment

i. If environmental site study/assessment Phase I and II will be provided by the Developer, the Contractor must take into account study's findings and follow its recommendations.

A.10. Statutory Approvals

i. The General Contractor is responsible for carrying out all liaisons with local authorities and utility companies.

ii. The General Contractor is responsible for preparing and compiling all aspects of the Construction Permit / Any other relevant permits required for construction, and to ensure compliance with any conditions imposed.

iii. All approvals are to be made via an approved competent consultant in accordance with Local and European law.

iv. Any approval or rejection by a competent local engineer/technician/expert in accordance with Local and European law shall not relieve the General Contractor of his responsibilities in respect of Design contained in the Building Contract and these Employer's Requirements, including ensuring that uncompleted structures shall be structurally sound at all stages of their construction and the warehouse is fit for purpose at completion and for the duration of its design life.

v. Copies of all relevant correspondence regarding compliance with the requirements of any Authority and copies of all approval notices shall be supplied to the Developer on Receipt.

vi. Should this specification at any time conflict with any of the statutory requirements the most onerous requirement shall be deemed to apply.

A.11. Development Timeline

i. The General Contractor shall submit the Developer a Detailed Master Time Schedule covering the whole construction period no later than 15 calendar days before the commencement of the activities.

ii. The Detailed Master Time Schedule shall be updated on a bi-weekly basis and shall include all the information related to the following aspects:

d. Preliminary phases;

e. Permitting/Administrative procedures/Utilities connections;

f. Design;

g. Procurement;

h. Construction (including detailed prefabrication process);

i. Test & Commissioning;

j. Milestones;

k. Desnagging activities.

A.12. Area Requirements

i. All area measurements, Gross Internal Areas, are to be in accordance with the Code of Measuring Practice published by RICS and ISVA, see **Annex 06 - RICS Standards for Area Measurement** for more details.

A.13. Drawings and documents

i. The Developer shall design and prepare a complete suite of drawings, through the General Contractor, related to the scope of work for review by the Client (in case there is a Client) together with the approval of the Local Approving Authority.

ii. During the Technical Design Stage carried out by the General Contractor, design in following stages shall be made available for review with the Developer, a minimum of 2 weeks prior to any stage of permitting design, Concept design, Tender design, Execution design, Shop and other manufacturing drawings, Record design.

iii. All documents transmitted for purposes of administration of the contract are to be in the source format as well as native pdf format (not scanned images) and transmitted via cloud service provided by Developer.

iv. All drawings shall follow **Annex 05 – Close-out requirements**

v. An approved web-based document management system is to be provided by the General Contractor to store all levels of Documentation to be accessible by Developer and its partners.

A.13.1. Shop Drawings, Product Data, and Samples:

i. Provide soft and 1 hard copy available on site for sole use of Developer of all shop drawings, product data, technical sheets, material data sheets, O+M manuals etc. at least 5 working days prior to any approval needed by Developer.

ii. Samples of materials for review and comment by Developer shall be provided for all materials and products, prior to orders. Proper time shall be left for sample review and review of potential replacement sample.

A.13.2. Consultant Drawings

i. Using the cloud service, a folder with up-to-date latest version of all consultant designs shall be kept updated all the time during the construction by the General Contractor.

ii. The project is to be developed with 2D software (i.e. AutoCAD).

iii. As option, the General Contractor will offer:

iv. A full REVIT Building Design BIM level 2 (LOD 2). Technical rooms, Electrical rooms, Sprinkler rooms and other rooms with concentrated MEP equipment to be developed in BIM level 5 (LOD 5).

v. 7D Building design (this is optional, and shall be quoted separately).

A.13.3. Health & Safety File, Operating & Maintenance Manual

i. At Completion, the Contractor shall provide three electronic copies (editable and pdf format) and two paper copy of the completed building manual. The manuals will comprise of:

- Health & Safety File
- Operating and Maintenance Manual (Incorporating all As Built Drawings from consultants and sub-contractors, including red-line as-built boundary drawings).

ii. Hard and soft copies of each document shall be duly stamped and signed by the designer, the General Contractor and the Director of Works.

iii. Provide a Emergency Information Box (EIB) at the Guard House and Reception area, which shall contain all relevant information required by the Fire Brigade in an emergency (site plans, position of fire hydrants, general scheme of MEP systems, details about sprinkler and smoke extraction system, emergency keys to all premises, fire safety manual, information on occupants, details of key personnel, evacuation strategy, any unusual features etc.).

A.14. Exclusions & Tenant's Fit-out Works

i. For the avoidance of doubt, the following works are to be undertaken by the Tenant's own direct contractors (supply and installation) and are not in the scope of works of the General Contractor.

ii. The General Contractor shall allow for coordinating the design interface between his own and the tenant's works and for supervising, coordinating, providing attendances and access.

l. Back-up generation equipment (emergency services and IT as a minimum);

m. Racking and storage systems;

n. MHE and Battery Room equipment;

o. Office furniture, kitchen equipment, lockers or racking;

p. Office telephone equipment;

q. IT hardware equipment;

r. Full Cable Tray (separated) Distribution installation (main infrastructure is to be provided);

s. Specialist data centre room fit out (only standard IT server room provided);

t. UPS room fit out;

u. Server room detailed fit out / hardware;

v. Other items required by the Tenant.

A.15. Spares

i. For all replaceable parts and maintenance-intensive products, provide spare parts to 1% of the total of each type installed but a minimum of 5No per type, which shall be delivered to the Developer/Tenant. This applies inter alia (and if applicable):

   a. Lighting: Spare lamps and fixtures (including emergency and exterior);

   b. Wall and Floor Tiling (external, internal, including special pieces);

   c. Ceiling Tiling;

   d. Paint: All colours, 10 litres of each;

   e. Bollards;

   f. Sanitary accessories;

   g. Filters: 1 set of spare filters (G4/F7) per HVAC machine.

ii. Contractor is to provide all non-standard tools and equipment needed for proper maintenance and set-up of equipment (custom made keys and handles, custom made remote controls etc.)

B. PERFORMANCE SPECIFICATION

B.1. Site Preparation and Clearance

B.1.1. General

i. Prior to undertaking the design of the facility, the Contractor shall undertake a Site Investigation Study. This study shall be in accordance with **Annex 013 - Ground Investigation Brief and Earthworks Specification**. If such documentation is shared by the P3, the General Contractor accepts to be responsible of what is included in such documentation and, if more investigations are required, General Contractor will execute them at its own cost.

ii. All site preparation and earthworks and related activities shall be constructed to the design lines, elevations and details shown on the Drawings. The site preparation including the earthworks shall be undertaken in accordance with a Vegetation Clearing, Earthworks and Rehabilitation Environmental Management Plan. This Plan shall follow the workmanship requirements of **Annex 013 - Ground Investigation Brief and Earthworks Specification**.

iii. The Contractor shall be wholly responsible for the construction of the works in accordance with this Specification, associated Contract documents, Drawings, relevant National Codes and Standards and any requirements of Local and Government bodies. Any discrepancies between Codes and Standards, and this Specification shall be referred to the Developer for resolution at tender stage.

iv. The site preparation and earthworks shall include the setting-out, construction of drainage, surface preparation, working platforms, supply and winning of materials, hauling, placing and compaction of fill and surface courses, testing, slope protection, rehabilitation, provision of temporary works, management and quality requirements. The works shall be carried out to the levels and cross sections as shown on the Drawings. The Contractor is responsible for maintaining the site in a safe, dry and clean condition at all times.

v. Prior to commencing work, the Contractor shall submit necessary construction documents for Approval by the Employer as outlined in the contract documents.

B.1.2. Quality Assurance and Control

i. The Contractor shall be responsible for all QA and QC activities necessary to ensure the Works meet the requirements specified in the contract.

ii. QA and QC strategy shall be shared by the General Contractor during Tender phase for approval by P3.

B.1.3. Health and Safety

i. The Contractor shall undertake all work in accordance with the Health and Safety requirements set out in the contract and requirements of the local legislation and authorities.

ii. The General Contractor, if not following the internal procedures and regulations, can receive, in sequence:

   a. A reprimand

   b. An official Warning

c. A site expulsion

Based on the level of risk of any violation, the General Contractor can be subjected to a financial penalties (from 200€ to 2,000€ each), which will be applied at sole discretion of the CSE.

B.1.4. Environmental Requirements

i. The Contractor shall comply with all Project environmental commitments in accordance with the contract. The Contractor shall undertake monitoring of the works for environmental impacts in accordance with the contract documents. The Contractor may at any time stop any works it considers necessary if, in its opinion, any part of the Works contravenes environmental requirements or is in an unsafe condition. The Contractor shall immediately rectify the condition at no cost to the Employer.

ii. No clearance works are to be undertaken until adequate ecological surveys have been undertaken, in accordance with all local legal requirements.

iii. All vegetation and unsuitable material to be cleared from the site is to be removed from site for disposable in an appropriate, legal, manner. Vegetation is not to be burned on site. All buildings, hardstanding and other man-made objects cleared from the site are to be demolished / dismantled in a safe and controlled manner. All Asbestos Containing Materials (ACM) and other hazardous materials are to be removed by appropriately trained and licenced contractors, and disposed of in accordance with local regulations, separate from other general waste. All non-hazardous materials are to be stockpiled and sorted, to permit the maximum degree of recycling / material recovery.

B.1.5. Construction Access and Temporary Roads

i. The Contractor shall construct and maintain all construction roads, by-pass roads, detours and other temporary works, including all warning lights, signs, fences and the like that may be necessary for the safe and orderly control of traffic. Details of the proposed temporary works shall be submitted for Approval prior to the start of those works.

ii. Construction activities shall be based on the use of the construction access roads as shown on the Drawings. If additional construction access roads, laydown or work areas are required a proposed layout shall be submitted to the Developer for Approval. Tracked vehicles and large earth moving plant shall be routed such that damage to either natural substrata or placed fill pavements, which form part of the existing or future permanent works, is avoided.

iii. The Contractor is totally responsible of maintaining the local authorities informed of any possible temporary modification of the local viability, due to the works. Permitting (presentation and permit's obtainings in Contractor's scope of works).

B.1.6. Survey and Set Out

i. All survey and setting out work as required for the Works shall be in accordance with the Employer's Requirements. On completion of the setting out of each section of Works the Contractor shall notify the Employer and obtain Approval before commencing with any section of the Works.

B.1.7. Service Location

i. The General Contractor is responsible to:

a. Coordinate work with utility companies;notify before starting work and comply with their requirements; obtain required permits.

ii. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

iii. Provide protection to any existing utility that can be affected by construction (on-site, off-site) like water, power, sewage etc. lines. Any services encountered during the progress of the works shall be notified immediately and shall be marked on the 'As Built' Drawings.

iv. Contractor shall include all costs associated with relocation of any utilities, poles or other obstructions that may be required at the site.

B.1.8. Excavation Permit

i. Prior to undertaking any clearing or excavation, the Contractor shall request an Excavation Permit from the Employer at least seven (7) days in advance and provide all the documentation needed / requested by local authorities.

B.1.9. Utility Crossing under Roads

i. Temporary markings for the recovery of installed ducting shall consist of a length of telltale blue survey tape, attached to each end, and the free end brought to the surface. In addition, a survey peg, painted blue for the top 200mm, shall be driven 150mm into the soil adjacent to the tape. Different colours of tapes shall be used, depending on the local standard requests and/or utility type.

B.1.10. Protection of Works

i. During construction, embankments and excavations shall be kept shaped and drained. Prior to rainfall, all earthworks and excavation surfaces should be sealed by compaction to prevent significant ponding of stormwater and moisture induction. Following rainfall, all saturated material shall be removed and replaced with compacted General Fill. Drains shall be maintained in such a manner as to drain effectively at all times.

ii. The finished sub-grade shall not be disturbed by traffic or other operations and shall be protected and maintained by the Contractor in an approved condition until the completion of the Works or until the sub-base, base or pavement is placed, whichever is the sooner. Storage or stockpiling of material on the finished Sub-grade will not be permitted without written Approval from the Employer.

B.1.11. Archaeological & Historic Surveys

i. If necessary or directly expressed by local rules/authorities, heritage cartography, historical constraints' list, a, n archaeological survey of the site will be provided by the Developer, if applicable. Contractor must follow all recommendations/obligations regarding possible archaeological findings during site construction.

B.1.12. Enclosures and Barricades

i. Determine methods and procedures to be used and assume responsibility for proper protection and safety of all personnel, site, adjoining areas and structures, and public during all phases of the project including providing:

a. 2 m cladding Security fence to the full boundary of the site (if applicable);

b. Security Guards;

c. To manage an entrance gatehouse 24/7/365;

d. To check the flow of vehicles, people and materials In and Out of the site;

e. To prevent unauthorized access and theft;

f. Provide all necessary boarding and fencing around all open excavation as required by applicable codes, by-laws, or governing authorities.

B.1.13. Relocation of Utilities

i. Contractor shall include all costs associated with relocation of any utilities, poles or other obstructions that may be required at the site.

B.1.14. Existing Utilities Demolition

i. Safely remove items necessary to accomplish the new work including archaeological findings, existing foundations, underground obstacles, waste, decommissioned services, etc.

ii. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

iii. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

iv. Provide protection to any existing utility that can be affected by construction (on-site, off-site) like water, power, sewage etc. lines

B.1.15. Welfare facilities for Developer

i. The Contractor will provide a secured wi-fi for the Developer covering all site cabins.

ii. 2N° (two) connected containers for sole Developer's use. Including tables, chairs, cabinets, power sockets, wi-fi coverage, heated and cooled, with white magnetic boards, roller blinds in windows, water and sink, PPE for No 10 people, door directly to the outside, screen of appropriate dimensions, printer A4-A3 format, scanner, plotter.

iii. Occasionally, make available GC's general site meeting room to Developer.

iv. Provide Construction sign / site panel, in line with Project drawings of the Contractor (6m x 3m), including logos of Developer, Contractor etc. in line with **Annex 014 – Branding guidelines Façade colour**

v. Services will include:

a. Bi-weekly cleaning service;

b. 24/7 security guarding;

c. All janitorial, photocopying and stationery consumables;

d. Dedicated parking spaces for 4No cars.

B.2. Substructure

The General Contractor acknowledges P3 has internal peer-review service, and the Executive Design package relating foundations, deep foundations and slab shall be made available 4 weeks before starting construction activities of such packages, for peer-review approval. The General Contractor acknowledges that a mock-up involving foundations, deep-foundations and slab shall be realized onsite (according to peer-review requests) and technical report, including settlement monitoring, shall be shared regularly with peer-review.

B.2.1. Deep foundations

i. Where deep foundations and/or consolidation techniques are required, either to support the main structure or the ground floor slab, design is to be done in accordance with relevant International Standards, Seismic Design Standards and Local Regulations.

ii. Deep foundation/consolidation techniques typology (jet-grouting, piles, gravel columns, etc) shall be approved by the Director of Works prior to the start of works.

iii. Spoil generated from the site will require disposal in accordance with the local laws and regulations and shall be included in the contractors pricing.

B.2.2. Foundations

i. The foundations are to be designed for the site-specific ground conditions and in accordance with relevant International Standards, Seismic Design Standards and Local Regulations.

ii. Plinth-pillar connection shall be done by means of certified centering devices as Peikko, Halfen or similar type, provided with related fasteners and weldings to plinth reinforcement. The devices shall allow pillar installation without the use of erection ties.

iii. Foundations/Deep foundations design shall be submitted to the Director of Works for approval. It shall indicate the mix design, reinforcement, displacements etc.

B.2.3. Quality Assurance

The General Contractor shall submit a Quality Assurance Plan which at minimum includes the following:

i. A pile installation plan shall form the basis for the piling works and shall be agreed with the Employer. At minimum, the plan should give the following design information: the pile type; the location and inclination of each pile, including tolerances on position; pile cross-section; for cast-in-situ piles, data about the reinforcement; pile length; pile number; required pile load carrying capacity; pile toe level (with respect to a fixed datum within or near the site), or the required penetration resistance; installation sequence; known obstructions; any other constraints on piling activities;

ii. The contractor will test piles as per Local Standards. Piles are to be subjected to pile load testing, with at least 1% of all working piles statically tested. A pile test plan must be agreed between parties;

iii. The GC will be responsible for any additional works required if working piles fail the load test or integrity test. The GC will be required to undertake additional testing – both load testing and integrity testing – should piles fail the initial tests: the number of such additional tests will be established at the time;

iv. Settlement assessments must assess also all external hard standing areas, including the potential for utilities to form 'hard-spots' relative to external paved areas, for ground movements to affect the fall on drainage, etc;

B.2.4. Internal floor Slab

i. Design and manufacturing lifetime of slab and all of its components shall be 10 years. Warranty length per **Annex 03 - Warranty Lengths**.

ii. The slab is to be designed to accommodate loadings as indicated in the table below (rack legs positioned 300mm back to back and 150mm away from construction metal joints). The design shall be based on an effective racking base-plate size of 140mm x 120mm.

Warehouse Clear Height	Single racking leg load (kN)	UDL (kN/m²)	FLT wheel Load (kN)
≤ 12m	70	50	55
>12m to ≤15m	100	70	65

iii. Floor slab design shall be submitted to the Director of Works for approval. It shall indicate the mix design, base reinforcement, additional reinforcement (where needed), threshold between outside and inside (to be foreseen with dedicated metal corner pieces, etc), construction and sawn cut joints, displacements, bearing load capacity performances etc.

iv. Floor slabs shall be designed to minimize internal floor joints and reinforced with fibers and/or steel mesh. The construction joints should match grid dimensions, i.e. preferable min 24m x 24m. If agreed with the Developer soft cut sawn joints should be on a max 4m x 4m grid. Where sawn joints are used in a fibre reinforced slab the design will consider this as a free edge and aggregate interlock will not be permitted as a form of load transfer. If Tenant's racking/technology layout is available, then coordinate with joint positions. The floor slab will have a minimum thickness of 180mm.

v. Steel strip joint forms shall be no less than 10mm thick on each side of the joint with an adequate means of anchorage into the slab to prevent delamination of the steel plate from the concrete.

vi. Eventual sawn joints located in singularity zones (i.e. pillars or edges) are to be cut within 24 hours of casting the floor slab. Depth of saw cut to be 1/3 of slab thickness. Sawn joints are to be filled with a soft mastic sealant prior to occupation by the Developer/Tenant.

vii. Surface regularity shall be FM2 in accordance with TR34. The FM2 requirement shall be achieved without the use of surface grinding equipment to achieve the desired result. The surface level shall be within ±10mm of the specified structural floor datum level.

viii. If grinding has to be used to achieve surface tolerance this can only be done with the written acceptance of P3 and both the surface abrasion and specified slip resistance must be proven on completion of the remedial grinding.

ix. The ground slab is to be constructed on a minimum of 350 micron polythene damp proof membrane laid on a minimum of 150mm thick layer of Type 1 stone sub-base, thickness as stipulated on the engineer's drawings. Contractor to provide any upgrade to the damp proof membrane (dpm) necessary to protect the building from any gases (radon, methane etc.).

x. Polythene sheets will be lapped by a minimum of 300mm, and laps shall be taped if specified in the contract specification. For slabs without fabric reinforcement, lapping and taping of the membrane joints is mandatory.

xi. Use laser screed machines during concrete placement. The surface of the floor shall be double power troweled to produce a hardwearing surface.

xii. Prompt and efficient curing of the floor slab is essential. The slab will be protected by an appropriate curing membrane to be installed immediately after slab mechanical finishing activity for at least 48 hours.

xiii. The completed floor slab shall be free of cracks. In case of steel fibers reinforcement, no more than 3 fibers will be visible in any one square meter of the slab when sampled in accordance with Belgian Guideline TV204. Any fibres projecting above the finished slab surface shall be removed by the sub- contractor when requested by the Engineer and prior to the end of the Defects Liability Period.

xiv. Testing and Records:

a. Plate bearing tests, using a minimum of a 600mm diameter plate (according to LCPC CT2 Method), shall be undertaken on a ratio of one test per 500m^2 to determine the modulus of subgrade reaction. This shall be assessed by the floor slab designer and written confirmation that the design is in accordance with the test results shall be provided.

b. Prior to pouring, the top of the sub-base will be checked for level and shall be within +0 / -10mm of specified level with no rutting or soft spots.

c. Following preparation of the initial sub-base layer and prior to the laying of the final trim layer, the sub-contractor shall test the performance of the sub-base by assessing the effects of trafficking by a fully loaded concrete truck. This process shall be carried out at least three days prior to start of slab construction and shall be monitored by the Engineer and Specialist Flooring Consultant.

d. The Contractor shall arrange and pay for services of an independent testing laboratory to comply with country and local specific regulations / recommendations. At least one test set of four (4) samples per concrete pour per day or every 100 cubic meters. Test for compressive strength, slump, air content and unit weight.

e. Building floor tolerance measurements are to be taken within 16 hours after completion of final trowel operations via dipstick method, and provide results within 24 hours of data collection. The resulting report shall be made available to the Developer.

f. Independent floor slab survey with results within 72 hours to be provided to Developer.

g. Prior to the commencement of the works, a mock-up test shall be performed on site (one per each mix design, min. dimension 5m x 5m).

h. The sub-contractor shall make detailed records during construction. These should include the following information for each slab pour:

   a. Pour date;
   b. Ambient temperature during pouring;
   c. Wind and weather conditions during pouring
   d. Records of level check on steel joint forms;
   e. Time of start and finish of each pour Records of level check on sub-base;

f. Total volume of concrete used in each pour timing of power floating;
g. Records of level check on sub-base and determination of resistance to rutting by concrete trucks;
h. Record of check on placing and fixing of fabric/bar reinforcement;
i. Record of fibre dosage tests (if fibre reinforced slab);
j. Record of tests to determine dry-shake topping spread rate (if fibre reinforced slab);
k. Time of start and finish of each pour direction;
l. Abnormals such as delayed concrete delivery;
m. Concrete test cube references and locations of tested batches results of concrete slump tests, etc.
n. The sub-contractor shall record all concrete deliveries and the locations of all samples taken in a format agreed with the Specialist Flooring Consultant.
o. A copy of the construction records shall be issued to the Engineer upon request.

xv. Environmental Conditions During Construction:

a. The main contractor shall ensure that the roof and wall sheeting to the entire external envelope of the warehouse is completed prior to casting the floor slab (as recommended in TR34), except where otherwise agreed between the Employer's Agent, Main Contractor and Engineer following discussions relating to project specific program issues. In any case the whole floor area to be cast shall be protected from cross winds, rain, and direct sun. In addition, the roof should be completed and watertight, with all drainage connected prior to commencement of the installation of the sub-base or final trim layer.

b. Any open doorways/windows shall be fully sheeted by the main contractor during the installation of the slab and for a minimum of 7 days after completion of the installation, or until installation of the permanent doors/windows, whichever is the sooner. However, the main contractor shall also ensure there is sufficient ventilation in the building to provide adequate working conditions for operatives and comply with all applicable Health and Safety requirements.

c. The internal air temperature of the building during each slab pour shall be a minimum of 5°C, and shall be regularly monitored by the Main Contractor during periods of cold weather. Where the air temperature is below 5°C prior to commencement of a pour, special precautions shall be put in place to mitigate against freezing of the wet concrete. Concrete works shall be suspended on any day where the air temperature inside the building is less than 2°C prior to commencement of that particular pour. Uncured concrete shall be maintained above 4°C at all times. The potential program effects of cold weather conditions should be considered by the main contractor if planning to construct the slab during winter. Advice is to be sought from the Engineer and the Specialist Flooring Consultant where the ambient air temperature is above 30°C.

xvi. Slab protection:

a. No access to plant or vehicles onto the slab shall be permitted for at least seven days after pouring in order to facilitate curing.

b. All forklift trucks, scissors lifts and the like traversing the slab, shall be fitted with either white rubber tyres or tyre covers, (which should be maintained in good condition), and oil drip catchers (which should be maintained in good condition). No such equipment shall be permitted to run between the external yards and the inside slab.

c. No vehicles, other than forklift trucks, access equipment, and floor cleaning equipment, shall be permitted into the building. All deliveries shall be via the above-protected area.

B.3. Superstructure

B.3.1. Frame

i. Design and manufacturing lifetime of structure, associated works and all components shall be 25 years. Warranty length per **Annex 03 - Warranty Lengths**.

ii. The whole frame will be designed in accordance with relevant International Standards, Seismic Design Standards, Firefighting and Local Regulations.

iii. The main warehouse frame will be prefab concrete structure with prefab concrete columns, girders, purling and edge beams, or a combination of prefab and structural steel structure. Elements fair faced on all sides. The design is to be agreed with Developer.

iv. Internal Frame Grid to be 24m X 12m minimum. Different grid dimension shall be approved by the Developer prior to proceed.

v. Minimum clear height to underside of structural frame shall be 12m (from finished floor level). No services of any kind shall be installed below this height. Maximum height shall be designed to comply with Firefighting regulation. Geometrical assumptions on clear heights must always take in care of local rules and (for external maximum heights) and firefighting sprinkler system (for appropriate coverage of warehouse and rackings).

vi. The structure should be Earth bonded to meet the relevant International Standards and Local Regulations. Grounding points shall be provided at +0.3m on some warehouse columns for future racking/equipment connections and for battery charging. Two perpendicular column grids in each commercial unit shall have the grounding points plus every column with battery charging station. Exact position to be approved by Developer.

vii. Fire resistance: Comply with International and National codes.

viii. Deflection limits to be in accordance with the International and Local Regulations to ensure it complies with any deflections required by the Cladding Manufacturer. Maximum vertical tolerance is less than 1.0 cm on 20 m if not prescribed otherwise by National/Local codes. Frame deflections shall not exceed those required by the roof and wall cladding system and shall be such that they do not cause ponding of water on the roof.

ix. Roof shall be designed for local loads including snow load, live load, dead load of structure, plus appropriate collateral loads. The following minimum services loading of shall be considered all over the roof surface:

a. Roof plants 25 kg/sqm
b. Photovoltaic system 35 kg/sqm

Additional allowance shall be made locally for the weight of any siphonic pipes, suspended ceilings and/or specific plant loads. Additional loads on the roof have to be foreseen for clima plant predisposition and photovoltaic plant on all the roof surface.

x. Intumescent fire paints shall be avoided. Developer's approval required if intumescent paint is to be used.

xi. All exposed interior walls shall be white painted. All ceilings/soffits/beams shall be white painted.

B.3.2. Warehouse Perimeter Concrete Retaining Walls

i. Pre-cast retaining walls including dock leveller pits and tailgate slots will be provided to the dock area of the building.

ii. External retaining walls to the sides of the dock access will be also of smooth fair faced concrete formed by the use of steel shutters, rounded edge corners.

iii. Minimum panel height will be sufficient for inclusion of the direct access doors plus, panel height should match to the closest façade metal panel.

iv. Provide sealant at interior joint where wall panels abut slab on grade. Provide sealant at all interior slab on grade penetrations and exterior wall penetrations.

v. Pre-cast retaining walls shall be painted with textured coating matching Developer's branding manual per **Annex 014 - Branding Guidelines Façade Colours**. Paint to be 100% acrylic with no modifiers, 16 to 20 mils total dry film thickness, with manufacturer's 5-year material warranty. System to include primer and textured finish coat.

B.3.3. Upper Floors

i. Suspended floors in office areas shall be designed for an imposed loading of 4kN/m² plus 1kN/m² allowance for lightweight partitions plus 0.25 kN/m² for suspended services and 0.25kN/m^2 for suspended ceilings, will be constructed using pre-casted elements. Plant room floor slabs shall be designed for a minimum imposed load of 7.5kN/m² or all specific plant and equipment loads including the storm water collection tank whichever is the greatest.

B.3.4. Internal Partition Walls

i. Warehouse partitions walls to be constructed by precasted panels or blockworks to meet local building regulations and to meet the required fire rating to suit the local fire authority and/or the relevant insurance requirements. All exposed interior walls shall be white painted and properly sealed on both faces.

ii. Office partitions walls to be constructed to achieve a minimum sound reduction value of 40dB, the required thermal performance to meet local building regulations and to meet the required fire rating to suit the local fire authority and/or the relevant insurance requirements.

iii. Office partitions will be constructed with Stud Partitioning with double sheet plasterboard both sides with organic paint emulsion.

B.4. External Envelope

B.4.1. General

i. The building envelope shall not exceed the following maximum U-values:

a. External Walls – Concrete panels	0.26 W/m^{2}K
b. External Walls – Sandwich panels	0.26 W/m^{2}K
c. Roof	0.18 W/m^{2}K
d. Roof skylights	2.00 W/m^{2}K
e. External Loading Dock Doors	1.50 W/m^{2}K
f. External Level Access Doors	1.50 W/m^{2}K
g. External Window (Glass & window):	1.20 W/m^{2}K

ii. Carry out an air leakage test in accordance with CIBSE TM23 'Testing of buildings for air leakage' and EN 62305: Parts 1-4, to demonstrate that the requirements are achieved.

The works shall be designed and constructed to control airflow from the inside to the outside of the building. Air exfiltration shall be distributed and not concentrated at any one location.

The works to the 'conditioned spaces' including interfaces shall be constructed to achieve compliance with Country Code or other National, Regional, Local equivalent requirements.

Maximum Air Leakage shall be either 1.5 $m^3/(m^2$ hr) at 50 Pascals or as required by National, Regional, Local Codes / Standard / Regulations depending on which criteria is more onerous.

B.4.2. Roof

i. Design and manufacturing lifetime of roof and all materials shall be 25 years. Warranty length per **Annex 03 - Warranty Lengths**. Subcontractor warranties for materials shall be provided.

ii. The roof construction will comprise roof cladding on a structural metal deck.

iii. Internal profile deck shall be factory primed and bottom painted white. After erection has been completed, damaged, rusted or scraped metal areas shall be touched up with the same white coloured paint or substituted.

iv. Roof insulation shall be a maximum as per U values indicated above, certified and approved thermal insulation; material mineral wool or PIR, in compliance with Firefighting Design (please note that the whole roof surface shall be suitable for photovoltaic installation).

v. The Roof Membrane is to be an adhered PVC or TPO membrane, min thickness 1.5mm. Colour: Light Grey.

vi. Optimum roof slope 2%-3%, minimum 1,5% after deflection.

vii. The roof membrane must be mechanically fastened to the trapezium shaped metal roof sheeting. Ballasted roof systems are not permitted.

viii. Roof entrances must be reinforced in area 2x2m under the final waterproof layer to avoid damages due to frequent use

ix. Metal flashing including copings, gravel stops, fascia, scuppers, downspouts and collector heads shall be minimum 0,5mm (24 gauge), prefinished galvanized steel with a non-reactive. Pure thermoplastic fluoropolymer polyvinylidene fluoride (PVDF) coating and rustproof fasteners.

x. All parapet walls shall have metal copings.

xi. A minimum of one permanent roof accesses will be provided by galvanized staircase. The number of staircase must be in accordance with VVF prescription. All the external roof accesses shall be protected with metal grill and an access escape door.

xii. Roof parapets have to be guaranteed with a minimum height of 110cm.

B.4.3. Rainwater System

i. Rainwater shall be collected and discharged in the underground drainage by a gravity system. This system will include external outlets and down pipes in painted metal plate (drainpipes inside pillars not allowed). The number of pipes must be N+2 (1 for single long side

ii. Gravity drainage solution is to be used. A minimum design rate of rainfall of 4.5 times the design life of the building or 112.5 years plus 20% (whichever is the greater) allowance for Climate Change shall be used for all roof drainage.

iii. Weir overflow outlets evenly distributed to provide advance warning of blockage of the drainage system (overflow system).

B.4.4. Roof Skylights

i. The roof area is to include translucent, Polycarbonate or GRP (glass reinforced plastics) roof skylights, to a rectangular linear layout as per Local Authority Regulations. The roof above the office shall be constructed in the same materials as the warehouse except that no roof lights will be provided. Colours subject to Developers manual, following Developer's colour and branding manual.

ii. Rooflights shall:

a. Be factory assembled and compatible with the roof cladding system.
b. Comprise a minimum of three layers of GRP (Glass reinforced plastic), or Acrylic, or Polycarbonate to meet required U value, subject to Local Authority Regulations.
c. Be constructed from non-combustible materials.
d. Follow the slope of the roof.
e. Steel mesh shall be provided at each rooflight as anti-fall protection in both the temporary and permanent condition.
f. The minimum skylight basement height shall be 50cm.
g. Not inficiate the normal drainage of rainwater on roof.

iii. Minimum required performances:

a. U-value (heat transfer coefficient): Ug <= 2.0 W/m²K
b. Max. solar transmission from outside: g <= 0.4 (40%)
c. Translucence (light transmission): T >= 70%

B.4.5. External Walls/Cladding

i. Design and manufacturing lifetime of façade, coating, and all associated works and components shall be 25 years. Warranty length per **Annex 03 - Warranty Lengths**. Subcontractor warranties (min 25 years for panels and coating) for materials shall be provided.

ii. Wall cladding made of precast concrete panels up to 6,00 m from Final Floor Level. Horizontal PIR Sandwich panels above supported by a galvanized steel structure.

iii. The external wall cladding system shall meet all Local Authorities' fire and thermal requirements and minimum U value as per indication above.

iv. Concrete panels shall be provided with internal and external sealing.

v. Concrete panels shall be internally and externally painted with textured coating matching Developer's branding manual.

vi. Panel colours to meet Developer branding scheme, per **Annex 014 - Branding Guidelines Façade Colours**. The panel finish shall be matt. Used colours are following:

a. RAL 7016 - Anthracite Grey
b. RAL 9007 - Grey Aluminium
c. RAL 9006 - White Aluminium
d. RAL 7035 - Light Grey

e. RAL 3003 - Bespoke P3 Band

vii. Special attention to details, avoiding cold bridges and condensation traps.

viii. Flashings to be provided by the cladding manufacturer with the colour to match the adjacent panel. Flashings shall cover all finishing pieces such as corner pieces, thresholds, roof edges, parapet coping, and doorframes. Ancillary components, including louvers and grilles will have the same finish as the wall cladding. All flashings shall be detailed with suitable drips to avoid staining of the external cladding.

ix. The external walls of the Technical Rooms, enclosed shafts and stairs, shall be constructed of same sandwich panels as main façade, or prefabricated concrete panels. Solution to be approved by Developer.

x. On exterior walls when entering fire escape doors/staircases, green stripe above the doors to the ceiling, 600mm wide.

B.4.6. External Glazing

i. Windows system to be standard window frames, with concealed vent, commercial quality powder coated, thermally broken, double-glazed aluminium units. Frames to be white internally and a standard RAL colour externally. Top hung opening lights (opening out), shall be made only if required by and to comply with National/Local regulations, limited to 150mm opening and with lockable handles shall be distributed. All windows shall be in compliance with the regulations relating to access for cleaning and maintenance of windows and curtain walling all in accordance with local laws and rules.

ii. Colours of the frames shall be agreed with Developer.

iii. Glazing generally shall meet following criteria:

a. Light transmission min 70%
b. Solar factor G-Value Max 40%
c. Min U-Value 1.2 W/m²K (Area Weighted Average for whole window)
d. 16mm Argon filled.

iv. Window units are to be integrated into the cladding system to manufacturer's details. No fixings will be made in to the window frame except for those explicitly required to fix the frame to the structure.

v. A solar shade canopy is to be provided to the main office entrance.

B.4.7. Louvres (if applicable)

i. External louvres to any plant areas are to be trapezoidal louvre system or equal and approved, to meet following criteria: Horizontal configuration, Aluminium, Finish polyester powder coated to match adjacent cladding colour, with Insect Mesh and Insulated Blanking Panels. Louvers should be designed to prevent rain ingress.

ii. In the instance of louvres being installed to accommodate future installations, they are to be blanked off with insulated backing boards prior to completion that can be easily removed.

B.4.8. Loading Docks

i. Loading docks are to provide a level difference of:

a) 1.2m between the ground floor slab and the external yard level for loading docks

b) 0.8m between the ground floor slab and the external yard level for van docks

ii. If not stated otherwise, the Contractor shall assume one dock door position per every 850 m^2 of warehouse.

iii. On the total number of the dock doors, the Contractor shall foresee n.1 jumbo van door every 5.000 sqm of warehouse, with minimum of 4 units.

iv. The Contractor shall see that there are no air gaps or level differences at the entrance dock lips to avoid wheel damaging, or sand ingress (including brush joint detail), loading docks will comprise of the following:

1. Dock Door	Insulated sectional panel vertical lift dock doors to achieve a minimum U-Value of 1.5W/m²K (subject to Local Authority Regulations), Micrograin finish with a colour to suit what stated in **Annex 014 - Branding Guidelines Façade Colours** to be electrically operated with emergency hand chain operation. Size: 2,8m x 3,0m. Doors will be provided with a single row of vision panel per door at nominally 1780mm above FFL. on both sides of doors. Dock Doors to be CE marked to meet European Directives. Dock door in closed position to overlap front of leveller (including lip), and to be aligned with metal panel covering tailgate slot (wind apron). Please see the below example image: 
2. Dock Shelter	Each dock door will be provided with a 3,40m wide x 3,50m high x 0,60 deep dock shelter with heavy duty scissor type retractable system with crash resistant frames with front side flaps reinforced, in high frequency welded PVC, colour Black. Particular care shall be taken for the finishing along the side of the panel to avoid air/water infiltration from the tailgate slot into the warehouse.
3. Load Levelers	Each dock location will be provided with a 2m wide fully fitted hydraulic dock leveller of 6,000kg dynamic load and 9,000kg static load, 3.0m long x 2.0m wide, rising to a trailer bed height of 1.550m and falling to a trailer bed height of 1.050mm. A tapered swing lip of minimum dimension 650mm is to be provided and each leveller will have appropriate EPDM rubber weather seals. Dock Levellers to be CE marked to meet European Directives.

4.	Wheel Guides	Wheel Guides 4mm bent galvanized steel with base plate fixing. Located on both sides of truck for each docking position.
5.	Dock Buffer	Each dock location will be provided with a couple of heavy duty dock bumpers, dimension 100mm deep x 250mm wide x 600mm high, steel skid plate min 10mm thick.
6.	Control Box	A composite control box will be provided which will operate the dock leveller, dock door, all interlocked in a safe work sequence. This panel must be located on the left side (EU) or right side (UK) of the door seen from the inside.
7.	Bollard Protection	Each dock door is to be protected by 2 No. internal bollards 138mm dia. X 1100mmhigh. Painted yellow / black horizontal stripes.

v. Maintenance: All Dock Equipment will meet a five-year warranty period, under normal maintenance contract for servicing and repair. Movable parts and motors shall have two-year long coverage.

vi. All loading docks are to be provided with a dock numbers. The external at high level as indicated in **Annex 014 - Branding Guidelines Façade Colours**. 3mm thick x 600mm high aluminium polyester powder coated number signs with a front width of 100mm are to be provided, in a font to be agreed with P3. Backing plates to have hidden fixings set 40mm off face of cladding. Text to be contrasting colour and backing plate to match the adjacent cladding colour. The internal number to be stencilled on the internal face of dock door.

vii. Dock Control System: Additionally an automatic opening system with emergency energy supply must be provided for the necessary amount of dock doors in order to comply with the fire study and in accordance to the local fire regulations to guarantee the necessary fresh air supply for the mechanical smoke extraction system in case of fire.

B.4.9. Level Access Doors

i. Insulated sectional panel vertical lift dock doors to achieve a minimum U-Value of 1.5W/m²K (subject to Local Authority Regulations), Micrograin finish with a colour to suit **Annex 014 - Branding Guidelines Façade Colours**, to be electrically operated with emergency hand chain operation, size 4000mm wide x 5000mm high clear daylight opening. A single row of two double glazed vision panels per door will be provided at nominally 1500mm above FFL.

ii. Each level access door to be protected by 2no.internal bollards 225mm dia. x 1100mm high.

iii. Accessories: Operation buttons (open/stop/close) on the inside; Safety edge at the bottom of the door; Infra-red safety beams; The doors shall be installed and equipped according to the applicable safety regulations.

B.4.10. Personnel and Escape Doors

i. All doors are to meet the requirements of the Local Authority Regulations.

ii. The main entrance doors will have double electric doors leading to a reception area. The doors will be double glazed, thermally broken aluminium framed to achieve a minimum U-

Value of 2.2 W/m²K, subject to Local Authority Regulations. Equipped with heavy duty self-closer and suitable cover threshold strips.

iii. Suitably rated steel personnel door sets will be provided in locations to satisfy fire escape requirements and in accordance with local authority requirements.

iv. Fire escape doors on the perimeter of the warehouse must be lighted with led strips along the door frame.

v. Doors to be polyester powder coated with a colour to suit **Annex 014 - Branding Guidelines Façade Colours**. Panic bolts to be provided and security hinges, friction stays and the relevant fire signage to meet local regulations. Doors will be provided with suitable cover threshold strips.

vi. Heavy duty door closers to be located on entrance and other high traffic doors. Type to be approved by Developer. All doors to have three hinges. Emergency escape doors to be equipped with manual push bars.

vii. Doors leading to technical rooms, or doors located at corridors adjacent to technical rooms shall be sufficiently sized in order to allow unobstructed passage of typical equipment located within these rooms.

B.4.11. Warehouse Escape Stairs

i. Escape stairs to be fitted from door openings above ground level in accordance with Local Authority requirements, consisting of galvanized steel frame, balustrade and open mesh steps & landings. Visual/tonal colour contrasting stair nosings/edgings are to be provided.

B.4.12. Fire walls and Fire gates (if applicable)

i. Fire sliding doors, dimensions 4,0m x 4,5m high (dimensions could vary according to the producer standard dimensions) to be installed as per Firefighting Design.

B.5. Office Fit-Out

B.5.1. General

i. As optional, the Contractor shall provide a provisional cost to carry out the installation of data cabling [CAT6], as all office layouts. Conduits shall be considered in the basic offer. See electrical dedicated chapter

ii. As optional, the Contractor shall provide a provisional cost to carry out the installation of CCTV and access control installation to the development and other associated security items as all office layouts.

iii. Office shall have conduits inside all perimetral walls, with socket outlet per 3m (double 16A+E 240V + 2 data socket). Conduits shall be safe for office use in accordance with local law and fire brigade. They shall be adequately separated to avoid interference with data cabling. Empty conduits shall be provided for extra cables of the tenant.

iv. All internal railing in the office area (false ceiling and/or access floor if any) shall be stainless steel, height and type to meet National codes and standards.

B.5.2. Internal Walls

i. Core walls including all stair cores, toilet cores and risers will be constructed from structural slab to the underside of structural soffit. The fire resistant partition walls will build only in

the positions requested by fire department. All the fire certification and declaration of correct installation has to be provided by the builder.

ii. The partitioning walls shall be designed as minimum in accordance with the noise and fire protection regulations. Partitioning walls for wet environments (toilets, cleaner's stores, tea kitchen, showers etc.) shall be erected with waterproofed gypsum board.

iii. All internal walls unless otherwise specified throughout the offices, ancillary and circulation areas shall be plastered/dry lined (double sheets) and fully sealed (Q3 finishing) and then painted with one mist coat and two coats vinyl matt emulsion paint (colour to be defined with Developer/Tenant). The builder must ensure compliance with the acoustic and thermal regulations specific to the construction zone, in particular there should be no acoustic bridges between different rooms.

iv. Install wallboard accessories in accordance with manufacturer's requirements and recommendations.

v. If not differently foreseen by local H&S authority (ASL), the design of the technical installation and the choice of the building materials shall be designed in such a manner that the noise levels inside the rooms shall not exceed the following levels (otherwise to be agreed with Developer):

a. Offices and meeting rooms < 40 dB(A)

b. Corridors, Toilettes, Showers, Lockers < 50 dB(A)

c. Technical plants rooms (with exception of sprinkler pump room and generator rooms) < 55 dB(A)

vi. Head details are to allow for appropriate deflection of above structures.

vii. Where units are included in fire rated wall/ceiling/floor construction, provide mineral wool units, which have been tested and rated as required for the indicated assembly

viii. Special attention to details, avoiding heat bridges and condensation traps.

ix. Server room shall be separate 1 hour fire rated zone, subject to local regulations.

B.5.3. Internal Doors / Windows

i. All doors will be solid core hardwood veneered and lipped, colour to be agreed with Developer. All four edges are to be veneered.

ii. Rectangular clear glazed vision panels will be provided to satisfy statutory requirements. Fire rated where applicable to meet the Fire Rating of the associated door.

iii. Frames and architraves will be painted softwood or MDF and finished to match skirting. Colour Light Grey.

iv. Window boards to be painted softwood or MDF, joints to align with window v joints.

v. All doors to have three stainless steel class 13 ball bearing hinges.

vi. Door height to comply with local regulations.

vii. Behind each door a doorstop shall be installed to avoid damage to walls and doors.

B.5.4. Ironmongery

i. All ironmongery will be provided with the door sets and with Euro profile cylinders throughout.

ii. Euro profile cylinders are also to be provided for the office external doors and the personnel fire escape doors.

iii. 3no. Master keys will be provided to operate locksets within the office area.

iv. Thumb turn locks are not to be used, all locks used are to be closable/openable with a closed fist. All doors shall be equipped with a handle and lockable with suited locks.

v. Ironmongery will be in a good quality stainless steel or satin anodised aluminium finish.

vi. Unless required by National regulations or permits, panic bars are not required and not preferred. All warehouse exterior doors shall have standard handle. Handle to have emergency exit features when located on emergency exit door.

vii. Doors to be provided with construction cores, with 7-pin key system to be used. No replacement to permanent IC cores is required. The cores to allow at least 7 groups of users.

B.5.5. Miscellaneous Sanitary Equipment/Fittings

i. All toilet provision should consider disabled/ambulant access and requirements in accordance with National and local authority regulations.

ii. All toilets provisions must fit with BREEAM request, relating to the foreseen score.

iii. Floor mounted and overhead braced compartments with a High-Pressure Laminate finish, to be supplied to all toilet areas. Colours from a standard range. Min thickness 15mm. Plastic or stainless-steel pilaster shoes and caps, finished to match hardware. Manufacturer's standard exposed anchorages and fasteners, with theft-resistant-type heads, stainless steel or plastic. All metal parts to be galvanized, cadmium plated or with other rust-resistant protection.

iv. Metal or plastic coat hook to be provided in each cubicle.

v. Sanitary ware to be white from a standard range including urinals, low flush volume WCs and non-percussive spray type taps with hand proximity detectors for on/off control.

vi. All WCs, urinals and washbasins shall be operated by an infra-red auto-flushing and dual flush system.

vii. Electric Hand driers shall be provided in all toilet areas. No 1 per 4 washbasins.

viii. Shaver points [TBA] shall be provided in all male toilets. No 1 per each toilette.

ix. An alarm facility shall be provided in the disabled toilets to report back to reception*/office*/gatehouse*.

x. Mirrors to be provided above all washbasins.

xi. All low-level ductwork/pipework to be boxed in as appropriate. All visible pipework to be chrome finished.

B.5.6. Lift (if any)

to offices with multi-level floors / disabled requirements (If Required)

i. The lift, will be provided to facilitate access to the upper floors. The lift will be suitable for at least ten person / 800kg capacity hydraulic or electric traction passenger lift to meet

the requirements of the Local Authority for disabled access. Each landing will have stainless steel lift entrance doors and surround. Stainless steel push button controls will be located adjacent to the lift entrance doors.

ii. The lift doors are to meet the standards of fire resistance required by the Local Authority if required. Stainless steel jamb protection will be provided to the lift opening on all floors.

iii. The lift car will have minimum plan dimensions of 1350mm width and 1400mm depth, constructed of steel and is to be provided with decorative laminate walls, stainless steel ceiling and half height rear wall mirror. Internal finishes to be agreed with the Developer/ Tenant.

iv. A phone line will be provided for the connection of the lift.

B.6. Finishes

B.6.1. Wall Finishes

i. All finishes to be sampled and approved by Developer/Tenant.

ii. Reception area walls to be organic emulsion paint.

iii. Male/female & disabled toilet walls to be finished in 150x150 satin finished wall tiles, up to 2m height, colour, white plus top stripe to match P3 colours per branding guideline, to be approved by Developer. Tile grout to be the same colour, food safe grout to be used in kitchenette / kitchen areas.

iv. Showers to be finished in 400x250 satin finished wall tiles, up to ceiling, colour, white.

v. Janitor rooms to be finished in 400x250 satin finished wall tiles, up to 2m height, colour, white.

vi. Open plan office areas; to have organic emulsion to walls and bulkheads above windows.

vii. Tiles to be aligned with walls and ceilings, minimizing cutting

B.6.2. Floor Finishes

i. Reception area floor to be ceramic tiled, min thickness 8mm, deep coloured, colour Grey to be approved by Developer. Light coloured contrasting grout to be provided. Floor tile to provide relevant slip and wear resistance properties and visual/tonal colour contrast in accordance with the local authority regulations. To be finished with a 100mm same colour tiled skirting.

ii. Male/female & disabled toilet floors to be ceramic tiled, min thickness 8mm, deep coloured, colour Grey to be approved by Developer. Finished in light coloured contrasting grout to be provided. Floor tile to provide relevant slip and wear resistance properties and visual/tonal colour contrast in accordance with the local authority regulations. To be finished with a 100mm same colour tiled skirting.

iii. Open plan office areas to have ceramic tiled, min thickness 8mm, deep coloured, colour Light Grey to be approved by Developer Heavy duty, nylon fibres, min tufted weight 800g/m^2, provided in rolls, sized per manufacturer's standards.

iv. Vinyl sheet flooring is to be provided with coved skirting. PTV (pendulum test value) to be +36 (low risk of slip). Colour, Ash Grey, Min thickness 3mm. To be provided in kitchenettes and in server room. Server room to be antistatic.

v. Tiles to be aligned with walls, minimizing cutting.

vi. In wet areas use special anti-slippery surfaces and provide easy cleanable edge and corner solutions (Lockers, showers, kitchen etc).

vii. Main entrance to be equipped with barrier matting, 10mm thick, 1000mm x 2000mm, Black colour.

viii. Exterior recessed cleaning zone to be adopted in front of main entrance.

B.6.3. Ceilings

i. Reception area ceiling to be regular suspended ceiling with DSG plasterboard and skim bulkhead over reception desk position. Colour, white. 25mm shadow gap to be provided to perimeter.

ii. Male/female & disabled toilet to have moisture resistant suspended ceilings. Specific care to paid to details above vanity units and above WC pans and urinals. Colour, white. 25mm shadow gap to be provided to perimeter.

iii. Open plan office areas to have suspended ceilings, 600x600mmx15mm regular tiles, colour, white. Incorporating ceiling void cavity fire barriers to suit local authority regulations.

iv. Min clear height of all suspended ceilings is 2,7m.

v. Suspended ceilings should allow proper access to all equipment above.

vi. Stickers or marks will be provided on tiles where maintained equipment is located above (valves, fire seals or dampers, etc.).

B.7. External / Internal Protection

i. Miscellaneous metals shall include following installation:

a. Metal plate protection of exposed exterior downspouts at paved areas, mounted to façade walls.

b. Protection of exposed electrical panels and switchboards, roof drain piping, water lines and other plumbing, gas lines, dock door equipment, level access doors, frequently used gates and doors, exposed fire sprinkler risers, and sprinkler test drain piping within 2m of warehouse floor.

c. Cage protection to protect sprinkler bells.

d. Guard rail (e.g. Armco type) barrier galvanized mild steel and hand railing (minimum 1100mm high) shall be provided adjacent to the retaining wall to level access ramps, to prevent heavy goods vehicles damage and to protect personnel from failing.

e. Wheel guides and all exposed external light columns.

f. (if applicable) External railing to be galvanized steel, height and type to meet National codes and standards, minimum 1100mm.

ii. Internal bollards to be steel with yellow paint 1.1m high, exterior to be hot dipped galvanized, 1.5m high.

iii. Handrails and balustrading to be provided per local regulation in circular hollow. Handrails shall be a minimum of 40mm diameter.

iv. The Contractor shall provide flexible double rail sprung type vehicle impact barrier protection to the perimeter exposed walls of the warehouse section. The Contractor shall also allow for the same flexible barrier protection to the internal valley columns and exposed areas of internal walls.

v. Vehicle Security barriers are to be used in front of office and personnel entrances/exits where applicable, in accordance with National or local road safety and anti-terrorism standards and regulations.

B.8. External Works

B.8.1. Enclosures

i. The General Contractor is to provide for any housings and foundations/ plinths etc. for incoming statutory services that may be required by the relevant statutory authority / utility organization in keeping with the finishes and style of the primary buildings on the site.

ii. Above ground sprinkler tanks and all ancillary structures (substations, cabinets, enclosures etc.) are to have appropriate concrete bases.

iii. Contractor shall prepare spare underground conducts under hard surfaces for future use. Typical locations: under truck yard (every 50m), to guardhouse (4x), to sprinkler house, under main entrance road, and whenever elsewhere reasonable per external layout. Locations to be coordinated with Developer. Sizes 80-100mm diameter. The contractor shall provide a coordinated drainage and below ground services drawing to see that there are no clashes.

iv. Specific protection sleeves will be provided for anticipated telephone and data cable. Such sleeves shall be provided under roads and hard surfaces in position of anticipated telephone and data cable. The anticipated line is between nearest possible telecom provider connection point and office area. One specific sleeve 100mm diameter shall be provided under every hard surface

v. Generally, preferable location of underground utilities is underneath asphalt roads, not under concrete road.

B.8.2. Signage

i. All signage (external, internal) is to be included in accordance with Statutory Regulations and **Annex 014 - Branding Guidelines Façade Colours**. Cost of all said signage including P3 logos is in base price. The Developer is to agree all positions types of logos/signage. Logos including electric supply, rear panel reinforcement and support and full installation.

ii. The Contractor is to provide all external on-site traffic signs required per local laws and regulations (one way roads, stop and give way signs, parking type signs etc).

iii. The General Contractor has to provide technical signage as per VVF regulations/requests.

B.8.3. Drainage

B.8.3.1. Foul Water

i. Foul drainage will be by gravity main. Pumped is allowed only when necessary due to local ground water or other conditions. Sewage is to drain to existing foul sewerage system or to zone waste water facility. If pumps are to be used the Contractor is to provide a 24-hour emergency storage as well as a duty and stand by pump system. Any drainage in

public land is to be adopted by the Authority where possible. The Contractor is reposible for arranging the adoption.

ii. The Contractor shall supply and install all above ground drainage commencing with connections to each appliance and terminating with connection of soil and vent stacks to drain connector at ground floor slab level.

iii. All necessary traps, tees, bends and other required shall be provided to ensure maximum efficiency of the systems.

iv. All toilet areas, tea rooms etc. shall be served in the main office block and gatehouse.

v. Provide foul drainage to all wet points as noted on proposed office layouts.

vi. Provide warehouse heavy duty gully for each commercial unit.

vii. All soil pipes and fittings are to be PVC-U system with solvent welded joints, except where seal ring joints are required for thermal movement. All pipes and fittings shall comply in all respects with EN 1329-1:2014 and shall, where appropriate, bear the EC kite mark.

viii. All internal pipe work shall be supported using approved type holder bats made of mild steel protected from corrosion by galvanizing or plastic coating. The holder bats shall either locate around fitting sockets to provide both anchor points for support and as a fixed point to control thermal movement, or locate around pipes to act as a pipe steady permitting free longitudinal thermal movement of the pipe work.

ix. Access shall be provided where necessary either by means of an integrally moulded door on access branch, bend type, or pipe, or alternatively by a two-piece door with integral clamp fitted directly into the pipe.

x. Pipe joints shall be solvent welded using cement and where necessary using pre-assembled seal ring joints to accommodate thermal expansion. Sockets of the solvent weld type may be converted to seal ring joints by the addition of a seal ring adaptor.

xi. All waste pipes and fittings are to be MuPVC system with solvent welded joints except where seal ring joints are required for thermal movement.

xii. The Contractor shall provide all necessary underground and in-slab drainage for a full kitchen facility including grease traps, outlets and the like.

xiii. No pumped piping is allowed under warehouse/office slabs. If pumping is required this shall be only in exterior areas. The piping shall be designed to leave underneath of warehouse/office slabs through the shortest possible way. No sewage mains are to be located under warehouse slabs. Sewage main shall be located alongside whole length of the long side of the warehouse on the office (non-dock) side, to allow flexibility for future connections.

xiv. Connection pieces should have max 45 deg connection angle, while the system (angles, proximity of accesses) shall be designed in way that all underground pipes and connections are reasonably reachable with potable augers or water jets. Minimum sloping of gravity pipe is 1.25%, 1:80.

xv. Drainage pipe work shall be designed and constructed in accordance with the applicable norms and local prescriptions. Diameter and slope shall be provided to achieve self-cleansing velocities.

xvi. Manholes shall be prefabricated or constructed on site and covered with a cast iron cover for heavy traffic E600 minimum load class. Where a high water table is encountered, subsoil drainage shall be provided.

xvii. Provide trap primers at all floor drains or special drain-seal unit.

xviii. Provide condensate drain piping from all mechanical equipment, drips/drains to floor drains as required by local code. Where possible condensate drain lines should route to roof-top, scupper-type, storm system downspouts, not sanitary system.

xix. A CCTV survey of the completed installation shall be provided and included within the O&M Manuals.

B.8.3.2. Surface Water

i. On-site rainwater infiltration is preferred option. Connect to off-site main only for amounts excessive of available local infiltration. The Contractor shall be in charge of all the contacts and the timing of the Water & Sewage Company. The connection costs, which have to be paid to the Water & Sewage Company, shall be borne by the Contractor.

ii. All external areas should be designed and suitably sized to facilitate free rainwater drainage and dispersal without ponding according to local laws and rules.

iii. No discharge of water onto adjacent properties or plots is permissible.

iv. Surface water drainage will include connections to all primary rain water pipes from the roof of the building.

v. Any below ground drainage shall be surveyed with CCTV on completion of the system.

vi. Where practicable, surface water drainage channels and gullies shall be designed and installed out of trafficked areas.

vii. All manholes receiving siphonic drainage discharge pipework will be fitted with a vented lid. Opening size to be confirmed by the siphonic contractor.

viii. Petrol/oil interceptors, or other means of petrol/oil treatment (interception or filtration) are to be implemented and serve the surface water drainage system to external paved areas. Solution to meet at least national or local regulations, or requirements of Planning or Drainage Authority or Environment Agency. Solution to be approved by Developer. No roof drainage is to pass through the interceptors.

ix. The surface water drainage design shall allow for any necessary surface water attenuation as required by the Local Approving Authority. The below ground drainage network shall be designed such that it does not surcharge under a 1 in 10 year storm, flood under a 1 in 30 year storm and the building and other critical areas must remain operational without the ingress of water for a 1 in 100 year storm. A minimum of 20% additional allowance for Climate Change shall be allowed for in all calculation.

B.8.4. Hard-Standing and Yards (Concrete)

i. Kerb radii must be a minimum of 13m in all areas where HGV's will operate. Two way traffic lanes are to be a minimum of 7.3m wide kerb to kerb (or more if required by national standards), increasing in width at corners as required to allow vehicles to pass safely. The General Contractor will provide vehicle tracking drawings to justify their design.

ii. If not shown differently on General Layout: Hardstanding apron depth is minimum 18m from dock wall face. Truck yard depth to be a minimum of 35m in total with single apron (including the apron); and a minimum of 55m when two opposing aprons (i.e. warehouse dock sides, or parking opposite docks) are presented. Turning areas to be located on the plot to allow adequate truck movements.

iii. If not specified in the design but in accordance with the local regulation, 1 truck parking must be guaranteed every 1000 sqm of SLP

iv.

v. The service yard hard-standings and other truck routes will be constructed with C32/40 6% air-entrained, chlorine resistant, reinforced concrete, incorporating crack control fabric or steel reinforcement with coarse brush finish wearing surface and troweled margins. It will be designed to accommodate vehicles of up to 44 tonnes loading on 5 axles with a maximum axle loading of 11,500 kg, and 5.000 kg/m2. The slab is to be designed for minimum 5 million standard axles (and daily 450 Commercial Vehicles) unless specified otherwise. Required design lifetime of all road layers shall be 25 years. The design shall be based on the use of road legal vehicles only operating in the yard areas. Recommended pavement design is to be as directed by a geotechnical engineer.

vi. As option, the areas where trucks are only moving (not standing), shall be offered by the Contractor as tarmac surface. Same load bearing requirements and design lifetime shall be assumed. If a tarmac solution is presented it must take due allowance of chanalised trafficking and tight turning manouvers.

vii. The slab should be minimum 200mm thick with a steel mesh and will be provided with all the necessary longitudinal joints, contraction joints, expansion joints and isolation joints to determine and control slab crack formation. All panels to have a maximum aspect ratio 1.5.

viii. 'Trief' kerbs or similar will be provided to protect vulnerable areas. Standard precast concrete kerbs to all other areas.

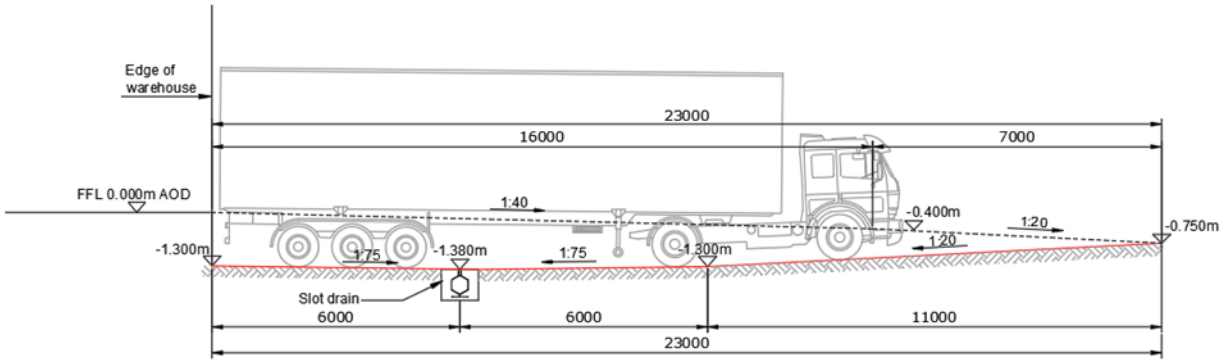
ix. Loading Dock Aprons to receive trowelled-in grey quartz surface hardener finish. Coarse brush finish parallel with 100 mm bullnose trowelled margins. Plus thickening under trailer jockey wheels.

x. Load transfer is to be provided across all trafficked joints and due allowance shall be made for channelized traffic flow.

xi. Hardstanding design is based on the use of vehicles that are suitable for use on public highways only.

xii. Hardstanding at dock levellers shall fall away from the warehouse for at least a minimum of 6m. The sloping afterwards can be altered, and is to be designed in order to minimize necessary earthworks. The hardstanding apron slope shall be altered only once. The level of the lorry body at rest, should ideally fall away from the building, to ensure water on top of the lorry runs towards the front of the vehicle and NOT into the warehouse via the dock doors. The preference for sloping is around 1,5%, with minimum local value 1%, and maximum local value 3%; while such maximums and minimums are to be assumed in the worst direction (cross-slopes). Heavy-duty linear drainage channels are to be located in the bottom cross-fall, concrete or plastic types to be used (example pictures below). The design to be approved by Developer. An example of falls adjacent to loading docks are shown opposite.

xiii. Provide a 3,5m long shoulder (free area) beyond trailer parking areas to allow trailer overhang without hitting sloping ground, light poles or fencing. Where site restrictions prevent the desired clearance, provide highway guardrail or other Developer-approved barrier to prevent damage to trailers.



Typical Section Through Dock Levellers

Scale 1:100

xiv. All hard-paved surfaces will be edged with concrete kerbs/edgings as appropriate and marked out with thermo-plastic white lining 100mm wide.

xv. The yard areas will include retaining walls as necessary, external dock staircases and barrier / bollard protection.

xvi. Hardstanding shall be profiled to ensure adequate run-off of surface water drainage via linear heavy duty drainage channels or based on local requirement, local conditions as approved by the Developer.

xvii. A maintenance access strip will be provided around the offices for window cleaning purposes, and for maintenance to the perimeter of the warehouse.

xviii. Ground compression values under the gravel layer (truck yard) Ev2 >= 80 Mpa, Ev2/Ev1 <= 2.5

xix. At level access doors the slope shall be minimum 1.5% sloping away from the building.

xx. The surface tolerance for the concrete pavement should be ±10 mm on 4 m length

xxi. Provide access for fire brigade at building perimeter to comply with local regulations.

xxii. The site roads shall be fully kerbed and shall, where necessary, have adequate horizontal and vertical radii and widths for articulated vehicles. This is to be proved by performing a full-scale towing curve study by Traffic Specialist. Towing curve analysis shall confirm that standard 16,5m long truck is able to perform all required manoeuvres and access all dock, parking and ramp positions (specific attention is to be paid to parking lots and docks at end positions).

xxiii. Drawings shall be explicit, showing turning radius and flows.

xxiv. Truck yards shall not be used for storm water detention.

B.8.5. Hard Standing (Other)

i. Car parking areas and roads around site perimeter to be finished with flexible bituminous paving with white lining. HGV entrance road and goods yard to have an enhanced heavy-duty sub base installed to make it suitable for HGV traffic, capable of withstanding HGV

loading per previous chapter. The Contractor is responsible for the complete Design and Build responsibility, to ensure gradient and road levels are fit-for the purposes intended. The design must also make due allowance for channelized vehicle flow.

ii. Hardstanding design is based on the use of vehicles that are suitable for use on public highways only.

iii. Pedestrian routes are to be provided to enable safe access to / from all pedestrian entrances. The walkways to be air-entrained, chloride resistant concrete or concrete block paving providing 1200mm minimum path width, or as per general layout design. The walkways to meet all relevant national codes. As appropriate, ramps will be provided to suit access by disabled persons and visitors.

iv. Appropriate vehicular (if required) maintenance access will be provided around buildings for window cleaning and other maintenance of the external elevations.

v. Pedestrian routes are to be provided to enable safe access to / from all pedestrian entrances.

vi. These pedestrian routes are to have dedicated pedestrian crossing points to roadways with the use of dropped kerbs & tactile paving and adequate street lighting in accordance with local authority design guidance.

vii. Minimum dimension of internal roads (kerb to kerb):

a. Cars one way – 3.0m

b. One-way trucks/buses – 4.0m

c. Cars two way – 6.0m

d. Two-way trucks/buses – 7.3m

viii. If bus traffic applicable, bus stops to be concrete slab, with same (drainage type, calculation of layer thickness based on anticipated vehicle moves for 25 years, mesh reinforcement, towing curves prove stops are accessible).

ix. Roads used exclusively by cars, vans and buses shall be constructed from tarmacadam.

x. Parking areas shall be designed to minimize ponding.

xi. On Grade Car Parking:

a. The car parking areas shall be designed to suit the ground conditions and expected traffic flows.

b. Car parking areas shall be constructed using either asphalt or concrete block paving. Car parking bays shall be delineated by white lining where the surface is asphalt or coloured pavers.

c. Disabled parking spaces shall be provided in the appropriate numbers and delineated by white lining and include a disabled logo. Handicap parking areas shall be graded at 2% maximum and conform to accessibility code requirements.

d. If not specified in the design but in accordance with the local regulation, 1 car parking must be guaranteed every 600 sqm of SLP

e. To avoid standing water, minimum gradients for car parks to be 1.5 % generally and external channels leading to gullies shall have a gradient of not less than 0.5 %. Any channels within the paved area shall have a minimum gradient of 0.5 %.

xii. Generally, on-site roads shall have min 1% and max 3,5% sloping, if not otherwise approved by Developer

xiii. Ground compression values above the gravel layer Ev2 >= 60 Mpa, Ev2/Ev1 <= 2.5.

xiv. Parking Space Dimensions

a. Car Parking (Standard) - 2.5m wide x 5.0m long

b. Car Parking (Disabled) - 3.75m wide x 5.0m long (or larger if local regulation requires so).

xv. All hard-paved surfaces will be edged with concrete kerbs/edgings as appropriate and marked out with thermo-plastic white lining 100mm wide.

xvi. Metal parking bollards shall be provided for all sensible equipment as required for protection against trucks or other vehicles: Electrical transformers, gensets, gas meter, hydrants, PIV's, light poles, ramps and exterior stairs in HGV yard, dock and grade level overhead doors, fence gates, exposed building corners, etc. Material: 150mm diameter hot dipped galvanized steel tube with steel cap, 1500mm high, Finish: Black & yellow hazard striping.

B.8.6. Estate Roads/Entrances

i. Cars and HGVs will be provided with appropriate separation on site for safe operation, vehicular tracking is to be provided.

ii. Manual sliding gates will be provided at all positions where external fence crosses roads. Automatic sliding gates and automatic barrier arm gates will be provided at on all incoming and outgoing lanes around and connected to the gatehouse.

iii. The General Contractor is to liaise with the Industrial-Zone & Local Approving Highways Authority to ensure all conditions relating to highways in the planning conditions are met.

iv. No 2 flagpoles 8-10m high shall be located near main entrance road or office entrance.

B.8.7. Landscaping

i. The site must be suitably landscaped to meet current local regulations.

ii. A minimum depth of 300mm, or more if required by statutory requirements, topsoil to be provided for all planted areas.

iii. Road and Parking layout shall avoid designing narrow, small, remote or otherwise unmaintainable green areas.

iv. Landscaping including grassing, ground cover, shrubs, and trees shall be provided to satisfy the minimum requirements of the local governing authorities, and restrictive covenants of the park.

v. Landscape design and plant selection shall be governed by the desire for a low-maintenance installation.

vi. Provide water outlet for every 5.000 m2 of warehouse area on façade for manual irrigation, locations to be approved by Developer.

vii. Provide the distribution and the tank for automatic irrigation and toilets in offices, using rain water collected from the roof. The tank shall be connected to the main distribution to guarantee if rain water is missing. The tank and the system shall be dimensioned to guarantee the to requirements: landscaping and wc toilets in accordance with local regulation and Breeam.

viii. Maintenance and care (including watering and mowing) for all plants and grass areas shall be included for the first year.

B.8.8. Gatehouse/Control Barriers

i. Base structure to be metal panel container on concrete foundation, single story.

ii. Location suitable for controlling both incoming and outgoing vehicles.

iii. All detailed requirements for external & internal materials are to match office/warehouse standards (U values, colours, slip resistance, thickness etc.) unless agreed otherwise with Developer.

iv. The gatehouses will be suitable for controlling both incoming and outgoing vehicles. The Internal layout will include the following:

a. Worktops for mounting CCTV consoles and the like.

b. Toilet facilities including wash basin, hot and cold water.

c. Sink base unit worktop.

d. Single leaf doors leading to both sides of the guardhouse. Large scale windows located to oversee incoming and leaving traffic. Polarizing film to the inner pane of all windows and door windows.

e. Document hand over openings within windows. Sliding closable and lockable from inside, facing both sides for incoming and outgoing vehicles.

f. Vehicle access barriers control.

v. If applicable, the General Contractor is to establish the service requirements for the Gatehouses and provide all lead-up services and internal services distribution necessary for its intended use.

vi. 4 no 100mm diameter spare service ducts are to be provided from the warehouse to the gatehouse, terminating in a chamber. 2no 100mm diameter ducts will be provided from the warehouse into the soft landscaping in a total of 4no locations.

vii. Provide ducts from all base-build alarm points to the gatehouse.

viii. Electric Torque Motor Automatic rise & fall entrance barriers will be provided to each HGV access and egress lane adjacent to the gatehouse. Cabinets to be white, booms to be red and white stripes. The barriers will be controlled from within the gatehouse / (security point).

ix. Intercom from every barrier arm to guardhouse.

x. Concrete foundations and gravel subbase.

xi. 1No foam + 1No dry powder fire extinguishers.

xii. 38mm laminated worktop 800mm deep to perimeter of Guard Room.

xiii. Internal doors to have 250mm kick plates.

xiv. Services:

a. Guardhouse to be connected to sewage and drainage connections;

b. Roof drainage gravity system only;

c. Hot and cold water to sinks, hot water preparation by local electric boiler;

d. White ceramic urinals & toilets with infra-red auto-flushing;

e. Electric wall mounted panel radiators to all rooms;

f. Ventilation: extract to toilet, openable windows;

g. Cooling to Guard Room via flush ceiling mounted cassette and external roof mounted outdoor unit;

h. No 10 twin 16A sockets under CCTV console worktop;

i. Lighting in guard room 300 lux, with diffusers suitable for computer use;

j. Lighting in toilets waterproof ceiling mounted bulkhead type.

B.8.9. Fencing

i. Site fencing and entrance to meet all industrial-zone and local rules and regulations.

ii. Location of the fence per approved layouts

iii. Fence shall be minimum 1,8m high, paladin type. with a maximum gap to ground shall be 100mm, max aperture size 50x200mm vertical, min wire thickness 1,4mm. All posts, rails, bracing and tension wires, to locate on the secure/protected side, i.e. inner side, of the fence. Stability of support pales and fixture of weld mesh to support pales must not allow removal or bending or bringing down of parts of the fence with simple tools (screw driver). Mounting components of security fence shall be done from force resistible materials (steel, hardened plastic)

iv. Minimum distance of fence to trees and shrubs is 4m. The fencing shall be sufficiently set behind kerbs to in such way that vehicle and trailer overhangs cannot damage the fencing.

v. Manual sliding gates to be located on every road crossing the fence. The gate to allow usage of full road width. Gaps beneath gates are to be no greater than 100mm. Gate 2m high, decent quality material, corrosion protected, and finished in a colour identical to the fence to be approved by Developer. Gates to connect to perimeter fence, specific care to be provided to fence-gate connection details. Gate to be provided with mechanic lock and gate stop for both open and closed position.

B.8.10. Vehicle Maintenance Unit (VMU)

Not applicable.

B.8.11. Truck Refueling Facility

Not applicable.

B.8.12. Truck Washing Facility

Not applicable.

B.9. Incoming Services

i. All underground utilities are to be buried to their required standards and provided with appropriately coloured marker system to allow future identification. Insulated wire or tapes incorporating a metal strip or passive electronic marker systems should be laid as an aid to the location of non-metallic pipes and ducts.
ii. All underground utilities (water, sewage, power) shall be covered with protective sheets with wiring to allow their easy on-site identification in future.
iii. Contractor is responsible for negotiations with utility providers and management of delivery for all incoming and outgoing utilities (gas, water, power, drainage and sewage if applicable). Contractor shall manage and instruct Developer for all required actions from Developer's site like consents, document signatures and other necessary cooperation.
iv. Contractor is responsible to construct proper access for utility providers at all hand-over places (chambers, switch-house etc.) per statutory or provider's regulations.
v. The Contractor is to advise on the resilience of all incoming supplies to see that that they meet the requirements of the developer.

B.9.1. Incoming Water Mains

i. The capacity of the service shall be calculated to Statutory Authority Standards appropriate to the use and demand of the building. The mains cold water service shall commence at the Statutory Authority's metered site service entry point in a purpose-built meter pit and a potable water supply will be provided to serve the domestic water requirements of the offices. The capacity of the service shall be calculated to Statutory Authority standards.
ii. A metered domestic water supply will be provided to the offices. Separate meter to be provided in technical room for each branch to commercial unit.
iii. Where the external ground conditions are unknown or the ground is contaminated all underground cold water services shall be installed in suitable barrier pipe. Where no contamination is present blue MDPE may be used.
iv. From the metered connection to the Statutory Authority's water main at the site boundary, a sprinkler infill main shall be provided, terminating with connections to the sprinkler tank(s).

B.9.2. Incoming Gas Supply (if any)

i. A new natural gas connection shall be obtained from the local Supply Authority. The supply authority shall provide a new metered gas supply at the site boundary complete with the required housing. The supply shall then be extended into the building.
ii. Natural gas distribution system at the building will be provided from the gas meter to all building equipment requiring gas service. Gas pressure and volume delivered to the building will be sized to provide for gas demand at the building.
iii. All piping and accessories shall meet national and local codes, as well as gas provider standards.
iv. All piping concealed in walls or above ceiling, all medium pressure piping and 50mm or larger piping shall have butt welded joints. Expansion loops on piping when crossing building expansion joints.

v. Each gas burning piece of equipment will be provided with a pressure regulator and shut-off valve with dirt leg to accommodate gas service pressure, with over-pressure device when required by national or local regulation.
vi. Gas main shut-off valves will be tagged and an identification sign installed on the wall above the valve.
vii. The Contractor shall install a gas shut off valve (solenoid valve) interfaced to the fire alarm system which shall be provided on the main gas entry point into the building. The valve should be normally closed and powered open.
viii. Routing of gas pipe work through the building shall be via ventilated areas (including ceiling voids). Gas pipework shall not be routed below the suspended ceiling level in any area of the building.
ix. All gas pipework shall be applied with a yellow painted finish for necessary 50 µm to 100 µm thickness

B.9.3. Incoming Electrical Supply

i. The Contractor is to liaise with the Electricity utility provider and will include for the cost of any utility upgrade required.
ii. The requirement is for an adequate Midium Voltage supply with appropriate redundancy to serve the site, terminating at the Statutory Authority's metering MV cut-out within an approved housing. The housing including all necessary equipment is part of Contractor's delivery. The housing to meet required separation of provider's and Developer's sections, as well as to meet all provider's requirements for access and equipment.
iii. Energy Consumption & demand requirement (in MW) should be considered for this type of RDC.

B.9.4. Standby Generator

(if applicable)

i. The Contractor shall allow in his pricing for necessary preparations as conduits (underground and within walls), and preparations within switchboards to allow generator connection.

B.10. Sprinkler System – full design and construction in accordance with NFPA Standards

i. A sprinkler supply main will be provided to the sprinkler tank only as a below ground installation, to be located below the freezing depth.
ii. Provide sprinkler system to warehouse. Other areas like office block, pump house or technical rooms shall have sprinkler protection only if required by national/local regulations or related fire protection design/plan.
iii. Sprinkler zoning and branching to respect warehouse division to commercial units, or Developer's instructions.
iv. All pipes, components and equipment to be UL listed, and to be used in accordance with instructions of manufacturer. All materials and equipment to be approved by Developer.
v. All underground pipework shall be blue HDPE or similar.
vi. Sprinkler system branches shall be taken from the yard main with external post indicator valves and connections to internal valve sets.
vii. Zone valves will be installed on the yard main between take-offs and on each branch.
viii. The yard main and pumps shall be hydraulically tested (flow test) and commissioned in accordance with NFPA, the Local Authority / Civil Defence requirements, and written evidence of these tests having been satisfactorily completed shall be provided.

ix. Branch locations will be identified for connections to sprinkler valve stations. A sacrificial zone will be provided within any external pavement and the warehouse floor slab at the point of connection to the building.

x. The complete sprinkler installation works shall be an NFPA compliant system, carried out as per the regulations of the local / Civil Defence Authority. It shall consist of ESFR sprinklers (where applicable) or roof coverage ordinary hazard sprinklers (offices) and internal hose reels. Roof level sprinkler head connection points to be provided for as concept racking layout. Drain-off points for routine testing to be identified, location preferably on the perimeter and not interfering with docks, to be approved by Developer. Al sprinkler drain of and test points shall be connected to the foul drainage network unless approved otherwise by the Local Approving Authority.

xi. The fire pumps, jockey pump and ancillary items shall be housed in a pump house on reinforced concrete foundations. Pump house structure type to be approved by Developer (brickworks with plasters, metal sandwich panels, GRP etc.). The sprinkler tanks shall be placed in reinforced concrete bases.

xii. Pumps shall be sourced from one approved manufacturer, to country regulation standards.

xiii. A sprinkler alarm panel shall be located in an agreed position.

xiv. The truck yard main pipe shall be preferably located within bituminous part (not under concrete hardstanding apron).

xv. Two sprinkler tanks, pump house tanks interconnected so each serve any tank. Backflow valves shall prevent drainage of tanks back into the public line.

xvi. Base storage category is at least CUP (cartoned unexpanded plastics) or UUP (uncartoned unexpanded plastics). Hazardous material storage (tires, aerosols) is not anticipated unless stated otherwise by Developer.

xvii. Minimum storage height is 10m.

xviii. Risers to be protected by fence with openable and lockable gate. Risers equipped with control valve, riser check valve, gauges, main draft, flow switch and tamper switch.

xix. All sprinkler pipes subject to external weather or freezing conditions shall be equipped with heat tracing or be dry type.

xx. Ensure sprinkler heads are installed to manufacturer's data sheet. Specific attention to distance to ceiling and proper clearance to top of storage (0,9m for suppression mode sprinklers).

xxi. Pay attention to sprinkler head obstruction (ductwork, cable trays, and structural members). In absence of local or manufacturer's standards, follow FM global data sheet 2.0.

xxii. Sprinkler control valves not in a locked room shall be chained and locked in open position.

xxiii. Water flow alarm devices to be provided on all sprinkler system for monitoring by fire alarm system.

xxiv. All mechanical fittings from same manufacturer.

xxv. Coordinate sprinkler head positions with high-speed fans and smoke extraction system for interference of proper water flow.

xxvi. Emergency lights to be located also in pump house and fire alarm room.

xxvii. All holes in walls and floors shall be core drilled or have protective sleeves.

xxviii. In seismic areas, specific measures to be incorporated to ensure proper system operation after seismic event. Typically this involves: seismic bracing on piping, expansion loops on piping, seismic resistant tanks and their foundations, doubling number of pumps etc. All measures to be approved by Developer.

xxix. Fire Hydrants:

a. A fire hydrant installation shall be installed in full compliance with NFPA, the fire strategy and the request of the local Fire department.

b. In general the pipe shall be laid a minimum of 6m away from the perimeter of the building (or 6m from anticipated future expansion).

c. Hydrants in car park to be positioned so easily accessible with full occupancy of parking lots.

d. Provide damage protection to all fire hydrants.

e. Fire extinguishers: Follow local standards. In absence of local standards, follow at minimum NFPA 10, including marking guidelines.

B.11. Telecommunications

i. The Contractor will provide protection sleeves under roads and hard surfaces (on site) in position of anticipated telephone and data cable. The anticipated line is between nearest possible telecom provider connection point and office area. Two specific sleeves 100mm diameter shall be provided under every hard surface.
ii. Provide distribution for data cabling between server room and office area. Conduit to run on office in internal wall and falseceiling. Provide adequate separation from other conduits to avoid interference with data cabling
iii. All racks,cables cat6,fyber,sockets (2 every 10 sqm in the offices and 20 sockets to be positioned in accordance with the developer), etc shall be provide (if requested)

B.12. Mechanical Services

i. Any item requiring periodic maintenance of five years or less shall be positioned to allow safe access for servicing staff. All plant installed to be provided with clear safe access to areas requiring servicing. Safe access routes shall avoid obstructions within clear heights and minimize warehouse or office area space taken. Any such safe access (ladder, catwalk etc.) needs to be approved by Developer.

B.12.1. Smoke Ventilation

i. Smoke filter ventilation shall be provided as a specialist Sub-Contractor system in accordance with local authority and national codes in accordance with UNI EN 12101.
ii. Smoke extraction ventilation shall be provided as a specialist Sub-Contractor system in accordance with local authority and national codes in accordance with UNI 9494 (SEFCC system)
iii. If allowed by national regulations, both options mechanical (ducted fan assisted) and/or natural smoke ventilation or their combination is acceptable by Developer.
iv. The sub-contractor will supply and install compressor/receiver, smoke curtains, pneumatic pipes and fire/day-to-day control panels.
v. Electricity supplies for the compressor and control panels will be provided by the electrical contractor. Usage of sand trap louvres is not allowed in warehouse, and thus such structures shall not be assumed as air intakes for smoke extraction calculation.
vi. Smoke vents should consider the overall building height and internal clear headroom constraints.
vii. If required, smoke curtains shall be executed in incombustible materials. The position and size of the smoke curtains shall be in correspondence with regulations of the local fire authorities. The bottom of the smoke curtains should be no lower than the clear height.
viii. Provide fireman's override fan/louver control switches in the Fire Pump Room, Reception area or other location approved by the fire marshal.
ix. Fan/Louvers may be controlled in groups suitable with fire marshal.
x. Coordination with fire sprinklers – Smoke hatches shall be sized and located to minimize the impact of increased air velocities at fire sprinklers.
xi. Smoke ventilation shall have independent back-up power source (preferred battery for each ventilator, and back up for central station).

B.12.2. Ventilation / Air conditioning

i. The external ambient design temperatures for heating and cooling load calculations are to be in accordance with local or national regulations.

ii. The external ambient design for plant selection is to be -10 deg C for heating and +35 deg C for cooling.

iii. Plant rooms are to be designed for a maximum 40 deg C at 33 deg C ambient temperature.

iv. Internal design conditions for comfort are to be compliance with DPR74/2013

v. The Contractor shall consider the outside winter / summer design temperatures as defined in applicable norms according to the region, the altimetry and orientation of the building.

vi. Heat gains to be inclusive of following:

a. 1 person / 200m^2 in warehouse area, or using exact permitted building occupants.

b. 1 person / 7,5m^2 in offices. 100W per person

c. 1W/m^2 in warehouse or 5W/m^2 in office area for lighting.

d. Battery charging units for every 2.000 m^2 or as per preliminary design.

e. Allow for ventilation rates of 10 l/s per person as a minimum. Some offices may require higher at 12 l/s.

f. Infiltration rates to be as per national standards for form of construction and building use.

vii. The Contractor shall assume all national and local standards (binding or recommended) for minimum and maximum temperatures, air changes per hour, humidity, or any other air quality requirements if not clearly more stringent highlighted in this document, then follow ASHRAE standards.

viii. Warehouse ventilation not required by Developer. If necessary due to local/national regulations, then forced ventilation shall be utilized (natural trough openable windows not preferred)

ix. Office rooms (offices, meeting rooms etc.) shall have air conditioning system. If allowed by national/local regulations, natural ventilation is preferred. If allowed by national and local regulations, and is common industry standard within the region, heating can be provided through separate heating elements (radiators etc.). Such system shall be interlinked with ventilation/AC system through BMS.

x. Secondary rooms (lockers, reception, toilets, janitors, various technical rooms) can have natural ventilation if applicable per national or local standards and NFPA standards; otherwise forced ventilation only (no air conditioning). Provide antifreeze protection to all technical rooms.

xi. Server room shall have 5kW split cooling unit.

xii. Air handling units / Rooftops shall comprise at minimum of:

a. Aluminum box skid-mounted units, suitable for external use;

b. Supply and recirculation fans, external air inlet, re-cycler air inlets, outlets for warehouse supply;

c. Heating coils and filters;

d. Unit sized to provide air changes in accordance with UNI 10339-13779 for the various types of environments

e. Heat recovery units, with efficiency in accordance with National regulatory requirements;

f. CO sensors;

g. Filtering devices, G4= Iso Coarse F7= ePM1 (60-70%) type

h. Environmental friendly refrigerant;

i. Maintenance electrical outlet in each roof mounted equipment;

j. External light for maintenance crew use;

xiii. Air handling units / Rooftops shall:

a. Must be safely accessible for maintenance;

b. Be linked to the fire alarm system and is to be automatically turned off should the fire alarm be activated;

c. Have attachment to roof curbs in accordance with local wind speed and seismic design requirements.

xiv. Any cooling or fresh air ventilation ducting to be heat insulated.

xv. If existing technology layout is available by Developer/Tenant, the location of ventilation outlets and ducting to be accordingly aligned with racking and other layout features.

xvi. The toilet ventilation shall be complete with also a twin fan extract system to provide 5 air changes per hour, to ensure area is under negative pressure.

xvii. Maximum achieved airspeed at ground level shall be 0,2m/s. Max airspeed inside ducting is 0,8m/s.

xviii. Filters and other regularly replaced equipment shall be clean and free of damages and any other construction impacts at a time of handover.

xix. If required by ATEX or national/local regulations, dedicated ventilation system shall be provided for battery charging stations. Such system to be in compliancy with all national/local and ATEX regulations.

xx. Comfort cooling system requirements:

a. All necessary power including DB, isolators, cabling, UV relays, and capacitor bank etc. shall also be provided;

b. The system shall be complete with safety valves, draw off cocks and drain points, altitude gauges, temperature gauges, with siphons and cocks, all fitted in the flow and return pipework;

c. Pumps shall be sourced from one manufacturer;

d. Hydronic chilled and heating system must be flushed and cleaned in accordance with a recognised standard or agreed method statement in advance of putting into service;

e. Hydronic chilled and heating system must have a means of balancing flows on the main circuit, main branches and at all terminal devices in accordance with a recognised standard or as agreed with the Engineer;

f. Hydronic chilled water systems must be commissioned fully flushed and cleaned with a mechanism for dosing both biocide and scale and corrosion inhibitor to maintain water quality subject to periodic sampling under maintenance.

B.12.3. Hot and Cold-Water Distribution

i. Provide an open hot, cold and mains water installation. The systems installed shall serve the office block and all other domestic water outlets.
ii. Provide hot and cold water to all sanitary appliances and other appliances as necessary.
iii. To reduce the risks of scalding users of the system by avoiding accessible surface temperatures greater than 38°C and by providing blending or thermostatic devices local to, or integral with, each hot water outlet where installed to achieve 38°C outlet temperature for showers and 41-43°C for basins. Sinks are to remain unblended and have appropriate warning signage.
iv. All hot water piping shall be insulated to minimize energy loss. Cold water and condensate pipework within the Technical Rooms and above suspended ceilings shall be insulated to minimize condensation.
v. Cold water pipework must be run separate too hot water pipework and in a manner to minimise heat gains in accordance with local regulations.
vi. Overhead piping shall be routed parallel and perpendicular to column lines.
vii. Coordinate all overhead plumbing piping to be located above the bottom cord of all roof joists to avoid conflicts and maintain the highest possible clear height.
viii. Provide manufactured expansion device or fabricated expansion loop on all piping systems crossing building expansion joints.
ix. Provide backflow prevention and/or pressure reducing valves as required by local code or water system provider, and hydraulic profile of the site water system.
x. Above-ground water piping shall be PPR plastic, min PN20.
xi. Provide one hose bibb at battery charging areas and at floor scrubber dumps.
xii. Provide non-freeze hose bibbs on the exterior walls at each drive-in ramp and for each 70m of façade and elsewhere as noted by the architect.
xiii. Minimize hot water distribution providing local electric or gas boilers to each zone (toilet block, office block etc.).
xiv. Each Janitor room shall have water tap and heavy duty (stainless steel or ceramic) janitor sink.
xv. Control valves shall be provided to any branch longer than 25m.
xvi. Provide chlorine cleaning of all water distribution system prior to handover. Perform testing done by independent laboratory, proving that water meets all national/local/provider's requirements for water potability. Testing to be done at selected location, but in minimum for each main branch and each zone, always at end element (water tap or bibb).
xvii. Device allowing input of chlorine shall be installed at commencement of drinking water main. Location to be approved by Developer.

B.12.4. Controls System

i. To be proposed & included within Contractor proposal. All building life and environmental systems are to be controlled/configurable/reportable to the BMS.

ii. Appropriate sub-meters are to be installed on plant measure energy consumption in accordance with local regulations.
iii. All mechanical services equipment shall be controlled via a master H&V control panel located in the plant area. The controls system shall be arranged to enable a complete shutdown of all items of plant on a signal from the fire alarm system.
iv. The BMS shall be open protocol (non-proprietary) system.
v. The Contractor shall supply, install, test, commission and set to work the full BMS system. The Contractor shall allow for system commissioning for both (two) seasons, i.e summer and winter.
vi. Each commercial unit shall have a separate control unit. These control units shall be connected to central PC. The central PC is not main control unit, and in case of failure of one separate control unit, all the other separate control units shall not be affected.
vii. Central PC shall be connected to a distant command centre via optical cable. The distant command centre shall read all the data visible on central PC on-line.
viii. Central PC shall be back-up powered.
ix. Central PC shall have visualization showing commercial units, sensors and equipment in realistic positions on building layouts. System shall be user friendly and intuitive, and have a bar with quick access to each system.
x. The system shall issue warning and event list, to be saved on local disc for maintenance crew. Lists to allow easy sorting and filtering by time, by system, and by criticality level.
xi. Refer to **Annex 09 - BMS Functionality Requirements** for further details and required functionalities of BMS system.

B.13. Electrical Services

B.13.1. Lightning Protection

i. The lightning protection system (LPS) will be provided to EN 62305 and any other local applicable norm utilizing the main structural frame as the earth conductor with ground level connections into earth electrodes (the steelwork contained within the structure will be utilised as down conductors, linking the roof level lightning protection network with the earth termination points. The rein-forced concrete structure and piles will provide the earth termination points, inclusive of test points). All service entries will be bonded to the lightning protection.
ii. Provide full risk assessment and LPS calculations for comments prior to order of system.
iii. Include surge protection devices.
iv. The full system shall be retested 12 months after Practical Completion and any necessary remedial works undertaken.

B.13.2. Fire Alarm

i. The fire fighting and fire alarm works shall be carried out as per the national and local regulations of respective Authority, consisting of forced aspiration system, heat detectors, Break Glass Units, Hose Reels, Alarm Control Panel, CO2 & Dry powder Fire Extinguishers, Exit Lights, Alarm Bells and Monitor system.
ii. The system throughout shall be fully automatic and fully addressable analogue or digital (depending on industry standard within country/region) installation, able to cyclically verify the status of the sensor by the control panel.
iii. Fire and Smoke detection (with forced aspiration system) shall be foreseen in all the areas (warehouse, offices, technical rooms, ancillary buildings, HVAC roof units, inside ventilation ducts etc.).
iv. The output signal shall be connected to fire brigade monitoring location. The connection shall be dual, through optical cable and mobile phone network signal.
v. The fire alarm system shall fully comply with UNI 9795.

vi. Distinct evacuation signal shall be recognizable in all rooms and on roof and outdoor emergency exit. Unless required by fire protection design or national/local regulation, an emergency voice communication system shall not be utilized.

vii. Wiring in to be in approved and tested with: red enhanced thermoplastic zero halogen, low smoke cable sheaths; enhanced silicon rubber insulant; electrostatic screen; aluminium/polyester laminated tape, and; shall be suitable for enhanced services. The cables shall be routed in dedicated closed trays. The cables must be fire-resistant type in accordance with current regulations. The cable shall comply with EU 305/11 CPR regulation.

viii. All components (circuits and wiring, equipment) shall be specifically listed for use with fire alarm systems

ix. Power to all fire alarm system device shall be supplied from dedicated AC power circuits, which serve no other loads and shall be backed up by UPS or batteries.

x. The fire alarm equipment distributor and installer shall be competent firms which are regularly engaged in the design, installation, testing and servicing of fire alarm systems for commercial buildings.

xi. Contractor shall be certified by the material/equipment manufacturer as trained in, and as knowledgeable of, the manufacturer's standard practices and procedures relating to installation of fire alarm systems. The contractor shall be certified and licensed by the state and local jurisdictions, as applicable.

xii. Full scale testing and demonstration involving all related components and related installations (smoke extraction, HVAC, fire dampers etc.) shall be undertaken prior to hand over.

xiii. Hydrogen monitoring system at battery charging area to implemented if required by local codes.

xiv. Refer to **Annex 012 – FDS Fire Detection System Functionalities**, for further details and required functionalities of fire detections system and its central panel.

B.13.3. Emergency Lighting

i. Emergency lighting shall be provided by individual luminaries supplied with 1-hour inverter packs which shall operate upon circuit failure or luminaires powered by centralized sources (UPS compliant with EN 50171), in this case the luminaires must be connected with fire resistant cables. Autonomy will be defined in accordance with the requirements of the Fire Officer.

ii. Final exit doors shall be provided with self-contained emergency exit signs.

iii. Emergency lighting shall have independent fire-rated wiring. The cables shall be routed in dedicated closed trays

iv. Emergency lighting shall illuminate 1 lux minimum values at any place, or more if required by national/local regulations or valid permits.

v. Consideration shall be given to a central UPS system (comply with 50171) for warehouse to achieve higher lux levels.

B.13.4. Electrical Distribution and MEP

i. All electrical works shall be carried out as per the regulations of the National and Local Authority and shall consist of supplying, installing and commissioning.

ii. A composite modular constructed MCCB distribution board shall be installed to supply the electrical installation. From this MCCB board distribution boards shall be served to provide local lighting and power final circuit. Generally, the main distribution shall consist of cables in accordance with UE 305/11 CPR rules on cable tray at high level throughout the facility to serve local distribution panels. In details (non exhaustive indicative list):

   i. FG16M16 - FG16(O)M16
   ii. FG16R16 - FG16(O)R16
   iii. FTG18(O)M16
   iv. H07Z1-K type 2

v. *FG40HM1*
vi. *RG16H1(O)R12*
vii. *RG26H1M16*
viii. *FG16OH2M16 0,6/1kV.*
ix. *Busbar are also accepted*

iii. Sub-main cables and distribution boards to be provided to offices and external lighting and must comply with local and national codes.

iv. The main low voltage panel shall be form 3 type 2 and shall have main incoming ACB and bus bars rated for base build electrical requirements only, with MCCB outgoing supply protection devices and sub-meters on incoming and outgoing ways.

v. The LV panel shall allow sub-metering of office, warehouse, lighting and mechanical consumptions for each commercial unit. Note: An allowance of 20% spare capacity shall be made to all panel boards for future expansion.

vi. MEP – The following will be considered within the design & construction:

a. Easy access to all electrical panels;

b. Electrical cables ducting must be accessible to maintenance when needed;

c. Piping network must be accessible to maintenance when needed.

vii. Unless regulated by local law, the GC shall provide a minimum of 5 percent of the total number of parking lots with electric vehicle (EV) charging points - 2X Schneider (or similar) EV-connected ELECTRIC VEHICLE charging stations for 22 kW with 2 T2-type outlets and EVF2S22P22R RFID reader..

viii. Block with 1000 kVA transformer with main distribution panel shall be provided for every 15.000 m2 of warehouse on average. Location of the blocks to be approved by Developer.

ix. Separate distribution and wiring system shall be provided for each commercial unit as per **Annex 07 - Typical distribution scheme**.

x. The Medium/Low Tension room for the mains connection, is a technical room specifically designed and built in accordance with the national and local regulations and the indications of the Electricity Provider. It shall be located at the border of the property, in proximity of the building and with access from the public road to guarantee easy access to the Electricity Provider. The room must be divided in different sub-rooms to accommodate the equipment of the main electrical supply, the meters and the Developers main breakers which protect the feeding lines to the building.

xi. The Main Power Supply is to be requested to the Electricity Provider and shall guarantee the feeding at full capacity required.

xii. Transformers:

a. Dry-type transformers allowed only;

b. Transformer to be loaded up to max 90% of their capacity;

c. Transformer rooms to be provided with proper ventilation, grids in doors, and overheating sensors;

d. Fire resistance of transformer room walls per national/local regulations or fire design. Rooms to have structural ceiling, with no use defined above. The rooms shall have all necessary systems (lighting, ventilation, smoke detection with forced aspiration system, etc.) and operating accessories (trenches to lay cables, anti-static vinyl flooring, emergency portable lights, suitable extinguishers etc.) according to the local regulations a Electricity provider requirements;

e. They shall be provided with close coupled switchable Ring Main Units (RMU) to facilitate full operation of the site in the event of any individual MV/LV cable failure;

f. Each transformer shall have Shunt trip/ Emergency Power Off (EPO) facility with an EPO button outside each transformer room to isolate the respective transformer in the event of any emergency; every single transfomer room shall have a EPO also located in a control room/guardhouse if requested by the fire brigade

g. Transformer rooms are to be designed and built considering accessibility to change transformers, proceed with maintenance;

xiii. Electrical cabinets

a. Each transformer block shall have one main LV cabinet feeding all the building systems. The main cabinet shall allow for future connection of back-up generator, and automatic switching device for generator supply. The main switchboards shall be made of modular system allowing future flexibility and easy implementation of additional units/sections.

b. The cabinets shall be designed in accordance to the local laws, technical standards and regulations. They shall have metal structure, divided in modular connectable columns, front access, internally segregated according to the "Form 3" and shall be designed with all the necessary equipment and accessories (including but not limited to circuit breakers for each circuit, re-phasing device, capacitors, etc.).

c. Location of secondary cabinets inside warehouse and office block shall be approved by Developer.

d. Provide metering component within switchboard to allow for remote monitoring of the switchboard load and operating characteristics (voltage, frequency, power factor).

e. Cabinets shall have hinged lockable front covers to prevent unauthorized access. Two spare keys shall be provided for every lock type.

f. Cabinet circuit reference charts shall be typed and contained within a plastic protective wallet. This wallet shall be secured affixed to the inside of a hinged lockable cupboard of the distribution board.

g. Provide surge suppression protective device for each switchboard. Surge suppression equipment shall be exterior type, not internal to the switchboard.

h. Cabinets shall have proper waterproofing depending on their location and possible humidity load.

i. 10% spare capacity shall be provided in all distribution boards and their connection spaces. The spare capacity shall be fitted with blanks.

j. Lighting and power circuits shall be separated.

k. Full discrimination between all protective devices shall be achieved.

l. No water piping allowed above or nearly above any electrical cabinets.

xiv. Cables

a. All the cable shall be copper. Aluminum can be accepted above certain surface according to technical rules and Developer's approval. All cables will be in accordance with UE 305/11 CPR regulation.

b. As a principle all cables for whatever purpose shall be run in or on galvanized cable ladder, cable tray, cable trunking or conduit as appropriate to the size and nature of the cable. Provide raceway and conduit system as required. All cables shall be evenly spaced and securely clipped to the cable tray and identified where necessary with cable markers.

c. Cables/cables trays shall be run parallel to building grids.

d. Cables installed on walls and columns, shall be protected by the use of PVC conduits, according to the applicable regulations. Fixations at the building structure shall only take place by clamping.

e. Except of the main feeder between transformer and primary LV cabinet, all feeders are to be run overhead. No other underground feeders are permitted.

f. In the office building the cables from the Local Distribution Boards to the final points shall be routed through cable trays installed in the false ceiling. Raceways shall not be supported (directly or indirectly) by false ceiling structures

g. In the walls the cables shall be build-in by means of PVC conduits to connect the cable trays and the final power outlets or switches. To comply with applicable legislation.

h. The power and data/weak current containment systems shall be separated.

xv. Sockets

a. Socket types shall align with national standards, national regulations and all applicable safety rules. If national standard different from CEE, and if possible to install types allowing both standards, then socket combining local and CEE standard shall be applied (for example CEI and CEE combined socket).

b. Warehouse and technical/electrical room sockets to be industrial heavy-duty types with suitable circuit breakers and switch.

c. The power outlets and switches installed in rooms with high humidity shall be water-proofed.

d. Refer to **Annex 011 - Electrical Sockets Details**, for further details, locations and numbers of required power sockets.

xvi. Miscellaneous

a. Thermal infrared inspection of all switchboards and panelboards shall be done after powering up all of the systems. All of the systems shall be turned on to draw full loads during the inspection.

b. Prior to handover of all power connections, full survey (revision), testing and report shall be provided to Developer. The survey to include but not be limited to arc-flash analysis, resistance measurements, proper phase connection measurements, frequency analysis etc.

c. The contractor shall provide certificate and testing reports showing that all electrical systems has been tested per national/local regulation and are ready and safe for use.

d. photovoltaic system is mandatory as renewable energy resources; it is the Contractor's obligation to design and build according to local rules and fire brigade. The building must be compliant to cover all the roof with photovoltaic system.

B.13.5. General Lighting

i. Supply and install warehouse lighting as required by "INSERT COUNTRY" building permit requirements
ii. All the lights will be led.
iii. The lighting shall be mounted on a pre-wired busbar system and installed above the operator's clear working height. The lighting design shall be served by header bus bar with tap-off units to provide flexibility in Tenant's possible future racking layout changes.
iv. If racking plan is presented by Tenant, then lighting positions and types shall be adjusted to the racking plan. Lux levels and uniformity rations are then valid at both, 0,75m afl and at top height of racks. The approach and design to be approved by Developer
v. General office lighting shall be provided by means of modular and compact LED lights. Luminaires shall be 600 x 600mm within the office area fit for suspended ceiling use.
vi. All the lights shall have key switches for testing of emergency lights.
vii. PIR detection in all the office building, toilets, change rooms and circulations shall provide automatic 'on demand lighting' via marshalling control boxes. The controller will be provided with an override facility to a 20a grid key switch for the purpose of testing the emergency lighting. The timers for all of the above automatic controls shall be set to 21 minutes. Only meeting rooms and close office will have also a local switch in parallel with the pir detection. The design must be submitted to the developer to be approved.
viii. Unless higher standard required by national/local regulations or existing planning and construction permits, the lighting levels generally shall be as follows:

E_m	Medium maintened illuminance
U_0	Surface lighting uniformity
Ra	Color fidelity index
U_{GRL}	Glare
$E_{m,z}$	Medium Cylindrical illuminance (it's a vertical illuminance and it's used to distinguish faces)
$E_{m,walls}$	Medium walls illuminance (to check how good is ambient lighting)
$E_{m,ceiling}$	Medium ceiling illuminance (to check how good is ambient lighting)

Type of task/activity area	$\bar{E}$m lx required a	U_o	R_a	U_{GRL}	$\bar{E}_{m,z}$ lx	$\bar{E}_{m,wall}$ lx	$\bar{E}_{m,ceiling}$ lx	*Measured at*
					$U_o \geq 0{,}10$			
Traffic zones inside buildings								
Corridors and circulation areas	100	0,4	40	28	50	50	30	Floor Level
Stairs, escalators, travolators	100	0,4	40	25	50	50	30	Floor Level
Loading ramps/bays	150	0,4	40	25	50	50	-	Floor Level
Plant area / technical area	300	0,6	80	25			-	Floor Level
General areas inside buildings – Rest, sanitation and first aid rooms								
Cloakroom (area), washrooms, bathrooms, dressing-, lockers-, shower-, sink- and toilet areas	200	0,4	80	25	75	75	50	Floor Level
Facial lighting in front of mirrors	200	0,4	80	-	-	-	-	
Sick bay	500	0,6	80	19	150	150	100	750mm AFFL
Rooms for medical attention	500	0,6	90	19	150	150	100	750mm AFFL
General cleaning	100	0,4	-	-	50	50	30	Floor Level
Logistics and warehouses								
Unloading / loading area	200	0,4	80	25	50	50	30	Floor Level
Packing / grouping area	300	0,5	80	25	100	100	30	750mm AFFL
Configuration and rehandling	750	0,6	80	22	150	150	30	
Open goods storage	200	0,4	80	25	50	50	30	750mm AFFL
Rack storage - floor	150	0,5	80	25		-	30	Floor Level
Rack storage - rack face	200	0,4	80	–	-	-	-	Full height
Battery charging area	300	0,6	80	25	100	100	30	Floor Level
Central logistics corridor (heavy traffic)	300	0,6	80	25	100	100	30	Floor Level
Automated zones (unmanned)	75	0,4	80	25				Floor Level
Offices								
Filing, copying, etc.	300	0,4	80	19	100	100	75	750mm AFFL
Writing, typing, reading, data processing	500	0,6	80	19	150	150	100	750mm AFFL
Conference and meeting rooms	500	0,6	80	19	150	150	100	750mm AFFL
Conference table	500	0,6	80	19	150	150	100	750mm AFFL
Reception desk	300	0,6	80	22	100	100	75	750mm AFFL

ix. The Contractor shall provide lighting calculations proving the spec requirements are met, for Developer's approval. Such maps and calculations shall be provided site specifically for all areas and rooms, and shall be made for full areas (not only typical sections). The calculations shall be done using approves software (Dialux etc.), and full source code shall be provided for Developer's review. The Contractor shall calculate maintenance factor for all

types of lights and all areas for Developer's review. The Contractor shall propose maintenance care for all types of lights and areas. The Contractor shall use real data of surrounding material reflectibility (walls, floor, ceiling), and assume medium clean environment.

x. Technical data sheets of all lamps are to be provided for Developer's approval.

xi. Contractor shall provide to Developer all necessary certificates for lamps and lighting as a system, including ENEC certification.

xii. The design and installation shall be in compliance with EN-12464-1, and all other applicable national or local regulations

xiii. Lights shall be operated centrally through BMS, by natural illumination sensors, locally by switches and/or occupancy sensor and through local electrical switch boards (switches to be located on switchboard doors). Locations to be approved by Developer. Lighting shall be operated through Dali system and connected to BMS. The BMS shall allow programmable timeclock for different lighting zones, as well as manual override of local switches by BMS. The illumination sensors shall be located above the lighting level (in skylights).

xiv. The warehouse lighting shall be gradable, with steps by 1/3 using switching by electrical phases.

xv. Warehouse lights to meet min 130 lm/W.

xvi. Lighting to be European manufacturers only.

xvii. Minimum required performance is L80 B50 @ 50.000 hours as 35 deg Celsius.

xviii. Colour temperature of warehouse lighting to be between 4.000K and 5.000K, office areas 3.500K-4.000K, all to be approved by Developer. Max deviation from colour stability is 5%.

xix. CRI index (Ra) shall be higher than 80.

xx. Min IP 54 cover.

xxi. Unified Glare Rating (UGR) to be between 23-25.

xxii. Contractor shall provide 3rd party measurement protocol showing results of on-site survey. The survey shall prove that anticipated design values were achieved in reality. Contractor to remedy all deficiencies and deviations from design values.

xxiii. Lighting zones shall be approved by Developer. Typical size of lighting zone is 5.000 m2 or every commercial unit. Dock line shall be separate zone at any case.

xxiv. Dock light to include an LED lamp. High power LED lights suitable for maximum trailer/container lengths, vertically mounted lamp, on a galvanized swivel bracket mounted to the door guides at 1800mm above finished floor, complete with movement restrictor to prevent contact with door.

xxv. The degree of protection (waterproofing) of the lighting fixtures and system components shall be suitable for the environment of installation.

xxvi. The lighting armatures shall be placed above clear heights with symmetry between the prefabricated structure, racking and sprinkler installation, allowing easy maintenance.

xxvii. Office & minor rooms: Surface mounted luminaries shall be used in rooms not equipped with suspended ceilings.

xxviii. Each Roof-top or HVAC unit shall have an illumination with local switch for emergency repairs.

B.13.6. External Lighting

i. Lighting for external roadways, car parking and lorry parking areas shall be provided by LED lights mounted on the building and/or on columns. All building elevations shall be provided with security lighting.

ii. All exterior lighting shall be controlled by photo-cell through relay panels, by BMS programmable timeclock for different lighting zones, and their combination.

iii. Luminaries utilized for external lighting shall be of the zero ULOR type and suitable for mounting direct to the outside façade of the building or mounting on free standing columns.

iv. All exterior lighting shall be dark sky compliant.

v. Lighting shall be designed to give the following average maintained levels, generally to the EN 12464-2.

vi. All mast mounted/wall mounted lights have to be accessible for maintenance purposes with a 15 m scissor lift. Provide safe and easy access to preform maintenance when roof mounted.

vii. The Contractor shall provide lighting calculations proving the spec requirements are met, for Developer's approval. Such maps and calculations shall be provided site specifically for all external areas, and shall be made for full areas (not only typical sections). The calculations shall be done using approved software (Relux, Dialux etc.), and full source code shall be provided for Developer's review. The Contractor shall propose maintenance care for all types of lights and areas. The Contractor shall use real data of surrounding material reflectibility (roads, ground, walls). It is understood local Planning restrictions will need to be considered and standards adapted where necessary.

viii. Technical data sheets of all lamps are to be provided for Developer's approval.

ix. Contractor shall provide to Developer all necessary certificates for lamps and lighting as a system, including ENEC certification.

x. The exterior lighting shall be divided in lighting sectors of less than 20,000 sqm. The zoning shall be agreed by Developer.

xi. Locate light poles for truck court areas 3.5 m behind the trailer curb. All lamp columns adjacent to service yards / access roads shall be set back from kerbs or protected by guardrails (Armco type barriers). All lamp columns in car parks shall be located in landscaped areas or alternatively protected by a barrier system.

xii. Lighting for 2 flagpoles and exterior signage per **Annex 014 - Branding Guidelines Façade Colours** to be included.

xiii. External lighting shall be controlled via twilight sensors and clock with the possibility of manual forced command.

xiv. All the external loading dock area and level access doors shall be lit with a minimum of 1 spotlight for every two doors.

xv. Unless higher standard required by national/local regulations or existing planning and construction permits, the lighting levels generally shall be as follows:

Em	Medium maintened illuminance
U_0	Surface lighting uniformity
R_{UGL}	Glare
Ra	Color fidelity index

Area	Ēm Min. req.	Uo Min. req.	RUGL Min. req.	Ra Min. req.	Measured At
Truck yard	20 lx	0,25	55	20	Ground
LOADING / UNLOADING AREAS (YARD) CIRCULATION AREAS AND SHARED PEDESTRIAN AND ELECTRICALLY POWERED HANDLING EQUIPMENT	50 lx	0,40	50	20	Ground
Personal car parking Medium traffic	10 lx	0,25	55	20	Ground
Personal car parking Heavy traffic	20 lx	0,25	50	20	Ground
Site roads	10 lx	0,40	50	20	Ground
Site roads	20 lx	0,40	45	20	Ground
Pedestrian walkways	5-10 lx	0,25	50	20	Ground
Pedestrian crossings, Pedestrians interfering with traffic	50 lx	0,40	50	20	Ground
Vicinity of Guardhouse	100 lx	0,40			Ground
Main entrance, and other Plant Areas	50 lx	0,40			Ground
Bus stops	50 lx	0,40			Ground

B.13.7. Bonding/Earthing

i. Earthing and bonding to be provided to the racks in accordance with Italian law. Grounding points shall be provided at +0,3m on some warehouse columns for future racking/equipment connections and for battery charging. Two perpendicular column grids in each commercial unit shall have the grounding points plus every column with battery charging station. Exact position to be approved by Developer.

C. SCHEDULE OF ANNEXES

C.1. Annex 01 - List of deviations

C.2. Annex 02 – Development summary

C.3. Annex 03 - Warranty lengths

C.4. Annex 04 - Preliminaries

C.5. Annex 05 - Close-out requirements

C.6. Annex 06 - RICS Standards for Area Measurement

C.7. Annex 07 - Typical distribution scheme

C.8. Annex 08 – BREEAM Standards

C.9. Annex 09 - BMS requirements

C.10. Annex 010 - BUG & BOM standards

C.11. Annex 011 - Electrical Socket Details

C.12. Annex 012 - FDS Functionalities

C.13. Annex 013 - Ground Investigation Brief and Earthworks Specification

C.14. Annex 014 - Branding Guidelines

C.15. Annex 015 – Early Access Criteria

C.16. Annex 016 - Single ply roofing Good practice guide & Membrane repair guideline