



VOLUME A

WORK REQUIREMENTS

Barrack Accountant Store

At

Sarsfield Barracks, Limerick

for

THE MINISTER FOR DEFENCE

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Section A

General Information and Conditions

General Information and Conditions

WORK TO BE EXECUTED:

Sarsfield barracks is the Defence Forces' primary location for the 12th Inf Bn. The site contains mostly permanent structures, all of which are listed on the Limerick County Council list of protected structures. The current arrangement is unsuitable for the storage of the Barrack Accountants stores. The scope of this project is to construct a new steel portal frame structure for the main storage area with an annex for an office, toilet and an additional smaller store.

The proposed site is brown field with services nearby for water, waste water and power. The proposed structure will require new infrastructure to connect into the existing services and also connect communication ducting.

The proposed structure is a steel pitched portal frame on strip foundations with an insulated reinforced concrete floor slab. The external fabric of the structure is insulated steel clad sandwich panels accessed by a pedestrian and forklift entrance. The internal of the buildings are split into open storage area and block on flat rooms for office, small store and toilet. The internal rooms are to be plaster board finish with insulated board on the external facing walls. The heating needs of the building shall be provided through an air to air heat pump.

A renewable energy source for the proposed project will include a roof mounted (32)16kWp PV array.

The building shall be serviced by an L1 FDAS system and emergency lighting.

The site area will be vacant for the duration of the Works and the Contractor given possession of the site but access to adjacent buildings will need to be maintained.

LOCATION:

Sarsfield Bk's, Limerick

DOCUMENTS FORMING BASIS OF TENDER:

Drg numbers: 1B_391_26 - 01 to 1B_391_26 – 14
1362-01 – 1362 -07
1362-101 – 1362-103

Specification provided:

Yes ☒ **No** ☐

Contractor to be appointed as PSCS:

Yes ☒ **No** ☐

Contractor to have vacant possession of site
OR

Yes ☒

Contractor required to work around personnel in
occupation of location where work carried out

Yes ☐

PSDP APPOINTED

Name: Zoe O'Hanlon

Address: 1 Engineer Group, Collins Barracks, Old Youghal Road, Cork

TIME ALLOWED FOR COMMENCEMENT AFTER CONTRACT COMES INTO EFFECT

Reference PW CF6 Clause 2.1 The Contractor will be allowed to occupy and use the site within 2 days from the date that the Contract comes into effect and, in accordance with PW CF6 Clause 2.3, shall commence work on site within 5 working days of being allowed access and complete within the time stated for Completion.

SITE VISITS

To arrange visit to inspect the site of the Works contact

Name	Phone number
Captain Zoe O'Hanlon	021- 4514178 (087-7827784)

WORKING HOURS RESTRICTIONS

Except with prior approval, the Contractor will only be allowed to carry out work on site between the hours of:

Mon to Fri 0800hrs to 1700hrs

Sat 0800hrs to 1700hrs

Work will not be permitted on Public Holidays nor on Sundays.

WATER AND ELECTRIC POWER

When available, water and electric power may be taken from:

Water: As shown on drawing

Electrical power: As shown on drawing

3 Phase available	No	X	Yes
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1 TENDER COMPETITION

1.1 Parties referred to in the Contract

<u>Employer:</u>	Minister for Defence
<u>Employer's Representative:</u>	Director of Engineering McKee Barracks Dublin 7.
<u>Contractor:</u>	The party appointed to carry out the Works

Safety - Design and Construction

<u>Project Supervisor – Design Process</u>	The party named on the cover sheet of the Works Requirements
<u>Project Supervisor -Construction Stage</u>	The Contractor appointed to carry out the Works (unless section on Form of Tender relating to matter states otherwise).

1.2 Tender documents

The following shall be deemed to form the tender documents.

- (1) Volume A, Works Requirements
- (2) Volume B, Form of Tender & Schedule and ancillary documents included in Volume B to be submitted with Tender
- (3) Volume C, Pricing Document and any tender summary provided to tenderers for completion and submission with their tender documents.
- (4) Suitability Assessment Questionnaire
- (5) Specification, drawings and any other documents referred to in the Works Requirements

Tender documents are intended for the specific party to whom they are addressed. The Employer will only consider tenders received from parties specifically invited to submit a tender and unsolicited tenders will not be taken into consideration in the tender assessment process.

1.3 Errors in tenders

In the event of errors being found in a tender the tenderer shall be informed of the errors and asked to formally confirm or withdraw the tender. If the tender content is confirmed, a signed endorsement shall be attached to the tender stating that all rates or prices (except Preliminary Items) are to be regarded as having been reduced or increased appropriately. Where the tenderer refuses to confirm the tender content, the Employer may treat the tender as being invalid.

No liability shall attach to the Employer for failing to discover errors in any tender and the tenderer shall be solely responsible for the accuracy and comprehensiveness of their tender

1.4 Lowest or any other tender

The Employer shall not be bound to accept the lowest or any other tender and reserves the right to cancel the tender competition at any time.

In the event of the Employer deciding to accept a tender, the Contract shall be awarded on the basis of the lowest priced suitable tender (suitability refers to such items as capacity, organisation, experience, performance on previous contracts, financial standing relative to the Contract and compliance with any specifications or quality standards laid down for the Contract).

Tenderers shall not be reimbursed for the costs incurred in tendering nor, in the event of the cancellation of the competition, in preparing qualification and tender submissions.

Tenders deemed to be abnormally low may be excluded from consideration for award of the Contract.

Where a tenderer, or any member of the tendering Group or Consortium, has supplied information that is inaccurate or false in relation to their submission, their tender will not be considered.

Where a tenderer, or any member of the tendering Group or Consortium, is the subject of any of the 'insolvency events' listed below before a Contract award is made, their tender shall be deemed to have been withdrawn and will be excluded from consideration when the decision on the award of the Contract is made.

A petition being presented to wind the tenderer up and not being dismissed within 14 days after presentation.

A meeting of the tenderer's creditors or members being held for the purpose of considering a resolution to wind it up.

The tenderer entering or proposing to enter an arrangement with or for the benefit of its creditors.

A petition being presented to appoint an examiner to the tenderer.

A liquidator, examiner, supervisor, receiver, administrative receiver, trustee, encumbrancer, or similar being appointed for the tenderer or any of its assets.

The tenderer ceasing or threatening to cease its business.

The tenderer becoming insolvent or unable to pay its debts as they fall due.

The tenderer, being an individual, becoming bankrupt or dying or becoming incapable of performing this Contract.

Furthermore, tenders will not be considered where the tenderer, or any member of the tendering Group or Consortium, has been the subject of a conviction by final judgement for one of the following:

Participation in a criminal organisation, as defined in Article 2 of Council Joint Action 2008/841/JHA.

Corruption, as defined in Article 3 of the Council Act of 26 May 1997 and Article 2(1) and Article 2(1) of Council Joint Action 2008/841/JHA.

Fraud within the meaning of Article 1 of the Convention relating to the protection of the financial interests of the European Communities.

Money laundering, as defined in Article 1 of Council Directive 2005/60/EC of 26 October 2005 on prevention of the use of the financial system for the purpose of money laundering.

1.5 **Conditions of Contract**

The Conditions of Contract will be the SHORT PUBLIC WORKS CONTRACT, as published by the Dept of Public Expenditure and Reform. The applicable version shall be that posted on the www.constructionprocurement.gov.ie website ten days prior to the return date for tenders.

1.6 **Scope of the work, adequacy of tender and conflicts between documents**

The tenderer shall be responsible for assessing the extent of the work required after visiting the site, examining the tender documents and being briefed on the extent of the Works (where such a briefing is provided). The tender sum submitted shall be deemed to cover the cost of carrying out all work either shown or described or which might a competent contractor carrying out work of the type required should reasonably be expected to infer as being intended for execution. All associated costs, including temporary works, shall be deemed to be included.

The Contractor shall be deemed to have visited and inspected the site and the buildings to be worked on and to have assessed all local circumstances likely to affect the execution of the Works before preparing his tender. The nature of the soil shall be deemed to have been taken into account.

Attention is drawn to the provision of PW CF6 Clause 1.4, dealing with discrepancies between Contract documents. Tenderers will be deemed to have fully assessed all documents provided and, in the event of there being discrepancies between them resulting in alternative specifications or requirements being called for, then **the Contract Sum will be deemed to include for the most expensive of the alternatives required.** The discrepancies will be resolved by the Employer's Representative in accordance with PW CF6 Clause 1.4. All apparent discrepancies shall be raised with the Employer's Representative before the Contractor orders materials or commences work.

1.9 **Tax clearance certification**

The award of the Contract will be conditional on the selected tenderer being in a position to produce a valid 'Subcontractor's Notification of Determination' issued by the Revenue Commissioners' eRCT system. The Notice shall be not more than 30 days old on the date that the tenderer provides it to the Employer.

Where the 'Notice' states that tax is to be deducted from the tenderer at the rate of 35% then the tenderer shall be deemed unacceptable for the award of the Contract and his tender shall be deemed invalid.

A tenderer asked to produce a 'Notice' shall be allowed ten working days to do so after which, should he have failed to do so, he may be deemed to have withdrawn his tender.

The tenderer shall be responsible for all costs incurred by him in obtaining a 'Subcontractor's Notice of Determination'.

The Employer is obliged to withhold tax from the Contractor in accordance with the instructions of the Revenue Commissioners at the rate determined by them as appropriate for the Contractor at the time any payment is due to be made.

In addition to the Notice referred to above, a copy of the tenderer's Tax Clearance Certificate will also be required.

1.10 **Pay and Conditions of Employment**

In order to be considered for the award of the Contract, a tenderer must confirm that their firm complies with its obligations under sectoral employment orders, employment regulation orders, registered employment agreements, where applicable, registered under the Industrial Relations Acts 1946 – 2015 and is also in compliance with the National Minimum Wage Act by completing the declaration included with the Tender Documents.

The tenderer must show that their firm is a fully paid-up member of the Construction Workers' Pension Scheme and Construction Industry Sick Pay schemes where employees of the firm are required to be members of them in accordance with the legal requirements covering workers employed in the relevant areas of the construction industry. A tenderer asked to do so shall promptly submit contribution receipts or other evidence of membership acceptable to the Employer. Any tenderer unable to provide evidence of being in compliance with their obligations may be deemed to have withdrawn his tender. A Contractor required to be a member of the Pension and Sick Pay Schemes shall remain in membership of them for the duration of the Contract.

A tenderer claiming exemption from the requirement to be a member of the Construction Industry schemes on the basis of not directly employing persons eligible for membership of them shall be obliged to provide a detailed proposal of how they intend to have the Works carried out, including how the required labour is to be sourced. Any tenderer proposing to subcontract the entirety of the Works shall be excluded from further consideration and their tender shall be deemed to have been withdrawn. A tenderer proposing to subcontract some elements of the work shall provide details of the planned extent of the subcontract arrangements and, where the arrangements are broadly acceptable to the Employer, commit to the intended subcontractors being in membership of the Construction Industry pension and sick pay schemes where the work to be so subcontracted falls within the scope of the sectoral employment orders, employment regulation orders, registered employment agreements, where applicable, registered under the Industrial Relations Acts 1946 – 2015.

1.11 **Evidence of insurances**

Any tenderer asked to provide evidence of having, or being able to get, the required insurances shall be required, as a minimum, to provide a statement undertaking to procure the insurances immediately upon entering into a Contract together with a further statement from a licensed insurer or bona-fide insurance broker that such insurances will be available to the Contractor. A tenderer failing to meet this requirement shall be excluded from further consideration and their tender deemed to have been withdrawn.

Tenderers shall be required to have Employer's Liability insurance cover regardless of whether they directly employ labour or not.

1.12 **Schedule of Rates / Pricing Document**

A fully priced and quantified Pricing Document shall be provided by the Tenderer. The total of the quantities shown multiplied by the rates tendered shall equal the tender sum offered. Failure to provide this information with the tender submission, or at latest within 5 working days of it being requested, may result in the tender being deemed invalid.

1.13 **Publication of tender information**

Tenderers are advised that the Employer is obliged to circulate the name and address of the Contractor awarded the work, the type of work involved and the address of the site to a nominee of the Irish Congress of Trade Unions (ICTU).

Submission of a tender shall be deemed to confirm the tenderer's acceptance that he agrees to the circulation by the Department of the above information. Any tender which is accompanied by a statement stating or implying that the tenderer does not agree to the release of the above information shall be deemed to have been qualified and may be treated as an invalid tender.

1.14 **Pricing**

Unpriced items

Any item left unpriced shall be deemed to be included for in the tender and the cost of the item shall be deemed to be spread across, and included in, the rates generally.

Currency

All prices and rates shall be deemed to be denominated in Euros.

1.15 **Value Added Tax**

The tender shall include for Value Added Tax liability at the Standard (23%) rate only.

No amount shall be included for the VAT liability at the special building rate (13.5%). Where the work is liable at various rates, the Contractor shall provide a detailed breakdown of the items of work liable at 23% and or 0% / exempt to facilitate the valuation of Change Orders. Where the cost of any items are zero rated / exempt for VAT purposes, the relevant items shall be itemised and the amount of the liability at this rate shall be clearly identified on the tender summary, with the amount carrying the zero rated / exempt liability kept separate in the compilation of the total tender price.

Adjustments to the V.A.T content of the Contract Sum will only be made in accordance with PW CF6 Clause 4.

1.16 **Freedom of Information Legislation**

The Department undertakes to use its best endeavours to hold confidential any information provided by the tenderer subject to the Department's obligations under law, including the Freedom of Information of Act, 1997 and its amendments. If the tenderer wishes any of the information supplied by him with the tender submission not to be disclosed because of its sensitivity, he should, when providing the information, identify same and specify the reasons for its sensitivity. The Department will consult with the tenderer about this sensitive information before making a decision on any Freedom of Information request received.

2. GENERAL INFORMATION

2.1 Security

The Contractor will be required to submit completed Garda Central Vetting Unit application forms in respect of all personnel that are intended to attend site on a regular basis. Completed forms for Contractor's personnel shall be submitted to the Officer identified to the Contractor by the Employer ('designated Officer'). Clearance and issue of passes for persons resident in the State will take a minimum of six working weeks and may be considerably longer for those resident outside the State. Personnel may be allowed access to the site during the clearance process at the discretion of the military authorities responsible for the installation but will be denied access in the event of the vetting process leading to any person being deemed unsuitable to be allowed admission to Defence Forces establishments.

The application forms must be completed in full with all requested information requested, including an email address, and must be signed by the person seeking Vetting. Each application must be accompanied by photographic evidence of the identity of the applicant for whom clearance is being sought that complies with the '100 points' requirement set out in the application form guidance notes. At least two distinct types of photographic evidence identity will be needed to achieve the '100 points' requirement.

No reasons will be given in the event of refusal of clearance.

The details of the personnel required on site by the Contractor during the first six weeks of the Contract shall be submitted to the designated Officer within TEN WORKING DAYS from the date of a letter requesting the details. Details shall be submitted on the special application forms that will be issued to the Contractor and shall be fully completed and signed by the person for whom clearance is being sought.

Denial of security clearance will not form grounds for claims for a Delay Event or a Compensation Event.

Personnel and materials entering and leaving the site may be searched.

No photographs shall be taken within the confines of a military installation.

The Contractor will be deemed to have included in his tender for all costs involved in complying with security requirements as described above and for taking all steps necessary, should access to the establishment where the work is to be carried out be denied to any person or firm.

Notwithstanding the fact that the work is to be carried out in a security aware area, the Contractor will have sole responsibility for protecting plant, materials, equipment and work executed against damage and theft.

The Minister or any of his officers shall have the right without condition to refuse admission to the site of the works of any person whatsoever. Should an employee of the Contractor be refused admission the Contractor shall provide a substitute employee, acceptable to the Employer and fully cleared for security purposes, in lieu thereof.

The requirement for the exclusion of employee(s) shall be deemed to result from an 'act or omission of the Contractor' in accordance with the terms of Clauses 2.7 and 4.5.

2.2 Photographs for passes

Three passport sized photographs (with the person's name and address on the reverse) shall be submitted to the Employer's Representative to allow for the issue of Security Passes if required. Three signed photocopies of each person's Safepass card shall also be submitted.

2.3 **Insurances**

The Contractor shall indemnify the Minister for Defence against all claims arising from the execution of the Works that are the subject of the Contract and shall maintain all necessary insurances for the duration of the Contract in accordance with the requirements of PW CF6 Clause 10. The Contractor shall provide evidence to the Employer that all insurances required by the Conditions of Contract are in place prior to the commencement of the Works. The insurances shall be kept in place for the periods required by the Conditions of Contract.

The Employer's Liability and Public Liability levels of cover and excess shall provide the minimum levels of cover and excesses set out in the proposed Schedule to the Contract.

The policy required by PW CF6 Clause 10.1 (hereafter referred to as the 'All – Risks' policy) shall provide insurance cover of an amount not less than the total contract amount plus a minimum of 30% to allow for Value Added Tax, fees and site clearance costs. The 'All Risks' policy shall name the Minister for Defence as a 'co-insured'.

Particular attention is drawn to the provisions requiring the All-Risks and the Public Liability policies to name the Employer as 'co-insured' (ref Clauses 10.1 and 10.3) and for the Contractor's policy providing Employer's Liability cover to indemnify the Employer against the same liability that is provided by the policy for the Contractor.

2.4 **Changes in the Contract Sum**

Contractors are advised to make themselves aware of the provisions of PW CF6 Clause 4 and particularly its notice requirements.

2.5 **Dayworks**

Where the Contractor proposes that work arising from an instruction should be valued on a 'Dayworks' basis he shall only be entitled to payment on this basis where:

- a) it is not possible to value the work at, or on the basis of, rates and prices in the Contract and the Employer's Representative and the Contractor agree that it is not practicable to agree a price for the work in advance of its execution
- b) the Employer's Representative's approval is obtained in advance of the carrying out of the works, arrangements agreed for its execution and its supervision by his representative and notification issued to him of the intended starting date of the work to allow him to arrange its supervision
- c) record sheets specifying the names and trades of the workers involved and their individual hours worked per day, the materials incorporated, the plant used and the period of its use on a daily basis and details (and durations of use) of any scaffolding, hoardings or other temporary work required are submitted to the Employer's Representative for verification no later than five working days from the completion of the work where the work is completed within a five-day period of time. Where the work continues for a longer period the record sheets shall be submitted for signature at weekly periods and no later than one week in arrears. All claims for materials shall be accompanied by invoices for the materials used
- d) where the Employer's Representative is represented on the site by a Resident Engineer, Clerk of Works or other party, daily record sheets - listing the materials and plant used and the names of workers and the duration of their involvement - shall be submitted to the site representative for examination and signing (as a record only) no later than 48 hours in arrears of the execution of the day's work

The Contractor shall at all times use every endeavour to ensure the most efficient completion of work authorised for execution on a 'Dayworks' basis. Failure to do so shall entitle the Employer's Representative to retrospectively withdraw his approval and revert to valuing the work on his assessment of the effect of the

change on the Contractor's cost of constructing the Work.

2.6 **Materials, workmanship and equivalent items**

All materials used in the work shall be new and unused unless specifically required to be salvaged or re-used by the Contract documents.

Materials and workmanship shall be of the best quality and shall comply with all relevant European Community Standards or, in the absence of such a standard for a product or material, relevant Irish Standards and Codes of Practice.

Materials shall comply with the requirements of the European Communities (Construction Products) Regulations, 1992.

Only fully qualified and competent tradesmen and helpers shall be employed on the Works. Work shall not be sub-let or done by sub-contractors without the Employer's Representative's permission.

All work shall be carried out within the tolerances specified in BS 5606. No work shall be covered up prior to inspection and approval by the Employer's Representative.

Wherever a proprietary name is used to specify a material or process it shall be deemed to have the term '**or equivalent**' appended to it.

Where a material or process is described by reference to its proprietary name, the name is used to indicate the standard of construction, appearance, ease of maintenance and durability acceptable to the Employer's Representative. The Employer's Representative will approve the use of alternatives where such alternatives are shown to equal or surpass the qualities of the product or process specified. Accordingly proprietary names wherever mentioned in the Specification, Schedule of Rates or on the drawings shall be deemed to mean the provision of the named product or process or an approved alternative.

2.7 **Working hours**

The Contractor shall only carry out work within the hours stated on the cover sheet of the tender document or elsewhere in the document. Work shall only be carried on outside the stated times with the prior approval of the Employer's Representative and the personnel in charge of the military establishment. Approval to work outside the hours allowed shall be applied for in writing to the Employer's Representative at least three working days prior to the day for which additional hours are proposed.

2.8 **Water and Electric Power**

Water may be available from the location identified on the cover sheet of the Works Requirements. The Contractor shall be responsible for supplying temporary storage and distribution equipment and for removing it on completion of the Works.

Electricity may be available from the location identified on the cover sheet of the Works Requirements. The supply shall be 220 Volt single phase unless noted to the contrary. The Contractor shall be responsible for supplying all transformers and distribution equipment required and for removing them on completion. He shall ensure that the temporary installation complies with all appropriate electrical regulations and is electrically isolated from the Employer's supply in a manner that prevents any interference with the Employer's supply as a result of incidents on the site

No warranty is given about the amount of power and water available.

2.9 **Site access and parking**

Site access for the Contractor shall be by the access route shown from the main gate at Sarsfield Bks to the brown field site (Transport Yard) where the Barrack Account Stores is to be constructed. Office buildings

leading onto the yard will remain open for DF staff. Builder's compound set-up area and site parking as detailed on the drawings. There will be no facility for Contractor parking elsewhere in the Camp.

2.10 **Condition of site and of the Works**

All rubble and waste shall be removed as it arises. The Contractor shall at all times maintain on site a waste skip, or skips, appropriate to the work being undertaken from time to time. Skips shall be properly protected against wind dispersal of materials therein, clearly marked to avoid creation of a hazard either by day or night, removed and replaced whenever filled.

The Contractor shall be deemed to have included in his tender for thoroughly cleaning the site of the Works and any other areas affected by it on completion of the Work. All rubble, plant and materials shall be removed and any areas damaged shall be reinstated at the Contractor's expense.

Where relevant to the specific project, all mortar and paint splashes shall be carefully removed and backgrounds left perfect, glass and mirrors cleaned and polished and vinyl and linoleum coverings washed, cleaned, polished and sealed in accordance with the manufacturer's instructions.

In the event of the Contractor failing to comply with the above requirements, the Employer shall retain a specialist company to carry out this work in accordance with the procedures set out in the Conditions of Contract. The cost shall be charged to the Contractor and shall be deducted in the calculation of the amount owed by the Employer to the Contractor.

All work completed shall be protected against damage.

2.11 **Protection**

The Contractor shall be deemed to have included in his tender for the provision of temporary coverings and weatherproofing wherever the building is opened to the weather.

All work completed shall be protected against damage.

2.12 **Pay and Conditions – Spot Checking**

Contractors may be subject to spot checking throughout the course of the Contract to ensure ongoing compliance with the requirements of the 'Pay and Conditions of Employment of Workers' PW CF6 Clause for all 'Contractor's Personnel', which shall include all persons employed on the delivery of the Works by the Contractor and their subcontractors. The Contractor shall be obliged to submit written confirmation with every payment application submitted of being in compliance with the requirements of the Contract Clause.

2.13 **Prompt Payment of Accounts Requirements**

The provisions of the European Communities (Late Payment in Commercial Transactions) Regulations 2012 concerning the prompt payment of amounts due in commercial transactions shall apply to all sums payable to or by the Contractor or any subcontractors or suppliers for work or items supplied for this project. Attention is also drawn to the requirements of the Construction Contracts Act 2013.

2.14 **Invoicing**

In the event of a Payment Certificate including work carrying a VAT liability at both 13.5% and another rate then the Contractor shall be obliged to submit two invoices – one covering the payment amount liable to VAT at 13.5% and the other for the balance of the amount certified, including VAT.

3 SAFETY

3.1 Safety, Health and Welfare at Work

The Contractor shall be deemed to have included in his tender sum for complying with the terms of all relevant legislation and regulations. The Contractor shall be deemed to have included for the preparation of Safety Statements and for taking all steps necessary to ensure the safety of all persons likely to be affected by the execution of the Works.

The Contractor shall submit Safety Statements / Health and Safety Plans at the times shown in Appendix A. They shall identify hazards and risks arising during the course of the Works and specify how it is intended to safeguard the safety, health and welfare of parties likely to be affected.

The Contractor shall incorporate in his Safety Statement / Health and Safety Plans measures to deal with any hazards identified in the Safety Statement of the Defence Forces Establishment within which the work is to be executed, a copy of which shall be made available on request.

The Safety Statement shall be updated during the course of the Works to include any further hazards that may arise and reflect changing circumstances on site.

3.2. Safety File

On completion of the Works, the Contractor shall hand over to the Employer's Representative, for transmission to the PSDP, three copies of all information developed or obtained by the Contractor (except for Contract documentation issued to him) that is relevant to the preparation of the Safety File for the project – refer to Appendix B for further information on required contents of the Safety File. The Contractor will be required to co-operate in the compilation of the Safety File by providing relevant information about the Works including the materials used and processes adopted as well as the requirements for the operation, maintenance and future demolition of the Works.

3.3 Notification of the Health and Safety Authority (Commencement Notice)

The notification of the commencement of project to the HSA shall be the responsibility of the Project Supervisor for the Construction Stage.

3.4 Refurbishment/alterations Work - Asbestos Products

Where asbestos is known to be present in an area on which work is to be carried out as part of this project, the procedures for dealing with it are set out in the tender documentation.

Where the tender documents do not provide for the presence of asbestos and the Contractor encounters any material suspected of containing it - or where asbestos is found or suspected to be present in areas not identified in the tender documents - work shall be immediately suspended in its vicinity and no other work shall be carried out which might expose either the Contractor's personnel or third parties to contact with the suspect material or of releasing it into the environment. The Employer's Representative shall be informed immediately and his instructions awaited. If any of the material has been disturbed, the area possibly contaminated shall be sealed off, all personnel excluded from the area and the Employer's instructions sought.

Work on asbestos containing materials shall be carried out in accordance with the appropriate legislation and regulations and with the published guidance of the Health and Safety Authority.

3.5 Electrical Subsystems Certification

All electrical sub-systems shall be certified as having been carried out in compliance with the requirements of the ETCI Wiring Regulations.

Copies of the ETCI Subsystems certificates, accompanied by the relevant test results, shall be included with the ETCI Completion Certificate required for the Health and Safety File for the project, which shall be

included with the project information handed over by the Contractor to the PSDP.

In the event of the Contractor failing to secure Subsystem certificates for all items of equipment then the Contractor shall be liable for the cost of having the systems tested, remedied as necessary and certified. The tender figure shall be deemed to include for all costs incurred by the Contractor in providing the appropriate documentation.

Section B

Detailed Requirements

INTRODUCTION

Sarsfield barracks is the Defence Forces' primary location for the 12th Inf Bn. The site contains mostly permanent structures, all of which are listed on the Limerick County Council list of protected structures. The current arrangement is unsuitable for the storage of the Barrack Accountants Stores. The scope of this project is to construct a new steel portal frame structure for the main storage area with an annex for an office, bathroom and an additional smaller store. A small retaining wall South of the Stores is also required due to the slope of the site.

The proposed site is a brown field, tarmacadamed yard that is used for vehicle parking, with services adjacent for water, waste water and power. The proposed structure will require new infrastructure to connect into the existing services and also connect communication ducting.

The proposed structure is a steel pitched portal frame on strip foundations with an insulated reinforced concrete floor slab. The external fabric of the structure is blockwork at the ground and insulated steel-clad sandwich panels accessed by a pedestrian and a goods ramped entrance. The internal of the buildings are split into open storage area and block on flat rooms for an office, small store and bathroom.

A renewable energy source for the proposed project will include a roof mounted (32) 16kWp PV array.

The building shall be serviced by an L1 FDAS system and emergency lighting.

The site area will be vacant for the duration of the Works and the Contractor given possession of the site but access to adjacent buildings will need to be maintained.

Location of Works

This Specification refers to the construction of a new Barrack Accountant Storage Building at Sarsfield Barracks, Limerick, Co. Limerick.

Take adequate precautions to protect the building during the works. Any damage caused to the building shall be repaired immediately at the Contractor's expense.

Where disruption to the use of other buildings in the vicinity of the building is unavoidable by the Contractor, the Contractor shall inform the Employer Representative not later than two (2) working days prior to the commencement of that work and provide a detailed statement of extent and the program for the works.

Liaise with the Facility Safety Officer to ensure co-ordination between construction activities and those of other workers and personnel in the area. Areas adjacent to the working area shall be physically sealed off and made dust-proof to prevent access by personnel occupying those areas.

Access to and Fencing off the Site

Securely fence off the site to provide site compound for equipment and materials. Prevent all unauthorized personnel from entering the works or working area. The extent of the site compound is indicated in drawings.

The fencing shall be a minimum of 1.8 m high Heras fencing or equivalent. Allow for its removal on completion of the work on site. Use enclosed areas as the project, material storage and administration area

All debris associated with the demolition work is to be removed off site at the Contractor's expense. All structural members to remain are to be protected during the works.

Allow for all necessary coring and demolition to meet the requirements laid down in the mechanical, electrical and construction works.

Protection to the Structure during the Works

Provide protection to the existing structure while work is being carried out on it. Any protection shall be agreed with the Employer's Representative prior to the Works being undertaken.

Liaise with the Employers Representative regarding action to be taken in the event of an emergency situation arising in the building or barracks.

DEMOLITION AND ALTERATIONS

NOTE:

Demolition work shall be carried out in accordance with BS 6187:2011

All materials arising from the Demolitions and Alterations shall, unless otherwise specified, be cleared away and removed off site as they arise.

Materials on site, both arising from Demolitions and whether in skips or temporary mounds, and new materials stored pending incorporation shall be fully protected to ensure that they are contained and that no loose material leaves the site compound.

All areas are to be kept clean of dust and any dry works are to be dampened to prevent dust blowing around.

Materials shall be disposed of in accordance with relevant statutory requirements. Safe disposal certificates for all hazardous materials removed from the site shall be provided to the Employer's Representative.

The Works shall be shored / supported temporarily as necessary and the Contractor shall have sole responsibility for ensuring the adequacy of such shores / supports. Details of shores and supports shall be provided to the Employer's Representative but such provision shall not mitigate the Contractor's responsibility for their adequacy.

All floor, wall and ceiling surfaces adjoining, or arising from, demolitions and alterations work shall be made good to match the existing adjacent surfaces and left ready to receive redecoration / new works.

Removal of items listed includes all associated fixings, attachments and ancillary items.

All new external facing brick shall be of equal dimensions (imperial size), texture and colour to match the existing brick, laid in a cement lime mortar (1:1:6) flush pointed.

No masonry work is to be carried out while the temperature is not less than 2⁰C on a rising thermometer or below 5⁰C on a falling thermometer.

All items requiring work to be removed shall be deemed to include associated making good to surfaces damaged during removal.

REMOVAL OF EXISTING GROUND SURFACE

The contractor shall remove all loose materials, break-up the existing hardstanding surfaces and remove from site all waste material required to be disturbed during the enabling works and site clearance.

STRUCTURAL STEEL PORTAL FRAME

The contractor shall design and construct a steel pitched portal frame structure as shown and specified in Structural Drawings and Specification.

STRIP AND PAD FOUNDATIONS

The contractor shall construct concrete strip foundations for the Barrack Accounting Stores and retaining wall as shown and specified in Structural Drawings and Specification.

The number of strips, spacing, concrete thickness and steel reinforcement will be as detailed in Structural Drawings and Specification.

CONCRETE FLOOR

The contractor shall construct a reinforced concrete floor to the proposed structure as shown Structural Drawings and specification.

The contractor shall prepare for proposed new floor build up. All ground preparation and floor beds shall be formed in accordance with the requirements of TGD C edition Site Preparation and Resistance to Moisture. Hardcore material shall be clean graded crushed stone, free from shale and pyrite, 40mm maximum size. Hardcore material shall meet the requirements of Annex E of SR21. Demolition material, site rubbish or pit run gravel may not be used. Excavated material must not be placed inside the line of perimeter walls. Hardcore is to be consolidated in layers not exceeding 200mm in thickness. This is essential to avoid subsequent settlement of hardcore. After compacting the hardcore, the area should be blinded with 50mm of clean blinding sand.

Radon membrane shall be adhered to the external wall and brought up to a minimum of 150mm where it abuts the external walls. All existing service pipes to be adequately sealed around. Provide Monarflex Radon protection system or equivalent approved; using Blackline 1400-gauge membrane material. All joints to be sealed with Monobond double sided, self-adhesive butyl tape. Incorporate a Monarflex Radon sump (or equivalent approved) complete with vent pipe.

Under the 150mm concrete slab, provide 150mm foilback, polyisocyanurate (PIR) floor insulation, K103 board or equal approved, throughout the extent of the floor. Ensure 25mm vertical insulation is brought up the internal face of all external walls.

Over the radon barrier and insulation, the contractor shall pour the ground floor slab at a thickness and steel reinforcement as detailed further in Structural Drawings and specification.

All details shall be in strict compliance with the requirements of the Building Regulations. The contractor shall powerfloat the concrete to provide a smooth finish. The maximum tolerance in the floor surface finish shall be 3.0 mm across a 4.0 m straight edge.

Expansion joints no more than 3m apart on the concrete slab.

Apply Temaflor P300 two component solvent free pigmented epoxy or equivalent to concrete floor.

Concrete shall be tested to determine its compliance with the design requirements in accordance with the requirements elsewhere in the Works Requirements. The cost shall include for taking the tests, providing moulds, curing, having them tested by a laboratory approved by the ER and having the test results provided directly by the laboratory to the ER.

- ***10 Nr tests shall be included for in the Contract Sum.***

CLADDING AND GUTTERING

The contractor shall design and construct the cladding structure as shown and specified in Structural Drawings and specification.

Side cladding shall be vertical green Kingspan KS1000 RW 60mm insulated panel or equal approved wall cladding system.

Roof cladding shall be green Kingspan KS1000 RW 60mm insulated panel or equal approved insulated roof cladding system and including associated fixing and new supports if required.

Alfas expandable ‘C’ seal and apex insulation to be applied.

Rainwater collection system to include all guttering and 6-inch downpipes to be fitted. Guttering shall be double sided plastisol “highline” guttering. Excavate a trench 600mm deep as indicated on Drawing No. 06 & 07 Proposed Plan. Install 6inch uPVC underground drainage pipe and associated works as indicated. Make good road with tarmac.

Roof apex to be covered with standard ridge flashing.

ANNEX ROOF

All products shall be used in strict accordance with the manufacturer's instructions.

The Annex roof will be covered by a standing seam configuration

Annex Roof Covering

- In between the Ceiling Joists fit 150mm PIR insulation lined with Tyvek dupont 'airguard' Reflective vapour control layer or approved AVCL on its underside.
- On the new Annex rafters install 25mm lower deck WBP Plywood.
- On the OSB board lay a Tyvek dupont metal vapour permeable roofing felt or approved vapour control layer.
- Supply and install Seamlock or equal approved rigid 0.7mm gauge Steel Standing seam roof cladding in 454mm widths in single lengths to cover full roof span and fitted as per manufacturer's specifications. To selected RAL colour by the ER.
- Include ventilation gap at abutment to vertical cladding of the main shed area.

ANNEX WALLS

Construction of masonry walls

All walls of the proposed Annex to Storage building shall be constructed in solid masonry blockwork to the following requirements

- Concrete blocks to comply with I.S. EN 771-3:2011.
- Mortar shall comply with IS406:1987 "Masonry Mortars".
- Precast concrete lintels should be manufactured in accordance with IS 240: 1980.
- Precast concrete lintels shall be used for openings as per structural drawings and specification.
- All wall ties to be stainless steel type suitable for 150mm cavity between leaves. A minimum of 5 wall ties shall be fitted per square meter of wall area. Wall ties to be fitted at every course of blockwork at openings and at movement joints.
- All walls to be provided with "Ruberoid" Hyload Damp Proof Course (DPC) System - minimum 127mm wide.
- DPCs to be provided at the following locations:-
 - Base of all walls external/internal.
 - At all window sills, jambs and window heads.
 - Abutments to all roofs.
- External walls shall be constructed with 100mm concrete block outer leaf, 150mm cavity and 100mm concrete block inner leaf. Prior to plastering, the Contractor will fill the cavity of the external walls with Kingspan Platinum Ecobead insulation, or equivalent approved (Thermal Conductivity: 0.033W/mK).
- Internal 215mm walls shall be constructed with 100mm X 215mm X 440mm concrete block laid on flat.
- Internal 100mm walls shall be constructed with 100mm X 215mm X 440mm concrete block laid on edge.
- Windowsills shall be reinforced cast concrete with 100mm deep front face.
- All windowsills shall have minimum 25mm polystyrene insulation packing behind the inner face.
- All internal solid blockwork shall be scratch coated in sand and cement plaster and finished in smooth sand and cement plaster
- Services entering through the rising walls should have 50mm clearance all round pipework to accommodate movement. Ducts should be provided where necessary to facilitate the introduction of services. Where pipes through rising walls exceed 100mm, PC lintels shall be provided and

bedded in accordance with good building practice. All services open to be packed after fitting to prevent risk of entry by fill or vermin.

- Substructure concrete blocks (below DPC level) shall have a minimum compressive strength of 13N/mm².
- Concrete blocks above DPC level shall have a minimum compressive strength of 7.5N/mm².

Internal & External Plastering/Rendering of Masonry Walls

External Rendering of all external walls shall be completed as follows:

- Apply a sand and cement scudding coat.
- Apply two cement-lime-sand undercoats conforming in all respects to BS5262 to blockwork previously scudded.
- The undercoat should be scratched for mechanical key. This coat should be allowed to dry out and fully shrink prior to application of the finish coat.
- Apply one cement-lime-sand finish coat conforming in all respects to BS5262 to walls previously scratch coated. Include approved water proofers.
- The following thicknesses shall be applied:

<u>External Render</u>	<u>Thickness</u>
Scudding coat	Minimal
Undercoat render	12mm
Finish coat render	8mm

Internal plastering of all new masonry walls shall be completed as follows:

- Apply one cement-lime-sand undercoat conforming in all respects to BS5262 to blockwork.
- The undercoat should be scratched for mechanical key. This coat should be allowed to dry out and fully shrink prior to application of the finish coat.
- Apply one cement-lime-sand finish coat conforming in all respects to BS5262 to walls previously scratch coated.
- The following thicknesses shall be applied:

<u>Internal Render</u>	<u>Thickness</u>
Undercoat render	10mm
Finish coat render	8mm

ANNEX CEILINGS

Internal Ceilings

The ceiling joists throughout the building shall be lined as follows:

- Install 150mm PIR Board insulation (maximum conductivity of 0.018 W/mK) over all ceiling areas.
- The ceiling shall consist of 1 layer of 15mm *Gyproc Fire Board* fixed to the underside of the joists.
- Joints in board to be in accordance with *Gyproc Paper Joint Tape* method.
- All fixings strictly in accordance with manufacturer's instructions.
- 38mm *gyproc drywall timber screws* to fix boards.
- Screws installed at maximum 230mm centres.
- Screws to maintain minimum 25mm penetration through into timber supports.
- 3mm *Gyproc Skimcoat Plaster* applied to all ceiling boards in accordance with manufacturer's recommendations.

In addition to above, the Store Room 2 ceiling that extended into Main Store (refer to Section CC on Drawing 12) shall have:

- 19mm plywood screw fixed to 225x44 SWD joists at 400c/c.

DOORS AND WINDOWS

The dimensions listed on drawings are approximate and are for identification purposes only. The Contractor shall visit the site and measure all openings before installation of the specified door. Any concerns about the installation of any door system unless unforeseen as judged by the ER should be outlined in advance of manufacturing by the Contractor to the client. Any door manufactured to the incorrect dimensions shall be the sole responsibility of the Contractor and he shall bear any associated costs incurred.

EXTERNAL DOORS

EXTERNAL DOORSETS –D1

The contractor shall supply and fit 3 No. External doors as shown on construction drawings.

External door sets with panelled door leaves, as indicated on drawing, including:

- UPVC composite door and frame
- All frames bedded in mastic and neatly pointed
- Solid infill panels
- Draft excluder trims to head and jambs of door ope
- Proprietary anodized aluminium threshold strip with rubber inserts

The contractor shall provide a set of two (2) tagged keys for each new lock and a master key to the ER upon completion of the works.

Automatic Sectional Door

The contractor shall supply and fit 1 No. Automatic sectional doors as shown on Construction Drawings.

Sectional Door Double-Skinned Type SW 40 with glazing "Teckentrup" Sectional door double-skinned PUR foam core. Building depth 40 mm. 20mm synthetic double-glazing. Outer surface stucco design. Inner surface smooth, uniformly arranged, horizontally ribbed sections. Colour Dark Green. Special lock with automatically locking catches. Round handle set with profile cylinder. Sections with centre seal. EPDM header seal and floor seal and lateral protective strip. Screwed hinges made of galvanized steel, lateral roller guide with adjustable ball bearing rollers. Weight compensation with torsion spring shaft with lateral load-bearing cables. "Teckentrup SW with glazing" or equivalent.

Clearance dimensions:

Dimensions as indicated in drawing

Headroom: 2900mm

Lateral right-hand buffer 150mm, left-hand buffer 150mm

Fitting:

Normal fitting which follows the shape of the roof (Headroom – 470-550mm)

Required space:

Lateral buffers: for direct mount drive on drive side min. 210 mm

Drives: Electric drive as shaft or chain drive, single phase, power: 0.37 kW/0.42 kW, degree of protection IP 44

Control: Deadman, impulse with self-monitoring test.

INTERNAL DOORS

As per Construction Drawing No. 14 Proposed Window & Door Schedules.

Internal Door D2:

- 1 No. D1 door at bathroom.
- Minimum frame thickness of 75mm.
- Doors shall be minimum thickness of 44mm.
- Threshold gap under or around any door not exceeding 3mm at any point.
- Doors to be solid cored, flush panelled, sheeted with plywood minimum 6mm thick, and faced both sides with 3mm thick ash veneer; solid ash lipping's, minimum 10mm thick, all round; left ready for clear finish
- Door frames shall be hardwood, ash, to match the depth of the wall rebated and fixed with galvanised mild steel frame anchors, 3 No. per jamb, countersunk and pelleted; for varnish finish.
- Bed all frames in intumescent mastic and between the wall and door frame top and sides and inside and outside of each door.
- All fire-resistant glazing and glazing channels shall be bedded in intumescent paste
- Doors to be fitted with automatic door closers
- Ironmongery to be *IN.00.072 Round-Two Door Lever Handle in stainless steel* of similar approved.

Internal Door D3:

- 1 No. D3 door at Office.
- Minimum frame thickness of 75mm.
- Doors shall be minimum thickness of 44mm.
- Threshold gap under or around any door not exceeding 3mm at any point.
- Doors to be solid cored, flush panelled, sheeted with plywood minimum 6mm thick, and faced both sides with 3mm thick ash veneer; solid ash lipping's, minimum 10mm thick, all round; left ready for clear finish
- Door frames shall be hardwood, ash, to match the depth of the wall rebated and fixed with galvanised mild steel frame anchors, 3 No. per jamb, countersunk and pelleted; for varnish finish.
- Vision panels and fanlights shall be fire-rated clear plate glass set into fire resistant ash veneered non-combustible glazing channel, butt jointed at corners with ash cover beading (40 x 10mm). Vision panel to be minimum dimensions of 125mm wide by 1250mm height and adjacent to the door handle.
- Bed all frames in intumescent mastic and between the wall and door frame top and sides and inside and outside of each door.
- Doors to be fitted with automatic door closers
- Ironmongery to be *IN.00.072 Round-Two Door Lever Handle in stainless steel* of similar approved.

Internal Door D4:

- 2 No. D4 doors at Lobby and Store 2.
- Minimum frame thickness of 75mm.
- Doors shall be minimum thickness of 44mm.
- Threshold gap under or around any door not exceeding 3mm at any point.
- Doors to be solid cored, flush panelled, sheeted with plywood minimum 6mm thick, and faced both sides with 3mm thick ash veneer; solid ash lipping's, minimum 10mm thick, all round; left ready for clear finish
- Door frames shall be hardwood, ash, to match the depth of the wall rebated and fixed with galvanised mild steel frame anchors, 3 No. per jamb, countersunk and pelleted; for varnish finish.

- Bed all frames in intumescent mastic and between the wall and door frame top and sides and inside and outside of each door.
- Vision panels and fanlights shall be fire-rated clear plate glass set into fire resistant ash veneered non-combustible glazing channel, butt jointed at corners with ash cover beading (40 x 10mm). Vision panel to be minimum dimensions of 125mm wide by 1250mm height and adjacent to the door handle.
- All fire-resistant glazing and glazing channels shall be bedded in intumescent paste
- Doors to be fitted with automatic door closers
- Ironmongery to be *IN.00.072 Round-Two Door Lever Handle in stainless steel* of similar approved.

WINDOWS

Contractor shall supply and fit windows as indicated on the drawings including:

- uPVC triple glazed panel and single opening windows with a maximum U-Value level of 0.8w/m²k.
- Triple glazed, 16mm wide argon filled spaces; 6mm low-e float glass; for clear glazed units, both internal and external panes shall be 6mm clear low-e glass; for opaque units on W1, the internal pane shall be in obscure glass, pattern to be selected by the ER.
- Frames to be white internally and grey externally.

FLOOR AND WALL FINISHES

NOTE:

Surfaces shall be prepared in accordance with the recommendations issued by the manufacturers of the finish for the surface involved. All materials used in preparing surfaces shall be compatible with the finish specified.

All materials to be fitted in strict accordance with the manufacturer's instructions.

The Contractor is to provide colour samples for selection by the Employers Representative.

FLOOR FINISHES

LINOLEUM SURFACES

Fit new 2.0mm thick Polysafe, or equivalent approved vinyl floor covering to office, lobby and bathroom in the annex. The contractor shall include for the following:

- Include for floor levelling compound (fibre-sand-cement compatible) with the proposed floor covering as necessary.
- In WC's, the skirtings shall be formed using a cove former and shall be continued up the wall 150mm. Finished with proprietary trim at top of skirting.
- All other rooms shall be a timber skirting.
- Covering to fully conform to the European Norm for safety flooring – EN 13845.
- Minimise the number of joints.
- Covering shall meet the water tightness requirements in EN 13553, meaning suitability for installation in special wet areas.
- Covering to conform to R10 slip rating.
- Covering to be fitted strictly as per manufacturer's written instructions
- Covering to be fixed with an approved adhesive, with welded joints, all in accordance with manufacturer's instructions, cleaned off and polished on completion
- Proprietary stainless steel transition strips at joining between the proposed floor covering and the adjoining existing floor coverings.

The linoleum finish in different rooms / areas shall be colour coded to suit the location. A palette of up to eight different colours may be used throughout the building but single colours shall be used in individual rooms and corridors.

WALL FINISHES

TILED SPLASHBACKS TO WC WHB AND STORE 2 Cleaners Sink

Splash back, 600 wide x 450mm high to each WC wash hand basin and store 2 sink; including:

- Tiles 150 x 150 x 6mm porcelain wall tiles, colour to be chosen by Employers Representative.
- Waterproof adhesive and grout; chrome finish square edge beads to all exposed edges
- Anti-fungal silicon bead in selected colour to joint between tiles and WHB/fountain, pointed

PAINTING AND DECORATING

NOTE:

Colour to be selected by Employers Representative. Include for painting sample colours to selected surfaces.

All new surfaces are to be primed prior to painting, the primer chosen to suit the substrate and the finish that is to be applied.

Primer coats to seal new surfaces to consist of the following:

- *Water based paints: add 10% water to 90% paint.*
- *Solvent-based paints: add 10% white spirit to 90% paint.*

All surfaces are to be prepared prior to painting, to be left clean, dry and free from all contaminants.

- *New surfaces to be wiped clean to leave free of dust, plaster residue, etc.*
- *Existing surfaces to be cleaned by washing down thoroughly and made good*
- *Cracks and damaged plaster to be repaired with Polycell - Polyfilla or equivalent and left ready to receive new works.*
- *Timber work to have cracks filled and to be lightly sanded all over to provide a key.*
- *External render and dashing to be scraped down or brushed to remove all loose or friable material; scraped down and power hosed clean where required to remove staining*
- *All metal work to be wiped clean and sanded to ensure no loose material and provide a key.*

New softwood timber to receive a coloured finish shall be knotted, primed, stopped and filled. Timber for a clear finish shall be sanded, primed and sanded again before applying the specified coating.

Metal surfaces shall be sanded down, primed and sanded again before applying the specified coating. Heated metal surfaces, including pipes that are to be painted, shall be prepared as for other metal but with the use of a heat-resistant metal primer in place of standard metal primer.

Ensure all paint coats are evenly applied to correct thickness with no drip marks.

Apart from primer coats, other paints shall not be thinned and shall be applied from the tin.

All paint finishes shall be brush or roller applied. Spray painting of finishes shall not be permitted.

INTERNAL PAINTING

Prepare and prime as appropriate for surface type and material, apply the following finished coats:

Newly plastered wall surfaces {internal}

Matt emulsion, Dulux or equivalent - 3 nr coats.

Internal door leaves

Clear satin varnish, Dulux Diamond Glaze or equivalent to internal hardwood doors – 3 nr coats.

New skirting's, architraves, quadrants and door frames

Clear satin varnish, Dulux Diamond Glaze or equivalent to internal hardwood doors – 3 nr coats.

Window boards (excluding PVC)

Satin finish, Dulux Satinwood or equivalent – 3 nr finish coats.

Saddle boards

Clear satin varnish, Dulux Diamond Glaze or equivalent to saddle boards – 3 nr coats.

Exposed metal surfaces, pipework and conduit

Satin finish, Dulux metal care or equivalent – 3 nr finish coats.

EXTERNAL PAINTING**Annex Walls**

Weather shield or equal approved – 3 nr coats.

Annex Window sills

Weather shield or equal approved – 3 nr coats.

SITE SERVICES

NOTE:

Allow for hand excavations to expose existing services.

All water, gas, drainage service chambers/manholes to have a Public Area Class D400 cover and frame.

Shown on drawing, the new ducting is to be run through an old stone wall entrance, South of proposed Stores. This entrance is currently blocked and shall be block again once ducting is complete.

DATA CABLE DUCT

Fit underground communications ducting as on indicated on the Mech and Elec drawings.

Fit junction/services boxes to manufacturer's requirements, including:

- Precast junction box JB4 from Killeshal Precast or equivalent.
- JB4 Traffic ductile iron cover, Class D400, from EJ Ireland Ltd or equivalent.

Fit ducting services as specified on the drawings, including:

- 2 layers of PVC marker tape; 75mm above the duct and 300mm below finished surface.
- 110mm uPVC, Wavin Duct or equivalent including all associated fittings.
- All ducting to include 8mm diameter nylon rope cable pull rope.
- Ducts to be surrounded in 10mm pebble, 150mm above and below.
- Bring ducting into agreed location inside the Annex (Office).

WATERMAIN

Fit underground water main ducting as indicated on drawings. The contractor shall provide a new water supply to the building through a connection to the existing water distribution in the barracks. The contractor what use minimum pipe size of 50mm HDPE connected to the existing water at the location shown on drawing no. 04. The new connection shall be below ground level until it reaches the existing watermain and have lever gate valves connection. The new pipe shall be run in a trench as indicated on the drawing and the ground reinstated with a peas gravel surround to the pipe, SR21 build up and tarmac finish to match existing.

Fit ducting services as specified on the drawings, including:

- 400mm wide blue polyethylene warning mesh.
- 50mm HDPE pipe including all associated fittings.
- Pipe to be surrounded in 150mm above and below in Type B Granular Bedding.
- Connect into the existing service and fit a new Tee junction.
- Sluice valve chamber.
- Thrust blocks at bends and tee junction.

MAIN ELECTRICAL CABLE DUCTING

ELECTRICAL SUPPLY

1PH N E 240V

The electrical supply for the solar PV and Barrack Accounting Stores is to be taken from Pillar Box No. 1 which is located at the Sports Ground entrance gateway outside the Church also shown on the dr. The

contractor shall supply and install the new electrical supply in new ducting to Pillar Box No.1 as per drawings and supply and install new ducting from the building to the Pillar box.

Junction/Services boxes to manufacturer's requirements, including:

- Fit precast junction box JB4 from Killeshal Precast or equal approved.
- Fit JB4 Traffic ductile iron cover, Class D400, from EJ Ireland Ltd or equal approved.
- All excavation, backfilling, concrete and reinstatement works associated with the Junction/service boxes installation.

Fit ducting services as specified on the drawings, including:

- 2 layers of PVC marker tape; 75mm above the duct and 300mm below finished surface.
- 110mm uPVC ducting, ESB approved electrical ducting including all associated fittings.
- Ducting to be red in colour.
- All ducting to include 8mm diameter nylon rope cable pull rope.
- Ducts to be surrounded in 150mm above and below 10mm pebble.
- Fit ducting into agreed pop-up location inside the building, including:
 - Break out rising block work wall, fit approved concrete head and close opening in concrete.
 - Capping of incoming pipes.

OPENINGS FOR MECHANICAL WALL VENTS, FLUES AND THE LIKE

Wall openings to be diamond cored to suit the size of the items being installed, including:

- Wall faces on both sides of each opening shall be neatly re-instated to match the existing surface finish.
- Openings in brickwork shall be pointed with cement lime mortar (1:1:6)

FIRE SLEEVES

Fire sleeves to achieve 30 / 60min fire rating, to match the rating of the relevant transition, shall be provided to all pipe work, trunking, cable tray and similar passing through fire rated walls, ceilings and floors.

BUILDERS WORK - FORMING OPES

Builder's work to facilitate the fire stopping and passage of cables and other services through partitions, ceilings, and floors with and including the appropriate 'Hilti' or equivalent one hour fire-rated fibre-board and sealing with intumescent mastic, including sleeves if necessary and all subsequent making good. Form opes through existing masonry internal / external walls, pipe conduits not exceeding 100mm diameter. Include for sealing the ope using intumescent mastic. Opes to be formed using diamond tip cutters.

DRAINAGE

NOTE

Allow for working adjacent to and crossing of existing underground services.

The Contractor shall make good all disturbed surfaces following the completion of the drainage works.

FOUL AND SURFACE WATER DRAINAGE

The contractor shall supply and fit new underground foul and surface water drains as indicated on the drawings, including:

- uPVC, size 225, 160 and 110mm diameters to BS4514, Wavin or equivalent complete with flexible ring sealed jointing, complete with all ancillary fittings.
- Access junctions (AJ's) complete with covers, branches, bends, tees, couplers, etc. Wavin or equivalent.
- Stone, sand, sand and cement and concrete surrounds where indicated on the drawings.
- All excavation, backfilling, concrete and reinstatement works associated with the drainage installation

PIPEWORK & AJS

Supply and fit "Access Junctions" manufactured in accordance with EN13476, EN1401, to BBA and IAB, as shown on drawings. Pipework and AJs shall be installed as follows:

- All underground pipework and AJs to be minimum 150mm uPVC laid to a fall of 1 in 60.
- Connect and cascade sewer to existing drainage system as shown on drawing.

MANHOLES, DRAINAGE CHANNEL

Construct new manholes & Gulley Traps as indicated on the drawings to the following requirements:

- Manholes shall have a 150mm concrete C25/30 XC1 base, 215mm solid block concrete walls, 19mm internal rendering, benched and haunched as required, internal dimensions 800x600mm.
- Manhole frames and covers shall be D400 to EN124, Coated, with frame bedded in cement mortar, and cover bedded in grease and sand.
- Access covers and frames shall be D400 to EN124, Coated, with frame bedded in cement mortar, and cover bedded in grease and sand.
- Include for all inspection chambers and gully traps as shown.
- The proposed drainage channel shall be *ACO Multidrain PPD System* (or equivalent approved) 100mm wide with galvanized steel grating laid with a fall of 1 in 200 towards the proposed manhole. Must be D400 to EN124.

SURFACE PAVING AND LANDSCAPING

GENERAL

The Contractor shall make good all tarmac, concrete and grass surfaces disturbed upon completion.

Areas external to the boundary of the construction site shall be reinstated immediately on completion of work being carried out to them – deferral until towards completion of the project will NOT be permitted.

MAKING GOOD EXTERNAL SURFACES

Tarmac surfaces

Make good all disturbed tarmac surfaces upon completion, including:

- Backfill/sub-base, Clause 804 hard-core bed shall be minimum of 300mm finished thickness compacted in layers of 250mm; blinded with quarry fines
- Wearing course of 50mm finished thickness of 14mm nominal size dense wearing course.
- Base course of 110mm compacted thickness of 20mm open textured base course macadam
- Joints (new to existing) sealed in bitumen

CONCRETE PATH

New concrete path around the perimeter of the proposed building as indicated on the drawings, Include the following:

- Excavate topsoil/subsoil to formation level.
- Build up the sub base of the new paths using 200mm SR21 fill compacted.
- 35N20 In-situ concrete, 150mm thick.
- Lay to a cross slope of 2.5%, away from the adjoining building.
- Expansion joints formed in a straight line, at right angles to the footway, at a maximum spacing of 3m and each joint should include a double layer of roofing felt, for the full depth of the joint.
- The Contractor shall ensure that the entrance ramp is dished to cater for surface water run-off.
- Surface finish shall be a timber float finish.
- A separation membrane, should be placed between the concrete and the sub-base. The membrane should be impermeable polythene plastic sheeting, 125 microns thick laid without creases. All overlaps shall be a min of 300mm.
- Erect, maintain, take down and remove from site upon completion all necessary formwork to complete the works.

EXCAVATION AND EARTHWORK

Generally

The Contractor shall be responsible for setting up and maintaining a site datum level and for clearing away on completion of the works.

Nature of the Ground

The Contractor will be deemed to have satisfied himself about the nature of the ground. Basic excavation rates will be deemed to include for excavation through all-natural material occurring in the ground other than solid rock as defined in the 'Definitions' Section herein and the densely packed gravelly topsoil. Rates shall also include for grubbing up roots and other natural obstructions encountered.

The information given hereinafter is supplied as an indication only and NO warranty or guarantee is given that the information about the nature of the ground is either complete or typical of the site.

Other Services

The Contractor shall notify the Employer's Representative as soon as any under or overground service not shown on drawings or described herein is discovered.

The Contractor shall make proper provision for identifying all services passing through the excavation area, such as, electrical, data cables, surface water, and sewers. Any available records and proprietary cable locators shall be used prior to excavations taking place. Due diligence shall be used when making excavations for water mains and services and care shall be taken to protect and support all existing services (water, gas, telecommunications, drainage and electricity mains) and other works so as not to interfere with the working arrangement of same.

Any service so damaged by the failure of the Contractor to provide adequate protection shall be made good at the Contractor's expense. Any damage shall be made good to the satisfaction of the Employer's Representative.

Trees and Vegetation

The roots of all trees and shrubs which are to be removed shall be grubbed up and disposed of offsite. Except where otherwise specified the voids left by the roots shall be backfilled with material of the Contractor's choice. The existing tree belt has reached a mature condition and shall be felled in the near future.

General Excavation

The excavation shall be carried out in such a manner as to cause as little disruption to the traffic system in the Barracks as possible. To this end the work shall be carried out at a time and in a sequence to be agreed on site prior to beginning the excavations.

The Contractor shall allow for the excavation of obsolete manholes, hydrant and valve chambers, drains and similar items.

Excavated material shall be disposed of off-site. The Contractor shall be responsible for meeting all charges levied by the dump owners and for paying all licence fees arising. Materials deemed to be hazardous shall be packed and disposed of in accordance with the provisions of the legislation and regulations governing their disposal.

Where a delay in laying of services is envisaged, the bottom layer of 300mm shall not be removed until immediately before laying commences.

Where topsoil is to be excavated, a sufficient quantity to reinstate grassed areas shall be stockpiled as directed on site. No other material shall be mixed with it. Any surplus remaining shall be disposed of off-site.

Workmanship

Work shall comply with BS 8000-0, 14th Edition, February 4, 2020 - Workmanship on construction sites – Part 0 and BS 6031 in respect of:

1. Materials and preparation.
2. Excavating and filling.

The contractor shall set out the work to the correct positions, levels dimensions, gradients and alignments and shall provide all necessary facilities and equipment for this purpose.

Execution of Works

Trenches shall be excavated in the route as shown on Drawings. Adequate room shall be provided in the trench for pipe and duct jointing and placing and compacting of backfill.

4.1.1. Excavate trenches at least 300mm wider than external diameter of pipeline.

4.1.2. Ensure trench bottom provides a firm even pipe bed for full length of pipes.

4.1.3. Ensure trench depth allows for minimum cover for supply pipes as follows;

Surface/ Service	Depth
Roadways	750mm (min)
Grass Areas	600mm (min)

Trenching within 600mm of existing services which are being retained shall be hand digging. The Contractor is to include in his tender for all costs associated with this requirement.

There shall be a minimum horizontal clearance of 300mm between Electrical service pipe and other ducted services.

Excavated spoil shall be kept well back from the edge of the trench and all loose stones shall be removed to the side of the spoil heap remote from the trench.

Trenches shall be excavated to a depth which shall allow the pipes to be laid on a prepared underbed. The trench bottom shall be carefully examined for the presence of hard objects such as stones, rock projections or tree roots.

Where the trench bottom is through rock or shows a recurrence of hard objects as described above, allowance shall be made in the cutting of the underbed of not less than 150mm below the actual depth of trench required and backfilled with DOE Clause 805 prior to the laying of the underbed.

Excess excavations below the required levels shall be filled up to the correct level with DOE Clause 805, or as the Employer's Representative may require, at the Contractors expense. The Bottoms of excavations must be inspected and approved by the Employer's Representative before any further works are commenced.

Adequate temporary support shall be provided to retain sides of excavations as necessary to ensure safe construction. All supports to be removed on completion unless otherwise instructed.

Electrical Mains

All pipes shall be laid on a prepared 150 underbed of a rounded single sized pebble of 10mm nominal diameter and haunched and covered to depth of 150mm with similar material.

In all cases the underbed shall be the correct gradient and shall provide uniform support to the pipe over its full length.

Where scouring of the bed from under the pipe is likely to occur due to site conditions, precautions to prevent loss of support to the pipeline shall be taken.

Backfilling Material

Excavations shall be backfilled with DOE Clause 804 compacted in layers of 225mm thickness.

Selected excavated material shall be used where proposed pipe runs cross-grassed areas. Selected excavated material shall be dry and clean and capable of compaction to form a dense fill. It shall NOT include the following:

- Material from marshes or containing peat, vegetation or perishable matter.
- Material which by the nature of its physical or chemical composition, frozen state, combustibility or moisture content will not compact to form a stable fill.
- Lumps exceeding 150 in any direction.
- Builders rubbish.
- Organic clays or silts.
- Chalk or clay which is soft or wet
- Clay lumps retained on a 75 sieve and stones retained on a 25 sieve.

All trenches in or near roadways shall be backfilled in compliance with the *Guidelines for the Opening, Backfilling and Reinstatements of Trenches in Public Road*.

Mechanical compactors should not be used until the total depth of backfill over the pipe exceeds 450mm.

Marker Tape

An approved colour coded marker tape such as ESB Networks Cable Yellow Warning Tape, containing a tracer wire, shall be placed 300mm above each pipe service over the length of the service immediately above the sand or fine gravel surround.

Protective Barriers & Warning Lights

The Contractor shall provide and maintain on site all the necessary protective barriers and warning lights around the open trenches. The barriers and lights shall be left in position until such time as the ground is reinstated to the satisfaction of the Employer's Representative.

Earthwork Support

The term earthwork support shall mean providing everything necessary to uphold the sides of excavations, whether the Contractor decides to provide support or to over excavate and ramp the sides. The Contractor will be responsible for supporting the sides of the excavation and will be deemed to have included in his rates for all the work required.

Conformity to Drawings

Trenches and pits shall be excavated to the depths and widths shown on the drawings or as directed by the Employer's Representative.

Should the widths or depths of the trenches or pits be greater than the designed width, the Contractor shall be liable for the cost of any extra work necessary.

Disposal of Water

Keep the excavations and the surface of the ground free of water, both surface water and ground water. Water must not be disposed of into the permanent drainage system. The excavation and backfilling of temporary sumps and ditches shall be deemed to be included in the Contractor's tender.

Hardcore

Hardcore shall mean hard stone, concrete, coarse gravel or hard broken brick, free from unsuitable filling material and capable of passing through a 100-diameter ring.

"Rock Fill" shall mean sound hard rock or broken stone. The material shall lie within the following grading limits.

<u>Sieve Size</u>	<u>% by weight passing</u>
75mm	100
37.5mm	85 - 100
10mm	40 - 70
5mm	25 - 45
.600mm	8 - 22
.075mm	0 - 10

Material passing a .425mm sieve shall be non-plastic. The particle size shall be tested in accordance with BS 1377. Material used shall be frost resistant.

Unsuitable Filling Material

Unsuitable filling material shall mean perishable material, material from marshes or bogs, stumps, slurry, mud, material susceptible to spontaneous combustion or material in a frozen condition. Clay of liquid limit exceeding 80% and/or plasticity index exceeding 55 as determined in accordance with BS 1377 shall not be used. Materials with a water-soluble sulphate (in SO₄ form) content in excess of 0.1% shall be excluded as shall materials having moisture content greater than the maximum permitted.

For cohesive soils the permitted moisture content shall be not greater than the soils plastic limit multiplied by 1.1.

Rock Excavation

Should rock be met with in the course of excavation as much as possible shall be removed by pneumatic tools, wedges, levers or other recognised methods of quarrying. Blasting shall not be carried out. The Contractor shall notify the Employer's Representative before commencing excavations in rock and shall only excavate to the depths as directed by him. All excavations below these depths shall be made up with top quality concrete, grade 15N/mm², at the contractor's own expense.

Location of (Other) Utility Equipment

Any available records and proprietary cable locators shall be used prior to excavations taking place. Due diligence shall be used when making excavations for services, and care shall be taken to protect and

support all existing services (water, gas, telecommunications, drainage and electricity mains) and other works so as not to interfere with the working arrangement of same.
Any damage shall be made good to the satisfaction of the utility or other authority concerned.

FITTINGS, EQUIPMENT AND FURNITURE

NOTE

All fittings, equipment and furniture to be assembled and fitted to the areas indicated on the drawings in strict accordance with the manufacturer's guidelines.

Fitted furniture to be measured on site for differences in actual measurements +/- 50mm

ELECTRICAL FITTINGS

Office 1

- Supply and fit 4 No. R326060-01 (32W LED panel – 600mm X 600mm) or equivalent approved controlled by PIR. One of the fittings shall be fitted with a 3-hour emergency pack (R3EMPK4-PSU).
- 6 No. Double Sockets c/w individual socket switches and two USB outlets (one to USB C) mounted in Dado Rail.
- 3 No. Twin plate data point connections with Cat6 cabling connected to outlet.

WC

- Supply and fit 1 No. RAM40306060-01 (ATMOS 40W LED panel – 600mm X 600mm) or equivalent approved controlled by PIR. One of the fittings shall be fitted with a 3-hour emergency pack (R3EMPK4-PSU).
- A vanity light with IP44 fluorescent tube Max13W 600mm or equivalent in length will be installed over the WHB in the WC.
- Supply and fit 1 No. hand dryer “World dryer Vmax” or equivalent approved.
- Supply and fit 1 No. Vent Axia Lo-Carbon NBR dMEV 125 extract fan complete with wall fitting kit with a minimum extraction of 100m³/hr. Mechanical vents to be connected through isolator switch into the proposed fuse board and operated by a timer and PIR sensor.
- Supply and fit 1 No. under sink water heater for WHB. 2kW, wall-mounted unit with a 10-Litre capacity. Adjustable thermostat from 30 to 65°C.

Lobby

- Supply and fit 1 No. R326060-01 (32W LED panel – 600mm X 600mm) or equivalent approved controlled by PIR. The fitting shall be fitted with a 3-hour emergency pack (R3EMPK4-PSU).

Storage Room 1

- Supply and fit 10 No. RS 253-9991 (100 WRS PRO LED Low Bay Light Fitting)) or equivalent approved controlled by PIR.

- Supply and fit 7 No. RS 795-9381 (RS PRO LED Emergency Lighting, Twin Spot, 2x7.5w, non-maintained)).
- 6 No. Double Sockets c/w individual socket switches and two USB outlets (one to USB C) mounted in surface metal conduit.

Storage Room 2

- Supply and fit 10 No. R326060-01 (32W LED panel – 600mm X 600mm) or equivalent approved controlled by PIR. One of the fittings shall be fitted with a 3-hour emergency pack (R3EMPK4-PSU).
- 4 No. Double Sockets c/w individual socket switches and two USB outlets (one to USB C) mounted in surface metal conduit.
- Supply and fit 1 No. under sink water heater for WHB. 2kW, wall-mounted unit with a 10-Litre capacity. Adjustable thermostat from 30 to 65°C.

External Lighting

- Supply and fit 7 No. RS 176-8529 (150W. 13500lm, IP65, 220-240V ac RS PRO Floodlight) or equivalent approved.
- Lights to be controlled by photocell.

Emergency Exit Signs - Running man

- Maintained emergency exit signs will be provided in all areas as depicted on the drawing. Emergency exit signs will comply with the requirements of IS 3217- Emergency Lighting. All emergency exit signs shall be CE marked and certified for use in accordance with IS 3217. Emergency exit sign fittings shall be Robus LED Exit Box and Robus Blade LED (or equivalent). All light fittings shall be CE marked and certified for use in accordance with IS 3217.

Emergency Luminaires

- Emergency luminaires shall be installed as described in IS 3217– Emergency as outlined under “Fixtures & Fittings” above and shown on drawing no. 13.

SANITARY FITTINGS {All Armitage shanks or Equivalent, colour white}

WC

Supply and fit to include:

- Armitage Shanks Sandringham 21 + Close Coupled Pack [E8963(01)] or equivalent.
- Double flap soft close seat.
- Water saving delay fill cistern with spatula lever.
- 1¼" strainer waste and plastic bottle trap.
- TMV3 lever operated spray mixer tap.
- 32mm chromed grated basin waste.
- 1 No. Under sink Water heater under WHB.
- 450 x 450mm mirror over basin, 25mm bevelled edge all round, recessed, 3mm polystyrene backing bored for and plugged with 4 nr chrome cupped countersunk screws with rubber washers to background.
- Sanitary fittings shall be thoroughly cleaned prior to handover of the Works to the Employer and shall be fully tested in the presence of the Engineer Officer to ensure their correct operation

Store Room 2

Supply and fit to include:

- Armitage Shanks heavy duty Belfast Cleaners Sink or equivalent. C/w bucket grating.
- Multilayer 20mm hot and cold supply
- 1. no floor gully with connection to foul

FIXED STORAGE SHELVING

Storage rooms 1

As indicated/specified on the drawings, including:

- Single sided rows of MECALUX system or equivalent
- SWL for each unit to be 9105kg and 3050kg per each beam level
- 2000mm high x 2500mm Long and 600/900mm wide
- All uprights fixed to floor by expansion bolts
- All columns fitted column guards
- Galvanised decoking panels fitted throughout
- Steel hot dipped galvanised coated

Storage Rooms 2

As indicated/specified on the drawings, including:

- Single sided rows of MECALUX system or equivalent
- SWL for each unit to be 9105kg and 3050kg per each beam level
- Various sizes shown on drawing
- All uprights fixed to floor by expansion bolts
- All columns fitted column guards
- Galvanised decoking panels fitted throughout
- Steel hot dipped galvanised coated

ELECTRICAL SPECIFICATION

Scope of work

The scope of the contract work is to include installation & to supply, fix, connect, test and commission all necessary materials required to provide an upgrade to Electrical Installation to all areas as per the proposed layout for the Barrack Accountant Building, Sarsfield Barracks, Limerick. Samples MUST be submitted for approval by ER. All wiring to be enclosed in conduit/trunking which is suitable for area and environment in question. All units to be wired in accordance with manufacturer recommendation and in accordance with current day wiring regulations.

All holes and opes finished and touch up with paint to match existing.

All installation works and apparatus to meet current day regulations and standards.

Electrical Testing

A full Periodic Inspection to include a full test package of the building to be submitted as part of the Project upon completion to comply with current day recommendations.

All results to be issued on relevant paperwork to include a report outlying any recommendations and observations made.

Electrical Supply

A new electrical supply to the Bk accountant stores shall be run from the existing Barracks electrical network in new ducting:

- Provide 4c x 70mm² XPLE/SWA +1x35mm² CPC from **Pillar No. 1 located at the entrance of the Sports Ground and across from the Church** in a mix of existing and new ducting as shown on drawings. Include for connection into Pillar Box No.1.

Distribution Panel

A new main DB located in the main store area is to be provided.

- Provide CTU for emergency circuits.
- All boards shall be fitted with proper blanking pieces for spare circuit ways.
- All busbars shall be sized for 150% of circuit protection rating.
- The distribution centre shall be arranged for top cable entry and exit.
- The distribution centres shall be in accordance with IEC 439, BS5486 Part 1 and of the Code of Practice for selection and erection of low voltage switchgear assemblies published by ETCI.

Stores 1 & 2

Lighting to be MW type as per Elec fittings. Local socket and spur outlet to be installed for specified dehumidifier as per Mechanical fittings.

Lobby

Lighting to be MW type as per Elec fittings.

Office

Lighting to be MW type as per Elec fittings.

Local socket and spur outlet to be installed for specified heater per Elec fittings.

WC

Supply and install electric hand wash unit, and hand drier as per Elec fittings. Electrical supply to be provided for extraction system. All circuits to be controlled by a PIR with off delay via contactors located in the main DB with the exception of lighting which is to be MW type.

Dehumidifier Store 1

Controlled via a wall mounted humidity sensor.

Electrical supply to be provided via a 25A Isolator and protected as to discriminate against the load of the unit.

Roller Door

Supply and Install an Electric roller shutter door as specified in Doors and Windows Section above.

Electrical supply to be provided.

Heat Pump

Electrical supply to be provided via a 25A Isolator and protected as to discriminate against the load of the unit. Air to Air heat pump as specified in Mechanical section below.

Bonding and Earthing

Existing main earth to be verified by test.

All metal work benches to be bonded to requirements.

External Lighting

As per Elec fittings as to type and spec.

All lighting controlled via a photo cell and HOA switch.

Emergency Lighting

As per drawings and as per Elec fittings.

A CTU is to be incorporated into the DB in accordance with current day regulations.

Containment

All containment and fixtures to be fixed securely to surfaces using appropriate fixings.

All steel to be bonded in accordance with current day regulations.

The warehouse installation should be fitted utilising standoff brackets. A sample of this type of installation is available to see if required during a site visit.

Circuit Identification

All circuits to be clearly labelled at source and field utilising “Phase” and “Circuit Number” or “Rack and “Patch Number” in the case of Data.

Schedules of Timers

	Area	Time
1	Common Areas, Corridors Lighting	5min
2	WC Lighting	15min
3	Office Lighting	30min
4	Store, Lighting	30min
5	Fan, Extraction	10min
6	External Lighting	Photo

Note

All Lighting to be Passive Infra-Red (PIR)

Data Cable Installation

Provide 12U 19” glass door lockable wall mounted rack unit.

Provide 2 No. **UNSWITCHED** spur outlets behind 12U 19” rack.

This supply is a dedicated circuit and should not be shared or form part of any other supply.

Location of cabinet to be in the Office.

Cabinet to be securely fixed to the wall.

Cable to meet CAT6a U/FTP or higher standard.

Please allow for a 3M CAT6a patch cable for every outlet as per design and drawings.

The cable to be four-pair Category 6A with a low-flammability sheath (complying to IEC 60332-1-2 as a minimum).

The cable to be of U/UTP Unscreened Twisted Pair.

The cables to be metre marked.

The flammability performance must meet EuroClass Cca-S1b, d2, a2.

Will have current independent third-party approval status at channel link level to a minimum of ISO/IEC 11801.

Will be supplied with a valid DoP (Declaration of Performance) Certificate.

Data Fibre Runs

A fibre run from the cabinet to the nearest fibre patch panel as shown in drawings is required.

This includes using new ducting as shown in drawings required to complete the installation.

MECHANICAL SPECIFICATION

Scope of work

The scope of the contract work is to include installation & to supply, fix, connect, test and commission all necessary materials required to provide an upgrade to Mechanical Installation to all areas as per the proposed layout for the Barrack Accountant Building, Sarsfield Barracks, Limerick. Samples MUST be submitted for approval by ER.

All opes to be made good and a high-quality cowl or vent cover to prevent weather ingress and touch up with paint to match existing

All installation works and apparatus to meet current day regulations and standards.

Pipework. All pipework to be used in the heating installation shall be to copper.

All pipework jointing shall be affected by means of Compression Fittings.

All pipework to be buried in the floor. No Drop Feeds permitted.

When the pipework installation is complete, thoroughly flush out the entire system and test the entire system hydraulically to a pressure of seven (7) Bars gauge to hold for Eight (8) hours with no drop in pressure. Include for phased testing of system to suit building Works progress.

The pipework insulation shall be KOOLTHERM or equivalent, Class 0, CFC free, foil coated pipe insulation having a standard density of 3.5kg/cubic m and a factory supplied reinforced aluminium foil vapour barrier jacket as supplied by KINGSPAN INDUSTRIAL INSULATION or equivalent and shall be installed to the thickness as laid down in part 1 of this specification.

Heating Specification

Install Air to air heat pump mutli-split system to connect to four indoor units to one outdoor unit. Indoor units to be white and wall-mounted.

Indoor Unit Schedule:

Room	Area	Heat Loss (W)	Unit	Height mm	Depth mm	Width mm
Office	16	250	Daikin Perfera Indoor Unit	Based on kW size		
Store 2	43	534	Daikin Perfera Indoor Unit	Based on kW size		
Lobby	3	155	Daikin Perfera Indoor Unit	Based on kW size		
Toilet	3	133	Daikin Perfera Indoor Unit	Based on kW size		

Heating Control

Heat pump driven 1 zone closed loop pressurised wet system to incorporate high efficiency aluminium radiators in 1 zone. All radiators to be fitted with TRV's.

Hydraulic Balance tank with air vent to form part of the installation.

All zone pumps/actuators to be sized as required to meet demand.

Heat Pump Specification

Supply Install and commissioning a low temperature heat pump, similar in specification to the following:

- A 3kW Daikin Perfera Air to Air Heat Pump or equivalent to suit Heat Loss per room in Unit schedule above. Wall Mounted.
- 4 indoor units to be connected in rooms specified on Drawings. Units to operated individually.
- System must be capable of meeting heating demand of building at -2°C outside temperature.
- Proposal to be approved prior to installation.
- Main control to be located in store 2.
- Outdoor unit to be mounted on isolation Blocks fixed to concrete path.
- Drain kit to be provided for outdoor unit when not supplied as part of unit and run to suitable drain.

Dehumidifier

- **Supply and install a ‘Cotes C35e dehumidifier’** or approved.
- Supply and install 200mm duct c/w louvered outlets for “Process Air Out” as shown in drawings.
- 2 No. additional opes to outside of building will be required for both “Wet Air” and “Reactivation Air”.
- The “Wet Air” exhaust to return up the wall outside away from the external air intake to avoid cross contamination.
- The dehumidifier shall be of a non-cycling sorption type with single desiccant rotary structure and shall be designed for continuous operation.

Technical specification – dehumidifier

Operating temperatures -20°C to + 40°C

Operating RH ranges 0-100% RH

Required output RH ranges 30-60% RH

Rate of proceeded air flow at least 800m³/hr

Ducting

Supply, install and commission the ducting, including dry air, recitative air and wet air exhaust. The ducts shall be free from sharp edges or obstructions, all ducting shall be rigid and free from movement and air tight in all operating conditions. The ducting shall have a maximum 10m/s flow rate. The ducting shall be circular 160mm diameter stainless steel grade 304 and supported with pipe hangers fixed at 1200 centre to the ceiling joists. The ducting for the system shall comply with the BS Standard 15727:2010 for components and testing for fire resistance to EN 15871.

Humidity Control System

Supply and fit humidity control system type to match the installed dehumidifier. The controller shall be wall mounted and be capable of detecting changes in relative humidity and adjust the operation of the dehumidifier. The Contractor shall allow for all associated electrical work with isolation switches required to power the dehumidifier.

Testing and Commissioning

Include for final testing and commissioning of the entire dehumidifier and ducting by the specialist and obtaining a Commissioning Certificate acceptable to the Employers Representative.

Extraction toilets

- New In line fans ducted through opes in ceiling in roof of building as shown in drawings in WC. Fans to be controlled via PIR located in WC and time delay off made available.
- A high-quality cowl or vent cover to prevent weather ingress.

Isolation Valves

To be fitted at all appliances.

Handover and Witness Testing

Prior to handover of project a full test and certification package for both Electrical and Mechanical installation must be issued to the ER during witness testing.

Duct Work

All ducting as per drawing and to be suspended below roof apex allowing at least a 400mm clearance between the fire detection heads and top of the ducting.

FIRE DETECTION AND ALARM SYSTEM

GENERAL

A new L1 fire detection and emergency lighting systems are to be installed as a part of the project. The fire detection system shall comply with the standards IS 3218:2013. The installation shall be an **ANALOGUE ADDRESSABLE FIRE DETECTION and ALARM SYSTEM** in compliance with IS 3218 for a Category L1 system. Include for all work, cabling etc. to install and commission the system. The Contractor shall include for location of fire alarm panel, detectors, break glass units, sounders etc. **This shall be submitted to the Engineer for approval prior to any work commencing.** On installation, ownership of the alarm system shall pass to the Minister for Defence. After the end of the defects liability period, the Department of Defence reserves the right to appoint any company to maintain the system. In addition, the company chosen to install it shall withdraw any condition in their tender that allows it to retain ownership of the installed equipment or gives it the exclusive right to maintain it in the future (after completion of the defects liability period). The Contractor shall include for the provision by the fire alarm supplier of full 'as- installed' drawings. A zone identification diagram shall be provided in a glass fronted framed wall mounted unit, which clearly identifies the fire alarm zones. The drawings shall be A3 size. The Contractor shall include for final testing and commissioning of the entire system by a competent person. All handover documentation shall be provided in strict accordance with IS 3218.

SYSTEM TO BE INSTALLED

The system specified in this Specification is “*Notifier ID3000*” or equivalent. The system shall also be supplied and commissioned by a suitable third-party accredited company.

SURFACE WIRING

All wiring shall be surface mounted in metal conduits as per manufacturer’s instructions.

STANDARD OF INSTALLATION

The Fire Detection and Alarm System shall comply with the requirements of *I.S.3218 “Code of Practice for Fire Detection and Alarm Systems for Buildings – System Design, installation servicing and Maintenance”* to the following requirements:

- The system shall be Category L1.
- The system shall comprise of an analogue addressable fire detection and alarm system.
- The system shall be controlled from a main control panel located inside the main entrance door to the office.
- On completion of the contract the Control Panel will identify the exact location of each device, when activated and will have the facility to give general or alert alarm capable of transferring all data to the main system via the Notifier ID2Net or equivalent.

ELECTRICAL SUPPLY

Supply and install one number 20-amp MCB at the main electrical board to power the main control panel and repeaters. All this work shall be certified as per ETCI regulations and shall be permanently marked as to their function.

CONTROL PANEL

The control panel shall be a four loop Analogue addressable Control Panel with 2 working loops *Model No. ID3008/2*. It shall comply with EMC LVD directives and have LBCP approval. The panel shall have a 240 x 64-pixel graphic LCD display with membrane control switches; it shall allow up to 198 addresses per loop with each loop having its own processor. The Panel shall house the following features:

- Large LCD display
- Large 4.5A power supply to drive loop powered beacons
- 4 individual programmable Panel outputs

- Alarm sensitivity and delay adjustments
- Automatic time control functions by day of week for “Control-by-event” (CBE)

SMOKE DETECTORS

Smoke sensors shall meet the following requirements:

- Be analogue addressable low-profile type using the photoelectric principle to measure smoke density.
- The sensors shall on command from the Control Panel, send data to the Panel representing the analogue level of smoke density.
- The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the Control Panel.
- The sensors shall have two integral tri-colour LEDs for 360° viewing.
- The two LEDs shall flash ‘green’ during normal operation, red in a Fire condition and amber must a fault develop in the sensor.
- Each sensor shall have a built-in loop isolator.
- Smoke detectors shall be white in colour.
- All detectors/sensors shall be LPCB approved.

HEAT DETECTORS

Heat sensors shall meet the following requirements:

- Be analogue addressable and shall be software configured to work as a Rate of Rise and/or a fixed 58°C or fixed 78°C.
- The sensing element of the sensor shall be panel controllable to customise the device for the area it is protecting.
- The sensor shall have two integral tri-colour LEDs that will provide 360° local visual indication of the device status.
- The LEDs shall be programmable with static blinking red, amber and green status indications as required.
- All detectors/sensors shall be LPCB approved.
- The two LEDs shall flash ‘green’ during normal operation, red in a Fire condition and amber light when a fault develop in the sensor.
- Each sensor shall have a built-in loop isolator.
- Heat detectors shall be white in colour.

MANUAL CALL POINTS

The call points shall meet the following requirements:

- Be constructed of flame-retardant plastic with clearly visible operating Legend provided on the glass.
- Be suitable for surface or semi-flush mounting.
- Provide a dipswitch at the rear of each unit for address setting.
- Visual indication of operation shall be by LED indicator.
- Units shall be LPCB approved and fixed at a height of approx. 1100mm above floor level.

ISOLATOR MODULES

Each smoke and heat sensor shall be fitted with a loop isolator. Its operation shall be totally automatic and shall not be necessary to replace or reset after its normal operation. Location and sitting shall be determined by a pre-commissioning visit by system supplier at an early stage of the project.

INTERNAL ALARM/VISUAL UNITS

Provide 3 No. internal combined alarm/visual units to the following requirements:

- The sounder shall have an output of 95-100dB (A) and the strobe shall flash at 30 flashes /min with an output of 2 Joules.
- Units can be WHITE or RED in colour and shall be mounted at 2100mm above finished floor level and no closer than 150mm to the ceiling.
- Units shall be wired in two separate circuits. Internal alarm/visual units are indicated in the drawing.

EXTERNAL AUDIO/VISUAL UNITS

Provide external alarm/visual unit at the office door entrance to the building to the following requirements:

- The external audio-visual unit shall be positioned externally to the building in order to guide firefighting assistance to the correct entrance point.
- To comply with Clause 5.6.1 of IS3218 it shall be marked 'Fire Alarm' and shall automatically silence the sounder after 30 minutes while the visual indicator shall continue to operate.

FIRE MAN SWITCH

Provide a fireman's switch for electrical distribution board. Fire man switch to comply with requirements for Building Regulations TGD Part B – Fire.

CABLE AND WIRING

Detection loops and sounders shall be wired in 2C 1.5mm Fire-rated cable with red PVC sheathing. All inter-panel wiring shall be twisted pairs, enhanced fire-rated and mechanically protected. Suitable conduit boxes shall be used at each device to prevent dust and dirt ingress to the sensor. The cable type shall be approved by this office before installation.

DRAWING APPROVALS AND SUPERVISION

The Contractor shall provide full "working" drawings and a pre-installation site visit along with supervision during the installation period. On completion he shall provide as installed drawings showing equipment locations, cable routes and location of power sources.

TESTING AND COMMISSIONING

Certification of installation to IS3218 is required on the Electrical Sub-Contractor's own HEADED PAPER. The Contractor shall be responsible for system protection during the contract. Include for the provision by the fire alarm supplier of full 'as installed' drawings. A new zone identification diagram shall be provided in a glass fronted framed wall mounted unit, which clearly identifies the fire alarm zones. The drawings shall be A3 size. Provide for supplying and mounting one chart, one adjacent to the fire alarm panel. Include for final testing and commissioning of the entire system by the specialist and obtain from the specialist a Commissioning Certificate acceptable to the Employer Representative and in accordance with IS 3218.

PV ARRAYS

GENERAL

The design objective is to maximise the cost-effectiveness of the system by ensuring self-consumption of the generated power onsite.

The PV array is to be installed on the roof and provide a total minimum acceptable power output of (32)16kWp from the installation.

It is the intention to appoint a suitably experienced design and build contractor to complete the project in accordance with this technical specification.

The Contractor shall be deemed to have taken into consideration all of the detailed information contained in the Works Requirements and the tender price submitted will be deemed to include for all costs arising from satisfying the Works Requirements.

The cost of providing and commissioning the project called for in the Works Requirements shall be detailed as called for on the Tender Summary provided.

Failure to comply fully with the requirements of the Instructions to Tenderer's and Works Requirements document will result in exclusion of the tender from consideration.

FAMILIARISATION WITH THE SITE

The Contractor will be deemed to have examined the site to ascertain the extent of the alterations required to the building to facilitate the PV installation, the conditions under which the Works will be undertaken and the nature of the structure being worked upon. The Contractor will be deemed to have included in the Contract Sum for all factors affecting the work. Claims for Delay or Compensation Events arising from lack of knowledge of site conditions will be rejected.

The Contractor shall include for all works deemed necessary to keep the site safe for both Contractor's Personnel and third parties on, or in the vicinity of the site, during the course of the Works. This shall include protective hoardings and covered access routes to allow the ongoing use of the building during the course of the Works.

SCOPE OF WORKS

- Design of a grid-connected Solar Photovoltaic System satisfying the Works Requirements for installation.
- Provision of the installation and final connection to the facility power supply installation.
- Testing and commissioning of the installation.
- Training of the Employer's Personnel in the operation of the installation.

The works shall include the installation of the PV panels and associated electrical and associated structural work to support the panels on the roofs. PV panels may only be placed on the East and West Side of the main storage roof space.

There is NO fall arrest system on the roof.

A safe walking edge of not less than 800mm and preferably not more than 1m wide shall be maintained around the perimeter of the sloping roof of the buildings.

The system design specification shall define the overall performance goal as maximizing the cost-effectiveness of the system by maximizing self-consumption of the generated energy (kWh) on-site.

DESCRIPTION OF ROOF MOUNTED BUILDING

The roof structure is steel portal frame, steel purlin and insulated cladding. The pitch of the roof is approximately 15 degrees. Internally, the building is divided into 2 areas.

The orientation of the roof can be taken as EAST-WEST with no over shading.

The main electrical distribution board for the building is located inside the front door. Single phase power supply is available at this board.

The adequacy of this available space shall be deemed to have been assessed by the Contractor prior to submitting their tender. Unless the Contractor specifically noted in their tender submission that the proposed space is not adequate, the Contract Sum shall be deemed to include for using this room and for all works required to install the required equipment and commission it.

Location	Sarsfield Barracks, Limerick	
Roof Area	Total roof area 270m ² (125 m ² East facing aspect and 145m ² West facing) This area has NO fall arrest protection fitted.	Note: This roof space calculation does not take into consideration, mechanical services, etc., and is gross of all margins to edges and between arrays.
Roof Type	Insulated cladding	
Roof Age	New	
Roof Pitch	15°approx	
Roof Orientation	East - West	
Shading	No Over-Shading	
Rooftop Access	Exterior access only	Hoists and scaffolding for construction, responsibility of Contractor
Building Demand	100% PV generation - to be consumed on site	

STANDARDS, CODES AND GUIDELINES COMPLIANCE

The installation shall be installed to the relevant Standards below and to the satisfaction of the Employer's Representative.

The installation must comply in full with the relevant Codes of Practice, Planning and Building Regulations and design specification. Attention is drawn to important sources of relevant information (the list is not intended to be exhaustive).

Where Irish standards are not fully developed, additional design specifications may be drawn from UK or European codes or standards as detailed in the sections that follow:

1. Government statutory laws and regulations
2. Planning Regulations
3. National Buildings Standards and Codes
4. Health and Safety Authority Publications
5. Workplace Safety and Health Management, Practical Guidelines on the Implementation and Maintenance of an Occupational Safety, Health and Welfare Management System, Health and Safety Authority, 2006, ISBN 1-84496-033-1
6. Code of Practice for Safety in Roof work, Health and Safety Authority, 2011, ISBN 978-1-84496-147-4.
7. Appendix F provides a comprehensive summary of applicable statutes, standards, codes of practice and advisory documents.
8. Additional solar specific guidance for roof work is available from the UK Construction Skills document.
9. CITB-Construction Skills Solar panel installation. What you need to know to work safely
10. Leaflet GS001 11/12 in partnership with the Health and Safety Executive
11. ET101:2008, National Rules for Electrical Installations (Fourth Edition)
12. I.S. HD 60364-7-712:2006 Electrical Installations of Buildings – Part 7-712: Requirements for Special Installations or Locations – Solar Photovoltaic (PV) Power Supply Systems
13. ET201:2009, Good Practice Guide on the Management of Electrical Safety at Work
14. SEAI – Good Practice Guide – Photovoltaic (PV)
15. MCS – ECA Guide to the Installation of Photovoltaic Systems (UK Industry Code)

INTEGRATION OF PV POWER OUTPUT INTO ELECTRICAL GRID

The Contractor shall liaise with the ESB in the design and construction phase to ensure full compliance with the guidelines set down by the ESB licensing requirements. The Contractor shall ensure the steps included on the link www.esb.ie/esbnetworks/en/generator-connections/gen_connection_export.jsp are followed.

The Contractor shall furnish the Employers Representative with a copy of all ESB related paper work prior to the installation works starting on site.

The system needs to comply with Embedded Generation Interface Protection (EGIP) standards as required for ESB Networks assessment and compliance certification.

The Contractor shall include for the supply and installation of a suitable interface with the ESB grid.

The Contractor shall allow for the cost of applying for permission to connect the supply from the PV installation to the ESB Networks grid and for all ESB Networks fees and charges associated with that connection. These costs shall be identified in the Tender Summary.

All generated power is planned to be consumed on site within the barracks. Export to the national grid will not occur.

The MPRN for the location is given below:

- Sarsfield Bks 10000060070

The Contractor shall be deemed to have familiarised themselves with the existing electrical distribution network and to have allowed for any required works to connect the Solar PV Array safely into the existing electrical distribution network.

Note:

Sarsfield Bks has available spare ducting in a ring main to run data cables from the solar PV. However, an additional length of ducting is required to be run by the contractor from the proposed Barrack Accounting Stores to Pillar Box no. See drawings for details.

All work shall be certified as per ETCI regulations and shall be permanently marked as to their function.

LABELLING

The system components must be identified with clearly legible and durable labels:

- DC cabling
- DC plugs and sockets
- DC switch-disconnect
- Inverters
- AC switch-disconnect
- Points of connection to the AC grid (dual supply label)

TECHNICAL SPECIFICATIONS FOR SOLAR PV SYSTEM COMPONENTS

The Solar Photovoltaic (PV) system shall include the following main components:

- PV Modules
- Module Mounting Systems
- Fall Prevention System
- Cabling DC and AC
- Connectors
- Junction Boxes/String Combiners
- Inverters (power optimisers)
- Switch/Disconnects (isolators) DC and AC
- Electrical Protection
- Monitoring System

Photovoltaic Modules

- Solar PV modules shall be certified to the appropriate European and Irish Standards and shall be CE marked. Modules shall be provided with datasheets that state all relevant test parameters under the standard test conditions (STC) defined by the relevant standard. The Contractor shall provide 'Tier 1' Solar PV panels. Solar panels shall, as a minimum, be covered by a 25-year performance warranty and a 10-year product warranty.
- A data sheet for the selected modules must be submitted as part of the Works Proposals providing details of the following values at STC:
 - Module Peak Power (Wp)
 - Peak Power Tolerance (%)
 - Efficiency (%)
 - Maximum Current (A)

- Short Circuit Current (A)
- Open Circuit Voltage (V)
- Fill Factor

The following are the applicable performance standards for crystalline and thin-film modules respectively:

- IS EN 61215: 2005 Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
- IS EN 61646: 2008 Thin-Film Terrestrial Photovoltaic (PV) Modules
- The Photovoltaic modules, laminates and associated external equipment shall be suitable for operation within an ambient temperature range of -40°C to +85°C and the following are also requirements.
- The PV modules must be resistant to Potential Induced Degradation (hereafter PID).
- The plugs of all modules and cables between the modules and the connection boxes must be the same model to ensure good connections. They must be positioned appropriately so as they avoid accumulation of dust, sand or water preventing short-circuits and/or premature degradation.
- DC cables must be attached to the supporting structure or placed in trays to avoid loose cables coming in contact with objects such as roof tiles or sharp structures that may damage their insulation or cause trip hazard.
- The STC power measured in the input of each inverter must be equal or above 93% of the nominal power i.e. – the sum of the losses due to initial degradation, mismatching and wiring cannot be above 7% of the nominal power.
- The PV modules must not exhibit “hot spots” or “hot cells” when no shade is being cast and the inverter is injecting to the grid normally.
- As a protection measure against indirect contact, the PV arrays (active poles) shall not be earthed.
- The expected operational ranges of PV array voltages and currents (VOC, /SC, VM and /M) must agree with the technical specifications of the inverter.
- All strings, consisting of modules connected in series, must be protected with fuses in both poles. String fuses must be rated (at 50° C) between 2 and 4 times the modules STC short-circuit current, below the rated DC current of module cables.
- The parallel association of strings must be done inside connection boxes including the following elements:
 - All strings with operative fuses.
 - Overvoltage protection devices (operative surge arrestors) between both positive and negative poles and earth (another one between poles is optional).
 - Load breaking switch to safely open the DC part in case of emergency.
 - Fixed labels warning the risk of electric shock.
 - Poly-Methyl-Methacrylate (PMM) sheets for preventing direct contact with live wires, fuses, busbars etc.
 - Individual labels for each cable, stating its polarity and its origin.
 - A blocking system in doors or covers to avoid damage due to wind gusts when opened.
- The elements inside the connection boxes shall be correctly ordered and disposed so that positive and negative poles are adequately separated to minimize the risk of direct contact.
- All fuses, surge arrestors and load breaking switches must fulfil the standard IEC 60634-7-712.
- The connection boxes must have (and respect) at least IP54, in accordance with the standard IEC 60529, and must be resistant to UV radiation. So, cable entering connection boxes must be correctly installed and sealed so IP protection is maintained.
- Where DC cables from connection boxes to inverter input must run in underground tubes. The manholes will be separated by 15m maximum. The extremes of the tubes must be sealed once the tubes and cables are fully laid.

Module Electrical Protection

- The protection of individual modules or strings, string fuses or electronic protection must take account of the manufacturer's maximum module safety fuse as defined in the standard:
- IS EN 61370:2007 Photovoltaic (PV) Module Safety Qualification.
- String Fuses will be required if any fault current could exceed the manufacturer's safety rating.

Module Performance and Warranty Terms

- All models must be provided with a power warranty as specified. The maximum annual power loss under the warranty after the first year must be less than 1%. In warranty conditions, linear warranties based on a uniform decline in performance each year will be preferred to those with step changes after the first year of installation.
- Product warranty for the modules shall be as specified with a minimum of 10 years. Maintenance instructions shall be supplied with the modules detailing the manufacturer's requirements, particularly with regard to cleaning techniques and materials.

Module Mounting Systems – Bk Accountant Store Roof

- The mounting system selected shall provide appropriate physical connection of the PV solar panels to the roof top. The integrity of the existing roof shall be maintained with panels securely connected to the roof to ensure that the panels are orientated correctly, both initially and in the future.
- The integrity of the roof shall not be compromised with respect to structure, U-value, water tightness, air tightness nor aesthetics. Any interference or alteration to the rooftop structure, fixtures and fittings shall be rectified by the Contractor. The installed mounting system must not compromise the safety of the building in any way.
- The module mounting system, including all fittings, shall be fabricated in either stainless steel or anodised aluminium. Galvanised materials may only be substituted if they can attain equivalent operational lifespan. Materials shall be recyclable at end-of-life through normal recycling channels.
- The mounting system must be chosen to match the chosen location and mounting surface and must be compatible with the module frame dimensions and structural loading points. The module mounting system shall be chosen to best suit the mounting surface and minimize potential leakage from installation requirements. The materials chosen must be resistant to local weather and atmospheric conditions, including corrosion from chemical exposure. Adequate fire-resistance shall be provided in accordance with the requirements of the Building Regulations.
- The structural strength and integrity of the system must be designed to withstand the effect of wind and snow loading. The action of wind on supporting structures must be rigid and resistant to wind gusts up to 150 km/h (IS EN 1991) and to corrosion environments equal to or higher than C4 (ISO 9223).
- Supporting structure materials shall be aluminium or hot dipped galvanized steel. The installation procedures must ensure anti-corrosion protection. This is also applicable to doors, trays, bolts, nuts, washers and fixation elements in general.
- All the parts of the supporting structure must be correctly assembled, must fit with each other and must be compatible to avoid galvanic corrosion.
- Supporting structures must allow every single module to be accessible for periodic inspections.
- PV modules must be rigidly fixed to the supporting structure with appropriate clamps and/or bolts and nuts according to the PV modules manufacturer specifications.
- Supporting structures must allow quick drainage in the case of heavy showers.

Power Cables

- Cabling on the array side of the solar system must be adequately protected from abrasion and cuts, maximum temperatures of 80° C and provide UV and water resistance over the system lifespan.
- Double insulated solar cable to the HO7NF standard may be used, as well as single insulated cable enclosed in a conduit or multi-core SQA steel-wire-armoured for longer distances and mechanical protection.
- Cables shall satisfy IS EN 50618:2014 Electric cables for Photovoltaic Systems.
- DC cable cross-sectional areas must be sized to limit the voltage drop along the cable to less than 2.5% of the open-circuit string voltage.
- In the absence of string fuses or electronic protection, string cables must also be sized to withstand any fault currents on a continuous basis.
- AC cables shall be sized according to standard practice to maintain a voltage drop of less than 1%. Some variance above this limit is permissible with prior agreement.
- All cables shall be delivered to the site for installation in complete coils or reels with the manufacturer's name attached, indicating wire size and type of insulation.

Connectors

- DC connectors must be fully electrically compatible (as verified by a test certificate) as well as mechanically compatible. Ideally only identical connectors from the same manufacturer shall be used.
- Connectors must be designed for Solar PV use and be protected against water ingress and UV exposure and touch-safe to IP21.
- Connectors must be designed for Solar PV use and be protected against water ingress and UV exposure and touch-safe to IP21.
- Connectors shall satisfy IS EN 62852: 2015 Connectors for DC-application in Photovoltaic Systems – Safety requirements and tests.
- Connectors must not be removed from modules.
- AC connectors for inverter connection must be touch safe.

Junction Boxes/String Combiners

- All connections in the DC circuit other than approved plug and socket connections must be inside non-conductive weatherproof enclosures that segregate positive and negative connections to prevent short circuits.
- Junction Boxes shall satisfy IS EN 50548:2011 Junction Boxes for Photovoltaic Systems and IS EN 62790: 2015 Junction Boxes for Photovoltaic Modules – Safety requirements and tests
- Larger arrays shall use purpose constructed string combiner boxes. These may be integrated into the monitoring systems and may also enclose string fuses.

Inverters

- All inverters are to be designed for grid-connected operation and shall comply with Embedded Generation Interface Protection (EGIP) standards. Final inverter positions must be clarified with the Engineer on site prior to installation.
- Installed inverters must not compromise the safety of the existing electrical infrastructure in any way. Electrical design shall make use of existing electrical infrastructure with minimal interruption to building operations.

Inverter Characteristics

- The inverters shall have a mechanism to verify that the grid parameters are within their defined tolerances and must disconnect from the grid within a specified time if any of the tolerances are exceeded. The inverter specifications must be provided in detail in the manufacturer's datasheet and be supported with comprehensive installation and user manuals.
- Inverter data sheets and nameplates must satisfy the IS EN 50524:2009 Data Sheet and Name Plate for Photovoltaic Inverters
- A type-test approval certificate must be submitted for each inverter to verify this behaviour as required to the CER or EN50438 standard or additionally in larger systems incorporated within a grid-protection relay operating to the same standard.
- Inverters must connect to the national grid via a dedicated medium-voltage interface unit, whose specification must be agreed with the grid operator.
- Inverters must be sized to match the array characteristics in respect of max voltage and current limits, acceptable power sizing ratio, maximum power tracking voltage range and compatibility with module type.
- The inverters shall properly operate at their nominal power and with an ambient temperature $T_A = 50^{\circ}\text{C}$.
- In order to preserve the quality of the general electricity service, the inverters shall comply with IEC 61000-6-2 and IEC 61000-6-4 (EMI), with EN 50178 (Grid quality requirements) and also with particular national codes.
- The inverters shall include anti-islanding protection with automatic shutdown of the inverter once a grid power outage is detected in accordance with standard IEC 62116.
- Inverter-on after grid voltage and frequency restoring shall be delayed between 1 to 3 minutes.
- The inverters shall include protection against inverse polarization in its DC input, short-circuits in its AC output, over-voltages (operative surge arrestors) in both input DC and output AC, insulation failure with output to relay.
- The inverters shall include detection and protection in case of lack of insulation in accordance with the requirements of standard IEC 60364-7-712.
- The inverter shall include an emergency stop device (software or hardware and it shall be easily accessible).

Inverter Performance and Safety Standards

- As a minimum the inverters must satisfy the requirements of:
- IS EN 50530:2010 Overall Efficiency of Grid Connected Photovoltaic Inverters
- Both the maximum conversion efficiency and the Euro-weighted efficiency shall be provided from the manufacturer's test results.
- Safety requirements of:
- IS EN 62109:2010 Safety of Power Converters for use in Photovoltaic power systems
- And the Anti-Islanding requirements of:
- IS EN 62116:2014 Utility-interconnected Photovoltaic Inverter
- Inverters shall have the following minimum specifications:

Efficiency (%)	95%
Harmonic Distortion (% THD)	<3
Standby Losses (W)	<20
Power Factor	>0.99
Output Voltage	400/230V +1%

Output Frequency	50Hz + 1%
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Inverter Warranty and Maintenance Schedule

- The inverter manufacturer shall provide comprehensive warranty cover as specified. Maintenance schedules for PV inverters shall be in accordance with the manufacturer's recommendations.

Switch Disconnects

- DC switch-disconnects (isolators) must be double-pole, load-break and rated for both the array maximum string current and voltage under all foreseeable conditions of under-temperature and over-irradiance.
- Switch-disconnects integral to an inverter may be used for isolation, if approved by the manufacturer for this purpose.
- AC switch-disconnects at the point of grid connection must be 4 pole and be capable of being locked in the off-position. An additional AC switch disconnect is recommended for maintenance purposes if the inverter is remote from the grid connection point.

Electrical Protection

- The inverter connection to the grid must be protected by an appropriate overcurrent device. The type and rating of the device must be compliant with the manufacturer's recommendations and the nature of the earthing and disconnection time required for the final circuit.
- An RCD may be required to protect vulnerable wiring or may be required by the inverter manufacturer. If an RCD is required then it must be an appropriate type for the inverter and the residual current rating chosen to match the manufacturer's requirements.
- Risk assessments require surge protection to be provided on the DC and AC sides of the PV systems. As with lightning protection, specialist advice may be sought as to the degree of protection necessary.
- The array structure of the PV array shall be grounded properly using an adequate number of earthing kits. All metal casing/shielding of the plant shall be thoroughly grounded to ensure safety.

System Monitoring

System monitoring and communication is required for the following purposes:

- Monitoring of current plant yield and past generation
- Logging of abnormal events or faults
- Sending error and alarm messages by email or SMS
- Integration with existing remote metering system for the Defence Forces
- Providing system information to a public display
- Scheduling of maintenance services
- Preferred devices Schneider PowerLogic series DMM on each export Cubical
- The photovoltaic systems shall be controlled/monitored by its own system with provision for future interconnection with the any new Building Energy Management Systems (BEMS), including detectors, controls, status, alarm conditions, colour operating graphics and schematics, etc.

Metering

- The Contractor shall be responsible for providing PV System Metering

- A Measuring Instruments Device (MID) approved generation meter shall be fitted to verify system generation. The inverter unit must be fitted with a modem which is capable of receiving a SIM card to allow transfer of data.

COMPLETION DOCUMENTATION

Drawings provided by the Contractor post award of the Contract must include all new ducts, cable routing and equipment locations proposed for the Barrack Accounting Stores building, i.e. from the roof space to the Sub Distribution Boards to the Module Case Circuit Breaker. A system wiring schematic must include all the detail specified in the system information pack below:

The system shall be supplied with the information specified below a minimum. This information must be presented and explained to the ER as part of the formal handover procedure in accordance with the requirements of I.S. EN 62446:2009.

- Basic system information (parts used, rated power, installation dates, etc.)
- System designer information
- System installer information
- Wiring diagram, to include information on:
 - Module type & quantities
 - String configurations
 - Cable Specifications – size and type
 - Over-current protective device specification (where fitted) – type and ratings.
 - Array junction type, location and rating
 - Array over-current protective devices (where applicable) – type, location and rating
 - Details of all earth/bonding conductors – size and connection points
 - Details of any connections to an existing Lightning Protection System (LPS)
 - Details of any surge protection device installed (both on AC and DC lines) to include
 - Location, type and rating
 - AC isolator location, type and rating
 - AC over-current protective device location, type and rating
 - Residual current device location, type and rating (where fitted)
- Module datasheets
- Inverter datasheets
- Mounting system datasheets
- Fall Prevention System user operation, maintenance, warranty information and datasheets
- Operation and maintenance information, to include:
 - Procedures for verifying correct system operation
 - Checklist of what to do in case of a system failure
 - Emergency shutdown/isolation procedures
 - Maintenance and cleaning recommendations (if any)
 - Considerations for any future building works related to the PV array (e.g. roof works).
- Warranty documentation for PV modules and inverters – to include starting date and period of warranty
- Documentation on any applicable workmanship or weather-tightness warranties
- Test results and commissioning data
- System Monitoring – Operating Procedures, Hardware, Software information.

OPERATING & MAINTENANCE MANUAL

On completion of the works, the Contractor shall provide four copies each of the record drawings, log-book and Operating and Maintenance (O&M) manuals. The manuals shall be comprehensive and clear in order to enable a dedicated staff member to operate and maintain the installation to best practice levels without the need for specialist personnel or consultants. O&M manuals shall be specific to the system installed.

The Contractor shall submit a copy of each of the record drawings, log-book and Operating and Maintenance Manuals for the Engineer to review before final copies are provided.

On completion of the works and immediately following the testing and commissioning of the system, the Contractor shall arrange and present a training session for nominated staff targeted at the operation of the systems. The session shall include a full demonstration of the systems installed. Any faults/alarm conditions shall also be simulated, using special equipment, if necessary, to encompass the full range of readouts that are likely to be encountered.

PHOTOVOLTAIC SYSTEM LIFE EXPECTANCY

Photovoltaic modules and associated structures shall have a minimum life expectancy of 30 years and inverters shall have a minimum designed life expectancy of 15 years. The tenderer shall include with their Works Proposals required evidence (satisfactory to the Employer) that establishes the claimed life expectancies. The Works Proposals shall also include pro-forma collateral warranties in respect of the PV modules and inverters with a wording acceptable to the Employer, in favour of both the Minister for Defence and the Contractor. The equipment supplier shall be jointly and severally liable for the repair or replacement of items that fail during the warranty periods.

Photovoltaic modules and Inverters shall have a product warranty against structural failure of at least 5 years.

Photovoltaic modules shall also have a minimum power warranty of 25 years and inverters shall have a minimum power warranty of 10 years. The first 10 years warranty shall guarantee at least 90% of the specified minimum power output rating and at least 80% of the specified minimum power output rating for 25 years from Substantial Completion of the installation.

The warranty descriptions shall explicitly identify the term of the warranty, confirmation of supply and installation of product that remain in warranty (labour and material breakdown), provisions for transfer or assignment of the warranty and any special conditions that are unique to the specific equipment.

PROVING OF PV OUTPUT

The PV installation will be deemed to have met the requirements of the Specification when, after two months of production has been achieved, the calculated output return in kWh as specified by the Contractor in their Works Proposals has been achieved. Where production falls below the required standard, the actual Solar Radiation for the month shall be applied and the production figures must then meet the estimated output.

5% of the overall tender price will be withheld for a period of two months until output capacity is demonstrated.

The output shall be calculated using the formula below:

$$\text{Output (kWh)} = 0.8 \times \text{kWp} \times S \times Z_{pv}$$

Where:

KWp = installed peak power

S = month solar radiation

Z_{pv} = over shading factor (typically a value of 1 where placed on a roof with no shading)

In the event of the output failing to reach the required levels the Contractor shall be required to present proposals to redress the deficit for the consideration of the Employers Representative. In the event of the proposals being rejected a dispute shall be deemed to exist.

DESIGN INFORMATION

The Contractor shall use the figures in below table in calculations to ensure fair comparison. These figures are taken from Sustainable Energy Authority of Ireland (SEAI) – Best Practice Guide for Photovoltaics (PV)

Annual Solar Radiation (kW/m²)

Tilt of Collector	S	SE/SW	E/W	NE/NW	N
Horizontal	963	963	963	963	963
15°	1036	1005	929	848	813
30°	1074	1021	886	736	676
45°	1072	1005	837	644	556
60°	1027	956	778	574	463

APPENDIX A

TYPICAL INFORMATION REQUIRED

TO BE HANDED OVER TO THE EMPLOYER'S REPRESENTATIVE

ON COMPLETION OF THE PROJECT AND TO BE MADE AVAILABLE TO THE PSDP TO ALLOW

COMPILATION OF THE SAFETY FILE

- a. Identification of and locations of all potentially hazardous materials (eg certain insulation materials, two pack and other special paint coatings) and installations and the procedures to be followed in order to minimise the associated risks:
 - i) in the daily use of the building or structure
 - ii) when maintenance, repair, refurbishment or replacement of the materials or installations is to be undertaken.
- b. Marked up construction drawings showing how the work was built where it differs from the requirements shown on the drawings issued to the Contractor. Information may be provided in the format of drawings marked up by hand in sufficient detail to allow the design staff to prepare the 'as built' drawings.
- c. Specifications and details of pipe and cable run layouts and fixed systems. Information may be provided in the format of drawings marked up by hand in sufficient detail to allow the design staff to prepare the 'as built' drawings.
- d. Details of fixed equipment and systems including charts and manuals specifying the operating procedures and maintenance requirements and procedures.
- e. Test and commissioning certificates for mechanical and electrical installations installed or altered as part of the Works.
- f. Design criteria, where design work formed part of the Contract, for structural elements and for electrical and mechanical systems.
- g. Details of existing services and utilities encountered - either underground or in buildings - during the course of the Works, stating their location and describing them.