

Claycastle Watersports Facility

New Development

Mechanical Installations Specification

MECHANICAL INSTALLATIONS

**Claycastle
Youghal
Co. Cork**

Cork County Council

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Appendix	Mechanical installation pricing document	Separately attached



1 Introduction

1.1 Introduction / scope of project

This specification together with the project layout drawings & equipment schedules is in respect of the [mechanical] services installations in the project.

1.2 The project

The project represents the new proposed Waterports activity facility at Claycastle, Youghal, Co. Cork.

1.3 Limitations to use of site

The area of the works may be in a location where specific regulations/standards /requirements apply. The area may not be used for any purpose other than the works.

Agreement must be reached with the architect / client on access, deliveries, location of crane, location of compound on or adjacent to the site.

1.4 Adjacent Buildings, Etc.

The site shares a boundary with existing buildings / services.

1.5 Existing Services

The site or in the close proximity of the site has existing live services present.

1.6 Program

Anticipated building program

Description	Start	Duration
<i>Building program</i>	As per main contract program	As per main contract program

1.7 Definition of meanings herein assigned.

The client	means	Cork County Council
The architect	means	Cork County Council
The structural engineer	means	RKA Consulting Engineers
The quantity surveyor	means	Karl Slyne QS
The engineers	means	DKPartnership
The contractor / sub-contractor	means	The MECHANICAL CONTRACTOR
The main contractor	means	The nominated main contractor – TBA
Approved	means	Approved by the engineers in writing
Provisional sum / PS/PC sum	means	Provisional sum

1.8 Tender note.

There as the specification / layout drawings / equipment schedules are compiled in good faith and checked on departure it is the tendering contractors responsibility to indicate to the engineer in writing if documents listed in the tender schedules are missing from the package on receipt of the package. Late notification will not immunize the tendering contractor from the set tender return date. Each and every item requires to be priced individually in each section. An incomplete schedule of prices may not be considered. The lowest tender may not necessarily be successful.

1.9 General scope of works.

Mechanical installations as to enclosed drawings and specifications briefly defined as ;

All area's
Mains water installation
Hot and cold water installation
LTHW heating installation for hot water
Ventilation installation
Above ground foul & waste water installation
Pipe & duct work containment installation

1.10 Party walls

Where services are to be mounted or recessed on/in a party wall or fire rated wall the fire rating and noise transfer integrity is to be maintained to the required standards. The contractor, prior to working on party walls, shall ensure that whatever works are to be executed in/on the party / fire rated wall that the contractor has the express written confirmation from the main contractor to proceed with such works.

1.11 Fire seals, fire sealing, fire stopping.

Each and any service penetrating a fire rated wall, partition, façade, floor, ceiling etc construction element is to be fire sealed using fire wraps, seals, stops, foam to comply to BS 476 Part 22 / 23, Section 6, 60 minutes. Fire and sound integrity is to be maintained on all party walls between units meaning that no services can be recessed into the party walls unless a certified body certifies the construction method to comply to the fire and sound regulations and or specifications set and agreed in writing by the fire consultant or fire officer.

1.12 Auxiliary certification.

This project is subject to the BCaR compliance procedures and as a result the contractor shall, as part of the contract works, issue auxiliary BCaR certification where the contractors works have no design input or design BCaR certification where the contractors works have a design input. The relevant form shall be issued by the main contractor.

1.13 Air tightness.

Airtightness of the building is critical to the energy rating (BER) targeted hence each and any service penetrating the air tightness barrier on the envelope of the building i.e. external wall, façade, floor, ceiling to attic or roof etc is to be sealed using flexible mastic or similar product to maintain the airtightness of the said construction element. Any service penetration to be made through the envelope shall be identified and notified to the main contractor prior to executing same.

1.14 Particular works note.

As the building is to be constructed without any ceilings/ceiling voids the building services installations are all installed exposed in the plant rooms and recessed in all other rooms. Therefore it requires particular attention to neatness and workmanship. Any exposed external metallic parts are to be made of marine 316 stainless steel or any other in writing confirmed to be approved for sea side locations materials. Apart from the plant rooms, no pipe work is to be exposed. Where pipes/services are to be run in pre cast, they are to be fitted before the pour. No chasing will be allowed. All pipe ends are to be properly capped so that no debris can enter the pipe.

2 General specification.

2.1 Codes and Standards.

This contract shall be subject to and in accordance with the following : :

- A) The relevant Irish, British and European Standard Specifications for materials and equipment.
- B) The Factories Act current edition.
- C) The Safety, Health and Welfare at Work Act current edition.
- D) Any Standard or Code of Practice referred to in the Contract Documents or any other Standard or Code of Practice that may be substituted therefore, shall be held to be the latest edition published three months prior to the last date for submission of tender.
- E) Any special regulations issued by the local electricity, gas or water authority.
- F) Manufacturer's recommendations and requirements.
- G) National Rules (IEE / IS10101) wiring for Electrical Installations, Latest Edition.
- H) The Local Authority and relevant Local Government Bye Laws.
- I) Local Utility supply companies
- J) CE approved.
- K) The approval and satisfaction of the Engineer.

2.2 SI Units.

The International System of Units (SI) shall be used for all designs, specifications, drawings, submissions and tenders.

2.3 Good Practice.

Where, and to the extent that materials, products and workmanship are not fully specified, they shall be

- a) The best quality and suitable for the purpose of the works stated in, or reasonably to be inferred from, the Contract Documents.
- b) In accordance with good engineering practice.

2.4 Nominated Suppliers/Supplies.

Where any item of plant, equipment or works is specified to be from a nominated supplier or manufacturer, it is intended that the particular supplier or manufacturer is be used in order to ensure a certain quality of supply.

2.5 Free issue Suppliers/Supplies.

Where the client decides to supply his or her own fittings/equipment/Suppliers prior or during the execution of the contract the contractor shall credit the client with the appropriate amount. The contractor shall fit/install/connect the goods as per contract but is entitled to a re-stocking charge if any fittings/equipment has been purchased and delivered to site.

2.6 Single Sources.

Where a choice in manufacturer or source of supply is allowed for any particular product or material, the whole quantity required to complete the work must be of the same type, manufacture and/or source. Changes must be approved by the Engineer. The Contractor shall provide written evidence of sources of supply when requested by the Engineer.

2.7 Samples.

Where approval of products or materials is specified, the Contractor shall submit samples or other evidence of suitability. Order shall not be confirmed or materials used until approval has been obtained. Approved samples shall be retained on site for comparison with products and materials used in the works and the samples shall be removed when no longer required.

2.8 Approvals.

Where, and to the extent that products, materials or work are specified to be approved, or the engineer instructs or requires that they are to be approved, the approval must be in writing from the engineers, and the same must be supplied and executed to comply with all other requirements and, in respect of the stated or implied characteristics. Inspection or other action by the Engineer other than the written approval must not be taken as approval of materials, products or work, unless the Engineer so confirms in writing in express terms, referring to:

2.9 Variations (changes).

There, and to the extent that designs, installations, products, materials or work as outlined in the project specifications, equipment schedules and/or layout drawings are to be revised or that additions/omissions to the works are to be executed, they are only to be executed on receipt of a DKP Engineers Instruction. Where it is absolute necessary to execute a variation forthwith and the afore mentioned procedure would prolong this execution and would therefore be subject to claims from other trades/main contractor/client etc., the contractor shall use a DKP Day Works / Variation Approval Certificate which are issued to the contractor on commencement of works or during the execution of the contract works.

DKP Day Works / Variation Approval Certificates are to be fully completed and duly signed prior to execution of any variations by the engineer, architect, client or other appointed design team member with the authority to sign such document.

The contractor shall forward a copy of the signed DKP Day Works / Variation Approval Certificate(s) or DKP Engineers Instruction(s) with his/her variation claim.

All variation claims shall list separately the material and labour costs with the number and type of man hours included for each and every item.

Variation claims forwarded for payment without a DKP Engineers Instruction or signed DKP Day Works / Variation Approval Certificate and/or not properly illustrated will NOT be entertained.

2.10 Day works.

There, and to the extent that designs, installations, products, materials or work as outlined in the project specifications, equipment schedules and/or layout drawings are to be revised or that unscheduled day works to the works are to be executed, they are only to be executed on receipt of a DKP Engineers Instruction.

Where it is absolute necessary to execute day works forthwith and the afore mentioned procedure would prolong this execution and would therefore be subject to claims from other trades/main contractor/client etc., the contractor shall use a DKP Day Works / Variation Approval Certificate which are issued to the contractor on commencement of works or during the execution of the contract works.

DKP Day Works / Variation Approval Certificates are to be fully completed and duly signed prior to execution of any day works by the engineer, architect, client or other appointed design team member with the authority to sign such document.

The contractor shall forward a copy of the signed DKP Day Works / Variation Approval Certificate(s) or DKP Engineers Instruction(s) with his/her day works claim.

All day works claims shall list separately the material and labour costs with the number and type of man hours included for each and every item.

Day works claims forwarded for payment without a DKP Engineers Instruction or signed DKP Day Works / Variation Approval Certificate and/or not properly illustrated will NOT be entertained.

2.11 Layout drawings & schematics.

The layout drawings & layout schematics issued as part of this specification are prepared in good faith to indicate the general positions, routes, runs etc. of all services & fittings however the actual positions, routes, runs etc of the services & fittings maybe different and determined by the building structure or other reasons.

The contractor, prior to submitting the tender, is to visit the project site and must familiarise him/herself with the project and determine/identify all positions, routes, runs etc. of all services & fittings or seek clarification from the engineer in writing as no claims for additional materials will be entertained.

2.12 Materials and Equipment Supplied.

Materials and equipment supplied shall be new, unless otherwise specified. Materials and equipment shall be handled, stored and fixed with care to ensure that they are not damaged when incorporated into the works.

2.13 Sub-contracts

Sub-contracts or sub-contracting of any part of the contractors works other than nominated sub-contracts specified by the engineer are **not** permitted unless the proposed sub-contractor is approved in writing by the engineer. When specialist works are to be carried out on specialist installations as part of the contractors work not being nominated under the contract works the contractor shall seek written confirmation and approval from the engineer prior to engaging/appointing such specialist works sub-contractors.

2.14 Manufacturer's Recommendations.

All materials and equipment supplied shall be handled, stored, prepared and used or fixed in accordance with the manufacturer's recommendations. The Engineer shall be informed if these conflict with any other specified requirement. Copies of manufacturer's recommendations shall be provided for the Engineer when requested.

2.15 Products.

Products shall be new unless otherwise specified. Products shall be handled, stored and fixed with care to ensure they are not damaged when incorporated into the works.

2.16 Storage on site.

The contractor shall be responsible for the provision of suitable storage for the plant or materials to be supplied to the works in accordance to the building program.

2.17 Waste on site.

The contractor is responsible for the removal of any waste materials from the existing / new services installations from the work place to the waste skip or waste area.

The actual waste skip or other equipment will be supplied by others..

2.18 Power supplies.

If a power supply is not available on site for the carrying out of all required contract or other works, the contractor shall be responsible for his own power supply.

2.19 Give notice prime cost or provisional sums

Where provisional PV/PS/PC sums are provided for the execution of installations the Contractor shall give due notice in writing to the Engineer, in order that such installations may be resolved before the trades men whose attendance is required have completed their work elsewhere in the building and that the lead-in time of such installations/equipment does not effect the program in any way.

No claim for extra remuneration on account of their NONE-completion before such date shall be made.

2.20 Tools & equipment.

Contractors tendering for the work will be deemed to have satisfied themselves as to the conditions of the site and structure regarding the requirement of all tools & equipment necessary to execute the proposed works.

They shall include in their tenders if and as necessary for all tools, equipment, special equipment, ladders, scaffolding, hire of special tools that may be required for execution of the Contract.

Claims for additional costs for this section will NOT be entertained.

2.21 Health & Safety statement.

The contractor shall issue prior to commencement a health & safety statement to the Main contractor and same shall be of an acceptable standard to the Project Supervisor Construction Stage (PSCS) satisfaction.

2.22 Submittals.

In due time and prior to commencement of any MEP/building services construction works the contractor shall submit all proposed materials, equipment, appliances, for the works for approval of the engineer.

2.23 Quality statement.

The contractor shall issue prior to commencement a quality statement to the Main contractor and same shall be of an acceptable standard to the Project Quality coordinators satisfaction.

2.24 Labour and labour cost.

The contractor shall allow in the tender the cost of ALL labour required to execute the works up to and including completion and maintenance period. The work may involve working outside standard daytime hours and/or night time and the contractor shall allow for all costs associated with this.

2.25 Changes.

Any work which is not inferred by this specification, equipment schedules and/or drawings and is deemed necessary or not necessary for the satisfactory completion of the contract shall be termed "variations" (changes) or "day works". No variations / changes are to be carried out without the written approval of the engineer.

2.26 Award of Contract.

The Clients do not bind themselves to accept the lowest or any tender.

The tender submitted by the contractor shall remain open for a period of 90 calendar days from the date of receipt of tender. The award of contract will be made to the Contractor whose tender has been determined to be the lowest evaluated tender and who meets the required standard of capability and financial responsibility. costs for this section will NOT be entertained.

2.27 Labour.

Non but fully qualified and competent tradesmen together with their necessary labourers or helpers shall be employed by the Contractor on the works and the whole of the same shall be carried out and completed in the best and most substantial manner. Contractors tendering for the work will be deemed to have satisfied themselves as to the conditions obtaining in the district regarding the recruitment of labour, both skilled and unskilled. They shall include in their tenders for all labour and related cost including travelling time, overnight, overtime, holidays or any demanded or any other special conditions that may affect the cost of labour during the execution of the Contract. Claims for increased costs of labour will NOT be allowed as the wage and price variation clause has been abolished for the purpose of this contract.

2.28 Bill of quantities.

The successful contractor shall provide the engineer with a priced Bill of Quantities prior to signing the contract. The Bill shall list separately the material and labour costs with the number of man hours included for the tender of all items. The complete Bill shall be forwarded to the engineer within three (3) weeks of acceptance of his tender.

2.29 Tender sum.

The tender sum as submitted in the tender form is a fixed price for the duration of the building program as outlined in this specification.

2.30 O&M manuals.

The contractor shall operate the complete works under 100% load and issue full operating and maintenance manual / instructions of all equipment, systems and installations to the project safety file coordinator prior to practical completion as issued by the engineer.

2.31 Certificates and retention.

The engineer shall issue completion / progress certificates for work carried out and materials supplied as estimated by the engineer at set intervals as outlined under periods of measurement.

Full retention will be certified up to and including practical completion, half of the retention will be certified on virtual completion and the balance will be certified on final completion at the end of the maintenance period subject to clause "Maintenance / defects liability period".



2.32 Periods of progress/valuation and final progress/valuation measurement.
As per main contract

2.33 Lead in time progress/valuation certification.
As per main contract

2.34 Time for honouring progress/valuation certification.
As per main contract.

2.35 Practical completion.
Practical completion means when the installation is deemed completed by the engineer at the start of the maintenance period.

2.36 Maintenance / defects liability period.
The work is to be maintained in good running order for a period of "as per main contract" after completion of the contract. Any defect developing in the system during this period is to be rectified and made good at the contractors own expense.
This clause is for defects arising out of faulty manufacture, workmanship and failure to meet the requirements of this specification and the relevant Standards and Codes of Practice.
In the event that the Contractor refuses to rectify the defect within a reasonable period the engineer has the power to have the work done by a competent third party and to deduct the total costs of such work from the contractors own account, without prejudice, to any other claim which may arise out of the refusal of the contractor to make good the defects.

2.37 Percentage of certified value retained.
As per main contract.

2.38 Contractual requirements.
The contractor is to engage in the following contracts prior to the commencement of any works.
As per main contract.

2.39 Insurances.
The contractor must have adequate insurance to cover Employers, Public, Fire & Explosion and Theft liabilities and produce these to the engineers when awarded the contract.
The contractor shall maintain the following minimum insurance cover for the duration of the installation contract and full building warranty period.
Employer liability : € **6,500,000**
Public liability : € **13,000,000**
Where the contractor is to have design responsibility and is to submit auxiliary design certification the contractor must have the flowing additional insurance cover.
Professional indemnity : € **6,000,000**

2.40 Building & existing services Protection.
The contractor shall ensure that no damage is caused to the existing services , structure, fabric or finishes of buildings where electrical work is undertaken. The contractor shall prepare/project existing area/equipment/services where possibly damage can occur and shall make good all openings, finishes and damage which has occurred as a result of this work.

2.41 Builders Work.

All builders work deemed necessary to install the installations as per this specification, equipment schedules and layout drawings defined as chasing, make openings >50mm, coring >50mm is the responsibility of the main contractor.

Cores / openings of 50mm or less in walls, partitions, ceilings, floors, beams or other timber/steel/concrete structures and any other minor builders work items are the responsibility of the contractor.

Excavations, concrete channelling, concrete ducts, external supply & service ducts and tank supports are to be carried out by the main contractor unless stated otherwise.

The contractor shall issue a builders work drawing or listing/schedule within 4 weeks of acceptance of his/his tender. All setting out of cable & tray runs, etc., shall be agreed with the project M&E coordinator before any work commences and to facilitate this agreement the Contractor shall give full particulars to the project M&E coordinator with regard to required chases, recesses, holes and any other builders works which the contractor intends to undertake as part of his works, so that subsequent delays and alterations can be avoided.

The contractor's tender sum is to include for such builders work as defined in this specification and the setting out or relevant documentation for builders works to be executed by others.

2.42 Setting Out.

The Contractor shall set out the whole of the works and be responsible for the correct positioning of all equipment and fittings including all builders work to be executed by the contractor and main contractor which will be necessary for the contract.

The exact courses and routes of all electrical services and related containment and locations of appliances, equipment, fittings shall be approved by the project coordinator, architects and engineer before the installation commences.

2.43 Decoration.

The contractor shall allow in the tender for the once loosening, removing (if required) & retightening of equipment/fittings mounted on/against walls, ceilings etc required to be removed for painting/decorating the surface on which it is affixed too.

2.44 Mechanical Protection.

In all cases where wiring systems emerge from floors, the Contractor shall provide supplementary mechanical protection within a vertical distance of 1.8 meters from the finished floor level where these systems remain to be exposed.

2.45 Fire Protection.

The contractor is to allow in the tender for fire protection where mechanical systems/services pass through / penetrate fire rated elements of the building construction such as walls, floors, roofs, ceilings, partitions etc. Any openings remaining after the passage of the electrical systems shall be fire sealed in accordance with the fire regulations, current edition.

The contractor shall supply & install a suitable intumescent wrapping or seals to all services where they penetrate a fire barrier or fire rated construction whether or not indicated on the layout drawings.

Fire protection shall be to BS 476 Part 22 / 23, 60 minutes.

The contractor shall issue the certification of the proposed products to the main contractor for approval prior to commencing the relevant works.

2.46 Flow test.

The contractor shall carry out a flow tests on completion of the works on all L.T.H.W. Heating / cooling circuits, H&CW appliances and foul/waste water pipe work to ensure the required design standard and continuation of full bore. A commissioning report outlining the results of the flow test is to be submitted to the engineer prior to penultimate account submission.

2.47 Flushing.

After testing and corrective work the entire system shall be flushed with fresh water and refilled with the addition of suitable additives.

2.48 Commissioning / testing - general.

The contractor shall commission all systems/appliances/equipment at 100% load and issued the relevant test results and commissioning reports to the engineer prior to practical completion.

2.49 Testing.

Hydrostatic testing.

Two number hydrostatic tests shall be carried out on each individual pipe work installation in the presence of the project coordinator or main contractors building services representative.

Hydrostatic test shall have a minimum duration of 6 hours to the following test pressures :

0.5 Mpa on all Heating services pipe work.

1.5 Mpa on communal / district Heating services pipe work

0.5 Mpa on all Hot & cold water services pipe work.

1.0 Mpa on all water mains services pipe work.

2.0 Mpa on communal / district water services pipe work.

1.0 Mpa on all fire hydrant services pipe work.

0.5 Mpa on all Fire hose reel services pipe work.

1.0 Mpa on all Fire sprinkler services pipe work.

Test results shall be recorded and issued to the engineer immediately after testing.

Test are to be conducted on 2 separate occasions ;

1) On completion of "first fixings"

2) On practical completion.

On completion of the above tests the Contractor shall complete and sign a "Completion Certificate" and shall furnish 1 No. copy to the Engineer prior to penultimate account submission.

Where connection to a public grid supply service is required, the Contractor shall provide the relevant grid provider with an identical original Certificate, together with any relevant information or documentation as requested, in order to comply fully with the national grid supply providers pre-connection requirements.

2.50 Ventilation testing.

The contractor shall in the presence of the project coordinator or main contractors building services representative conduct a balancing and bag (flow rate) test covering fan speeds, and air quantities of all supply and extract terminals. The balancing test shall also include the volume of air supplied being supplied & re-circulated or exhausted from various rooms and the actual air being handled at the individual return & exhaust air outlets. Before the installation is passed over to the operator all fans, coils, ducts are to be thoroughly cleaned and made dust free.

Test results shall be recorded and issued to the engineer immediately after testing.

Test are to be conducted on 2 separate occasions ;

1) On completion of "first fixings"

2) On practical completion.

2.51 Gas services testing. N/A

Two number pressure tests shall be carried out on each individual pipe work installation in the presence of the project coordinator or main contractors building services representative.

Pressure tests shall have a minimum duration of 6 hours to the following test pressures :

3 x the operational / working pressure of all low pressure gas services pipe work.

Test results shall be recorded and issued to the engineer immediately after testing.

Test are to be conducted on 2 separate occasions ;

1) On completion of "first fixings"

2) On practical completion.

2.52 Sub-contracts or other installations not executed by the contractor but part of the project works.

Where work is executed by others in particular area's of the project and are deemed fall under the project mechanical installation works and could effect the integrity of the contractors overall installation certification it is the responsibility of the contractor to ensure that this work is covered by a sub-completion / compliance certificate issued by others and is satisfied that that work is carried correctly and according to the required standards and project requirements.

The contractor is responsible for the complete installation, not having sub-completion / compliance certificates for work carried out in area's/items not executed by the contractor will put the responsibility on the contractor

2.53 Record test documentation and certification.

On completion of the above tests the Contractor shall complete and sign a "Completion Certificate" and shall furnish 2 No. copies and the original to the Engineer prior to penultimate account submission.

Where connection to a public grid supply service is required, the Contractor shall provide the relevant grid provider with an identical original Certificate, together with any relevant information or documentation as requested, in order to comply fully.

3 Particular specification.

3.1 BCaR requirements.

Particular items to be sub-mitted.

- 01 Gas installation statutory national test & completion certification. - If applicable
- 02 Heating pipe work pressure test and certification.
- 03 Plumbing pipe work pressure test and certification.
- 04 Heating system CIBSE Test & Commissioning certification.
- 05 Plumbing system CIBSE Test & Commissioning certification.
- 06 Ventilation system CIBSE Test & Commissioning certification.
- 07 Ventilation terminal air flow test at boost and set-back modes.
- 08 CE certification all services, materials, appliance/equipment
- 09 BCAR ancillary national compliance certification : Commencement, design & inspection.
- 10 As-build/constructed heating, plumbing and ventilation plan drawings
- 11 Maintenance & operation manuals of system and major appliances/equipment.
- 12 Simple 1 page heating / plumbing / ventilation system operation principle and controls description.
- 13 Submittals for approval for all equipment and materials.
- 14 Compliance certification for all fire spread stopping materials applied.

3.2 Note to drawings

Layout drawings as part of this specification representing risers, runs, routes & locations of cable, trunking, conduit, ducts, fittings and equipment are indicative and may not include all details of such risers, runs, routes & locations of cable, trunking, conduit, ducts, fittings and equipment required to comply to the relevant mechanical, electrical & fire regulations. It is the responsibility of the contractor to ensure that all cable, trunking, conduit, ducts, fittings and equipment required to comply to the relevant mechanical, electrical & fire regulations have been included in the tender submission. No claims will be entertained for additional cable, trunking, conduit, ducts, fittings and equipment relating to this issue.

3.3 Local Authority & Local Government Bye Laws notice.

All relevant DKP specifications, equipment schedules & drawings are prepared in good faith to the required standards however it is the contractors responsibility to ensure compliance of all work carried out under this tender & contract to any Local Authority regulations and Local Government Bye Laws as part of this tender & contract. The contractor shall ensure that prior to executing any works that these Local Authority regulations and Local Government Bye Laws have been complied to and confirm same to the engineer in writing.

3.4 Determination of area's.

The installations are to be executed in the classified area's as listed below indicating the services to be recessed or exposed into/to any walls, floors, partitions, roofs, ceiling voids or any other construction elements and what to what classification, extend or type the containment of such services shall be.

Area	Recessed	Exposed	Classification	Extent	Type
Showers / Toilets / Changing room area	Yes	No	As required	As required	As required
Roof, Plant / Equipment rooms	No	Yes	As required	As required	As required

3.5 Services routes.

The main routes where possible should be in corridors, common areas. In tight spaces the horizontal services can be bracketed securely to the ceiling soffit, for main routes the horizontal services are carried on suitable services trays. **See note 1.14**

3.6 Pipe work.

Pipe work / fittings for heating & cooling services..

Pipe systems for sealed heating or cooling systems shall be ;

a. Copper pipe to BS EN 12449 or BS EN 1057 .

Seamless copper tube thermally insulated throughout all area's including voids, floors, floor voids, ceiling voids, partitions etc..

b. Steel tubes to BS EN 10255 / BS 1387 light duty.

Seamless steel tube suitable for screwing or welding insulated throughout all area's including voids, floors, floor voids, ceiling voids, partitions etc.

c. Cross linked polyethylene (PE-X) to BS 7291

Seamless thermoplastics pipe thermally insulated throughout all area's including voids, floors, floor voids, ceiling voids, partitions etc..

External in ground: Pipe systems directly buried to ground for sealed heating or cooling systems shall be ;

a. Pre insulated cross linked polyethylene (PE-Xa) HDPE to BE EN 14419, BS EN 15698 (2 pipe systems).

Seamless thermoplastics pipe (factory) thermally pre insulated.

b. Pre insulated steel pipe to BS EN 253.

Seamless steel tube (factory) thermally pre insulated.

3.7 Pipe work / fittings for mains water, hot & cold water services.

1. Internal: a. Cross linked polyethylene (PE-X) to BS 7291

Seamless thermoplastics pipe thermally insulated throughout all area's including voids, floors, floor voids, ceiling voids, partitions etc..

b. (Mains and cold water services only) High & medium density polyethylene pipe work to BS EN 12201.

Seamless thermoplastics pipe thermally insulated throughout all area's including voids, floors, floor voids, ceiling voids, partitions etc..

2. External in ground: a. (Mains and cold water services only) High & medium density polyethylene pipe work to BS EN 12201. Seamless thermoplastics pipe for pressurised potable water services.

3.8 Pipe work thermal insulation.

The following thermal insulation standards are a minimum requirement.

All heating / cooling and hot water services pipe work throughout

(including floors, floor voids, wall, partitions, ceilings, ceiling voids, attics etc.) shall be thermally insulated with PUR / PIR insulation @ 0.020W/mK : 20mm insulation for Ø15 to Ø25mm, 25mm insulation for Ø32 to Ø50mm or equivalent achieving the same thermal resistance. All cold water and water mains services pipe work throughout the dwelling (including floors, floor voids, wall, partitions, ceilings, ceiling voids, attics etc.) shall be thermally insulated with PUR / PIR insulation @ 0.020W/mK : 15mm insulation for Ø15 to Ø25mm, 20mm insulation for Ø32 to Ø50mm or equivalent achieving the same thermal resistance.

External or in ground.

Where pipe work / thermal insulation is exposed or buried the pipe / insulation system is to be a proprietary system particularly engineered and manufactured for the expected conditions and in particular to water ingress including continuous submersion under water and have the same thermal resistance requirements as set out in section a, b and c.

3.9 Pipe expansion.

All pipe work systems must be sufficiently flexible to accommodate the movements of the components as they expand. Expansion joints are to be incorporated where the pipe work or joints maybe under undue stress due to expansion on the pipe work, relevant anchor points and type of pipe material applied.

Anchor or support points may have to be adapted to slide without causing long time damage to the pipe work.

Expansion maybe achieved by means of full loop, horse shoe loop, U loop, sliding joint and/or expansion bellows suitable for the relevant service. Expansion joints are to be applied in terms of preference : i.e. axial displacement is better than angular, which in turn, is better than lateral. Angular and lateral movement should be avoided wherever possible.

3.10 Pipe supports.

All pipe work either running horizontally or vertically shall be supported in accordance with EN 13480, securely

fixed to the surface using the correct maximum bracket distances using a PVC sleeve where metal brackets are in contact with the pipe work.

Where pipe work requires expansion suitable pipe brackets are to be used to allow for any lateral, axial, or angular movement without the pipe work being anchored.

3.11 Pipe sleeves.

Where pipes are fitted through walls and floors, a PVC sleeve of appropriate diameter including pipe insulation, shall be used to finish flush with the finished surface to the satisfaction of the architect.

Where pipes are fitted through timber studs, beams and floors a PVC sleeve of appropriate diameter excluding pipe insulation shall be used to finish flush with the finished surface to the satisfaction of the architect.

3.12 Run of pipe work.

All pipe work shall be neatly installed using horizontal or vertical runs only as to the drawings and the satisfaction of the engineers.

3.13 Extent of work.

The contractor is to allow for the supply & installation of the complete installation for the supply & extract air system of the complete HVAC installation as shown in the drawings and equipment schedule. The contract is to allow for the supply & installation of fans & controllers but these will be electrically connected by others.

Ventilation services.

3.14 Duct work.

All duct work shall be mild steel hot dipped galvanised to BS 2989, BS EN 10147:1992 and comply to BS 5588:part 9 and to hvac specification DW142, DW/144 Part 7 and erected as shown in the drawings.

Support brackets shall be provided where necessary according to DW142. All duct work and associated mountings, brackets etc. where in contact with the general structure of the building shall be isolated with suitable anti-vibration mountings, securely fixed using the correct maximum bracket distances and sound insulated to the engineers satisfaction.

3.15 Bends, elbows & auxiliaries.

All fittings, termination sets, spigots, condensation traps, bends, transformations & tapers etc. shall be pre-fabricated mild steel hot dipped galvanised to BS 2989 and comply to hvac specification DW142 and erected as shown in the drawings. Support brackets shall be provided where necessary according to DW142.

All fittings etc. and associated mountings, brackets etc. where in contact with the general structure of the building shall be isolated with suitable anti-vibration mountings, securely fixed using the correct maximum bracket distances and sound insulated to the engineers satisfaction.

3.16 Fire dampers.

The contractor shall provide & install fire dampers/seals to all ducts/ventilation services passing through fire barriers and fire rated walls, compartments and floors as required by the fire authority complying to DW/144 part 7, section 22 whether or not indicated on the drawings.

The contractor shall only use a certified product for this purpose and issue the engineer with a fire certificate of these products on completion.

All fire & smoke damper shall be accompanied with a fire test certificate to be issued to the engineer.

The fusible linkage shall be designed so that the damper closes immediately if the temperature reaches 68 °C.

3.17 Isolation, balancing & control dampers.

The contractor shall provide & install isolation, balancing or volume control dampers where required and as shown in the drawings all complying to DW/144 part 7, section 21.



3.18 Grills, registers & diffusers.

Grills, registers & diffusers shall be installed according to the manufacturers instructions.

All positions shown on the drawings are descriptive and final positions are to be co-ordinated by the contractor to the architects/engineers satisfaction prior to commencement of any installation works.

3.19 Flexible connections / ductwork.

Flexible connections / ductwork shall comply to DW/144 Part7, Sections 25, 26.

Flexible connection shall not impair / restrict the design air flow and terminated properly using drive hose clips to both ends or other approved method. Where possible flexible ductwork should be avoided or kept as short as possible.

3.20 Duct supports.

All duct support systems shall be to DW/144 Part 6 utilising P1000 Unistrud or similar & approved.

3.21 Thermal insulation duct work..

Insulation material shall conform to BS-5422 & BS-5970 and installed to the highest standards (gaps are not permitted) to the satisfaction of the engineer covering ;

a) Recessed internal air duct work on all heated, returned or cooled HVAC systems - in unheated/cooled voids : To be insulated using 50mm flexible fibre mattress with aluminium foil facing taped on the joints with 100mm tape.

b) Exposed internal warm air duct work in ventilation serviced rooms : Un-insulated

c) Exposed internal air duct work on all heated, returned or cooled HVAC systems in plant room or other non-habitable un-treated rooms : To be insulated using 50mm flexible fibre mattress with aluminium foil facing taped on the joints with 100mm tape finished in 20SWG polished aluminium sheet.

d) Exposed external air duct work on all heated, returned or cooled HVAC systems: To be insulated using 50mm flexible fibre mattress with aluminium foil facing taped on the joints with 100mm tape finished in 20SWG polished aluminium sheet

AC installation

3.22 Extent of work.

The contractor is to allow for the complete air conditioning installation as shown in the layout drawings and equipment schedule. The contract is to allow for the supply & installation of indoor units, condensers, controls, drainage and all other items required. Control wiring is to be included in the air conditioning installation tender/construction package, power supplies are executed by the electrical contractor unless otherwise stated.

3.23 Pipe work.

The contractor shall allow for the supply, delivery and installation of all necessary refrigeration pipe work to complete the refrigeration system. The refrigeration pipe work shall be to BS.2871 Part 2, The refrigeration pipe work shall be of copper 99.85% pure. The pipe work supplied shall not exceed the maximum impurities detailed below and the total impurities shall not exceed 0.06% (excluding Ag, Ni, AS and P)

3.24 Supports (Refrigeration).

The refrigeration installation shall conform to BS.4434 Part 1, including any subsequent amendments.

The installation shall also conform to the Code of Practice as published by the Institute of Refrigeration. The pipe work shall be supported with spacing of each support no less than 1m for 3/8" to 7/8" soft copper and 2m for 1/2" to 2 1/8" half hard copper. The supports shall be of the "hydrosorb" type or similar. If slotted cable tray is to be used, then the pipe work shall be tie wrapped to the tray shall be supported as detailed later in this specification. The route of pipe work shall be such to avoid rubbing of pipe against obstruction or there pipe work. The pipe work shall be supported with adequately sized supports to carry the weight of the pipe work, insulation and the contents of the pipe.

3.25 Fittings and Brazing.

Brazed connections shall be used to reduce the possibility of leaks. Socket fittings shall be used for half hard



pipe work. The number of brazed fittings shall be kept to the minimum. Bending shall only be used on fully annealed tubing and elbow fittings shall be used on half tubing. To prevent scaling, all brazed joints shall be made with nitrogen passing through the pipe work. Brazing shall be done with the use of a non-ferrous filler metal or alloy which shall have a high melting point. BS.1845 shall apply to brazing rods, these shall be free of impurities. BS 2871 shall apply to socket fittings for half hard pipe work and brazing shall be in accordance with BS.1723. All brazing operators shall be qualified to carry out such works. Only diaphragm type, bellow type or packed valves shall be used for compressors, liquid receivers etc. Each valve shall have back seating and a seal cap.

3.26 Insulation.

Insulation for refrigeration system shall conform to BS. 6700, BS. 5422 and BS. 476 Parts 5,6 and 7. Only Class 'O' fire performance insulation to the Building Regulation 1985 shall be used, as manufactured by Armstrong or similar & approved. Insulation shall be as directed by the refrigeration plant manufacturers. The insulation shall be run along the entire length of the suction line. The liquid line shall only be insulated if the plant manufacturers so direct or if the surrounding temperature is higher than the temperature of the liquid. All joints in the insulation shall be made with Armaflex or similar & approved non flame adhesive manufactured by Armstrong. No gaps shall be permitted along the entire length of the insulation run.

3.27 Vibration Control.

All dynamic equipment (fan, AC units, etc.,) shall be installed complete with anti-vibration mounting. The isolation efficiency of such mountings shall not be less than 85% efficient and are not to be connected/touching timber structures or other sound carrying structures.

3.28 Condensate systems & pipe work.

Condensate shall be collected and disposed of by a condensate drain line piped to an open site drain as sized and shown in the layout drawings. Or as per manufacturers requirements. The system shall be installed with adequate insulation, trapping and slope to prevent back filling of the pipe work. All condensate pipe work shall be of either UPVC or non corrosive material. The condensate drain line shall be properly trapped to:-

- Permit free drainage
- Prevent entrance of unconditioned air on pull through systems
- Prevent loss of conditioned air on blow through systems
- Prevents insects or rodents from using on open drain lines as access into the AC unit and subsequently into the occupied area

3.29 Coordination of ALL services.

The contractor shall liaise with the project building services coordinator or main contractor's building services coordinator before ANY installation works is carried out. The electrical services routes and locations of equipment shall be designed in conjunction with the mechanical installations and other building services / construction works. The contractors shall submit a layout drawing prior to commencement of installation work, detailing the proposed main services routes to the coordinator and ensure that there are no clashes or cross over's effecting other services, structure, ceiling voids, ceiling, joists, beams etc. All works shall be coordinated in an agreed time scale to avoid any works to be taken down / re-installed and to avoid trade clashes on the contract works site. Only when agreement and approval with the coordinator is achieved installation work can commence.

3.30 Maintaining construction drawings.

It is the contractors responsibility to maintain and update the construction drawings issued by the engineers at commencement and to include all changes to the electrical installations post initial construction issue for the full construction period up to and including completion. This is executed electronically in Autocad format and by hard copy generally on a monthly basis unless the changes are substantial and effecting other designs and or other trades. Before any changes are to be engaged they require to follow the "changes" protocol.

3.31 Metering

The building has a single (external) water meter which will be the part of the external water mains contractor.



3.32 Coordination of ALL services.

The contractor shall liaise with the project building services coordinator or main contractor's building services coordinator before ANY installation works is carried out.

The electrical services routes and locations of equipment shall be designed in conjunction with the mechanical installations and other building services / construction works.

The contractors shall submit a layout drawing prior to commencement of installation work, detailing the proposed main services routes to the coordinator and ensure that there are no clashes or cross over's effecting other services, structure, ceiling voids, ceiling, joists, beams etc.

All works shall be coordinated in an agreed time scale to avoid any works to be taken down / re-installed and to avoid trade clashes on the contract works site.

Only when agreement and approval with the coordinator is achieved installation work can commence.

3.33 Maintaining construction drawings.

It is the contractors responsibility to maintain and update the construction drawings issued by the engineers at commencement and to include all changes to the mechanical installations post initial construction issue for the full construction period up to and including completion.

This is executed electronically in Autocad format and by hard copy generally on a monthly basis unless the changes are substantial and effecting other designs and or other trades

Before any changes are to be engaged they require to follow the "changes" protocol.



4 Mechanical installations.

The sections below are to be priced as separate items in the tender sub-mission

M.01 Preliminaries.

This section shall allow for the general contract preliminaries and cover all the contractors preliminaries including but not limited to the following :

- a) All general preliminaries and obligations covered under this specification including site attendance etc.
- b) **3** no. copies of : Record documentation, Maintenance & operation manuals of all equipment, systems, installations, as build / installed / constructed installation drawings, test results and certification, completion certification and compliance certification.
- c) Spares - allow for the supply of 5% consumables (filters etc)
- d) Main-contractors preliminaries
- e) Insurances, warranties, contract requirements
- f) Maintaining the construction drawings and services coordination.
- g) Construction meeting attendances.
- h) Commissioning.
- i) BCaR certification.
- k) All other sub-contractors requirements as stipulated under this specification and the main contract.

M.02 Main water installation..

a - Extend of work.

This section shall allow for the main water installation excluding the incoming Irish Water mains water pipe and upstand in the plant room extending to the cold water storage tank(s) and potable (drinking water) points as per drawings and/or specifications.

b - Additional information.

The incoming Irish Water mains water pipe and upstand is provided under the underground works contract however the contractor shall allow for a suitable main water stopcock on the upstand.

M.03 Cold water storage tank & booster pump installation.

a - Extend of work.

The contractor shall allow for the supply, delivery, installation, connection and commissioning of the complete cold water storage tank c/w booster pump as per drawings and/or specifications. The installation comprises the complete installation including insulated cold water storage tank, equipment, fittings, pipe, insulation and all other items/requirements deemed necessary.

b - Additional information.

The contractor shall supply and install an insulated cold water storage tank to format 30 as shown in the layout drawings, the tank base is constructed by the main contractor. The tanks shall be complete with overflow, vent pipe, tank connections, drain point and breather pipe including insect mesh and booster pump. The contractor shall ensure that all preparation works by the main contractor is carried out to the manufacturer's instruction.

M.04 Hot & cold water installation.

a - Extend of work.

The contractor shall allow for the supply, delivery, installation, connection and commissioning of the complete *hot & cold water installation* as per drawings and/or specifications. The installation comprises the complete hot water, hot water return and cold water installation in the plant room and from the plant room to all CW/HW/HWR locations / equipment / outlets including pumps, HWR pump, equipment, fittings, valves, pipe, pipe insulation and all other items/requirements deemed necessary. Where *hot & cold water installation* equipment is supplied by others the contractor shall allow for the fittings, pipe, insulation, fitting, connection of equipment and all other items/requirements deemed necessary for such equipment unless otherwise stated in the equipment schedules or layout drawings.

b - Additional information.

Both hot & cold water services are to be insulated to the relevant standard. All WC cisterns and WHB's are to have individual maintenance valves to each cistern. The supply of the calorifiers and auxiliary equipment is supplied under a separate section however the contractor shall allow for the fittings, pipe, insulation, fitting, connection of equipment and all other items/requirements deemed necessary for such equipment in this section. Any wiring & electrical connection of any electrical equipment supplied by the contractor as part of this section is executed by others but the contractor shall ensure that the manufacturers recommendations / instructions and job specifications are implemented correctly.

M.05 Calorifier(s) supply & delivery only.

a - Extend of work.

The contractor shall allow for the supply, delivery and commissioning of the calorifier(s) as per drawings and/or specifications. The installation comprises the calorifier(s) supply complete with the required expansion vessel(s), safety valve(s), check valve(s) and any other items/requirements deemed necessary.

b - Additional information.

Any wiring & electrical connection of any electrical equipment supplied by the contractor as part of this section is executed by others but the contractor shall ensure that the manufacturers recommendations / instructions and job specifications are implemented correctly.

M.06 Supply/delivery - Sanitary ware & brass ware. **By the main contractor.**

M.07 Sanitary ware & brass ware handle/install & connect.

a - Extend of work.

This section shall allow for the handling, installation/fitting and connection of the *Sanitary & brass ware equipment* as supplied by the main contractor and/or as per drawings and/or specifications. The supply & delivery is free issue to the contractor.

M.08 Extract ventilation installation.

a - Extend of work.

The contractor shall allow for the supply, delivery, installation, connection and commissioning of the complete *mechanical extract ventilation installation* as per drawings and/or specifications. The installation comprises the complete installation including extract fans (EV1, EV2, EV3), controls, fittings, duct work, volume control dampers, fire dampers, grills, plenum boxes, duct work insulation and all other items/requirements deemed necessary.

b - Additional information.

Final connections to fans shall be acoustically isolated from all main duct work. Flexible duct work shall be avoided or where deemed necessary shall be kept as short as possible. Each extract system has its own controls based on occupational (PIR) sensors. The ventilation controls are part of the ventilation installation however the wiring & electrical connection of any electrical equipment supplied by the contractor as part of this section is executed by others but the contractor shall ensure that the manufacturers recommendations / instructions and job specifications are implemented correctly.

M.09 Heating installation.

a - Extend of work.

The contractor shall allow for the supply, delivery, installation, connection and commissioning of the complete *Heating installation* as shown in the layout drawings and schematics. The installation comprises the complete installation including the heat pump(s), buffer tank(s), circulation pumps/controls, valves, thermostats, control valves, mixers, expansion, fill, pressurisation set, headers/manifolds, underground pre-insulated MDPE pipe work, drain pipe work, safety pipe work, equipment, fittings, pipe work, insulation etc., all other items/requirements deemed necessary.

b - Additional information.

This section also includes for all 2/3/4 port valves / diverters/mixers, actuators, actuator controllers, gauges, circulation pumps, thermostat pockets, test points and fill/pressurisation & expansion. All LTHW and fill & drain water pipe work in the plant room shall be insulated. The wiring & electrical connection of all equipment is by others but the contractor shall ensure that the manufacturers recommendations / instructions are implemented correctly. The contractor shall allow for a suitable mix of inhibitor for bacteria, corrosion and frost protection.

M.10 Foul & waste water installation

a - Extend of work.

The contractor shall allow for the supply, delivery, installation, connection and commissioning of the complete *foul & waste water installation* as per drawings and/or specifications. The installation comprises the complete installation from the ground floor up stands to the roof outlets including equipment, fittings, pipe, insulation and all other items/requirements deemed necessary with vent pipes to roof level. Where *foul & waste water installation* equipment is supplied by others the contractor shall allow for the fittings, pipe, insulation, fitting, connection of equipment and all other items/requirements deemed necessary for such equipment.

b - Additional information.

The contractor shall allow for the installation of an overflow drainage pipe 2 sizes larger than the ball valve nominal size complete with tundish or overflow collector to a suitable location of nuisance to the operator/tenant. All internal foul & waste pipes $\geq 100\text{mm}$ shall be in ridged PVC pipe to I.S. 424, 1990, using rubber "O" seal type fittings only. All internal foul & waste piping $< 100\text{mm}$ shall be ridged PVC to I.S. 424, 1990, using soluble type joints only. The main contractor is responsible for any roof penetration, roof flashings and completion of vent pipe work on the roof.

M.11 Pipe & duct work containment installation.

a - Extent of work.

The contractor shall allow for the supply, delivery, installation, connection and commissioning of the complete pipe & duct work containment installation as required for the containment of all pipe and duct work. It is the contractors responsibility to design and allow for the correct sizing and routing of all containment and shall forward a layout drawings showing proposed service routes to the project services coordinator prior to commencement. DKP drawings may show containment on the drawings but this is executed for general information and represent the initial assumed containment sizing and routes however final sizing and routes for the purpose of tender and construction shall be the responsibility of the contractor in coordination with the project services coordinator or electrical contractors / electrical containment and routes. Variations for incorrect capacities and or routes to be revised will not be entertained. The installation comprises the complete installation including hangers, supports, trunking, conduit, basket, tray and all other items/requirements deemed necessary.

M.12 Heavy duty retractable waterhose reel

The contractor shall allow for the supply and fit connect 2x Heavy duty retractable waterhose reels for washing out fitted as per drawing. Hose reels to be 30 mtr in length each.

M.13 Concealed Flush Cistern.

The contractor shall allow for the supply, install and connect of 3x concealed flush cistern with pneumatic push button to be fitted in plant room corridor as per plumbing drawing.

M.14 BMS panel

The contractor shall allow for the supply of the BMS panel as per schematic drawing complete with UPS and PLC broadband connection suitable for remote access and programming, All electrical wiring will be done by the electrical contractor. The BMS supplier is to connect, test and commission the panel.

5 Responsibility matrix.

Item	Approval	Supply	Handle/fit	Connect	Test/check
General light fittings	✓	EL	EL	EL	EL
Decorative light fittings	✓	EL	EL	EL	EL
Emergency / exit light fittings	✓	EL	EL	EL	EL
External light fittings	✓	EL	EL	EL	EL
Distribution boards	✓	EL	EL	EL	EL
Telecoms/data/TV wiring J-Box	✓	EL	EL	EL	EL
Electrical switch gear, socket outlets, isolators etc	✓	EL	EL	EL	EL
Extract fan(s)	✓	ME	ME	EL+ME	EL+ME
Extract fan controls; PIR	✓	ME	ME	EL+ME	EL+ME
Cooker hood / canopy		OT	OT	EL+ME	OT
MVHR/CMEV units	✓	ME	ME	EL+ME	EL+ME
MVHR/CMEV controls; Time clock, Humidity sensor, PIR	✓	ME	EL	EL	EL+ME
Kitchen sink(s), mixer tap, drain and syphon	✓	OT	OT	ME	ME
Laundry sink(s), mixer tap, drain and syphon	✓	OT	OT	ME	ME
Cooker / cooking equipment *		OT	OT	EL+ME	OT
Fridge freezer *		OT	OT	EL	OT
Washing machine / Dryer *		OT	OT	EL+ME	OT
BMS controller with backup and broadband interface		ME	EL+ME	EL+ME+OT	OT
Heat pump	✓	ME	ME	EL+ME	OT
Calorifier / factory insulated immersion tank	✓	ME	ME	EL+ME	ME
Calorifier thermostat	✓	ME	ME	EL+ME	EL+ME
Heating, hot-water, hot-water return time clocks	✓	ME	EL	EL	EL+ME
Thermostat(s)	✓	ME	EL	EL	EL+ME
Control valves	✓	ME	ME	EL+ME	EL+ME
Cold water storage tank c/w booster pump	✓	ME	ME	EL+ME	ME
Heating manifold(s)	✓	ME	ME	EL+ME	ME
Fire blanket	✓	OT	OT	Na	OT
In ground floor pre-insulated Pex pipe work and fittings	✓	ME	ME	ME	ME
All Pex/copper pipe work, insulation and fittings	✓	ME	ME	ME	ME
WC suite (sanitary ware, taps, mixers, syphons etc)	✓	BW	ME	ME	ME
Bathroom suite (sanitary ware, taps, mixers, syphons etc)	✓	BW	ME	ME	ME
En-suite suite (sanitary ware, taps, mixers, syphons etc)	✓	BW	ME	ME	ME
Bath shower panel	✓	BW	BW	BW	BW
Shower panel/door	✓	BW	BW	BW	BW
External earth pit and earth wire duct	✓	EL	EL	EL	EL
25mm fibre internal supply duct for Eir fibre cable/pull cord		BW	BW	BW	BW
External metered ESBN metered and MDB pillar	✓	BW	BW	BW	BW
Telecoms/Eir ducting and pull rope	✓	BW	BW	BW	BW
Under ground incoming Irish Water mains & upstand	✓	BW	BW	BW	BW
Under ground drainage & upstands	✓	BW	BW	BW	BW

EL = Electrical contractor, ME = Mechanical contractor

BW = Main contractor / Builders Works

✓ Approval = To be approved by DKP in writing

EL+ME Both or relevant elec and/or mech contractor, Relevant service.

OT = Others

* Where provided under the build contract.