



Term Maintenance Contract

For

MECHANICAL SERVICES TO WESTMEATH COUNTY COUNCIL HOUSING STOCK

Volume A – Work Requirements and Specification

2026 to 2028

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TABLE OF CONTENTS

PRELIMINARIES	3
INTRODUCTION	3
CONDITIONS OF CONTRACT	3
SCOPE, OPERATION & REQUIREMENTS OF WORKS CONTRACT.....	3
MECHANICAL SERVICES	12
GENERAL	12
INTERNAL DRAINAGE	13
EXTERNAL DRAINAGE	15
EXTERNAL SEWERS (SEE DRAINAGE & SERVICES SECTION).....	16
INTERNAL PLUMBING	16
CENTRAL HEATING SYSTEMS	21
CENTRAL HEATING BOILERS & HEAT PUMPS	22
SOLAR HEATING	30
SPACE HEATING	31
FLUES & ADAPTER KITS	32
INSULATION	32
VENTILATION	33
DRAINAGE AND SERVICES.....	35
GENERAL	35
DRAIN PIPES	35
TESTING PIPES	37
COMPLETION	40
PREVENTATIVE MAINTENANCE/SERVICING.....	42

PRELIMINARIES

INTRODUCTION

These Works Requirements and Specifications cover the repair and maintenance of Plumbing and Heating works in Westmeath County Council. This will involve routine and emergency response repairs and maintenance of plumbing and heating of its housing stock and other buildings under the control of Westmeath County Council. The contract will be awarded as a standalone contract. A single participant contractor will be used for administrative area of Westmeath County Council for maintenance and response repairs.

The successful contractor's scope includes all sundry civil, mechanical/electrical works associated with carrying out the mechanical servicing, repair and maintenance works.

The contractor must be able to demonstrate a track record and commitment to implementing continuous improvement in the delivery of services.

The contractor must have a suitable quality control system in place.

CONDITIONS OF CONTRACT

The Successful Tenderer(s) shall be subject to the Conditions as set out in the attached **Public Works Term Maintenance and Refurbishment Works Contract – PW CF11** (Volume A.3). Each Candidate should review this document.

SCOPE, OPERATION & REQUIREMENTS OF WORKS CONTRACT

The purpose of this contract is to appoint a Contractor/Contractors to carryout reactive and planned maintenance to mechanical services to Westmeath County Council Social Housing Stock and Buildings under the control of Westmeath County Council.

Presently Westmeath County Council maintains 2500+ Local Authorities houses, including leased properties, and two Traveler Halting Sites.

For pricing purposes the spread of the housing stock within the County is shown in Volume A.2_ – Housing Location Map.

The Council housing stock has a variety of mechanical services:

- Hot and Cold Water Supply with standard hot water cylinder fitted with electrical immersion heater with open or closed pressurized water supply.
- Central Heating Systems (often dual systems):
 - Solid Fuel Appliances with back boilers
 - Oil and Gas Fired boilers
 - Underfloor heating systems
 - Air to Water Heat Pumps

- Gas Hybrid Air to Water Heat Pumps
- Wood Pellet boilers
- Circulating pumps, motorized valves, PRVs, TRVs,
- Building Energy Management Systems
- Solar Panel Water Heating
- Mechanical ventilation systems to wet rooms and whole house
- Waste and stormwater drainage systems
- Connection to public water supply or wells
- Connection to public sewer or sewage treatment system
- Energy efficiency measures e.g. heavily insulated water cisterns and roof spaces

The works awarded will be dependent on what arises over the contract period but will generally consist as follows;

- Domestic plumbing in local authority housing/buildings e.g. leaking taps, leaking stopcock, broken toilets, burst pipes, etc.
- Repairs, servicing and installing central heating systems in local authority housing/buildings.
- Registered with Sustainable Energy Authority of Ireland for the specific work activities tendered.
- Install standard and off standard connections to the public watermain network
- General mechanical services in water and waste water treatment plants.
- Repairs/Replacement of ranges, stoves, sanitary ware, copper cylinders, storage tanks, pipework, stopcocks, pressure reduction valves, circulating pumps, repairs to control heating systems including oil and gas boiler systems.
- **Reporting requirements under the +AddJust Maintenance Module.**

The number and type of the stated house numbers will vary during the duration of the Contract. Works will generally include items as described in the Pricing Document and the Specification. For the purposes of pricing, sample social house layouts have been included in Volume A.2-Typical House Drawings.

When a plumbing or heating maintenance task or repair is required, the Council may direct the Contractor to visit a social house. The Contractor shall visit the property, liaise with the tenant and select the appropriate item from the relevant Pricing Document and respond to the Task Order in accordance with the conditions of contract as shown in Appendix B. The price of the items listed on the task order will be the maximum agreed price submitted by the successful tenderer in his Pricing Document. The Contractor shall allow for travelling to the property location and assessing the fault/repair.

RESPONSE TIMES TO ROUTINE & EMERGENCY REPAIRS

When a Task Order is issued, it will state the "repair category" i.e. Emergency, Urgent or Routine, the Contractor is deemed to respond in the following manner:

Emergency request within 2 hours of receipt of call and complete the works within 24 hrs.

Urgent requests will need to be completed within 5 days.

Routine requests will need to be completed within 1 month.

The contractor will be required to respond to each Task Order within the time outlined above of receiving the task order. He will visit the site and take detailed account of the works required and will complete the task in full in accordance to the requirements of Volume A – Works Requirements and Specification and Volume C - Pricing Document.

Emergency Call Outs: In the event of an emergency, the contractor will be contacted by a Westmeath County Council staff member or out of hours service and must respond within 2 hours of receiving the call. The contractor will attend to the property and render the problem safe. No maintenance or repair works will take place until during normal working hours on the next working day.

Where maintenance works arise that is not specified in Volume C – Pricing Document, the successful Contractor may be asked to submit a fixed price for completing the identified task and payment shall be in accordance with clause 6.2 of any signed Public Works Term Maintenance and Refurbishment Works Contract (Appendix B)

Alternatively Westmeath Local Authorities may hold a mini tender competition among Contractors who have met the mandatory criteria as specified in the Instructions to Tenders.

The Contractor is required to provide an email address to which the Client can issue written task orders.

The works may vary in terms of time needed to complete the task. In many cases, replacement of more than one defective item may be required.

In almost all cases, some ancillary works will need to be done to complete the replacement. These ancillary works are expressly included in the contractor's scope.

In providing the services to be covered in this contract, the contractor is solely and totally responsible for all elements and aspects of the works. No services or supports of any type will be provided by Westmeath Local Authorities or any third party. The contractor must include for the provision of all such services.

Contractors shall also have satisfied himself as to the form and nature of the site to the extent and nature of the work and materials necessary for the completion of the works, the means of access to the site, the accommodation he may require and in general, to have obtained for himself all necessary information (subject to the above-mentioned) as to risks, contingencies and all other circumstances influencing or affecting his price as submitted in the Pricing Document. No claims will be allowed on the grounds of ignorance of the conditions under which the works will be executed.

The contractor is expected to work with other trades on site and where necessary take instructions from the General Contractor who could be appointed PSCS for the overall works.

The contractor is expected to liaise with utility companies and other agencies with regard to location of existing services, application for new connections and diversion of existing services.

ADDITIONAL WORKS

Where the Contractor considers that additional repairs are necessary to any property, the contractor shall contact the Employer's Representative immediately. No additional repairs will be executed without first receiving authorisation from the Employer's Representative. Where, during the course of a repair the contractor causes damage to be done to any property or part thereof, he shall effects repairs as soon as possible at no extra cost to Westmeath Local Authorities.

REPORTING REQUIREMENTS

The successful tenderers will be required to submit reports via the +AddJust Maintenance Module when rolled out. Full training on this reporting module will be provided to the successful tender free of charge.

CONTRACT HOURS

Contract Hours for the provision of maintenance repairs are defined as from 08:00 hours to 18:00 hours Monday to Friday, excluding Bank Holidays and Public Holidays applicable to the Republic of Ireland.

BUILDING REGULATION REQUIREMENTS.

It should be noted that the current Building Regulations will take precedence in any Task Order works. All materials workmanship etc. shall comply with the most recent amendments of the Building Regulations.

MEMBERSHIP OF REGULATORY BODIES.

The successful contractor must be registered under the Building Control Act 2007 and its subsequent regulations in particular the Building Control (Amendment) Regulations 2013. All works to be carried out by RECI registered plumbers with in-date certification.

Be registered with the following organizations:

- RGII for work on gas operated appliances,
- OFTEC for work on oil operated appliances
- SEAI for work on energy systems e.g. Solar Heating Panels
- FGas for work on solar panels and air-to-water heat pumps.

The contractor will be asked to submit staff qualifications that are to be assigned to this project. Technical staff to have the necessary trade qualifications and to have undergone necessary training with various companies supplying heating appliance e.g. solid fuel stoves, ranges, oil & gas boilers, heat pumps, solar heating systems etc.

INSURANCE REQUIREMENTS

The contractor shall indemnify Westmeath local authorities against the risk of accidental injury, loss, or damage caused by, through or in connection with his work and that of any subcontractor he may engage. In particular the contractor shall take out insurance policies as detailed hereunder with approved insurance companies and shall keep such policies validly in force during the period of contract. The contractor shall immediately inform the employer's representative of any changes in his insurance arrangements.

The Contractor is required to produce satisfactory evidence of such insurances to the County Council for approval prior to commencement of the Contract and subsequently on demand at any time during the term of the Contract.

The Insurances shall provide for insurances as set out in the contract Schedule and Conditions.

HEALTH AND SAFETY REQUIREMENTS

The contractor will be required to be appointed as Project Supervisor Construction Stage (PSCS) in accordance with the Safety, Health and Welfare at Work Act (2005).

The Contractor shall comply with all legislation and regulations and amendments applicable under the Health and Safety at Work Acts including:-

- Safety Health and Welfare at Work Act 2005
- Safety, Health and Welfare at Work (Construction) Regulations 2013, 2019 & 2020
- Safety, Health and Welfare at Work (General Application) Regulations 2007, 2010, 2012 & 2021

The Council has prepared a Preliminary Health and Safety Plan for this project. It is included in the Information Pack. The successful Contractor will be required to submit a copy of the Construction Stage Safety and Health Plan prior commencing works.

The Contractor shall carry out a risk assessment prior to commencing any task. The Contractor shall use a Health and Safety Safe System of Work Plan (SSWP) to assess the risk at any site and put in place appropriate control measures. These forms shall be kept on file for inspection by the Employers Representative or Deputy.

The contractor's staff will be required to be in possession of an in-date SOLAS SAFE PASS identity card at all times when on Westmeath Local Authorities housing property.

All staff, visitors, employers representative's visiting or working at a site will first be inducted onto the site. The contractor shall also ensure that all equipment, transport, plant and machinery will be safe and secure during works and that the site is left safe at end of work-day.

The contractor is to be particularly aware that houses will be occupied during works and that children will be present at all times. The tenderer should also be aware that no works will be allowed in dwellings where only minors are present. The tenderer will be obliged to conform to the Child Care (Amendment) Act 2015.

The Contractor shall ensure that all employees are provided with and at all times use all appropriate Personal Protective Equipment (PPE).

Working at height shall be carried out in accordance with safety statements and risk assessments approved by the PSCS. Work at height is to be properly planned and organised. A risk assessment shall be carried out for all work conducted at height and appropriate work equipment shall be selected and used. People working at a height are to be competent and equipment used for work at height is to be properly inspected and maintained. Risks from fragile surfaces are to be properly controlled.

The successful contractor will be required to provide Traffic Management Plans, Pedestrian Management Plans as necessary when working on roadside, on streets etc. An Garda Síochána will have to be informed when any stop go system involving temporary traffic lights is employed.

All temporary traffic management plans and signage is to comply with NRA Specification for Road Works Clause 1212 and NRA Traffic Signs Manual 2010, Chapter 8.

It is recommended so as to assist with compliance with the Health & Safety requirements of the contract that tenderers consider the purchase of the Safety Management System (SMP 20) from the HSA for a purchase price of €40 approx. It is further recommended that tenderers consider attending the 3-day course, 'Managing Safety in Construction' and also complete section 7 of the Pre-Qualification Questionnaire. Careful consideration of the above may lead to reduced delays in assessing any submitted tender for compliance with Health & Safety requirements by the Council's Health and Safety Officer.

ACCESS TO PROPERTIES

Westmeath County Council will supply the successful tenderers with a list of property addresses and keys to access the property if vacant. If the property is occupied the tenants name and contact number (if available)

will be given. Please note that Westmeath County Council cannot guarantee the accuracy or currency of any phone numbers supplied.

In relation to access to occupied properties, the Contractor will be required to make contact with the individual tenants either by calling to the property in advance, or by letter or by phone or by a combination of these methods. In the event of difficulty of contacting the tenant, the Contractor shall make a minimum of three separate attempts to contact the tenant. A mutually suitable time for the works to take place should be arranged directly between the Contractor and the tenant. Some tenants may require advance notice in order to make access arrangements.

Westmeath County Council cannot guarantee the availability of tenants during normal business hours or that the individual tenants will be available at the times previously arranged. It may be necessary, in some situations, for the refurbishments to be carried out outside of normal business hours to suit an individual tenant. In the event that the refurbishment cannot be carried out at a previously arranged time due to unavailability of the tenant, then a second arrangement should be made with the tenant. In the event that the tenant does not provide access to the Contractor at the time of second arrangement, then the Contractor shall duly notify the Employers Representative/LA Building Inspector.

INSTRUCTION OF OWNER/OCCUPIER:

The owner/occupier shall be instructed on the operation of any new or replacement heating system, advised on the recommend cleaning and service arrangements, and provided with the manufacturers literature on the appliance.

The owner shall also be advised on the correct safety action to be taken in the event of any malfunction of the system.

In particular, written instructions shall be provided on the correct action to take in the event of any indication of hazard.

RESOURCES ASSIGNED TO CONTRACT

The successful Tenderer shall demonstrate to the satisfaction of the Employers Representative that he has the capacity in terms of plant, equipment, stores and experienced personnel to competently undertake the Contract.

The Contractor shall provide at his expense suitable local premises from which the Term Maintenance Contract will be conducted. This shall include adequate accommodation to house his staff, stores, maintenance equipment, vehicles, office equipment, filing and record systems for the satisfactory execution of the Contract.

The Tenderer shall submit details of plant and personnel to be assigned to the Contract on the attached forms.

The Contractor shall maintain adequate supplies of materials at all times and shall not be allowed to claim lack of material as a reason for not effecting repairs on time.

QUALITY OF MATERIALS AND WORKMANSHIP

All work to be carried out by an approved firm of plumbing contractors tidily and in the best-approved manner. All fittings are to be tested and stamped by an approved body. The contractor is to provide for carrying out all cuttings, chasing, trenching, etc and to allow for all making good and repainting to walls, ceilings etc afterwards. The contractor shall act with due consideration for the client and will carry out the work at the times required without delay, or unnecessary disruption to the contract. The contractor shall provide protection of surfaces; fittings etc as may be necessitated by the work, and shall leave the premises clean and free of any building waste and dust. The installation of products shall be carried out in a neat and

craftsman like manner. All exposed pipework shall be boxed out as described elsewhere. Pipe joints shall be clean of excess jointing material. The contractor shall take adequate care and be responsible for drilling holes in walls and floors, cutting chases in floors, lifting and replacing floorboards, notching joists and making good generally.

The contractor will guarantee all materials and workmanship for a period of 48 months from the date of satisfactory commissioning and acceptance by Westmeath Local Authorities.

Defects that manifest themselves after that period may still be the Contractors responsibility if they are deemed to be "latent defects" due to faulty workmanship or defective materials. Materials shall be installed according to manufacturer's instructions and a manufacturers commissioning certificate for any boiler units installed be handed over on completion.

The Contractor will be responsible for the removal from site and disposal of all builders materials associated with the works. This is to be included in the Tender price submitted.

MONITORING OF CONTRACTORS PERFORMANCE

Monitoring of the contractors compliance with the requirements of this contract will be carried out by the Employer's Representative. Where the Contractor is deemed not to comply with the Contract they shall be so notified in writing by the Employer's Representative. The Employer's Representative may subsequently terminate the Contract as per Clause 2.3 of the Public Works Term Maintenance and Refurbishment Works Contract. The performance of the Contractor will be evaluated at six months and twelve months using the following evaluation sheet.

Performance Evaluation:

Performance Evaluation of Mechanical Services Contractor for Westmeath County Council (including Role of PSCS)					
RATING	Excellent	Very Good	Good	Moderate	Poor
PLEASE GIVE ONE RATING FOR EACH CRITERION. ADD COMMENTS AS REQUIRED TO JUSTIFY RATING					
Evaluation Criteria					RATING
1	ADHERENCE TO THE SPECIFIED RESPONSE TIMES				
	Did the Contractor complete the Works associated with Task Orders within the specified response times?				
	Where any difficulties or delays encountered?				
	Where these difficulties or delays within the control of the Contractor?				
	Comments:				
2					
QUALITY OF WORKMANSHIP					

	Was the required work completed in a good workmanlike manner? Did the Contractor demonstrate a desire to complete the work to a high quality?	
	Comments:	
3	CONTRACTOR LEVEL OF SERVICE PROVIDED	
	Could the Employer communicate easily with the Contractor? Where all issues arising addressed in a professional and timely manner? Did the Employer have to issue any requests for corrective actions following works carried out by the Contractor?	
	Comments:	
4	COMPLIANCE WITH THE REQUIREMENTS OF HEALTH & SAFETY LEGISLATION	
	Did the Contractor comply with the Safety, Health and Welfare at Work (Construction) Regulations 2013? Did the activities of the Contractor demonstrate awareness of Health & safety risks associated with the Works? Did the Contractors site activities create any Health & safety risks?	
	Comments:	
OVERALL RATING		

Every month the Mechanical Services Contractor shall provide the Employer's Representative a list of all outstanding Task Orders where the works specified in the Task Orders have not been completed for the Contract.

WASTE MATERIALS

All redundant, surplus, waste and damaged materials shall be removed from site and safely disposed of by the Contractor at licensed facilities in accordance with all regulations in force pursuant to the Waste Management Acts 1996, 2001, 2013, 2016 and 2021 and the Waste Management (Amendment) Act 2001 and any subsequent amendments. The Contractor and any civil sub-Contractor he employs shall have valid Waste Permits relating to collection/transport/storage of waste.

The Contractor shall pay particular attention to the safe storage, handling, and disposal of used materials and any other items containing potentially toxic material.

The Contractor shall ensure that his staff does not litter any work site.

LOSS AND DAMAGE OF MATERIALS

The Council will accept **no responsibility** for damage to, loss or theft of any materials installed or left on site before or during repair works. The security of staff, equipment and materials is the contractor's own responsibility.

SAMPLING REQUIREMENTS

If the Employer's Representative so requires, samples of materials, manufactured articles or appliances shall be submitted for his approval before their adoption in the works. Approval shall not relieve the Contractor of responsibility under the contract for any defects which appear. Materials and manufactured articles supplied or fixed or work executed without approval of samples shall be removed and any necessary reinstatements shall be executed at the Contractor's expense.

The Contractor shall make such tests of executed work and shall supply such samples of materials, fixed or unfixed, for tests as the Employer's Representative may direct, executing the necessary removal or reinstatements. The cost of all tests shall be borne in full by the Contractor, except where otherwise specified in the conditions of contract.

MECHANICAL SERVICES PARTICULAR SPECIFICATION

GENERAL

The Particular should be read carefully in conjunction with Volume C – Pricing Document and Volume A - Works Requirements.

The design, installation, testing, commissioning and maintenance of services supplying water for domestic use within buildings and their curtilages shall comply with BS EN 806: 2000-2012 & BS 8558: 2015. BS 8558:2015 provides complementary guidance to BS EN 806 and. It is a guide to the design, installation, testing, operation and maintenance of services supplying water for domestic use within buildings and their curtilages.

All works shall comply with the NSAI SR-50-1: Code of Practice for Building Services and SR 50-2: Code of Practice for Thermal Solar Systems.

All commodities shall comply with the requirements of the Local Authority and be in accordance with appropriate Irish or British Standard Specification.

The mechanical contractor to supply test certificates and O & M manuals for all newly installed mechanical systems for each dwelling.

Store appliances under cover and keep dry. Separate with clean dust sheets of polythene when not in manufacturers own packing.

Store metal appliances on a level surface to prevent twisting. Prevent contact with cement and lime and do not pack in straw.

Internal plumbing shall include all work, attendance, cutting of holes etc., and for supplying all labour and materials for fixing of piping and fittings. Make provision for all necessary joints to water supplies, wastes and drains, plugging to walls and for all trades attending on plumber while fixing and making good after. Pipe fittings etc, to be sized in accordance with IS134: 1977, IS EN 1057: 2006 & IS EN 1254-2 respectively.

(Ref. Building Regulations, Technical Guidance Documents 2011) "proper materials" means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

bear a CE mark in accordance with the provisions of the Constructions Products Directive (89/106/EEC);

OR

comply with an appropriate harmonised standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive (89/106/EEC);

OR

comply with an appropriate Irish Standard or Irish Agrément Board Certificate or with an alternative national technical specification of any Member State of the European Community, which provides in use an equivalent level of safety and suitability.

in addition to establishing the fitness of a material for its intended use by reference other methods which may be considered include:

- independent certification by an approved body e.g. the national Standards Authority of Ireland (NSAI);
- quality assurance i.e. that the material is covered by a scheme which complies with the relevant recommendations of I.S. ISO 9000/EN 29000 Quality System Management and/or I.S. EN 45014: General Criteria for Suppliers Declaration of Conformity;
- tests and calculations showing that the material is capable of performing the function for which it is intended. The ILAB Accreditation Scheme for Testing Laboratories offers a way of ensuring that tests are conducted in accordance with recognised criteria;
- performance in use i.e. that the material can be shown by performance in use, such as in an existing building, to be capable of performing the function for which it is intended

ELECTRICAL WORKS

All electrical installations shall comply with the requirements of the Electrical Technical Council of Ireland (ETCI). Any pipework shall be installed clear of all electrical cables. All electrical work and installation shall conform to BS 7671: 2018 Requirement for electrical installation IEE Wiring Regulations 17th edition. When running electrical cables with insulation, the advice given in the BRE publication "Thermal insulation avoiding risks & BS 7671: 2018 should be followed. All work to floors, walls etc to be made good on finishing.

Where required the contractor shall employ a qualified electrician. The cost of this shall be deemed to be included in the rates submitted.

INTERNAL DRAINAGE

MATERIALS

uPVC waste pipe to BS EN 1452:1999 - 2009

uPVC fittings for solvent welding to BS EN 1452: 1999 & BS EN 14814: 2007 - 2016.

uPVC fittings for mechanical jointing to BS EN 1452: 1999 & BS EN 14814: 2007 - 2016.

uPVC soil and vent pipe fittings and accessories shall comply with B.S. 4514: 2001.

uPVC rainwater goods shall be heavy grade complying with BS EN 12200-1: 2016; 1462: 2004; & 607: 2004.

CULINARY FITTINGS

Stainless steel sinks shall be by an approved manufacturer and shall be to an approved size 1000 x 500mm with single bowl, single drainer, waste, plug chain and overflow and 12mm hot and cold high necked pillar taps, 38 x 77mm PVC bottle trap with cleaning eye.

SANITARY FITTINGS

All fittings to be white vitreous china with rounded corners.

WORKMANSHIP

Different metals should be separated by non-metallic material to prevent electrolytic corrosion. Pipes should be firmly supported without restricting thermal movement. Attention is also drawn to the requirement of Part

B of the First Schedule to the Building Regulations 1991, and guidance in Technical Document B relating to penetration of fire separating elements and of fire stopping provisions.

Do not use compounds containing red lead.

uPVC PIPES: joint in accordance with the manufacturer's recommendations.

INSTALLATION

GENERAL

Fix pipes and fittings securely, with fittings and fastenings appropriate to the location and materials. Fix pipes and fittings in accordance with pipe manufacturers' recommendations. POSITION pipes to falls to prevent air locks.

DUCTS AND CHASES: make adequate provision during construction of structure.

FIXING HOLES: cut holes as required for connection of pipes.

DEBRIS: flush, clean out and remove all debris from drainage system.

WASTE PIPES: Provide 32mm PVC waste from wash hand basin and 38mm from bath to connect to 100mm PVC soil and vent stack above floor level. Provide 38mm PVC waste from sink, take through external wall and discharge over gulley trap. Connect 100mm diameter PVC waste from W.C.'s on upper floors to soil stack. Connect ground floor W.C.'s directly to drain upstand with suitable adaptor.

Provide Redland Cambrian Thru Vent or similar to top of soil stack where internal soil stack is used.

SOIL AND VENT PIPE:

Connect W.C. on first floor to 100mm PVC soil stack. Properly joint all junctions and provide cleaning eye at branch junction and approximately 300mm above ground level. Provide collar boss connection for wash hand basin and bath or shower. Connect to drainage system with 135° long radius bend to B.S. 5572. Where required build in pipe sleeves to external walls for soil and waste pipes.

BATH AND SHOWER: Seal junction of bath and washbasin and plaster walls with Silicone Sealant 33 or other equal and approved, applied in accordance with the manufacturer's recommendations and incorporate plastic cover trim as detailed.

SANITARY FITTINGS

PROTECTION AND DAMAGE:

Retain protective coverings, when practical, during and after fixing.

Replace any appliances which are chipped or scratched.

Do not stand in or on any appliance.

Do not use appliances for preparing or soaking materials or for washing tools.

FIX appliances in accordance with manufacturer's recommendations. Use fastenings supplied by manufacturer wherever possible.

CISTERNS:

Fix at height recommended by manufacturer unless otherwise specified.

FLUSH PIPES:

Position and fix to ensure complete emptying after each flush.

W.C. PANS:

Connect to soil pipe spigots with plastics connector in accordance with manufacturer's recommendations.

CLEARANCE OF BLOCKAGES:

Sufficient and suitable access points should be provided for clearing blockages from drain runs which cannot be reached by any other means. The location, spacing and type of the access point will depend on the layout, depth and the size of the runs.

The provisions described below are for normal methods of rodding (which need not be in the direction of flow) and not for mechanical means of clearing.

Location of access points - access should be provided at the following points:

- on or near the head of each drain run, and
- at a bend and at a change of gradient, and
- at a change of pipe size (but see below if it is at a junction), and
- at a junction unless each run can be cleared from an access point (some junctions can only be rodded through from one direction.)
- Access should be provided to long runs.
- Construction of access points - these should contain the foul water under working and test conditions and resist the entry of ground water and rainwater.

EXTERNAL DRAINAGE

RAINWATER INSTALLATION

Cut pipes and gutters clean and square, with equipment appropriate to the material.

Lay gutters to falls of not less than 1:200.

THERMAL MOVEMENT: make adequate provision in the fixing and jointing of gutters for thermal movement in the length of the gutter.

Movement joints in gutters must coincide with those in the structure.

FIX downpipes true to line.

TEST external pipes with water to satisfy the LA Building Inspector that gutters are laid to correct falls and that pipes and gutters are unobstructed.

EAVES GUTTERS:

shall be 125mm heavy grade half round PVC gutters to B.S. 4576 Part 1 with strong uPVC gutter brackets, not more than 900mm apart, galvanised screwed to fascia board, include for all necessary drop nozzles, stop ends, angle bends, all jointed in accordance with recommendations of the manufacturers. Parapet gutters to be lead lined with formed outlets, all as detailed on LA Building Inspector's drawings.

DOWN PIPES:

Provide and erect in position as indicated on plan 75mm diameter heavy grade uPVC pipes to B.S. 4576 Part 1. Joints to be carried out in accordance with the manufacturer's recommendations but in all cases, not more than 1800mm apart. Provide all necessary shoes and swan necks. Down pipes to discharge directly over the gulley traps.

EXTERNAL SEWERS (SEE DRAINAGE & SERVICES SECTION)

INTERNAL PLUMBING

MATERIALS

Copper tubes shall comply with IS EN 1057: 2006 in accordance with the Irish Standard Mark Licensing Scheme of the Institute for Industrial Research and Standards and shall bear the Irish Standard Mark or should be clearly marked in accordance with BS 1710: 1984.

Manufacturers' or suppliers' certificates of compliance with the Standard shall be provided when requested by the LA Building Inspector/ Engineer.

Hard drawn thin wall copper pipes shall comply with I.S. 238.

Heavy gauge copper pipes shall comply with B.S.61: 1969.

Stainless steel tubing to comply with BS EN 10216-5: 2021, 10217-7: 2021 & 10312: 2002.

Compression fittings for use with copper pipes to IS EN 1057 shall comply with IS EN 1254-2: 2021.

Compression fittings for use with copper pipes or fittings to British Standards shall comply with IS EN 1254-2: 2021.

All heating pipework shall be carried out in heavy gauge to IS EN 1057: 2006 conforming to the following thickness:-

- 12 - 19mm - 19 gauge
- 25 - 38mm - 18 gauge
- 50 - 75mm - 17 gauge

Flexible cross-linked polyethylene pipework to BS 7291: 2010 with a valid Agrément Certificate may be used where applicable.

Polyethylene pipes (HDPE) for rising mains/service connection shall be heavy gauge Hydrodare or equally approved complying with IS EN ISO 22391:2009-2020.

Twin walls polyethylene piping will be allowed in concrete floor and certain concealed locations and only with Irish Instantor compression fittings with brass inserts. Proprietary plastic connectors, elbows and bends shall not be used. The use of this type of piping will be agreed on site.

All pipework in hot press and attic areas shall be in copper only.

COMPONENTS / ACCESSORIES

TAPS:

Chrome plated brass taps, suitable for use in high pressure systems. Fixing in accordance with manufacturer's recommendations making a watertight seal with the appliance. Place hot tap to left of cold tap as viewed by the user of the appliance. Fit isolation valves to hot and cold supply to allow tap replacement.

Fit dual control mixing unit to kitchen sink.

Fit tilt and turn mixing unit to showers

WATER STORAGE:

The cold water storage tank shall be an approved uPVC type or GRP min 300 litres capacity and shall comply with BS EN 13280: 2001 complete with lid and drip tray. Tank and drip tray to have 19mm heavy gauge polyethylene overflow pipe clipped to sides of ceiling ties and taken through external wall or roof soffit. Tank to be surrounded with 200mm fibre insulation in sealed bags and fitted tightly. Patent ball valve and silencing pipe to be included with each tank. Storage tank to be tested and be duly stamped as such. Drip trays to be drained to exterior of building.

- 1 no. 15mm ball valve and float.
- 1 no. 19mm cold feed
- 1 no. 25mm open vent
- 1 no. 19mm overflow
- 1 no. tank cover
- 1 no. drip tray

HOT WATER CYLINDER:

Hot water cylinder shall be unvented 300 litre (actual capacity), twin coil, pre-insulated twin skin stainless steel or copper cylinder with factory fitted min 50mm fire retardant CFC free, HCFC free Polyurethane Foam Insulation, min density 30kg/m³ manufactured, tested and marked in accordance with BS 1566-1: 2002. The cylinder shall be Joule or other equally approved, suitable for use with solar heating and gas fired condensing boilers. Cylinder to be suitable for 3kW immersion.

The cylinder shall have an indirect coil capable of raising 180 litres of water through 45 deg. C in 2 hours, when supplied with primary water at a flow temperature of 82 deg. C and a return temperature of 71 deg. C.

If not factory fitted, a hot water cylinder thermostat should be installed 1/4 to 1/3 of the way up from the bottom of the cylinder, on the front face, with clean contact, set to 60 to 65 degrees C to protect against Legionella.

Cylinders to be fitted with drain plug.

The hot water cylinder should be isolated on an independent zone of the heating system with a motorized valve.

On an existing system where the heating system is not zoned, fit a motorised valve on the flow pipe controlled by the cylinder thermostat.

PLEASE NOTE: Where condensing boilers are being used the Hot Water Cylinder should be Fast Recovery Type with a 30 minute recovery time.

Where Solar Heating System and/or Air to Water Heating Systems are being installed the Hot Water Cylinder (Domestic Hot Water Cylinder DHW) shall be designed to suit to meet the requirements of the system manufacturers.

IMMERSION HEATER

Replacement 3 kW immersion heaters (sink/bath type) shall be 2½ BSP Incoloy type and shall have a dual safety protection thermostat rated at 15amp. The unit shall be approved and tested to EN60335-2-73. The thermostat shall be approved and tested to EN60730-1. A warranty must be provided for all immersion heaters fitted. The contractor shall also allow for testing of the hot water element after replacement.

PUMPED SHOWER UNITS

Thermostatically controlled pumped shower with a maximum temperature setting of 43°C shall be fitted in the level access shower enclosure in the 2 bed houses and over the bath in the 3 bed houses and connected to the cylinder. Adjustable telephone type shower head, detachable and accessible from a seated position. Controls and soap dish to be installed as per Part M of the Building Regulations.

PRESSURE BOOSTER PUMPS

Supply and install booster pumps for hot and cold water supply. The contractor is to determine if the pump is to be negative or positive pressure designed to provide min 1.5 Bar pressure for low pressure systems, either open vented or closed systems. The pumps are to be designed for whole house pressure boosting applications in vented stored water systems. Inlet pressures to the pump and ambient temperatures must not exceed the values given in the technical specifications.

The hot and cold water storage capacity must be sufficient to meet the flow rates required by the pumped equipment and any other water using fittings and appliances, which may be operated simultaneously. Pumps are to be installed in accordance with manufacturers' instructions.

BALL VALVES

Brass body ball valves shall be piston type complying with B.S. 1212-1: 1990 part 1 suitable for high pressure and shall match the pressure of water supply.

BRACKETS

Pipe brackets for fixing pipes shall be as recommended by the manufacturer of the pipes. Holderbats for securing copper pipes to concrete, brickwork or blockwork shall be standard brass holderbats in two pieces screwed together with tail for building in. Clips for securing copper pipes to timber background shall be standard copper clips with brass screws.

WORKMANSHIP

GENERAL

BS 8000 workmanship on building sites (which gathers together guidance from other BSI Codes and Standards) gives guidance on basic workmanship for conventional types of building work. If you are using other methods, you may be able to demonstrate that the workmanship satisfies the relevant requirement by:

- quality assurance schemes i.e. the method is covered by a scheme which complies with the relevant recommendations of I.S. /ISO 9000/EN 29000 Quality System Management;

or

- performance in use i.e. by showing, such as in an existing building, a previous use of the method of workmanship.

WATER SUPPLY: impure water must not be connected into pipe runs.

WATER SUPPLY: for drinking to be from rising main/service connection to water supply.

WATER SUPPLY: for sanitary appliances to be from storage cistern.

PROTECTION: where pipes are laid through holes or notches do not subject them to pressure or friction due to movement. Do not cut notches in joists for pipes within the centre third of the joist span.

PROTECTION: lay pipes underground with not less than 750mm cover below finished ground level except within 600mm of the internal face of any external wall.

CUT pipe ends clean and square using equipment appropriate to the material.

SEALING OFF: prevent entry of foreign matter into any part of system by sealing openings during construction.

JOINTING material must not project into bore of pipes, fittings or appliances.

OPERATIVES must be skilled in jointing the pipes and fittings as specified.

COPPER PIPES to be jointed with brass compression fittings in accordance with manufacturer's instructions. Copper pipes under first floor to be in continuous lengths, no joints being allowed.

POLYETHYLENE PIPES to be in continuous lengths and jointed to fittings in accordance with the manufacturer's recommendations.

MAINS PIPEWORK

A 13mm HDPE rising main shall be taken from the main supply from a point shown on drawings to the cold water storage tank. A 13mm HDPE cold supply is to be taken off the rising main for the ground floor sink only. No other fittings or appliances may be connected off the rising main.

Where lead pipework is encountered it shall be brought to the attention of the LA Building Inspector. It will be replaced with pipes as specified.

SERVICE PIPEWORK

From cold water storage tank, take two 19mm copper supplies, one to hot water cylinder and one under floor to sanitary fittings. Provide and fix to each of these supplies in an approved position a 19mm brass gate valve, connect 19mm supply to bath or shower and to tee junction between bath, W.C. and wash hand basin. Take 13mm copper branches for same to W.C. cistern and lavatory basin. Expansion pipe from cylinder to be 19mm copper carried up and bent over to discharge over cold water storage tank in roof. Provide drain cock to supply pipe joining boiler. Take 19mm copper hot water supply from expansion pipe to bath and take 13mm copper branches from same to wash hand basin and sink. Provide 100 x 35mm bearer fixed to trusses in roof space to support expansion pipe. Provide isolation valves to all appliances and sanitary ware.

SHOWER ROOM & WC

Toilet should be set at height of 450mm-460mm to top of seat and be wheelchair accessible. Close coupled raised height toilet bowl with horizontal outlet, 75cm projection with floor fixing kit to BS EN 997 & BS EN 33 WC. WC to come complete with shower seat and back support. Shower seat, folding 650mm projection fixed height, multi-system back support, fixed height. 600mm grabrail, 3no. per set, 450mm hinged grabrail for back of door, 2no. per set.

Wash-hand basin should be of standard size, wall mounted without pedestal and waste pipes recessed to allow for wheelchair access. Washbasin 1 right hand tap hole, overflow, single sequential long lever, copper tube inlet to BS EN 14688 & BS EN 31. Size 50mm wide x 42mm deep.

Basin trap shall be 32mm plastic bottle, 75mm seal

Grab rails shall be fitted as shown on the drawings. Grab rails shall be 35mm diameter by specified length.

Recommended height for wheelchair users 750mm minimum - 820mm maximum to top of wash-hand basin.

Shower room is designed as a wet room. See section 49 "Vinyl floor covering" below for details.

Pumped shower unit shall be supplied and fitted.

Shower controls should remain within easy reach from sitting position between 900mm-1200mm from floor level. Shower spray should be by way of a flexible hose which can be detached from sliding bar to use as hand spray. Sliding bar brackets positioned to allow use from sitting/standing height –between 1200mm-2200mm from floor level.

Shower hose shall be at least 1.35m long.

Shower flip down seat shall be supplied and fitted as indicated on the drawings.

Shower curtain rail to be fitted at 2000mm high and weighted shower curtain to drag floor and fall 75mm inside the shower.

BATHROOM

WC shall be a close coupled WC unit with push button dual flush cistern including WC bowl, cistern, seat and cover with chrome hinges, flush bend and all fixing accessories included.

Wash hand basin 580mm wide, complete with pedestal, Shires monobloc low water pressure tap, waste, trap and fixing brackets.

Bath shall be heavy gauge steel with side and end panels to match, bath taps, waste and trap. Adjustable legs, stopper and chain to be supplied and fitted.

Thermostatic pumped shower shall be fitted over the bath, shower to have phased shutdown, 15mm dual entry push fit, ½" BSP male outlet connections, 230V power supply, max. 2.5mm² terminal block connections, cold water up to 25 degrees Celsius and hot water range from 55 to 60 degrees Celsius, flow rate of up to 16 litres per minute, separate temperature and flow controls, 11cm four spray showerhead, complete with 2 number 60cm x 35mm diameter grab rails fitted as instructed on site. Shower curtain and rail shall be fitted.

Supply and fix 780mm diameter circular 4mm plate glass mirror with polished edges and fixed with adhesive.

CENTRAL HEATING SYTEMS

PIPEWORK:

All bends shall be as far as possible, formed from the piping, great care being taken to avoid distortion or flattening.

Piping between the circulating piping and the various radiators shall be neatly run. All necessary bends, sets and brackets etc., shall be provided.

VALVES:

Supply and fix isolating valves of the brass, gunmetal or bronze full way pattern gate valve provided with screwed union couplings and metal hand wheels or ball valves with 90degree turn with handle for pipes less than 25mm diameter.

Butterfly valves will not be used unless approved by engineer/LA building Inspector.

Connections to valves and fittings and at all points where unions are required shall be by means of an approved type of brass union with tail for welding to copper tube.

CLEANING OF COPPER PIPE:

The Contractor shall be responsible for thoroughly cleaning all pipework that is exposed in the building and preparing the surface of the copper to a smooth polish finish by use of emery cloth. The surface shall not be scratched or scored in the process.

UNIONS:

Connections to valves and fittings and at all points where unions are required shall be by means of an approved type of brass union with tail for welding to copper tube.

PIPE BRACKETS & SUPPORTS:

All necessary pipe brackets and supports shall be provided for carrying pipework and these shall be detailed on drawings.

Where pipework is not supported as detailed, it shall be supported by school-board built in holderbats. Holderbats built in to be fixed as follows:-

- 12 mm horizontal 1,200 mm vertical 1,800 mm
- mm horizontal 1,800 mm vertical 2,400 mm
- 25 mm horizontal 1,800 mm vertical 2,400 mm
- 32 mm horizontal 2,400 mm vertical 3,000 mm
- 33 mm horizontal 1,700 mm vertical 3,000 mm
- 50 mm horizontal 3,000 mm vertical 3,000 mm
- 63 mm horizontal 3,000 mm vertical 3,600 mm
- 75 mm horizontal 3,000 mm vertical 3,600 mm
- 100 mm horizontal 3,000 mm vertical 3,600 mm

WALL SLEEVES, FLOOR PLATES:

Where pipes pass through the walls, floors and ceilings, sleeves shall be provided to allow for free expansion and contraction. The sleeves shall finish flush with the finished wall surface and be provided with chromium plated clip-on plates.

CONNECTIONS TO FIXTURES:

The Contractor shall allow for running all "dead legs" connections up to the actual fittings. The "dead legs" shall be fitted with isolation valves for fitting replacement.

Piping between the circulating piping and the various fixtures shall be neatly run. All necessary bends, sets, brackets, etc., shall be provided.

MAINTENANCE

Fit drain plugs to lowest point on pipework and to DHWC.

HEADER TANK

The feed and expansion tank shall be an approved uPVC type or GRP min 20 litres capacity and shall comply with BS EN 13280: 2001 complete with lid and drip tray. Tank should be sized to accommodate 5% of total system contents. Tank and drip tray to have 19mm heavy gauge polyethylene overflow pipe clipped to sides of ceiling ties and taken through external wall or roof soffit. Tank is to be surrounded with 200mm fibre insulation in sealed bags and fitted tightly. Patent ball valve and silencing pipe are to be included with each tank. Storage tank is to be tested and be duly stamped as such. Drip trays to be drained to exterior of building.

- 1 no. 15mm ball valve and float.
- 1 no. 19mm cold feed
- 1 no. 25mm open vent
- 1 no. 19mm overflow
- 1 no. tank cover
- 1 no. drip tray

CENTRAL HEATING BOILERS & HEAT PUMPS

GENERAL

An external tamper proof frost stat is required to start the boiler automatically when the temperature drops to 2°C.

Connect condensing boiler to nearest drain gully.

All fuel lines to be fitted with externally located fire valve. It must be activated by a remote sensor located over the burner but in a position clear of any direct radiation or excessive heat.

Boiler is to be sized by the contractor to meet the heating requirements and BER for the dwelling.

Location of boiler is to be agreed by LA Building Inspector.

Boiler to be fitted with both automatic cut off once desired water temperature has been reached and safety cut off in the event of controls failure.

Condensing boiler is to have 5 years parts and labour warranty and built in condensate trap connected to the foul or stormwater sewer.

All ancillary equipment is to have EU markings and approved Agreement Certificates.

Fit flue in accordance with Part J, Building Control Regulations.

Supply and fit magnetic filter, pressure sealed, capable of multiple orientations, suitable for heating and cooling systems, dimensions: 115mm high x 255mm wide x 180mm deep, if not already fitted and Fernox corrosion inhibitor when draining down the CH system. The filter should be fitted on the return pipe and as close to the boiler as possible. The magnet should achieve a min gauss rating of 7500, min 10 year lifespan. It should not block the system if full.

Servicing of heating system is to be in accordance with manufacturers' instructions.

All boilers are to be fitted with a pressure release valve on the primary flow pipe in a vertical position, with lift pressure of 3 Bar. The discharge should not be near electrical fittings, flue pipes and in a position that it can be seen.

Commissioning of the central heating system should be in accordance with BS 7593.

GAS BOILERS

Where required, install a new natural gas fired condensing boiler, this shall be wall hung 'A' energy rated and with a seasonal efficiency of min 91%, complete with flue kit, compact cupboard fit, concealed pipe connections. Boiler is to have 5 years parts and labour warranty.

OIL BOILER

Where required, install a new oil fired condensing boiler, (internal or external) this shall be 'A' energy rated, weather proof – PVC coated, 4-tapping points, size 945mm high, 720mm wide by 625mm deep, integrated flue, 26-35kW output, oil fuel, frost protection with a seasonal efficiency of min 95% or equally approved, complete with burner, with flue kit. Boiler is to have 5 years parts and labour warranty. Oil supply line to be fitted with de-aerator, max nozzle capacity 75LPH, max return oil pumped into de-aerator 113lph, max oil flow 189lph, operating temperature -6 degrees F to 40degrees F, max operating pressure in feed line 8PSI, connections ¼" - NPT.

SOLID FUEL & WOOD PELLET BOILERS

Where required, install a wrap around boiler to stoves/ranges in accordance with manufacturers' instructions.

Where required, supply and install a multifuel 8kW backboiler, to heat 6no. radiators, open vent flue with 150mm flue outlet and 150mm flue pipe size, inset type backboiler, size 570mm high, 520mm wide and 317mm deep, or 12kW Insert Boiler, inset stove, 8.3kW heat to radiators, size 560mm high, 406mm wide and 375mm deep, or similar approved to an existing fireplace, complete with matching Stainless Steel Flue kit, 200mm diameter by 1250mm high chimney extension. A new insulated flow and return pipework shall be connected between the fireplace and hot press with new circulating pump, valves, pipe thermostat, fittings and associated electrical work necessary to link the backboiler to the central heating and domestic hot water system. The existing fireplace shall be retained as per original. The contractor shall also allow for testing the heating system after installation of the boiler.

Where required, supply and install a 12kW wood pellet internal boiler, removable ash draw, heat exchanger with manual cleaning system, safety thermostat, predisposition for external thermostat, weekly chronothermostat, circulation pump, expansion vessel, 3 bar safety valve, rated thermal power of 3.6-12kW, power output to water 10.8kW-H₂O, size 1035mm high, 538mm wide, 543mm deep, 80mm diameter fume exhaust, hourly consumption 0.8-2.8kg/h complete with matching flue kit, approved by manufacturer. A new insulated flow and return pipework shall be connected between the boiler and hot press with new circulating pump, valves, pipe thermostat, fittings and associated electrical work necessary to link the boiler to the central heating and domestic hot water system. The contractor shall also allow for testing the heating system after installation of the boiler.

Where required, supply and install a multifuel 12kW free standing stove, 12kW dedicated to the room, up to 7 no. radiators, 76% efficiency rating, complete with matching Stainless Steel Flue kit, 200mm diameter by 1250mm high chimney extension. A new insulated flow and return pipework shall be connected between the boiler and hot press with new circulating pump, valves, pipe thermostat, fittings and associated electrical work necessary to link the boiler to the central heating and domestic hot water system. The existing fireplace shall be retained as per original. The contractor shall also allow for testing the heating system after installation of the boiler.

AIR TO WATER HEAT PUMPS

An integrated air to water heating and hot water system and a monobloc and hot water system or equal and approved system are specified. The following specification shall be used;

HEAT PUMP SPECIFICATION

The H.P must be capable of delivering min 4.30 kW at flow T of 45°C and outside air of -7°C inclusive of defrosts.

The H.P must meet all EU standards

The H.P must have a DEAP SPF of above 350% for 7 kw mono bloc H.P and 418% for 8kw split system.

The H.P must be able to operate down to -20°C outside air.

The Air to Water Heat Pump must come complete with matching condensing unit, stainless steel hot water cylinder, solar heating panels, controls, circulation pump etc.

The heat pump should be fully compliant with Eco-Design Labelling Directive, both EN14825 and EN 16147. The declaration of compliance from the manufacture should be available.

The Energy Efficiency label should be A++ for space heating (35°C & 55°C) and A for DHW. The heat pump should have an output not less than their rated output with a COP of greater than 4.3 at A7W35. The heat pump performance is a measured item in DEAP.

The minimum acceptable water heating energy efficiency for hot water under EN16147 should be 120%. This should be backed up with the relevant test declarations from the manufacturer.

The heat pump shall be capable of providing heating water for Domestic Hot Water (DHW) generation at 60°C minimum during a pre-programmed anti-legionella cycle once per week in accordance with BS 6700 without the aid of an ancillary booster for ambient temperatures as low as -12°C. The Domestic Hot Water cylinder shall come with a pre-fitted 3 kw immersion heater, to assist for thermal disinfection.

The sound pressure level of the internal unit during heating and cooling modes should not exceed 28dB(A). The sound pressure level of the external unit should not exceed 49dB(A) in heating mode.

Where required the internal and external units shall be fitted with fridge pipe works liquid line of ¼ " and gas line of ½ " – the connection of such must be carried out by an F-Gas registered engineer.

The heat pump controller should be integrated into the unit or can act as a remote control for the system, acting as both a three-zone time and temperature controller and as a room thermostat for the primary (living) heating zone. The controller should be capable of acting as a user friendly 3-Zone Controller.

Heating controls by heat pump manufacturer to allow full time and temperature control for each zone.

Domestic Hot Water to be prioritised via 3 way valve if applicable. Control must include Domestic Hot Water scheduling, with automatic disinfection mode and weather compensated heating curve.

The supplier should supply all Heat Pump Tool for DEAP information, manufactures declared data, product fiche information and all Energy Labelling as required by SEAI.

All Heat Pumps to be installed in accordance with the manufactures/suppliers requirements, specification and instructions.

The installer must be fully trained to Manufacture Service Level. On completion of the works, the heating system to be commissioned in accordance with the manufacturer's instructions and commissioning certificates shall be issued as part of the Operating & Maintenance manual. Upon successful commissioning, a full 3/5 years manufacturer's parts warranty is to be issued.

Steel Panel double convactor radiators to be sized for Low Temperature Heating System. Radiators must be sized at a flow T of 45°C. If required or applicable, the existing radiators outputs must be checked at a flow temp 45°C and measured against the heat loss of the room.

Where existing radiators are to be utilised, the existing heating system shall be pressurised to manufactures recommendations prior to any installation works being carried out where instructed by Clerk of Works.

New pipe work can be wall mounted, clipped, boxed out and painted, incorporated into existing floors, walls, etc. The location of all new pipework both horizontally and vertically to be decided on by the Clerk of Works.

The following are the principal Codes and Standards which shall apply:-

- EN 14511-1:2018, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling Part 1: Terms, definitions and classification
- EN 14511-2:2018, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling Part 2: Test conditions
- EN 14511-3:2018, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling Part 3: Test methods
- EN 60204-1, Safety of machinery Electrical equipment of machines Part 1: General requirements
- (IEC 60204-1, modified)
- EN 60335-2-40, Household and similar electrical appliances- Safety Part 2-40: Particular requirements
- for electrical heat pumps, air-conditioners and dehumidifiers (IEC 60335-2-40, modified)
- EN 61000-3-11, Electromagnetic compatibility (EMC) Part 3-11: Limits Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems Equipment with rated current 5A and subject to conditional connection (IEC 61000-3-11)

Except where otherwise stated, tests shall be conducted as described in EN 14511-1 and EN 14511-3.

OUTDOOR UNIT

Compressor unit, 750x850x350, linked to indoor unit with 6mm and 16mm refrigerant pipes, complete with cantilever arms and drip tray. Unit to be securely seated on matching concrete plinth, 150mm over finished ground level.

Monobloc with domestic hot water tank or equally approved. The distance between outdoor unit and an adjacent surface at the back and sides must be minimum 300mm. The unit will comprise of a compressor, condenser and pump. Inlet and Outlet connections will be 1". If the outdoor unit is to be mounted, the unit will come supplied on cantilever arms with drip tray fitted and condensate pipe fitted to storm drain including all associated works. If the outdoor unit is to be standing, the unit will come supplied with 2 rubber mounts and drip tray condensate pipe fitted to storm drain including all associated works. The outdoor unit shall be supplied with a separate back up heater.

The heat pump must be capable of delivering 6.25kw at Flow T of 45°C and outside air temperature of -7°C.

The heat pump compressor must be inverter driven, capable of full modulation depending on heat load demand.

INDOOR UNIT SPECIFICATION

3 low temperature split integrated floor standing indoor unit with associated outdoor unit, suitable for use with Solar Heating Panels, complete with inverter driven water pump, expansion vessel, back up heater, primary diverter valve and 180litre DHW cylinder. Control must include DHW scheduling, with automatic disinfection mode availability and a weather compensated heating curve. The heat loss for the DHW cylinder must not exceed 1.3kwh/24hrs.

HEATING CONTROLS

The building energy management system, timers and temperature controls are to comply with BS EN 60730:2011 & 2015.

The distribution system to have time and temperature controlled heating circuits as follows:

- Zone 1: Hot Water only
- Zone 2: Downstairs
- Zone 3: Upstairs

Each zone shall be controlled by a 24hour 7day timer. Timers to be mounted in a PROMINENT position and clearly marked as to the zone they control.

Room thermostats located in Main Bedroom and Hallway. Fit thermostat to Hot Water cylinder, if not already factory fitted, to switch off Zone 1 once hot water has reached 60°C. Thermostats are to be located approx. 1.5m over floor level in an accessible location.

Central heating system to have pressure release valve fitted on flow pipe from boiler.

External boiler to be fitted with frost thermostats.

Simple Pin time clock with volt free immersion heater time switch with on/off and clock operation, slider switch on/off and program operation, 24hr operation with 30min resolution, max. of 48 on/off operations per

day, neon on indication, impact resistant flush mount housing and supplied with a back box for surface mount applications, power rating 3.5kW.

Electronic Dial thermostat with LCD Indicator and volt free contacts, remote air sensor function, variable switch differential, range: 5-35 degrees Celsius, 230v supply. Each zone is to have its own thermostat and isolation motorised valve.

Supply, deliver, install and commission the following:

ELECTRICAL CONNECTIONS FOR DANFOSS HEATING CONTROLS OR OTHER EQUAL AND APPROVED:

Use electrical thermostats to control the level of comfort in a heating zone and the availability of hot water in the hot water cylinder.

Isolate zone when the room/rooms and/or Hot Water Cylinder is at the desired temperature. Zones are controlled via motorised valves

TIME CONTROL UNIT

A permanent live is fed to the programmer allowing it to control switched lives to both the Hot Water (HW) and the Central Heating (CH) control circuits

ELECTRICAL INSTALLATION - CENTRAL HEATING

Wire the switched live wire from the CH output of the programmer to the room thermostat(s). Wire the room thermostat(s) wire to the motorised Valve (HP22).

Provide interlocking to the boiler to ensure that the boiler is only on when there is a call for heating.

All controls, appliances, motors, pumps etc. to be wired in accordance with the manufacturers' instructions. All equipment must be compatible.

ELECTRICAL INSTALLATION - HOT WATER

Wire the switched live wire from the HW output of the programmer to the Cylinder thermostat. From the Cylinder thermostat wire to the Brown wire of the 3 port motorised Valve (HP3) and connect the Blue wire to Neutral.

Provide interlocking to the boiler to ensure that the boiler is only on when there is a call for heating.

FIELD WIRING

Installers will be wiring each component back to a wiring centre. It is therefore important to know the number of cores required for each cable. Manufacturers usually present this information as a field wiring table as shown below. The cores are presented as "3+E" which means that three cores are required from the connection, plus an earth if the component requires it. Double insulated components do not require an earth, but it is good practice to leave an earth conductor available.

Mains Supply	2+E	Room Thermostats	3+E
Programmer	5+E	2 Port Valves	4+E
3 Port Valves	4+E	Boiler & Pump	4+E

Cylinder Thermostat	3+E		
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UNDERFLOOR HEATING

Install underfloor heating (UFH) pipes strictly in accordance with the manufacturer's instructions. Underfloor loops should not exceed 80m in length and laid not greater than 150mm apart. Heating loops may not cross movement joints installed in the floor screed. For screed specification see Concrete Section.

No heating loop is to be higher than the height of the UFH inflow and return manifold. The UFH manifolds are to be positioned min 500mm above finished floor level. Thermal actuators are to be fitted to the Return Manifold only.

A four way mixing valve, valve position face plate printed on both sides and can be rotated allowing a choice of valve mounting positions, adaptable with ESBE electronic motor actuator, suitable fluid of water or glycol mixture for heating or cooling closed loops, with actuator to be fitted to heating system flow and return and the UFH flow and return. The mixing valve is to be controlled by temperature sensor to maintain the temperature of the UFH heating loops to a max 30°C.

Prior to installation of the screed, each heating circuit to be filled and flushed with filtered water and cleared of all air bubbles. Pressure test with cold water for 24 hours at 10 Bar/1 MPa. After the successful pressure test, the heating circuits shall be filled with hot water to the maximum permitted temperature as instructed by the manufacturers. Prior to installation of finished floor screed, all fastenings are to be re-tightened.

On commissioning all heating circuits are to be balanced.

RADIATORS:

Supply, deliver and install radiators as listed on the schedule. The radiators shall be steel plate single or double superheat convectors or other equal and approved.

In the event that Air To Water Heat Pump is specified, radiators shall be aluminium high efficiency model, sized with flow temperature 45C or ΔT 22.5C to BS EN 442-1: 2014.

Each radiator shall be fitted with a concealed type air vent and concealed brackets. All radiator dimensions shall be checked on site before ordering. The Contractor is to include for taking down and refixing the radiator for painting purposes.

Radiators to be mounted between 150 & 1754mm over floor level.

A drain plug should be fitted on the lowest level on the central heating pipework.

On commissioning the radiators are to be balanced by the contractor.

Typical radiator sizes for houses with BER rating less than C are listed in the table below. The contractor is to confirm radiators size to suit rooms.

Room	Type	Length	Height	Watts	No.
Sitting Room	DP+	1600	520	2300	1
Kitchen/Living Room	DP+	1400	520	2000	1
Hall	DP	700	520	750	1
Main Bedroom	DP+	1100	520	1500	1
Other Bedrooms	DP	800	520	900	1
Bathroom	DP	800	520	830	1
Landing	DP	700	520	750	1
DP+	Double Panel with convector fins				

RADIATOR VALVES:

Each radiator shall be provided with radiator valves as scheduled on the schematic drawings. All radiators except bathroom to be fitted with thermostatic control valves, Danfoss or equal and approved, unless in rooms where a room thermostat is fitted and lockshield valves to balance radiators.

HEATING FEED & EXPANSION TANK:

Supply, deliver and install a 45 litre feed and expansion tank at high level in the attic. This tank shall be complete with the following:

- 1 no. 15mm ball valve and floor
- 1 no. 20mm cold feed
- 1 no. 25mm open vent
- 1 no. 32mm overflow
- 1 no. tank cover

CIRCULATION PUMP:

Supply, deliver and install an 'A' Rated modulation circulating pump, cast iron with 32W motor size, 0.27A full load current, 240V 1PH 50Hz, 2.7m³/hr max flow, 5m max head, complete with isolating valves, a 2 year warranty on materials and labour should be provided with the circulating pump.

MOTORISED VALVES:

2 port or 3 port valves complete with isolating valves.

EXPANSION VESSEL

A diaphragm type expansion vessel, complying with IS EN 13831, must be connected at a point close to the inlet side of the circulation pump as per manufacturer's instructions. The volume should be suitable for the system water contents and the nitrogen/air charge pressure should not be less than the static head. It should be connected to the system by a 19mm pipe on the collier return side of the system and should be well supported. The vessel should be installed in the vertical down position only and be securely supported.

OIL TANKS

Supply and Install a new 1100 litre oil tank. All tanks shall be double skinned and must comply with EN 13341:2005. Contractors shall provide and fit an oil gauge. The construction of a 150mm thick 35n20 concrete tank base and 215mm thick supporting block work shall be provided to suit the particular type of oil tank. Supply and fit a gate valve and oil filter at the tank and lay underground plastic coated copper oil feed line to the boiler. Location of the oil tank to be agreed on site with the LA Building Inspector.

Oil feed pipes shall be 8mm uPVC coated un-jointed copper piping and shall be laid in a 40mm polyethylene pipe 600mm below the existing ground level with sand bed surround. Warning tape to be laid 300mm below ground level over the pipe cutting.

Gravity fed heating systems should have the pipe fitted within a continuous rise in the direction of flow to prevent airlocks.

Non gravity fed systems requires that the pipe be sized correctly to ensure that the flow rate to the pump is correct. The contractor shall be responsible for the correct sizing of this pipe.

The contractor shall also allow for testing and commissioning the heating system after replacement of the boiler.

SOLAR HEATING

Supply and fit Flat Panel Solar Heating System to comply with European Technical Approvals.

Solar Panels to be installed on roof in location as shown on drawing, panels to be in accordance with draft SR 50-2:2010 Code of practice for building services – Part 2: Solar panels. These should be installed proud of the roof surface.

3 Bedroom House: Supply and fit 6m² of flat plate panels required, solar panels to have 92% transmission rate and a highly selective coated aluminium absorber plate, minimum of 50mm wool insulation to reduce heat loss, panels filled with a glycol antifreeze solar fluid, panels to coincide with a solar enabling kit to be supplied and fitted to hot water cylinder to transfer hot water from panels to cylinder, panel dimensions 2000 x 1300 x 85mm, max. operating pressure of 6 Bar, max. standstill temperature 200 degrees Celsius, installation angle 15 to 80 degrees, provide a 10 year warranty on labour and materials.

1 or 2 Bedroom House: Supply and fit 4m² flat plate panels, solar panels to have 92% transmission rate and a highly selective coated aluminium absorber plate, minimum of 50mm wool insulation to reduce heat loss, panels filled with a glycol antifreeze solar fluid, panels to coincide with a solar enabling kit to be supplied and fitted to hot water cylinder to transfer hot water from panels to cylinder, panel dimensions 2000 x 1300 x 85mm, max. operating pressure of 6 Bar, max. standstill temperature 200 degrees Celsius, installation angle 15 to 80 degrees, provide a 10 year warranty on labour and materials.

Expansion vessel and cooling vessel to be sized in accordance with manufacturer's instructions to match the selected solar heating system.

Supply and fit solar pump station, pump station to have automatic pump speed, flow and return temperature gauges, safety valve and pressure gauge, expansion vessel gauge, filling valves and drainback controller which contains the pump station, with flow rate of 2-12 l/min 'A' energy rated pump.

Supply and fit a control panel in accordance with ETCI regulations in a prominent location complete with over-voltage lightning protection, Thermostat Function and Stagnation Reduction Function.

Thermal Solar System and components to comply with EN 12975-2: 2006.

All pipework associated with the Solar Heating System to be copper pipe, flexible stainless steel as specified above. Only compression or brazed joints to be used.

PEX/Plastic/PEX-ALU-PEX or galvanised pipes or SOLDER & GALVANISED FITTINGS ARE NOT PERMITTED.

All pipework to be insulated with a flexible high temperature foam insulation material that is temperature up to 150 degrees Celsius, closed cell structure with built-in water vapour barrier, UV resistant, wall thickness at least equal to the diameter of the pipe.

Installation and commissioning of the Solar Heating System to be in accordance with manufacturer's instructions and positioned to avoid shading and orientated as closely as possible to the South. Solar panels to be bolted or secured to rafters to resist likely wind loadings, fixings to be sealed to prevent any water ingress. Connections penetrating the roof shall be waterproof using a vent tile/slate, vent shall be suitable for insulation upgrades.

Servicing of solar panel heating system is to be in accordance with manufacturers' instruction.

SPACE HEATING

SOLID FUEL STOVE SCHEDULES

Works to comply with Part J, Technical Guidance Documents, Building Regulations.

Supply, deliver, install and commission multi solid fuel free standing dry stove or other equal and approved solid fuel stove. The contractor shall size stove heat output to suit dwelling. Stoves should be fitted in accordance with the manufacturer's recommendations and specification complete with filler piece from back of stove to wall and cover flange for stove pipe soot box junction. Stove to be provided with direct combustion air feed and finished in enamel black.

Supply, deliver, install and commission 7 kW multi solid fuel insert dry stove with 83.2% efficiency, dimensions: 557mm high x 400mm wide x 369mm deep and suit an 16" or 18" opening, 5" flue pipe, top flue outlet, glass size 248mm x 295mm or 4.8kW multi fuel dry stove 83.2% efficiency, dimensions 600mm high x 545mm wide x 270mm deep, top flue outlet, glass size 248mm x 295mm. The contractor shall size stove heat output to suit dwelling. Stoves should be fitted in accordance with the manufacturer's recommendations and specification complete with filler piece from back of stove to wall and cover flange for stove pipe soot box junction. Stove to be provided with direct combustion air feed and finished in enamel black.

This can be achieved by providing a 100mm duct under floor from one external wall through to the opposite wall with a tee piece left up for the stove. Hit and miss vents shall be fitted on the plinth externally. Cast iron flue pipe from the stove shall be connected to the 200mm diameter clay flue pipe using a 316 Grade stainless steel flue adaptor to IS EN 1856.

All materials to be stamped EU approved with an approved Agreement Certificate.

STOVE ALCOVE

Where a range is being replaced with a stove, provide 75mm deep black granite hearth shall be fitted in the alcove. Rear and side walls of the alcove shall be tiled with 150mm x 75mm heat resistant black tiles laid with heat resistant adhesive in brick course.

Where an open fireplace is being replaced with an inset stove, provide 75mm deep black granite hearth shall be fitted.

FLUES & ADAPTER KITS

Supply and install twin wall stainless steel flues, grade 316 stainless steel, with 25mm insulation, complete with bends, wall support bracket, wall fixing brackets, cleaning eye, anti-downdraught cowl, roof brace if required to support carrying of flue min 1m over eaves or roof barge.

If flue is to be installed internally, fit ceiling support unit at each ceiling, attic insulation shield and roof penetration kit to match roof finish.

Supply and install stainless steel adapter kits for free standing and insert stoves and central heating boilers or equally approved.

Supply and install stainless steel low level balanced flue kits for central heating boilers or equally approved, complete with external security grill.

All elements to be EU/CE marked and have approved Agreement Certification. Installation in accordance with manufacturers instruction and in compliance with Part B, Fire – Building Control Regulations.

Plume from boilers to comply with IS 813

INSULATION

HEATING:

All heating pipework in rising ducts, floor ducts chased in walls or under floors, shall be insulated with Armaflex or other equal and approved and comply with BS 5422: 2009 and BS 5970: 2012 to the thicknesses given below with foil backed fibre glass pre-formed insulating sections jointed with suitable foil backed tape.

Thermal insulation of buried services shall comply with BS 4508-1: 1986. Thermal insulation materials shall comply with BS 3927, BS 3958 and BS 5608 as appropriate.

Minimum 65mm concrete cover to insulation is required.

- Pipe Bore (mm) 15 20 25 32 40 50 65 80
- Insulating Thickness (mm) 25 25 25 25 40 40 40 40

WATER SERVICES PIPEWORK:

As specified for heating pipework.

Insulate underground hot and cold water supplies to sink, all water pipes in roof space and on the inner face of external walls with with a flexible high temperature foam insulation material that is temperature up to 150 degrees Celsius, closed cell structure with built-in water vapour barrier, UV resistant lagging sections.

Insulate cold water storage tank with a proprietary lagging jacket - holed for expansion pipe.

INSULATE all exposed pipes in roof space and hot water pipes in ducts in accordance with manufacturer's recommendation.

INSULATE cold water storage tank in roof space in accordance with manufacturer's recommendations and detailed drawings.

VENTILATION

GENERAL

All works to comply with BS EN 12239-2001 Ventilation in Buildings, Part F-Technical Guidance Documents, Building Regulations.

DUCTWORK & ACCESSORIES

All PVC extract ducting and fire wraps from kitchen extractor hoods, bathrooms and ensuites shall comply with BS EN 1866: 2007. PVC back draught shutters shall be supplied and installed in all kitchen extract hood exhaust air circular ductwork as it rises into the ceiling void.

All ductwork joints shall be taped with approved PVC tape.

EXTRACT AIR GRILLES

All exhaust air grilles from kitchen, bathroom and en-suite extract shall be 145mm diameter circular punched aluminium grille with a minimum free area of 12500mm² or other equally approved. All grilles to have powdered coated finish, WHITE.

All exhaust air grilles should require a PVC and a galvanised steel transition piece to adapt from circular ductwork to flat pack ductwork where necessary.

DUCTING INSULATION

All extract ductwork in un-heated roof voids shall be insulated with foil backed fibreglass insulation or other equally approved.

BATHROOM EXTRACT FANS

Mechanical extractor to be supplied and fitted in the bathroom. Mechanical extract ventilation capable of extracting between 12m³/hr and 70m³/hr. Vents shall be controlled by a humidistat and shall also incorporate a boost function. A secondary damper is required to increase airflow where insufficient pressure.

All fans shall be fitted with PVC back draught shutter and integral 15 minute run-on timer controlled from light switch.

TESTING

All tests and commissioning to comply with BS EN 1886: 2007.

WHOLE HOUSE VENTILATION

To combat condensation, the contractor shall supply and fit a motorized positive fan in the roof space, permanently wired and controlled by a humidity sensor, low energy consumption, base and cowl to be made of sheet steel and protected against corrosion, brushless DC motor, power supply 230V, located over landing to provide a positive air pressure throughout the house. The unit shall incorporate a heating element which may be disabled if so required.

DRAINAGE AND SERVICES

GENERAL

This Specification is to be read in conjunction with the Preliminary Specification. All works to comply with **'Recommendations for Site Development Works for Housing Areas'** as issued by DOECLG 1998.

All sewers and watermains except for individual connections shall be laid in the road carriageway only.

ALL FILL MATERIAL SHALL BE TESTED AND CERTIFIED FREE FROM PYRITE CONTAMINATION

Only steel or cast iron covers, frames and gratings shall be used, with loading capacity determined in accordance with location as per IS EN 124 and to the approval of the engineer. E.g. Class A-15 for areas inaccessible to vehicles, Class B-125 for footways and open spaces, Class D-400 for roads, driveways, hard shoulders, car parks etc.

DRAIN PIPES

GENERAL

The **Contractor** shall include in his tender the cost of connections to existing services for the above and where necessary, the cost of digging up and disconnecting the old connection and all associated works.

House drainage pipes shall be P.V.C. conforming to BS 4660: 1989, BS EN 1401-1: 2019 & BS EN 752: 1977 2017. Minimum service pipe to each dwelling shall be 100mm diameter. Each dwelling shall be individually connected to public sewers and storm drains.

A drainage channel 100mm internal width, 115mm invert depth, galvanized steel edge rail and grate shall be fitted outside external doors and connected to the stormwater drainage system with min 100mm dia. pipe.

JOINTS FOR P.V.C. DRAIN PIPES

The pipes shall be jointed with hard P.V.C. coupler incorporating two rubber sealing rings in accordance with manufacturer's instructions.

CONCRETE PIPES FOR FOUL AND SURFACE WATER SEWERS (OVER 150 DIAMETER)

Unless otherwise stated, concrete pipes for sewers shall be flexible spigot and socket type conforming with IS 6: 2004 incorporating rubber rings to the requirements of BS EN 681 & 682 & BS 7874: 1998 Concrete surface water pipes to IS 166: 1972.

CONCRETE O.G. PIPES

Concrete O.G. pipes shall be in accordance with IS 6: 2004

CLAUSE 503 - MATERIAL TRENCH BEDDING

Shall be free draining all-in 0/10 washed gravel. Material shall be in accordance with TII Specification for Road Works 2015.

CLAUSE 505 TYPE A - MATERIAL TRENCH BACKFILL

Shall be free draining 13mm single size washed gravel chippings to BS EN 13043: 2003. (Min. size 10mm, Max. size 20mm). Type A material is in accordance with Clause 505 of the TII Specification for Road Works 2015.

CLAUSE 505 TYPE B - MATERIAL TRENCH BACKFILL

To be used for pipes laid in gardens, public open spaces and as approved by **Engineer**. It shall be fine material which may be selected from excavated material or imported, as required, from which all clay lumps in excess of 75mm, stones in excess of 25mm and vegetable matter have been removed. This material must be readily compatible. Wet or plastic clay may not be used. The material must meet with the approval of the **Engineer**. Type B material is in accordance with Clause 505 of the NRA Specification for Road Works.

Pipes laid under roads, driveways, paths, shall be backfilled with approved compacted hardcore.

GRANULAR BEDDING & SIDE FILLING TO PIPES

A granular bed of approved bedding material, Type A, shall be provided under all pipes to following depths:

Item	mm
110 and 150 watermain	150 depth
100 and 150 sewers	100 depth
225, 300 and 375 sewers	150 depth

Granular bed, Type A, material as described in 2.5 above.

Side filling shall be placed to a level on top of pipes in similar material to that used in beds and shall be thoroughly compacted in three layers to completely fill the space between the sides of the trench and the piping.

BACKFILLING OF TRENCHES

On completion of each length of pipeline and after inspection, testing and approval by the **Engineer**, the backfilling of trenches shall be carried out as follows:

The first 150mm depth over top of foul sewers and surface water sewers and the first 300mm depth over watermains, shall be filled with granular bedding material Type A, carefully placed and compacted by hand. The remainder of the filling, Type B, shall consist of fine material as described and this shall be placed only in gardens and under open space and compacted by hand or light mechanical tamper. The contractor shall maintain the surface of refilled trenches level with adjoining surfaces.

CONCRETE BED BENCHING AND SURROUND

Where a concrete bed is required under sewers, i.e., where cover to the crown of the pipe is less than 1200mm in roads or any areas subject to vehicular traffic and 750mm in grassed areas, it shall be bedded in Grade C20 concrete 150mm and benched and covered with 150 mm C20 concrete.

LAYING SEWER PIPES

All sewer pipework and trenches to comply with Code of Practice BS EN 752: 2017 and this specification.

Sewer pipes shall be laid and jointed in accordance with manufacturer's instructions to correct line and gradient, each pipe being true to the general gradient of the section in where it is laid.

In ground which contains ashes or chemicals or material which could accelerate corrosion or deterioration of the pipe, the pipe shall be encased in 150mm Grade C20 concrete. In the case of concrete pipes the rubber seal shall be surrounded in concrete Grade C20 to a minimum thickness of 150mm.

BRANCH JUNCTIONS AND SPECIALS

The Contractor shall provide all necessary branch junctions and specials in the correct locations.

TESTING PIPES

Sewers shall be tested in convenient sections by one or other of the following methods, as directed by the **Engineer**.

WATER TEST

Pipes shall be tested for a minimum of 30 minutes under a head not less than 1000mm over crown at high point and not more than 2400mm over crown at low point. Any defective work shall be made good or replaced and test repeated until pipe line is proved watertight to the satisfaction of the **Engineer**.

AIR TEST

Air shall be pumped into the section of sewer under test until a pressure of 100mm of water is indicated on a U-Tube (1 kPa) connected to the system. The air pressure shall not fall to less than 75mm head of water (0.75kPa) during a period of 5 minutes, without pumping, after a period of requisite stabilisation. Failure to pass the Air Test is not conclusive and, when failure does occur, a water test shall be carried out.

MANHOLES

Manholes inside the site boundary, where less than 1500 mm deep may be constructed in 215mm thick blockwork finished fair and nap plastered externally, if so permitted by the **Engineer**.

Manholes in the public domain and in ground which contains ashes or chemicals or material which could accelerate corrosion or deterioration of the pipes which feed into the manhole, shall be constructed in Grade C40 concrete to BS EN 1917: 2002.

Precast concrete rings to BS 5911: Parts 2 & 3: 2010 from an approved supplier maybe used. Unreinforced precast manholes in trafficked areas, greater than 1.5m deep to be surrounded with outer layer 150mm thick of C20 concrete. All joints to be sealed water tight.

Manholes shall be of following internal dimensions:

- Less than ≤ 1500 mm in height: 1m diameter
- Over > 1500 mm in height: 1.2m diameter
- Bases shall be 150mm thick Grade C40 concrete
- Walls shall be 225mm thick Grade C40 concrete

Roofs shall be min 150mm thick Grade C40 concrete reinforced designed to IS EN 1992 to carry all live and dead loads.

Manholes shall be subjected to a water test. The pipes shall be plugged off and the manhole filled with water to the level of the top of the highest chamber ring. The manhole shall be watertight under this head of water. There shall be no infiltration into manholes.

CHANNELS AND BENCHING FOR MANHOLES

Channels shall consist of preformed channels or pipes cut to form channels. At manholes where there is a change in pipe size between the main pipe entering and that leaving the manhole, the connecting channel may be formed in Grade C20 in situ concrete finished with 19mm cement sand (1:2) mortar with steel trowel finish. This may also apply where curved channel sections are not available.

Benching shall be in Grade C20 concrete finished with 19mm thick 1:2 cement/ sand mortar with steel trowel finish. Benching shall rise vertically from the top edge of the channel to a height not less than that of the soffit of the outlet and shall be sloped upwards to the walls at a gradient of 1 in 6.

In the case of branch drains, the benching shall be so shaped as to guide the flow of sewage in the desired direction.

Manhole covers and frames and gully tops shall be cast iron, D400 and comply with IS EN 124:1994, as follows:

Group 3 circular manhole covers and frames to be used in all areas to which vehicles have access.

In all other areas, Group 2 circular covers and frames to be used.

Minimum clear opening 600 diameter.

Allow for spot welding as required by **Engineer**.

In areas which are not paved, surround manhole frames with a cement and sand (1:3) collar 150 mm wide x 100 mm thick.

MANHOLE STEP IRONS

Manhole step irons shall be provided in manholes deeper than 975mm. Step irons shall be provided in two vertical runs, 300mm apart centre to centre. Irons shall be 300mm apart in each run and shall be staggered vertically by 150mm.

The top rung shall be at a maximum depth of 450mm from ground level and the bottom rung shall be a maximum of 300mm above benching.

INFILTRATION TEST FOR MANHOLES

If so required by the **Engineer**, manholes shall be tested for infiltration of ground water.

ROAD GULLIES

Precast sealed gully chambers from an approved supplier will be used. Road gullies shall be cast iron Dublin Corporation pattern with grate, trap, cleaning eye, overall weight approximately 114 kgs and shall be **lockable**.

Outlet from RG is to be minimum 150mm diameter.

ARMSTRONG JUNCTIONS

Armstrong junctions shall be uPVC with required number of inlets to suit pipe runs. They shall be set on Grade C40 concrete 150mm thick and surrounded in similar concrete. Provide all necessary raising pieces. Provide galvanised cast iron cover set into concrete yard.

HOUSE GULLIES

House gullies shall be uPVC of approved type. Gullies shall be provided at sink outlets. Rainwater pipes shall be vertical back inlet type. Set gulley on 150mm Grade C40 concrete base and surround in similar concrete. Provide dished concrete surround at yard level to all gullies. Provide all necessary raising pieces and 150 x 150mm galvanised cast iron covers.

ENCASING GULLIES AND JUNCTIONS

In ground which contains ashes or chemicals or material which could accelerate their corrosion or deterioration, gullies and Armstrong junctions shall be encased in concrete Grade C20 to a minimum thickness of 150mm.

PVC. ADAPTERS

Provide all necessary P.V.C. adapters for jointing P.V.C. pipes to Armstrong junction and gulley outlets.

FRENCH DRAINS TO HOUSES

Construct French drains with min 100mm dia. slotted rigid uPVC drainage pipe laid on a bed of 100mm deep pea gravel to BS EN 13043: 2002 to a fall min 1:100 to outlet. Overlay to surface level with pea gravel. Provide Armstrong junctions to every change of direction. Depth of trench is to be min 600mm and min 300mm wide. Where abutting the external wall the top of trench shall be min 150mm below DPC level.

CLEANING SEWER SYSTEM

On completion of the works, the Contractor shall ensure, to the satisfaction of the Architect, that all sewers and manholes are clean and free from obstruction.

The contractor shall provide a CCTV survey of all sewers both foul and stormwater on completion and to repair at his expense any defects found in this survey.

P.V.C. drains and fittings should always be laid and properly bedded i.e., Contractor to ensure that pipes and fittings are never freely suspended and unsupported while being placed and fitted on site.

Manhole covers and frames must be adequately supported. When finalising the position and level of manhole cover in road, high density engineering bricks must be used to support the frame as necessary, particularly where manholes are likely to be subjected to heavy traffic loads.

CONNECTION TO PUBLIC SEWERS

Connections to mains which are the property of the Local Authority can be made by the Local Authority only. No other person may interfere in any way with these mains. Such connections will be made by the Local Authority at the expense of the persons requiring them. The estimated cost of such connections must be lodged with the Local Authority before the work is undertaken.

COMPLETION

CLEANLINESS (PIPEWORK DISTRIBUTION SYSTEMS)

Items for incorporation in the works shall be kept in protective storage until needed. Tubes and equipment shall be kept effectively plugged, capped or sealed until required.

Before installations are commissioned and subjected to the required tests they shall be thoroughly cleaned internally and externally.

Arrangements to ensure cleanliness of systems shall follow the recommendations of the relevant codes and where indicated chemical cleaning of water systems shall be carried out as required.

Effluent from cleaning processes shall be disposed of in compliance with the requirements of the local Water Authority/Irish Water.

Internal cleaning for gas installations and condensate installations shall include scavenging with steam or oil-free compressed air to the satisfaction of the Engineer. Items which could be damaged by scavenging shall be isolated and cleaned by approved alternative methods.

Fuel oil installations shall be cleaned by steam or flushing with water at velocities not less than 1.5 m/s. Water flushing shall include detergent treatment as required.

Heating systems shall be thoroughly flushed out with clean water to remove all foreign matter to the satisfaction of the Engineer.

Water services systems shall be flushed, cleaned and disinfected as required in accordance with BS EN 806 & BS 8558: 2015.

CLEANING OF COPPER PIPE

The Contractor shall be responsible for thoroughly cleaning all pipework that is exposed in the building and preparing the surface of the copper to a smooth polish finish by use of emery cloth. The surface shall not be scratched or scored in the process.

IDENTIFICATION OF PIPE LINES

Provide identification of pipelines to indicate service and direction of flow at intervals of approx. 5m and at branches and valves.

Identification shall be self-adhesive PVC tapes or bands with appropriate, to BS 1710: 1984 and D.W. 142.

TESTING & COMMISSIONING

GENERAL

After installation is complete, the pipes and valves etc., shall be hydraulically tested to a pressure of 5 bar (0.5 mPa) and remain drop tight at that pressure for 2 hours. Should any leakage occur, the heating contractor is to make good at his own expense.

All testing shall comply with BS EN 806: 2000-2012 & BS 8558: 2015. Inform LA Building Inspector before carrying out tests. Provide clean potable water and apparatus for testing as required.

OBSTRUCTIONS

Before testing ensure that all pipe lines are clear.

Seal valve of main service to be tested with blank flange or with plug if socket valve.

SERVICE PIPES

Fill slowly with potable water to exclude all air. Apply test pressure of 90mm head or maximum working pressure plus 50% whichever is greater. There must be no measurable loss of pressure for at least 30 minutes.

DISTRIBUTING PIPES

Fill slowly with potable water to exclude all air. Close all draw-off taps. The system must be water-tight.

TAPS

Open each tap and check for satisfactory rate of flow.

DEFECTS

Locate and make good all defects before starting new work. Retest to satisfaction of the LA Building Inspector. Leave system sound and perfect.

PROTECTION

After cleaning, flushing and testing of pipework, contractor shall fill system with Fernox Protector F1 or equivalent and shall install a filter to remove magnetic and non-magnetic contaminants Fernox Total Filter TF1 or equivalent in accordance with manufacturer's instructions.

AIRTIGHTNESS

The pipes, fittings and joints should be capable of withstanding an air or smoke test of positive pressure of at least 50mm water gauge (380 Pa) for at least 3 minutes. During this time, every trap should maintain a water seal of at least 25mm. Smoke testing is not recommended for uPVC pipes.

WATERTIGHTNESS (FINAL TEST)

After laying, including any necessary concrete or other haunching or surrounding and backfilling, gravity drains and private sewers up to 300mm should be capable of withstanding a final water test to a pressure equal to 1.5m head of water (15 kPa) measured above the invert at the head of the drain or an air test ensuring that head of water on a manometer does not fall by more than 25mm (250 Pa) in a period of 5 minutes for a 100mm water gauge (1 kPa) test pressure and 12mm (120 Pa) for a 50mm water gauge (500 Pa) test pressure.

COMMISSIONING

All mechanical systems shall be operated by the contractor in accordance with the manufacturers' commissioning instructions. The results of all tests, O & M manuals, user manuals shall be given to the LA Building Inspector on completion. The tenant shall be shown how to operate the mechanical system and is left with user friendly operating instruction, in laminate form, either fixed or attached to the appliance.

Each new component is to be registered with the manufacturers to cover the warranty.

All components are to be tagged and shown on schematic drawing. The drawing shall be laminated and left in boiler house or hot press and a copy given to LA Building Inspector.

All components are to be fitted such that they can be accessible for maintenance and replacement.

PREVENTATIVE MAINTENANCE/SERVICING

The contractor shall carried out planned maintenance and servicing of all mechanical services as directed by the LA Building Inspector. All works are to comply with the relevant manufacturers' instructions. All replacement parts are to be OEM or otherwise approved by the LA Building Inspector.

The contractor and the LA Building Inspector shall agree a works schedule based on number of dwelling units to be attended and the resources available. The contractor shall maintain a log on Excel, of nature and type of servicing carried out and what repairs, if any, were required. During and at the end of the Term Maintenance Contract the contractor shall hand over the service log to the Local Authority in electronic format.

The contractor shall issue a Certificate of Continuance within 10 days of completing the maintenance inspection of all equipment.

During all servicing, the contractor shall note where the installation or the equipment does not comply with current building, fire and safety regulations and bring this to the attention of the LA Building Inspector.