Risk Assessment and Management Plan

Inspection Body No. 9052

Prepared For:

Wedgewood House
Forth Drive, Chelmsley Wood,
Birmingham, West Mids,
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Wedgewood House

Prepared By: Corporate Office

Address:

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RA Report:

Assessed by: Peter Ingram (PINGRAM)
Assessed Date(s): 24/03/2020
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Authorised By: Wayne Homer

This document has been created to assist those with the responsibilities for the water systems in the buildings surveyed to reduce the risk associated with Legionella and other water borne pathogens. The document has been formulated in such a way that when the various recommended actions and remedial works are completed, and regular routines for monitoring, testing and maintenance/cleaning/disinfection are followed, the user will comply with current requirements and the risk associated with Legionella will be minimised.

Water Treatment Services

CONTENTS:

1. The Prevention Or Control Of Legionellosis

1.1 Legionellosis (Including Legionnaires' Disease)

Legionellosis is the term used for infections caused by Legionella Pneumophila and other bacteria from the family Legionellaceae.

The first identified outbreak of Legionnaires' disease occurred among people who had attended an American Legion Convention in Philadelphia in 1976. Since then, each outbreak has received high publicity, as a result of which a number of legislative and guidance documents have been published in the UK detailing the required procedures to eliminate or minimise the risk of further outbreaks.

Legionnaires' disease is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age, illness, immunosuppression, smoking, etc. Legionella bacteria can also cause less serious illnesses, which are not fatal or permanently debilitating but which can affect all people.

On average there are approximately 200-250 reported cases of Legionnaires' disease each year in the United Kingdom (UK). It is thought, however, that the total number of cases of the disease may be generally underestimated. About half of cases are associated with travel abroad. Infections which originate in the UK are often sporadic, for which no source of infection is traced. However, clusters of cases also occur and outbreaks have been associated with cooling systems and hot and cold water systems in factories, hotels, hospitals and other establishments.

Cases of Legionnaires' disease have occurred among staff in the workplace (factories, offices, local authority premises and hospitals); visitors (delivery drivers) and members of the public (patients, hotel guests, clients or passers by).

1.1.1 Legislation – Health And Safety Law

A Code of Practice (The prevention or control of legionellosis (including legionnaires' disease) - Approved Code of Practice), which was approved by the Health and Safety Commission under Section 16 of the Health and Safety at Work Act (HSWA) 1974, was published in 1991 and came into effect on 15 January 1992. This was revised in 1994, the revised Approved Code of Practice (ACoP) coming into effect on 16 January 1995. It was supported by Health and Safety Executive Guidance Note HS(G)70 (The control of legionellosis including legionnaires' disease), the second edition of which was published in 1993. The third edition, which combines HS(G)70 and the ACoP into one document (entitled Legionnaires' disease. The control of legionella bacteria in water systems and known as L8) came into effect on 8 January 2001. The fourth edition, was published in 2013 split the document into the ACoP L8 and HSG274 parts 1, 2 & 3 (part 1 The control of legionella bacteria in evaporative cooling systems, part 2 The control of legionella in hot and cold water systems & part 3 The control of legionella bacteria in other risk systems.

The Approved Code of Practice ACoP L8 and HSG 274 gives practical guidance on the requirements of (HSWA) and the Control of Substances Hazardous to Health Regulation 2002 (COSHH) concerning the risk from exposure to legionella bacteria. In particular it gives guidance on Section 2, 3, 4 and 6 (as amended by the Consumer Protection Act 1987) of HSWA, and Regulations 6, 7, 8, 9 and 12 of COSHH. The Code also gives guidance on compliance with the relevant parts of the Management of Health and Safety at Work Regulations 1999 (MHSWR)

The Code applies to the risk from legionella bacteria (the causative agent of legionellosis including Legionnaires' disease) in circumstances where the Health and Safety at Work etc Act 1974 applies.

To comply with their legal duties, Dutyholders which include employers and those with responsibilities for the control of premises should:

- Identify and assess sources of risk – this includes checking whether conditions are present which will encourage bacteria to multiply, e.g. Is the water temperature between 20°C – 45°C; is there a means of creating and disseminating breathable droplets, e.g the aerosol created by a shower or cooling tower; and if there are susceptible people who may be exposed to the contaminated aerosols
- Prepare a written scheme of precautions for preventing or controlling the risk
- Implement, manage and monitor precautions – if control measures are to remain effective, then regular monitoring of the systems and the control measures is essential. Monitoring of general bacteria numbers can indicate whether microbiological control is being achieved. Sampling for legionella is another means of checking that a system is under control
- Keep records of the precautions; and
- Appoint a person to be managerially responsible

The Code and guidance also set out the responsibilities of suppliers of services such as water treatment and maintenance as well as the responsibilities of manufacturers, importers, suppliers and installers.

The ACoP is enforced by the Health and Safety Executive Inspectorate and Local Authority Environmental Health Departments.

The Code has been approved by the Health and Safety Commission with the consent of the Secretary of State. It gives practical advice on how to comply with the law. If you follow the advice you will be doing enough to comply with the law in respect of those specific matters on which the Code gives advice. You may use alternative methods to those set out in the Code in order to comply with the law.

However, the Code has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the Code, you will need to show that you have complied with the law in some other way or a court will find you at fault.

The Code also contains guidance issued by the Health and Safety Commission and Executive, the parts of the ACoP document that are guidance are clearly identified. Following the guidance is not compulsory and you are free to take other action, but if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

1.1.2 Responsibility

Duties under the HSWA extend to risks from legionella bacteria, which may arise from work activities. The MHSWR provide a broad framework for controlling health and safety at work. As well as requiring risk assessments, they also require employers to have access to competent help in applying the provisions of health and safety law; **to establish procedures to be followed by any worker if situations presenting serious and imminent danger were to arise**; and for co-operation and co-ordination where two or more employers or self-employed persons share a workplace.

Only the courts can give an authoritative interpretation of law in considering the application of these regulations and guidance to people working under another's direction, the following should be considered: if people working under the control and direction of others are treated as self-employed for tax and national insurance purposes they may nevertheless be treated as their employees for health and safety purposes. It may therefore be necessary to take appropriate action to protect them. If any doubt exists about who is responsible for the health and safety of a worker this could be clarified and included in the terms of the contract. However, it should be remembered that a legal duty under section 3 of HSWA cannot be passed on by means of a contract and there will still be duties towards others under section 3 of the HSWA. If such workers are employed on the basis that they are responsible for their own health and safety, legal advice should be sought before doing so.

More specifically the Control of Substances Hazardous to Health (2002) COSHH Regulations provide a framework of actions designed to control the risk from a range of hazardous substances including biological agents.

The essential elements of COSHH are:

- risk assessment
- prevention of exposure or substitution with a less hazardous substance if this is possible, or substitution of a process or method with a less hazardous one;
- control of exposure where prevention or substitution is not reasonably practicable;
- maintenance, examination and testing of control measures, e.g. automatic dosing equipment for delivery of biocides and other treatment chemicals;
- provision of information, instruction and training for employees; and
- health surveillance of employees (where appropriate, and if there are valid techniques for detecting indications of disease) where exposure may result in an identifiable disease or adverse health effect.

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) require employers and others, e.g. the person who has control of work premises, to report to HSE, accidents and some diseases that arise out of or in connection with work. Cases of legionellosis are reportable under RIDDOR if a doctor notifies the employer and if the employee's current job involves work on or near cooling systems that use water or hot water service systems in the workplace. Further details can be obtained in HSE guidance (L73).

Those who have, to any extent, control of premises, have a duty under the Notification of Cooling Towers and Evaporative Condensers Regulations 1992 to notify the local authority in writing with details of 'notifiable devices'. These consist of cooling towers and evaporative condensers, except when they contain water that is not exposed to the air and the water and electricity supply are not connected. Although the requirement is to notify the local authority, the Regulations are enforced by the relevant authority for the premise concerned. Forms are available from local authorities or the local HSE office. If a tower becomes redundant and is decommissioned or dismantled, this should also be notified. The main purpose of these Regulations is to help in the investigation of outbreaks.

The Safety Representatives and Safety Committees Regulations 1977 and the Health and Safety (Consultation with Employees) Regulations 1996 require employers to consult trade union safety representatives, other employee representatives, or employees where there are no representatives, about health and safety matters. This includes changes to the work that may affect their health and safety at work, arrangements for getting competent help, information on the risks and controls, and the planning of health and safety training.

1.2 The Principles of Risk Assessment

Risk assessment has been a requirement of health and safety regulations for some years. COSHH Assessment, for example, is a form of risk assessment introduced in 1988 and relates to exposure to substances (both chemical and biological) hazardous to health. Risk assessment is also a major requirement of Managing for Health and Safety HSG65.

As explained in Sections 1.2 and 1.3, legionella risk assessment is part of the requirements under the COSHH Regulations, 2002, to assess the risk due to biological agents.

The basic principles of risk assessment have become well established over the years since the introduction of these legislative measures. This Section describes the basis on which our risk assessment is founded. It is designed to follow the established principles.

1.2.1 Definitions

Risk assessment is the identification of the hazards associated with the systems being surveyed and the evaluation of the risks associated with those hazards.

In order to appreciate this statement, it is first necessary to define HAZARD and RISK.

Risk Assessment calls for a quantitative exercise of judgement.

1.2.2 The Hazard

Legionella is the name given to a genus of bacteria of which Legionella Pneumophila is one species. Legionella organisms are widespread in natural water sources and have been found in rivers, lakes, streams, mud and soil as well as in man-made water systems.

To date over 40 species of the legionella bacterium have been identified. The species most commonly associated with disease outbreaks is *Legionella Pneumophila*, which causes about 90% of the cases and is apparently the most pathogenic of the genus. Sixteen different Serogroups of *Legionella Pneumophila* have been described. *Legionella Pneumophila* serogroup 1 is the one most commonly associated with cases of Legionnaires' disease in the UK, although other serogroups have been associated with cases worldwide.

Legionnaires' disease is a type of pneumonia. Besides affecting the lungs it may also have serious effects on other organs of the body. Inhaling airborne droplets or particles containing viable legionella, which are small enough to pass deep into the lungs and be deposited in the alveoli, causes infection.

Infection with legionella bacteria can be fatal in approximately 12% of reported cases. This rate can be higher in a more susceptible population; for example, immunosuppressed patients or those with other underlying disease. Certain groups of people are known to be at higher risk of contracting Legionnaires' disease; for example, men appear more susceptible than women, as do those over 45 years of age, smokers, alcoholics, diabetics and those with cancer or chronic respiratory or kidney disease.

1.2.3 The Risk

Having considered the hazard, it is now necessary to determine the risks associated with this hazard.

Risk is defined as the product of hazard and exposure. The risks are therefore determined by defining the factors that affect exposure. These can be divided into groups as follows.

- **Contamination**

Legionella bacteria are common and can be found naturally in environmental water sources such as rivers, lakes and reservoirs, usually in low numbers. Legionella bacteria can survive under a wide variety of environmental conditions and have been found in water at temperatures between 6°C and 60°C. Water temperatures in the range 20°C to 45°C seem to favour growth. The organisms do not appear to multiply below 20°C and will not survive above 60°C. They may, however remain dormant in cool water and multiply only when water temperatures reach a suitable level. Temperatures may also influence virulence; legionella bacteria held at 37°C have greater virulence than the same legionella bacteria kept at a temperature below 25°C.
The chances of the bacteria entering into the water system is higher if the water entering the building is derived from a natural source or a private water supply, rather than treated and disinfection supply, the potential for nutrients to enter ther water system for example by airborne contamination can be influenced by the location of the system.

- **Amplification and Proliferation**

Legionella Pneumophila are aerobic bacteria that also require a supply of nutrients to multiply. Sources can include, for example, commonly encountered organisms within the water system itself such as algae, amoebae and other bacteria. The presence of sediment, sludge, scale and other material within the system, together with biofilms, are also thought to play an important role in harbouring and providing favourable conditions in which the legionella bacteria may grow. A biofilm is a thin layer of micro-organisms which may form a slime on the surfaces in contact with water. Such biofilms, sludge and scale can protect legionella bacteria from temperatures and concentrations of biocide that would otherwise kill or inhibit these organisms if they were freely suspended in the water. Some types of material used in water fittings might similarly provide the environment in which *Legionella Pneumophila* can proliferate.

As legionella bacteria are commonly encountered in environmental sources they may eventually colonise manufactured water systems and be found in cooling tower systems, hot and cold water systems and other plant which use or store water. To reduce the possibility of creating conditions in which the risk from exposure to legionella bacteria is increased, it is important to control the risk by introducing measures which:

- Do not allow proliferation of the organisms in the water systems; and
- Reduce, so far as is reasonably practicable, exposure to water droplets and aerosols.

It is uncommon for *Legionella Pneumophila* to proliferate at temperatures below 20°C and it does not survive at temperatures in excess of 60°C. A water pH of 6.9 and traces of iron favour growth and multiplication. The following factors will therefore have an effect on the rate of proliferation of *Legionella Pneumophila*:

- Deposits, scale, corrosion, process contaminants, airborne material scrubbed into the system, etc.
- Stagnation may encourage the growth of biofilm (slime that forms on the surfaces in contact with water) which can harbour legionella and provide local conditions that encourage its growth
- Nutrient from the fabric of the system, from process contamination, from airborne material scrubbed into the system, from other micro-organisms (algae, amoebae, other bacteria), microbiological media, algal slime, biofilm, slime, protozoa, amoebae
- Inadequate water treatment control of scale inhibitor, corrosion inhibitor, antifouling, biocide, pH
- Temperature proliferation range 20ºC – 45ºC

A water treatment programme is defined as a system comprising plant, instrumentation, and water treatment chemicals and documented operating and maintenance instructions designed for the treatment of water supply. The programme may include the use of treatment chemicals, ultra-violet light, or *in situ* generation of ozone or metal irons.

- **Aerosol Formation and Transmission**

In order to contract Legionnaires' disease, the bacteria must be inhaled deep into the lungs. This occurs when the bacteria are carried in small airborne water droplets or particles or in droplet nuclei (the particles left after the water has evaporated). Types of system that can produce such droplets and particles and disseminate them into the atmosphere are:

  - water systems incorporating a cooling tower;
  - water systems incorporating an evaporative condenser;
  - hot and cold water systems and
  - other plant and systems containing water which is likely to exceed 20°C; and which may release a spray or aerosol (i.e., a cloud of droplets and/or droplet nuclei) during operation or when being maintained.

While this is not an exclusive list it identifies those systems most likely to cause infection. Other plants and systems containing water which is likely to exceed 20°C and which can release a spray or aerosol during operation or when being maintained or tested may also present a risk. Plants and systems such as fire-fighting systems may present a negligible risk in operation but a significant risk during testing procedures.

Experience has shown that cooling towers, evaporative condensers and hot and cold water systems in a wide variety of workplaces present a risk of exposure to legionella bacteria.

A water system includes all plant/equipment and components associated with that system, e.g. all associated pipe-work, pumps, feed tanks, valves, showers, heat exchangers, quench tanks, chillers etc. It is important that the system is considered as a whole and not, for example, the cooling tower in isolation. Dead legs and parts of the system used intermittently, e.g., test loops in engineering factories and injection moulding machines, also need to be included as part of the system since they can create particular problems with microbial growth going unnoticed. Once brought back on-line they can cause heavy contamination, which could disrupt the efficacy of the water treatment regime.

- **Effectiveness Of Engineering Controls and Design**

Water systems should be designed and constructed so as to:

  - Comply with relevant British Standards or their international equivalents
  - Control the release of spray / production of aerosols
  - Aid safe operation, for example, water circuitry should be as simple as possible, ideally without deadlegs, or if this is not possible, with the length of deadlegs limited, and non-essential standby plant disconnected or removed
  - Aid cleaning and disinfection, for example, those parts of the system which require regular cleaning should be readily removable and easily accesible
  - Be made of materials which can be easily disinfected and which do not support microbial growth

- **Exposure Potential**

  - The risk of exposure will be dependent on the potential for persons to come into contact with aerosols from the system before it has become disseminated and the bacteria in it has died, it is important to consider the risk generated under all operations and maintenance tasks for example a closed system when opened for cleaning and maintenance tasks

- **Host Susceptibility Of Those Exposed**

As described earlier, those at greatest risk are:

  - The infirm - especially patients with cancer, chronic respiratory disease, kidney disease, or the immunosuppressed.
  - Smokers
  - Alcoholics
  - Those in the age group 45 years and above
  - Males

- **Non-Steady-State Conditions**

Conditions that are outside the normal day-to-day running of the system can often result in increased risk. The conditions to be considered include:

  - Maintenance
  - Breakdown
  - Abnormal operation
  - Commissioning
  - Start up after holidays
  - Unusual circumstances

- **Management Control**

The effectiveness of risk management has a major influence on the risk itself. Factors that must be taken into account are:

  - Management structures - is it well defined, is deputy/ies nominated to cover for absence, are duties and lines of communication established?
  - Training - are those responsible for management and those responsible for the routine operation of the system adequately trained?
  - Written records - are the management structure, duties and lines of communication established as a written record; are written procedures (e.g. routine inspection and monitoring, water treatment control, cleaning and disinfection) in place, are the results of routine inspections and monitoring logged, are training records available, are records kept in a central location?
  - Control of actions - are tasks identified as a result of inspection and monitoring completed, is there a record of who completed the task and when?

1.3 The Facts about Scalding

Where temperature is used as the primary measure to reduce the risk of Legionella bacteria growth then the risk of scalding should also be considered.

1.3.1 The risk from Scalding

Scalding may occur in many situations in all types of buildings and applications, the degree of potential scalding depends on the water temperature, contact time, susceptibility of individuals and the volume of water delivered.

1.3.2 Who are most at risk?

The risk of burns and scalding is higher with regard to older people, people with mental illness or learning disabilities, children, anyone with reduced sensitivity to temperature and people with disabilities (who may not be able to recognise high temperatures or respond appropriately or quickly). Fatal accidents have occurred in the case of whole-body immersion of vulnerable people in baths and showers. Although susceptibility varies from person to person, it is generally accepted that the risk of scalding is significantly increased at temperatures in excess of 45°C.

2. Precautionary Measures

2.1 Basis Of Recommendations For Legionella Control)

Our recommendations for the control of legionella in your water systems are based on the Health and Safety Commission Approved Code of Practice L8 and Guidance document HSG274 part 2, and are intended to cover current requirements under the Health and Safety at Work Act 1974.

The primary objectives should be to avoid conditions, which permit legionella to proliferate and to avoid creating a spray or aerosol. Where this is impractical the risk may be controlled by minimising the release of droplets and by preventing water conditions which permit legionella to proliferate. Legionella may be present in very low concentrations in many water systems but by careful control it will be prevented from multiplying.

In general, Guidance is based on "Good Housekeeping" and recommends that:

- Systems are operated safely and correctly and are well maintained
- Materials are avoided that can harbour or provide nutrient for micro-organisms
- Nutrient is prevented from entering systems where possible
- The build up of sediments, scale deposits, and corrosion deposits is avoided
- Suitable water treatment programmes are used where it is appropriate and safe to do so
- Stagnation is avoided. Stagnation may encourage the growth of bio-film (slimes that form on surfaces in contact with water) which can harbour legionella and provide local conditions that encourage its growth. If water is allowed to stand for long periods in a warm building or in hot weather its temperature is more likely to rise above 20°C;
- Water is stored below 20°c or above 60°c
- Water is distributed below 20°c or above 50°c (55°c in Healthcare premises)
- All cooling towers, evaporative condensers, water storage tanks, and calorifiers are routinely inspected and are routinely cleaned and disinfected to avoid the build up of sediments, etc. which may harbour bacteria or provide a nutrient source for them;

2.1.1 The Risk Assessment

In accordance with the guidance described in this Section of our report, we have:

- Reviewed the structure in place for the management of legionellosis
- Inspected the water systems specified
- Studied records kept that relate to control of legionellosis
- Tabulated our findings
- Provided our risk assessment
- Recommended precautionary measures, and
- Made recommendations for further risk minimisation and improved control.

Having assessed the risk it will be necessary to determine the appropriate precautions. The main objective is to operate water services under conditions, which do not permit the growth of legionella. It is also important to ensure that the system is clean in order to minimise the opportunity for bacterial contamination.

2.1.2 Risk Assessment Review

In line with the recommendations in ACOP L8 and HSG274 this risk assessment should be reviewed regularly and, whenever there is a reason to suspect that it is no longer valid. This may result from eg. changes to the water system, changes to the use of the building, the availability of new information about risks or control measures, the result of checks that indicate that control measures are no longer effective, a case of Legionnaires disease/Legionellosis is associated with the system.

2.2 Recommended Maintenance Programme

The suggested maintenance cycles below have been drawn from the current legislative and guidance documents relating to legionnaires disease and its prevention: -

2.2.1 Storage tanks/cisterns

- Carry out visual inspection annually, to identify build up of debris/scale and biofilms.
- Storage tanks/cisterns should be cleaned and chlorinated following unsatisfactory inspections.
- Each tank/cistern should be sampled annually if the monitoring regime or annually inspection shows the system is contaminated or not under temperature control and the sample analysed for Total Viable Count of bacteria and legionella species.
- On an annual basis check and record the tank water temperature remote from ball valve and the mains temperature at the ball valve (summer or as indicated by the temperature profiling).

2.2.2 Calorifiers

- Each calorifier should be purged to drain and visibly sampled every 6 months to note the condition of the drain water.
- Carry out a visual check of the internal surfaces of each calorifier for signs of scale or sludge every 12 months, where possible and practical.
- The flow and return temperature from each calorifier should be monitored and recorded monthly.

2.2.3 Showers

- Dismantle, clean, descale and disinfect shower heads and hoses on a quarterly basis or on a more frequent basis if necessary.

2.2.4 Temperature Monitoring

- The temperature of hot and cold sentinel taps should be monitored on a monthly basis. All hot and cold water outlets should be checked of intervals not exceeding twelve months.

2.2.5 Sampling

- A representative number of samples should be taken from the distribution outlets annually if the monitoring regime or inspection of the tanks and calorifiers show the system is contaminated or not under temperature control. The samples should be analysed for Total Viable Count of bacteria and Legionella species.

2.2.6 Thermostatic Mixing Valves (TMV)

- TMV’s are to be maintained as protection against scald risks, TMV’s should have regular routine maintenance carried out annually taking into account any manufacturer's recommendation.

2.2.7 Infrequently used outlets

- Infrequently used outlets should have a routine flushing regime put into place inline with L8 and HSG274.

An accurate record should be kept of all maintenance work that is undertaken, along with certificates relating to analysis and disinfection work. This information would normally be held on site system survey photographs and schematics within the Site Log Book.

3. Risk Assessment Data, Table of Responsible Persons, System Survey Photographs and Schematics

This document has been created to assist those with the responsibilities for the water systems in buildings surveyed. The document has been formulated in such a way that when the various sections are completed with site details, and regular routines for monitoring, testing and maintenance/cleaning/disinfection are followed, the user will comply with current requirements.

The survey was carried out on only the parts of the premises, which were made accessible to the surveyor. Any water services found in any part of the building, which were not made available, are not included in this report and exclusion of these systems does not indicate absence. Whilst every effort is made to ascertain the correct information regarding the site layout and system plant information, the risk assessor must rely on site staff knowledge and any available system drawings. Lack of such knowledge or information may lead to assumptions, on the part of the risk assessor, and will be stated as such in the report.

Data recorded in this section is current at the time of survey. Once changes made as a result of our recommendations are carried out, the information will be out of date.

This section contains the following details of the systems surveyed:

- Details of line drawings (if available)
- System schematics
- Management and records survey summary sheets
- System survey summary sheets and photographs
- System photographs are ordered to demonstrate the route of water flow through the building from incoming mains to water storage cisterns/tanks, hot water heaters and calorifiers.
- Sample point location photographs; included to identify the source of any water samples taken as part of the survey. The photographs are to aid the identification of outlets should positive legionella results be reported.

3.1 Management & Records Survey Summary Sheets

Risk Assessment Summary			
Reference Number	**211530000A**	Survey Date	**24/03/2020**
Contract no.		Assessor	**Peter Ingram (PINGRAM)**
Location	**Wedgewood House**		
Location Address	**Forth Drive, Chelmsley Wood, Birmingham,**		
Site Contact for Survey	**Karl Smith (Risk Assessor)**		
Contact Telephone	**0121 717 1646**		
Description Of Site	**A multi storey block of flats**		
Building Use	**Residential**		
Typical number of building users	**Various**		
System Description	**Domestic hot and cold water system**		
System Operation	**Water system supplying hot and cold water to the building**		

Table of Responsibilities	
Nominated Duty Holder	**Chief Executive**
Contact details	**0121 779 8812**
Nominated Deputy Duty Holder	**N/A**
Contact details	**N/A**
Designated Responsible Person:	**Executive Director of Assets & Development**
Contact details	**0121 717 1403**
Other responsible persons / specialist companies	
Nominated deputies to responsible person:	**Karl Smith**
Contact Details	**0121 717 1646**
Water Hygiene Services Provider:	**Not Provided**
Address:	**N/A**
Facilities Maintenance Provider:	**Not Provided**
Other relevant contractor details	**Not Provided**

Management System	
Organisation Legionella Policy	
Is a site Legionella policy in place?	**No / not provided**
Is the Policy available on site?	**No / not provided**
Does the policy include details on :	
- Responsibilities?	**No / Not available**
- Lines of Communication?	**No / Not available**
- A Written Scheme of Control?	**No / Not available**
- Record Keeping?	**No / Not available**
Are site duties clearly defined and communicated?	**No / Not available**
Written Scheme	
Is the Written Scheme being applied on site?	**No**
Are all site personnel involved in legionella control adequately trained?	**No**

Training	
Training	
Have further training needs been identified?	**No**
Is confirmation of training available in the logbook?	**No**

Records System - General	
Records	
Are monitoring & maintenance records available?	**No**

Are the records up to date?	**No**
Are Records in place for the last 5 years?	**No**
Are Schematic drawings available?	**Produced as part of this assessment**
Are the schematics accurate?	**Yes**
Are monitoring and inspection records in the Water Hygiene Log Book and up to date?	**No**

Monitoring And Inspection Records	
Are the following on record	
Are visual physical inspections on record?	**No evidence of checks**
Are suggested flushing tasks done and recorded?	**No proof of completion**
Are suggested monthly monitoring tasks done and recorded?	**No proof of full completion**
Are any hot temperatures out of specification?	**No**
Are any cold temperatures out of specification?	**No**
Are shower C+D tasks done and recorded?	**No**
Are cleaning and disinfection records in place?	**N/A**
If fitted, are TMV's serviced at least annually?	**N/A**
Are any other suggested control tasks being carried out?	**N/A**
Are laboratory analysis records available?	**N/A**
Is supplementary chemical dosing in place?	**No**
Are chemical usage volumes recorded?	**N/A**
Are physical checks on dosing equipment recorded?	**N/A**
Are chemical reserves monitored as per guidance?	**N/A**

Health and Safety Record and Procedures	
Health and Safety	
Is a COSHH Assessment on record for Water Hygiene Chemicals?	**N/A**

General operation / Design / Condition	
System Operation	
General Structural Condition of system	**Satisfactory**
Does the system operate on a continuous basis?	**Yes**
Are any blindends identified in the system?	**Some identified**
General System Contamination	**Clean**
General assessment of controls regime(s)	**No – control scheme does not manage risk**
Aerosol production & exposure risk: Taps	**Non spray taps only**
Aerosol production & exposure risk: Showers	**Showers in private dwellings**

Aerosol production & exposure risk: Other	**No other aerosol risk assets**
Overall Rating for domestic system	**Medium risk site**
For multiple dwelling buildings, have at least 10% of premises been surveyed?	**N/A**
Are risks consistent between the dwellings surveyed?	**N/A**
Other risk systems present on site	**N/A**
Recommended Risk Assessment review period	**24 months**

Susceptibility of Occupants	
Susceptibility	
Susceptibility of Building Users in general	**med risk group**
Executive Summary	**Boosted mains cold water supplies all assets on site**

3.2.1 Incoming Supplies

Towns Main 1		
NO IMAGE	Asset	**MCW 1**
	Location	
	Block	**Block 1**
	Floor	**Ground Floor**
	Room	**Plant Room**

Access	**The assessor was unable to gain access to this asset.**
Comments	**Landlord fed from Westham House. Please refer to Westham House risk assessement**

3.2.2 Storage Tanks *see section 7.4 for full asset list*

No Storage Tanks Recorded

3.2.3 Calorifiers *see section 7.4 for full asset list*

No Calorifiers Recorded

3.2.4 Water Heaters

REWH 1 (Remote Electric Water Heater)		
	Asset	**REWH 1**
	Location	
	Block	**Block 1**
	Floor	**Ground Floor**
	Room	**Cleaners**

Size, Construction & Installation			
Capacity Nominal (Ltrs)	**15**	Supplied By	**MCW1**
Type	**REWH**	Material	**Copper**
Integral Cold Feed Tank	**No**	Thermostat Setting	**Unknown**
Insulation Type	**Cased**	Thermostat Position	**Bottom**
Insulation Condition	**Good**	Pipework Insulated	**No**
Cold Feed Pipework (CFP) Size	**15mm**	Hot Feed Pipework (HFP) Size	**15mm**
CFP Material	**Copper**	HFP Material	**Copper**
CFP Isolation Valve	**Yes**	HFP Isolation Valve	**No**
CFP Isolation Valve Size	**15mm**	HFP Isolation Valve Size	**Not Present**
Overflow Size	**Unknown**	Manufacturer	**Santon**
Overflow Material	**N/A**	Model	**Express 15**
Overflow Screened	**N/A**	Serial Number	**Unknown**
Inspection and Monitoring			
Flow Temperature	**62°C**	Require Cleaning	**N/A**
Maintenance			
Access to Heater	**Yes**	Adequate Lighting	**Yes**
Heater Labelled	**Yes**	Power Supply	**Yes**
Pipework Labelled	**Yes**	Voltage Available	**240 Volts**
Distance to Drain	**1m**	Distance to Power Supply	**5m**
Comments			

3.2.5 TMVs *see section 7.4 for full asset list*

No TMVs Recorded

3.2.6 Showers *see section 7.4 for full asset list*

No showers recorded

3.2.7 Blind ends

BLIND 1		
	Asset	**BLIND 1**
	Location	
	Block	**Block 1**
	Floor	**Ground Floor**
	Room	**Cleaners**

Size, Construction, Specification & Installation			
Blind end Pipework Size	**15mm**	Supplied By	**MCW1**
Blind end Material	**Copper**	Main Pipework Size	**15mm**
Main Material	**Copper**	Removed Pipework Length	**0.045m**
Isolation Valve available	**Yes**		
Maintenance			
Comments			

3.2.8 Vending / Leisure / Air *see section 7.4 for full asset list*

No Vending / Leisure / Air assets recorded

3.2.8 Plant and Equipment

FDOSPS 1 (Fire, Dust and Odour Suppression Systems)		
	Asset	**FDOSPS 1**
	Location	
	Block	**Block 1**
	Floor	**Ground Floor**
	Room	**Bin Store**

Size, Construction, Specification & Installation			
Supplied By	**MCW1**	Manufacturer	
Model			
Inspection and Monitoring			
Condition	**Good**		
Maintenance			
Serviced	**Yes**		
Comments			

3.2.8 Fountains / Washers *see section 7.4 for full asset list*

No fountain / washer assets recorded

3.2.9 Deadleg

Infrequent Outlet 1		
NO IMAGE	Asset	**FDOSPS 1**
	Location	
	Block	**Block 1**
	Floor	**Ground Floor**
	Room	**Bin Store**

Size, Construction, Specification & Installation			
Type	**Fire, Dust and Odour Suppression Systems**	Supplied by	**MCW1**
Manufacturer			
Serial Number			
Model			
Comments			

3.2.10 Outlets - Records 1 to 2 of 2

Date: 24/03/2020 **Site: Wedgewood House**

Asset Ref	Block	Floor	Room	Location	Fed By (Asset)	Sentinel Point	Mains Water Temp	Cold Water Temp	Hot Water Temp	Infrequent Outlet
						(Y/N)	°C	°C	°C	(Y/N)
HWSO1	**Block 1**	**Ground Floor**	**Cleaners**			**Y**	**-**	**-**	**62.0**	**N**
MCWSO1	**Block 1**	**Ground Floor**	**Cleaners**		**MCW1**	**Y**	**9.0**	**-**	**-**	**N**

4. The Risk Assessment

Wedgewood House was surveyed by Peter Ingram (PINGRAM) on 24/03/2020. Our Risk Assessment is based on the data collected (detailed in Section 3 of this report).

Wedgewood House property use at time of survey is categorised as residential

Building Description: a multi storey block of flats.

The building occupants comprise various.

The systems surveyed comprise domestic hot and cold water system.

The overall risk assessment is presented in the table that follows. It takes into account the survey data presented and all of the factors discussed. It considers the management control factors as well as the factors relating to the condition and operation of the system and in particular consider the susceptibility of those using or in the vicinity of the building.

Section 5 summarises the precautions recommended as a result of this risk assessment. It is recommended that the implementation and effectiveness of these precautions is monitored as detailed in Section 7 and recorded in your site logbook.

By taking these precautions and monitoring their efficacy, the risk is better controlled and therefore reduced.

Classification Of Risk		Action
N/A	No risk.	No action required
Low	Slight risk under exceptional operating conditions.	Take actions recommended in Section 5.
Med	Slight risk under normal operating conditions..	Take actions recommended in Section 5 to control the risk.
High	Serious risk present.	Take actions recommended in Section 5 to reduce the risk.

Risk Assessment

Overall Assessment	High	Med	Low	N/A	Comments
Overall Rating for domestic system		**X**			**Elevated overall risk**
Management & Records	**High**	**Med**	**Low**	**N/A**	**Comments**
Responsibilities	**High**	**Med**	**Low**	**N/A**	**Comments**
Nominated Duty Holder			**X**		**The duty holder is nominated**
Nominated Deputy Duty Holder				**X**	**Not applicable**
Designated Responsible Person:			**X**		**The responsible person is nominated**
Nominated deputies to responsible person:			**X**		**The deputy responsible person is nominated**

Other Responsible persons/specialist companies	High	Med	Low	N/A	Comments
Facilities Maintenance Provider:		X			**No FM details available**
Other relevant contractor details		X			**No supplementary contractor details available**
Organisational Legionella Policy	**High**	**Med**	**Low**	**N/A**	**Comments**
Is a site Legionella policy in place?	X				**No legionella policy available to view**
Is the Policy available on site	X				**Legionella policy not available for inspection**
Policy Details	**High**	**Med**	**Low**	**N/A**	**Comments**
Does the policy include details on responsibility	X				**No Responsibilities outlined**
Does the Policy include details on lines of Communication	X				**No line of communication outlined**
Does the Policy include details on Record Keeping?	X				**Record keeping requirement not outlined**
Written Scheme	**High**	**Med**	**Low**	**N/A**	**Comments**
Does the Policy include details of a Written Scheme of Control?	X				**No written scheme**
Are site duties clearly defined and communicated?	X				**Site duties are not defined**
Is the Written Scheme being applied on site?	X				**A suitable written scheme is not in use**
Training	**High**	**Med**	**Low**	**N/A**	**Comments**
Are all site personnel involved in legionella control adequately trained?	X				**Staff are not suitably trained**
Have further training needs been identified			X		**Training need not currently identified**
Is confirmation of training available in the logbook?	X				**Confirmation of training not available**
Record System	**High**	**Med**	**Low**	**N/A**	**Comments**
Are monitoring & maintenance records available?	X				**Monitoring records not available for inspection**
Are the records up to date?	X				**Monitoring records are not up to date**
Are Records in place for the last 5 years?		X			**Historic control records not available**
Are Schematic drawings available			X		**Schematics are available**

Record System - continued	High	Med	Low	N/A	Comments
Are the schematics accurate?			X		**Drawings do not require amendment**
Monitoring and Inspection Records	**High**	**Med**	**Low**	**N/A**	**Comments**
Are monitoring and inspection records in the Water Hygiene Log Book and up to date		X			**Records are not up to date**
Are visual physical inspections on record?	X				**Inspection reports not available**
Are suggested flushing tasks done and recorded?	X				**Little used outlets not flushed**
Are suggested monthly monitoring tasks done and recorded?	X				**No record of suitable monitoring**
Are any hot temperatures out of specification?			X		**Monthly monitoring in place**
Are any cold temperatures out of specification?			X		**Monthly monitoring in place**
Are shower C+D tasks done and recorded?	X				**Showers can harbour bacterial growth**
Are cleaning and disinfection records in place?				X	**Not applicable**
If fitted, are TMV's serviced at least annually?				X	**No assets of this nature require monitoring**
Are laboratory analysis records available?				X	**No task of this nature required**
Is supplementary chemical dosing in place?				X	**No supplementary dosing**
Are chemical usage volumes recorded?				X	**No assets of this nature require monitoring**
Are physical checks on dosing equipment recorded?				X	**No assets of this nature require monitoring**
Are chemical reserves monitored as per guidance?				X	**Not applicable**
For multiple dwelling buildings, have at least 10% of premises been surveyed?				X	
Are risks consistent between the dwellings surveyed				X	
Operation	**High**	**Med**	**Low**	**N/A**	**Comments**
Does the system operate on a continuous basis?			X		**System in regular use**
Aerosol Formation	**High**	**Med**	**Low**	**N/A**	**Comments**
Aerosol production & exposure risk: Taps				X	**No spray taps present**

Aerosol Formation - continued	High	Med	Low	N/A	Comments
Aerosol production & exposure risk: Showers	**X**				**Shower cleans and records not up to date**
Proliferation	**High**	**Med**	**Low**	**N/A**	**Comments**
General Structural Condition of system			**X**		**Condition acceptable**
General assessment of controls regime(s)	**X**				**Control scheme ineffective**
General System Contamination.			**X**		**Condition acceptable**
Are any blindends identified in the system?	**X**				**Blindend identified**
Other risk systems present on site					
Susceptibility	**High**	**Med**	**Low**	**N/A**	**Comments**
Susceptibility of Building Users in general		**X**			**User susceptibility medium risk**
Health and Safety	**High**	**Med**	**Low**	**N/A**	**Comments**
Is a COSHH Assessment on record for Water Hygiene Chemicals				**X**	

Potential Sources Of Risk From Blindends			
Asset(s)	Source of Risk	Hazard	Risk Level
BLIND 1	**Redundant pipework causes a dead end**	**Stagnation within the dead leg can lead to heat gain and the multiplication of Legionella Bacteria at temperatures above 20°C; the system can be continually re-infected from the deadleg**	**High**

Potential Sources Of Risk From HO Outlets			
Asset(s)	Source of Risk	Hazard	Risk Level
HWSO 1	**Risk of scalding (62.00°C)**	**Risk of scalding increases at temperatures above 45°C**	**High**

Potential Sources Of Risk From Plant and Equipments			
Asset(s)	Source of Risk	Hazard	Risk Level
IFDOSPS 1	**By design, the asset is infrequently used, creating a dead leg**	**Potential for stagnation to occur within pipework between branch off and asset, encouraging bacterial growth to occur**	**Medium**

5. RECOMMENDED PRECAUTIONARY MEASURES

5.1 Introduction

The risks highlighted in Section 4 can be reduced or eliminated by acting upon the recommendations made in this section. These recommendations are prioritised according to our perception of the impact they will have on the reduction of risk.

This prioritisation is made under three headings:

- **High Priority** is the highest and requires immediate action.
- **Medium Priority** is the intermediate rating and requires action as soon as it can conveniently be included in the work schedule.
- **Low Priority** is the least urgent and requires action when the opportunity arises, eg, the next available shutdown.

Three sets of recommendations are tabulated. These are:

1. Measures to improve management and records.
2. Remedial action on systems.
3. Summary of Health and Safety Controls.

When remedial actions are taken and when maintenance programmes are initiated and scheduled, it is recommended that the date of action is recorded on the relevant summary sheet on the IWS Online Report Tracker System – the relevant sheets can then be re-printed and filed in the routine audit section of this report, the risk assessment will then be retained up to date.

Full historical records should then be kept in the central records system.

5.2 Measures To Improve Management And Records

When measures to improve management and records are required, it is recommended that the date of action is recorded on the relevant summary sheet on the IWS Online Report Tracker System – the relevant sheets can then be re-printed and filed in the routine audit section of this report, the risk assessment will then be retained up to date.

Classification Of Priority		Action
N/A	No Risk	No action needed
Low	Low Priority	Action at first opportunity
Med	Medium Priority	Schedule as soon as convenient
High	High Priority	Immediate action

Overall Assessment	High	Med	Low	N/A	Action
Overall Rating for domestic system		**X**			**Review control measures regularly to ensure they remain effective**
Responsibilities	**High**	**Med**	**Low**	**N/A**	**Action**
Nominated Duty Holder			**X**		**Review duty holder personnel routinely to ensure names are current**
Nominated Deputy Duty Holder				**X**	**Not applicable**
Designated Responsible Person:			**X**		**Review responsible person personnel routinely to ensure names are current**
Nominated deputies to responsible person:			**X**		**Review responsible person personnel routinely to ensure names are current**
Other responsibile persons/ specialist companies	**High**	**Med**	**Low**	**N/A**	**Action**
Facilities Maintenance Provider:		**X**			**Identification of all parties involved in legionella control is required**
Other relevant contractor details		**X**			**Identification of all parties involved in legionella control is required**

Organisational Legionella Policy	High	Med	Low	N/A	Action
Is a site Legionella policy in place?	X				**A legionella policy is strongly recommended to aid compliance with HSG274**
Is the Policy available on site	X				**Provide access to the policy for appraisal**
Policy Details	**High**	**Med**	**Low**	**N/A**	**Action**
Does the policy include details on responsibility	X				**Issue role responsibilities to relevant staff and acknowledge receipt**
Does the Policy include details on lines of Communication	X				**Issue a formal communication structure for legionella issues**
Does the Policy include details on Record Keeping?	X				**Outline record keeping requirement and ensure it is followed**
Are site duties clearly defined and communicated?	X				**Define site duties and ensure relevant staff are aware**
Written Scheme	**High**	**Med**	**Low**	**N/A**	**Action**
Does the Policy include details of a Written Scheme of Control?	X				**Issue a suitable written scheme and review regularly**
Is the Written Scheme being applied on site?	X				**Establish a suitable and sufficient scheme of control for site**
Are all site personnel involved in legionella control adequately trained?	X				**Identify and implement suitable and appropriate training for all relevant staff**
Training	**High**	**Med**	**Low**	**N/A**	**Action**
Have further training needs been identified			X		**Review regularly and update as required**
Is confirmation of training available in the logbook?	X				**Implement suitable training to appropriate staff or make records available for inspection**
Records System	**High**	**Med**	**Low**	**N/A**	**Action**

Records System - continued	High	Med	Low	N/A	Action
Are monitoring & maintenance records available?	X				**Inspection records should be made available for inspection**
Are the records up to date?	X				**Records must be kept up to date and in accordance with a suitable written scheme**
Are Records in place for the last 5 years?		X			**Ensure records are retained for a minimum of 5 years**
Are Schematic drawings available			X		**Ensure drawings are kept up to date**
Are the schematics accurate?			X		**Ensure drawings are kept up to date**
Are monitoring and inspection records in the Water Hygiene Log Book and up to date		X			**Records should be up to date and retained for 5 yrs**
Susceptibility of Building Users in general		X			**Risk level may increase if user groups change**
Are visual physical inspections on record?	X				**Implement inspection regime**
Monitioring and Inspection Records	**High**	**Med**	**Low**	**N/A**	**Action**
Are suggested flushing tasks done and recorded?	X				**Initiate flushing regime and record actions**
Are suggested monthly monitoring tasks done and recorded?	X				**Ensure tasks are carried out and recorded appropriately**
Are any hot temperatures out of specification?			X		**Continue with current measures**
Are any cold temperatures out of specification?			X		**Continue with current measures**
Are shower C+D tasks done and recorded?	X				**Clean and disinfect showers at least quarterly to reduce risk of growth**
Are cleaning and disinfection records in place?				X	**Not applicable**

Monitioring and Inspection Records - continued	High	Med	Low	N/A	Action
If fitted, are TMV's serviced at least annually?				X	**No assets of this nature require monitoring**
Are laboratory analysis records available?				X	**No task of this nature required**
Is supplementary chemical dosing in place?				X	**No supplementary dosing**
Are chemical usage volumes recorded?				X	**No assets of this nature require monitoring**
Are physical checks on dosing equipment recorded?				X	**No assets of this nature require monitoring**
Are chemical reserves monitored as per guidance?				X	**Not applicable**
Is a COSHH Assessment on record for Water Hygiene Chemicals				X	**No task of this nature required**
General Structural Condition of system			X		**Review condition regularly**
Are any blindends identified in the system?	X				**Remove blindends and record the action**
General System Contamination.			X		**Review condition regularly**
General assessment of controls regime(s)	X				**Implement a suitable written scheme and review regularly**
For multiple dwelling buildings, have at least 10% of premises been surveyed?				X	**Survey is for whole building**
Are risks consistent between the dwellings surveyed				X	**Question only valid for part of survey**
Other risk systems present on site					
Operation	**High**	**Med**	**Low**	**N/A**	**Action**
Does the system operate on a continuous basis?			X		**Continue with current level of use**

Proliferation	High	Med	Low	N/A	Action
Aerosol production & exposure risk: Taps				**X**	**Alter written scheme if spray taps added**
Aerosol production & exposure risk: Showers	**X**				**Tenants should be notified of their responsibility to clean and disinfect showers/hoses at least quarterly**

5.3 Remedial Action Of The System

When measures are taken to carry out the recommended actions to reduce the risk from Legionellosis, it is recommended that the date of action is recorded on the relevant summary sheet on the IWS Online Report Tracker System – the relevant sheets can then be re-printed and filed in the routine audit section of this report, the risk assessment will then be retained up to date.

Summary Of Remedial Control Required For Blindends			
Asset(s)	Source of Risk	Control	Risk Level
BLIND 1	**Redundant pipework causes a dead end**	**Remove redundant pipework back to main service branch & piece through**	**High**

Summary Of Remedial Control Required For Plant and Equipments			
Asset(s)	Source of Risk	Control	Risk Level
IFDOSPS 1	**By design, the asset is infrequently used, creating a dead leg**	**Install a double check valve as close to the mains branch off as possible to prevent any possible back flow**	**Medium**

5.4 Health And Safety Controls Recommended

Although we have carried out a Legionella risk assessment on the systems surveyed we have also identified any noted Health and Safety risk associated with the operation of the systems.

We have particularly looked to identify risks such as scalding that are created by the operation of hot water services in line with the temperature requirements of L8 & HSG274. Where we have identified a potential scalding risk we will have recommended the installation of "Caution Hot Water" notices for areas where system users would normally be expected to be fully aware of their surroundings and thus signage is considered sufficient. Where there is a potential for system users to be considered at risk from scalding; eg the elderly, infirm or those with restricted movement then we have recommended the installation of thermostatically controlled fail safe mixing valves.

We will also aim to identify risks associated with access where safe access to tank rooms and boiler houses is required for monitoring to be carried out.

Health and Safety risks are identified as follows.

Health & Safety Controls Recommended For HO Outlets			
Source of Risk	Control	Asset(s)	Risk Level
Risk of scalding (62.00°C)	**Install "CAUTION HOT WATER" signage**	**HWSO 1**	**High**

5.5 Water Regulation Controls Recommended

Whilst conducting a Legionella risk assessment on the systems surveyed we have also identified any Water Regulation risks associated with the operation of the systems. Most of these systems require a supply of mains water and will therefore be subject to the regulatory applications of the Water Supply (Water Fitting) Regulations 1999, The Water Supply (Water Quality) Regulations 2010, The Water Supply (Water Fittings) (Scotland) Byelaw 2014 and The Private Water Supplies Regulations 2009, We have particularly looked to identify risks such as inadequate backflow prevention and available pipework not being coded in line with the requirements of L8 & HSG274. Where we have identified a water regulation risk such as pipework not being coded we will have recommended that the coding be available to all pipework. Failure to comply with these regulations could contaminate both your water supply and the public water supply network, which may result in legal action being taken against you.

Water regulation risks are identified as follows:

6. LABORATORY ANALYSIS RECORDS

No Samples Recorded

7. ROUTINE MONITORING AND INSPECTION

Our recommendations for a programme of monitoring and inspection include recommended frequencies that will help in managing the control of legionellosis and water hygiene.

When monitoring and inspection programmes are initiated and scheduled, it is recommended that the date of action is recorded on the relevant summary sheet on the IWS Online Report Tracker System – the relevant sheets can then be re-printed and filed in the routine audit section of this report, the risk assessment will then be retained up to date.

Full historical records should then be kept in the central records system.

7.1 Recommended monitoring and inspection points (continued) - Records 1 to 3 of 5

Summary of Main Monitoring Points								
Asset	Block/Room	Location	Material	Dimension	Capacity	Type	Photo 1	Photo 2
MCWSO 1	**Block 1 / Ground Floor / Cleaners**		**N/A**	**N/A**	**N/A**	**MCWSO**		
HWSO 1	**Block 1 / Ground Floor / Cleaners**		**N/A**	**N/A**	**N/A**	**HWSO**		
REWH 1	**Block 1 / Ground Floor / Cleaners**		**Copper**	**N/A**	**15.00 L**	**REWH**		

7.1 Recommended monitoring and inspection points (continued) - Records 4 to 5 of 5

Summary of Main Monitoring Points								
Asset	Block/Room	Location	Material	Dimension	Capacity	Type	Photo 1	Photo 2
MCW 1	**Block 1 / Ground Floor / Plant Room**		**N/A**	**N/A**	**N/A**	**MCW**	NO IMAGE	
IFDOSPS 1	**Block 1 / Ground Floor / Bin Store**		**N/A**	**N/A**	**N/A**	**IFDOSPS**	NO IMAGE	

7.1 Recommended monitoring and inspection points / asset list Key

Key to Identify Asset Types	
Asset	Description
ACU	**Split Air Conditioning Units**
AHU	**Air Handling Unit**
AIRWSH	**Air Washers**
BDPNWU	**Bed Pan Washing Unit**
BHCW	**Borehole Water**
BLIND	**Blind ends**
BOILPT	**Boil Pot**
BSP	**Booster Pump**
BUBTUBE	**Bubble Tubes**
CDG	**Chlorine Dioxide Generator**
CHILL	**Chilled Water Dispenser**
COMOVN	**Combi Oven**
CRBFLT	**Carbon Filters**
CRP	**Circulation Pump**
CWT	**Cold Water Storage Tank**
DGSC	**Direct Fired Gas Hot Water Storage Calorifier**
DNTSTC	**Dentist Chair**
DOSPOT	**Dosing Pot**
DRYR	**Dryer**
DWS	**Dishwasher**
EMSHW	**Emergency Shower**
ESC	**Electric Water Storage Cylinder**
ESHW	**Electric Shower**
EXPVSL	**Expansion Vessel**
EYE	**Emergency Eye Wash**
FCW	**Final Water**
FDOSPS	**Fire, Dust and Odour Suppression Systems**
FETNK	**F & E Tank**
FHR	**Fire Hose Reels**

7.1 Recommended monitoring and inspection points / asset list Key

Key to Identify Asset Types	
Asset	Description
FLXHS	**Flexible Hose**
FRSTNK	**Fire Sprinkler Tank**
HMS	**Horticultural Misting System**
HP	**Hydrotherapy Pool**
HW	**Hot Water**
HWBF	**Hot Water Buffer Vessel**
HWO	**Hot Water Outlet**
HWSO	**Hot Water Sentinel Outlet**
HYB	**Hydro Boiler**
ICEMCH	**Ice Machine**
IHWH	**Instantaneous Hot Water Heater**
INC	**Incoming Main**
IRR	**Irrigation System (non misting/aerosol)**
LPHWSC	**Low Pressure Hot Water Storage Cylinder**
MCRTR	**Macerator**
MCW	**Towns Main**
MCWO	**Mains Cold Water Outlet**
MCWSO	**Mains Cold Water Sentinel Outlet**
MSHW	**Manual Shower**
NDNEBU	**Non Disposable Nebulisers**
OTH	**Other**
PCW	**Process Water**
PCWT	**Potable Cold Water Tank**
PDNTLE	**Powered Dental Equipment**
PHE	**Plate Heat Exchanger**
PNTSPE	**Paint Spray Preparation Equipment**
POP	**Potato Peeler**
PRSWSH	**Pressure Washer**
PTGSCRB	**Particle and Trivial Gas Scrubbers**

7.1 Recommended monitoring and inspection points / asset list Key

Key to Identify Asset Types	
Asset	Description
RCW	**Raw Water**
REWH	**Remote Electric Water Heater (over/under sink)**
RGWH	**Remote Gas Water Heater (non storage)**
RHSV	**Rainwater Harvesting System**
RPZVLV	**RPZ Valve**
RSPVNT	**Respiratory Ventilator**
SB	**Spa Baths / Parker Baths**
SCW	**Spring Water**
SDDISP	**Soft Drink Dispenser**
SHSV	**Solar pre-heat storage vessel**
SMB	**Smell Bell**
SOL	**Solar pre-heat system**
SP	**Swimming Pool**
SPLSHP	**Splash pad**
SPRYHUM	**Spray Humidifiers**
STMOVN	**Steam Oven**
STR	**Strainer**
TCWO	**Tank Cold Water**
TCWSO	**Tank Cold Water Sentinel Outlet**
TMCV	**Towns Main**
TMV	**Thermostatically Controlled Mixing Valve**
TNLPST	**Tunnel Pasteurisers**
TOILT	**Toilet**
ULTHUM	**Ultrasonic Humidifiers/Foggers**
UNCW	**Unspecified supplied**
URNL	**Urinal**
UVFILTR	**UV Filters**
UVLMP	**UV Lamp**
VEND	**Vending Machine**

7.1 Recommended monitoring and inspection points / asset list Key

Key to Identify Asset Types	
Asset	Description
VH	**Vehicle Wash**
WF	**Water Feature**
WMC	**Washing Machine**
WS	**Water Softeners**
WSTDU	**Waste Disposal Units**
WTRSOF	**Water Softener**
WTSCRB	**Wet Scrubbers**

7.2 Routine monitoring and inspection requirements

When monitoring and inspection programmes are scheduled, it is suggested that the date is recorded and signed off individually by the person taking the action. Log records of each of the following monitoring and inspection actions should be kept in the records system.

The following tables and checklists are reproduced from ACoP L8 and HSG274 parts 2 & 3

HSG274 part 2 Table 2.1: Checklist for hot and cold water systems

Service	Action to take	Frequency
Calorifiers	Inspect calorifier internally by removing the inspection hatch or using a boroscope and clean by draining the vessel. The frequency of inspection and cleaning should be subject to the findings and increased or decreased based on conditions recorded	Annually, or as indicated by the rate of fouling
	Where there is no inspection hatch, purge any debris in the base of the calorifier to a suitable drain Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris, and temperature	Annually, but may be increased as indicated by the risk assessment or result of inspection findings
	Check calorifier flow temperatures (thermostat settings should modulate as close to 60 °C as practicable without going below 60 °C) Check calorifier return temperatures (not below 50 °C, in healthcare premises not below 55 °C)	Monthly
Hot water services	For non-circulating systems: take temperatures at sentinel points (nearest outlet, furthest outlet and long branches to outlets) to confirm they are at a minimum of 50 °C within one minute (55 °C in healthcare premises)	Monthly
	For circulating systems: take temperatures at return legs of principal loops (sentinel points) to confirm they are at a minimum of 50 °C (55 °C in healthcare premises). Temperature measurements may be taken on the surface of metallic pipework	Monthly
	For circulating systems: take temperatures at return legs of subordinate loops, temperature measurements can be taken on the surface of pipes, but where this is not practicable, the temperature of water from the last outlet on each loop may be measured and this should be greater than 50 °C within one minute of running (55 °C in healthcare premises). If the temperature rise is slow, it should be confirmed that the outlet is on a long leg and not that the flow and return has failed in that local area	Quarterly (ideally on a rolling monthly rota)

Service	Action to take	Frequency
	All HWS systems: take temperatures at a representative selection of other points (intermediate outlets of single pipe systems and tertiary loops in circulating systems) to confirm they are at a minimum of 50 °C (55 °C in healthcare premises) to create a temperature profile of the whole system over a defined time period	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control
POU water heaters (no greater than 15 litres)	Check water temperatures to confirm the heater operates at 50–60 °C (55 °C in healthcare premises) or check the installation has a high turnover	Monthly–six monthly, or as indicated by the risk assessment
Combination water heaters	Inspect the integral cold water header tanks as part of the cold water storage tank inspection regime, clean and disinfect as necessary. If evidence shows that the unit regularly overflows hot water into the integral cold water header tank, instigate a temperature monitoring regime to determine the frequency and take precautionary measures as determined by the findings of this monitoring regime	Annually
	Check water temperatures at an outlet to confirm the heater operates at 55–60 °C	Monthly
Cold water tanks	Inspect cold water storage tanks and carry out remedial work where necessary	Annually
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted	Annually (Summer) or as indicated by the temperature profiling
Cold water services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20 °C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing	Monthly
	Take temperatures at a representative selection of other points to confirm they are below 20 °C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control
	Check thermal insulation to ensure it is intact and consider weatherproofing where components are exposed to the outdoor environment	Annually

Service	Action to take	Frequency
Showers and spray taps	Dismantle, clean and descale removable parts, heads, inserts and hoses where fitted	Quarterly or as indicated by the rate of fouling or other risk factors, eg areas with high risk patients
POU filters	Record the service start date and lifespan or end date and replace filters as recommended by the manufacturer (0.2 µm membrane POU filters should be used primarily as a temporary control measure while a permanent safe engineering solution is developed, although long-term use of such filters may be needed in some healthcare situations)	According to manufacturer's guidelines
Base exchange softeners	Visually check the salt levels and top up salt, if required. Undertake a hardness check to confirm operation of the softener	Weekly, but depends on the size of the vessel and the rate of salt consumption
	Service and disinfect	Annually, or according to manufacturer's guidelines
Multiple use filters	Backwash and regenerate as specified by the manufacturer	According to manufacturer's guidelines
Infrequently used outlets	Consideration should be given to removing infrequently used showers, taps and any associated equipment that uses water. If removed, any redundant supply pipework should be cut back as far as possible to a common supply (eg to the recirculating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding 'T' Infrequently used equipment within a water system (ie not used for a period equal to or greater than seven days) should be included on the flushing regime Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain Regularly use the outlets to minimise the risk from microbial growth in the peripheral parts of the water system, sustain and log this procedure once started For high risk populations, eg healthcare and care homes, more frequent flushing may be required as indicated by the risk assessment	Weekly, or as indicated by the risk assessment

Service	Action to take	Frequency
TMVs	Risk assess whether the TMV fitting is required, and if not, remove Where needed, inspect, clean, descale and disinfect any strainers or filters associated with TMVs To maintain protection against scald risk, TMVs require regular routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in paragraphs 2.152– 2.168	Annually or on a frequency defined by the risk assessment, taking account of any manufacturer's recommendations
Expansion vessels	Where practical, flush through and purge to drain	Monthly–six monthly, as indicated by the risk assessment

HSG 274 part3 other risk systems

System/service	Task	Frequency
Ultrasonic humidifiers/ foggers and water misting systems	If the equipment is fitted with UV lights, check to ensure the effectiveness of the lamp (check to see if within working life) and clean filters	Six monthly or according to manufacturer's instructions
	Ensure automatic purge of residual water is functioning	As part of machinery shut down
	Clean and disinfect all wetted parts	As indicated by risk assessment
	Sampling for legionella	As indicated by risk assessment
Spray humidifiers	Clean and disinfect spray humidifiers and make-up tanks, including all wetted surfaces, descaling as necessary	Six monthly
	Confirm the operation of non-chemical water treatment (if present)	Weekly
Air washers, wet scrubbers, particle and trivial gas scrubbers	Clean and disinfect air washers, wet scrubbers, particle and trivial gas scrubbers and water storage tanks	As indicated by risk assessment
	Apply, monitor, and record the results of the water treatment	As indicated by risk assessment
Water softeners	Clean and disinfect resin and brine tank – check with the manufacturer what chemicals can be used to disinfect resin bed	As recommended by manufacturer
Emergency showers, eyebaths and face-wash fountains	Flush through and purge to drain ensuring three to five times the volume of water in the stagnant zone is drawn off	As indicated by risk assessment, but at least every six months
	Inspect water storage tanks (where fitted)	Monthly
	Clean and disinfect shower heads, nozzles, roses, 'Y' strainers, and water storage tanks (where fitted)	Quarterly, or more frequently, as indicated by the risk assessment
Sprinkler and hose reel systems	When witnessing tests of sprinkler blow-down and hose reels ensure that there is minimum risk of exposure to aerosols	As directed
Spa pools	Detailed HSE/PHE guidance on the management of spa pools is available in Management of spa pools: Controlling the risks of infection	
Whirlpool baths	Clean, flush and disinfect air channels Remove, flush and clean jets	As indicated by risk assessment

System/service	Task	Frequency
Horticultural misting systems	Clean and disinfect distribution pipework, spray heads and make-up tanks including all wetted surfaces, descaling as necessary	Quarterly or as indicated by risk assessment
Dental equipment	Drain down, clean, flush and disinfect all system components, pipework and bottles	Twice daily (typically at the start and finish of each working day). Disinfectant contact time as recommended by the manufacturer
	Clean storage bottles, rinse with distilled or Reverse Osmosis (RO) water, drain, and leave inverted overnight	Daily
	Take microbiological measurements – refer to Decontamination Health Technical Memorandum 01-05: Decontamination in primary care dental practices[5]	As indicated by risk assessment
Vehicle wash systems	Check and clean filtration systems, collection tanks and interceptor tanks and check treatment system A biocide programme should be in place and should be monitored and controlled similar to the standards required in cooling towers Clean and disinfect system and ensure sludge tanks are emptied	As indicated by risk assessment
	Sample for legionella	Initially to establish that control has been achieved and thereafter quarterly or as indicated by risk assessment
Fountains and water features	Clean and disinfect ponds, spray heads and make-up tanks including all wetted surfaces, descaling as necessary	As indicated by the risk assessment, and depending on condition
Industrial process water systems	Conduct a risk assessment of each system, preferably using an assessment team comprising members knowledgeable in legionella management and control, as well as those familiar with the design and operation of the system Devise a control scheme based on this risk assessment	Monitoring, inspection, and testing frequencies to be determined as indicated by the risk assessment

7.3 Summary Of Recommended Monitoring & Inspection

Recommended Monitoring & Inspection For CO Outlets		
Asset(s)	Action Required	Frequency
MCWSO 1	**Check temperatures of the cold water after running for up to 2 minutes from the sentinel point. Record temperatures in the site log book. All non sentinel outlets to be checked at least annually.**	**Monthly**

Recommended Monitoring & Inspection For HO Outlets		
Asset(s)	Action Required	Frequency
HWSO 1	**Check temperatures of the hot water after running for up to 1 minute from the sentinel point. Record temperatures in the site log book. All non sentinel outlets to be checked at least annually.**	**Monthly**

Recommended Monitoring & Inspection For Hot Water Heaters		
Asset(s)	Action Required	Frequency
REWH 1	**Check the flow temperature of the water heater and record in the site log book.**	**Monthly**

Recommended Monitoring & Inspection For Plant and Equipments		
Asset(s)	Action Required	Frequency
IFDOSPS 1	**Implement flushing regime on the outlet and record the actions in the site logbook.**	**Weekly**
IFDOSPS 1	**Service and Maintain unit as per manufacturer guidelines**	**As Needed**

7.4 Asset list

Asset type	Asset ref	Block	Floor	Room	Client name	Location	Sentinel
Blindend	**BLIND1**	**Block 1**	**Ground Floor**	**Cleaners**			
CO Outlet	**MCWO1**	**Block 1**	**Ground Floor**	**Cleaners**			**Yes**
HO Outlet	**HWO1**	**Block 1**	**Ground Floor**	**Cleaners**			**Yes**
Hot Water Heater	**REWH1**	**Block 1**	**Ground Floor**	**Cleaners**			
Incoming Main	**MCW1**	**Block 1**	**Ground Floor**	**Plant Room**			
Plant and Equipment	**FDOSPS1**	**Block 1**	**Ground Floor**	**Bin Store**			

8. Risk Assessment Review and Records System Audit

This document has been produced in loose-leaf style to aid the addition of updates as and when legislation changes and to allow the addition of further information following review. Reviews are required on a regular basis or when significant changes to the systems have been made.

The recommended precautionary measures detailed in section 5 will form the basis of the Action Plan to minimise the risk of Legionellosis.

Routine auditing of records and review of the initial assessment is recommended at the following frequency:

Risk Assessment Review

To review the effect of the precautionary measures on the overall risk rating.

Recommended following completion of High Priority actions and then as determined by the risk assessment.

Records System Audit

To test the completeness and accuracy of the records system with particular reference to action following out of specification results.

Site Survey / RiskAssessment

To incorporate new or replacement systems, take account of changes in legislation, guidance and management / operational personnel.

Reviewed sections in this report

Action	Date

9. Demonstration of Competency

Integrated Water Services Limited are registered with the Legionella Control Association and are certified under the following main categories:-

1. Legionella Risk Assessment
2. Water Treatment Services
3. Hot and Cold Water Monitoring and Inspection Services
4. Cleaning and Disinfection Services
5. Training Services
6. Legionella Analytical Services
7. Plant and Equipment Services

Full details of the terms of registration can be found at the following e-mail address:-

www.legionella-conduct.co.uk

Each risk assessor employed by the company are trained to a competency in line with the LCA knowledge matrix

Legionella Control Association

A Code of Conduct for Service Providers

Certificate of Registration

This is to certify that the following company has submitted a registration under the Conditions of Compliance as laid out in the LCA's Code of Conduct for Service Providers

Name of Company: **Integrated Water Services Ltd**

Registration Number: **2001/1276** Certificate valid until: **31st August 2020**

Registration under the following services categories:

(1) Legionella Risk Assessment Services
- 1.1 Hot and Cold Water Services
- 1.2 Evaporative Cooling Systems
- 1.3 Process and Other Systems
- 1.4 Healthcare Risk Assessment

(2) Water Treatment Services
- 2.1 Chemicals
- 2.2 Dosing and/or Control Systems

(3) Hot and Cold Water Monitoring and Inspection Services

(4) Cleaning and Disinfection Services

(6) Training Services

(7) Legionella Analytical Services
- 7.1 Sampling
- 7.2 Laboratory Analysis
- 7.3 Interpretation of Analysis

(8) Plant and Equipment Services
- 8.1 Installation
- 8.2 Refurbishment
- 8.3 Servicing
- 8.4 Design and Supply

This Certificate is only valid if the Company named is listed on the LCA website www.legionellacontrol.org.uk/directory.php

Signed: *Chairman, Executive Committee*

Certificate Secretary

Legionella Control Association Limited. www.legionellacontrol.org.uk

Registered In England and Wales No. 8502723

The legal duty to comply with relevant health and safety legislation (including avoidance or control of risk to exposure to Legionella bacteria) rests solely with the statutory dutyholder, being either the employer or the person in control of the premises or systems where any relevant risk is present, and this cannot be delegated. Specific functions (e.g. carrying out risk assessment) can be delegated and the Legionella Control Association (LCA) Code of Conduct is designed to help service providers, who also have duties under health and safety legislation, to establish appropriate management systems for the prevention or control of risk from Legionella bacteria. The LCA assesses the management systems of LCA members upon initial registration, reviews annually upon re-registration, and re-assesses by annual company audits. The LCA cannot and does not carry out other regular supervision of its members' commitments to the Code of Conduct nor their compliance with other LCA guidelines. A valid LCA certificate of registration (which is only valid if the Company named is listed on the LCA website www.legionellacontrol.org.uk/directory.php) confirms only that a service provider has satisfied LCA requirements at registration and its most recent company audit. It does not confirm the service provider's actual or continuing compliance with their commitments to the LCA Code of Conduct and/or other LCA guidelines. The LCA does not approve specific products or services as being effective in controlling Legionella or verify the competence of service providers' staff and sub-contractors, which is the duty of the service provider and the statutory dutyholder. The LCA accepts no liability for any omission or any act carried out in reliance on the LCA Code of Conduct or other LCA guidelines, or any loss or damage resulting from non-compliance with such documents.

10. Glossary and Abbreviations

10.1 Abbreviations used in the production of this report

WS	Water Softeners
MCWSO	Mains Cold Water Sentinel Outlet
TCWSO	Tank Cold Water Sentinel Outlet
HWSO	Hot Water Sentinel Outlet
FHR	Fire Hose Reels
SB	Spa Baths / Parker Baths
ACU	Split Air Conditioning Units
CWT	Cold Water Storage Tank
MCW	Incoming Cold Water Main
RGWH	Remote Gas Water Heater (non storage)
REWH	Remote Electric Water Heater (over/under sink type)
ESC	Electric Water Storage Cylinder
LPHWSC	Low Pressure Hot Water Storage Cylinder
DGSC	Direct Fired Gas Hot Water Storage Calorifier
PHE	Plate Heat Exchanger
U.K.A.S.	United Kingdom Accreditation Service
C.O.S.H.H.	Control of Substances Hazardous to Health
T.V.C.	Total Viable Counts
Galv	Galvanised
R.W.	Rockwool
Cu	Copper
Leg	Legionella
Bacti	Bacteriological
N/A	Not Applicable
H.W.S.	Hot Water Services
C.W.S.	Cold Water Services
Poly	Polystyrene
G.R.P.	Glass Reinforced Plastic
V	Volts
Ø	Diameter
h	Height
°C	Degrees Celsius
Kw	Kilo Watts
M.D.P.E.	Medium Density Poly Ethylene
mm	Millimetre
"	Inch
L.T.H.W.	Low Temperature Hot Water
L.P.H.W.	Low Pressure Hot Water
R	Room
TBA	To Be Arranged
Sentinel taps	Nearest and furthest outlet from source
F & E	Feed and expansion

10.2 Abbreviations used in the production of this report

Aerosol:	a suspension in a gaseous medium of solid particles, liquid particles or solid and liquid particles having negligible falling velocity.
Air conditioning:	a form of air treatment in which temperature, humidity, and air leanliness are controlled within desired limits.
Air washer:	a device for the intimate mixing of water and air, the air leaving the device at a humidity approaching saturation. See also capillary cell air washer, spray air washer.
Algae:	small, usually aquatic plants, which require light togrow. Often found at the edges of cooling towers.
Antibodies:	substances in the blood which destroy or neutralise various toxins or components of bacteria known generally as antigens. The antibodies are formed as a result of the introduction into the body of the antigen to which they are antagonistic as in all infectious diseases.
Anti-stratification pump:	a pump fitted usually to a vertical calorifier to reduce thermal layering within the calorifier and therefore to reduce the risk of proliferation of legionella in the bottom. The pump is usually designed to take water from the top of the calorifier and pump it to the bottom at predetermined time intervals, usually when the system is otherwise lying idle.
Bacterium (plural bacteria):	a microscopic unicellular or multicellular organism.
Ball valve:	a valve used to maintain a liquid level in a tank by means of a hollow ball floating on the surface of the liquid.
Biocide:	chemical which interferes with the life pattern of organic growths, causing death of the organism; sometimes called microbicide'.
Biofilm:	a community of bacteria and other microorganisms, embedded in a protective layer with entrained debris, attached to a surface.
Calorifier:	an apparatus used for the transfer of heat to water in a vessel by indirect means, the source of heat being contained within a pipe or coil immersed in the water.
Chlorine:	treatment of water with chlorine release agent or hypochlorite, to kill micro-organisms. See also Hypochlorous acid.
Chlorine demand:	The quantity of chlorine used up in oxidising the oxidisable material (both dissolved and suspended) present in the water before a reserve can be established.
Chlorine release agent:	A chemical, usually in tablet or powder form, that reacts when it comes into contact with water to release chlorine.
Cistern:	a fixed open topped water container e.g. a water tank
Cold water system:	an installation that includes plant, pipes and fittings in which cold water is stored, distributed and subsequently discharged.

Combination water heater (combi):	A rectangular or circular storage water heater (usually heated by electric immersion element) usually pre insulated and having their own built-in cold feed tank. Usually provide domestic hot water to local outlets. Hot water storage capacities range from 25- 210 litres
Combined chlorine:	the amount of chlorine, which has reacted with pollutants to form chlorinated compounds. In spas the pollutant is usually nitrogenous and the compounds formed are chloramines.
Cooling tower:	a device for removing heat from a system by the evaporation of recirculating water. Heat is transferred from the system into the recirculating water by means of a heat exchanger. The water is circulated to the cooling tower, in which it is discharged through a stream of air. This results in the evaporation of a small quantity of water into the air stream, increasing the humidity of the air towards saturation point. Latent heat of vaporisation is taken from the body of recirculating water, cooling it to a temperature approaching the wet bulb temperature. The cooled recirculating water is collected in a pond or sump from which it is pumped back to the heat exchanger to provide further cooling and thus complete the circuit.
Corrosion:	the destruction of a metal by chemical or electrochemical reaction with its environment.
Dead end/Blind end:	a length of pipe closed at one end through which no water passes such that stagnant conditions develop forming an environment, which may be favourable to the proliferation of bacteria. A pipe is considered to be a dead end or blind end if its length is greater than or equal to 1.5 times its internal diameter.
Dead leg:	pipes leading to a fitting through which water only passes when there is draw off from the fitting. A pipe is considered to be a dead leg if its length is greater than or equal to 1.5 times its internal diameter.
Deposit:	any one or a combination of materials that have settled on the waterside surfaces of a system, e.g. the base of a storage tank, or a heat exchanger. The deposit may consist of corrosion products, lime scale, sludge, live or dead organic matter, silt or even water-soluble salts left behind by evaporation at points of leakage.
Dip slide:	a dip slide is a device for testing the microbial content of liquids. It consists of a plastic carrier bearing a sterile culture medium, which can be dipped in the liquid to be sampled. It is then incubated to allow microbial growth. The microbial colonies resulting are estimated by reference to a chart.
Disinfection:	a process which destroys or irreversibly inactivates micro-organisms and reduces their number to a non hazardous level.
Distribution circuit:	pipework, which distributes water from hot, or cold water plant to one or more fittings/appliances.
Dispersant:	a chemical which loosens inorganic or organic material adhering to surfaces and lifts the materialinto suspension in the liquid.

Domestic water services:	hot and cold water intended for personal hygiene, culinary, drinking water or other domestic purposes.
Fire sprinkler:	a network of piping which sprays water over an area when a fire occurs.
Free chlorine:	the amount of chlorine freely available to act as a disinfectant in the water. Note that its disinfection properties are strongly affected by the pH of the water and decline rapidly with increasing alkaline conditions.
Free residual level of chlorine:	when chlorine is dosed to a water system, there is usually a demand caused by the presence of oxidisable material (both dissolved and suspended) in the water. The free residual level of chlorine is the free chlorine that is left after the demand has been satisfied.
Fungi:	low form of plants without chlorophyll that reproduce by spores.
General corrosion:	corrosion in a uniform manner across an entire surface.
Heat exchanger:	a device for transferring heat from the medium being cooled to recirculating water. The most common designs are shell-and-tube heat exchangers and plate heat exchangers.
Horizontal calorifier:	a calorifier, usually cylindrical, which is mounted horizontally. Such calorifiers are not normally prone to stratification.
Hot water system:	an installation that includes plant in which water is heated and pipes and fittings through which it is distributed and subsequently discharged. Hot water systems do not include cold water feed tanks or cisterns.
Hypo:	a term that is short for Sodium hypochlorite.
Hypobromous acid:	see Hypohalous acid.
Hypochlorous acid:	The active biocidal agent in the chlorination reaction. See also Hypohalous acid.
Hypohalous acid:	A mixture of hypobromous and hypochlorous acids, which are the active biocides in the bromination reaction.
Incubation period:	time taken for micro-organisms to grow in a culture medium to the point at which the number of colonies is counted to indicate the microbiological status of the system from which the culture medium sample was taken.
Immuno-suppressant drugs:	drugs which suppress the body's natural defences.
Inhibitor:	material that reduces a normal tendency to cause an effect (e.g., scale or corrosion). Usually used to describe chemicals that almost eliminate corrosion through the formation of a protective film on a metal surface, or prevent scaling by interference with the scaling mechanism.
Legionnaires' disease:	a special form of pneumonia caused by inhaling Legionella bacteria.

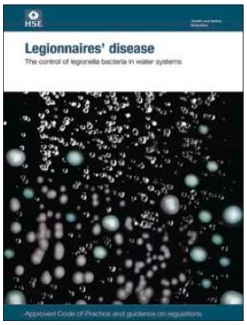
Legionellae:	the genus legionella belongs to the family Legionellaceae and has over 40 species. These are ubiquitous in the environment and found in a wide spectrum of natural and artificial waters.
Legionella:	type of aerobic bacteria, which are found predominantly in warm water environments. (singular of Legionellae)
Legionella neumophila:	one of the causative organisms of legionnaires' disease
Legionellosis:	an illness caused by exposure to legionella bacteria.
Make-up:	water (raw or treated) added to the circulating water in an evaporative cooling system to replace that lost by windage, bleed-off and leakage. It is sometimes expressed as a percentage of circulating water rate, but is more often expressed as volume per unit time, e.g. litre/minute.
Micro-organism:	mainly microscopic plant and animal life which can grow in a system when conditions are suitable. They include algae, bacteria, fungi and protozoa.
Milligrams per litre (mg/l):	standard unit of concentration of a substance in solution. When applied to solids dissolved in water, the term is numerically equivalent to the older term, parts per million (ppm).
Monitoring:	planned observation of a variable.
Monoclonal antibody:	an antibody which has developed to combat a particular organism.
Multiplication temperature:	temperature at which a bacterium grows and divides to create more bacteria.
Non-oxidising biocide:	a biocide that functions by mechanisms other than oxidation. Such mechanisms include interference with cell metabolism and structure.
Nutrient:	a food source for micro-organisms
Occupied zone:	an enclosure in which human activity occurs.
Operative:	person who operates the plant or system.
Oxidising biocide:	a biocide that functions by the destruction of microorganisms through oxidation. Oxidising biocides will oxidise all oxidisable matter (organic and inorganic) in the system. They therefore need to be dosed in sufficient quantities to overcome the demand of the system. (See chlorine demand, bromine demand). The most commonly used oxidising biocides are based on chlorine or bromine (halogens) which liberate hypohalous acids on hydrolysis in water. The exception is chlorine dioxide, a gas which does not hydrolyse but which functions in the same way. Other oxidising biocides not based on halogens are also sometimes used. These include ozone, hydrogen peroxide, and peracetic acid.
Pasteurisation:	heat treatment to destroy pathogens usually at high temperature.

pH:	a numerical indication of the degree of acidity or alkalinity of a solution. The scale is logarithmic and runs from 0 to 14. Low numbers are acidic and high numbers are alkaline. 7 is neutral.
Pontiac fever:	a disease caused by the bacterium legionella. An upper respiratory illness less severe than legionnaires' disease
POUWH:	Point of Use Water Heater. Usually installed to provide hot domestic water at remote points beyond the recirculation system.
ppm:	parts per million. A measure of dissolved substances given as the number of parts there are in a million parts of solvent. It is numerically equivalent to milligrams per litre (mg/l) for solids dissolved in water.
Proliferation:	growth or extension by the multiplication of cells.
Protozoa:	lowest and simplest form of animal life, which reproduce by fission or conjunction.
Risk assessment:	in the case of Legionnaires' disease, the identification and assessment of risk of legionellosis from the association between water sources and human activities on and around premises, and the determination of any necessary precautionary measures to eliminate or minimise the risk identified.
Sentinel taps:	for a recirculating hot water service, the first and last taps on a recirculating system. For cold water systems (or non-recirculating hot water systems), the nearest and furthest taps from the storage tank. The choice of sentinel taps may also include other taps, which are considered to represent a particular risk.
Serogroup:	a sub-group of the main family.
Serological test:	identifying the sub-group in the laboratory, usually by antibody-antigen reactions.
Service hot water:	hot water intended for hygienic or culinary use.
Shunt pump:	a circulation pump fitted to hot water service/plant to overcome the temperature stratification of the stored water.
Slime:	A mucus-like exudate produced by some microorganisms, which covers a surface.
Sludge:	a general term for soft mud-like deposits found on heat transfer surfaces or in other sections of a cooling system.
Sodium hypochlorite:	an alkaline solution that releases hypochlorous acid when diluted by dosing to a water system.
Species:	a group of micro-organisms whose members differ only in minor detail.
Sprinkler:	a pipe system installed in a building having at frequent intervals spray nozzles protected by connections made of fusible alloy which, in the event of fire, melt and release water for automatic fire fighting.

Stagnation:	the condition where water ceases to flow and is therefore liable to support increased microbiological growth.
Strainer:	a coarse filter usually positioned upstream of the water pump to protect it from debris.
Stratification:	the thermal layering of water in a calorifier caused by lack of sufficient flow. The result is that the hottest water is in the top layers and the coldest is in the bottom layers, usually where the cold feed water enters. Vertical calorifiers are often susceptible to stratification. The problem can be solved by installing an anti-stratification pump.
Sump:	depressed chamber below or alongside the collection basin underneath a cooling tower, designed to facilitate pump suction.
Susceptible population:	people who are much more likely to contract a disease.
Tank:	a closed liquid container.
Thermal disinfection:	heat treatment to disinfect a system
Thermal insulation:	a material having low heat transfer characteristics, used to reduce undesirable heat transfer.
Thermostatic mixing valve:	mixing valve in which the temperature at the outlet is pre-selected and controlled automatically by the valve.
Total chlorine:	the sum of the free chlorine and the combined chlorine.
Total dissolved solids (TDS):	the quantity of solids dissolved in the water.
Total viable counts (TVC):	the total number of living micro-organisms (per volume or area) in a given sample remembering that it only includes those organisms detectable by the particular method used.
Vermin screen:	a mesh device fitted to the overflow of a cold water storage tank to prevent ingress of vermin.
Vertical calorifier:	A calorifier, usually cylindrical, which is mounted vertically. Such calorifiers are often prone to stratification.

11. Bibliography

The following documents should be consulted for further information on Legionellosis and related topics:



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HSC Approved Code Of Practice & Guidance (L8)

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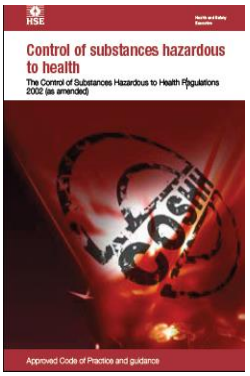
Legionnaires' Disease, Technical Guidance

HGS274 Part 1 The Control of Legionella bacteria in evaporative systems
HGS274 Part 2 The Control of Legionella bacteria in hot and cold water systems
HGS274 Part 3 The Control of Legionella bacteria in other risk systems



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HSG65

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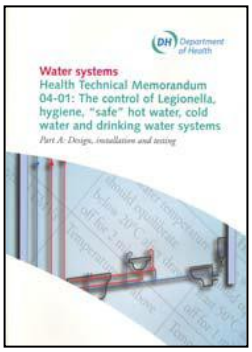

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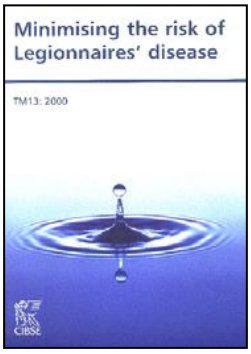

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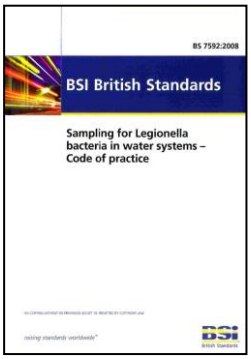

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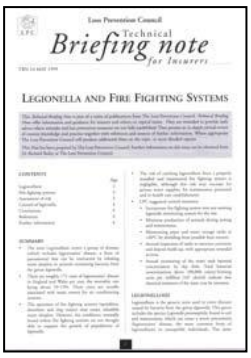

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