LEGIONNAIRES' DISEASE

THE CONTROL OF LEGIONELLA BACTERIA IN WATER SYSTEMS

London Borough of Merton

POLICY STATEMENT

This document is a statement of the policy adopted by the London Borough of Merton in order to comply with its legal responsibilities to manage and operate the buildings under its control to prevent the proliferation of Legionella and take all reasonable and practicable measures to minimise the risk and prevent Legionnaires' disease being contracted by staff, visitors or members of the public as a result of its operations. It must be adhered to by all employees, contractors and persons charged with the responsibility for the water systems owned or operated by the London Borough of Merton.

Signed on behalf of London Borough of Merton

Ged Curran
Chief Executive Officer
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London Borough of Merton Policy Document

1. Introduction

Legionnaires’ disease has proved fatal as confirmed by a number of cases, almost all of which could have been prevented. The London Borough of Merton accepts its responsibilities to take every reasonable precaution and it has a commitment to implement these preventive measures across its building and premises portfolio for the protection of staff, tenants, contractors and visitors occupying and visiting their properties, as well as passers-by, within the vicinity of its buildings.

Water quality has been the subject of much publicity and discussion, fuelled by outbreaks of Legionnaires’ disease, with an increasing awareness of the measures available to control and maintain acceptable standards. It is the responsibility of the London Borough of Merton to ensure that the facilities they provide in their properties achieve the requisite standards and has overall responsibility for the good design of water systems, as defined by the HSE document Approved Code of Practice L8.

The associated liability of such an outbreak, coupled with public attention attaching to even a suspected outbreak, necessitates the need for clear, concise guidelines to be published, recommending measures to be taken to prevent Legionella bacteria becoming active within the buildings owned, managed or maintained by the London Borough of Merton.

Water services, in particular hot water services installations, humidifiers, together with air supply systems are the sensitive areas requiring close scrutiny regarding maintenance methods and procedures. This has been emphasised by many studies of such services, and in available documentation relating to maintenance and monitoring of water systems.

In new, unoccupied or partially occupied buildings, special care must be taken, as the operation and conditions therein require bespoke solutions dependent upon circumstances encountered.
2. Preventative Measures Directive

To ensure that the highest standards reasonably practicable are maintained throughout its properties, the London Borough of Merton has appointed a ‘Responsible Person or Persons’ to have overall responsibility for the design and day to day management of water systems, as defined by the HSE document Approved Code of Practice L8 ‘Legionnaires’ disease – The Control of legionella bacteria in water systems (ACoP L8) at all sites owned or maintained by London Borough of Merton.

A Management Plan for the control of Legionellosis including Legionnaires’ disease shall be operated and managed by the ‘responsible person’ and shall include all directives issued by Authorities such as the Health and Safety Executive and the British Standards Institution relating to the improvement, prevention and the control of Legionella and will be adopted where relevant.

The London Borough of Merton will ensure that resources are available and these procedures together with manufacturers’ and suppliers’ recommendations associated with specific plant items shall form the basis of the Management Plan for the control of Legionellosis including Legionnaires’ disease.

The London Borough of Merton fully complies, as a minimum, with the terms of ACoP L8. The Policy and Management Plan will be adopted as necessary and must be complied with by all employees, contractors and persons charged with the responsibility for the management of water systems in ALL buildings and premises developed, owned, managed and maintained by the London Borough of Merton including where a building is let to tenants but the London Borough of Merton retains responsibility for its maintenance.

Departments with devolved budgets e.g.: Schools and Domestic Social Housing etc., shall appoint within the Department a ‘Responsible Person or Persons’ to have overall responsibility for the design and day to day management of water systems and develop or adopt a Management Plan for the control of Legionellosis including Legionnaires’ disease. In the case of Schools, the Head Teacher would normally be the Responsible Person.

Failure to comply with this Policy could result in prosecution by the HSE of the individual who did not follow the guidance if a case of Legionnaires’ disease occurs.

The following publications and references form part of the Policy document.

- Statutory Framework

2) The Control of Substances Hazardous to Health regulations 2002 (COSHH).

- Publications and Guidance

The following publications form the basis of the Guidance Procedures to be adopted by the London Borough of Merton.

2) The Control of Substances Hazardous to Health regulations 2002 (COSHH).
3) The Personal Protective Equipment at Work Regulations 1992 (as amended).
4) The H & S Commission Approved Code of Practice and Guidance regarding Control of Legionella Bacteria in Water systems (L8). 2013
7) Legionella Control Association (LCA) All published documentation and guidance
13) Specification for the Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages BS EN806 & BS8558
14) Water fittings and material directory Produced by the Water Regulations Advisory Service and published by the Water Research Centre ISBN 18726 9956 1. Published twice yearly.
15) HTM 04 - Health Technical Memorandum 04:01 “Safe water in healthcare systems”
20) Minimising the risk of Legionnaires’ disease TM13 2013. The Chartered Institution of Building Services Engineers (CIBSE) ISBN 9781906846275
22) All relevant Health and Safety Executive Environmental Health Guidance Notes.
23) EU Biocides Regulations (528/2012)
24) London Infectious Disease Outbreak Management Plan
3. **Policy Statement**

- The **Policy** will apply to all buildings operated by the London Borough of Merton and individuals who are employed and/or engaged by the London Borough of Merton.

- This **Policy** will also apply where establishments order work directly (e.g., departments with devolved budgets, Social Domestic Housing and Schools etc.)

- The overall responsibility for the implementation of this **Policy** rests with the **Director of Corporate Services**.

- The London Borough of Merton recognises that it is responsible for complying with the Health & Safety Executive (HSE) ACoP L8 and accepts its responsibilities to take every reasonable precaution. It has a commitment to implement preventive measures across its building and premises portfolio for the protection of staff, tenants, contractors and visitors occupying and visiting their properties, as well as passers-by, within the vicinity of its buildings.

- As **Legionella** bacteria are a naturally occurring organism widely dispersed in nature, it must be accepted that there is a constant risk of the bacteria entering into the building services of our properties and the large number of buildings under LBM’s control increases this risk.

- The **Policy** of the London Borough of Merton is to follow the ACoP L8 and associated guidance issued by Health & Safety Executive (HSE) to manage the water systems such that conditions under which **Legionella** can proliferate are designed out of systems. The control of water temperatures and regular flushing of little used outlets is the main control measure used by London Borough of Merton for the prevention of **Legionella**.

- It is legally unacceptable due to a fault in design or poor maintenance to allow the bacteria to find favourable conditions for growth, multiplication and possibly the infection of people by being conveyed in aerosols created by our building services or facilities.

- The measures to be taken for the management of this risk shall be contained within the appropriate **Management Plan**.

- Risk Assessments shall be undertaken in accordance with the assessed risk or when there have been modifications to the water systems or a change in the use or occupancy of a property whichever is sooner.
4. **Corporate Management Responsibilities**

- **London Borough of Merton**

  The London Borough of Merton appoints the **Corporate Management Team (CMT)** as the Duty Holder and recognises and accepts the duty placed upon it by Legislation.

- **Responsible Person (Executive)**

  The London Borough of Merton through the Corporate Management Team (CMT) has appointed the **Director of Corporate Services** as the ‘Responsible Person’ to take ultimate responsibility for the enforcement and monitoring this policy.

- **Responsible Person (Managerial)**

  The London Borough of Merton has appointed the **Head of Safety Services** as the ‘Responsible Person’ who shall be the person responsible for ensuring the development of the corporate policy on Water Safety and prevention of Legionellosis, to ensure the appropriate department appointments a competent organisation or person to undertake the Risk Assessment and to ensure the implementation of precautions within each Department.

- **Responsible Person (Departmental)**

  The London Borough of Merton shall appoint a ‘Responsible Person’ (Departmental) who shall be the person responsible for developing the **Legionella Management Plan**, to appoint a competent organisation or person to undertake the Risk Assessment, overseeing the assessments and implementation of precautions within the Department. This would be the person who has management control of the premises. The person should have sufficient authority, competence and knowledge of the premises to ensure that all operational procedures and measures identified in the **Policy and Management Plan** are carried out in a timely and effective manner.

- **Nominated Person (Corporate)**

  The London Borough of Merton has appointed the Head of Facilities Management as the nominated person.

  This person should take control of any notified outbreak using the Outbreak protocol and liaise with the Head of the Regulatory Services Partnership or the Environmental Health Commercial Officer who will then initiate actions in accordance with the **London Infectious Disease Outbreak Management Plan**.
5. **Other Responsibilities**

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Water Safety Maintenance Contractor</td>
<td>The person or persons responsible for carrying out the tasks detailed in the Management Plan</td>
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<tr>
<td>Appointed Independent Auditor / Advisor</td>
<td>The persons appointed to Audit operation of the logbook control manual, provide overview on system operation and to carry out risk assessments, tests, inspections and measurements to support the precautionary measures.</td>
</tr>
<tr>
<td>Water Treatment Specialist</td>
<td>The persons appointed to undertake water treatment services and to undertake sampling, monitoring and reporting, as required, to confirm adequacy of the treatment service.</td>
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6. **Risk Assessment**

A suitable and sufficient assessment is required and enables the person on whom the statutory duty falls to demonstrate, identify and assess the risk of exposure to *Legionella* bacteria from work activities and water systems on the premises and assess the effectiveness any necessary precautionary measures that may have been implemented.

In conducting the assessment, the person on whom the statutory duty falls shall have access to competent assistance in assessing the risk and shall be detailed within the Portfolio Management Plan.

Where the assessment demonstrates that there is no reasonably foreseeable risk or that risks are insignificant and unlikely to increase, no further assessment or measures are necessary.

The Health & Safety Commission Approval Code of Practice and Guidance (L8) states however, that a full review of the risk assessment should be carried out regularly. The assessment should be reviewed regularly and, whenever there is reason to suspect that it is no longer valid.

Should the infrastructure, design or use of the premises change, the assessment shall be reviewed and any necessary changes to the Management Plan made.

An indication of when to review the assessment and what needs to be reviewed should be recorded. This may result from, for example:

- changes to the water system or its use;
- changes to the use of the building in which the water system is installed;
- the availability of new information about risks or control measures;
- the results of checks indicating that control measures are no longer effective;
- a case of Legionnaires’ disease/legionellosis is associated with the system.
7. **Training & Competency**

The duty holder shall ensure that all employees involved in work that may expose an employee or other person to legionella are given suitable and sufficient information, instruction and training. This includes information, instruction and training on the significant findings of the water risk assessment and the appropriate precautions and actions they need to take to safeguard themselves and others. This should be reviewed and updated whenever significant changes are made to the type of work carried out or methods used.

All Responsible Persons or their nominated deputies shall undertake appropriate Responsible Person training provided by a City and Guilds Registered Provider. Head Teachers or their nominated deputies with responsibility for legionella control on their premises are also required to undertake City and Guilds registered Responsible Person training.

Employees specifically appointed to implement the control measures and strategies should be suitably informed, instructed and trained and their suitability assessed. They must be properly trained to a level that ensures tasks are carried out in a safe, technically competent manner; and receive regular refresher training.

London Borough of Merton will undertake to source a preferred supplier for all levels of training in relation to the control of Legionella in water systems and this shall be provided to all employees who may be involved with the management of water systems on London Borough of Merton owned, managed and maintained properties.

The Responsible Person (executive) will arrange to undertake regular reviews of training requirements and refresher training will be undertaken every 3 years or as necessary.

The Responsible Person must maintain a record of all trained individuals and training certificates must be stored for all employees for all levels of training.

8. **Notification**

In the event of a suspected outbreak of Legionnaires’ Disease or a legionella positive test result implicating a London Borough of Merton Site, the procedures listed in Part 2 – Corporate Management Plan for Operational Buildings Owned, Managed and Maintained by the London Borough of Merton must be adopted and followed.
1. **Contact Details**

Head of the Regulatory Services Partnership  
**Paul Foster**  
Paul.foster@merton.gov.uk  
Telephone No 0208 5453077

Environmental Health (Commercial Manager)  
**Andrew Bradley**  
andrew.bradley@merton.gov.uk  
Telephone No 0208 5453947

**CMT**

Chief Executive  
**Ged Curran**  
ged.curran@merton.gov.uk  
Telephone No 0208 5453332

Director of Children, Schools & Families  
**Yvette Stanley**  
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Telephone No 0208 5453251

Director of Corporate Services  
**Caroline Holland**  
caroline.holland@merton.gov.uk  
Telephone No 0208 5453450

Director of Environment & Regeneration  
**Chris Lee**  
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Telephone No 0208 5453050

Director of Community & Housing  
**Simon Williams**  
simon.williams@merton.gov.uk  
Telephone No 0208 5453680

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**Revision Log**

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London Borough of Merton

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Signed on behalf of London Borough of Merton

Ged Curran
Chief Executive Officer
LONDON BOROUGH OF MERTON

WATER SAFETY AND THE PREVENTION OF LEGIONELLOSIS

PART 2
CORPORATE MANAGEMENT PLAN

For
OPERATIONAL BUILDINGS OWNED, MANAGED AND MAINTAINED BY

THE LONDON BOROUGH OF MERTON

March 2017
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1. Introduction
2. User Guide
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7. Maintenance Requirements
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9. Manufacturer’s Maintenance Recommendations
10. General Monitoring Procedures
11. Auditing and Escalation Procedures
12. Independent Monitoring and Testing
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Part 2 – Portfolio Management Plan

1. **Introduction**

The responsibility of the building owner to ensure that the facilities they provide in their properties achieve the desired standards, within accepted criteria, is recognised by the London Borough of Merton (LBM) as requiring regular monitoring. Water quality is an area, which has been the subject of much publicity and discussion, fuelled by recurring outbreaks of Legionnaires’ disease and an increasing awareness of the measures available to control and maintain acceptable standards.

LBM accepts its responsibilities to take every reasonable precaution necessary to protect the people occupying and visiting its properties, as well as passers-by, within the vicinity of its buildings. This Management Plan refers to any premises owned, managed or maintained by LBM. A list of these premises is held within the Corporate Property Asset Register.

Legionnaires’ disease can prove fatal as confirmed by a number of cases, all of which could have been prevented. It is a commitment by LBM to implement these preventive measures across its building and premises portfolio for the protection of staff, tenants, contractors and visitors. The associated liability of such an outbreak, coupled with public attention attaching to even a suspected outbreak, necessitates the need for clear, concise guidelines to be published, recommending measures to be taken to prevent the Legionella bacterium becoming active within the buildings owned, managed or maintained by LBM.

Water services, in particular hot water services installations, humidifiers, together with air supply systems are the sensitive areas requiring close scrutiny regarding maintenance methods and procedures. This has been emphasised by many studies of such services, and in available documentation relating to maintenance and monitoring of water systems. There are no evaporative cooling towers associated with the buildings owned, managed or maintained by LBM and it is policy that none will be installed.

In new, unoccupied or partially occupied buildings, special care must be taken, as the circumstances therein require bespoke solutions dependent upon circumstances encountered.

2. **User Guide**

This Portfolio Management Plan necessarily contains much detail as it covers the mixture of Building Services Maintenance and Design, Legislation, Microbiological and Contaminant Control, together with procedures, which are required to manage water supplies within LBM properties to limit the risks associated with Legionnaires’ disease.

The LBM Policy Statement (Part 1) is included at the start of the document. What then follows is further information on how to achieve and maintain this policy.

**If you are unclear on any point please seek guidance from a responsible person as defined within the management structure.**

When using the document, ensure that you read the whole of the text relating to each sub section so that all information necessary is received.

The document should be read in conjunction with the Health and Safety Commission Approved Code of Practice and Guidance (L8) regarding Control of Legionella Bacteria in water systems.
3. Management Lines of Communication

**Appointed Persons (Corporate Services)**

<table>
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<tr>
<th>Category</th>
<th>Person(s)</th>
</tr>
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</table>
| London Borough of Merton Nominated Person | Name: Edwin O'Donnell, Head of Facilities Management  
Location: London Borough of Merton, 6th Floor, Merton Civic Centre, London Road, Morden, Surrey, SM4 5DX  
Tel No: 020 8545 4176  
Mob: 07944 228 230 |
| London Borough of Merton Deputy Nominated Person | Name: David Bell, Energy & Sustainability Manager  
Location: London Borough of Merton, 6th Floor, Merton Civic Centre, London Road, Morden, Surrey, SM4 5DX  
Tel No: 020 8545 3391  
Mob: 07956 631 249 |

The nominated persons for other LBM departments to be confirmed. If not delivering the roles below themselves these are also to be completed.

**Independent**  
**Auditor / Advisor – Healthy Buildings International Limited**

**Water Treatment Specialist – appointed when required**

**Water Safety Maintenance Contractor – Bilfinger Europa Facility Management Limited**
4. **An Introduction to Legionella**

Legionella is the bacterium, which causes Legionnaires’ disease. This is identified as a pneumonia-type infection of the lower respiratory tract. The infection is most commonly acquired by the inhalation of airborne droplets or particles containing viable Legionella.

Investigations have shown that the occurrence of Legionella contamination is greater in hot and cold Water Services than in Cooling Towers. However, it should be remembered that the contamination “footprint” of a Wet Cooling Tower is larger than any other likely source.

The following conditions have been documented as affecting the rate of growth of Legionella.

- The presence of sediment, sludge, scale and organic material can provide nutrients and protection for Legionella. Legionella has been shown to colonise certain types of material used in the construction of water systems many of which also provide nutrients.

- Other organisms commonly encountered in water systems such as bacteria, amoeba and algae can provide a suitable nutrient and habitat in which Legionella can survive, multiply and concentrate.

- Installations containing biofilms can harbour and provide favourable conditions for Legionella growth. Legionella, which can grow in Protozoa and within biofilms, may be protected from biocides that would otherwise kill or inhibit growth within the water system.

- Legionella is most likely to proliferate in water systems, which have a temperature between 20°C, and 45°C. Human body temperature of approximately 37°C is that at which the bacterium is most active. Water within the above temperature range and which is stagnant, appears to provide the ideal conditions to promote colonisation by Legionella.

- Legionella will survive at temperatures below 20°C but is considered to be in a dormant state with no colonisation activity. The bacterium does not survive for extended periods at temperatures maintained consistently at 60°C or above.

5. **Identification of Installations at Risk**

Legionnaires’ disease is most commonly caused by the inhalation of contaminated water droplets. It is therefore necessary to identify the sources of possible infection where respirable water sprays or aerosols are created.

The Health & Safety Commission Approved Code of Practice and Guidance (L8) require that all systems susceptible to colonisation by Legionella and which may create water droplets must be identified and their risk assessed.

This risk assessment must be completed not only for routine operations but also circumstances such as breakdown, abnormal operation, commissioning and any other unusual circumstances.

This assessment will take account of

i. Incubation temperature
ii. Nature of exposed population and degree of exposure
iii. Droplet formation
iv. Source Condition
v. Measures for preventing or controlling risk.

It is important to note that droplets may be created in ways other than spraying, bubbling and impact within hard surfaces. Large water droplets may be reduced to respirable size by further impact or evaporation; such respirable water droplets may persist for long periods or be carried on air currents.
The importance of Risk Assessment and precautionary measures is highlighted where:

i. The exposed population contains a high number of susceptible people as for example in hospitals and nursing homes.

ii. A high number of people at potential risk, for instance, in densely populated areas.

The assessment should ideally be reviewed annually or sooner if it is thought that the original assessment may no longer be valid. Such circumstances would typically include:

i. Changes to plant or water systems or its use.

ii. Changes to the use of the building in which the water system is installed.

iii. New/revised information relating to risk or control measures.

iv. The results of checks, which indicate that control measures, are no longer effective. These may be elevated TVC (Total Viable Count) levels or a positive sample analysis result when tested specifically for the presence of Legionella.

The Health & Safety Commission Approval Code of Practice and Guidance (L8) states that a full review of the risk assessment should be carried out at least every 2 years.

The following sources are those most likely to promote conditions where Legionella will thrive and are capable of creating water droplets, which become airborne and in turn can be inhaled.

5.1 Air Conditioning Plant and Ductwork

Within the air-handling unit, water pools can form from accumulations of water droplets being arrested on filter elements. This water is susceptible to contamination by particulates collected alongside the water droplets on the filter element.

Condensate drip trays under cooling coils are specifically designed to collect the condensing moisture formed on the coil face, and this standing water can be contaminated directly by airborne particulates or via the drainage system if inadequate precautions have been taken to ensure that an air break is included within the discharge pipes.

Within an air conditioning system, accumulations of water can occur at various points throughout the distribution ductwork, depending on weather conditions and the demands of the control system.

5.2 Hot and Cold Water Systems

The potential risk within hot and cold water systems can be increased by a number of indicators including: excess water storage capacities; inadequate sealing of water tanks by the lack of lids; ill-fitting lids; unscreened over-flow pipes; and inadequate or unsuitable thermal insulation. Lack of circulation and flow in water tanks created by unsuitable or incorrect positioning of water inlet and discharge connections resulting in stagnation should also be considered.

Temperature stratification, stagnation and sediment build up can occur in DHW (Domestic Hot Water) calorifiers and heaters and expansion vessels.

Hot water systems should supply water to all outlets at a temperature of at least 50°C. In some cases this may prove difficult to achieve because of inadequate insulation or poor circulation. In such cases careful risk assessment of these circuits and outlets must be made to determine appropriate action.

Pipe work dead-legs have often contributed to the proliferation of Legionella in that they often contain sediment, sludge and scale, and in some instances where the outlet being served is infrequently used, water temperatures stabilise within the critical range. Positioning of drain cocks on distribution pipe work should be given due consideration to prevent the creation of avoidable dead-legs.
5.3 **Showers and Spray Heads**

Showers are a potential source of infection by Legionella bacteria. The risk potential increases with reduction in use, and the lack of a facility to dump blended water between operations. Water retained within the shower unit can remain within the ideal proliferation range until the next user operates the shower, thereby creating an aerosol spray from water, which may have remained stagnant.

Further consideration within the category of showers should be given to the equipment utilised in kitchens to pre-wash dirty dishes. This type of spray unit is invariably complete with a hand operated control valve linked by flexible or solid connections to the hot and cold water supplies, whose valves are left at pre-set positions to achieve the desired temperature blend. This may give an ideal breeding temperature for the bacteria when not in use, but can also cause cross-contamination between hot and cold systems as a result of pressure variations.

Also, within this category are spray taps attached to wash hand basins within toilet facilities. These taps again create the ideal spray to promote water aerosol.

5.4 **Spas and Whirlpool Baths**

Spas and whirlpool baths, which can create a spray or aerosol, have been linked with various infections including Legionnaires’ disease. No spas or whirlpool baths are operated by London Borough of Merton, but they may be present on London Borough of Merton premises and be operated by appointed contractors.

5.5 **Adiabatic Coolers**

Adiabatic coolers can create a spray or aerosol, which may be disseminated over a wide area and therefore present a significant risk of causing Legionnaires’ disease.

The Approved Code of Practice and Guidance (L8) also identifies the following systems which may also present a risk:

- Ultrasonic humidifiers / foggers and water misting systems
- Water softeners
- Emergency showers and eye wash sprays
- Sprinkler and hose-reel systems
- Indoor fountains and water features

The above identify the main high-risk sources susceptible to colonisation by Legionella. It is therefore important to ensure that all operation and maintenance instructions contained within this document are adhered to. It will be the responsibility of delegated personnel, be they London Borough of Merton employees or Agents, to implement the necessary procedures for the control of Legionella within London Borough of Merton buildings.

All spray and aerosol producing water plant, whether listed above or not, should be identified, assessed and the details fully recorded.
6. **Water Treatment Requirements**

6.1 To ensure that installations utilising water within London Borough of Merton buildings are maintained to the requisite standards, a regime of water treatment will be adopted as required. This regime must comply with the Health & Safety Commission Approved Code of Practice and Guidance (L8), the Control of Substances Hazardous to Health Regulations (COSHH) and the EU Biocides Regulations (528/2012).

6.2 Where steam evaporative humidifiers are utilised in air conditioning systems, they should be supplied with softened water to reduce the rate at which scale deposits build up.

6.3 Independent monitoring of any treatment regime should be carried out at appropriate intervals as defined by the Risk Assessment and Management Plan.

7. **Maintenance Requirements**

Where the Risk Assessment indicates that there is a foreseeable risk, use of such equipment or systems leading to exposure should be avoided as far as is reasonably practicable. Where this is not reasonably practicable, there must be a written scheme for minimising the risk of exposure. It is vital that such a scheme should be suitably detailed to enable it to be implemented and managed effectively.

The regime for minimising the risk of exposure will contain all relevant information relating to the plant or system as necessary. In more detail:

i. An up-to-date plan of the system showing layout, including parts temporarily out of use. (A schematic plan is sufficient).

ii. Details of correct and safe operation.

iii. Precautions to be taken.

**THE FOLLOWING MAINTENANCE PROCEDURES WILL BE ADOPTED IN LONDON BOROUGH OF MERTON BUILDINGS**

7.1 It is a requirement that full records are kept of all maintenance procedures carried out, and that copies of the records are maintained in an accessible position on the site for routine inspection by visiting surveyors and statutory officers. **Records must be kept for a period not less than 7 years.**

7.2 To ensure that the above procedures are carried out effectively, it will be necessary for up-to-date record drawings of the various installations to be included with the operating manuals, complete with manufacturer’s information.

7.3 When implementing the maintenance procedures and when cleaning and de-contamination work is carried out it will be necessary for operatives to ensure that adequate safety precautions are taken and that suitable protective wear and equipment is utilised as required to comply with The Personal Protective Equipment at Work Regulations 1992 (as amended) and The Health and Safety at Work etc. Act 1974. The procedures laid down in the Health & Safety Commission Approved Code of Practice and Guidance (L8) must be considered.

7.4 All Management appointees and Maintenance Contractors employed by the London Borough of Merton or its representatives will be required to submit a copy of their Health &Safety Procedures and Method Statements before undertaking any activities on London Borough of Merton buildings.

7.5 It is a requirement that all new buildings and installations therein shall adopt the design practices laid down in BSEN 806 & BS8558 and conform to the Water Byelaws. All materials utilised in future installations (be they new or modifications to existing systems), will be materials which comply with The Water Supply (Water Fittings) Regulations 1999 and are identified in the WRAS (Water Regulations Advisory Scheme) water fittings and materials directory.
8. **Base Specification for On-going Monitoring, Maintenance and Water Treatment**

8.1 HOT WATER SERVICES  
8.2 COLD WATER SERVICE  
8.3 INCOMING AND DISTRIBUTION MAINS  
8.4 CLOSED WATER SYSTEMS  
8.5 HUMIDIFIERS AND AIR WASHERS  
8.6 BASE EXCHANGE SOFTENING/SAND FILTRATION  
8.7 ADIABATIC COOLERS

The detailed requirements for Maintenance and Water Treatment for control of Legionellosis at each of the London Borough of Merton sites will vary according to the requirements of the site specific Risk Assessment.

The Water Safety Maintenance Contractor who has been appointed by the London Borough of Merton to be responsible for the Heating Ventilation, Air Conditioning and Water systems on each site must implement the Maintenance and Water Treatment procedures, which are directly applicable.

The site Water Risk Assessment Survey report must be referenced when the on-going monitoring, maintenance and water treatment regimens are being devised. The level of risk identified for the water systems on each site will have a direct bearing on the level of on-going monitoring, maintenance and water treatment, which is required.

It is important that the responsibility for completing each on-going monitoring/maintenance task is clearly defined. The table alongside the task descriptions in this section identifies whether completion of the specified task is the responsibility of the Site Manager or the Water Safety Maintenance Contractor.
Base Specification for Water Treatment

Introduction

This document is a base specification for water treatment prepared for the London Borough of Merton. It is designed to provide a framework for development of planned preventative hygiene maintenance programmes applicable to water systems in any building.

It is important that this specification is read in conjunction with the preceding section of this document.

All contractors providing maintenance and water treatment for the London Borough of Merton or for their agents must ensure that they comply with the requirements of this document as a minimum. Written confirmation of this is required.

It is not the purpose of this document to provide the reader with a detailed understanding of water hygiene, nor to give guidance on mechanical maintenance, but rather to bridge the gap between the two and to lay down standards and guidelines for achieving conditions conducive to good hygiene by means of appropriate design, operation and maintenance.

The base specification is laid out in sections each relating to a type of water system. Within any building there is likely to be some connection between the water systems, for example the rising main not only supplies drinking water where required but also makes up the cold water storage tank. The cold-water storage tank will supply both the domestic cold water systems and the hot water service calorifier. This in turn has its own distribution system and outlets where there may even be further connection, for example where cold and hot water services are mixed in a shower unit or mixer tap. It is assumed that such serial connections and cross connections shall be taken into account when drawing up the preventative hygiene maintenance programme.

Each of the following sections are dedicated to a type of water system including some guidance for design followed by detail of the conditions to be maintained with an outline of how this may be achieved.

A final section describes the actions to be taken when hygiene monitoring indicates Legionella contamination.

The Control of Substances Hazardous to Health Regulations (COSHH) requires that any contact with any substance, which is potentially harmful by reason of its chemical or microbiological constitution, be assessed. Such COSHH Assessments form part of the obligations placed on Employers and employees under the Health and Safety at Work etc Act. These must be prepared accordingly for task involving exposure to chemical or microbiological agents with potentially harmful effects.

Legionellosis Including Legionnaires’ disease

Legionellosis is the generic term used to cover Legionnaires’ disease, Pontiac Fever and Lockgoilhead Fever.

Legionnaires’ Disease is a rare form of pneumonia, most commonly caused by an infection with Legionella, a gram-negative rod shaped bacterium, widespread in nature, indigenous to Britain and commonly found in soil samples. Outbreaks only occur when three criteria are satisfied. The organism must be present; the organism must be disseminated in an inhalable aerosol form; a susceptible individual must inhale the infected aerosol.

Outbreaks have been traced to cooling towers or evaporative condensers of air conditioning systems. In such cases the organism was shown to be present within these systems and is believed to have spread by water droplets in an air stream, either by the wind or through ventilation ductwork. In several outbreaks, domestic or other water services have been shown to be the source, with victims inhaling infected aerosols.

In the absence of specific treatment, Legionnaires’ disease produces about 12% mortality due to progressive pneumonia or shock. In the other 88%, recovery is usually slow and may be complete, although lung or nervous system damage may lead to permanent disability.
To reduce the risk, it is essential to carry out good engineering housekeeping of water systems as part of a planned preventative maintenance programme. Such procedures must be clearly defined naming individuals responsible for carrying out and confirming operations with an audit system to identify omissions or deviations, all of which must be recorded in a single contemporaneous log.

Legionella is a very hardy organism, which can tolerate drying out, and has been shown to survive for at least a year in tap water, but is commonest by far in hot domestic services.

8.1 **Hot Water Services**

**Point of Use Heaters**

Point of use heaters may be instantaneous units such as electric or gas fired multi-point type units, or they may be small storage units (<15 litres stored water capacity). Such units should be able to achieve a temperature of >50°C within one minute of running the outlet.

Point of use storage hot water generators of >15 litres capacity should be treated as centralised hot water systems except that in many cases it is not feasible to prevent thermal stratification by enforced circulation.

**Centralised Hot Water Generators including Calorifiers**

Centralised hot water generators typically consist of one or more large vessels, usually cylindrical, where water is heated and drawn through a distribution system to outlets as required. In larger systems, to reduce the time taken for water to reach an acceptable temperature at the distant installations, a pumped hot water circuit is often used.

The water in the generator must be held at a temperature of at least 60°C by means of accurate, individual controls and a temperature gauge. With cold water making up losses as water is drawn for service, there is a tendency, encouraged in some designs, for the water in a calorifier to stratify according to temperature. To overcome this and prevent the development of incubating temperatures, the water should be circulated either by a hot water flow and return system or by separate short circuit pumping the hot water from the top of the calorifier into the bottom, or both.

An approved drain cock and low-level inspection plate should be fitted to calorifiers and a routine periodic draining and cleaning should be employed to maintain clean internal conditions.

A maintenance programme should include the following:

<table>
<thead>
<tr>
<th>Monthly</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LBM</td>
</tr>
<tr>
<td>1.</td>
<td>Check hot water temperature, re-adjust where necessary</td>
</tr>
<tr>
<td>2.</td>
<td>Check inspection plate, bolted heads and access covers for correct fit and any signs of leakage and tighten up as necessary</td>
</tr>
<tr>
<td>3.</td>
<td>Check setting of each thermostat. Re-adjust/recalibrate where required</td>
</tr>
<tr>
<td>4.</td>
<td>Check thermometer. Replace if necessary. Draw off water through drain valve to waste at pasteurising temperature for a minimum of 2 minutes; (3 monthly frequency for units fitted with anti-stratification circuit)</td>
</tr>
<tr>
<td>5.</td>
<td>Check all valves and drain cocks for correct operation and report any defects immediately</td>
</tr>
<tr>
<td>6.</td>
<td>Check operation of hot water services primary controls, where fitted, re-adjust where necessary</td>
</tr>
<tr>
<td>7.</td>
<td>Check operation of secondary water circulation</td>
</tr>
</tbody>
</table>
8. Log all actions, date and sign log

**Anually**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carry out monthly checks as detailed</td>
<td>LBM</td>
</tr>
<tr>
<td>2.</td>
<td>Check operation of safety valve. Remove and clean complete assembly. Re-assemble and reset to manufacturer’s specification</td>
<td>WSMC</td>
</tr>
<tr>
<td>3.</td>
<td>Complete work as follows:</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Isolate primary pipe work and secondary pipe work to calorifier</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Drain down calorifier secondary shell and remove bolted head or inspection plate for inspection</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Disconnect primary pipe work to primary coil and withdraw coil for inspection</td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Clean primary coil and, after inspection, pressure test; (if applicable)</td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Clean inside of calorifier shell and remove all scale or deposits</td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>Refit bolted head, inspection plate and primary coil using new jointing rings (Water Research Centre approved type only)</td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>Reconnect all pipe work to calorifier and refill;</td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>Ensure that calorifier is on line and recommission to working temperature</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Clean and if necessary repair lagging/shell of hot water services calorifier</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Log all actions, date and sign log. Log to be checked, dated and signed by designated responsible person in charge (appointed Independent Auditor/Advisor)</td>
<td>LBM</td>
</tr>
</tbody>
</table>

N.B. Direct fired calorifiers and low-pressure calorifiers may not require inspection for insurance, but must be maintained as pressure calorifiers for hygiene purposes. (ACOP (L8)

**Hot Taps**

Hot water must reach a temperature of 50°C at the outlet within one minute. Temperatures in excess of 50°C may constitute a scald hazard and therefore need to be marked with a sign conforming to BS 5378, bearing a warning in black lettering on a yellow background.

Where blending valves are fitted, the outlet temperature shall be 43°C +/- 2°C. Hot and Cold inlet temperatures to the blending valves/TMV’s shall be checked, recorded and the valves adjusted to meet the specified temperatures.

Taps, sinks and washbasins should be maintained clean and free from any scale. Appliances should be connected in accordance with regulations including suitable non-return valves where applicable and maintained clean, hygienic and in good working order.

**A maintenance programme should include the following:-**

**Monthly**

<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Flush hot taps at designated representative locations to check the water temperature meets the specification (prepare site programme)</td>
<td>LBM</td>
</tr>
<tr>
<td>2.</td>
<td>Remove deposits such as scale which may accumulate on taps and surroundings; (rolling programme)</td>
<td>WSMC</td>
</tr>
</tbody>
</table>
3. Log all actions, date and sign log.

Annually

<table>
<thead>
<tr>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBM</td>
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<tr>
<td></td>
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</tbody>
</table>

1. Carry out monthly tasks

2. Flush hot taps across the whole site to check the temperature of water delivered meets the specification

3. Log all actions, date and sign log. Log to be checked, dated and signed by designated responsible person (Appointed Independent Auditor/Advisor)

Showers and Spray Heads

The following procedures will be adopted at personnel showers and spray equipment.

Hot water supplies to showers should reach at least 50°C within one minute. Cold water supplies to shower units should reach less than 20°C within two minutes. Mixed water pipe runs should be kept as short as possible.

These recommendations apply to all showers, but are specifically important for rarely used installations or where a group of showers are identified as having infrequent use, in which case, consideration should be given to reducing the number of shower outlets provided.

Where blending valves are fitted, the outlet temperature shall be 43°C +/- 2°C. Hot and Cold inlet temperatures to the blending valves/TMV’s shall be checked, recorded and the valves adjusted to meet the specified temperatures.

A maintenance programme should include the following:-

Weekly

<table>
<thead>
<tr>
<th>Responsibility</th>
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<tbody>
<tr>
<td>LBM</td>
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<td>✔</td>
</tr>
</tbody>
</table>

1. Where shower units are identified as being utilised infrequently and/or as indicated within the Risk Assessment, it will be necessary to draw water through each discharge nozzle. Water at a temperature of above 50°C must be discharged from the showerhead for a minimum of 2 minutes in each instance where identified. The site manager, grounds person or site nominated responsible person shall undertake these duties and record actions within the site log book.

2. Log all actions, date and sign log

Quarterly

<table>
<thead>
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<th>Responsibility</th>
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<td>LBM</td>
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</tbody>
</table>

1. Carry out weekly schedule

2. Remove showerhead and descale any deposits, which may have accumulated within the head and spray nozzles. (Prepare site rolling programme)

3. Log all actions, date and sign log
Cold water may be supplied directly from the mains or more commonly via a cold water storage tank or tanks, usually located at high level, which serve WCs and washing facilities by gravity.

**Cold Water Storage Tanks**

Approved lids must be fitted, vented and be fully compliant with current water regulations. Temperatures should be maintained below 20°C.

All tanks must be kept clean and in good repair. Overflows and open vents should be directed to drain via vacuum breaks and protected against ingress of foreign material.

Sizing should comply with regulations for water storage capacity and be such as to produce a rapid water turnover. (24-hour turnover recommended). Inlet and outlet should be arranged to provide a cross flow to reduce stagnant areas. Combinations of several tanks should be configured to prevent stagnation.

**A maintenance programme should include the following:**

### 6 Monthly

1. Examine tanks and pipe work for leaks

2. Examine internal and external condition and correct operation of ball valve

3. Check that overflow is clear

4. Report immediately if tanks are showing signs of corrosion

5. Check the general bacterial quality of the water by dip slide. Record the result.

6. Check cold feed connections for blockage

7. Log all actions, date and sign log.

### Annually (in Summer)

1. Check water temperature
**Cold Water Taps**

Cold water should reach a temperature at the outlet of less than 20° C within two minutes of running. Potable water should be supplied directly from the mains and should reach a temperature of less than 20° C, or preferably the temperature of the supply, within two minutes. To prevent the use of stored water for human consumption, consideration should be given to replacing a cold-water down service with one supplied directly from the mains in any location where confusion could arise. Drinking water taps should be clearly labelled. Taps and sinks should be maintained clean and free from scale, appliances should be connected in accordance with regulations including suitable non return valves where applicable and maintained clean and hygienic and in good working order.

**A maintenance programme should include the following:-**

### Monthly

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Flush cold taps at designated representative locations (prepare site programme) to check the water temperature delivered meets the specification.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Remove deposits such as scale, which may accumulate on taps and surroundings. (rolling programme)</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Log all actions, date and sign log.</td>
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</table>

### Annually

<table>
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<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Carry out the monthly tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Flush cold taps across the whole site to check the temperature of water delivered meets the specification.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Log all actions, date and sign log. Log to be checked, dated and signed by designated responsible person in charge (appointed Independent Auditor/Advisor)</td>
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</tr>
</tbody>
</table>
**Major Cleaning and Disinfections**

Domestic hot and cold water can harbour Legionella particularly in areas of fouling, stagnation and in the ferric sludge that collects at the bottom of calorifiers and storage tanks. It is therefore important that these are kept clean and free from sludge by periodic flushing to deprive the bacteria of an important nutrient medium.

When carrying out remedial treatment, an Independent Specialist should be appointed to witness operations, confirm their satisfactory completion and recording and compliance with EN806 & BS8558

The water systems should be cleaned and disinfected before being taken into service and if any one of the following occurs:

1. A routine inspection identifies the need.
2. Following substantial alteration or entrance of the system for maintenance.
3. An outbreak, suspected outbreak or Legionella positive test result.

There are two main options for the eradication of Legionella in hot water systems, chlorination or pasteurisation. Pasteurisation may not be as effective as chlorination and so its use is recommended as an initial remedial action prior to full chlorination.

**Chlorination**

Chlorination should be carried out in accordance with BSEN 806 & BS8558 specification for the design, installation, testing and maintenance of services supplying water for domestic use and their curtilages.

Where a hot water system is to be disinfected by this procedure, the system must be allowed to cool prior to chlorination and the system must be vented adequately. For pressurised systems, specialist advice must be sought.

All visible dirt and debris shall be removed from the cistern. The cistern and distributing pipes shall be filled with clean water and then drained until empty of all water. The cistern shall then be filled with water again and the supply closed. A measured quantity of sodium hypochlorite solution of known strength shall be added to the water in the cistern to give a free residual chlorine concentration of 50 mg/L (50 ppm) in the water. The cistern shall be left to stand for 1 hour. Then each draw-off fitting shall be successively opened working progressively away from the cistern. Each tap and draw-off fitting shall be closed when the water discharged begins to smell of chlorine. The cistern shall not be allowed to become empty during this operation; if necessary, it shall be refilled and chlorinated as above. The cistern and pipes shall then remain charged for a further 1-hour.

The tap furthest from the cistern shall be opened and the level of free residual chlorine in the water discharge from the tap shall be measured. If the concentration of free residual chlorine is less than 30 mg/L (30ppm) the disinfections process shall be repeated.
**Pasteurising (Thermal Disinfections)**

There is no British standard for pasteurisation and so the following is recommended as a means of pasteurising the system.

Having ensured that the calorifier is vented, increase the temperature in the calorifier so that it is above 60°C. Draw water through the drain cock at a pasturing temperature of 60°C or above for 2 minutes (preferably longer). Hold the calorifier at temperature for 1 hour then, starting with the furthest outlet away, draw hot water through each tap and appliance sequentially at a pasteurising temperature for 5 minutes. If the calorifier cannot produce water at the correct temperature, the procedure must be repeated.

If the hot water is at a pasteurising temperature initially, but the recovery of the calorifier is insufficient to maintain the water temperature, the procedure must be stopped, the calorifier held above 60°C for a further 2 hours and the procedure re-started at the outlets, which have not been pasteurised.

For the procedure to be effective, **ALL PARTS** of the system must reach a pasteurising temperature.

Both chlorination and pasteurisation should be carried out only when the building and all relevant systems are under the full control of the operating contractor/Independent Specialist, who should ensure compliance with the Health and Safety at Work Act etc. and the COSHH regulations.

### 8.4 Incoming and Distribution Mains

#### Drinking Water

Mains water supplied by water undertakers is governed by The Water Supply (Water Quality) Regulations 2010 which specify in detail the quality of water which may be supplied. E.C. Directive 80/778/EEC also lays down maximum total bacteria counts which are not included in the UK Regulations and are frequently not achieved by mains water in this country.

The responsibility of the water undertaker stops at a clearly defined point, usually the isolating stopcock outside the premises of the consumer, or at the curtilage. Downstream of this point it is the responsibility of the building occupier to maintain water quality.

Mains water is usually chlorinated by the water undertaker to control microorganisms and is available to the consumer in a satisfactory and stable condition. Once inside the building it is very often subjected to a heat gain from its surroundings and, if the turnover or insulation is inadequate, significant deterioration may result.

Mains water distribution systems must therefore be designed to minimise stagnation. To achieve this, long pipe runs serving infrequently used outlets should be avoided, pipe work routing should be such as to avoid heat sources and where necessary hot and cold pipe work should be insulated.

Mains water may only be allowed to come into contact with components approved by the Water Research Centre who publish a directory of approved fixtures and fittings which is available from WRC Plc, Frankland Road, Blagrove, Swindon, Wiltshire, SN5 8YF, Tel No 01793 865 000, e-mail: solutions@wrcplc.co.uk and care must be taken when installing or modifying systems to ensure only appropriate components are used and that water Byelaws are not contravened.

Mains water should cool to a temperature comparable to the incoming supply within one minute of opening an outlet. Should this not be the case, consideration should be given to ways of improving the distribution system by increasing water turnover. Ideally, drinking water should be served directly from a mains supply. Where this is not possible, it must be ensured that all parts of the distribution system, including any storage tanks, are maintained, clean, hygienic and in good working order.

Taps and sinks should be maintained clean and free of scale. Appliances should be connected in accordance with regulations, including suitable non-return valves where applicable and maintained clean, hygienic and in good working order.
A maintenance programme should include the following:

**Monthly**

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Flush drinking outlets at designated representative locations (prepare site programme) across the whole site to check the temperature of water delivered meets the specification.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Remove deposits such as scale which may accumulate on taps and surroundings; (rolling programme)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Log all actions, date and sign log.</td>
<td></td>
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</tbody>
</table>

**Annually**

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Carry out the monthly tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Flush all drinking outlets across the whole site to check the temperature of water delivered meets the specification;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Log all actions, date and sign log. Log to be checked, dated and signed by designated responsible person in charge (appointed Independent Auditor/Advisor).</td>
<td></td>
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</tbody>
</table>

**8.5 Closed Water Systems**

Closed water systems are usually either heating circuits or chilling circuits. In the normal course of events the water used to fill the system at the time of commissioning remains in place indefinitely without coming into contact with personnel. There are however, three potential problems, which may occur with some systems.

Firstly, any circuit, which is not protected against frost, may freeze, causing damage to the system. Secondly, there are micro-organisms capable of living in closed water systems, which in some cases cause damage. Thirdly, a chemical interaction between the metal fabric of the system and the water may result in pipe work corrosion.

When designing and installing closed water systems, due consideration should be given to frost protection and the choice of materials and components. For example, many recirculating pumps have a temperature specification, which must not be exceeded, or cavitation and consequent damage may occur.
Water treatment for closed water systems should provide:

1. Frost protection where appropriate;
2. Oxygen scavengers such as nitrite or sulphite formulated with alkali to inhibit corrosion of ferrous metals where appropriate;
3. Specific copper corrosion inhibitors where copper and copper alloys are used;
4. Biocides to prevent the growth of micro-organisms in all water;

To facilitate the dosing and subsequent monitoring of additives, it is necessary to install a dosing vessel and also to know the total volume of water within the system. Water treatment chemical suppliers should be able to quote for the supply of appropriate formulations given the following information:

1. Materials and construction;
2. Total losses from the system due to leaks and other means;
3. Total water volume;
4. Recirculation rate;
5. Existence of sampling and dosing facilities;
6. Maximum and minimum temperatures.

A maintenance programme should include the following:-

<table>
<thead>
<tr>
<th>Annually</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Draw a water sample for analysis to confirm concentration of inhibitor corrosion products and microorganisms.</td>
<td>LBM</td>
</tr>
<tr>
<td>2. Dose additional chemicals as required.</td>
<td></td>
</tr>
<tr>
<td>3. Log all actions, date and sign log. Log to be checked, dated and signed by designated responsible person in charge (appointed Independent Auditor/Advisor).</td>
<td>✓</td>
</tr>
</tbody>
</table>
8.6 **Boilers**

Non-pressurised and non-steam generating boilers are closed water systems requiring the controls outlined in Section 9.5.

Pressurised non-steam generating boilers may require particular operating practices and safety controls, but are essentially closed water systems requiring the controls outlined in Section 9.5.

8.7 **Chillers**

Chillers are closed water systems requiring the controls outlined in Section 9.5.

Frost protection may be provided by the addition of chemicals. Ethylene glycol is the commonest and products are available from most water treatment chemical suppliers containing both antifreeze and corrosion inhibitors.

8.8 **Humidifiers and Air Washers**

Humidifiers operate by evaporating water into an air stream. Some humidifiers supply heat to the water in advance and inject steam into the airflow, others rely upon a passage of air to carry away water vapour.

Steam generating humidifiers, which necessarily operate at elevated temperatures, are susceptible to the development of deposits of scale. Softening part, or the entire make up water and periodic de-scaling of the steam generator can control this scale deposition and greatly extend the life of steam generators. A complete conventional steam generating boiler water treatment regime is however inappropriate in most cases because any carry-over of dosed chemicals into the steam will consequently be injected into the air supply to the building.

Unheated humidifiers or spray humidifiers usually rely upon breaking the water down into small droplets or spreading it over a large surface area to enhance evaporation. One consequence of this is the tendency for droplets to be carried forward in the air stream. It is therefore essential that any agents added to control scale corrosion or microbiological activity do not contain any potential harmful constituents.
A maintenance programme should include the following:

**Weekly**

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Drain and flush water reservoir (if fitted);</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

**Monthly**

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Carry out weekly tasks.</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>2. Wash and brush down surfaces to remove grease, scale and other material;</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>3. Chlorinate at 5 ppm for two hours and flush free of chlorine (wet spray only);</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>4. Log all actions, date and sign log.</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

**Quarterly**

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Thoroughly de-scale the entire humidifier water system;</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>2. Flush down and treat any corrosion, paint with a Water Research Centre approved paint;</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>3. Chlorinate with 5ppm chlorine for two hours</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>4. Drain and flush free of chlorine;</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>5. Log all actions, date and sign log. Log to be checked, dated and signed by designated responsible person in charge (appointed Independent Auditor/Advisor)</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>
8.9 **Air Conditioning Plant and Ductwork**

Within the air-handling unit, water pools can form from accumulations of water droplets being arrested on filter elements. This water is susceptible to contamination by particulates collected alongside the droplets on the filter element.

Condensate drip trays under cooling coils are specifically designed to collect the condensing moisture formed on the coil face, and this standing water can be contaminated directly by airborne particulates, or via the drainage system if inadequate precautions have been taken to ensure that an air break is included within the discharge pipes.

A maintenance programme should include the following:

### Monthly

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
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<tbody>
<tr>
<td>2. Check water level in drainage traps from chiller battery and humidifier compartments. Top up if required.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>3. Check that drainage pipe work discharge air break is clear and unobstructed.</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

### Six Monthly

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>LBM</th>
<th>WSMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Carry out monthly tasks.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>2. Check ductwork for evidence of condense ponding in the vicinity of chiller battery and humidifier installations.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>3. Clean and flush chiller battery and humidifier condense collecting sumps and associated drainage facilities. Disinfect if bio-fouling evident.</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
8.10 **Adiabatic Coolers**

Adiabatic coolers can create a spray or aerosol, which may be disseminated over a wide area and therefore present a significant risk of causing Legionnaires’ disease.

A maintenance regime is to be implemented following the recommendations of SFG20, standard maintenance specification for building services. Typically, this would include the following control measures:-

**Annually**

1. Prior to seasonal operation (or as required) clean and disinfect system

**6 Monthly**

1. At a selected point during the operating season conduct a Legionella test from supply line downstream of UV lamp

**Monthly**

1. During operating system conduct a TVC test from supply line downstream of UV lamp

**Weekly**

1. During operating season record water meter reading and adiabatic feed pump run hours. Confirm supply line has been flushed or flush manually

<table>
<thead>
<tr>
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<td></td>
<td></td>
<td>✓</td>
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<table>
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<tr>
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<th>WSMC</th>
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<td></td>
<td></td>
<td>✓</td>
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</table>

<table>
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<tr>
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<th>WSMC</th>
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<td></td>
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<td>✓</td>
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</tbody>
</table>
8.11 **Base Exchange Softening/Sand Filtration**

Particular attention should be paid to the maintenance and operation of water softeners and filters. These should be maintained and backwashed at the required frequency and to the manufacturer's instructions. Coarser filters and strainers should be checked and cleaned regularly to prevent the build up of organic contaminants.

### Weekly - Depending on site, type of plant and manufacturers requirements

<table>
<thead>
<tr>
<th></th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>1.</td>
<td>Check operation of softener.</td>
</tr>
<tr>
<td>2.</td>
<td>Check salt reserves in brine tank and refill if necessary.</td>
</tr>
<tr>
<td>3.</td>
<td>Log all actions, date and sign log.</td>
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</table>

### Three monthly

<table>
<thead>
<tr>
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<th>Responsibility</th>
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<tbody>
<tr>
<td>1.</td>
<td>Where the Facility is managed by an External provider. The Local Management Plan will be reviewed and site records checked for compliance. Log all actions, date and sign log.</td>
</tr>
</tbody>
</table>

### Six monthly

<table>
<thead>
<tr>
<th></th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>1.</td>
<td>Carry out weekly tasks.</td>
</tr>
<tr>
<td>2.</td>
<td>Carry out inspection/service to plant. Qualified service technicians should be used and full report issued.</td>
</tr>
<tr>
<td>3.</td>
<td>Take sample for total bacterial count.</td>
</tr>
<tr>
<td>4.</td>
<td>Log all actions, date and sign log.</td>
</tr>
</tbody>
</table>

### Annually (Specialist Water Treatment Contractor)

<table>
<thead>
<tr>
<th></th>
<th>Responsibility</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carry out weekly and six monthly tasks.</td>
</tr>
<tr>
<td>2.</td>
<td>Take sample for Legionella screening.</td>
</tr>
<tr>
<td>3.</td>
<td>Carry out disinfection of plant - this should be done annually as a minimum dependent on site and operation.</td>
</tr>
<tr>
<td>4.</td>
<td>Log all actions, date and sign log. Log book to be checked, dated and signed by designated responsible person in charge (appointed Independent Auditor/Advisor).</td>
</tr>
</tbody>
</table>
8.12 Fire Fighting Systems

Fire fighting systems involving sprinklers or hose reels may be permanently charged with water, often forming long dead legs. There may also be the risk of water temperatures exceeding 20°C. In the event of the system being employed, the risk from Legionellosis would be insignificant in comparison to the risk from fire.

They will, however, be a possible risk during the testing and maintenance of these systems. The control measures as applied to cold water systems should be adopted so far as is practicable for fire fighting systems.

**Quarterly or six-monthly – depending on site procedures**

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<tbody>
<tr>
<td>LBM</td>
<td>WSMC</td>
</tr>
<tr>
<td>1.</td>
<td>Discharge directly to drain during testing and minimise person’s exposure to aerosols.</td>
</tr>
<tr>
<td>2.</td>
<td>Take sample from initial discharge for total bacteria count.</td>
</tr>
<tr>
<td>3.</td>
<td>Log all actions, date and sign log.</td>
</tr>
</tbody>
</table>

8.13 Ornamental Fountains

Ornamental fountains should not be situated where they are exposed to high winds as this can disperse spray beyond the immediate confines of the basin/pond. The apex of the water column/jet should not exceed the distance to the nearest edge of the basin/pond, for this same reason.

An overflow/outlet to a suitable drain should be provided for easy emptying and the cleaning and, where possible, a permanently installed fresh water supply pipe with topping-up device should be provided.

Any open body of water requires biological management to assure its amenity value is not impaired.

**Six-monthly – depending on site conditions and nature of installation**

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<tr>
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<th>Responsibility</th>
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</thead>
<tbody>
<tr>
<td>LBM</td>
<td>WSMC</td>
</tr>
<tr>
<td>1.</td>
<td>Take water sample for total bacteria count.</td>
</tr>
<tr>
<td>2.</td>
<td>Log all actions, date and sign log.</td>
</tr>
</tbody>
</table>

**Annually (Specialist Water Treatment Contractor)**

<table>
<thead>
<tr>
<th></th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBM</td>
<td>WSMC</td>
</tr>
<tr>
<td>1.</td>
<td>Carry out six-monthly tasks.</td>
</tr>
<tr>
<td>2.</td>
<td>Drain, clean and re-fill the ornamental fountain/water feature.</td>
</tr>
<tr>
<td>3.</td>
<td>Log all actions, date and sign log.</td>
</tr>
</tbody>
</table>
9. Manufacturers’ Maintenance Recommendations

It is a requirement of these procedures that the recommendations within manufacturers’ maintenance routines will be adopted to ensure effective operation of specific equipment. These maintenance routines will be carried out in addition to the procedures listed in this document.

It is assumed that new equipment provided by manufacturers and sold as package items for use within the mechanical services installations throughout London Borough of Merton buildings will have been designed and constructed with due consideration to the control of the Legionella bacteria and necessary precautions required to prevent the bacterium colonising the specified equipment. This will entail the use of appropriate materials and practices covered by British Standards Institutes Specifications and Codes of Practice with due consideration being given to Health and Safety Executive directives. All suppliers must provide full operating and maintenance instructions relating to their equipment.

It is a further requirement that all water contact equipment and material utilised throughout London Borough of Merton buildings will be of the type approved by the Water Research Centre and be included in their published Water Fittings and Material Directory.

10. General Monitoring Procedures

Monitoring will be undertaken in general accordance with the following procedures:

- The Contractor’s staff will take readings as dictated by the Merton Frontline system. A reminder is issued to the engineer’s IPad device from the Contractor’s CAFM system.
- Contractor’s engineer records the readings in the site log and leaves a copy on site.
- Contractor’s engineer takes a photograph on the IPad job and closes the job down.
- If the temperature is out of range the Contractor’s engineer logs a job on the Merton helpdesk and Contractor’s helpdesk and records this on the relevant site log.
- Contractor’s engineer then rectifies the temperature if possible at the time of visit.
- If a Contractor’s engineer from another discipline is required to affect corrective action, this is assigned and complete within the contract SLA agreements.
- The rectification is then recorded on the Contractor’s defects log form FM-MR-15.

11. Auditing and Escalation Procedures

Temperature testing will be undertaken in accordance with the General Monitoring Procedures detailed in Section 10. In the event of an out-of-parameter result, corrective action is taken and a further non-compliant reading is obtained.

The site engineer would also notify the Contract Supervisor to inform the Contract Manager and Client Responsible Person.

In the event that consecutive out-of-parameter temperature results are obtained i.e. the corrective action has not proven effective, a legionella sample shall be taken from the appropriate outlet(s).

12. Independent Monitoring and Testing

If the above escalation procedure requires testing to take place or a system is deemed high risk, a programme of regular independent monitoring and testing should be considered to confirm that maintenance, and where appropriate, water treatment are effective in preventing Legionella.

Sampling will be carried out by competent personnel employed independently from the site maintenance sub-contractor and the samples submitted to an accredited laboratory for subsequent analysis. The results of the laboratory analysis of samples will be reported on a suitable certificated form identifying the laboratory’s UKAS accreditation.
Record Keeping

It will be the responsibility of the Water Safety Maintenance Contractor to ensure that the site records are maintained and a copy of the log sheet recording sources and times of sampling for analysis are inserted in the log book. The analysis result sheet, when received, will be inserted in the logbook.

Positive Legionella Results

In the event of positive samples being identified, remedial actions to eliminate the bacteria will be undertaken as quickly as reasonably practicable and must be supervised by a suitably Independent qualified member of staff or an appointed Independent Specialist.
13. **Actions To Be Taken In The Case Of A Legionella Positive Test Result On A London Borough Of Merton**

For an infection with Legionella to occur three factors must be satisfied:

a) The organism must be present.

b) The organism must be dispersed into the air within a fine aerosol.

c) A susceptible individual must inhale the infected aerosol.

**In the case of a Legionella-Positive Test Result**

**ACTION ONE**

Inform the London Borough of Merton ‘Nominated Person’ or ‘Deputy’ for the Division as listed in The Management Plan responsible for the site.

**ACTION TWO**

As soon as a Legionella-positive analysis is notified, endeavour to control one or more of the factors a, b, c above.

**ACTION THREE**

Undertake remedial action as described in Health & Safety Commission Approval Code of Practice and Guidance (L8).

**HOT AND COLD WATER SYSTEMS**

Legionella bacteria more than 100 cfu/litre but less than 1000 cfu/litre

Either:

a) If only one or two samples are positive, the system should be re-sampled. If a similar count is found again, a review of the control measures and risk assessment should be carried out to identify any remedial actions.

b) If the majority of samples are positive, the system may be colonised, albeit at a low level, with legionella. Disinfection of the system should be considered but an immediate review of control measures and risk assessment should be carried out to identify any other remedial action required.

Legionella bacteria more than 1000 cfu/litre

The system should be re-sampled and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system.

Remedial actions should be supervised by a suitably qualified member of staff or an appointed Specialist. If there is any doubt whatever about how to achieve the eradication, specialist assistance must be sought.

**ACTION FOUR**

Once the eradication procedure has been completed, the system is put back into service. Five to ten days later, further samples must be taken to confirm the effectiveness of the procedures. Once two consecutive negative tests have been obtained no further testing is required.
14. Actions To Be Taken in the Event of a Suspected Outbreak of Legionnaires' Disease Implicating a London Borough of Merton Site


In the case of a suspected outbreak of Legionnaires’ disease

**ACTION ONE**

Inform the London Borough of Merton ‘Nominated Person’ (Head of Facilities Management) or ‘Deputy’. This person should liaise with the Head of the Regulatory Services Partnership or the Environmental Health Commercial Manager who will then initiate actions in accordance with the London Boroughs Legionellosis Incident Protocol.

Inform the CEO and Members of CMT by telephone immediately and confirm in writing as soon as possible.

**ACTION TWO**

Assume that any aerosol-producing water source could be responsible and take such steps to prevent any further risk of exposure. It will be necessary to inform the operatives carrying this out to ensure compliance with the provisions of the Health and Safety at Work Act, COSHH Regulations and ACOP (L8).etc

**ACTION THREE**

Contact your appointed independent specialist to arrange for an investigation into the systems to identify any contaminated water source, which may be implicated, and to seek other relevant advice. (Any investigation undertaken must be strictly in line with any course of action and instruction issued as a result of the London Boroughs Legionellosis Incident Protocol. - Action One above).