CHEMTECH CONSULTANCY LTD | AWT WATER & ENVIRONMENTAL SERVICES

LEGIONELLA RISK ASSESSMENT

DOMESTIC WATER SYSTEMS

CUSTOMER: NORTH LANARKSHIRE COUNCIL

SITE: ST AMBROSE & BUCHANAN HIGH SCHOOL

SURVEYED BY: ALAN WATSON B.SC.(Hons) F.W.M SOC & ALAN PURDON B.ENG. M.W.M SOC

SURVEY DATE: 16TH – 18TH SEPTEMBER 2019

Registered Office:
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RELEVANT ASSESSOR BACKGROUND & ACCREDITATIONS

Alan Watson B.Sc (Hons), F.W.M Soc
Director

In 2002, I formed ChemTech Consultancy Ltd with a view to providing the marketplace with a quality Legionella risk assessment and control scheme service to both public and private sector companies. Over the course of the past 17 years, ChemTech has grown rapidly to hold a significant share in the Scottish market and is recognised as a quality service provider and accredited Category 1 member of the Legionella Control Association.

I manage all aspects of the company and various client projects from our head office in Linwood and second office in Aberdeen resulting from our take-over of AWT Water Treatment in the summer of 2013. In addition as the team has grown I now manage 41 employees.

I carry out internal and external training courses for Clients on Legionella Awareness Refresher Training and Duty Holders & Responsible Person Training Courses and am a qualified RQF accredited trainer for these courses. These courses cover everything from the background of the bacteria to the legislation in place and what steps to take to prevent the growth of the bacteria in cooling towers, process water and domestic water systems.

As a Legionella risk assessor, I have many years' experience of carrying out risk assessments of cooling tower systems and domestic water systems in various industry sectors such as Brewing, Industrial Engineering, Oil Refining, Local Authorities, Hotels, Housing Associations, Nursing Homes, large office blocks and many more.

On graduating as an industrial chemist in 1979 I joined Dearborn Chemicals as a junior consultant in their industrial water treatment division. Over the next 18 years I moved from my initial appointment in Manchester through senior consultant in Scotland and on to major account management in Scotland. In 1992, I was appointed Area Manager with a Senior Consultant reporting to me in the refining and petrochemical industries covering Scotland and Scandinavia. Extensive experience was gained in the steel, pharmaceutical, refining, petrochemical, food and drinks industries in process, water treatment and water hygiene activities.

Certificates Held:

- Fellow Member of Water Management Society
- City & Guilds Certificate: Managing Legionella in Building Water Systems
- City & Guilds Certificate: Legionella – Water Risk Assessments and Log Book Awareness in Building Water Complexes

David Harper Associates:

- Appreciation of the Maintenance and Management of a Building's Water System's with regard to Legionnaires Disease to include Cooling Towers and log books.

Alan Watson B.Sc (Hons), F.W.M Soc
Director (Continued)

IMS Scotland Ltd Certificates:

- Introduction & Awareness of the Control of Asbestos Regulations 2006
- Confined Spaces Training
- Manual Handling
- Working at Height
- Safe of Systems of Work including Hazard Identification and Risk Assessment
- Control of Substances Hazardous to Health & COSHH Assessments

St Andrew's Certificate:

- Emergency First Aid

Professional Qualifications

- B.Sc.(Hons) Pure and Applied Chemistry
- Fellow of the Water Management Society

Alan Purdon B.Eng. M.W.M Soc.
Senior Risk Assessor

As a Legionella risk assessor, I have over 5 years' experience of carrying out risk assessments of domestic water systems in various industry sectors such as Industrial Engineering, Oil Refining, Local Authorities, Hotels, Housing Associations, Nursing Homes, NHS hospitals and large office blocks.

I have completed specialist in-house training which is audited internally by the Contract Team Leader in compliance with the Legionella Control Association Standards and also the company's external auditors in compliance with ISO 9001 & OHSAS 18001. I have been a full member of the Water Management Society for three years.

The majority of my weekly duties include:

- Risk assessments of domestic water systems to BS8580 standard
- Cleaning & disinfection of cold water storage tanks and systems to BS8558 and PD 855468 standard
- Temperature monitoring of sentinel points, calorifiers, water heaters and cold water storage tanks to ensure our clients' compliance of ACoP L8 and HSG 274
- Microbiological sampling to BS7592 and BS EN ISO 19458 standard
- Cleaning & Disinfection of Showerheads to BS8558 and BS EN 806 standard
- TMV servicing, installation and disinfection

Certificates held:

- B.Eng. Building Services Engineering
- Member of the Water Management Society
- City and Guilds WH004 Risk Assessment for Legionella Control in Water Systems
- City and Guilds TMV Servicing and Maintenance
- City and Guilds Scottish Water Byelaws
- City and Guilds Asbestos Awareness
- Client Contractor National Safety Group (CCNSG) Safety Passport
- Citation Professional Solutions – Ladders & Stepladders Training
- MAKS Safety Services – Safety Harness & Line Certificate
- ITC Emergency First Aid at Work (SCQF Level 6)
- RQF Responsible Person

INDEX

1. EXECUTIVE SUMMARY AND RISK IDENTIFICATION

AIM OF THE RISK ASSESSMENT

The aim of this risk assessment is to enable the responsible person to make an informed decision regarding the adequacy of the precautions currently in place to minimise the risk to health from legionellosis to both building occupants and the general public.

SCOPE OF RISK ASSESSMENT

The findings and recommendations presented in this report have been based on information made available and inspection of areas made accessible by site staff during the survey. ChemTech Consultancy Ltd is only able to assess areas / systems which they have been given access to and using information supplied by site personnel. This survey was undertaken only on pipework and areas that were accessible and visible; it is possible that some sections remained hidden during the survey.

No responsibility can be accepted for systems and / or areas which ChemTech Consultancy Ltd have not been provided access to, or as a result of incorrect, misleading information supplied or information not provided.

The scope of this Legionella Risk Assessment is such that it includes the domestic cold and hot water systems on site but that it does **not** include the closed central heating system.

This risk assessment does not the supply of schematics, as agreed, due to a detailed pipe survey and update to line drawings being carried out as part of this project. Legionella pneumophila and microbiological sampling and analysis are not included in this legionella risk assessment; however three swab samples were taken to establish the presence of any biofilm within the circuit.

This risk assessment is being carried out by two experienced, trained (City & Guilds Standard) risk assessors who have a working knowledge of risk assessing domestic water systems similar to those in your property.

Our Legionella Risk Assessments include recommended control measures but excludes The Written Scheme. The preparation of The Written Scheme (Sometimes referred to as The Written *Control* Scheme) is the client's responsibility. The Written Scheme is the total management system and includes: the control measures and corrective actions produced by the risk assessment; detailed responsibilities; records and how and where they are kept; maintenance programmes and records; details of management of manufacturers, suppliers, installers and other contractors, etc. {see ACoP L8 paragraphs 58 – 63, HSE Technical Guidance HSG274, Part 2 Appendix 2.2 and BS8580:2010 'Water Quality – Risk Assessment for Legionella Control – Code of Practice}.

The pipework is concealed above ceiling tiles across the site and could not be inspected in its entirety. This survey was undertaken only on pipework and areas that were accessible and visible: a more detailed pipework survey is being carried out separately

There were no matters or areas of evident concern beyond the scope of this risk assessment.

INITIAL OVERVIEW AND ASSESSMENT

ChemTech Consultancy Ltd was commissioned by Chris Sullivan of North Lanarkshire Council to carry out a Legionella Risk Assessment at St Ambrose and Buchanan High Schools. During this assessment we were assisted by site staff who showed us around the property, explained the water systems on site and kindly donated their time to answer our questions regarding the management systems in place and the location of all records necessary to complete the Management section of this assessment.

St Ambrose and Buchanan High Schools are located on Townhead Road near Drumpellier Country Park and was opened in November 2012. The school sits alongside Buchanan High School and Townhead Community Centre. Up to 1250 pupils attend St Ambrose High with a further 101 pupils in attendance at Buchanan High. There is thought to be around 150 staff employed at the site. Buchanan High school caters for children with additional needs, some of whom may fall into the higher risk category. Due to the age range of staff present along with the possibility of many of these staff being smokers they may also fall into this category.

System Description
Mains water enters the property in the Tank Room located in the St Ambrose High Physical Education wing (ground floor). The Mains provides the make ups for the site's two 15000L (nominal capacity) GRP cold water storage tanks before supplying all staff sinks and various other outlets throughout the building. Cold water from the tanks is boosted via the Boiler Room pump set, supplying the cold feeds to the two hot water calorifiers, and the majority of cold water on site. All hot water on site is supplied from the two 3000 litre calorifiers. The calorifiers are provided with a secondary return system and anti-stratification equipment. An additional cold water storage tank is located on the 2nd floor in the Science Wing plant room for the purpose of providing Category 5 protection for the laboratory area sinks.

Cold Water System
Inspection of the site cold water storage tanks revealed satisfactory conditions, with only light sediment noted at the base of all tanks. Temperature monitoring indicated that satisfactory water turnover is occurring within CWST 2 and Lab CWST 3. Tank 2 appears to be the lead tank, and is inadvertently carrying out the majority of the duty. As a result, Tank 1 is demonstrating a higher storage temperature due to poor turnover and is susceptible to stagnation and heat gain. It was noted that hollow support pipes are present within Tanks 1 and 2, and these should be replaced due to the potential for stagnant water to pool inside these, increasing the possibility of biofilm formation. Inspection of the Laboratory tank revealed that, due to the positioning of the tank inlet, this does not currently satisfy the criteria for a Category 5 tank. The inlet should be repositioned and located at the raised chamber above the position of the weir overflow.

Cold water temperatures varied across the systems, with significant heat gain noted at extremity points and in low use areas. This is most likely the result of low turnover, thermal gain from a high ambient temperature and some very long pipe runs within the building. Ideally, high use outlets should be positioned at the extremity points on the systems to encourage water turnover. Long pipework runs to few or single outlets should be avoided where possible, for example, the 1st floor Home Economics and Art areas contains few outlets supplied from the boosted cold water system, with the majority of cold water being supplied from the Mains water service. This is resulting in significant heat gain occurring due to low turnover, and consideration should be given to converting all outlets in this area to Mains should the pressure be sufficient. The cold water outlets to the Art Room sinks are supplied from the Hydrotherapy area below, and due to the particularly high ambient temperature, the degree of heat gain is more significant than in other areas. As a first course of action, all cold pipework should be provided with adequate insulation in an attempt to

reduce heat gain. Secondly, should elevated cold temperatures persist, the cold and Mains water pipework should be strategically reconfigured to encourage water turnover.
Finally, consideration may have to be given to the installation of a chlorine dioxide dosing system to assist with microbiological control at cold water far points should temperature profiles not be reduced to be below 20ºC.

Hot Water System
The site calorifiers were inspected and found to be storing hot water at a temperature of approximately 63°C, with a secondary return temperature of 54°C also being maintained. Despite the acceptable temperatures noted on the principle loop, it was noted that various subordinate loops were failing to circulate effectively. As a result, low hot water supply temperatures were recorded in specific areas across the site (i.e. Community Centre, 1st Floor Art Department, 1st floor Home Economics Hospitality, 1st floor staff toilets above reception, 2nd Floor RE Wing, 2nd Floor Greenhouse and 2nd Floor Modern Languages Base). This must be investigated further as this could be the result of an incorrectly balanced secondary return system. Temperatures should continue to be recorded at the sentinel points identified within this risk assessment to ensure that the circulatory system is providing an effective thermal control regime. This problem of balancing the secondary circuit is a common one and not unusual for a building of this size.

System Condition
Inspection of the pipework on site revealed that the cold water pipework is currently uninsulated throughout although a programme of insultion is now underway. All copper pipework on cold water circuits has been replaced with UPVC. Due to the positioning of the pipework above warm rooms and adjacent to hot pipes, significant heat gain is occurring. It is recommended that all domestic pipework is insulated and provided with identification banding in accordance with BS1710. Dead leg pipework was observed in the 1-039 Health & Beauty Room where various outlets have been removed. Further investigation revealed that the hot flow, return and cold pipework have been capped in the corridor outside of the room reducing the length of redundant pipework to around 0.75 metres. These sections however must be cut back to the live system due the increased potential for bacterial growth and back contamination of the live systems. There is also new plastic cold pipework located in this area, and it could not be confirmed that this is not a live dead leg. It is recommended that an intrusive survey of all pipework ducts is undertaken to establish and confirm that no dead legs have been left following the changeover or from the original installation. It was noted that several dead legs have been created in disabled toilets where the hot supply pipework has been isolated (see Hot and Cold Outlets Section) It is believed that these have been isolated due to loosely fitting taps being unable to cope with the water pressure and flooding the areas, and this should be remedied as soon as possible.

Management
There are paper records on site relating to the management of the water systems indicating that temperature monitoring and shower head disinfection have been in place since November 2013 and October 2018. Electronic records are also in existence demonstrating sentinel temperature checks and shower head disinfections between August 2018 and September 2019. Although some control measures are in place this is not a complete program of measures. We would refer you to Section 10 where the full control scheme is described. It is recommended that a new monitoring schedule is developed and implemented, using the findings of this risk assessment and the sentinel points identified as the current Control Scheme only has one hot water and one cold water sentinel point which do not reflect the size or complexity of the building. There were no records found for the regular flushing of the low use outlets identified as part of this assessment. This should be instigated and records maintained of the location, date and name of the person carrying out the work. The completion of a non-conformance log is present in the electronic logbook and should be maintained to ensure all corrective actions are recorded and signed off once the necessary measures have been taken.

Although many control measures are in place there was no suitable Legionella Policy available at the time of inspection, this should be developed to describe the course of action that you will undertake to ensure compliance with ACoP L8:2013 and HSG 274. Additionally, to ensure clarity of understanding of each person's role within the defined company legionella policy, a full written definition, detailing the specific roles and responsibilities of each position, should be created.

The person occupying this position should then sign to show that they understand these roles and responsibilities. Regular audits are an excellent way of ensuring that the current risk assessment is still valid, all control measures are in place, remedial actions are being carried out in a timeous manner and all staff training is up to date. It is recommended that this should be carried out each year when a risk assessment is not being carried out.

Due to the operational periods of the site, please ensure that the operating instructions for all plant and equipment, including start-up and shut-down procedures, are included in your written scheme. If it is decided to enter into an agreement with a sub-contractor it is essential that an 'Allocation of responsibilities' document, or similar, is created and signed by each party to ensure that all tasks and control measures are assigned along with the frequencies that each task should be completed. A communication matrix should be created and provided with the current details of all parties/persons involved in the management of the water systems.

There is Hydrotherapy pool on site which is fitted with a filtration system including sand filters and an automatic chlorine dosing system. Currently the site complete daily pH and free chlorine checks, records were only available from April 2019. In addition a weekly backwash is completed via the sand filters, all actions are recorded. PWTAG recommends that microbiological sampling should be carried out of the pool on at least a weekly basis, given that the people who are using them may be more prone to infection that other persons. This should be put in place as soon as possible.

NB – The overall risk has be assessed as MEDIUM/HIGH due to the temperatures recorded on the hot and cold water systems and the lack of flushing records. A building of this type i.e. High School would typically return a MEDIUM risk. Following the completion of the remedial works, and the implementation of an appropriate Control Scheme, this risk could be reduced to MEDIUM.

IDENTIFICATION AND THE ASSESSMENT OF RISK

Each system section is accompanied by an explanation of the risk found with the actual risk detailed and reported based on the grading system below. This will enable the responsible person to prioritise future actions in conjunction with the remedial actions detailed in this document.

We have designated all of the areas of non-compliance into 3 categories.

LOW RISK	MEDIUM RISK	HIGH RISK
Action to be taken within a year. If not possible to do so, then put on a rolling programme	Action to be taken as soon as is practically possible.	Immediate action is required

ACTUAL RISK	MEDIUM/HIGH

NB – The overall risk has be assessed as MEDIUM/HIGH due to the temperatures recorded on the hot and cold water systems and the lack of flushing records. A building of this type i.e. High School would typically return a MEDIUM risk. Following the completion of the remedial works, and the implementation of an appropriate Control Scheme, this risk could be reduced to MEDIUM.

The Risk Assessor has used the risk factors detailed below to assess the overall risk of the system covered by this assessment. The "actual" relates to the current risk of this system to cause legionellosis.

Contamination – This is an evaluation of the risk of the water source, including the quality, temperature and integrity of the water supply.

Amplification – this is an assessment of the likelihood that Legionella will proliferate, including an assessment of conditions such as the temperature, water change rate, areas of stagnant or slow water movement and how conducive the conditions are to microbial growth.

Transmission – this is an assessment of whether droplets or aerosols are likely to form and spread.

Exposure – this is a determination of the risk that droplets or aerosols will be inhaled (or contaminated water aspirated)

Host susceptibility – this is an evaluation of the nature of the exposed population, taking account of their vulnerability when exposed to legionella bacteria.

2. SYSTEM REGISTER

SYSTEMS REGISTER

	No of Systems / units present	Risk of Legionellosis
Legionella Management Systems	1	Medium
Town Mains Cold Water Supply	1	Low
Cold Water Storage Tank(s)	3	Medium
Domestic Cold Water Distribution Systems	2	Medium
Calorifier(s)	2	Medium
Combi Boiler	-	-
Stored Hot Water Heaters (15 litres or more)	-	-
Stored Hot Water Heaters (less than 15 litres)	-	-
Domestic Hot Water Distribution Systems	1	Medium
Showers (Individual number)	80	Medium/High
Closed Central Heating Systems	1	Not Assessed – Closed System
Wet Fire Fighting Systems	1 – Fire Tank and Sprinkler System	Low
Emergency Showers / Eye Washes	-	-
Spa Baths / Whirlpools	-	-
Air Humidification Systems	-	-
Vehicle Washes	-	-
Closed Chilled Water Systems	-	-
Machine Coolants	-	-
Ornamental Water Features	-	-
Water Softening Equipment	-	-
Other 'At-Risk' Systems	-	-
Hydrotherapy Pool	1	Medium /Low

SYSTEM IDENTIFICATION

Below is a list of all of the water systems identified on site, what supplies each system and what they in turn feed.

System ID Number	1	System Type	Town Mains	Asset Location	PE Wing Tank Room
System supplies	This system is fed from Town Mains and provides the make ups to the cold water storage tanks in addition to supplying various cold water outlets on site, mainly staff rooms and drinking water outlets.				

System ID Number	2	System Type	Boosted Stored Cold Water	Asset Location	PE Wing Tank Room
System supplies	This system is fed from the two cold water storage tanks on site and supplies the cold feed for the calorifiers in addition to the boosted water supply to the majority of cold outlets on site.				

System ID Number	3	System Type	Stored Hot Water	Asset Location	PE Wing Boiler Room
System supplies	This system is fed from the two hot water calorfiers on site and supplies all hot water on site.				

System ID Number	4	System Type	Boosted Stored Cold Water	Asset Location	2nd Floor Science Plant Room
System supplies	This system is fed from the Science plant room cold water storage tank and supplies the science wing laboratory sinks only.				

REVIEW POLICY

The record of the assessment is a living document that must be reviewed to ensure it remains up-to-date. Arrange to review the assessment regularly and specifically whenever there is reason to suspect it is no longer valid. For example, the risk assessment for a new construction ought to be performed before commissioning, but then reviewed when the system has been operating normally for several weeks or months. An indication of when to review the assessment and what to consider should be recorded. This may result from, eg:

(a) changes to the water system or its use;
(b) changes to the use of the building in which the water system is installed;
(c) the availability of new information about risks or control measures;
(d) the results of checks indicating that control measures are no longer effective;
(e) changes in key personnel;
(f) a case of legionnaires' disease/legionellosis associated with the system.

Question		Answer
1.	Is there any stored cold water on site?	Yes
2.	Is there any stored hot water on site?	Yes
3.	Are there any showers / spray outlets on site?	Yes
4.	Could the showers / spray outlets be used by any people who may be more susceptible / at risk?	Yes
5.	Is micro-biological sampling *required* at site?	No
6.	Have there been any positive results from the sampling?	No
7.	Is the water source other than the towns' mains?	No
8.	Are there any recommendations from High Risks regarding the water source?	No
9.	Are there any recommendations from High Risks regarding the Cold Water Storage Tank(s)?	No
10.	Are there any recommendations from High Risks regarding the water heater(s)?	No
11.	Are there any recommendations from High Risks regarding the outlets / pipework?	Yes
12.	Are there any other at risk water systems present?	Yes
13.	Has the overall risk been assessed as High?	No
14.	Have any parts of the Written Scheme still to be implemented? (If no Written Scheme answer yes)	Yes
15.	Is the Legionella Policy missing?	Yes

The answers from the above list help us to determine the length of time between this assessment and the next review. 12+ yes answers would say that this assessment should be reviewed in 12 months to ensure the high risk actions have been resolved. Up to only 2 yes answer would indicate that the system is very low risk and does not need to be reviewed as is. All other response numbers should be reviewed in 2 years' time as best practice.

Assessment Recommended Review Date -	18th September 2021
Annual Audit as per HSE Audit Checklist to be carried out no later than -	18th September 2020

3. LEGIONELLA MANAGEMENT SYSTEM

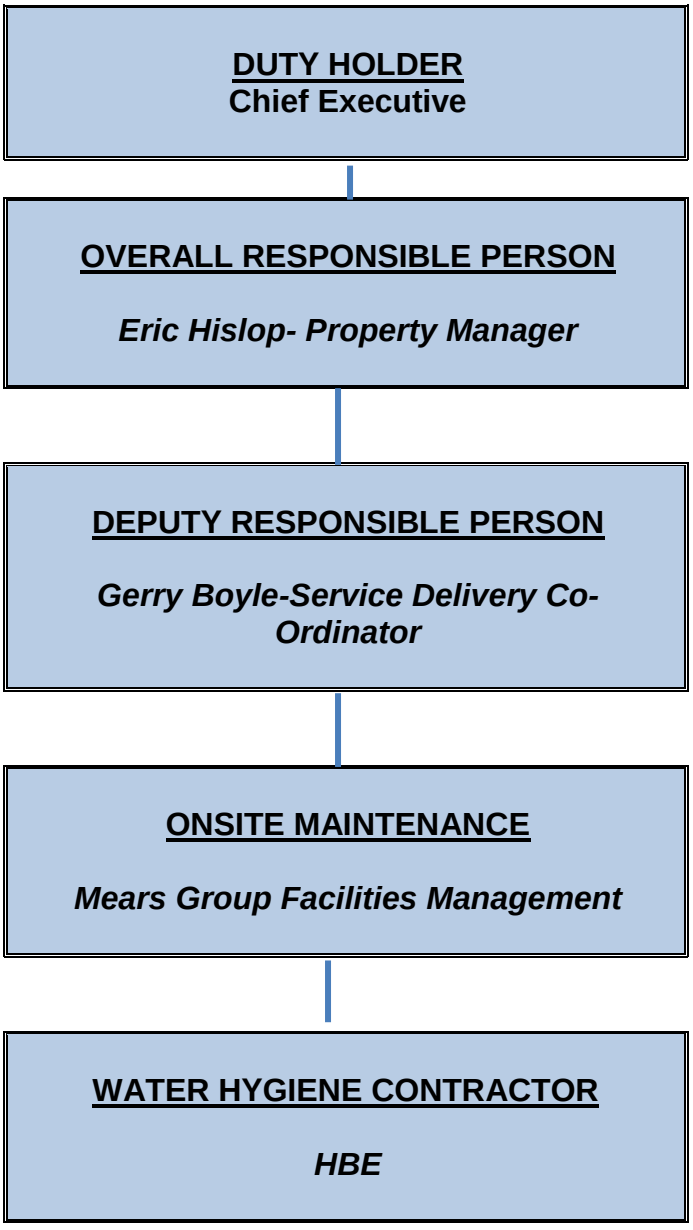
GENERAL LEGIONELLA MANAGEMENT

Summary of Risk Potential

Inadequate management, lack of training and poor communication have all been identified as contributory factors in outbreaks of Legionnaires' disease. This is particularly important where several people are responsible for different aspects of the treatment or precautions.

Communications should be 'fail-safe'. The record system is the method to ensure that precautions continue to be carried out and that information is available for checking what is done in practice.

MANAGEMENT REGIME



MANAGEMENT POLICIES	
MANAGEMENT QUESTIONS	**RESPONSE & COMMENT**
Are staff duties clearly defined in writing for the Duty Holder, Responsible Person and Deputies?	No. To ensure clarity of understanding of each person's role within the defined company legionella policy, a full written definition, detailing the specific roles and responsibilities of each position, should be created. The person occupying this position should then sign to show that they understand these roles and responsibilities.
Are all duties to be carried out by staff being completed? E.g. staff to staff and shift to shift?	Yes. However the duties currently carried out should be reviewed and amended to reflect the findings of the risk assessment.
Is there a microbiological sampling regime in place?	NLC have stated that 1 x TVC, Ecoli, Coliforms & 1 Lp sample is currently taken per year. Records were not available at the time of assessment. It is recommended that a sampling regime similar to that in Section 10 of this document is put in place. A recent sampling regime of TVC testing has been undertaken on the cold water areas where high temperatures have been recorded and shown some elevated TVC levels but more importantly no coliform or e-coli present. These high TVC levels are harmless in themselves but are indicator bacteria that conditions are not ideal.
Has a Legionella Policy been formulated?	There was no suitable Legionella Policy available at the time of inspection, this should be developed to describe the course of action that you will undertake to ensure compliance with ACoP L8:2013 and HSG 274.
Do they have a copy of ACoP L8 & HSG 274?	Yes. A copy of the relevant documentation is held centrally by NLC. However this was not present on site at the time of assessment.
Is there a Written Scheme in place?	A site specific written scheme should be prepared to ensure that a full description of the preventative control measures and all documentation associated with the management of legionella are easily identifiable and that they detail the location where all documents are located. The written scheme should include; a copy of the company legionella policy, the current legionella risk assessment location and the status of all remedial works identified, the list of control measures required along with their frequencies and the operational parameters, the location of the schematic drawings for all water systems, a response document to show what actions should be taken in the event that the water system is not operating as designed and a detailed account of what will be audited, how often and by whom.

MANAGEMENT PROCEDURES	
MANAGEMENT QUESTIONS	**RESPONSE & COMMENT**
Are there procedures in place to deal with Legionella Positive sample results and other bacteriological sampling?	At present there is no response document to refer to in the event of a positive Legionella, coliform or E.coli result or an elevated TVC count. This should be addressed in order that all staff are aware of the corrective actions that should take place in such an event.
Is regular clean and disinfection / pasteurisation of water services carried out?	Regular cleaning & disinfection or pasteurisations of water systems is strongly recommended with the frequency dictated following annual inspections. This is in place for the cold water storage tanks but should also include the calorifiers

MANAGEMENT TRAINING	
MANAGEMENT QUESTIONS	**RESPONSE & COMMENT**
Have training requirements been established for all staff involved?	No. Inadequate management, lack of training and poor communication are all contributory factors in outbreaks of Legionnaires' disease. It is therefore important that the people involved in assessing risk and applying precautions are competent, trained and aware of their responsibilities. A training plan for all appropriate staff should be prepared and reviewed regularly.
Are persons involved in management and control of water systems adequately trained with records held in a suitable system?	No.

USE OF SUBCONTRACTORS	
MANAGEMENT QUESTIONS	**RESPONSE & COMMENT**
Has an Allocation of Responsibilities form between you and all sub-contractors been completed?	If it is decided to enter into an agreement with a sub-contractor it is essential that an 'Allocation of responsibilities' document, or similar, is created and signed by each party to ensure that all tasks and control measures are assigned along with the frequencies that each task should be completed.
Is your service provider a member of the Legionella Control Association?	HBE are a member of the LCA. Companies who are part of the Legionella Control Association have agreed to abide by the "Code of Conduct for service providers", this in itself does not mean that they are a suitable company to carry out the necessary works but it does indicate that they have an audited management and quality system in place that conforms with the requirements of

	the code.
Do you have a copy of their current registration certificate and Code of Conduct for service providers?	Please ensure that a copy of your sub-contractors current Legionella Control Association certificate is included in your site records.
Is the Communication Matrix up to date?	The current communication matrix requires updating to ensure all parties are aware of all those involved in the management of the legionella control program.
MANAGEMENT RECORDS	
MANAGEMENT QUESTIONS	**RESPONSE & COMMENT**
Are there H&S Risk Assessments and Method Statements for each task?	As part of your written scheme it is advised that you have a method statement of how you carry out each task from the legionella control scheme.
Are there disinfection records available?	Yes. Cleaning and disinfection works have been carried out regularly at the cold water tanks and paper records are available. Comprehensive records of cleaning and disinfections of water systems with pre and post photographs should be documented following the work and retained within the on-site logbook.
Are there COSHH assessments available for chemicals used?	Yes. Relevant COSHH (Control of Substances Hazardous to Health) assessments should be retained for each chemical used within the disinfection processes.
Have there been any legionella positive results in the last 5 years?	No. No history of legionella sampling on site.
Has a risk assessment previously been carried out?	Yes. The last risk assessment was carried out by Interserve in 2015.
Have all remedial actions highlighted in previous Risk Assessment been completed?	Not all. Labelling of assets including CWSTs and Calorifiers has not been completed. All remedial actions recommended in this risk assessment document should be completed.
Are suitable water system drawings available and up to date?	A pipework route drawing has been completed during September 2019 to reflect recent changes to the water systems.
Is there a current asset register for the water systems available?	An up to date asset register can be located in the survey section of this report.
Has a regular audit been carried out? Is there a report on file?	No. Regular audits are an excellent way of ensuring that the current risk assessment is still valid, all control measures are in place, remedial actions are being carried out in a timeous manner and all staff training is up to date. It is recommended that this should be carried out each year when a risk assessment is not being carried out.
Are there operating instructions for the system(s) on site kept on file? E.g. start-up / shut down procedures, pump switching, record of plant usage etc.?	Please ensure that the operating instructions for all plant and equipment, including start-up and shut-down procedures, are included in your written scheme. This is particularly important as there are significant periods of low use for a site of this type.

SITE LOGBOOK AND RECORD KEEPING	
MANAGEMENT QUESTIONS	**RESPONSE & COMMENT**
Is there a water systems monitoring regime already in place?	HBE are currently responsible for the monthly monitoring of sentinel calorifier storage and hot and cold water temperatures, six monthly tank temperatures, showerhead clean and disinfections.
Are monitoring records held in suitable logbook / record system?	The records are held on the MBR 360 electronic monitoring system.
Are all monitoring records complete and up to date for the last 2 years? Is it in paper or electronic format?	Yes. Paper records date back to 2013 but exclude any flushing records
Do records include flushing of low use outlets / pump alternating etc.	There is no record of low use flushing or pump alternating on site.
Is there a non-conformance log? Is it being kept up to date and are non-conformances being signed off once work is carried out?	There is a non-conformance log in the electronic MBR360 system please ensure all corrective actions are recorded and signed off once the necessary measures have been taken.
Do records go back 5 years?	Yes. Records go back 5 years.
Level of Risk	**MEDIUM**

4. WATER SOURCE

WATER SOURCE

Summary of Risk Potential

The water supply to a premises in itself, presents a low legionella risk due to the temperature of the incoming water. Generally water into premises is well below control temperature and even though legionella is a naturally occurring bacterium in the water, the temperature will render the bacteria dormant.

However, the water supply may come from an unusual source. For example a bore hole, natural wells, rain water harvesting systems or even rivers and streams. These may have the potential to be contaminated with debris and other factors that would make bacteria proliferation a problem. This water should not contain any micro-organism, parasite or substance other than those listed in The Water Supply (Water Quality) Regulations 2010 and which have a maximum value or concentration.

Investigation of filtration systems and chemical treatment along with temperature profiling should give a good indicator of the risk of legionella proliferation from unusual sources.

Pictures from water source


Incoming Mains Water Pipework


Bypass on Mains Water Pipework

Water Source

Location	Ground Floor Physical Education Tank Room
System ID No.	1
Type	Town Mains
Supply company	Scottish Water
Labelled	No
Insulation	No
Size	90mm
Material	Plastic
Drain/injection point	No
Temperature °C	14.5°C
Isolation valve	Yes
Accessibility	Good Access
Fire Mains Supply Connected	No visible connection to Sprinkler Tank supply.
Double Non-Return Valve Fitted	Not visible
Additional comments	Bypass installed on Incoming Mains pipework. Slight dead legs created. Flush weekly.
Level of Risk	**LOW**

5. COLD WATER STORAGE TANK DETAILS

COLD WATER STORAGE TANKS (CWST)

Summary of Risk Potential

Water storage tanks, in themselves, present a low legionella risk in general terms however, where the tanked water supplies other plant that has a high risk factor (e.g. cooling towers, showers etc.), the potential risk of such tanks is much higher.

Poor control over water temperature and condition of the stored waters, plus the condition of the tank itself, may lead to small levels of legionella colonising and proliferating in the tank and therefore producing possible source of bacteria to infect other water services downstream.

Pictures of Cold Water Storage Tank(s)

Screened Overflow Pipework

Tank Lid Vent

CWST 1 – Slight Stagnation Present

CWST 2 – Very Light Sediment Present

Pictures of Cold Water Storage Tank(s) Continued

2nd Floor Lab Tank

Booster Pump Drain Line

Booster Pump Expansion Vessel

Cold Water Storage Tanks

Name / Number of CWST	Cold Water Storage Tank 1				
System ID No.	2				
Supply Source	Mains				
Labelled	*CWST*			*Valves*	
	No			No	
Type	Sectional				
Materials	GRP				
Manufacturer	Unknown				
Dimensions (m)	L	3	B 2.5	H	2
Volume (Litres)	L	15000 Nom.	*Over Capacity*	No	
Isolation valves fitted	Yes				
Pipe Size (mm)	Make up:	2 inch			
	DWS:	6 inch			
Linked / single	Linked				
M/U opposite draw off	Yes				
Temperature °C	*Make Up*		*Stored Water*	*Plant-room*	
	14.7		16.9	16.9	
Internal Condition (Corrosion)	None				
Internal Condition (Waterline)	Clean				
Internal Condition (Dirt/Silt)	Very Light Sedimentation				
Water Condition	Clear				
Stagnation	Slight				
Deadlegs Around CWST	No		Dia		
			Length		
Close fitting lid	Yes				
Screened lid vent	Yes				
Overflow Size	3 inch				
Overflow Rodent Screen	Yes				
*Emergency Overflow Size (*mm)	2 inch				
Emergency Overflow Rodent Screen	Yes				
Insulation	Yes				
Access	Good				
Vents Returning to CWST	No				
	Size:				
Non WRC Materials	No				
Drain valve size (mm)	2 inch				
Condition / Comments	There appears to be be a slight imbalance between the two cold water storage tanks resulting in Tank 1 being the lag vessel. The valves should be adjusted to ensure that equal flow is occurring.				
Level of Risk	**MEDIUM**				

Cold Water Storage Tank

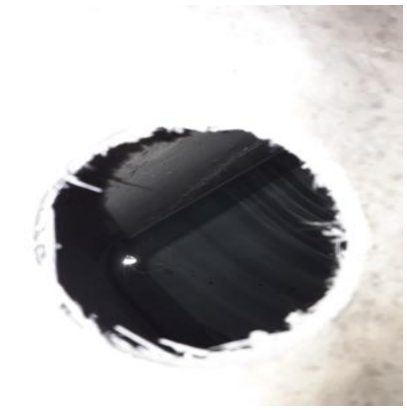
Name / Number of CWST	Cold Water Storage Tank 2				
System ID No.	2				
Supply Source	Mains				
Labelled	*CWST*			*Valves*	
	No			No	
Type	Sectional				
Materials	GRP				
Manufacturer	Unknown				
Dimensions (m)	L	3	B 2.5	H	2
Volume (Litres)	L	15000 Nom.	*Over Capacity*	No	
Isolation valves fitted	Yes				
Pipe Size (mm)	Make up:	2 inch			
	DWS:	6 inch			
Linked / single	Linked				
M/U opposite draw off	Yes				
Temperature °C	*Make Up*		*Stored Water*	*Plant-room*	
	14.7		16.4	16.9	
Internal Condition (Corrosion)	None				
Internal Condition (Waterline)	Clean				
Internal Condition (Dirt/Silt)	Very Light Sedimentation				
Water Condition	Clear				
Stagnation	None				
Deadlegs Around CWST	No		Dia		
			Length		
Close fitting lid	Yes				
Screened lid vent	Yes				
Overflow Size	3 inch				
Overflow Rodent Screen	Yes				
*Emergency Overflow Size (*mm)	2 inch				
Emergency Overflow Rodent Screen	Yes				
Insulation	Yes				
Access	Good				
Vents Returning to CWST	No				
	Size:				
Non WRC Materials	No				
Drain valve size (mm)	2 inch				
Condition / Comments	Replace the hollow support pipes in CWSTs 1 & 2 due to the potential for stagnant water to collect in the pipework.				
Level of Risk	**MEDIUM**				

CWSTs Booster Pumps

Location	Boiler Room	2nd Floor Tank Room
CWSTs Feeding Booster Pumps	CWST 1 & 2	CWST 3
Services Fed from Pumps	Cold feed to calorifiers. Boosted cold water services..	Boosted cold water to lab sinks.
Labelled – Pipework	No	No
Labelled – Valves	No	No
Pipework Insulated	No	No
Number of Pumps	2	2
Isolation Valves fitted?	Yes	Yes
Access to Pumps	Yes	Yes
Manufacturer	Wilo	Hydrovar
Pressure Vessel	Yes	Yes
Drain on Line to Pressure Vessel	None visible	Yes
Access to Flush Pressure Vessel	Not Fitted /	Yes.
Deadlegs	No Size:	No Size:
Pigtails / Swan-necks on Pressure Gauges	No	No
Condition/ Comments	Install a drain on line to pressure vessel. Ensure that pumps are set to change over automatically at least weekly.	Ensure that pumps are set to change over automatically at least weekly.
Level of Risk	Low	Low

Cold Water Storage Tanks

Name / Number of CWST	Cold Water Storage Tank 3				
System ID No.	4				
Supply Source	Boosted Tank				
Labelled	*CWST*			*Valves*	
	No			No	
Type	Moulded				
Materials	GRP				
Manufacturer	Unknown				
Dimensions (m)	L	1.0	B 0.75	H	0.75
Volume (Litres)	L	562 Nom.	*Over Capacity*	No	
Isolation valves fitted	Yes				
Pipe Size (mm)	Make up:	28mm			
	DWS:	42mm			
Linked / single	Single				
M/U opposite draw off	Yes				
Temperature °C	*Make Up*		*Stored Water*	*Plant-room*	
	17.5		18.2	17.9	
Internal Condition (Corrosion)	None				
Internal Condition (Waterline)	Clean				
Internal Condition (Dirt/Silt)	Very Light Sedimentation				
Water Condition	Clear				
Stagnation	None				
Deadlegs Around CWST	No	Dia			
		Length			
Close fitting lid	Yes				
Screened lid vent	Yes				
Overflow Size	35mm				
Overflow Rodent Screen	Yes				
*Emergency Overflow Size (*mm)	Weir overflow				
Emergency Overflow Rodent Screen	Yes				
Insulation	Yes				
Access	Good				
Vents Returning to CWST	No				
	Size:				
Non WRC Materials	No				
Drain valve size (mm)	Not fitted				
Condition / Comments	Tank does not provide category 5 protection. Reconfiguration required to raise make up point. Supplied from CWSTs 1&2.				
Level of Risk	**MEDIUM**				



Missing lid vent causing potential contamination risk

Laboratory CWST Internal Photo

Laboratory CWST

Wilo Twin Booster Pump Set

CWST 2 with hollow supports

6. CALORIFIERS AND WATER HEATERS

CALORIFIERS AND WATER HEATERS

Summary of Risk Potential

Calorifiers and water heaters above 15 litres present a legionella risk, when the water from the unit supplies other associated plant which may have a high risk potential (e.g. showers etc.).

Calorifiers and water heaters have been a major source of proliferation of legionella. Poor control over the water temperature and condition of the units are the most significant factors in determining the risk presented by them to the down water services.

Pictures of Calorifiers & Water Heaters

Boiler Room Calorifiers 1 & 2

DHWS Return System

Gauge Temperature 63ºC

Pigtail Pipework to Gauges

Calorifier

Location / Name of Calorifier	**Calorifier 1**	
System ID No.	3	
Supply Source	Boosted Tank	
Calorifier Labelled	No	
Valves Labelled	No	
Type	Vertical	
Materials	Steel	
Manufacturer	McCallum Calorifiers Ltd.	
Volume (Litres)	3000	
Linked / single	Linked	
Heat source	LTHW with immersion heater backup	
Cold feed location	Base	
Vent	Pressure Relief	
System pump	Yes	
Destratification pump	Yes	
Stratification	No	
Insulation	Yes	
Manhole diameter (mm)	300mm	
Pigtails/ Swan-necks	Yes	
Deadlegs on Pipework	Size	Length:
Isolation Valves Fitted?	Yes	
Pipe Diameters (mm)	Flow	2 inch
	Return	1.5 inch
	Drain	28mm
Non WRC Materials	No	
Drain	Yes	
Water quality	Not Run	
Temperatures °C	*Flow*	*63.5*
	Return	*54.5*
	Middle	*60.6*
	Base	57.9
	Cold feed	*17.2*
	Gauge(s)	63.0
Condition/Comments	Pigtail pipework to gauge. Significant heat loss noted on secondary return may indicate ineffective circulation.	
Level of Risk	**MEDIUM**	

Calorifier

Location / Name of Calorifier	**Calorifier 2**	
System ID No.	3	
Supply Source	Boosted Tank	
Calorifier Labelled	No	
Valves Labelled	No	
Type	Vertical	
Materials	Steel	
Manufacturer	McCallum Calorifiers Ltd.	
Volume (Litres)	3000	
Linked / single	Linked	
Heat source	LTHW with immersion heater backup	
Cold feed location	Base	
Vent	Pressure Relief	
System pump	Yes	
Destratification pump	Yes	
Stratification	No	
Insulation	Yes	
Manhole diameter (mm)	300mm	
Pigtails/ Swan-necks	Yes	
Deadlegs on Pipework	Size	Length:
Isolation Valves Fitted?	Yes	
Pipe Diameters (mm)	Flow	2 inch
	Return	1.5 inch
	Drain	28mm
Non WRC Materials	No	
Drain	Yes	
Water quality	Not Run	
Temperatures °C	*Flow*	*63.1*
	Return	*54.5*
	Middle	*60.0*
	Base	58.3
	Cold feed	*17.2*
	Gauge(s)	63.0
Condition/Comments	Pigtail pipework to gauge. Significant heat loss noted on secondary return may indicate ineffective circulation.	
Level of Risk	**MEDIUM**	

7. HOT AND COLD WATER OUTLETS

HOT AND COLD WATER OUTLETS

Summary of Risk Potential

Hot and cold water outlets do not normally present a risk for the development of Legionnaires' disease unless the outlets create fine droplets or spray. Outlets that do create sprays / droplets significantly increase the risk. Water temperature, tap design and cleanliness of the outlet are the most significant factors in determining the risk potential.

SHOWERS AND OTHER SPRAY OUTLETS

Summary of Risk Potential

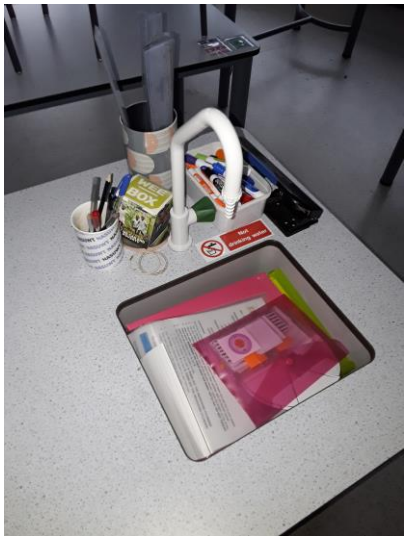
Since showers and spray outlets produce fine water droplets they present a significantly higher risk for the development of Legionnaires' disease than other types of hot and cold outlets. Water temperature, showerhead (spray head) design, frequency of use and cleanliness of the outlet are the most significant factors in determining the risk potential.

Showers supplied via storage tanks, blending valves and Thermostatic Mixing Valves (TMVs) pose greater risk of bacteria proliferation due to the design of the pipework and possible stagnated water stored in pipework pre mixing. Mains supplied electrical showers present a significantly lower risk of bacterial population and dispersion due to the water source for this type of outlet. Although an aerosol is produced, the temperature of the water source would render any legionella bacteria dormant.

Pictures of outlets

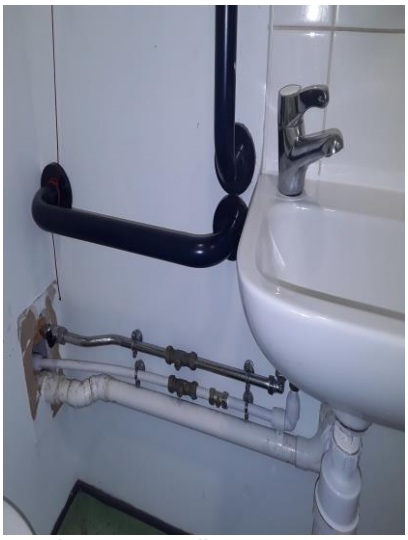

Tap Diffuser Condition


Example of Outlet Conditions


Rarely Used Laboratory Outlet 2-076


Example of Wash Troughs

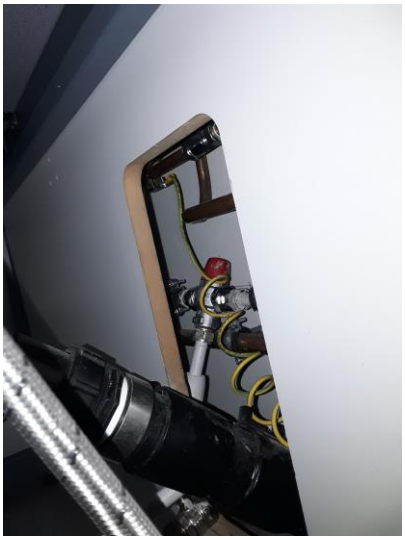

Example of Lab Fume Cabinet Ensure Regular Use


Dead Legs at Toilets – 2-017


Possible Dead Leg Pipework in Hydrotherapy Room


Example Wash Trough TMV


Example of Y-strainers at Mixer Taps


Classroom Access to TMVs


Typical Mixer Shower – TMV Above Ceiling Tile (1 Metre) – Push Button


Example of Y-strainer Condition

Hot & Cold Outlets – Ground Floor Physical Education

Location		G-219 Officials Change	G-217 Changing Room 8 Toilet	G-218 Changing Room 8	G-213 Changing Room 7 Toilet	G-214 Changing Room 7
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		HWSP,CWSP	-	-	-	-
Outlets	Sink	-	-	-	-	-
	WHB	1 - TMV	1 -TMV	-	1 -TMV	-
	WC	1	1	-	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	1 - TMV	-	5 – TMV x 5	-	5 – TMV x 5
	Others	-	-	-	-	-
Spray Potential		High	Low	High	Low	High
Frequency of Use		Rarely	Never	Rarely	Daily	Rarely
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		16.6	-	-	-	-
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		2	1	5	1	5
TMV	Cold In (˚C)	16.9	-	16.9	17.0	17.4
	Hot In (˚C)	60.1	-	55.2	61.3	59.5
	Mixed Out (˚C)	38.3	-	39.8	42.1	39.1
	No. Outlets Fed	2	1	5	1	5
	Distance to Outlets	1 Metre	<0.5	1 Metre	<0.5	1 Metre
Additional Comments		. Improve access to TMVs. No circulation in return leg behind WC panel (42ºC)	Hot and cold pipework isolated at WHB creating dead legs.	Ensure that showers are flushed weekly.	Cold pipe isolated - dead leg. TMV fail-safe preventing flush of hot tap.	. Ensure that showers are flushed weekly.
Additional Localised Risk		**MED/HIGH**	**MEDIUM**	**MED/HIGH**	**MEDIUM**	**MED/HIGH**

Hot & Cold Outlets –Ground Floor Physical Education

Location		G-210 Changing Room 6 Toilet	G-211 Changing Room 6	G-208 Disabled Changing Room	G-213 Changing Room 7 Toilet	G-207 Cleaners Cupboard
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	-	1
	WHB	1 - TMV	-	1 – Mixer Tap	1 -TMV	-
	WC	1	-	1	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	5 – TMV x 5	2	-	-
	Others	-	-	-	-	-
Spray Potential		Low	High	High	Low	Low
Frequency of Use		Daily	Rarely	Rarely	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		16.6	-	-	-	17.0
Hot temp (˚C) within 1 min		-	-	-	-	63.2
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	5	Mixer Tap	1	-
TMV	Cold In (˚C)	16.9	-	16.8	17.0	-
	Hot In (˚C)	59.8	-	59.2	61.3	-
	Mixed Out (˚C)	39.1	-	39.5	42.1	-
	No. Outlets Fed	1	5	1	1	-
	Distance to Outlets	<0.5	1 Metre	-	<0.5	-
Additional Comments		-	Ensure that showers are flushed weekly.	Ensure that showers are flushed weekly. Strainers present at WHB.	Cold pipe isolated - dead leg. TMV fail-safe preventing flush of hot tap.	. Hot Water Warning Signage in Place
Additional Localised Risk		**LOW**	**MED/HIGH**	**MED/HIGH**	**MEDIUM**	**LOW**

Hot & Cold Outlets –Ground Floor Physical Education

Location		G-206 Disabled Changing Room	G-232 Changing Room 3	G-231 Changing Room 3 Toilet	G-234 Changing Room 2 Toilet	G-235 Changing Room 2
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	-	-
	WHB	1 - Mixer Tap	-	1 – TMV	1 -TMV	-
	WC	1	-	1	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	2	5 – TMV x 5	-	-	5 – TMV x 5
	Others	-	-	-	-	-
Spray Potential		High	High	Low	Low	Low
Frequency of Use		Rarely	Rarely	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		17.4	-	-	-	-
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		Mixer Tap	5	1	1	5
TMV	Cold In (˚C)	17.5	17.8	17.3	17.0	17.5
	Hot In (˚C)	60.3	41.9	42.6	43.1	42.7
	Mixed Out (˚C)	40.5	37.2	38.5	40.2	37.0
	No. Outlets Fed	1	5	1	1	5
	Distance to Outlets	-	1 Metre	-	<0.5	-
Additional Comments		Ensure that showers are flushed weekly. Strainers present at WHB.	Ensure that showers are flushed weekly. Poor hot water circulation.	Poor hot water circulation.	Hot pipe isolated - dead leg. Poor hot water circulation.	. Ensure that showers are flushed weekly. Poor hot water circulation.
Additional Localised Risk		**MED/HIGH**	**MED/HIGH**	**MEDIUM**	**MEDIUM**	**MED/HIGH**

Hot & Cold Outlets –Ground Floor Physical Education

Location		G-237 Changing Room 1 Toilet	G-238 Changing Room 1	G-259 Changing Room 4 Toilet	G-260 Changing Room 4	P.E. Corridor
Source System ID No(s)		2,3	2,3	2,3	2,3	1,
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	-	-
	WHB	1 - TMV	-	1 – TMV	-	-
	WC	1	-	1	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	5 – TMV x 5	-	5 – TMV x 5	-
	Others	-	-	-	-	Water Cooler
Spray Potential		Low	High	Low	High	Low
Frequency of Use		Daily	Rarely	Daily	Rarely	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		-	-	-	-	-
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	5	1	5	-
TMV	Cold In (˚C)	17.7	17.8	17.3	17.0	-
	Hot In (˚C)	40.8	41.9	42.6	43.1	-
	Mixed Out (˚C)	39.3	37.2	38.5	40.2	-
	No. Outlets Fed	1	5	1	5	-
	Distance to Outlets	<0.5	1 Metre	<0.5	1 Metre	-
Additional Comments		Poor hot water circulation.	Ensure that showers are flushed weekly. Poor hot water circulation.	Poor hot water circulation.	Ensure that showers are flushed weekly. Poor hot water circulation	. -
Additional Localised Risk		**MEDIUM**	**HIGH**	**MEDIUM**	**HIGH**	**LOW**

Hot & Cold Outlets –Ground Floor Technical Education

Location		G-202 Disabled Toilet	Tech 5	G-185 Tech 4	G-186 Tech Base	G-191 Cleaners Cupboard
Source System ID No(s)		2,3	2,3	2,3	1,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	1 - TMV	1 - TMV	1	1
	WHB	1 - Mixer Tap	-	-	-	-
	WC	1	-	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		-	-	-	16.1	17.3
Hot temp (˚C) within 1 min		-	-	-	61.3	59.4
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		Mixer Tap	1	1	-	-
TMV	Cold In (˚C)	17.3	17.2	17.3	-	-
	Hot In (˚C)	59.8	56.8	55.5	-	-
	Mixed Out (˚C)	40.0	40.6	38.5	-	-
	No. Outlets Fed	1	1	1	-	-
	Distance to Outlets	-	<0.5	<0.5	-	-
Additional Comments		Strainers fitted at WHB.	-	-	-	. -
Additional Localised Risk		**MEDIUM**	**LOW**	**LOW**	**LOW**	**LOW**

Hot & Cold Outlets –Ground Floor Physical Education & Drama

Location		G-181 Changing Room 5 Toilet	G-182 Changing Room 5	G-177 Vocational	G-138 Drama Stage Costume Room	G-174 Cleaners Office
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	1 - TMV	-
	WHB	1 - TMV	-	1 – TMV	-	-
	WC	1	-	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	5 – TMV x 5	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	High	Low	Low	Low
Frequency of Use		Daily	Rarely	Rarely	Rarely	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		-	-	-	-	16.9
Hot temp (˚C) within 1 min		-	-	-	-	63.2
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	5	1	1	-
TMV	Cold In (˚C)	17.4	17.8	17.5	17.0	-
	Hot In (˚C)	50.1	49.6	60.1	60.2	-
	Mixed Out (˚C)	39.3	38.4	39.9	44.5	-
	No. Outlets Fed	1	5	1	1	-
	Distance to Outlets	<0.5	1 Metre	<0.5	<0.5	-
Additional Comments		Poor hot water circulation.	Ensure that showers are flushed weekly. Poor hot water circulation.	Ensure that outlet is in regular use.	Ensure that outlet is in regular use.	. -
Additional Localised Risk		**MEDIUM**	**HIGH**	**MEDIUM**	**MEDIUM**	**LOW**

Hot & Cold Outlets –Ground Floor Drama & Music

Location		G-173 Cleaners Cupboard	G-172 Disabled Toilet	G-148 Music & Drama Base	G-147 Disabled Toilet	Boys Toilet
Source System ID No(s)		2,3	2,3	1,3	2,3	1,2
Sentinel Point		-	-	-	-	-
Outlets	Sink	1	-	1	-	-
	WHB	-	1 – Mixer Tap	-	1 – Mixer Tap	-
	WC	-	1	-	1	12 (6 from MWS)
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Rarely	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		17.4	-	16.3	-	-
Hot temp (˚C) within 1 min		61.0	-	56.7	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	Mixer Tap	-	1	-
TMV	Cold In (˚C)	-	18.3	-	17.6	-
	Hot In (˚C)	-	61.2	-	60.0	-
	Mixed Out (˚C)	-	40.1	-	41.1	-
	No. Outlets Fed	-	1	-	1	-
	Distance to Outlets	-	-	-	<0.5	-
Additional Comments		-	-	-.	Ensure that outlets are in regular use.	. -
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**MEDIUM**	**LOW**

Hot & Cold Outlets –Ground Floor Music & Cafeteria

Location		Girls Toilet	Hand Washing Area	Entrance to Cafeteria from Music	Cafeteria Kitchen	Kitchen Toilet
Source System ID No(s)		2,	2,3	1,	1,2,3	2,3
Sentinel Point		-	-	-	-	HWSP
Outlets	Sink	-	-	-	3	-
	WHB	-	8 x WHB 2 x Wash Troughs	-	2	2 – TMV x 2
	WC	12	-	-	-	2
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	Water Cooler	Steam Oven, Pot Spray, Steriliser Sink, Dishwasher, Water Boiler, Waste Disposal	-
Spray Potential		Low	Medium	Low	Low	Low
Frequency of Use		Daily	Daily	Rarely	Rarely	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		-	-	-	16.9	18.5
Hot temp (˚C) within 1 min		-	-	-	50.1	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	10	-	1	2
TMV	Cold In (˚C)	-	16.1	-	-	18.5
	Hot In (˚C)	-	58.9	-	-	44.1
	Mixed Out (˚C)	-	39.7	-	-	38.1
	No. Outlets Fed	-	24	-	-	2
	Distance to Outlets	-	1 Metre	-	-	<0.5
Additional Comments		-.	Ensure that all taps are in regular use.	-	Poor hot water circulation.	. Long single pipe supply to area, no return present.
Additional Localised Risk		**LOW**	**MEDIUM**	**LOW**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets – Cafeteria & Offices

Location		Kitchen Cleaners	Coffee/Drinks Servery	Rest Room	1st Aid Room	ICF Disabled Change
Source System ID No(s)		2,3	1,3	2,3	1,2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1	-	1 - TMV	1 - TMV	-
	WHB	-	1	-	-	1 – Mixer Tap
	WC	-	-	-	-	1
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	2
	Others	-	Coffee Machine, Water Cooler x 2		Water Cooler	-
Spray Potential		Low	Low	Low	Low	High
Frequency of Use		Daily	Daily	Daily	Rarely	Never
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		18.2	17.9	-	18.3	18.5
Hot temp (˚C) within 1 min		49.1	56.4	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	-	1	1	Mixer Tap
TMV	Cold In (˚C)	-	-	18.0	18.3	18.4
	Hot In (˚C)	-	-	56.9	58.1	52.5
	Mixed Out (˚C)	-	-	39.5	43.2	39.6
	No. Outlets Fed	-	-	1	1	1
	Distance to Outlets	-	-	<0.5	<0.5	-
Additional Comments		Poor hot water circulation..	-	-	Ensure that outlets are in regular use.	. Poor hot water circulation. Low return temperature 38.2ºC beside WHB.
Additional Localised Risk		**MEDIUM**	**LOW**	**LOW**	**MEDIUM**	**HIGH**

Hot & Cold Outlets – Offices at Reception

Location		G-124 Reception Office	G-132 Disabled Toilet at Reception	G-261 Unisex Toilet	1st Aid Room
Source System ID No(s)		1,3	2,3	2,3	1,2,3
Sentinel Point		-	-	-	-
Outlets	Sink	1 - TMV	-	-	1 - TMV
	WHB	-	1 – Mixer Tap	1 - TMV	-
	WC	-	1	1	-
	Urinal	-	-	-	-
	Bath	-	-	-	-
	Shower – Electric	-	-	-	-
	Shower – Mixer	-	-	-	-
	Others	-	-	-	Water Cooler
Spray Potential		Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Rarely
Dead Ends Present		None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D
Cold temp (˚C) within 2 min		16.4	17.5	16.7	18.3
Hot temp (˚C) within 1 min		-	-	-	-
Scald Risk at Location		No	No	No	No
No of TMV's in location		1	Mixer Tap	1	1
TMV	Cold In (˚C)	-	17.5	16.7	18.3
	Hot In (˚C)	-	60.2	59.8	58.1
	Mixed Out (˚C)	42.5	40.4	44.0	43.2
	No. Outlets Fed	1	1	1	1
	Distance to Outlets	-	-	<0.5	<0.5
Additional Comments		Poor Access to TMV. Not possible to record temperatures.	-	-	Ensure that outlets are in regular use.
Additional Localised Risk		**MEDIUM**	**LOW**	**LOW**	**MEDIUM**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-106 Class Base 4	G-102 Class Base 5	Class Base 3	Class Base 6	Class Base 1
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		HWSP, CWSP	-	-	-	-
Outlets	Sink	1 - TMV	1 - TMV	1 - TMV	1 - TMV	1 - TMV
	WHB	-	-	-	-	-
	WC	-	-	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		19.2	18.5	17.7	17.5	17.4
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	1	1	1	1
TMV	Cold In (˚C)	19.2	18.5	17.7	17.5	17.4
	Hot In (˚C)	55.9	55.2	56.9	57.0	56.3
	Mixed Out (˚C)	41.0	40.2	38.7	41.8	39.6
	No. Outlets Fed	1	1	1	1	1
	Distance to Outlets	<0.5	<0.5	<0.5	<0.5	<0.5
Additional Comments		-	-	-	-.	-
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**LOW**	**LOW**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		Class Base 8	G-097 Cleaners Cupboard	G-096 ICF Disabled Change	G-095 Boys Toilet	G-094 Girls Toilet
Source System ID No(s)		1,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1 - TMV	1	-	-	-
	WHB	-	-	1 – Mixer Tap	3 - TMV x 3	3 - TMV x 3
	WC	-	-	1	3	3
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	2	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	High	Low	Low
Frequency of Use		Daily	Daily	Rarely	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		16.5	18.7	18.9	18.5	18.0
Hot temp (˚C) within 1 min		-	59.5	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	-	Mixer Tap	3	3
TMV	Cold In (˚C)	16.5	-	18.9	18.5	18.0
	Hot In (˚C)	57.8	-	55.1	58.9	57.8
	Mixed Out (˚C)	41.7	-	40.0	42.1	39.8
	No. Outlets Fed	1	-	1	3	3
	Distance to Outlets	<0.5	-	-	<0.5	<0.5
Additional Comments		-	-	-	-.	-
Additional Localised Risk		**LOW**	**LOW**	**MED/HIGH**	**LOW**	**LOW**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-061 Staff Room	G-068 Gents Toilet	G-067 Ladies Toilet	Class Base 9	G-066 Ladies Toilet
Source System ID No(s)		1,3	2,3	2,3	1,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1	-	-	1 - TMV	-
	WHB	-	1 - TMV	1 - TMV	-	1 - TMV
	WC	-	1	1	-	1
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	Zip HydroTap	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		16.8	17.7	17.6	16.8	17.9
Hot temp (˚C) within 1 min		60.2	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	1	1	1	1
TMV	Cold In (˚C)	-	17.7	17.6	16.8	17.9
	Hot In (˚C)	-	59.4	57.0	56.9	56.2
	Mixed Out (˚C)	-	41.1	42.1	43.0	39.8
	No. Outlets Fed	-	1	1	1	1
	Distance to Outlets	-	<0.5	<0.5	<0.5	<0.5
Additional Comments		-	-	-	-.	-
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**LOW**	**LOW**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-065 Gents Toilet	Corridor	G-057 Boys Toilet	G-056 Cleaner's Cupboard	G-055 Girls Toilet
Source System ID No(s)		2,3	1,	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	1	-
	WHB	1 - TMV	-	3 – TMV x 3	-	3 – TMV x 3
	WC	1	-	3	-	3
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	Water Cooler	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		18.0	-	18.6	19.1	19.0
Hot temp (˚C) within 1 min		-	-	-	55.2	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	-	3	-	3
TMV	Cold In (˚C)	18.0	-	18.8	-	19.0
	Hot In (˚C)	55.3	-	55.9	-	54.7
	Mixed Out (˚C)	43.5	-	40.4	-	39.9
	No. Outlets Fed	1	-	3	-	3
	Distance to Outlets	<0.5	-	<0.5	-	<0.5
Additional Comments		-	-	-	-.	-
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**LOW**	**LOW**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-033 Disabled Toilet	G-032 Staff Base	Home Economics	Home Economics Bathroom	G-034 Pottery
Source System ID No(s)		2,3	1,3	1,2,3	1,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	1 - TMV	2 – TMV x 2	-	2 – TMV x2
	WHB	1 - TMV	-	-	1	-
	WC	1	-	-	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	1	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	Dishwasher, Washing Machine	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		19.5	16.8	16.8	19.1	18.2
Hot temp (˚C) within 1 min		-	-	-	55.2	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	1	2	-	2
TMV	Cold In (˚C)	19.5	16.8	16.8	-	18.2
	Hot In (˚C)	58.9	58.9	57.2	-	47.5
	Mixed Out (˚C)	41.8	41.8	42.2	-	38.2
	No. Outlets Fed	1	1	2	-	2
	Distance to Outlets	<0.5	<0.5	<0.5	-	<0.5
Additional Comments		-	-	-	-.	-
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**LOW**	**MEDIUM**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-051 Science	G-036 Art	G-050 Science Prep	G-049 Tech	G-040 Class Base 10
Source System ID No(s)		3,4	2,3	2,3	2,3	2,3
Sentinel Point		CWSP (Lab CWST)	-	-	-	-
Outlets	Sink	1 x TMV 7 x cold only	4 – TMV x 4	1 - TMV	-	2 – TMV x2
	WHB	-	-	-	1	-
	WC	-	-	-	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	1	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Rarely	Daily	Daily	Daily	Rarely
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		23.3	16.8	23.5	22.5	22.2
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	4	1	1	2
TMV	Cold In (˚C)	23.5	19.9	22.5	21.9	22.2
	Hot In (˚C)	50.9	39.6	55.1	54.2	35.1
	Mixed Out (˚C)	38.9	39.0	36.4	38.2	35.1
	No. Outlets Fed	1	4	1	1	2
	Distance to Outlets	<0.5	<0.5	<0.5	<0.5	<0.5
Additional Comments		High cold water temperatures. Rarely used outlets.	Poor hot water circulation in area.	High cold water temperature.	High cold water temperature..	Poor hot water circulation. High cold water temperatures.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-042 Changing Room 1	G-045 Changing Room 2	G-056 Cleaners Cupboard	ICF 2 Disabled Change	Staff Rest
Source System ID No(s)		2,3	2,3	2,3	2,3	1,3
Sentinel Point		CWSP, HWSP	CWSP, HWSP	-	-	-
Outlets	Sink	-	-	1	-	1 - TMV
	WHB	1 - TMV	1 - TMV	-	1 – Mixer Tap	-
	WC	1	1	-	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	2	2	-	2	-
	Others	-	-	-	-	-
Spray Potential		High	High	Low	High	Low
Frequency of Use		Rarely	Rarely	Daily	Never	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		22.9	21.5	20.9	-	17.7
Hot temp (˚C) within 1 min		-	-	56.9	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		2	2	-	-	1
TMV	Cold In (˚C)	22.9	21.5	-	-	17.7
	Hot In (˚C)	38.9	48.5	-	-	55.1
	Mixed Out (˚C)	38.8	40.6	-	-	40.2
	No. Outlets Fed	2	2	-	-	1
	Distance to Outlets	1 Metre	1 Metre	-	-	<0.5
Additional Comments		High cold water temperatures. Poor hot water circulation Rarely used outlets.	High cold water temperatures. Poor hot water circulation Rarely used outlets.	High cold water temperature.	Outlets never used. Area being used for storage.	-.
Additional Localised Risk		**HIGH**	**HIGH**	**MEDIUM**	**HIGH**	**LOW**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		Physio	G-073 Medical	G-011	Home Economics 2	Laundry
Source System ID No(s)		1,3	1,3	2,3	1,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1 - TMV	1 - TMV	1 - TMV	5 – TMV x 5	-
	WHB	-	-	-	-	-
	WC	-	-	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	Dishwasher	Washing Machine
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Rarely	Rarely	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		17.9	16.8	19.7	17.7	17.7
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	1	1	5	1
TMV	Cold In (˚C)	17.9	16.8	19.7	17.8	17.7
	Hot In (˚C)	55.0	53.1	54.1	55.6	55.1
	Mixed Out (˚C)	40.9	40.4	40.2	41.1	40.2
	No. Outlets Fed	1	1	1	5	1
	Distance to Outlets	<0.5	<0.5	<0.5	<0.5	<0.5
Additional Comments		Possible rarely used outlets.	Poor hot water circulation Rarely used outlets.	-	-	Possible dead leg pipework behind washing machine. Hot flow and return.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**LOW**	**LOW**	**MEDIUM**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		G-021 Unisex Toilet	Changing Room Outside Hydrotherapy	Hydrotherapy Change 1 (RHS)	Hydrotherapy Change 2 (LHS)	Hydrotherapy Poolside
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	-	-
	WHB	1 - TMV	1 - TMV	1 - TMV	1 - TMV	-
	WC	1	1	1	1	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	1	1	1	2
	Others	-	-	-	-	Water Cooler
Spray Potential		Low	High	High	High	High
Frequency of Use		Daily	Rarely	Rarely	Rarely	Weekly
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	Yes – near water cooler hot and return.
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L 2500 D 15
Cold temp (˚C) within 2 min		17.1	18.9	25.1	25.0	-
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	1	1	1	2
TMV	Cold In (˚C)	17.1	18.9	25.1	25.0	-
	Hot In (˚C)	54.5	50.1	45.2	45.0	-
	Mixed Out (˚C)	41.8	40.4	41.0	40.3	-
	No. Outlets Fed	1	1	1	1	2
	Distance to Outlets	<0.5	<0.5	<0.5	<0.5	1 Metre
Additional Comments		-	High cold water temperatures. Poor hot water circulation Rarely used outlets.	High cold water temperatures. Poor hot water circulation Rarely used outlets.	High cold water temperatures. Poor hot water circulation Rarely used outlets.	High cold water temperatures. Poor hot water circulation Rarely used outlets.
Additional Localised Risk		**LOW**	**MED/HIGH**	**HIGH**	**HIGH**	**HIGH**

Hot & Cold Outlets – Ground Floor Buchanan High School

Location		Buchanan Entrance Reception	Hydrotherapy Plant Room
Source System ID No(s)		1,3	2,
Sentinel Point		-	-
Outlets	Sink	2	-
	WHB	-	-
	WC	-	-
	Urinal	-	-
	Bath	-	-
	Shower – Electric	-	-
	Shower – Mixer	-	-
	Others	Coffee Machine, Water Cooler	Bib Tap
Spray Potential		Low	Low
Frequency of Use		Daily	Rarely
Dead Ends Present		None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D
Cold temp (˚C) within 2 min		16.7	19.8
Hot temp (˚C) within 1 min		59.5	-
Scald Risk at Location		No	No
No of TMV's in location		-	-
TMV	Cold In (˚C)	-	-
	Hot In (˚C)	-	-
	Mixed Out (˚C)	-	-
	No. Outlets Fed	-	-
	Distance to Outlets	-	-
Additional Comments		Water cooler out of order creating dead leg.	Used to top up Hydrotherapy pool. Ensure that a double check valve is fitted at the branch point from the system.
Additional Localised Risk		**MEDIUM**	**MEDIUM**

Hot & Cold Outlets –Ground Floor Community Centre

Location		G-239 Cleaners Cupboard	G-241 Changing Room B	G-242 Changing Room A	G-243 Ladies Toilets	G-244 Gents Toilets
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1	-	-	-	-
	WHB	-	-	-	4- TMV x 4	4- TMV x 4
	WC	-	-	-	4	4
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	2 – TMV x2	2 – TMV x2	-	-
	Others	-	-	-	-	-
Spray Potential		Low	High	High	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		17.0	-	-	-	-
Hot temp (˚C) within 1 min		48.1	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	2	2	4	4
TMV	Cold In (˚C)	-	18.1	18.7	19.0	18.9
	Hot In (˚C)	-	47.8	47.6	47.2	47.7
	Mixed Out (˚C)	-	38.3	42.2	39.3	40.1
	No. Outlets Fed	-	2	2	4	4
	Distance to Outlets	-	1 Metre	1 Metre	<0.5	<0.5
Additional Comments		. Slightly low hot water supply temperature.	Poor hot water circulation in area. Low hot water supply temperature.	Poor hot water circulation in area. Low hot water supply temperature.	Poor hot water circulation in area. Low hot water supply temperature.	Poor hot water circulation in area. Low hot water supply temperature.
Additional Localised Risk		**MEDIUM**	**HIGH**	**HIGH**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets –Ground Floor Community Centre

Location		G-245 Disabled Toilet	G-246 Disabled Toilet	G-247 Cleaners Store	Reception	G-252 Kitchen
Source System ID No(s)		2,3	2,3	2,3	1	1,3
Sentinel Point		-	-	CWSP	-	HWSP, MWSP
Outlets	Sink	-	-	1	-	1- TMV
	WHB	1 – Mixer Tap	1 – Mixer Tap	-	-	1- TMV
	WC	1	1	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	Water Cooler, Drinks Machine (coffee)	Dishwasher, Water Boiler
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		18.2	18.4	17.4	19.1	17.9
Hot temp (˚C) within 1 min		-	-	34.1	-	25.2
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		Mixer Tap	Mixer Tap	-	-	-
TMV	Cold In (˚C)	18.2	18.5	-	-	-
	Hot In (˚C)	46.9	45.8	-	-	-
	Mixed Out (˚C)	39.5	42.1	-	-	-
	No. Outlets Fed	1	1	-	-	-
	Distance to Outlets	-	-	-	-	-
Additional Comments		Poor hot water circulation in area. Low hot water supply temperature.	Low hot water supply temperature. Strainers Present.	Poor hot water circulation in area. Low hot water temperature.	-	Poor hot water circulation in area. Low hot water supply temperature.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**	**LOW**	**MEDIUM**

Hot & Cold Outlets – Physical Education 1st Floor

Location		1-098 Fitness Studio	1-100 Laundry	1-102 P.E Base	1-106 Boys Changing Room	1-105 Boys Change Toilet
Source System ID No(s)		1	2,	1,3	2,3	2,3
Sentinel Point		-	-	MWSP	-	-
Outlets	Sink	-	-	-	-	-
	WHB	-	-	-	-	1 - TMV
	WC	-	-	-	-	1
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	5 – TMV x 5	-
	Others	Water Cooler	Washing Machine	-	-	-
Spray Potential		Low	Low	Low	High	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		19.3	19.7	16.3	-	18.3
Hot temp (˚C) within 1 min		-	-	60.2	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	-	-	5	1
TMV	Cold In (˚C)	-	-	-	18.5	18.3
	Hot In (˚C)	-	-	-	55.2	54.9
	Mixed Out (˚C)	-	-	-	39.1	38.9
	No. Outlets Fed	-	-	-	5	1
	Distance to Outlets	-	-	-	1 Metre	<0.5
Additional Comments		-	-	.-	-	-
Additional Localised Risk		**LOW**	**LOW**	**MEDIUM**	**MEDIUM**	**LOW**

Hot & Cold Outlets – Physical Education 1st Floor

Location		1-107 Disabled Toilet/Change	1-110 Girls Changing Room	1-109 Girls Change Toilet	1-096 Cleaners Store	1-111 Staff Change 2
Source System ID No(s)		2,3	2,3	2,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	-	1	-
	WHB	1 - TMV	-	1 – TMV	-	1 – TMV
	WC	1	-	1	-	1
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	2	5	-	-	1
	Others	-	-	-	-	-
Spray Potential		High	High	Low	Low	High
Frequency of Use		Rarely	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		18.4	18.9	18.7	18.5	19.8
Hot temp (˚C) within 1 min		-	-	-	60.8	55.1
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	5	1 – TBC	-	2
TMV	Cold In (˚C)	18.4	18.9	-	-	17.2
	Hot In (˚C)	56.7	55.9	-	-	48.5
	Mixed Out (˚C)	41.3	39.8	-	-	42.9
	No. Outlets Fed	1	5	-	-	1
	Distance to Outlets	<0.5	1 Metre	TBC	-	1 Metre
Additional Comments		-	-	No access to TMV. Weak flow at hot tap	-	
Additional Localised Risk		**MED/HIGH**	**MEDIUM**	**MEDIUM**	**LOW**	**HIGH**

Hot & Cold Outlets – 1st Floor Physical Education, Maths Department and Staff Facilities

Location		P.E. 1-095 Staff Change 1	Maths Base	Maths Disabled Toilet	1-066 Cleaners Cupboard	Main Staff Room
Source System ID No(s)		2,3	1,3	2,3	2,3	1,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	1	-	1	1
	WHB	1 – TMV	-	1 – Mixer Tap	-	-
	WC	1	-	1	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	1 - TMV	-	-	-	-
	Others	-	-	-	-	Dishwasher, HydroTap
Spray Potential		High	Low	Low	Low	Low
Frequency of Use		Rarely	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		17.2	17.8	20.5	19.2	16.9
Hot temp (˚C) within 1 min		-	54.9	-	55.6	51.2
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		2	-	Mixer Tap	-	-
TMV	Cold In (˚C)	17.2	-	20.5	-	-
	Hot In (˚C)	51.0	-	53.1	-	-
	Mixed Out (˚C)	42.7	-	40.2	-	-
	No. Outlets Fed	1 per TMV	-	-	-	-
	Distance to Outlets	Max 1 Metre	-	-	-	-
Additional Comments		Low hot water supply temperature. Shower possibly rarely used.	.	High cold water temperature.	-	Poor hot water circulation in area.
Additional Localised Risk		**MED/HIGH**	**LOW**	**MEDIUM**	**LOW**	**MEDIUM**

Hot & Cold Outlets – 1st Floor Staff Facilities

Location		Staff Gents Toilet	Staff Ladies Toilet	Staff Disabled Toilet
Source System ID No(s)		2,3	2,3	2,3
Sentinel Point		-	-	-
Outlets	Sink	-	-	-
	WHB	4– TMV x 4	4– TMV x 4	1 – Mixer Tap
	WC	4	4	1
	Urinal	-	-	-
	Bath	-	-	-
	Shower – Electric	-	-	-
	Shower – Mixer	-	-	-
	Others	-	-	-
Spray Potential		Low	Low	Low
Frequency of Use		Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D
Cold temp (˚C) within 2 min		19.4	19.2	19.5
Hot temp (˚C) within 1 min		-	-	-
Scald Risk at Location		No	No	No
No of TMV's in location		4	4	Mixer Tap
TMV	Cold In (˚C)	19.4	19.1	19.6
	Hot In (˚C)	48.6	47.9	48.9
	Mixed Out (˚C)	41.3	42.0	39.5
	No. Outlets Fed	4	4	1
	Distance to Outlets	<0.5	<0.5	-
Additional Comments		Low hot water supply temperature. WHBs 1 & 4 cold taps not working – dead legs.	Low hot water supply temperatures in area.	Low hot water supply temperatures in area.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets – 1st Floor and English Department

Location		English 1-048 Disabled Toilet	1-059 English Base	1-022 Cleaners at Seating Area (English)	SFL Base
Source System ID No(s)		2,3	1,3	2,3	1,3
Sentinel Point		-	-	-	-
Outlets	Sink	-	1	1	1 – TMV
	WHB	1 – Mixer Tap	-	-	-
	WC	1	-	-	-
	Urinal	-	-	-	-
	Bath	-	-	-	-
	Shower – Electric	-	-	-	-
	Shower – Mixer	-	-	-	-
	Others	-	-	-	-
Spray Potential		Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Rarely
Dead Ends Present		None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D
Cold temp (˚C) within 2 min		18.0	59.1	58.5	-
Hot temp (˚C) within 1 min		-	16.9	17.1	17.1
Scald Risk at Location		No	No	No	No
No of TMV's in location		Mixer Tap	-	-	1
TMV	Cold In (˚C)	18.0	-	-	-
	Hot In (˚C)	58.6	-	-	-
	Mixed Out (˚C)	39.9	-	-	41.3
	No. Outlets Fed	1	-	-	-
	Distance to Outlets	-	-	-	-
Additional Comments		-	-	-	No access to TMV to record temperatures.
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**MEDIUM**

Hot & Cold Outlets – 1st Floor English Department & Art Department

Location		Girls Toilets Opposite 1-044	Boys Toilets Opposite 1-044	1-088 Art Base	1-039 Health & Beauty Room	1-023 Art Open Area
Source System ID No(s)		2,3	2,3	1,3	2,3	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	-	1	-	6 –TMV x 6
	WHB	4 - TMV	3 - TMV	-	1	-
	WC	10	10	-	-	-
	Urinal	-	-	-	-	
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	Wash Trough (TMV)	1 x Trough (TMV)	-	Washing Machine	Spray Gun for Paint Area
Spray Potential		Medium	Medium	Low	Low	Medium
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	Yes	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L 750 (hot, cold &return) D 28	L D
Cold temp (˚C) within 2 min		17.4	17.5	17.0	27.4	26.5
Hot temp (˚C) within 1 min		-	-	55.3	57.3	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		5	4	-	-	6
TMV	Cold In (˚C)	17.5	17.5	-	-	23.5
	Hot In (˚C)	56.3	57.1	-	-	47.1
	Mixed Out (˚C)	39.2	41.0	-	-	39.8
	No. Outlets Fed	4 x WHB 1 x Trough	3 x WHB 1 x Trough	-	-	6
	Distance to Outlets	<0.5	<0.5	-	-	<0.5
Additional Comments		Slight spray from Trough outlets. TMV serving multiple outlets.	Slight spray from Trough outlets. TMV serving multiple outlets.	-	High cold water temperatures in area.	Low hot water supply temperatures in area.
Additional Localised Risk		**LOW**	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets –1st Floor Art Department & Home Economics Department

Location		1-024 Art Kiln Room	1-029 Disabled Toilet	1-031 Home Economics 3	1-033 Home Economic 2	1-034 Home Economics Base
Source System ID No(s)		2,3	2,3	1,3	1,3	1,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1	-	10 – TMV x 10	10 – TMV x 10	1
	WHB	-	1 – Mixer Tap	-	-	-
	WC	-	1	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	Dishwasher	Dishwasher	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		24.4	22.7	-	-	19.1
Hot temp (˚C) within 1 min		46.4	-	-	-	56.3
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	1 x Mixer Tap	10	10	-
TMV	Cold In (˚C)	-	22.8	23.4	22.9	-
	Hot In (˚C)	-	55.1	56.4	56.1	-
	Mixed Out (˚C)	-	41.2	41.0	40.8	-
	No. Outlets Fed	-	1	10	10	-
	Distance to Outlets	-	-	<0.5	<0.5	-
Additional Comments		Low hot water supply temperatures in area. High cold water temperature in area.	Diffuser biofilm formation. High cold water temperatures.	High cold water temperatures	High cold water temperatures.	
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**LOW**

Hot & Cold Outlets –1st Floor Home Economics Department

Location		1-035 Home Economics 1	1-036 Home Economics Hospitality Kitchen	1-040 Cleaner's Cupboard
Source System ID No(s)		2,3	1,2,3	2,3
Sentinel Point		-	HWSP, CWSP, MWSP	-
Outlets	Sink	2 – TMV x 2	9 – TMV x 9	1
	WHB	-	1 - TMV	-
	WC	-	-	-
	Urinal	-	-	-
	Bath	-	-	-
	Shower – Electric	-	-	-
	Shower – Mixer	-	-	-
	Others	-	Steam Oven	-
Spray Potential		Low	Low	Low
Frequency of Use		Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D
Cold temp (˚C) within 2 min		22.9	23.8 (CWS) 26.9 (MWS)	27.2
Hot temp (˚C) within 1 min		-	50.0 (Near) 26.9 (Far)	57.9
Scald Risk at Location		No	No	No
No of TMV's in location		2	10	-
TMV	Cold In (˚C)	22.8	-	-
	Hot In (˚C)	50.1	-	-
	Mixed Out (˚C)	38.3	-	-
	No. Outlets Fed	2	-	-
	Distance to Outlets	<0.5	<0.5	-
Additional Comments		Elevated cold water temperature.	Elevated cold water temperature. Hot Water Circulation failure far side - return isolated.	Elevated cold water temperature.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets –2nd Floor Modern Languages Department, ICT & Science

Location		2-052 Modern Language Base	2-044 Cleaners Sink	2-041 ICT Base	2-055 ICT Tech Room	2-063 Science Lab 10	2-064 Science Lab 9
Source System ID No(s)		1,3	2,3	1,3	1,3	3,4	3,4
Sentinel Point		HWSP, MWSP	CWSP	-	-	-	CWSP (Lab)
Outlets	Sink	1	1	1	1	1 (hot and Cold – TMV) 6 x cold only	1 (hot and Cold – TMV) 6 x cold only
	WHB	-	-	-	-	-	-
	WC	-	-	-	-	-	-
	Urinal	-	-	-	-	-	-
	Bath	-	-	-	-	-	-
	Shower – Electric	-	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-	-
	Others	-	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Daily	Rarely	Rarely
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		20.8	22.1	22.2	20.9	18.7	18.6
Hot temp (˚C) within 1 min		40.3	40.2	42.1	40.9	-	-
Scald Risk at Location		No	No	No	No	No	No
No of TMV's in location		-	-	-	-	1	1
TMV	Cold In (˚C)	-	-	-	-	18.7	18.6
	Hot In (˚C)	-	-	-	-	51.9	52.5
	Mixed Out (˚C)	-	-	-	-	38.3	37.2
	No. Outlets Fed	-	-	-	-	1	1
	Distance to Outlets	-	-	-	-	<0.5	<0.5
Additional Comments		Elevated cold water temperature. Low hot water temperature.	Elevated cold water temperature. Low hot water supply temperature.	Elevated cold water temperature. Low hot water supply temperature.	Elevated cold water temperature. Low hot water supply temperature.	Ensure that all outlets are in regular use.	Ensure that all outlets are in regular use.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets – 2nd Floor RE Department, Social Studies & Science

Location		2-065 Science Lab 8	2-034 Cleaner's Sink	2-022 RE Base	2-028 Chaplain	2-029 Social Subjects Base
Source System ID No(s)		3,4	2,3	1,3	2,3	1,3
Sentinel Point		-	-	HWSP, MWSP	-	-
Outlets	Sink	1 (hot and Cold – TMV) 6 x cold only	1	-	-	1
	WHB	-	-	-	1 - TMV	-
	WC	-	-	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Rarely	Daily	Daily	Daily	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		-	19.0	19.8	-	19.8
Hot temp (˚C) within 1 min		-	55.8	45.2	-	55.0
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	-	-	1	-
TMV	Cold In (˚C)	-	-	-	20.9	-
	Hot In (˚C)	-	-	-	54.5	-
	Mixed Out (˚C)	-	-	-	40.2	-
	No. Outlets Fed	1	-	-	1	-
	<0.5	<0.5	-	-	<0.5	-
Additional Comments		Ensure that all outlets are in regular use.	-.	Low hot water supply temperature.	Elevated cold water temperature. Low hot water supply temperature.	-
Additional Localised Risk		**MEDIUM**	**LOW**	**MEDIUM**	**MEDIUM**	**LOW**

Hot & Cold Outlets – 2nd Floor Social Studies & Science

Location		2-017 Disabled Toilet Near Social Subjects Base	2-066 Science Lab 7	2-070 Science Lab 6	2-071 Science Lab 5	2-072 Science Lab 4
Source System ID No(s)		2,3	3,4	3,4	3,4	3,4
Sentinel Point		-	-	-	-	-
Outlets	Sink	-	1 – (cold and hot – TMV) 6 x cold only	1 – (cold and hot – TMV) 6 x cold only	2 (cold and hot – TMV x2) 5 cold only	1 – (cold and hot – TMV) 6 x cold only
	WHB	1 – Mixer Tap	-	-	-	-
	WC	1	-	-	-	-
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	-	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Rarely	Rarely	Rarely	Rarely
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		19.8	-	-	-	-
Hot temp (˚C) within 1 min		-	-	-	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		-	1	1	2	1
TMV	Cold In (˚C)	-	19.4	19.7	19.4	19.1
	Hot In (˚C)	-	52.6	55.0	53.8	54.0
	Mixed Out (˚C)	-	39.1	40.4	38.7	37.9
	No. Outlets Fed	-	1	1	2	1
	Distance to Outlets	<0.5	<0.5	<0.5	<0.5	<0.5
Additional Comments		Hot supply pipe isolated creating dead leg.	Ensure that all outlets are in regular use.	Ensure that all outlets are in regular use.	Ensure that all outlets are in regular use.	Ensure that all outlets are in regular use.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**

Hot & Cold Outlets – 2nd Science Department

Location		2-008 Tech & Prep	2-074 Cleaner's Cupboard	2-075 Lab Staff Base	2-076 Science Lab 3	2-006 Disabled Toilet
Source System ID No(s)		3,4	2,3	1,3	3,4	2,3
Sentinel Point		-	-	-	-	-
Outlets	Sink	1 (cold & hot TMV) 2 (cold only)	1	1	1 – (cold and hot – TMV) 6 x cold only	-
	WHB	-	-	-	-	1 – Mixer Tap
	WC	-	-	-	-	1
	Urinal	-	-	-	-	-
	Bath	-	-	-	-	-
	Shower – Electric	-	-	-	-	-
	Shower – Mixer	-	-	-	-	-
	Others	1 x Fume Cabinet (cold) De-ioniser Unit (not connected)	-	-	-	-
Spray Potential		Low	Low	Low	Low	Low
Frequency of Use		Daily	Daily	Daily	Rarely	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D	L D
Cold temp (˚C) within 2 min		19.1	19.7	19.1	-	19.9
Hot temp (˚C) within 1 min		-	55.1	52.3	-	-
Scald Risk at Location		No	No	No	No	No
No of TMV's in location		1	-	-	1	Mixer Tap
TMV	Cold In (˚C)	19.1	-	-	19.6	19.9
	Hot In (˚C)	52.3	-	-	53.9	54.8
	Mixed Out (˚C)	43.6	-	-	40.6	41.2
	No. Outlets Fed	1	-	-	1	1
	Distance to Outlets	<0.5	-	-	<0.5	-
Additional Comments		Dead leg at sink 2, cold isolated.	-	-	Ensure that all outlets are in regular use.	-
Additional Localised Risk		**MEDIUM**	**LOW**	**LOW**	**MEDIUM**	**LOW**

Hot & Cold Outlets – 2nd Science Department

Location		2-007 Science Lab 2	2-080 Science Lab 1	2-001 Greenhouse	2-040 Disabled Toilet
Source System ID No(s)		3,4	3,4	2,3	2,3
Sentinel Point		-	CWSP (Lab)	HWSP, CWSP	-
Outlets	Sink	1 (cold & hot TMV) 6 (cold only)	2 (cold & hot TMV) 5 (cold only)	1 - TMV	-
	WHB	-	-	-	1 – Mixer Tap
	WC	-	-	-	1
	Urinal	-	-	-	-
	Bath	-	-	-	-
	Shower – Electric	-	-	-	-
	Shower – Mixer	-	-	-	-
	Others	-	-	-	-
Spray Potential		Low	Low	Low	Low
Frequency of Use		Rarely	Rarely	Rarely	Daily
Dead Ends Present		None Visible	None Visible	None Visible	None Visible
Dead End Size Length (mm) Diameter (mm)		L D	L D	L D	L D
Cold temp (˚C) within 2 min		-	23.0	20.8	18.6
Hot temp (˚C) within 1 min		-	-	-	-
Scald Risk at Location		No	No	No	No
No of TMV's in location		1	2	1	Mixer Tap
TMV	Cold In (˚C)	19.2	19.7	20.8	18.4
	Hot In (˚C)	51.9	52.0	50.1	51.9
	Mixed Out (˚C)	38.1	39.3	38.2	40.0
	No. Outlets Fed	1	2	1	1
	Distance to Outlets	<0.5	<0.5	-	
Additional Comments		Ensure that all outlets are in regular use	Ensure that all outlets are in regular use.	Poor access to TMV. High cold temperature.	-.
Additional Localised Risk		**MEDIUM**	**MEDIUM**	**MEDIUM**	**LOW**

Ground Floor G219 Changing Room

Example of WRAS Flexible Hoses G-219

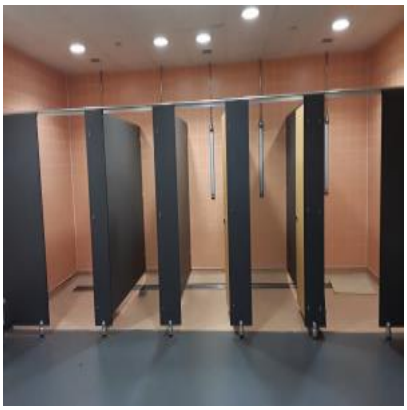
Example of WRAS Flexible Hoses G-219

Ground Floor G213 Toilet

Tap heads removed

G-208 Double Shower Head

Ground Floor G-235 Changing Room



Example of Changing Room Shower Arrangement

Ground Floor G-234 Toilet

G-234 WHB hot water supply pipework is isolated creating a dead leg

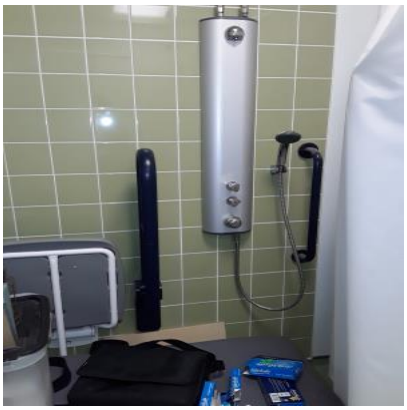
Ground Floor G-234 Toilet

Example of TMV feeding Shower Outlets

Ground Floor G-259 Toilet

Kinked Flexible Hose

Ground Floor G-087 Medical Room



G-088 Rarely Used Outlets

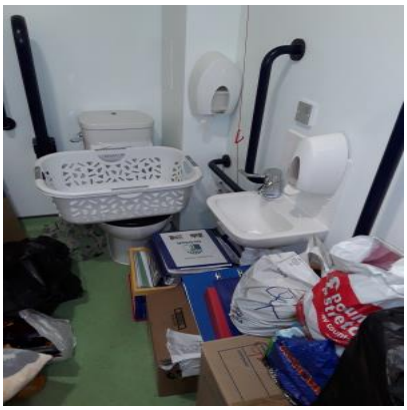
Ground Floor Buchanan Reception

Reception Water Cooler Out of Order

Ground Floor G-042 Changing Room

G-042 Rarely Used Shower

Ground Floor G-030 Home Economics 2 Toilet



G-026 Never Used Outlets

Ground Floor G-077 Disabled Toilet/ Store

G-077 Never Used Outlets

1st Floor Maths Corridor- 1-087

Maths Corridor 1st Floor Disabled Toilet Out of Order

8. OTHER SYSTEMS

Hydrotherapy Pool

Hydrotherapy pools, spa pools, whirlpool baths and decorative internal and external water features provide conditions that potentially favour the growth of *Legionella*. While there have been no reported cases of *Legionella* infections associated with hydrotherapy pools, there have been several outbreaks associated with spa pools or whirlpools. These types of pool are ideally suited to the proliferation and dissemination of *Legionella*. In addition, because of the small volume of water in circulation and the number of bathers (typically three to six people), spa pools can become a source of infection. Careful maintenance and chemical treatment is essential to maintain water quality. A log must be kept of water treatment and filter cleaning, and the results of tests for pH, free residual halogen and other treatment parameters. (For further guidance on hydrotherapy pools, see the Health Protection Agency's 'Hygiene for hydrotherapy pools' and the UKs Pool Water Treatment Advisory Group (PWTAG) Code of Practice.

The hydrotherapy pool is fitted with a filtration system including sand filters and an automatic chlorine dosing system. Currently the site complete daily pH and free chlorine checks, records were only available from April 2019. In addition a weekly backwash is completed via the sand filters, all actions are recorded.

PWTAG recommends that microbiological sampling should be carried out of the pool on at least a weekly basis, given that the people who are using them may be more prone to infection that other persons. This should be put in place as soon as possible.

All staff operating/maintaining this type of equipment should receive adequate training to ensure that appropriate safety procedures and effective water treatment regimens are adopted. It is recognised that CMM Pools Ltd currently carry out the maintenance of this system.

Maintenance for this equipment should be carried out in accordance with the manufacturer's recommendations.

Hydrotherapy Pool

9. PIPEWORK & DISTRIBUTION

Water Pipework / Distribution

Mains Water Pipework / Distribution

		Insulation	Labeling
Insulation & Labeling	Point of Entry	No	No
	At CWST(s)	No	No
	Calorifiers	N/A	N/A
	In Pipe Chases	No	No
	At outlets	No	No
Additional Comments		Provide all Mains water pipework with suitable insulation and identification banding in accordance with BS:1710.	

Cold Water Pipework / Distribution

		Insulation	Labeling
Insulation & Labeling	At CWST(s)	No	No
	Feed to Calorifier(s), COMBINATION WATER HEATER, PHE	No	No
	In Pipe Chases	No	No
	At Outlets	No	No
Additional Comments		Provide all boosted cold water pipework with suitable insulation and identification banding in accordance with BS:1710	

Hot Water Pipework / Distribution

Flow and Return System Fitted?		Yes	
Insulation & Labeling		Insulation	Labeling
	From Calorifiers	Yes	No
	On Return	Yes	No
	In Pipe Chases	Yes	Yes
	At Outlets	Yes	Yes
Additional Comments		Hot water pipework appears to be well insulated across the site. Identification labelling also present in ceiling voids.	

10. CONTROL SCHEME

CONTROL SCHEME

MANAGEMENT

ACTION	(✓) / (x) / N/A
Formulate a legionella policy.	x
Formulate a Written Scheme (including a Planned Preventative Maintenance program) specific for the building and implement logbook system in accordance with L8.	X – Parts of the Written Scheme still require to be implemented
Schematic drawings provided as part of Risk Assessment	Not required – site pipework drawings have been updated during September 2019.
Implement a review of training required for relevant site & management personnel.	x
Formalise reporting / organisational responsibility charts.	x
Appoint deputies and establish communication lines.	x
Label plant, valves and services including sentinel points.	x
Ensure that all materials used in domestic water system are WRC approved.	✓
Annual review of L8 Legionella Management & Control programme.	x
Biennial or regular review of L8 Risk Assessment.	✓
Implement PPM – Planned Preventative Maintenance	✓

(✓) Indicates that client currently undertakes this control measure
(x) Indicates that client has still to implement this control measure
N/A Not applicable

COLD WATER STORAGE TANKS

ACTION	(✓) / (x) / N/A
Alternate CWST booster pumps weekly	X – Ensure that the pumps are set to change over automatically.
Measure temperatures at Cold Water Storage Tank(s) 6 monthly	✓
Inspect Cold Water Storage Tank(s) annually and clean and disinfect as required	✓
Turnover test to be carried out routinely	x

WATER HEATERS

ACTION	(✓) / (x) / N/A
Alternate hot water service secondary circulation pumps weekly	N/A – Single Pump
Check De-stratification pump is working correctly monthly	x
Measure the calorifier incoming cold pipe, base - middle and top on the shell of the calorifier, hot water flow pipe and hot water return pipe temperatures monthly	x
Purge water from calorifier base until clear at least on an annual basis	x
Flush expansion vessels monthly and purge to drain where practical	x
Measure the combination water heater incoming cold pipe, top stored cold section, and hot water flow pipe monthly	N/A
Test accuracy of temperature gauges annually	x
Open & inspect calorifier internally annually where accessible.	x
Where internal inspection is not possible annual pasteurisation be carried out	N/A

(✓) Indicates that client currently undertakes this control measure
(x) Indicates that client has still to implement this control measure
N/A Not applicable

OUTLETS

ACTION	(✓) / (x) / N/A
Flush all outlets in unoccupied areas weekly	x
Measure all cold sentinel points, including input to TMV, if fitted, monthly	x
Measure all hot sentinel points, including input to TMV, if fitted, monthly	x
Measure distribution temperatures at the non-sentinel cold outlets annually	x
Measure distribution temperatures at the non-sentinel hot outlets annually	x
Ensure all shower heads & hoses are de-scaled and disinfected quarterly	✓
Inspect pipework and insulation to ensure all are okay annually	x
Service Thermostatic Mixing Valves (TMVs), Thermostatic Mixing Taps (TMTs) or mixer valves to ensure correct operation and calibration annually	x
Inspect all tap heads for signs of scaling annually	x
Ensure whirlpool bath, pipework and jets are disinfected on a quarterly basis	N/A

Hydrotherapy Pool

ACTION	(✓) / (x) / N/A
Create Normal Operating Procedures document	x
Create Emergency action plan to deal with accidents and gross contamination	x
Create schematic layout of unit with exploded view	x

(✓) Indicates that client currently undertakes this control measure
(x) Indicates that client has still to implement this control measure
N/A Not applicable

Control Measures		
Operational Actions	**Hydrotherapy pool**	(✓) / (x) / N/A
Check water clarity	Twice daily depending on risk assessment and usage	✓
Check if dosing system is working	Daily	✓
Check chemical reservoir level	Daily where appropriate	✓
Determine pH value, and residual disinfectant	Twice daily depending on risk assessment and usage	✓
Clean hydrotherapy pool surround	Check daily and clean as appropriate but as a minimum at water replacement	x
Record incidents	As appropriate	x
Check any automatic systems are operating correctly	Daily, where fitted	✓
Microbiological testing	Weekly for ACC, coliforms, E Coli, P aeruginosa and quarterly for legionella	x

Monitoring Procedures (Chemicals)			
Test	**Typical Range**	**Recommended Action**	(✓) / (x) / N/A
pH	7.0-7.6	None	
	<7.0 or >7.6	Close hydrotherapy pool and check the operation and calibration of acid/alkali dosing units. Recheck pH once any faults have been rectified. If pH is still out of limits, the hydrotherapy pool will need to be emptied and refilled with mains water to reach the typical pH range and additional treatment may need to be added to achieve the pH	
Disinfectant	Chlorine 3-5 mg/l Bromine 4-6 mg/l	None	
	Chlorine <1 mg/l or >10 mg/l Bromine <2 mg/l or >12 mg/l	Close the hydrotherapy pool, apply corrective actions and retest	
	Chlorine 1-2 or 6-10 mg/l Bromine 2-3 or 7-12 mg/l	Check dosing units are operating correctly. High levels of disinfectant can be lowered by partial replacement of hydrotherapy -pool water, once the underlying fault has been rectified. Low levels of disinfectant can be increased by shock dosing of spa-pool water, once the underlying fault has been rectified.	

Combined chlorine	0<1 mg/l	None	
	>1 mg/l	Review control measures. High levels can be lowered by partial replacement of hydrotherapy pool water, once the underlying fault has been rectified.	

Monitoring Procedures (Microbiological)		
Microbiological Result	**Action**	(✓) / (x) / N/A
Aerobic colony count (or total viable count)		
Aerobic or total colony count at 37°C >10 cfu/ml	If the colony count is >10 cfu/ml and is the only unsatisfactory microbiological result, and residual disinfectant and pH values are within recommended ranges, the water should be resampled and retested	
Aerobic or total colony count at 37°C >100 cfu/ml	• check treatment system and manual testing results records immediately • implement any remedial action as required • resample and retest	
Coliforms and *E coli*		
Coliforms and *E Coli* present >1 cfu/100ml	Occasional positive samples may occur if the spa-pool has been sampled immediately after a contamination event before the disinfection system had time to be effective. A repeat sample should be taken whenever coliforms have been detected	
Coliforms ≤10 cfu/100ml	A coliform count of up to 10 cfu/100 ml is acceptable provided that the residual disinfectant and pH values are within recommended ranges, there are no *E coli* present and the aerobic colony count is <10 ml.	
Coliforms present on repeat test or if >10 cfu/100 ml at any time	• indicates that disinfectant regime is ineffective • close hydrotherapy pool • shock dose the hydrotherapy pool with 50 mg/l free chlorine circulating for 1 hour or equivalent • drain, clean and disinfect • review control measures and risk	

	assessment • carry out remedial actions identified • refill, disinfect and adjust pH to recommend range; and retest next day and 2-4 weeks later	

Pseudomonas aeruginosa		
P aeruginosa present 10-50 cfu/100 ml with or without raised coliform, E coli or colony count	• take a repeat sample for testing • scrub walls of balance tank, if any, and cleanse the filter • chlorinate to 10 mg/l free chlorine, circulate and flush • if repeat sample contains P aeruginosa the filtration and disinfection processes should be examined to determine where the organism has been multiplying	
P aeruginosa present >50 cfu/100 ml with or without raised coliform, E coli or colony count	• close hydrotherapy pool • shock dose the hydrotherapy pool and balance tank, if any, with 50 mg/l free chlorine circulating for 1 hour or equivalent and flush through • drain, clean and disinfect • review control measures and risk assessment • carry out remedial actions identified • refill, disinfect and adjust pH to recommended range; retest next day and 2-4 weeks later	
Legionella (Quarterly)		
<100 cfu/l	Under control but maintain control measures	
>100 cfu/l and up to 1000 cfu/l	• resample and keep under review • review control measures and risk assessment • carry out remedial actions identified as necessary	
>1000 cfu/l	• immediate closure of pool and exclude public from pool area • shut down hydrotherapy pool • shock dose the hydrotherapy pool with 50 mg/l free chlorine circulating for 1 hour or equivalent • drain, clean and disinfect • review control measures and risk assessment • carry out remedial actions identified • refill and retest next day and 2-4 weeks later	

MANDATORY SAMPLING REGIME

Bacterial Sampling	No. Of Samples	Recommended frequency
TVC, E. Coli and Coliform Sampling	-	-
Cold Water Storage Tanks	-	-
Natural Water Source	-	-
Swimming Pool	-	-
Hydrotherapy Pool	1	Weekly

Legionella Sampling	No. Of Samples	Recommended Minimum Frequency
Hydrotherapy Pool	1	Quarterly

RECOMMENDED SAMPLING REGIME

Legionella Sampling	No. Of Samples	Recommended Minimum Frequency
From CWSTs	3	Bi-annually
From Calorifier Drains	2	Annually
From outlets farthest from CWSTs 1&2	12	Bi-annually
From outlets farthest from CWSTs 3	1	Bi-annually
From outlets farthest from Calorifier	12	Bi-annually
From outlets closest to Calorifier	1	Bi-annually
From Showers (Hot and Cold)	11	Bi-annually
From Low Use Outlets	-	-

TVC, Coliform, E.coli Sampling	No. Of Samples	Recommended Minimum Frequency
From CWSTs	3	Bi-annually
From outlets farthest from CWST 1&2	12	Bi-annually
From outlets farthest from CWST 3	12	Bi-annually
From outlets farthest from Calorifier	12	/Bi-annually
From outlets closest to Calorifier	1	Bi-annually
From low use outlets	-	-

Please note:

1. Analysis of water samples for legionella and potable (TVC) quality should be carried out by a UKAS accredited laboratory. No composite samples should be taken.
2. All Legionella samples should be taken as per BS 7592:2008.

BACTERIA ANALYSIS FOR HOT & COLD WATER SYSTEMS

Microbiological Analysis

The routine monitoring of general bacterial numbers (total viable count) is also appropriate as an indication of whether microbiological control is being achieved. This is generally only carried out for cooling tower systems, but it is also recommended for spa pools.

The risk assessment will help identify if you need to conduct routine monitoring in the specific system.

There is the potential for micro-organisms to proliferate in various parts of hot and cold water systems. This could manifest itself in taste and odour problems and microbiological growth could also support legionella growth and so the systems should be investigated fully.

Periodic sampling and testing for the presence of legionella bacteria may also be relevant to show that adequate control is being achieved. However, reliably detecting the presence of legionella bacteria is technically difficult and requires specialist laboratory facilities. The interpretation of results is also difficult; a negative result is no guarantee that legionella bacteria are not present in the system. Conversely, a positive result may not indicate a failure of controls, as legionella are present in almost all natural water sources. A suitably experienced and competent person should interpret the results of monitoring and testing.

Legionella Analysis

Legionella monitoring should be carried out where there is doubt about the efficacy of the control regime or it is known that recommended temperatures, disinfectant concentrations or other precautions are not being consistently achieved throughout the system. The risk assessment should also consider where it might also be appropriate to monitor in some high risk situations, such as certain healthcare premises. The circumstances when monitoring for legionella would be appropriate include:

- water systems treated with biocides where water is stored or distribution temperatures are reduced.
- high-risk areas or where there is a population with increased susceptibility, e.g. in healthcare premises including care homes;
- water systems suspected or identified in a case or outbreak of legionellosis where it is probable the Incident Control Team will require samples to be taken for analysis.
- where the target control parameters are not met (i.e. where disinfectant levels are low or where temperatures are below 50°C (55°C in healthcare premises) for HWS. In hot water systems, samples should also be taken as required from the calorifier hot water outlet and from the base of the calorifier, if it safe to do so, as some systems are under considerable pressure; as well as on each branch of a single pipe system (far and near point sentinel outlets), and from the furthest and nearest outlet on each loop of a circulating system (far and near sentinel outlets).
- where the target control parameters for CWS exceed 20°C samples should be taken from the point of entry (or nearest outlet) if the water is supplied from a private water supply or where the temperature of the incoming mains supply is above 20°C from the cold water storage tank or tanks and from the far and near sentinel outlets on each branch of the system.
- from areas subject to low usage, stagnation, excess storage capacity, dead legs, excessive heat loss, crossflow from the water system or other anomaly.

Where monitoring for legionella is considered appropriate in hot and cold water systems, sampling should be carried out in accordance with BS 7592:2008 Sampling for Legionella organisms in water and related materials.

ACTIONS IN THE EVENT OF AN OUTBREAK

In England and Wales, legionnaires' disease is notifiable under the Health Protection (Notification) Regulations 2010 and in Scotland under the Public Health (Notification of Infectious Diseases) (Scotland) Regulations 1988 Under these Regulations, human diagnostic laboratories must notify Public Health England (PHE), Public Health Wales (PHW) or Health Protection Scotland (HPS) (see 'Further sources of advice') of microbiologically confirmed cases of legionnaires' disease.

An outbreak is defined as two or more cases where the onset of illness is closely linked in time (weeks rather than months) and where there is epidemiological evidence of a common source of infection, with or without microbiological evidence. An incident/outbreak control team should always be convened to investigate outbreaks. It is the responsibility of the Proper Officer to declare an outbreak. The Proper Officer, appointed by the Local Authority, is usually a Consultant in Communicable Diseases Control (CCDC) in England and Wales, or the Consultant in Public Health Medicine (CPHM) in Scotland. If there are suspected cases of the disease, medical practitioners must notify the Proper Officer in the relevant local authority.

Local Authorities will have jointly established incident plans to investigate major outbreaks of infectious diseases, including legionellosis, and it is the Proper Officer who activates these and invokes an Outbreak Committee, whose primary purpose is to protect public health and prevent further infection.

HSE or local Environmental Health Officers may be involved in the investigation of outbreaks, their aim being to pursue compliance with health and safety legislation. The local authority, Proper Officer or EHO acting on their behalf will make a visit for public health reasons, often with the relevant officer from the enforcing authorities (ie HSE or the local authority) for health and safety reasons. Any infringements of relevant legislation may be subject to a formal investigation by the appropriate enforcing authority.

There are published guidelines (by PHE, PHW and HPS) for the investigation and management of incidents, clusters, and outbreaks of legionnaires' disease in the community.

These are, for England and Wales, Guidance on the Control and Prevention of Legionnaires' Disease in England and for Scotland, Guidelines on Management of Legionella Incidents, Outbreaks and Clusters in the Community.

As part of the outbreak investigation and control, the following requests and recommendations may be made by the enforcing authority.

(a) To shut down any processes which are capable of generating and disseminating airborne water droplets and keep them shut down until sampling procedures and any remedial cleaning or other work has been done. Final clearance to restart the system may be required.
(b) To take water samples from the system before any emergency disinfection being undertaken. This will help the investigation of the cause of the illness. The investigating officers from the local authority(ies) may take samples or require them to be taken.
(c) To provide staff health records to discern whether there are any further undiagnosed cases of illness and to help prepare case histories of the people affected.
(d) To co-operate fully in an investigation of any plant that may be suspected of being involved in the cause of the outbreak. This may involve, for example:
(i) tracing of all pipework runs;
(ii) detailed scrutiny of all operational records;
(iii) statements from plant operatives and managers;
(iv) statements from water treatment contractors or consultants.
Any infringements of relevant legislation may be subject to a formal investigation by the appropriate enforcing authority.

HIGH RISK			
Section	**Recommendation**	**Person assigned to**	**Completed Date**
6	Ensure water is stored at 60˚C and returns at 50˚C. Currently at significant risk of bacterial growth in areas where return system is not balanced correctly. ***(HSG 274 Part 2: Para 2.82 and Table 2.1)***		

MEDIUM RISK			
Section	**Recommendation**	**Person assigned to**	**Completed Date**
3	A site specific written scheme should be prepared to ensure that a full description of the preventative control measures and all documentation associated with the management of legionella are easily identifiable and that they detail the location where all documents are located. The written scheme should include; a copy of the company legionella policy, the current legionella risk assessment location and the status of all remedial works identified, the list of control measures required along with their frequencies and the operational parameters, the location of the schematic drawings for all water systems, a response document to show what actions should be taken in the event that the water system is not operating as designed and a detailed account of what will be audited, how often and by whom.		
3	Inadequate management, lack of training and poor communication are all contributory factors in outbreaks of Legionnaires' disease. It is therefore important that the people involved in assessing risk and applying precautions are competent, trained and aware of their responsibilities. A training plan for all appropriate staff should be prepared and reviewed regularly.		
3	Ensure that all control measures outlined in Section 10 Control Scheme are implemented at the recommended frequency.		
4	Please ensure that all mains water supplies to the wet fire system are separated by a double non return valve from all other mains feeds to the building. This could not be determined from pipework drawings. ***(Scottish Water Byelaws 2014)***		
5	Regular(annual) turn-over tests are required to determine the stored volume required. ***(HSG 274 Part 2: Para 2.36 and Scottish Water Byelaws 2014)***		
5	Adjust CWST valve arrangement to ensure that equal flow is occurring between tanks. Currently Tank 2 is operating as the lead vessel. ***(HSG 274 Part 2: Para 2.36 and Scottish Water Byelaws 2014)***		

5	Replace CWST hollow support pipes. These have been identified as a possible source of contamination due to the potential for water to stagnate internally within the pipes. ***(UK Department of Health Alert (EFA/2013/004))***		
5	Install drain valve on line to CWST Booster pump pressure vessel. ***(HSG 274 Part 2: Para 2.39)***		
4,5,6	Lag all accessible pipework to reduce any possible thermal gain or loss. ***(HSG 274 Part 2: Para 2.36)***		
6	Annually inspect calorifiers internally. ***(HSG 274 Part 2: Table 2.1)***		
7	Flush all rarely used outlets at least once per week for a minimum of 2 minutes and record this action once complete. ***(HSG 274 Part 2: Para 2.78)***		
7	Remove outlet and associated pipework of dead leg. Please refer to Hot & Cold Outlets section for location and details of dead legs. ***(HSG 274 Part 2: Para 2.77)***		
7	Ensure hot water outlet temperatures are in the 50-60°C range. Please refer to Hot & Cold Outlets section for temperatures. ***(HSG 274 Part 2: Table 2.1)***		
7	Ensure cold water outlet temperatures are below 20°C after 2 minutes through improved insulation and system design. Please refer to Hot & Cold Outlets section for temperatures. ***(HSG 274 Part 2: Para 2.6)***		
7	Please provide access to all TMVs. Please refer to Additional Comments within Hot & Cold Outlets section. ***(HSG 274 Part 2: Para 2.34)***		
7	Ensure TMVs are serviced as per manufacturer's instructions. ***(HSG 274 Part 2: Table 2.1)***		

LOW RISK			
Section	**Recommendation**	**Person assigned to**	**Completed Date**
4,5,6	Label all valves and all pipework wherever possible. ***(Scottish Water Byelaws 2014)***		
5	Reconfigure Laboratory Tank pipework and position inlet in raised chamber, above weir overflow. ***(Scottish Water Byelaws 2014)***		
6	Create access points and check the temperature at the top, middle and base of the calorifiers to determine any signs of stratification. ***(HSG 274 Part 2: Para 2.25)***		
6	Replace the pig-tail piece of pipe to the calorifier gauge with a piece of short, straight, copper pipe. ***(HSG 274 Part 2: Para 23)***		

11. GLOSSARY & DEFINITIONS

Risk Assessment

A risk assessment should be performed; it is the responsibility of the Duty Holder to ensure it is carried out. The basis of risk assessment derives from the Control of Substances hazardous to Health 2002 (COSHH) regulations; these are referred to in the ACoP&G (L8) paragraph 17. This states that the essential elements of COSHH are:

1. Risk Assessment

2. Prevent exposure to hazardous substances, or substitute to a less hazardous replacement, or substitute the process with a less hazardous one.

3. Where prevention of exposure and substitution are not "reasonably practicable", then the risk has to be controlled.

4. Control measures should be maintained, examined and tested.

5. Training, information and instruction should be provided to employees on the hazard and its control measures.

6. If techniques allow, health surveillance of employees should be carried out.

When considering legionella paragraph 28 of the ACoP&G (L8) requires that a "suitable and sufficient assessment is required to identify and assess the risk of exposure to legionella bacteria from work activities and water systems on the premises ……"

The assessment should:

- identify potential sources i.e. an asset register.
- evaluate potential sources.
- consider prevention of exposure to legionella.
- should include the means of controlling any residual risk.
- consider the factors affecting the risk such as,
    - the presence of legionella.
    - the means of distributing aerosols.
    - the population that may be affected.
    - the location of the system
    - conditions for proliferation such as temperature, scale, sludge, corrosion, algae, organic matter, etc.
    - the water supply quality.
    - The possibility of contamination.
    - Normal and unusual operating conditions that are "reasonably foreseeable"
- contains a system schematic.
- link the assessment to other documents "in particular, to the written scheme".

It is essential that the risk assessment is a living document and is reviewed regularly (at least every 2 years) and especially if changes have been made to the system, site or control measures.

Record Keeping

The Approved Code of Practice and Guidance (L8) details the records that are required, the ACoP sections covers this and therefore following this will ensure compliance with the law.

The "Responsible person" shall ensure that appropriate records are kept. This person is a manager/director (or similar status) that has responsibility for the implementation and maintenance of the control precautions.

Records to be maintained for 2 years

- Names and positions of people that carry out the control measures.
- The risk assessment.
- The written scheme of actions and control measures.
- Schematics of the systems.
- Details of precautions taken, including method statements and dates carried out.
- Details of remedial work carried out including method statements and date completed.

Records to be maintained for 5 years

- A log of visits to the system by contractors, consultants and other personnel.
- Any clean and disinfection procedures, reports and certificates.
- Water chemistry analysis results.
- Hazard information on other materials e.g. treatment chemicals.
- Training records for personnel involved in applying the precautions.
- Details of personnel involved including:
    - Names
    - Position held
    - Responsibilities
    - Lines of communication
- Current state of operation of the system e.g. operating drained shutdown etc.

Note – all records need to be authenticated either by signature or another form of authentication

Duty Holder

The 'Duty Holder' is defined in paragraph 28 of the Approved Code of Practice & Guidance (L8:2013) as:

a) The employer, where the risk from their undertaking is to their employees or to others.
This would normally be the Managing Director

b) A self-employed person, where there is a risk from their undertaking to themselves or to others.
This would normally apply to companies where the owner is also the Managing Director or a similar title

c) The person who is in control of premises or systems in connection with work where the risk is present from systems in the buildings (e.g. where a building is let to tenants but the landlord retains responsibility for its maintenance).
This applies where building services or facilities management companies are involved. In most cases the landlord or owner of the premises will be ultimately responsible for the maintenance. In these cases landlord/owner will usually be the 'Duty Holder'.

The ACoP&G (L8) describes the Duty Holder as being responsible for:

1. Ensuring that the local authority is notified in writing of any notifiable devices.
2. Ensuring a risk assessment of all systems has been carried out and the recommendations implemented.
3. Ensuring that a written scheme for prevention or control of the risk is prepared.
4. Designating the responsible person and their deputy to take day to day responsibility for controlling any identified risk from legionella bacteria.
5. Ensuring other members of the organisation are aware of their responsibilities and duties in relation to water systems.
6. Ensuring that control procedures are carried out to the standard required to prevent proliferation of legionella bacteria.
7. Ensuring that any sub-contractor supplies a service that satisfies HSE guidelines.
8. Ensuring all persons involved are trained and competent to carry out their tasks.
9. Ensuring that precautions within the scheme are implemented and managed.
10. Ensuring that records are kept of the precautions taken.
11. Reporting any cases of legionellosis to HSE.
12. Ensuring that employees or their representatives are consulted on the identified risks of exposure to legionella bacteria and on the measures and actions taken to control the risks.

Responsible Person

The 'Responsible Person' is described in paragraph 51 of the Approved Code of Practice & Guidance (L8:2013) as being in a position to "take managerial responsibility and provide supervision for the implementation of precautions". The Responsible Person should be a Manager, Director or have similar status and sufficient authority, competence and knowledge of the installation to ensure that all operational procedures are carried out in a timely and effective manner.

The Responsible Person would normally be the head of a department or an engineering manager. On sites where there are one or more organisations involved in the control of legionella there should be a line of communication between all parties responsible for the site. The Responsible Person whom the water treatment company liaise with would normally be the local manager of the building services company.

The ACoP&G (L8) describes the Responsible Person as being responsible for:

1. Ensuring that they have a clear understanding of their duties and the overall health and safety management structure and policy in the organisation.
2. Ensuring that a suitable Operations Manual is prepared for each water system.
3. Making reasonable enquiries to ensure that organisations such as water treatment companies or consultants together with personnel from the occupier's organisation are competent, suitably trained and have the necessary equipment to undertake their duties within the written scheme in a safe and adequate manner.
4. Ensuring that there are designated persons to carry out all maintenance operations, inspections, checks and remedial actions.
5. Ensuring that responsibilities and lines of communication are properly established and clearly laid down for those people carrying out work out work whether or not they are under their control.
6. Periodically reviewing management and communication procedures.
7. Ensuring that appropriate staff levels are maintained during all hours that the water system is in operation and ensure that he/she or their/her deputy can be contacted at all times.
8. Ensuring that the condition and the performance of the system are monitored either by him/herself or by a third party on at least a weekly basis.
9. Ensuring that regular testing of water quality is undertaken either by site personnel or by a service provider.
10. Monitoring the effectiveness of the control measures in place and making decisions on the frequency and manner of this monitoring.
11. Maintaining appropriate records as specified under the Approved Code of Practice and Guidance.
12. Ensuring that any deficiencies or limitations, which they identify in the occupier's system or written scheme, are notified to the duty holder.
13. Maintaining a water system visit log.

Full Glossary

Aerosol	A suspension in a gaseous medium of solid particles, liquid particles or solid and liquid particles having
Air Conditioning	A form of air treatment in which temperature, humidity and air cleanliness are controlled within desired limits.
Algae	Small, usually aquatic plants, which require light to grow. 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 micro-organisms, embedded in a protective layer with entrained debris, attached to a surface.
Bleach, household	Usually, but not always, a solution of sodium hypochlorite (5% available chlorine).
Bleach, laundry	Usually, a concentrated solution of sodium hypochlorite (10% available chlorine).
Blowdown	Same as bleed-off, but generally applied to steam boiler systems.
Bronchial Washings	Medical samples from the air passages of the lung.
Calorifier	An apparatus used for the transfer of heat to water in a vessel by indirect means, the source of heat being contained within pipe or coil immersed in the water.
Case Fatality	Infected people who die from a disease.
Chlorination	Treatment of water with chlorine release agent or hyochlorite, to kill micro-organisms. See also Hypochlorous acid.
Chlorine	An element used in chlorination and in disinfection. See combined chlorine, free chlorine, and total chlorine.
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 table or powder form, that reacts when it comes into contact with water to release chlorine.
Cistern	A fixed open topped water container.
Cold Water System	An installation that includes plant, pipes and fittings in which cold water is stored, distributed and subsequently discharged.

Control Measures	Covering the recommended measures to control identified risk (monitoring, inspection and treatment, etc.) including identification of sentinel outlets and/or other relevant sample and inspection points; and the recommended and prioritised (time scaled) corrective actions to eliminate, minimise or lower the risk.
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 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.
Deadleg	Pipes leading to a fitting though which water only passes when there is draw off from the fitting. A pipe is considered to be a deadleg 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 colonies resulting are estimated by referencing 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.
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.
Foulant	Any obstructive material in a system, including deposits formed from the water and alien substances introduced.
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.

Hot Water System	An installation that includes plant in which water is healed and pipes and fittings through which it is distributed and subsequently discharged. Hot water systems do not include cold water feed tanks or cisterns.
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.
Isolation, engineering	Physical separation, eg. Of an electrical connection or a piece of plant in a water system.
Isolation, microbiological	The establishment of a pure culture of a micro-organism.
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. The ubiquitous in the environment and found in a wide spectrum of natural and artificial waters.
Legionella	Type of aerobic bacteria, which are found predominantely in warm water environments (singular of Legionellae).
L. Pneumophila	One of the causative organisms of legionnaires' disease.
Legionellosis	An illness caused by exposure to legionella bacteria.
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.
Combination Water Heater	A rectangular or circular storage water heater (usually heated by electric immersion element) usually pre insulated and having their own built-in cold water tank. Usually provide domestic hot water to local outlets. Hot water storage capacities range from 25-210 litres.
Multiplication temperature	Temperature at which a bacterium grows and divides to create more bacteria.
Nutrient	A food source for micro-organisms.
Oxidising biocide	A biocide that functions by the destruction of micro-organisms 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. 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 including 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.
Pitting corrosion	Corrosion characterised by the formation of deep pits in the metal surface, usually caused by oxygen attack or by localised attack by a corrosive substance such as an acid or alkali. Thy type of corrosion is more destructive than general corrosion, because it renders an otherwise intact piece of metal unfit for purpose.
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, typically 5-25 litres capacity.
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.
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.
Rodent screen	A mesh device fitted to the overflow of a Cold Water Storage Tank to prevent ingress of rodents, birds etc.
Sentinel taps	For a recirculating hot water service, the first and last taps of 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.
Shock dose	One sudden high dose of chemical treatment usually dosed to remedy a problem identified in the system
Shunt pump	See anti-stratification pump.
Slime	A mucus-like exudates produced by some micro-organisms, which covers the 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 a 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 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.
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.
TMV	Thermostatic 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 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.
Written Scheme	This is the total management system and includes control measures and corrective actions produced by the risk assessment; detailed responsibilities, records and how and where they are kept, maintenance programmes and records, details of management of manufacturers, suppliers, installers and other contractors, etc. HSE L8:2013 paras 58-64.