BIOLOGICAL HAZARDS HEALTH AND SAFETY PROCEDURE

PURPOSE

This procedure provides guidance and information to enable the effective management of hazards associated with working where there is a risk of infectious disease or other chemical and biological hazards.

The objective of the procedure is to ensure a systematic approach ensure risks are assessed and controlled as far as reasonably practicable.

### SOURCES OF BIOLOGICAL HAZARDS

Combined sewer systems include stormwater such as road runoff, which may contain residues including oils, salts, metals and asbestos. Many systems, especially older ones, are suspect to infiltration, which can carry pesticides and herbicides from soil applications.

Harmful micro-organisms originating from humans, animals or animal products are likely to be present in untreated wastewater, these include:

 Tetanus,

 Poliomyelitis,

 Hepatitis-A, hepatitis-B

 Typhoid

 Leptospirosis

Waste water screening processes may expose workers to the risk of needle-stick injuries.

Sewage sludge may contain levels of substances and biological hazards such as:

 chlorinated organic solvents

 polychlorinated biphenyls (PCBs)

 pesticides

 petroleum hydrocarbons

 flame retardants

 heavy metals

 asbestos

 dioxins

 radioactive materials.

The nature and levels of concentration of substances will vary depending on the region’s industrial or agricultural practices and levels of rainfall and run-off.

In flood or earthquake situations, widespread deposits of liquefacted silt may spread over a wide area. Soil, silt or liquefied material could be contaminated with sewage and/or storm water, if underground services rupture. Any silt in affected residential areas should be considered as potentially contaminated. Silt may still remain under or around dwellings and other buildings.

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### EXPOSURE PATHWAYS AND VECTORS

Workers may be exposed to biological hazards or organisms by direct contact with sewage, water and sludges, or by inhalation of gases, particles, aerosols, vapours or droplets. These hazards may come into the treatment plant in soluble form or bound to suspended solids.

Workers may also be at risk of exposure to biological hazards through:

 Inadvertent ingestion and swallowing of untreated waste water or contaminated food and drink.

 Untreated waste water or contaminated material entering through cuts or unprotected skin.

### RISK CONTROL MEASURES

#### Immunisation

Workers who may be at risk to biological hazards should receive and maintain immunisation to the diseases listed in this procedure.

#### Engineering Controls

Where practicable engineering controls should be developed and implemented. These many include:

 Local ventilation for processes located within the building, including splash guards for dewatering equipment where appropriate, and design or operational features to reduce air- stripping and aerosols that can cause disease.

 The use of covers on clarification process unit weir area to shield it from wind or use submerged effluent collectors, such as pipes, rather than weirs.

 Reduce pathogen content of sludge by implementing processes such as aerobic and anaerobic digestion, air drying, low temperature composting, and lime stabilization.

 The reduction of aerosols by using diffused aeration rather than mechanical aeration.

 The presence of pathogens in airborne particles may be controlled by the use of local ultra-violet light.

#### Personal Protective Equipment and Administrative Controls

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In addition to the use of engineering controls, risks may be further controlled by the use of administrative controls, including the use of personal protective equipment. Controls may include:

 Rotating workers between the various treatment plant operations.

 Label piping so that potable and non-potable water are clearly identified.

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 Heavy-duty rubber gloves and boots to prevent skin contact with wastewater and sludges.

 Puncture resistant gloves to control risks associated with needle stick injuries.

 Where the risk of exposure to aerosol borne pathogens exists respiratory protection should be worn.

 Remove contaminated clothing after job completion.

 Shower at work and change into clean clothes and shoes.

 Wash hands with soap and water before eating or smoking and whenever hands contact wastewater and sludge. Care for cuts and abrasions promptly.

 Food storage in worker facilities at sewerage collection or processing facilities must be adequate to ensure that contamination cannot occur.

 Warm water, soap and towels and hand sanitiser should be readily available for all workers.

### BIOLOGICAL HAZARDS IN LABORATORIES

The development of a plan for the assessment and control of biologically hazardous materials in laboratories should conform to the provisions of AS 2243.3 1991 Safety in Laboratories: Microbiology. The plans shall include:

#### Identification of Hazards

The nature of the actual or potential hazard shall be identified, based upon classification of potential microorganisms according to their pathogenicity, mode of transmission, host range and availability of treatment and effective preventative measures.

#### Risk Assessment

The assessment shall consider the pathogenicity of the organism, the nature of the work process, potential for exposure by inhalation, skin contamination or skin penetration and the frequency of exposure.

#### Risk Control

Risk Control measurers shall be identified and implemented. Measures which should be considered include:

 Provision of sufficient space and lighting to minimise the potential for spills.

 Segregation of activities involving biological hazards from other laboratory activities.

 Provision of biological safety cabinets of an appropriate class where aerosols may be generated.

Administrative controls may include:

 Restriction of access to biologically hazardous areas to approved employees.

 Identification and placarding with approved biohazard warning signs.

 Regular programmed workplace disinfection or decontamination of all floors, equipment and safety cabinets.

 Containment storage and labelling of biologically hazardous material.

 Decontamination/disinfection/sterilisation of materials of equipment prior to disposal or repair.

 Disposal of biologically hazardous waste.

 Prohibition of food and drink in the laboratory.

 Performance of administration or report writing activities in nonhazardous areas only.

 Maintenance of personal hygiene.

 First aid management and medical assessment of injuries arising from biologically hazardous materials.

 Emergency procedures,

 Personal Protective Equipment:

~ Respiratory personal protective equipment shall be worn where there is a potential for aerosol generation.

~ Appropriate protective clothing shall be worn and suitable arrangement made for laundering.

~ Safety glasses shall be worn in the laboratory. A higher standard of protection e.g. goggles or face shield may be required where there is increased risk of splashes.

~ Gloves shall be worn when handling potentially hazardous material.

~ All skin lesions shall be appropriately covered.

### RECORD KEEPING

Persons in control of the workplace shall maintain records of worker immunisations and make available during inspections and audits.

### TRAINING REQUIREMENTS

Workers must be trained in the effective use of PPE, specifically relating to the use of respiratory protection, which may require training such as fit-tests or cartridge replacement.

REFERENCES

### WATER NEW ZEALAND PROCEDURES & GUIDELINES:

#### Health and Safety Procedures:

 Contractor Health and Safety Management

 Job Safety Analysis

 Health and Safety Training Program

 Workplace Chemical Management

### LEGISLATION, REGULATION AND STANDARDS

 Health and Safety at Work Act 2015

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 Health and Safety in Employment Regulations 1995

 Health Act 1956

 AS 2243.3 - 1995 Safety in Laboratories Part 3: Microbiology

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 SAA/NZS HB32 - 1995 Control Of Microbial Growth In Air Handling & Water Systems

 AS/NZS 3666.1 - Parts 1-3 Air Handling & Water Systems of Buildings