### General Materials H 01.01
Must reduce the use of PVC materials. Use concrete, vitrified clay, HDPE, zinc, cast iron, copper, galvanized steel or aluminium as alternatives.

### General Warranty Periods H 01.02
- Sanitary fittings: vitreous china – 2 years
- Sanitary fittings: stainless steel – 5 years
- Tapware – 5 years
- Plumbing reticulation systems – 5 years

### Non Potable Alternative Water
Opportunities for use of non-potable "fit for purpose" water must be undertaken where practicable. In order of preference this may consist of:
- Rainwater harvested from roofs via down pipes.
- Harvested stormwater.
- Cooling water reuse or recirculation,
- Recycled water of the appropriate standard

These systems shall comply with Department of Health and EPA Vic Guidelines on alternative urban water supplies and reclaimed water:
- "Code of Practice Onsite Wastewater Management" EPA Victoria, Publication number 891.3 February 2013.

### Non Potable Alternative Water-toilet flushing toilets H 02.01
Options for toilet flushing via the use of harvested or recycled water should be investigated for all projects. Header tank and flushometer systems are ideal for this approach, minimising the requirement for additional pipe work.

### Non Potable Alternative Water-metering H 02.02
All water harvesting and reuse systems must be remotely monitored and metered, preferably by central building automation system.

### Concealment Non-Concealment H 02.03
Where concealment of piping, traps, etc. is not possible, it must be brought to the attention of the Architect. If the Architect approves non-concealment in certain situations, the piping and fittings must be chromium plated, supported on CP Pillar clips, and fitted with CP wall plates to cover entry points in walls, floors or ceilings.

### Labelling & Identification Pipes and Valves H 02.04
Pipes in ducts and other concealed accessible spaces must be banded and labelled as required. Valves must be identified for service and area controlled. Where valves are controlling heating or cooling water the valve maximum flow rate must be clearly stated on the valve, as built diagrams and BAS graphics. Tags must be engraved copper round plate.

### Water Service Metering H 03.01.01
Water meters must have pulse heads to allow connection to network.

### Water Service Metering H 03.01.02
Metering must be capable of measuring consumption and must be a High-level RS-485 meter.

### Water Service Metering H 03.01.03
All meters must be connected to the campus Building Automation System (BAS) and update the graphics accordingly.

### Water Service Metering H 03.01.04
All physical meters should be labelled and match BAS. Check the accuracy of labels of meters and data verification prior to handover (onsite and online). Information (eg. Utility units, Attached building number) on BAS for all utilities need to be checked before handover.
| Water Service | Metering | H 03.01.05 | The drawing Central location for all drawings, which are relevant to metering, and a good recording system to list all relevant information. |
| Water Service | Tenancy Metering | H 03.02.01 | Metering must be provided at each building and to tenancies within the building. Tenancy metering has to be pattern-certified with the National Measurement Institute. |
| Water Service | Tenancy Metering | H 03.02.02 | All tenancies need to have sub-meters for each utility at all Monash buildings |
| Retail Food Tenancies | Water Cooling | Tenancy | H 04 | Once-through cooling systems for retail food tenancies are to be avoided. Where an ongoing water source is required, provide water reticulation and recycling systems to minimise potable water consumption. Replace traditional wok stoves with waterless wok stoves. |
| Sanitary Fixtures | Plumbing | Tenancy | H 06 | Install flow restrictors and aerators on existing taps (less than 5L/min) and showers (less than 9L/min). |
| Sanitary Fixtures | Dual-Flush Toilets | Toilets | H 06.02 | Use dual flush toilets with 4.5/3.0 L cistern similar to the Leda 2000 Smart flush toilet pan with Invisi cistern. Ensure pans and cisterns are matched to provide maximum water efficiency (WELS 4-star or greater.). No concealed serviceable fixings. Pan “P” trap connection must match existing conditions and alignment. |
| Sanitary Fixtures | Water-Saving Urinals | Toilets | H 06.03.01 | Waterless urinals are not to be installed, WELS -5 star or greater low flow urinal systems are to be installed with manual flush or smart demand operation with activation sensitivity field at the front of the urinal. Engage with the Cleaning Services Manager to ensure effective functioning of these systems. Provide cold water taps and floor wastes for cleaning purpose to be installed in proximity to waterless urinals. Fibreglass or plastic urinals must not be used. |
| Sanitary Fixtures | Water-Saving Urinals | Toilets | H 06.03.02 | Low flow urinal systems implementing (mains powered) sensors and timers and low-flush cisterns or flushometers can be implemented. |
| Sanitary Fixtures | Wash Basins | Toilets | H 08.04.01 | Cold Water only plumbing is appropriate for the vast majority of hand washing facilities providing significant energy savings. Provide Isolation valve to each fixture/service. Exceptions to this general rule may be required for workplace (as opposed to public) toilets where warm water hand washing may be a requirement. |
| Sanitary Fixtures | Wash Basins | Toilets | H 08.04.02 | Push-to-actuate, spring-return types including flow restriction must be used. Recommend RBA taps be used for this application. |
| Sanitary Fixtures | Cleaners Sinks | Toilets | H 08.04.03 | Program sensor taps (if fitted) to switch off within 6 seconds. |
| Sanitary Fixtures | Drinking Fountains | H 08.05 | Cleaners sinks must be must be stainless steel with bucket grate and hot and cold water taps. Provide isolation valve to each fixture/service. Engage with the Cleaning Services Manager to ensure effective functioning of these systems. |
| Sanitary Fixtures | Drinking Fountains | H 08.06 | All drinking fountains to be selected from the prescribed list in the Monash University Design and Development Controls. For Internal fountains the 'Billi Bubbler Fountain Water Chiller Stainless Steel unit shall be used (936175)'. |
| Sanitary Fixtures | Showers | Toilets | H 08.07 | Use only low flow shower heads of WELS three star or greater. |
| Sanitary Fixtures | Hand Dryers | Toilets | H 08.08.01 | In low-use toilets, the default standard is recyclable paper towels in conjunction with a recycling program. In high-use public toilets, two or more high-velocity hand dryers with on/off sensors are appropriate. Hand dryers without electric heating elements are the option e.g. Dyson Airblade, Davidson Washroom Machflow or equal. |
| Sanitary Fixtures | Hand Dryers | Toilets | H 08.08.02 | Assessment must be made of the noise isolation requirements as they affect surrounding areas. |
| Sanitary Plumbing | Cast Iron Pipe | H 09.01.01 | Cast Iron Non-Pressure Pipes and Pipe Fittings, must have approved joints and be coated inside and outside with approved composition. |
| Sanitary Plumbing | Cast Iron Pipe | H 09.01.02 | Provide all pipes, bends, junctions, I.O.’s, stoppers, gratings, traps, etc., as specified and as required to complete the installation. |
| Sanitary Plumbing | Copper and Brass Pipe | H 09.03.01 | Fittings must be either capillary sleeve type fabricated from seamless brass or copper tube or cast brass. Where required, pipe must be marked to indicate inspection and approval by the controlling Authority. |
| Sanitary Plumbing | Copper and Brass Pipe | H 09.03.02 | All copper tube must be of the tube types when used in the following locations:
Type “A” Tube:
- As directed.
Type “B” Tube:
- Gas services.
- Refer Current Gas Installation Code AG601.
- Cold water services
- Hot water service
- Flusher service
- Compressed air
- Vacuum service
- Steam supply |
| Sanitary Plumbing | Insulation | H 09.04 | Provide appropriate insulation for the particular service. Insulation must cover the entire exposed areas, including bends and valves. Pipe insulation wall thickness must be maintained and must not be crimped at hanging points. |
| Sanitary Plumbing | Floor Grates | H 09.05 | For floor grates use chrome plate on brass and vinyl clamp type in wet areas. |
| Sanitary Plumbing | Traps | H 09.06 | For traps:
- to basins, must be loose ring “P” type.
- to laboratory fittings, must be P.V.C. “P” traps, unless noted otherwise.
- to sanitary fixtures exposed to view and not in cupboards, ducts, etc., must be chrome plated on brass.
- All grease traps must be located outside building and have good access to service it.
- All neutralisation, settling, straining and separator pits must be installed with readily available access for pit maintenance and pH probe cleaning and calibration. |
| Sanitary Plumbing | Inspection Openings | H 09.07 | Inspection openings must adhere to the following conditions:
- Must be provided as necessary in all soil, waste and vent pipes and located where directed all in accordance with the regulations.
- Must be easily accessible.
- All neutralisation, settling, straining and separator pits must have a disconnector gully or sampling point downstream of the treatment pit to ensure free and easy access for trade waste sampling and discharge flow rate determination.
- Concealed flushometers must have 300 x 300 S.S. panel screw fixed to wall.
- Each concealed stop valve or waste and sewer I.O. must have a 300 x 300 mm standard “Trafalgar” access door and frame primed and fitted to allow easy access. |
| Sanitary Plumbing | Trade Waste Treatment | H 09.08.01 | Trade Waste Treatment must include the following:
- Treatment of trade-waste is to ensure compliance with trade waste acceptance criteria and if relevant Gene Technology Regulator and Biosecurity requirements.
- Automatic dosing treatment systems are to be connected to Campus BAS.
- Notification and consultation with the Sustainability Compliance & Integration Officer (SCIO) regarding changes to existing treatment apparatus or the installation of new trade waste treatment apparatus is essential to:
  (a) allow for utilisation of existing trade waste treatment systems;
  (b) update existing site-wide Trade Waste Agreements or
  (c) apply for new trade waste consents or agreements. |
| Sanitary Plumbing | Trade Waste Treatment | H 09.08.02 | As a rule trade waste neutralisation pits are to include pH probes on the inlet and outlet sides of the pit and controllers to ensure automatic acid and alkali dosing systems or disinfection/sterilisation systems result in a trade waste discharge that is between pH 6-10. The neutralisation pit should be adequately sized to allow for adequate retention and mixing time for the dose chemicals. Aeration may be utilised when sedimentation is not required by the relevant Water Authority. Note: Under bench marble chip pits do not generally provide adequate pH control, settling or retention time to ensure trade waste compliance and should not to be the sole treatment process for wet, clinical or teaching labs and may only be used: (i) in conjunction with other downstream trade waste treatment apparatus or (ii) very specific instances with the agreement of the SCIO. |
| Sanitary Plumbing | Trade Waste Treatment | H 09.08.03 | Appropriately sized oil and grease interceptors are to be installed for food preparation and food service tenants as per the relevant Water Authority Requirements. Appropriately sized settling/sediment or silt pits are to be utilised to provide primary treatment of wastes with high suspended insoluble solids contents such as from bin washes or studios as per the relevant Water Authority Requirements. |
| Sanitary Plumbing | Pipes | H 09.09 | For pipes:  
- In locations where noise may be transmitted to adjoining habitable spaces, use an approved sound insulating material over PVC pipe, or cast iron pipe. Pipe insulation wall thickness must be maintained and must not be crimped at hanging points.  
- Exposed pipe work and fittings in public areas must be chrome plated.  
- Locate tundishes so that condensation does not cause damage.  
- Copper Joints must be silver soldered.  
- All pipes must be labelled and have flow direction decals.  
- Hot water supply pipes must have high-performance pipe insulation including joints, elbows and valves.  
- Metal cladding around serviceable items must include quick release fixings. Screws are not acceptable. |
| Sanitary Plumbing | Reticulation | H 09.10 | Reticulation systems to enable separate metering of individual floors and areas. |
| Sanitary Plumbing | Valves | H 09.11 | Valves must meet the following conditions:  
- Must be Johns full bore gate valves with screwed ends with non-rising spindle or equal approved. Unless particularly required by the Controlling Authority.  
- All valves spindles must be zinc free. Valves with o’ rings must not be used.  
- All valves must be in accessible locations for operation and maintenance to approval of Architect and identified as before.  
- Location of stop valves as nominated by Architect must not be varied.  
- Each service i.e. n/gas, c/air, vac steam etc. must be fitted with a control valve adjacent to each fitting or small group of fittings suitable for the service served.  
- Balance valves must be globe type valves.  
- All valves must be located in service ducts or special pits with easy access.  
- Valves must be tagged to identify area served and maximum flow rate (L/S). Tags must be cooper round plate. |
| Sanitary Plumbing | Backflow Prevention Valves | H 09.12 | For Backflow Prevention Valves:  
- All water system must include backflow prevention devices.  
- Backflow prevention valves must be installed in locations with easy access for servicing and testing.  
- Tyco is preferable suppliers of backflow prevention valves.  
- Valves must be tagged to identify area served and maximum flow rate (L/S). Tags must be engraved copper round plate. |
<p>| Plantrooms | Design Principles | Plant room/Enclosure | H 10.01 | The plant room layout at the design stage must provide for future expansion if required. Sizing must accommodate all mechanical, electrical and other plant. Allow sufficient space for additional equipment, for perceived functionality during the life cycle of the building. |</p>
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**The plant must have:**
- Floor grates (Use chrome plate on brass),
- Water tap,
- Double GPO’s,
- The main plant room must have a 3 phase power outlet,
- Light must be operated via wall switch.

**Roller door and/or full door access must be provided to ground level plant rooms.**

**The plant rooms are to be located at roof top or basement level of the building, avoiding the main body of the building where possible. Also locate plant room close to most direct point of vehicular access, avoid extensive service road connections.**

**If required, dual cold water pumps must be provided. One pump must be capable of providing the flow and pressures required. The second pump must be used as standby.**

**Ensure water quality is assessed to determine need for filtration. Where filtration is installed, ensure the need for service/replacement is flagged but does not prevent operation of equipment unless continued operation would result in danger to users or plant.**

**Provide an appropriate water collection device in locations where water spillage during change of filter may cause damage to fitments and or floor coverings.**

**Hot water must be provided to the following points:**
- All showers,
- Kitchenette and tea preparation station sinks. An additional outlet must be provided for a dishwasher viz. 20 mm diameter copper, 200 litres/hour if required. These facilities must have their own hot water system which must not be less than 315 litre capacity where high turnover dishwashing facilities are required.
- Laboratory Glass Washers. This service shall terminate at an appropriately sized ball valve.

**Boiling water units (BWU) must only be used in kitchenettes serving a significant number of users (greater than 12). BWUs must be programmed to enter standby, sleep or off modes outside building operating hours to reduce energy wastage (Zip Hydroboil).**

**The hot water pumps:**
- Must be installed in the return water loop.
- Grundfos is the recommended pump manufacturer for a hot water pumps.

**The gas supply to each laboratory shall consist of two separate services:**
- Fume cupboards must be supplied from the main supply and each fume cupboard hall be fitted with a 15 solenoid valve (A.G.A. approved) (24V D.C. active open) to be connected to the BAS,
- The general gas service from the main supply to the other laboratory fittings must be controlled by an appropriate sized solenoid valve (240V) for connection by the Electrician to the emergency stop at the exit doors.

**Facilities which use gas for purposes other than heating, must have an individual gas meter.**

**Gas meters must have pulse heads to allow connection to network.**

**Supply and install “Gas” stop buttons located at each laboratory door. Wire stop buttons in series to isolate main gas solenoid valve for the general laboratory outlets.**

**Supply and install “Power” isolating stop button at each laboratory door, wire to isolate the general power in each area (not the fume cupboards). The stop button must operate a shunt trip to be located within the D.S.B.0.**

**Gas supply pressures must be clearly displayed on all pipes and meters.**