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Plant - Water Treatment

Room Code	PLNT-WTR
Briefed Area	18.00 m²
Ceiling Height	2.7 m
Occupancy	1-2 staff intermittently
Hours of Operation	Available 24 hours

Description

The Plant - Water Treatment provides a secure space with the services and equipment for water treatment, including multimedia filtration, water softening, carbon filters, particle filters and reverse osmosis (RO) membrane systems, to produce RO water for use with haemodialysis equipment. Staff are required to undertake water testing within the room at regular intervals.

Electrical

- [ ] PROTECTION: body protected
- [ ] PROTECTION: cardiac protected

Lighting

- [x] LIGHTING: general
- [ ] LIGHTING: colour corrected
- [ ] LIGHTING: dimmable
- [ ] LIGHTING: indirect

Nurse Call and Duress

- [ ] NURSE CALL SYSTEM: buttons / handset
- [ ] NURSE CALL SYSTEM: annunciator
- [ ] DURESS: fixed
- [ ] DURESS: wireless coverage

Security

- [x] ACCESS CONTROL: to door
- [ ] ACCESS CONTROL: to item / joinery
- [ ] INTERCOM: service communications
- [ ] INTERCOM: security and access control
- [ ] CCTV: camera coverage within room
- [ ] INTRUSION DETECTION: door monitoring
- [ ] INTRUSION DETECTION: spatial monitoring

ICT and Audio Visual

- [ ] AUDIO VISUAL: patient entertainment system
- [ ] AUDIO VISUAL: visitor experience system
- [ ] AUDIO VISUAL: virtual collaboration system
- [ ] AUDIO VISUAL: clinical support system
- [ ] AUDIO VISUAL: digital operating room system

Accessibility

- [ ] AUDIO: hearing augmentation
- [ ] VISUAL: luminance contrast
- [ ] SIGNAGE: accessible, statutory

HVAC

- [x] AIRCONDITIONING: general
- [ ] AIRCONDITIONING: HEPA filtered
- [ ] AIRCONDITIONING: positive pressure
- [ ] AIRCONDITIONING: negative pressure
- [x] VENTILATION: exhaust
- [ ] VENTILATION: supply
- [ ] VENTILATION: natural

Medical Gas

- [ ] MEDICAL GAS: general anaesthesia
- [ ] MEDICAL GAS: special care
- [ ] MEDICAL GAS: special care, neonatal ventilation
- [ ] MEDICAL GAS: birthing

Hydraulic

- [x] WATER: drinking
- [x] WATER: specialty
- [x] DRAINAGE: sanitary
- [x] DRAINAGE: specialty

Fire

- [x] DETECTION: smoke
- [ ] DETECTION: heat

Shielding

- [ ] SHIELDING: ionising radiation
- [ ] SHIELDING: magnetic and radio frequency

Acoustics

SPEECH PRIVACY:
not private ▼ moderate ····· private ····· confidential

NOISE SENSITIVITY:
not sensitive ····· low ····· medium ····· ▼ high

NOISE GENERATION:
low ····· moderate ····· high ····· ▼ very high

Additional Considerations

Planning Context

- To support staff undertaking regular mandatory water testing without impacting staffing ratios required for patient safety, care and observation, it is recommended that the Plant - Water Treatment is located within the Renal Dialysis Unit as opposed to outside the unit or on another level above/below the unit. Proximity of this room to the patient care areas also enables establishment of shorter runs of pipework to each patient space, improving efficiency of monitoring and maintenance to meet strict RO water requirements.
- A secure, access-controlled door to an external area may be provided if the Plant - Water Treatment is located on the periphery of the unit along a facade wall with appropriate vehicle/delivery trolley access. Provision of this door can support access by maintenance personnel and delivery of consumables (e.g. salts, chemicals, filters, etc.) while minimising disruption to the patient treatment areas. If provided, additional area will be required to accommodate the door and associated circulation space.

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● The Plant - Water Treatment may be collocated with the Biomedical Workroom - Renal Dialysis (BIOMED-REN) to support technicians to work efficiently between these spaces, particularly where the same vendor is engaged to support both dialysis equipment and the plant room equipment. A door between the rooms providing direct access may be considered and if provided, additional area will be required to accommodate the door and associated circulation space.
● Windows should not be provided to the Plant - Water Treatment as sunlight and higher temperatures can contribute to the growth of microorganisms.

Equipment Selection

● The final configuration of the pre-treatment and RO water treatment system will depend on several factors, including the size of the service (i.e. the number of dialysis machines), the quality of the feed water, and redundancy requirements. Water treatment equipment may need to be scaled to accommodate higher demand, either through provision of larger vessels or by duplication to create parallel treatment systems capable of supplying increased volumes of RO water for larger units. Where feed water quality is suboptimal, certain components of the treatment system may require upsizing or duplication to enable additional treatment passes at specific stages, ensuring the required water quality is achieved. Redundancy requirements for any pre-treatment and RO water treatment equipment is to be confirmed at project level and will be informed by assessment of the feed water quality or water quality risk, and the hospital location/proximity to repair replacement services. Early assessment of feed water quality, along with anticipated repair and maintenance timeframes, is recommended to inform system size, redundancy planning, and resulting spatial allocation.
● The requirements for the RO water treatment system, such as any water saving features, heat disinfection of the RO water treatment unit and/or RO water supply loop, double pass configuration of RO membranes, etc. are to be confirmed at project level. These requirements will influence equipment size and early review of equipment options will inform spatial allocation and services provision.
● Sustainability strategies and policies will inform both equipment selection and any hydraulic engineering requirements for supporting the capture and re-use of RO water. Equipment requirements for permeate production efficiency, the recirculation of any unused permeate and/or recirculation of a proportion of ‘reject’ water are to be confirmed at project level. Water conservation through re-use of ‘reject’ water by redirecting to appropriate applications, e.g. for landscape irrigation, may also be considered in line with operational models. Refer to HPU 620 for more information.

Important Dimensions and Clearances

● Final clearances around the pre-treatment and RO treatment systems will be dependent on the size and configuration of the selected equipment. Equipment is to be installed to manufacturer’s specifications, with clearance around the pre-treatment vessels/ filters and RO treatment system to support access to pipework, connections, drainage points, pressure valves and power outlets for maintenance and repairs. Clear area for accessing and opening panels on equipment must also be considered.
● The minimum dimensions required to routes for the delivery of plant equipment for installation and future replacement are to be confirmed with the equipment supplier.
● Clearly labelled water sample points for water quality testing are required at multiple locations in the system – following multimedia filtration, following UV irradiation, following filtration in the first carbon filter and then again after filtration in the second carbon filter (as outlined in the operational procedures for the Renal Dialysis Unit). Connection to a chlorine analyser station is also required following the filtration in the particle filters. The sample points and chlorine analysis station are to be positioned for easy access by staff. Depending on the maximum distances allowed from the water source to the sample point to ensure integrity of testing results, multiple sample points may be consolidated in one or more locations to support access.

ICT Strategies and Policies

● ICT requirements for record keeping related to water sample testing are to be confirmed at project level to suit operational models and ICT strategies and policies. This may include provision of a wall mounted or benchtop computer within the room or adequate space to take hand written notes for entering into the record keeping system at a computer within the Renal Dialysis unit.
● Connectivity requirements for remote vendor support and monitoring of pre-treatment and RO water treatment systems must be confirmed with the equipment supplier.

Work Health and Safety (WHS)

● Inclusion of a fixed duress button may be considered depending on the location of the room. This may not be required where the Plant - Water Treatment is planned in an area that is only accessible by staff. Mobile duress coverage is to be assessed and planned at a department level and coverage is to meet local security and WHS policies as well as operational service requirements.
● The room is to be designed to support compliance with safe work method statements (SWMS) for persons working on any part of the water pre-treatment or RO treatment system, as well as for SWMS for persons collecting and testing water samples.

Security

● Proximity card access control has been indicated in this Standard Component. Additional security requirements, such as door force/tamper or spatial monitoring, local or facility level alarms/alerts, CCTV camera coverage within the room and/outside entry to assess cause of alarm, etc., are to be confirmed at project level to suit operational models and security policies. Assessment

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of risk, identification of response persons and procedures, and integration into Building Management Systems (BMS) will inform requirements.

Storage

● The type, extent and configuration of storage within the room for consumables and chemicals is to suit the size of the system and equipment selected, operation models for keeping sufficient stock on hand, and WHS policies for handling heavy items.

● An area for the storage of salt is to be provided near the brine tank. Salt may be stored on a trolley, freestanding raised platform or on a half/full pallet. Multiple bags (at approximately 10kg each) of salt are delivered at a time, so the ease of manoeuvring a full trolley to the storage location should be considered.

Engineering

● The temperature of RO water at the point of patient care is to be between 30-37°C. The maximum temperature of the feed water is to be confirmed with equipment manufacturers and/or a dialysis water treatment specialist to determine if a heat exchanger or thermostatic mixing vale is required to meet patient care requirements and to ensure efficient operation of the equipment. Where feed water must be cooled, a heat exchanger supplied by mechanical chilled water may be required, with the chiller located outside the Plant – Water Treatment.

● High temperature waste water (approximately 90°C) is discharged from the RO system after heat disinfection of the unit/system. The hydraulic drainage system is to be designed to accommodate high temperatures and enable cooling of water before it reaches a connection point with the wider drainage system.

● In the event of equipment failure, large volumes of water may need to be managed. An open cooling pit has been indicated to the RO system for discharged waste water from heat disinfection and ‘reject’ water from the RO process. The cooling pit is shown centralised, therefore also acting as a floor waste for the room in the event of flooding from equipment failure. Where the configuration of the RO system requires a different placement of the cooling pit, a separate central floor drain main be required within the room.

● Pipework and components installed after the water inlet in this room shall not contain brass or copper.

● Quantity and type of building services connections/outlets must be confirmed to suit selected equipment.

● Air-conditioning and ventilation/exhaust are to be designed to accommodate the heat generation of selected equipment.

● Provision and extent of emergency/standby power and/or uninterruptible power supply (UPS) is to be confirmed to suit services requirements, site conditions and selected equipment. Confirmation of power requirements is to be based on risk assessment considering the impact of a power outage on patient care/safety and medical equipment specifications.

● Structural assessment is required to ensure the floor of the Plant - Water Treatment, and to the access route for installation/ replacement of equipment, is engineered to accommodate the weight of the pre-treatment and RO treatment equipment.

Acoustics

● The equipment within the Plant – Water Treatment generates a very high level of noise. Construction requirements and acoustic treatments for noise control, i.e. ceiling material and finishes, wall material and finishes, door material and seals, floor finishes, etc., are to be confirmed at project level to suit jurisdictional engineering services policies and the acoustic requirements of the adjacent areas.

Finishes

● Finishes to floor and walls are to be robust, suitable for high moisture environments, and resistant to wear from chemicals and salts that are used or produced during pre-treatment, testing and RO treatment.

Doors and Windows

CODE	DESCRIPTION	COMMENT
DOHI-106.01	DOOR: hinged, 1 1/2 leaves, 1600 clear opening, solid	
AFDPR-006.01	*DOOR PROTECTION: plate, to 900H*	*to corridor side*
AFDPR-006.01	*DOOR PROTECTION: plate, to 900H*	*to room side*
AFDPR-056.01	*DOOR FRAME PROTECTION: full wrap, to 900H*	*optional, provision and extent dependent on frame material/finish and movement of beds and mobile equipment in adjacent area*
ITSE-261	*READER: security, access control, proximity card, wall mounted*	

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Finishes

CODE	DESCRIPTION	COMMENT
FLGE-003	FLOOR FINISH: concrete, trowel finished, sealed	
FLSK-081	SKIRTING: concrete, sealed, coved	
WLFI-001	WALL FINISH: paint	
CLFS-013	CEILING: flush set, suspended, moisture resistant	
CLFI-001	CEILING FINISH: paint	
CLCN-031	CORNICE: square set	

Joinery

CODE	DESCRIPTION	GROUP	QTY	COMMENT
JOBE-033	BENCH: 600D, stainless steel lipped	1	1	
JOBE-231	BENCH SUPPORT: legs and frame, stainless steel	1	1	

Fittings, Furniture and Equipment (FF&E)

CODE	DESCRIPTION	GROUP	QTY	COMMENT
FIHR-294	BRACKET: combined single screen all-in-one computer, keyboard and mouse, articulated, wall mounted	2	1	optional, to computer if provided
HYBA-301	SINK: single bowl	1	1	integral to stainless steel bench
HYTP-182	TAPWARE: sink, tap set, wall mounted, lever handles	1	1	
ITNE-076	TELEPHONE: handset, wall mounted	2	1	optional
ITNE-121	COMPUTER: single display screen, all-in-one	3	1	optional, provision dependent on water testing recording strategy and vendor connectivity requirements
ITNE-201	INPUT DEVICE: keyboard and mouse	3	1	optional, to computer if provided

Engineering Services

CODE	DESCRIPTION	GROUP	QTY	COMMENT
ELGE-021	BOARD: electrical distribution (EDB)	1	1	optional, dedicated provision to be confirmed at project level to suit infrastructure strategy
ELGP-131	GPO: single, emergency power, wall mounted	1	1	optional, to chlorine analyser if provided
ELGP-131	GPO: single, emergency power, wall mounted	1	2	1 to booster pump, 1 to ultraviolet irradiator
ELGP-131	GPO: single, emergency power, wall mounted	1	1	optional, to secondary ultraviolet irradiator
ELGP-191	GPO: single, special, for equipment, wall mounted	1	3	to RO system, quantity and type of power to suit system requirements and configuration
ELGP-231	GPO: double, emergency power, wall mounted	1	1	optional, to computer if provided
ELGP-231	GPO: double, emergency power, wall mounted	1	3	to carbon filtration vessels, controller for multimedia filtration vessel, controller for softener vessel and general use adjacent bench
HYDR-102	TUNDISH: floor mounted	1	3	1 shared by multimedia filtration vessel and softener vessel, 1 shared by two carbon filters 1 to chlorine analyser station and shared with second ultraviolet irradiator if provided

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CODE	DESCRIPTION	GROUP	QTY	COMMENT
HYDR-102	TUNDISH: floor mounted	1	1	optional; shared by ultraviolet irradiator and chlorine analyser as required
HYDR-156	TRAP: cooling pit	1	1	to RO system for discharged waste water following heat disinfection
HYDR-201	DIRECT CONNECTION: wastewater, general	1	1	to sink
HYGE-181	VALVE: backflow prevention, wall recessed	1	1	
HYGE-211	PLANT: water pre-treatment, softener vessel	1	1	quantity and size to be confirmed depending on quality of feed water, requirements of selected water treatment equipment and size of service
HYGE-212	PLANT: water pre-treatment, brine tank	1	1	quantity and size to be confirmed depending on quality of feed water, requirements of selected water treatment equipment and size of service
HYGE-213	PLANT: water pre-treatment, multimedia vessel	1	1	quantity and size to be confirmed depending on quality of feed water, requirements of selected water treatment equipment and size of service
HYGE-221	PLANT: water pre-treatment, carbon filter	1	2	quantity and size to be confirmed depending on quality of feed water, requirements of selected water treatment equipment and size of service
HYGE-222	PLANT: water pre-treatment, ultraviolet filter, wall mounted	1	1	optional, to particle cartridge filters
HYGE-222	PLANT: water pre-treatment, ultraviolet filter, wall mounted	1	1	
HYGE-231	PLANT: water pre-treatment, particle cartridge filter, 1 micron	1	1	quantity to be confirmed depending on quality of feed water, requirements of selected water treatment equipment and size of service
HYGE-232	PLANT: water pre-treatment, particle cartridge filter, 5 micron	1	1	quantity to be confirmed depending on quality of feed water, requirements of selected water treatment equipment and size of service
HYGE-251	PLANT: water treatment, reverse osmosis (RO), dialysis	1	1	
HYGE-256	CONTROL PANEL: water treatment, reverse osmosis (RO), dialysis, programmable logic controller, wall mounted	1	1	optional, dependent on vendor requirements for PLANT: dialysis, water generation, reverse osmosis
HYGE-301	PUMP: water pre-treatment, pressure booster	1	1	
HYTP-431	OUTLET: water, cold	1	1	to backflow prevention valve; main feed water connection
HYTP-451	DIRECT CONNECTION: water, cold	1	1	to tapware for sink
HYTP-453	DIRECT CONNECTION: water, warm	1	1	to tapware for sink
HYTP-461	SAMPLE POINT: water, reverse osmosis, combined	1	1	
HYTP-462	SAMPLE POINT: water, reverse osmosis, single	1	3	
ITBU-376	ALARM: chlorine analyser	1	1	optional, requirement to be confirmed at project level
ITBU-402	ALARM: equipment monitoring, water treatment malfunction	1	1	
ITIN-016	OUTLET: data, single RJ45, wall mounted	1	1	optional, to telephone if provided
ITIN-026	OUTLET: data, double RJ45, wall mounted	1	1	optional, to computer if provided
MEGE-011	SWITCHBOARD: main, mechanical	1	1	optional, dedicated provision to be confirmed at project level to suit infrastructure strategy
MEGE-201	PLANT: heat exchanger, supplied by mechanical chilled water	1	1	chilled water source not within room

For guidance on how to use the Room Data Sheet, please visit the AusHFG website.

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