1. HYDRAULIC SERVICES – DESIGN

1.1 GENERAL REQUIREMENTS

All hydraulic services designs, including fire protection systems, are to comply with the NCC, the BCA, current relevant Australian Standards, Acts, Codes and Regulations applicable to the works, the requirements of the Building Certifier, the requirements of the Northern Territory Fire and Rescue Services Authority (NTFRS), the requirements of the PowerWater Corporation (PWC) and best practice.

Designs are to be forwarded to the Superintendent and the Client at 50%, 75% and 95% documentation stages.

Undertake a site inspection to locate all existing services and connection points. Show on the drawings all locations and levels, including existing and proposed ground levels, invert levels, lid and grate levels and dimensions of existing hydraulic infrastructure relevant to the works.

1.2 STANDARDS

Use Standards, and their amendments, current 3 months before the date for the close of tenders except where different editions and/or amendments are specified or are required by statutory authorities, including, but not limited to, NATA and the National Construction Code which includes the Building Code of Australia and the Plumbing Code of Australia.

AS/NZS 1546 On-site domestic wastewater treatment units
- AS/NZS 1546.1 - Septic tanks
- AS/NZS 1546.3 - Secondary treatment systems
- AS/NZS 1546.4 - Domestic greywater treatment systems

AS 2419 (set) Fire hydrant installations

AS 2441 Installation of fire hose reels

AS 2698 Plastic pipes and fittings for irrigation and rural applications
- AS 2698.1 - Polyethylene micro-irrigation pipe

AS/NZS 3500 Plumbing and drainage
- AS/NZS 3500.0 - Glossary of terms
- AS/NZS 3500.1 - Water services
- AS/NZS 3500.2 - Sanitary plumbing and drainage
- AS/NZS 3500.3 - Stormwater
- AS/NZS 3500.4 - Hot water supply systems

AS 4032 Water Supply - Valves for the control of hot water supply temperatures
- AS 4032.1 - Thermostatic mixing valves - Materials design and performance requirements
- AS 4032.3 - Requirements for field testing, maintenance or replacement of thermostatic mixing valves, tempering valves and end of line temperature control devices
- AS 4032.4 - Thermostatically controlled taps for the control of heated water supply temperatures

1.3 DEFINITIONS AND ACRONYMS

AAV Air admittance valve

AHD Australian height datum

BCA Building Code of Australia - Volumes 1 and 2 of the NCC

BMS Building management system

Client The department for which the project is undertaken by DIPL

Day Working days, not including Saturdays, Sundays and public holidays

DEPARTMENT, THE The Department of Infrastructure, Planning and Logistics

DIPL The Department of Infrastructure, Planning and Logistics

FWG Floor waste gully

HWS Hot water system

NCC National Construction Code of Australia - includes the BCA and the PCA

NTFRS Northern Territory Fire and Rescue Service

ORG Overflow relief gully

PB Polybutylene

PCA Plumbing Code of Australia - part of the NCC

PE Polyethylene

PROVIDE (a) Means give to the Superintendent where it refers to documentation.

(b) Generally PROVIDE means, supply, transport, install, connect, test, commission and leave ready for use unless the context clearly indicates otherwise. In the context of this design standard this sense of PROVIDE means to incorporate these requirements in the design and specification documentation.

PWC Power and Water Corporation

RFT/RFQ Request for Tender / Request for Quotation - requirements applicable to one are equally applicable to the other

RPZD Reduced pressure zone device

SHALL Is indicative of a mandatory requirement which must be incorporated in the design unless the context clearly indicates otherwise.

SUPERINTENDENT As defined in the contract. A reference to the Superintendent includes a reference to the Superintendent's Representative and to any person, or person occupying a position, nominated by the Superintendent, or by the Superintendent's Representative, to act on their behalf in procuring the works under the contract

TMV Thermostatic mixing valve

WC Water closet - a toilet pan

WILL Is indicative of a mandatory requirement which must be incorporated in the design unless the context clearly indicates otherwise.

1.4 CERTIFICATION

All hydraulic design and documentation is to be certified by an engineer with appropriate qualifications recognised by the main authority regulating the discipline. The design shall also take into consideration Fire Safety.

1.5 BUILDING MANAGEMENT SYSTEM (BMS)

Allow for any mechanical devices, sewer pumps, water pumps, irrigation systems and tank level indicators to be connected to new or existing Building Management System (BMS).

1.6 DRAWINGS

1.6.1 General requirements for drawings

- The floor plan scale shall be a minimum1:100.
- Use standard symbols and terminology from AS/NZS 3500 parts 0, 1, 2, 3, and 4 on the drawings and in the documents.

The following elements must be shown on the drawings as a minimum:

a. all stacks,
b. all inspection opening points,
c. all overflow relief gullies (ORGs) and disconnector gullies,
d. elevated pipework,
e. cold water reticulation and outlet points,
f. hot water reticulation and outlet points,
g. tempered water reticulation and outlet points,

h. locations of temperature tempering devices,
i. fire hydrant system piping, connection points and outlet points,
j. fire hose reels locations and connection points,
k. rainwater collection and disposal systems including roof guttering, connection points, inspection openings, downpipes, underground disposal piping, on ground kerbs, gutters, channels, including sizing of elements,
l. grey water reticulation, connection points, disposal points, treatment points,
m. recycled water reticulation, collection points, disposal points, treatment points,
n. backflow prevention devices,
o. Landscape irrigation system connection points to the potable water main.

1.6.2 Requirements for 50% drawings

a. A record of all observations made on site (all existing services and connection points, locations, levels, including existing and proposed ground levels, invert levels, and dimensions of existing hydraulic infrastructure relevant to the works),
b. General design outline of proposed infrastructure,
c. Adequate detail for Superintendent and client to be able to give approval of proposed design,
d. Provide minutes from Authority consultation meetings (PWC, NTFRS and Environmental Health),
e. Provide a service capacity report,
f. Provide a brief report on co-ordination with other disciplines' drawings,
g. All services must be shown on the drawings in their proposed positions with clearly shown connection points and connection types,
h. Site specific conditions are to have been allowed for and must be acknowledged on site plans and other drawings if relevant and in specifications,
i. All drawings must be developed based on industry best practice for construction and design with minimal future maintenance in mind,
j. The design and the drawings must reflect what is required by the Client as detailed in the design brief.

1.6.3 Requirements for 75% drawings

a. Mark-ups and comments from 50% documentation must have been incorporated in to these drawings,
b. Drawings to show defined plan of proposed layout of infrastructure including details of the infrastructure,
c. All stakeholders input should be completed and required changes incorporated with fixture types and positions finalised (including positions of ORGs, TMVs and Vents),
d. All services must be shown on the drawings in their proposed positions with clearly shown connection points and connection types,
e. Provide a brief report on co-ordination with other disciplines' drawings,
f. All drawings shall clearly show invert levels and reference levels to AHD where applicable,
g. Site specific conditions are to have been allowed for and must be acknowledged on site plans and other drawings if relevant and in specifications,
h. All drawings must be developed based on industry best practice for construction and design with minimal future maintenance in mind,
i. Drawings must reflect what is required by the Client as detailed in the design brief and as further developed after the 50% submission.

1.6.4 Requirements for 95% drawings

a. Mark-ups and comments from 75% documentation must have been incorporated in to these drawings.
b. Provide copies of approvals from Authorities (PWC, NTFRS and Environmental Health).
c. Provide a brief report on co-ordination with other disciplines' drawings.
d. Services to be shown on the drawings showing positions and clearly stating any extra requirements (e.g. TMV lockable box, connection to plaster trap , position of refrigeration unit for drinking troughs) and clearly showing connection types and position.

e. All drawings submitted to the Superintendent for checking must have been checked for compliance by an appropriately qualified engineer before submitting them to the Superintendent.
f. 95% complete set of hydraulic plans are to have been signed and approved by a Hydraulic engineer and must have a Section 40 design Certificate.

1.7 SPECIFIC REQUIREMENTS

Confirm the Hydraulic services requirements with the Superintendent. The Hydraulic Consultant shall forward requests for information to the Superintendent.

Develop a drainage plan which takes into consideration foundations/footings design, slab design, proposed landscaping, external ground levels, access for people with disabilities, and Power and Water requirements.

1.7.1 Sewerage Design;

a. Locate the sewerage connection point on site and show the location and depth (below ground level or RL or AHD) on the design drawings.
b. Show locations of new ORGs on the drawings.
c. Locate any existing ORGs on site and show them on the drawings. Indicate on the drawings if the existing ORGs are compliant or not.
d. An existing compliant ORG which covers multiple buildings on the same parcel of land must be indicated on the Hydraulic Plans or Site Plan showing its position, which buildings are connected to it and its current compliance status.
e. An existing ORG which is not compliant is regarded as a disconnect gully. If any exist on site, show their locations on the drawings and show what is connected to them.
f. At least one ORG must be installed in the drain except as provided in Clause 4.6.6.2 of AS/NZS 3500.2.
g. All ORGs to be charged by a fixture. Charging by a hose cock is a last option.
h. A compliant ORG position shall be indicated on the drawings.
i. Do not assume there is a compliant ORG on an existing site.
j. Where pump stations / pump wells are installed ORGs must be installed to the drain. Pump stations / pump wells and ORGs must be fully compliant.
k. Each new building included in the works must be protected by its own ORG, including where multiple buildings are located on a common parcel of land. Each ORG should serve one building only.
l. A reflux valve shall not replace an ORG at any time unless with the approval of Hydraulics DIPL.
m. Measure invert levels on site and show invert levels on the drawings.
n. Design the sewer system as a gravity system not as a rising main system. A rising main system would be a last resort alternative. Obtain Superintendent's approval to design the system as a system other than a gravity system before commencing design of the alternate type of system.
o. All underground drainage pipework below ground level must be 100mm diameter minimum with exception of shower and basin to a floor waste.
p. All condensate pipes connected to the sewerage system to be lagged and are to be shown on the drawings.
q. Use chrome plated metal floor wastes, grates and inspection openings internally. Use metal floor wastes and grates and inspection openings in exterior locations. These are to be shown on the drawings.
r. In Plant Rooms where the air conditioning unit does not run for 24/7, each floor waste trap receiving discharge from plant and/or equipment requires an electronic fixture primer valve connected to keep the trap full of water.

s. Within the building, all tundishes are to be rebated stainless steel units with a glass front, 40mm outlet and fully insulated, including waste pipe, to floor level. If a trap is required a waterless trap with a stainless steel removal cover is to be used under the tundishes.

t. Do not use AAVs. Use positive venting throughout. Where AAVs are proposed the designer is to provide a report on the need and benefits for their incorporation before incorporating them into the design.

u. Additional inspection openings may be required for public buildings, schools, prisons, hospitals, health clinics etc.

v. A clothes washing machine must not discharge into a Floor Waste Gully (FWG).

w. A laundry tub receiving the waste from a washing machine must not discharge to a FWG.

x. Inspection openings will be required in close proximity to every W.C as close as practical to the pan in all public buildings, schools, hospitals, health clinics etc. Inspection openings are required at every change of direction of sewerage lines inside the building.

y. Inspection openings in sensitive, secure areas will be at the direction of the governing body.

z. All sewerage outside the Lot involving Power and Water shall have separate drawings which must be submitted to, and be approved by, Power and Water.

1.7.2 Overflow Relief Gullys;

AHD reduced levels are required for ORGs and shall be shown for:

a. The Finished Ground Level adjacent to each ORG,
b. The grate of the ORG,
c. The Finished Floor Level for the lowest fixture connected to the sanitary drain. See AS/NZS 3500.2 Clause 4.6.6.6: For the NT the minimum height between the top of the overflow gully riser and the lowest fixture connected to the drain is 100 mm, and
d. The top of the ORG and for the lowest fixture connected to the sanitary drain.

1.7.3 Grease traps for food preparation

All grease traps are to be constructed of reinforced, Sulphur resistant, concrete, with a minimum compressive strength of 32MPa, and be fitted with air tight heavy duty lids.

a. Use PWC guidelines for grease trap requirements design and installation regardless of whether the system is connected PWC network or not. All grease trap installations and designs must comply with AS/NZS 3500.2, Installation of pumps section. All tanks, risers and precast products shall have structural and hydraulic certificates of Compliance to AS/NZS 1546.1.
b. Grease traps must be located on site in a position accessible from the outside of the building without need to interrupt any services and which is easily accessible for tanker vehicle access.
c. Refer to the Code of Practice for On-Site Wastewater Management published by NT Environmental Health.
d. Gas Tight lids are required on all Grease traps.
e. A suitably sized vent must be installed to vent the Chamber directly.
f. Grease trap outlets shall have a trap sampling point including a gas tight access cap.
g. Grease traps shall be designed to be as close as possible to the fixtures to be serviced.
h. Venting of the sampling point is not required if apparatus is located externally.

1.7.4 Plant rooms

a. Provide a tundish in the plant room to accept discharge from condensate lines.
b. All floor wastes receiving discharge from plant equipment require an Electronic timer controlled priming device.
c. Trap priming devices are to discharge to the tundish in the plant room.
d. All condensate lines to discharge to a tundish in the plant room.

1.7.5 Septic and aerated sewerage treatment systems

a. Design sewerage treatment and septic systems to suit the project actual usage.
b. The sewage treatment design shall be in accordance with Department of Health Code of Practice for On-site Waste Water Management and, where required, Draft Guidelines for Wastewater Works Design Approval for Recycled Water Systems.
c. All pump stations are to be constructed of reinforced, Sulphur resistant, concrete, with a minimum compressive strength of 32MPa, and be fitted with air tight heavy duty lids.
d. All sewage treatment/septic installations and designs will comply with AS/NZS 3500.2, Installation of pumps section. All tanks, risers and precast products shall have structural and hydraulic certificates of Compliance to AS/NZS 1546.1.
e. Do not use plastic, poly or fibreglass sewerage treatment structures.
f. Conduct an assessment of the absorption conditions prior to designing absorption trenches as per Department of Health requirements.
g. Provide a hose tap adjacent to the treatment system. Install a Reduced Pressure Zone Device (RPZD) upstream of the hose tap as a backflow prevention device.
h. Refer to the Code of Practice for On-Site Wastewater Management published by NT Environmental Health.

1.7.6 Requirements for On-site Domestic Sewerage Treatment Plants and Septic Design

Details required on Design Drawings:

a. Owner name and location of premises,
b. Real property description,
c. Site plan showing location and footprint of buildings and dimensions from boundaries,
d. Show street/road names for street/roads inside the property boundary, if any, and for the streets/roads outside the property boundary but adjacent to, or close to, the property boundary, especially those streets/roads which provide access to the property,
e. North point (all views to be orientated with north point to top of sheet), and
f. Dispersal Area calculation showing the site supporting the proposed installation type, depth of soil and depth of inverts.
g. Refer to the current Code of Practice for On-Site Wastewater Management published by NT Environmental Health.

1.7.7 Flows

Details required in documentation:

a. Secondary treatment system – manufacturer's name and system model name,
b. Type of disposal area: evapotranspiration,
c. Sub-surface irrigation to a designated wastewater effluent re-use area,
d. Sectional details of wastewater effluent re-use area,
e. Note any retaining structures and any areas of fill, both existing and proposed,
f. Site slope contours to be shown, both existing and proposed,
g. Domestic water sources (underground pipe if within 6.00m of the disposal area),
h. Depth to water table at location of disposal area (if less than 1.50m below ground surface),
i. Methods proposed to prevent surface run-off entering the disposal area (i.e. Diversion Mound),
j. Dimensions from boundaries, building(s), water courses, gullies, and water sources on project site property and on adjoining properties,
k. Required fencing, and
l. Distances from bores.

1.7.8 Pump Wells

a. All pump station installations and designs must comply with AS/NZS 3500.2, Installation of Pumps section. All tanks, risers and precast products shall have structural and hydraulic certificates of Compliance to AS/NZS 1546.1.
b. All sewage pump station designs shall be accordance with *WSA 04-2005 Sewage Pumping Station Code of Australia v2.1.*
c. All pump stations are to be constructed of reinforced, Sulphur resistant, concrete, with a minimum compressive strength of 32MPa, and be fitted with air tight heavy duty lids.

d. All pump stations will have a minimum 80mm vent.
e. The gravity discharge to the pump station shall be located at least 100mm above the highest working level and terminate with a square junction.
f. The lowest float will be set to stop pumping prior to pumping water below the top of the pump.
g. External switch board cabinets shall be manufactured in Stainless Steel

1.7.9 Cold Water Service;

The minimum requirement for PE water supply piping DN 110 or less, to be SDR 11 –PN 16HDPE PE100.

PE piping to AS/NZS 4130.

All water services pipes, including fire services pipes, which pass through directionally bored passages below ground must be encased within a suitable conduit.

Materials

Services to be constructed from materials as listed below unless specified otherwise or noted otherwise on the drawings
Provide a simple table indicating materials to be used for all components listed below. Refer to the example table below. Ensure all materials selected are acceptable.

A simple materials matrix table, located in general hydraulic Notes, indicating the materials of the following components:

1. Sewer Drainage
2. Sewer Plumbing
3. Rising Main
4. Exposed Wastes (C/Plated)
5. Cold Water (in Ground)
6. Cold Water (internal)
7. Hot Water/ Warm Water (internal)
8. Fire Service (in Ground)
9. Fire Service (above Ground)
10. Stormwater
11. Trade Waste

Example Table

SERVICE	MATERIAL	REMARKS
Cold water (in ground)	PN 16 HDPE PE 100	Fusion welded

Requirements

a. Design cold water supply to suit available pressures: Remote area water pressure operates around 90 to 120 kpa. Contact Power and Water for information about available pressure in these areas.
b. Design cold water services not to run in or under slabs. If there is no alternative the following requirements apply:
    - pipe must be full length, without any joins, and be made of copper, or stainless steel, or Rehau polymer material.
    - laid in a conduit of sufficient size to enable the removal of the pipe and lagging contained in it,
    - pipe to be lagged.
c. Select flushing apparatus to suit low pressures or design a break tank and pressure system to suit fixtures operating with higher pressure requirements than the pressures which are available.

d. Design water services to suit the quality of the water to be used. eg. Low ph requires all metal components to be stainless steel and pipework to be PB or PE not copper.
e. All isolation valves on branches are to be stainless steel ball valves from 50 mm to 12 mm.
f. Trap priming devices to be electronic timer controlled type.
g. Thermostatic mixing valves and tempering valves shall be indicated on the water plan where required.
h. Containment devices must be indicated on the hydraulic cold water drawings.
i. Closest tap to a grease trap shall have a suitable containment valve, which is to be indicated on the drawings.
j. Vented Containment devices located internally shall have a suitable method controlling the spill from the exhaust ports.
k. Pipe sizes shall be clearly marked on the plan.
l. Use Pentair Valve Check range of low pressure backflow devices. Ensure this requirement is marked on the drawings.
m. A hose tap must be provided adjacent to effluent treatment systems and grease traps. A Reduced Pressure Zone Device (RPZD) must be installed immediately upstream of the hose tap as a backflow protection device.

1.7.10 Hot Water Service;

Design to AS 3500.4.
HWS overflows and requirements for Safe trays to be shown on plans.

Water pipes for heated water in a non-circulatory heated water service shall be designed to;

a. Reduce to a minimum the amount of dead (cold) water drawn off before hot water commences to flow at any tap,
b. Be sufficient to give the required flow at all outlets (including branches from non-circulatory services),
c. Be by the shortest practical route for the main flow heated water pipes and branches to the heated outlets,
d. Be the minimum necessary diameter required to supply the outlet draw off; and provide a water velocity not exceeding 3 m/s,

Design hot water services to not run in, or under, slabs. If there is no alternative the following must apply:

e. pipes must be full length without any joins,
f. pipes must be laid in a conduit of sufficient size to enable removal of the pipe, insulation and lagging contained in it,
g. pipes must be lagged, and
h. pipes must be insulated with appropriate insulation to AS/NZS 3500.4.

1.7.11 Tempered Water Service

a. Design to AS/NZS 3500 parts 1, 2 and 4.
b. Thermostatic mixing valve (TMV) designs shall comply with AS 4032 series - Water Supply - Valves for the control of hot water supply temperatures.
c. Installation must conform to AS/NZS 3500.4 - Hot water supply systems.
d. The inlet hot water temperature to TMVs shall not exceed the recommendation of the TMV Manufacturer.
e. Where concealed, the locations of the TMVs shall be identified with clear signage in a visible location to ensure servicing personnel are able to locate the devices.
f. TMVs must be mounted at a maximum height of 1.6 metres from the floor slab for ease of access for maintenance.
g. Do not use standard tempering valves. where Thermostatic mixers are required according to AS 3500
h. There is a requirement to rationalise the number of TMVs for reasons of capital cost and associated maintenance. The designer shall consider allocating TMVs to serve multiple

fittings or outlets provided the flow and pressure of these fittings meets the minimum performance requirements under code and that the sequential operation of the additional fittings introduces a variance of no more than 10% of each fitting.

i. Generally the maximum total pipe length from TMV to the most disadvantaged fixture must not exceed 10 meters.

1.7.12 Fire Hydrants and Fire Hose Reels

Fire Hydrants to AS 2419 and to NTFRS requirements.

Fire Hose Reels to AS 2441 and to NTFRS requirements.

Fire Hose Reels to be designed where possible to come off of the fire ring main.

For Fire Hose Reel services, within the building, which are to be designed to be connected to the domestic supply, the following should be considered in design:

a. Each branch line off the domestic water supply main to domestic fixtures must have a ball valve on the branch line as close as possible to the main,
b. All ball valves must have identifying tags in a prominent position and which shows their location if the ball valves are concealed,
c. Design to comply with AS 2441.

1.7.13 Cross Connection Control and Backflow Protection (Backflow Assessment)

The Hydraulic Consulting Engineer (accredited backflow assessor) is responsible for assessing backflow risks to the site (low, medium or high) to all apparatus, fixtures, and equipment on the site according to AS/NZS 3500.1, and shall include Fire services, including Fire Hose Reels, and all applicable items listed in AS/NZS 3500.1, Appendix F, Table F1 and Table F2.

Power and Water backflow assessment at the boundary connection must be the same value as the highest rated internal device.

1.7.14 Stormwater and Subsoil Drainage

a. Storm water system design generally shall comply with AS/NZS 3500.3 - Stormwater
b. Drainage design: To the NCC (the PCA and the BCA) and Local Authority by-laws.
c. All storm water systems to use sewer grade pipes.
d. All storm water systems to AS/NZS 3500.3 or Engineer’s specification

1.8 IRRIGATION

1.8.1 Backflow prevention

Fit a backflow prevention device; To AS/NZS 3500.1 and as required to meet the approval of Power and Water Corporation (Pentair Valve Check or equivalent).

1.8.2 Irrigation controller

The irrigation controller is to be compatible with the Building Maintenance System and is to include the following features:

a. Variable timer for each station with a range from 1 minute to not less than 60 minutes,
b. Manual cycle and individual station operation,
c. Manual on-off operation of irrigation without loss of program,
d. 240 V input and 24 V output capable of operating 2 control valves simultaneously,
e. 24 hour battery program backup,
f. Power surge protection.

1.8.3 Electrical connection:

a. Connect to a 240 V supply.
b. Provide an isolating switch at the controller.

1.8.4 Automatic control valves:

a. 24 V solenoid actuated hydraulic valves with flow control and a maximum operating pressure rating of at least 1 MPa.
b. Provide valves able to be serviced without removal from the line.
c. Install a gate valve of the same size as, and immediately upstream from, each automatic control valve.
d. House both valves in a valve box with high impact plastic cover. The top of the cover is to be at finished ground level.

1.8.5 Control wires:

a. Connect the automatic valves to the controller with building wire laid in sealed conduits, with the mainline where possible.
b. Lay control wires intertwined for their full length without joints except within valve boxes.
c. Use waterproof connections.
d. Provide expansion loops at each solenoid lead or joint.
e. Backfill trenches only after inspection and approval of wiring.
f. Minimum size active 1.5 mm^2.
g. Minimum size common 2.5 mm^2 laid in closed loop.

1.8.6 Sprinkler Heads

Provide heads which maintain a pre-set arc of throw, which are adjustable for radius during watering operations and which are vandal-resistant.

1.8.7 Pop-up type heads:

Use heads designed to rise out of their housings under supply pressure to a minimum "pop-up" height of 50 mm.

1.8.8 Risers

Mount all in-ground heads on reticulated risers. Mount above ground heads on fixed risers.

1.8.9 Micro irrigation system

Polyethylene irrigation pipe

a. To AS 2698.1 Class IRRIG with barbed fittings of similar pressure rating fastened with ratchet type clamps.
b. Lay pipe on finished ground surface under planting bed mulch and anchor at minimum 1.5 m intervals with U-shaped stakes.
c. Connect micro-tube laterals with proprietary push in or screw in fittings.

Microsprays

Mount microsprays on stakes 300 mm above ground and connect to the pipework with microtubes.

Drippers

Use drippers which are turbulent flow types, easily dismantled for cleaning. Connect directly into the pipework or with microtubes.

Micro irrigation valve box

Use micro irrigation valve boxes which are of high impact plastic with snap lock covers at finished ground level, each housing a stop cock, filter (200 mm for microsprays, 100 mm for drippers), pressure reducing valve (170 kPa outlet pressure) and automatic control valve.

1.9 CONSULTANTS DOCUMENTATION

Hold points must be included in RFT documentation and must clearly indicate when Hydraulic inspections are required.

Refer to document INSPECTION PROCESS FOR HYDRAULIC DIPL PROJECTS Hold Points.

- For Drains refer to Section 2.
- For Water, Wastes and Stacks refer to Section 3.
- For Final inspection refer to Section 4.