

# Design Checklist for Building Developments, Extensions and Subdivisions

The proponent's Power and Water Corporation (PWC) accredited hydraulic engineer/designer is required to complete this checklist and submit to Indigenous Community Development, when submitting the water, sewer and power project drawings. For large subdivisions/extensions the items in this checklist are to be included in the project design report. Refer appendix for design report table of contents. Note: the applicant should attach design calculations, reports, approvals, and any information additional to this checklist that will assist in the assessment of their application by Power and Water Corporation (PWC). For more information visit [powerwater.com.au](http://powerwater.com.au)

## Northern Region

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## 1. Land Details / Location of Works

Lot No./Location : \_\_\_\_\_ Street Address: \_\_\_\_\_

Community: \_\_\_\_\_ Project: \_\_\_\_\_

Stage: \_\_\_\_\_

Description of works (i.e. no. of lots)  Power  Water  Sewer: \_\_\_\_\_

Drawing No.(s): \_\_\_\_\_

Comments: \_\_\_\_\_

## 2. Consulting Engineer/ Designer

Power and Water Corporation (PWC) accredited:  Yes  No

If No, consultant must make an application to PWC.

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Postal Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Signed (Checked): \_\_\_\_\_ Date: / /

## 3. General

- Ensure designs conform to all requirements of PWC Remote Operations.
- For detailed design and drawings, refer to the following documents found on the PWC website:
  - Remote Customer Information, Requirements and Forms
  - Indigenous Community Engineering Guidelines
  - PWC Standard Drawings
  - PWC Products Manual
  - PWC Master Specification
  - Network Policies, NP003 Installation Rules, NP007 Service Rules, and NP010 Meter Manual
- Conduct site inspection and survey the alignment.
- Obtain Aboriginal Areas Protection Authority (AAPA) clearances, Department of Lands and Planning, and Land Tenure approvals (if applicable).

- Obtain geotechnical investigation report with recommended bedding type, lateral and vertical bearing capacities at various depths, excavation condition and assessment of subsoil condition and subsoil drainage etc.
- Provide a design report of the subdivision (design calculations).
- Prepare project specific specification and schedule using PWC Master Water Supply and Sewerage Specification and other associated documents.
- Prepare project drawings and site servicing plan showing all existing and proposed services and obtain approval from PWC and other authorities.
- Prepare master services plan and master plan for the proposed development.
- Submit as constructed drawings before connection to PWC system and handover.
- Large or deep water and sewerage infrastructure proposed within a road reserve may require a suitably designed service allocation to ensure access to the infrastructure does not disturb other services. A utility access may also be required into an adjacent lot.
- Thrust boring or sleeving under road and railway may be required by PWC, road authority or council.
- Steel or concrete sleeve details should include OD, pipe thickness, joint type, type 4 bedding for steel sleeves, or type 2 bedding for concrete sleeves, select backfill under road, etc. Use Tyton-Lok joint for DICL, collar for MSCL and electrofusion weld joint for PE pipes through sleeves.
- In conjunction with PWC Indigenous Community Development determine the fees/costs applicable (i.e. contribution, Distribution Systems Extension Policy (DSEP), cost recovery, etc.), and inform the developer.
- Where possible locate water and sewer mains on opposite sides of the road. Where this is not possible maximise the separation distances of water and sewer.
- Ensure approval is granted from PWC Indigenous Community Development for any proposal concerning existing or proposed utility accesses.
- Ensure design is approved by PWC prior to tender or construction.
- Associated construction camp has been designed accordingly.

#### 4. Water

- Obtain approval from PWC Indigenous Community Development for services extensions/subdivisions concept plan and proposed connection points.
- Determine the current, future and ultimate demand (L/s) from the development, both domestic and fire fighting. Provide as an attachment.
- Determine the worst case headloss in the development.
- Ensure there is sufficient flow and pressure in the local water supply system to service the ultimate demand, including fire flows and worst case head loss.
- Review your load demands against the PWC hydraulic model. PWC will supply the existing EPANET model. This model is to be updated with your data and returned to PWC for review. If a PWC EPANET model is not available, separate arrangement will need to be made with PWC.
- Minimum pipe size shall be DN150 in residential areas, and DN225 in commercial and industrial areas.
- Minimum Series 1 PVC-M class 12 can be used for pipes  $\leq$ DN150 with working pressure below 350 kPa.
- Use minimum class 16 PVC pipes for all high pressure zones (working pressure above 350 kPa).
- Minimum series 2 PVC-M class 16 pipe can be used for mains DN200 $\leq$ DN300.
- PVC-O class 16 pipe should be used for all rising mains and mains subject to repeated cyclic loading.
- DICL can be used for sizes  $\geq$ DN100. Buried DICL pipework and fittings must be wrapped in a protective polyethylene sleeving and noted on the drawing.
- DICL pipe shall not be cut to suit. All dimensions of DICL short pipes should be provided in the detail drawings.
- Water services under roadways shall be either DICL flanged or Tyton-Lok jointed or MSCL collar jointed. Alternatively PE class 16 pipes electrofusion weld jointed with RCP or MSCL sleeves can also be used for pipes DN225 and below under road. No polyethylene is to be used for any other piping or connections

(unless specific approval granted for locations with corrosive water).

- Any section of pipe may be isolated by no more than 4 sluice valves.
- No more than 25 property service connections may be isolated at any time by valve operation. (Include the number of units on allotments in this calculation, i.e. ten units on one allotment are counted as ten service connections).
- All water service connections to commercial/industrial properties that include water critical businesses (see list), will require a stop valve either side of the service connection tapping to the existing water main. List of Critical Businesses as defined by AS/NZS 3500:2003
  - Dentists, medical clinics, hospitals, nursing homes
  - Shopping centres, hairdressers, photographic laboratories/processors, dry cleaners/ commercial laundries
  - Education facilities, child care centres
  - Chemical plants or storage facilities, abattoirs
  - Marinas/docks, caravan parks
- Provide a minimum of type 2 embedment for PVC pipe or type 4 embedment for steel pipe unless geotechnical investigations have been completed and the resultant report supports the use of lower quality embedment.
- Where the cover is insufficient but still greater than 300mm (with PWC approval only) use DI/CL pipes and flanged fittings. A concrete slab may be required as added protection.
- In general fire hydrant spacing shall be 80m, however actual location and spacing should be determined by fire coverage required to cover the subdivision and extension work. Fire hydrants shall be below ground type BS750.
- 100% of lots shall be covered by proposed fire hydrants or alternatively internal hydrants with DN80 or larger service connection will be required for larger lots not covered by external hydrants. Show areas covered by external fire hydrants.
- Cul-de-sacs must always have ring mains/through mains as shown on standard drawings.
- Dead ends will not be allowed unless approved. When allowed, valve and flushing hydrant arrangement for all dead end branches will be required.
- Ensure service size meets ultimate demand for zoning of lot. Zones MR, GI, DV, CV and other zones as determined by PWC Indigenous Community Development are to be provided with a minimum DN100 service as agreed by PWC.
- Ensure water services do not conflict with other services (i.e. electricity, sewer and driveway). Indicate non-standard alignments. Provide a copy of the master plan and master services plan.
- Liaise with Indigenous Community Development to select a service design (combination vs. dual fire/domestic). All fire services including internal lot hydrants, fire hose reels, fire booster arrangements or fire sprinklers are required to be connected after the meter assembly.
- A multi-metering manifold arrangement is to be used for multiple ground level units, townhouse style units, and industrial type units. It is limited to a maximum of 12 meters for residential and 6 meters for industrial, however this may be extended on a case by case basis.
- Complete backflow prevention assessment together with meter application.
- PWC provides a minimum of 15m pressure at the service. If a pump is required to meet the development's demands, include a break tank prior to the pump.
- Inline booster pumping >1 L/s will not be permitted without written approval from PWC.
- Provide water supply clear accesses for property water services sized 100mm and over. Size of access to be determined by PWC.
- Thrust block design required for water and pressure mains  $\geq$ DN300, Show calculation and lateral bearing capacity used for design.
- Pipe sizes shall not be less than DN150 for residential zones and DN225 for industrial and commercial zones. A maximum permissible loss is 6.0m/km for all reticulation mains sizes DN300 and below.
- Water pipes must always be located above sewerage/stormwater pipes.

- Construction camp domestic water supply point and storage tanks. Limited to 2L/s flow restrictor or 25mm water meter.
- Supply point for construction water i.e. bore.

## 5. Sewer

- Obtain approval from PWC Indigenous Community Development for services extensions/subdivisions concept plan and proposed connection points.
- Determine the ultimate peak wet weather flow for the development (L/s) at each discharge point to PWC's sewer system.
- Ensure there is sufficient existing capacity in the local sewer network. Provide sewer flow schedule as an attachment. Consult with PWC Indigenous Community Development for system modelling results.
- Sewers are to be located in road reserves. With approval they may be located in public land.
- U-PVC class SN8 is to be used for pipes  $\leq$ DN300. For diameters  $>$ DN300, VC or an alternative approved pipe material must be used. Rigid pipes are preferred for areas with high water table or subsoil drainage. Design must be based on the recommendation of a Geotechnical Investigation Report.
- Sewer pipes shall be designed to achieve self cleansing grades with pipe capacity exceeding peak wet weather flow. Under no circumstances can pipe grades be less than minimum grades.
- Sewer mains should be located within the road reserves and/or service corridors. Recommended offset of 1.6m from property boundaries in road reserves. Sewer mains inside allotments should be avoided but if they cannot an offset of 1.5m from the property boundary is recommended.
- Use heavy-duty rectangular lids (class D, shape R) in road reserves/parks/drains and light duty lids (class B) within yards.
- Ensure minimum drops and bends are achieved through/into maintenance holes.
- Maintenance hole spacing shall be in accordance to WSA Supplement WSA03.
- Maintenance shafts are permitted on DN150 sewers with depths  $<$ 3.0m. One maintenance shaft only between maintenance holes. Sewer branch lines are not to join at maintenance shafts.
- Maintenance shafts are permitted for a change in direction in standard manufactured angles up to 30°.
- For straight sewer section or sewer with maximum 30° bends with no branch connections and depth below or equal to 3.0m, Maintenance shafts are preferred over maintenance holes at alternate maintenance hole locations.
- Terminal maintenance shafts should not be used when future extension of sewer main is required (based on master plan).
- Ensure that sewer flow in maintenance hole is deflected by an angle no less than 90°, unless the appropriate drop is available.
- Ensure gas trap maintenance hole (in-line permitted only when space is constrained) is provided prior to connection to trunk sewers (i.e. sewers  $\geq$ DN300). Boundary traps are to be used for house connections when the receiving sewer is  $\geq$ DN375.
- Ensure property connection meets ultimate demand and current standards for servicing the lots. Minimum 150mm for residential and commercial lots and a minimum 225mm for industrial and large flows. Loads  $\geq$ 80EP shall discharge to a maintenance hole.
- Provide a copy of the lot control calculations. If accepted by PWC, show the limitations of lot control on sewerage reticulation plan.
- Provide pipe capacity and self cleansing check calculations for each gravity section between maintenance holes.
- Polyurethane or approved lining required for all maintenance holes with  $\geq$ DN300 gravity main. Standard 1200 dia. maintenance holes can only be used for gravity sewers  $\leq$ DN300.
- Provide a dedicated MH with a short gravity section to receive flows from sewer rising main to the gravity system.
- Construction camp connection.
- Determine what type of trade waste may be discharged (i.e. non-domestic or high volume).

- Determine what pre-treatment is required prior to connection to sewer.
- Obtain trade waste approved stamped drawings.

## 6. Power Network

- Obtain approval from PWC Indigenous Community Development for services concept plan and proposed connection point.
- Ensure there is sufficient capacity in the local power network, Provide calculated maximum demands for existing, additional new works, new calculated maximum demand.
- Services are to be located in public land or road reserve. No aerial trespass of mains or services over lots.
- Determine if a road clearance pole (RCP) is required and show location on lot servicing plan. Recommended location is offset 0.5m into road reserve and in line with property side boundary.
- Give pole schedule referencing pole types, pole tops, HV and LV requirements conductor size and type, switching arrangement, earthing, substation size and configuration, transformer details and construction and pole stays.
- Ensure design is approved by PWC prior to tender or construction.
- Show point of attachment for lots on plan (demands allowed for lots shown).
- Show MCB and meter location shown.
- Meter requirements – pre paid or credit?
- Where a service and/or meter is requested or additional load exceeding 5kVA is to be connected a 'Notice of Intention to carry out electrical installations (NIW) is required.
- The NIW must be submitted to PWC and shall be lodged prior to work commencing.
- Power will come from the existing power pole XX on the south boundary of Lot XX.
- The Point of attachment is to be on the front of the building closest to the existing power pole.
- Construction camp or temporary connection during construction?

## 7. Appendix

### Example of Design Report Table of Contents

#### 1. Introduction

#### 2. Background

- General
- Scope of Hydraulic Works
- Scope of Electrical Works
- Stakeholder Consultation
- Relevant Statutory Approvals
- Project Timeline
- Project Key Deliverables
- Geotechnical Report

#### 3. Sewerage

- General
- Connections to existing Sewer
- Sewer Loading and Sewer Grading
- Issues Confirmed with PWC
- Upgrades

#### 4. Water Supply

- General
- Connections to existing Water
- Thrust Blocks

#### 5. Power Network

- General
- Connections to existing Power
- Power Loading
- Issues Confirmed with PWC
- Upgrades

#### 6. Approved Specification and Drawings

- Specification including Preliminaries, and Technical Clauses
- Design Drawings

#### Appendices

- Appedix A Development Permit
- Appedix B Subdivision Plan and Site Plan
- Appedix C Master Plan
- Appedix D Works Plan
- Appedix E Design layouts
- Appedix F Sewerage Catchment Plan
- Appedix G Sewerage Loading and Grade Calculations
- Appedix H Water Demand Calculations and Modelling
- Appedix I Power Demand Calculations
- Appedix J Geotechnical Assessment Report
- Appedix K Meeting Minutes