

Indigenous Community Asset Handover Guidelines

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Introduction

Where it is envisaged that at the completion of the project the asset works will or may be handed over to Power and Water Corporation Remote Operations (PWC) for ongoing operation and maintenance, the following guidelines are to be adhered to:

All project have three distinct phases. These are:

1. Investigation and design;
2. Construction; and
3. Commissioning and practical completion (including handover and defects liability period).

These Guidelines will deal with each of these phases and the documentation/process required before PWC will accept the works as complete or as a gifted asset.

These Guidelines are to be used in conjunction with the “Indigenous Community Engineering Guidelines”.

Design Phase

2.1 Design concept

As the key stakeholder of the Power and Water infrastructure development in remote communities, PWC shall be involved early in the project for agreement on the scope of works and level of service. This shall be covered with a formal “In principle acceptance from PWC and Key stakeholders” prior to detailed design and documentation.

2.2 Design review

Design reviews are required when drawings and specifications are at the concept stage, initial draft stage, 30% and when documents are 90% complete as a minimum. It is recommended to also have a 60% design review for more complex projects. A minimum of ten working days should be allowed for the review of documents and return from PWC.

Concept design submission:

- Department of Planning and Infrastructure Lands planning consultation and project approval that the development is line with the community use plan;
- Conceptual layout and background engineering business case;
- Environmental and Aboriginal land use approvals/discussion for approval (AAPA, Aboriginal Land Councils, Traditional owners – project site and location site for construction work camps);
- Butter paper layout; and
- Draft design report.

Draft design stage:

- Whole of life review;
- More developed layout and draft details;
- Review of constructability issues – construction timeline wet season, resource availability; and
- Review of appropriate technology (including consideration of operational benefits and disadvantages).

90% design stage:

- Design Calculations and assumptions including population and design horizon;
- Whole of life review;
- Layout drawings should be 100% complete;
- Details for connections, complex arrangement, longitudinal sections;
- Other associated works such as roads and stormwater drainage where these interact with PWC infrastructure;
- Specification and draft tender documents including project estimates (budget costs);
- Review of constructability issues – construction timeline wet season, resource availability; and
- Include record of all stakeholder consultations and all approval required or received.

2.3 Design report

Design reports should be submitted to PWC on completion of the design phase of a project prior to design approval. The design report is to clearly set out design assumptions and project capacity or design horizon.

It is recommended that the design report is developed in draft form through the concept and draft review stages. The design report sets out all background engineering and assumptions along with clearances and consultation with stakeholders. (Refer to Appendix A – example of design report index). Having this information clearly set out will improve the turnaround of documents submitted to PWC for review and approval.

2.4 Design approval/acceptance

Works are not to proceed until drawings and documentation have been assessed and approved. The stamped 'as approved for construction' drawings will then be sent to the developer for tendering or construction. A minimum of ten working days should be allowed for the review of documents and return from a PWC remote operation's office.

Design approval submission:

- Design Calculations and assumptions including population and design horizon;
- Whole of life review (including but not limited to capital and operational cost, similar PWC plant or infrastructure, local availability of spares, appropriateness of technology, degree of specialized maintenance);
- Completed drawings and tender documents including project estimates;
- All associated approvals;
- Design horizon and infrastructure life;
- Consideration of all design issues including safety and environment;
- Benefits and disadvantages of all options; and
- Capital and operating costs.

2.5 Plant and equipment selection

Prior to selection of equipment the consultant must undertake a whole of life analysis and this must be submitted to PWC remote operation for approval. Prior to purchase of plant or equipment the consultant must also submit a detailed costing.

Plant is to be selected with regard to PWC current equipment, the operational and capital costs. A cost penalty may be attached to plant, which is of a different make to similar equipment in use, elsewhere by PWC.

PWC concurrence must be sought prior to proceeding with purchase of the recommended plant. Minimum performance guarantees may be required.

Technologies to be employed need to demonstrate satisfactory consideration of appropriate and robust function. For example control and electrical equipment shall be consistent with usage by staff with little formal engineering skills and English as a second language. Also to be considered is the high turnover of staff, severe climatic conditions, limited skilled maintenance personnel for repairs or upgrades, and the extreme difficulties in not only accessing, but getting equipment or spares to some of these remote sites at different times of the year.

Construction Phase

3.1 Pre-construction

The developer is to confirm with PWC proposed construction camp and construction demand data as it is anticipated that this will impact on PWC managed infrastructure. This includes:

- Construction camp size and location (number of staff, electrical and water demand);
- Proposed temporary construction plan for servicing the construction camp, along with remediation or rehabilitation plan for site on completion of project construction phase; and
- Construction service demands (e.g. water for dust suppression, hydrostatic testing, etc.)

The construction camp will be dealt with as a standard single (one) lot subdivision due to the possible large size and nature of these camps.

In some communities the existing water supply and/or electrical supply is limited and the contractor may be required to sustain their own camp and construction activities.

Developer will be responsible for submission of approval of the following:

- OH&S and environmental plans;
- Clearance/approvals;
- Construction program and connection plan;
- Inspection and test plan;
- Construction checklists; and
- Asset data spreadsheet.

3.2 Construction

A fulltime independent competent and appropriately qualified and experienced compliance certifier, be used for all projects to undertake observation and verification of works. The compliance certifier is to be approved by PWC.

The following documentation that was submitted in the pre-construction phase is to be reviewed and utilised during the construction works:

- Construction Program – including a construction plan and work methodology;
- Inspection and test plan;
- Construction inspection checklists;
- Commissioning plan and checklists/sheets;
- Product acceptance; and
- Copies of other relevant documentation as required of the contractor shall be submitted to PWC prior to construction works commencing. This may include but is not limited to – environmental management plans, OH&S plans, consultation plan and quality plans.

3.3 Inspection

PWC must be invited with reasonable notice (minimum 5 working days) to witness key inspections, ideally in conjunction with the design consultant and constructor. Attendance on site will be subject to the availability of staff, and supervision of the contractor remains the responsibility of the developer.

All underground works shall have full time site supervision by an independent, competent and experienced site supervisor. The site supervisor needs to be agreed with PWC along with the inspection test plan (ITP). The site supervisor shall report directly to the program director and PWC on issues related to construction quality, OH&S and environment.

Appropriate records of construction progress shall be made available for inspection. These should include as a minimum a daily site diary, daily photos on construction, daily completion of certification and ITP Forms for hold and witness points.

Works are to be inspected as pegged out, prior to covering in any way and at intervals agreed in the ITP.

Unless specifically funded to carry out an element of the works PWC will not direct Contractors or day labour. Any issues or concerns arising from site visits will be referred to the Developer/Consultant for resolution. Five working days notice is required for PWC presence on site. Additional time should be allowed for travel to and from remote areas. The developer/consultant is to pay all costs and arrange travel (where necessary) for PWC staff to attend site inspections.

The following are the minimum inspection milestones, and are also commonly referred to as Hold and witness points in the standard technical clause specification.

- All hold points and witness points for cut-ins or interconnects to existing system are to be documented and photographed.
- Sewer and water mains are to be tested regularly as completed in sections. The testing is to follow the submitted and approved test plan.
- All hold points and witness points for hydrostatic testing of sewer and water mains to be witnessed by Power and Water or their nominee.
- Power and Water to inspect all switchboards before they are dispatched to site.
- Power Pole footing verification of depth and diameter to be documented and photographed.
- Final defects inspection, commissioning and acceptance.
- As-constructed review checklists completed and signed off.

3.4 Testing and test certificates

PWC must be invited to witness key testing, ideally in conjunction with the design consultant and constructor. Attendance on site will be subject to the availability of staff, and supervision of the contractor remains the responsibility of the developer.

- Hydrostatic test of sewers, Maintenance Holes and water mains.
- Deflection (mirror) and ovality (prover) tests of sewers.
- Pressure testing of all water mains.
- Chlorination and disinfection of all water mains.
- Bedding material sieve analysis test.
- Backfill compaction tests.
- Surface finishing in line with technical specification.

Note: An independent Close Circuit television (CCTV) inspection is to be undertaken at ninth (9) month of the defect liability period and digital and a condition report provided to Power and Water.

3.5 Rehabilitation of service network

As part of the rehabilitation of the construction camp site, disconnection, cap and/or repair to PWC networks may be required. The Developer/constructor is to invite PWC to a site visit to confirm any rehabilitation work to its service networks has been completed to PWC satisfaction prior to backfilling any underground services.

The developer/consultant is to pay all costs for PWC staff to attend site inspections.

Commissioning and practical completion

4.1 Commissioning

The defects liability period starts from the date of notice of handover of constructed work to PWC and not the connection to network date. The defects period does not finish until the timeframe stated in the tender documentation is completed and any outstanding works are completed. This could be work being undertaken to rectify a non-conformance detected during the defects liability period.

PWC shall be present for all practical completion inspections. The constructor/developer will be responsible for the cost of any abortive practical completion visits.

Training of PWC staff and Essential Services Officers on specialised equipment or procedures for new or innovative equipment or management techniques to used as result of the new development works. Refer to Appendix D.

Note: Satisfactory site inspection is not to be taken as acceptance of the works by PWC. When all requirements have been complied with, PWC will accept the works and the Developer/Consulting Engineer shall arrange for final connection to the external power, water or sewerage systems.

Commissioning of the completed works has several distinct phases as outlined below:

1. Notice of Handover of constructed work and completion of any identified training;
2. Defects liability period (minimum 12 months); and
3. Acceptance of work – Project completion.

4.2 Notice of handover of constructed work

Handover shall be on practical completion of the whole of the works. PWC will undertake regular operation of the infrastructure as part of its service system or network. Any work required due to faulty workmanship or materials is to be repaired by the constructor. The Constructor/Developer shall be responsible for the prompt rectification of all defects and omissions within two (2) weeks of handover. Should this not be completed PWC may undertake to complete the works with ALL COSTS to be paid by the Constructor/Developer.

If defects arise within the defects period the Constructor/Developer shall be responsible for the prompt rectification of all defects and omissions within two (2) weeks of handover. Should this not be completed PWC may undertake to complete the works with ALL COSTS to be paid by the Constructor/Developer.

If defects are of an emergency or urgent nature these works may be done by PWC with ALL COSTS to be paid by the Constructor/Developer. Where possible PWC will attempt to contact the Constructor/Developer prior to undertaking the works. PWC shall not be liable for any damage/s associated with the defect or repair of the defect.

The following information is to be provided by the developer/constructor at handover:

- Three copies of service and operating manuals for all plant and equipment installed including operating manuals for the system as a whole, attention to the different operating modes and fault finding (draft copies to be submitted to PWC for acceptance no later than 3 weeks prior to practical completion);
- Detailed results of all tests carried out during the works, commissioning reports, meter schedules, asset schedules daily site photos, end copy of daily construction diary and a schedule of equipment installed;
- Log sheets in an approved format detailing system performance up to the time of handover;
- Stock list of consumable items supplied with the works;
- Certified 'as constructed' drawings (print and digital dgn/dwg format) of the works with details of any variations to the specifications;
- Details of any outstanding defects to be resolved and methods of resolution;
- Equipment warranty periods and procedures for claim under warranty;
- Three copies of the consultants design report clearly stating design loads, design performance levels, anticipated load on headworks and capacity for extension of the works. Data should include outline of Infrastructure capacity, or sewer catchment plans;
- One copy of the AAPA certificate, all Sacred Sites Clearance Certificates and approval from the relevant Land Council or land owner;
- A formal request to PWC for acceptance of the works stating the acceptance date and date for final inspection review prior to expiry of the limit of defects period. Generally the joint final inspection shall be undertaken in the period one to three weeks prior to the end of the defects liability period; and
- All of the above should be provided in both hard copy and electronic copy.

4.3 Defect liability period

A minimum defects liability period of 12 months is required for all infrastructure work and starts from the date of PWC acceptance of work and not from the connection to network date or any other mid project date where services may be connected to a live system prior to completion of work. Specific infrastructure may require a longer period for defects liability and will be in the tender specification.

The developer/consultant is to pay all costs for PWC staff to attend site inspections.

All works highlighted as a result of defective workmanship or materials during the site visit are to be remedied to PWC satisfaction prior to completion of project.

Note: CCTV inspection of sewer is to be undertaken at ninth (9) month of the defect liability period by the constructor/developer. A digital copy of the inspection and a condition report are to be provided to PWC.

4.4 Acceptance of works

At the completion of the Defects liability period the constructor/developer is to provide to PWC a formal request of acceptance of work, project completion notice. The request for acceptance of work should follow on from the limit of defects site visit, and will note how any items of non-conformance are to be rectified. Once these works are complete the project will be signed off by PWC as completed.

Appendix A

Example of design report table of content

Part A: Project Brief Information

- A1 Project Work Scope Summary
- A2 Project Background
- A3 Stakeholder Consultation
- A4 Relevant Statutory Approvals
- A5 Project timeline
- A6 Project Key Deliverables.

Part B: Design Calculation and Assumptions

- B1 Design Assumptions to be field checked during construction
- B2 Design system Calculations
- B3 Design Horizons and capacity calculations
- B4 Construction Safety Issues
- B5 Environment considerations and Clearances.

Part C: Approved Drawings and Specification (Tender Documentation)

- C1 Specification including Preliminaries, and technical clauses
- C2 Design Drawings
- C3 Project Estimates
- C4 Project Whole of life review – summary.

Appendix B

Example of inspection certificate

Contractor:

Project:

Location:

Date:

Excavation (Comply with Specification)

Start Chainage:..... Finish Chainage:.....

Width:..... Depth:.....

Excavated Material

Boulder:.....m³ Rock:.....m³

Cavities:.....m³ Replace Trench base:.....m³

Reusable:.....% Unusable:.....%

(Reusable material for backfill and unusable material for disposal, approx %)

Witness point:

Any location that has values for rock, boulders, cavities or trench-base replacement greater than 0.

Superintendent's Rep:

Name:..... Signature..... Date:...../...../.....

Note: if verbal approval write "Verbal" in place of signature

The inspection certificate needs to match the specific project requirements, Northern Territory Government requirements, PWC technical specification and relevant Australian Standards.

Construction

In line with excavation chainages

Item	Task	Measurement	Comments
1	Type of Bedding	mm	
2	Depth of Bedding	mm	
3	Alignment Tolerance		Meets Tolerance Yes/No
4	Level Tolerance		Meets Tolerance Yes/No
5	Invert level at Start		
6	Invert level at Finish		
7	Geo Textile Fabric		Used yes/no
8	Depth of Overlay material		
9	Warning Tape Installed		Yes/no
10	Backfill layer 150mm Watered/compacted		Yes/no
11	Minimum Cover achieved 750mm in Road Res. 600mm elsewhere		Yes/no

Hold point:

- Do not cover pipes without approval from Superintendent's representative.
- Any location where minimum trench width or Minimum cover is not achieved.
- Any location where unsuitable trench material is found.

Superintendent's Rep:

Name:..... Signature..... Date:...../...../.....

Note: if verbal approval write "VERBAL" in place of signature

Contractor's Rep:

I declare that this is a true representation of works completed and all non-conformance to the specification have been recorded here:

Name:..... Signature..... Date:...../...../.....

Appendix C

Example of notification for site inspection

To:

Site inspection/testing notification

In accordance with the requirements of the project Inspection Test plan a site inspection is planned for

Monday the/...../.....

Provide formal written notice not less than 4 working days prior to inspection.

The following works listed below will be at a stage ready for inspection/testing during the site visit:

- 1.
- 2.
- 3.

Please confirm who from Power and Water will be attending the site inspection:

PWC Officer/representative:

.....

.....

Other Stakeholder Representatives:

.....

.....

The following arrangements for travel have tentatively been made please confirm your representatives travel needs:

Charter:

Departing:

Arriving:

On site transportation for the site inspection is

Appendix D

Example of handover manual table of content

Part A: Project Information:

- A1 Project Work Scope Summary
- A2 Estimates of Operation and Maintenance Costs, Resources for Operation and Maintenance (Sufficient for reporting taxation requirements and depreciation.)
- A3 Arrangements for Ongoing Operation and Maintenance, Agencies and Funding
- A4 Relevant Statutory Approvals
- A5 Guarantees from Suppliers / Contractor
- A6 Record of Capital Assets and Valuations
- A7 Summary of stakeholder and community consultation and agreements.
- A8 Evidence of secure land tenure.

Part B: Equipment / Material Information:

- B1 Names, Addresses and Contact Details for: Suppliers and Subcontractors
- B2 Pump Station: (Water / Sewer)
 - B2.1 Pump – Technical Data Sheets, Operation and Maintenance Manual
 - B2.3 Macerator – Technical Data Sheet, Operation and Maintenance Manual
 - B2.4 Switchboard – Technical Details / Equipment Data Sheets, Test Records / Certificates
 - B2.5 Flow Meter – Technical Data Sheet/ Operating Instructions
 - B2.6 Backflow Prevention Device – Technical Data Sheet
 - B2.7 Pump Station – Electrical Certificate of Compliance, Equipment Warranties
 - B2.8 Rising Mains and Reticulation Mains
 - B2.9 Material/Technical Data Sheet (Valves, Air Valves etc)

Part C: As Constructed Information:

- C1 Checklists
- C2 Field Returns – Sewer Tests and Junction Information
- C3 As Constructed Drawings –
 - Sewerage Layout Plan and Long-sections
 - Individual Lot Sanitary Drainage Plans
 - Water Layout Plan and Details
 - Switchboards
 - Pump/Transfer Stations (water/sewer)
 - Electrical / Distribution
- C4 Test Results and Certificates –
 - Civil
 - Electrical
 - Hydraulic
 - Switchboard
 - Structural
- C5 Commissioning Sheets
- C6 Community Survey Detail – Lot Numbers

Part D: Training and operation updates:

- D1 Training required system and equipment
- D2 Operational manual for plant and equipment
- D3 Maintenance Schedule for plant and equipment

Note: Copies of factory/supplier documentation manuals are not acceptable

APPENDIX F

Example of notice of handover

To:

Power and Water Corporation Remote Operation Planning and Development Section

Notice of Handover: Network and services

Location of Works:

Contract Number/reference:

Contract Title:

It is hereby requested that you accept the notice of handover for the infrastructure work constructed in accordance with the requirements of the approved project specification and plans. The works have been commissioned and connected to service networks.

Drawing numbers to

Enclosed documentation:

- a) Certificate of compliance
- b) Easement plan
- c) Copies of all necessary acceptances and approvals
- d) SLAP MAP Amendment Plan
- e) Cadastral/Lot Plan and approved lot servicing plan
- f) As constructed drawings included in the handover manual
- g) House/service connection details sheet
- h) Handover manual/report
- i) Details of any outstanding defects to be resolved and the method of resolution
- j) Date of final inspection prior to end of defect liability period / /

We undertake to remedy any defects or omissions specified in writing or defects arising due to defective workmanship or materials during the specified defects liability period.

Signed: Name: (Please print) Date: / /

Handover notice accepted by PWC: Name: Date: / /

General notes for pressure testing and disinfection:

Water for testing shall be clean, potable quality water, obtained from the existing mains supply.

All hydrostatic testing shall be undertaken on a progressive basis and shall be independently certified. Pressure test all water mains after trench filling and compaction, and not before any concrete has cured for at least 7 days.

If any of the tests prove to be unsatisfactory, detect and rectify the fault, and re-test.

Contact PWC remote operations by fax on 8924 5027 detailing the unsatisfactory test and cause.

Continue to rectify and re-test until a satisfactory test result is achieved. Even if testing produces satisfactory results, rectify any water main or conduit in which there is a visible or detectable leak or blockage.

Test polyethylene water mains in accordance with Water Services Association of Australia's WSA 01-2001 Polyethylene Pipeline Code.

Base the rate of filling on a maximum velocity of 0.05 m/s.

Allow between 3 and 24 hours for the test water temperature to stabilise and dissolved air to vent from the system. Fill cement-lined pipes 24 hours prior to testing to allow for saturation of any lining.

Where isolation is available, the water main may be progressively tested in sections of at least 100m, or in its entirety if the main is less than 100 m.

Conduct a bacteriological test on all new disinfected mains following satisfactory completion of swabbing/flushing and pressure testing of the water main.

Disinfect water mains before placing in service and after completion of pressure testing.

Commence by flushing the main at high flow using mains water, through an approved Power and Water meter, to remove potential contaminants.

Determine the volume of chlorinating agent (V_c) to mix into solution in litres to achieve a concentration of 100 mg/L using the equation $V_c = 0.83V_w$, where the volume of water, $V_w = 3.142 \times L \times (D/2)^2$ and L = length of water main, D = internal diameter of water main.

Use sodium hypochlorite as the chlorinating agent, except where the agent is to be stored for extended periods or exposed to elevated temperatures such as in remote areas. In such cases use calcium hypochlorite.

Dose the chlorinating agent into solution using either a calibrated metering pump or otherwise mix the chlorinating agent into solution in a water tanker truck. The volume of water in the truck's tank must equal the volume of the main requiring disinfection. Add equal quantities of sodium hypochlorite through each of the tanks hatches and mix the solution by driving the truck around the site.

For calcium hypochlorite, which is supplied in dry powder form, make up into a 1% chlorine solution prior to adding to the tanker or injecting with a metering pump. Mix in the ratio of 1 kg calcium hypochlorite powder to 70 litres of clean water. Wear plastic gloves when handling or using chemicals and avoid contact with skin or breathing of vapours.

Upon filling the main with the chlorinating solution, determine the residual chlorine in the main using a chlorine comparator or equivalent device at various points along the main. Where the chlorine residual falls substantially below 100 mg/L repeat the disinfection process.

Temporarily open valves, hydrants and fittings to disinfect dead spots.

After 24 hours, again determine the chlorine residual. Where the chlorine residual falls below 10 mg/L, repeat the disinfection process.

Discharge the super-chlorinated water to waste and flush the main with mains water through an approved Power and Water meter until the chlorine residual is equal to that of the mains water where the mains are chlorinated or undetectable for where mains are not chlorinated

Appendix F

Example of notice of handover

To:

Power and Water Corporation Remote Operation Planning and Development Section

Notice of Acceptance:.....Network and services

Location of Works:

Contract number/reference:

Contract Title:

It is hereby requested that you accept the notice of acceptance and project completion for the infrastructure work that was handed over to PWC.

The Date of final inspection prior to end of defect liability period was...../...../.....

The following non-conformance items were noted during the site inspection:

- 1)
- 2)
- 3)

The following works have been undertaken to remedy these non-conformance:

- 1)
- 2)
- 3)

Signed:..... Name: (Please print)..... Date:...../...../.....

Authorise representative of Developer..... (Title)

PWC acknowledges that this project is not complete and finalised.

Work Accepted by PWC:..... Name:..... Date:...../...../.....

Authorise representative of PWC..... (Title)