



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **NWP331B Inspect conduit and report on condition and features**

**Release: 1**

## **NWP331B Inspect conduit and report on condition and features**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to plan, prepare and conduct an inspection of gravity sewer or stormwater conduits, using specialised CCTV camera and transport systems, and reporting on observed defects and other features of the conduit in accordance with the industry code and job specifications. The ability to interpret technical information, identify and assess hazards, operate and maintain specialised technical equipment and produce computer generated reports on the condition and features of the conduit inspected are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operators with a specific responsibility for: inspecting and reporting on the condition of operational gravity sewers and stormwater conduits and new or rehabilitated sewers or stormwater conduits; and operating and maintaining specialised CCTV inspection equipment in compliance with organisational and statutory requirements. This unit may also be applied to the inspection of other types of conduit system.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for conduit inspection.</b>	<ul style="list-style-type: none"> <li>1.1 Identify the purpose of the inspection and the location, size, type and extent of the <i>conduit assets</i> from <i>relevant documentation</i>.</li> <li>1.2 Determine the inspection method and <i>equipment</i> to be used according to <i>organisational and statutory requirements</i>.</li> <li>1.3 Conduct and document hazard identification and risk assessment and implement appropriate <i>risk control processes</i>.</li> <li>1.4 Establish and implement <i>asset isolation / flow management plans</i> and inspection schedules in consultation with the system operator.</li> <li>1.5 Arrange for <i>preparation of the conduit and site for inspection</i> as required.</li> </ul>
<b>2 Operate and maintain equipment.</b>	<ul style="list-style-type: none"> <li>2.1 Set up and calibrate equipment to suit the size, type and conditions of conduit according to relevant <i>industry codes and/or specifications</i>.</li> <li>2.2 Operate equipment according to relevant industry codes and/or specifications and examine, record and report <i>features of the conduit</i> accurately.</li> <li>2.3 Conduct routine maintenance of equipment in accordance with manufacturer's recommendations.</li> <li>2.4 Diagnose and correct equipment malfunctions.</li> <li>2.5 Recognise and appropriately respond to <i>potential risks to equipment and/or system operation</i>.</li> </ul>
<b>3 Identify and code defects and other features observed during conduit inspection.</b>	<ul style="list-style-type: none"> <li>3.1 Identify and code structural defects, service conditions and other features of the conduit according to relevant industry codes and/or specifications.</li> <li>3.2 Record asset and inspection <i>data</i> using approved data capture software according to relevant industry codes and/or specifications.</li> <li>3.3 Investigate and report unrecognisable defects, service conditions or other features.</li> <li>3.4 Identify a conduit at risk of imminent failure and communicate details to the system operator or owner according to organisational and statutory requirements.</li> <li>3.5 Identify and report defects or malfunctioning of access structures in accordance with industry codes and/or specifications.</li> </ul>
<b>4 Withdraw inspection equipment and reinstate system operation.</b>	<ul style="list-style-type: none"> <li>4.1 Clean and inspect equipment for damage during and after withdrawal from the conduit.</li> <li>4.2 Reinstate system operation according to asset isolation / flow management plan and/or specifications.</li> <li>4.3 Restore work site to meet organisational, safety, property owner's</li> </ul>

**ELEMENT****PERFORMANCE CRITERIA**

and environmental requirements.

**5 Review, record and report work.**

- 5.1 Check inspection data and video records prior to removal of equipment for completeness, quality and accuracy.
- 5.2 Compile *conduit inspection reports* and present to the client in the required format.
- 5.3 Complete job documentation and communication according to the asset owner or operator's, and statutory requirements.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify structural defects, service conditions and other features in a range of different conduits
- apply industry inspection reporting code requirements
- use data capture software
- operate CCTV camera controls and recording systems
- identify and solve operational problems
- operate communication equipment
- access and interpret GIS data, interpret plans/maps, house service diagrams, instructions, specifications and standard operating procedures
- interpret policies, procedures and standards
- use safety equipment and personal protective equipment
- use tools and instruments associated with camera/transport operation, maintenance and calibration
- identify hazards
- give and receive instructions
- communicate with customers and other employees
- prepare and restore work site.

#### Required knowledge:

- industry inspection reporting code
- data capture, recording and reporting software
- occupational health and safety
- confined space entry procedures
- typical traffic control arrangements
- personal work site safety
- potential hazards and risk factors of operational processes
- equipment operation
- techniques of operation in unusual situations
- capabilities of camera, lights and transport system
- routine maintenance and calibration requirements of camera, lights and transport system
- effects of weather and conditions on operation of site or plant
- environmental aspects of operation and installation
- features of conduits used in Australia for gravity sewer and stormwater construction over the last 100 years
- construction and operation of sewerage and stormwater systems.

# Evidence Guide

## EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan, prepare and conduct an inspection of gravity sewer or stormwater conduits including:

- preparing for conduit inspection by:
- identifying the location and extent of the work, methods to be applied, and equipment, including safety equipment, to be used
- assessing risks and preparing for hazards
- implementing appropriate isolation and inspection procedures
- calibrating equipment for conduit inspection
- operating and maintaining equipment
- conducting inspections and identifying and coding conduit defects and condition
- recording data manually, or using approved software program
- investigating and recording anomalies
- reporting conduit at risk of failure
- removing equipment and reinstating system operation
- restoring worksite
- completing and processing inspection information according to organisational procedures.

### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of

## EVIDENCE GUIDE

time reflecting the scope of the role and the practical requirements of the workplace

- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

- Conduit assets*** may include:
- pipes, including those manufactured from:
    - vitrified clay (earthenware)
    - reinforced concrete
    - polyvinyl chloride (PVC)
    - polyethylene
    - polypropylene
    - unlined cast iron
    - cast iron cement lined
    - asbestos cement
    - ductile iron cement lined
    - glass reinforced plastic
    - mild steel cement lined
    - profiled thin gauge steel
    - other types of conduit, including:
      - concrete box culverts
      - circular or oviform brick
      - circular or oviform cast in situ concrete
      - circular, rectangular or variable cross section stone masonry block
      - lined pipes
      - other cross sections
    - asset structures, such as:
      - maintenance holes
      - maintenance shafts
      - drainage pits.
  - plans
  - GIS asset data on digital media
  - drawings
  - 'house' service diagrams
  - specifications
  - work instructions.
- Relevant documentation*** may include:
- specialised closed circuit television conduit inspection equipment and associated apparatus
  - hand-held still camera
- Equipment used*** may include:

## RANGE STATEMENT

- computer hardware and software for data entry
- hand and power tools
- manhole cover lifters
- lifting and winching equipment
- mechanical excavation equipment
- pneumatic and motorised equipment:
- compressors
- pneumatic spades and attachments
- motorised cutting equipment
- on- and off-road vehicles
- road signage
- portable pumps
- sewer plugs - pneumatic, or other types
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.
- interpretation or assessment of:
- specifications
- instructions
- codes
- conduit size and configuration
- access to conduit
- sewerage or stormwater system operation.
- by-laws
- organisational policies
- standard operating procedures
- communication and reporting protocols
- environment protection
- occupational health and safety, including the use of personal protective equipment
- lifts and cranes
- mines and subsidence
- road signage
- electrical
- dangerous goods.
- traffic control arrangements
- grating or barricading of openings
- asset isolation/flow control

*Organisational and statutory requirements* may include:

*Risk control processes* include:

## RANGE STATEMENT

- compliance with confined space entry procedures
  - compliance with asset access procedures
  - personal protective equipment such as gloves
  - personal hygiene practices.
- Asset isolation / flow management plans*** may include:
- arrangements with system operator or owner for:
  - shutting down, tagging and/or lockout of parts of the system, for example:
  - pumping stations
  - valves
  - reinstatement of operations
  - conducting inspections to coincide with low flow in the conduit
  - blocking off flow in a sewer and monitoring backup
  - blocking off flow and bypass pumping.
- Preparation of the conduit and site for inspection*** includes:
- high pressure water jet cleaning to remove surface build-up on the wall of the conduit, roots and or debris
  - locating, exposing, removal and replacement of maintenance hole/pit covers or grates
  - arranging special access requirements, such as:
  - across private land
  - through gates
  - inside buildings
  - construction of platforms for above ground maintenance holes.
- Industry codes and/or specifications*** may include:
- the Conduit Inspection reporting code of Australia WSA 05 2006
  - other codes as nominated by the asset owner, operator or regulator
  - contract specifications for work activity.
- Features of the conduit*** may include:
- structural condition
  - service condition.
- Potential risks to equipment and/or system*** may include:
- loss of camera or equipment due to the condition of the conduit
  - backup of sewage caused by camera or equipment and/or sudden changes in flow.
- Data*** recording may be conducted:
- manually
  - using approved data capture software.
- Conduit evaluation reports*** may comprise:
- videotapes
  - log sheets
  - asset information such as plans, maps, asset location,

## **RANGE STATEMENT**

- number, age and type
- photographs.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution