



**Australian Government**

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

# **RIICRC301A Maintain drainage systems**

**Release: 1**

## RIICRC301A Maintain drainage systems

### Modification History

Not applicable.

### Unit Descriptor

This unit covers the maintenance of drainage systems in the civil construction industry. It includes planning and preparing, maintaining drainage components, excavating and repairing drainage systems, maintaining open drains, inspecting, clearing and repairing culverts, and cleaning up. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

### Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Civil construction

### Licensing/Regulatory Information

Refer to Unit Descriptor.

### Pre-Requisites

Not applicable.

### Employability Skills Information

This unit contains employability skills.

### Elements and Performance Criteria Pre-Content

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

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare	1.1. Access, interpret and apply <b>compliance documentation</b> relevant to the work activity 1.2. Obtain and confirm <b>safety requirements</b> from the site safety plan and organisational policies and procedures, and apply to the allotted task 1.3. Identify, obtain and implement signage requirements from the project traffic management plan 1.4. Select <b>tools and equipment</b> to carry out tasks consistent with the requirements of the job, check for serviceability and rectify or report any faults 1.5. Determine temporary stormwater diversion requirement in accordance with existing drainage outlets, site requirements and planned schedule of construction 1.6. Identify <b>environmental protection requirements</b> from the project environmental management plan, and confirm and apply to the allotted task
2. Maintain drainage components	2.1. Regularly inspect and maintain <b>drainage components</b> and rectify or report faults 2.2. Repair drainage components as per initial design specifications and/or engineer's redesign 2.3. Flush out drainage system to clear blockages and provide clear flows of fluid
3. Excavate and repair drainage systems	3.1. Determine location of repairs from work order and confirm on site 3.2. Carry out excavation in accordance with task specifications and site safety plan 3.3. Prepare <b>pipes</b> and accessories in accordance with design method of repair 3.4. Replace pipe sections and <b>join</b> and align to line and specified fall 3.5. Install packing to maintain alignment of pipeline 3.6. Make joints to pipe section junctions in accordance with specification requirements

	<p>3.7.Backfill required section</p> <p>3.8.Conduct inspection and testing of repaired drainage system to determine effectiveness of repairs</p>
4. Maintain open drains	<p>4.1.Maintain open drains to correct line and fall specifications</p> <p>4.2.Finish surfaces adjoining open drains allowing ease of run off</p> <p>4.3.Undertake adequate erosion control methods</p>
5. Inspect, clear and repair culverts	<p>5.1.Identify faults in <i>culverts</i> and determine appropriate repair requirements and specifications</p> <p>5.2.Repair/replace sections and joint to levels and design specifications</p> <p>5.3.Repair/maintain inlets and outlets in accordance with culvert design and specifications</p> <p>5.4.Compact backfill</p>
6. Clean up	<p>6.1.Clear work area and dispose of or recycle materials in accordance with project environmental management plan</p> <p>6.2.Seal and store/pack in unused materials in accordance with standard material handling practices and techniques</p> <p>6.3.Clean, check, maintain and store plant, tools and equipment</p>

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to maintain drainage systems:

- apply legislative, organisation and site requirements and procedures for maintaining drainage systems
- organise work activities
- select and use relevant tools and equipment safely
- identify and report on hazards related to the worksite and work activity
- communicate effectively to receive and clarify work instructions

### Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to maintain drainage systems:

- drainage types, characteristics, advantages and limitations
- basic flow theory
- basic principles of soil technology for civil works
- techniques for locating faults in drainage systems
- methods of joining pipes
- excavation techniques
- site and equipment safety requirements
- processes for interpreting engineering drawings and sketches
- site isolation and traffic control responsibilities and authorities
- materials safety data sheets and materials handling methods
- project quality requirements
- civil construction terminology
- sedimentation and erosion control
- JSAs/safe work method statement

## Evidence Guide

<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p><b>Overview of assessment</b></p>	
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:</p> <ul style="list-style-type: none"> <li>• knowledge of the requirements, procedures and instructions for maintaining drainage systems</li> <li>• implementation of requirements, procedures and techniques for the safe, effective and efficient completion of drainage system maintenance</li> <li>• working with others to undertake and complete the maintenance of drainage systems that meets all of the required outcomes</li> <li>• consistent timely completion of drainage system maintenance that safely, effectively and efficiently meets the required outcomes</li> </ul>
<p><b>Context of and specific resources for assessment</b></p>	<ul style="list-style-type: none"> <li>• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.</li> <li>• Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances.</li> <li>• The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job.</li> <li>• Customisation of assessment and delivery</li> </ul>

	<p>environment to sensitively accommodate cultural diversity.</p> <ul style="list-style-type: none"> <li>• Aboriginal people and other people from a non English speaking background may have second language issues.</li> <li>• 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.</li> </ul>
<b>Method of assessment</b>	<p>This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:</p> <ul style="list-style-type: none"> <li>• written and/or oral assessment of the candidate's required knowledge</li> <li>• observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes</li> <li>• consistent achievement of required outcomes</li> </ul> </li> <li>• first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• working with others to undertake and complete the maintenance of drainage systems</li> </ul> </li> </ul>
<b>Guidance information for assessment</b>	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

## Range Statement

<p>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. 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) may also be included.</p>	
<p><b>Relevant compliance documentation</b> may include:</p>	<ul style="list-style-type: none"> <li>• legislative, organisational and site requirements and procedures</li> <li>• manufacturer's guidelines and specifications</li> <li>• Australian standards</li> <li>• Employment and workplace relations legislation</li> <li>• Equal Employment Opportunity and Disability Discrimination legislation</li> </ul>
<p><b>Safety requirements</b> may include:</p>	<ul style="list-style-type: none"> <li>• OHS requirements in accordance with state or territory legislation and regulations, organisational safety policies and procedures, and project safety plan, including protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, use of First Aid equipment, hazard control and hazardous materials and substances</li> <li>• safe operating procedures including recognising and preventing hazards associated with high voltage power lines, uneven/unstable terrain, trees, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, traffic control, working at heights, working in proximity to others, worksite visitors and the public</li> <li>• safe parking practices including ensuring access ways are clear, equipment/machinery is away from overhangs and refuelling sites, safe distances are kept from excavations, and areas secured from unauthorised access or movement</li> <li>• recognising hazards and risks including uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials</li> <li>• emergency procedures related to equipment</li> </ul>



	operation including emergency shutdown and stopping, extinguishing equipment fires, organisational First Aid requirements and evacuation
<b>Tools and equipment</b> may include:	<ul style="list-style-type: none"> <li>• levelling equipment</li> <li>• tape measures</li> <li>• shovels</li> <li>• hand saws</li> <li>• cutting knives</li> <li>• crow bars</li> <li>• hammers</li> <li>• trowels</li> <li>• formwork</li> </ul>
<b>Environmental protection requirements</b> may include:	<ul style="list-style-type: none"> <li>• organisational/project environmental management plan</li> <li>• waste management</li> <li>• water quality protection</li> <li>• noise</li> <li>• vibration</li> <li>• dust and clean-up management</li> </ul>
<b>Drainage components</b> may include:	<ul style="list-style-type: none"> <li>• gully/silt traps</li> <li>• inspection openings</li> <li>• manholes</li> <li>• benches</li> <li>• lining</li> <li>• step irons</li> <li>• lids</li> <li>• headstones</li> <li>• backstones</li> <li>• grates</li> <li>• kerbs</li> <li>• gutters</li> <li>• inlets and outlets</li> <li>• gabion baskets</li> <li>• rip rap</li> <li>• wingwalls</li> <li>• endwalls</li> <li>• aprons</li> <li>• reno-mattresses</li> <li>• geofabric</li> <li>• drain blocks</li> <li>• check dams</li> </ul>

	<ul style="list-style-type: none"> <li>• sediment</li> <li>• silt control</li> </ul>
<b>Pipes</b> may include:	<ul style="list-style-type: none"> <li>• reinforced concrete</li> <li>• rigid PVC</li> <li>• flexible PVC</li> <li>• steel box culverts</li> <li>• clay pipes</li> <li>• fibre reinforced cement (FRC)</li> </ul>
<b>Join</b> may include:	<ul style="list-style-type: none"> <li>• sleeve joints with adhesives</li> <li>• socket and spigot with adhesives</li> <li>• socket and spigot with rubber rings</li> <li>• butt joints with outside bands</li> <li>• butt joints with inside rendering</li> <li>• flanged and bolted joining</li> <li>• welded connections</li> </ul>
<b>Culverts</b> may include:	<ul style="list-style-type: none"> <li>• reinforced concrete pipe sections</li> <li>• reinforced concrete box sections</li> <li>• steel pipe</li> <li>• FRC</li> <li>• PVC</li> </ul>

## Unit Sector(s)

Road and Pavements Construction and Maintenance (General)

## Competency field

Refer to Unit Sector(s).

## Co-requisite units

Not applicable.