



Australian Government

CPCLOC3003 Locate using ground penetrating radar (GPR)

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Modification History

Release	Comments
1	This unit of competency was first released in CPC Construction, Plumbing and Services Training Package Release 11.0.

Application

This unit describes the skills and knowledge required to use a Ground Penetrating Radar (GPR) to locate underground services.

It applies to those working in operational roles in utility location work. They generally work under supervision and hold some responsibility for the use of GPR to locate and protect underground services.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories and utility operators. It is a requirement to check with the relevant body before applying this unit.

Licensing/Regulatory Information

A White Card must be attained when working on a construction site.

Pre-requisite unit(s)

No pre-requisite units

Competency field(s)

Utility Locating

Unit sector(s)

Construction

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare GPR.	1.1 Identify the key components of the GPR device.

	1.2 Check the condition of components of the GPR device in accordance with manufacturer specifications. 1.3 Access personal protective equipment (PPE) and ensure they are fitted correctly on the worksite. 1.4 Test basic functions of the GPR device to ensure working order in accordance with manufacturer specifications. 1.5 Identify any faults or damage to the GPR device and report to relevant person in accordance with worksite reporting requirements.
2. Identify GPR features.	2.1 Identify the antennas orientation and frequency to determine depth penetration. 2.2 Determine the surface soil types in terms of how they affect GPR. 2.3 Identify hyperbola size, shape and contrast to determine suitability to the ground conditions. 2.4 Identify layers to determine the use of GPR to meet underground service requirements.
3. Utilise GPR in the field.	3.1 Identify and observe work health and safety (WHS) requirements associated with the use of the GPR device. 3.2 Determine the best scan methods, including grid and transversal to meet the underground service needs and discuss with relevant person(s) to ensure appropriate action is taken. 3.3 Determine the soil velocity on the worksite to facilitate appropriate use of GPR. 3.4 Position the GPR over a pipe or cable appropriately in accordance with WHS requirements. 3.5 Assess soil properties and conduct penetrative underground tests if soil properties are poor. 3.6 Mark ground services in accordance with regulations and codes of practice.
4. Locate unknown services in worksite area.	4.1 Determine appropriate grid search methods to scan for unknown services in the scope of works. 4.2 Determine the methods to look for unknown services noting that ground conditions may preclude the use of GPR. 4.3 Implement search methods identified to locate unknown services in accordance with worksite and WHS requirements.
5. Complete services.	5.1 Ensure the GPR battery is secure and safe in vehicle for transport. 5.2 Clean the debris from the GPR device on completion of works.

	5.3 Conduct documentation as required according to workplace procedures.
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Foundation skills

Skill	Description
Numeracy	Calculates tolerances to determine the requirements of the location worksite.
Oral communication	Acquires details and reports problems and/or hazards to a supervisor or service and/or utility owner/operator.
Reading	Identifies, interprets and implements requirements from at times complex workplace procedures, documentation, legislation and regulations
Writing	Records information relating to GPR.

Range of conditions

N/A

Assessment Requirements for CPCLOC3003 Locate using ground penetrating radar (GPR)

Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- Access and interpret calibration documentation and use GPR in the field on two occasions for two sites with different conditions.

During the above, the candidate must:

- implement the requirements, procedures and techniques to use GPR for underground services, including:
 - communicating to clarify instructions and information
 - identifying and reporting faults
 - completing documentation
- work with others to identify and use GPR or underground services that meets required outcomes, including:
 - using a range of communication techniques and equipment
 - complying with written and verbal reporting requirements and procedures
- employ required techniques and equipment to search for services and utilities.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- safety features of personal protective equipment (PPE), and when and how it should be used
- work health and safety (WHS) requirements associated with the use of GPR, including:
 - safety data sheets and materials handling methods
 - job safety analysis (JSAs), job safety environmental analysis (JSEAs), and safe work method statements (SWMSs)
- key risks relating to underground utility services when using GPR
- communication processes in utility locating when using GPR, including:
 - pre-field communication with relevant person to test GPR
 - on-site communication to coordinate practices, clarify instructions and observe GPR safety issues
 - reporting and documentation

- key indicators of work quality and accuracy, including:
 - antennas orientation and frequency to determine depth penetration
 - appropriate position the GPR over a pipe or cable
 - appropriate scan methods, grid and transversal
 - cleaning the debris from the GPR device following use
 - ensuring GPR battery is secure and safe in vehicle for transport
- key standards, policies and procedures, legislation and established requirements for identifying, locating and protecting underground services with the use of GPR
- GPR use methods to identify unknown services, including:
 - dielectrics in soil types and how they could affect GPR signal
 - resistivity in soils and moisture content and how this affects the signals
 - how material types can affect results and contrast of an image
 - how a GPR works out depth using soil velocity
 - hyperbola fitting and how this adjusts soil velocity
 - contrast and reflection of image
- methods to look for unknown services, in addition to GPR:
 - electromagnetic field (EMF) locator
 - other non-metallic technologies
- limitations for the use of GPR if the ground conditions include long grass, mud or if the ground is too rough
- key factors affecting work activities, including:
 - types of services, utilities and providers
 - working in a road reserve
 - equipment types, characteristics, technical capabilities and limitations
- manufacturer specifications for GPR use
- additional equipment, including:
 - marking equipment
 - safety equipment.

Assessment Conditions

Assessors are responsible for ensuring that the candidate demonstrating competency has access to:

- underground utility standards
- appropriate site, documents, equipment and personal protective equipment (PPE) currently used in industry

- requirements of workplace policies, procedures.

Mandatory Workplace Requirements

Assessment of performance evidence may be in a workplace setting or an environment that accurately represents a real workplace.

Unit Mapping Information

Previous Code and Title	Equivalence	Comments
	Newly created	This unit has been created to address a skill or task required by industry that is not covered by an existing unit of competency

Links

Companion volumes, including implementation guides, are found on the national training register - <https://training.gov.au/training/details/CPC>.