

Training Package	Amenity Horticulture (RTF03)	HSC Requirements and Advice
Title	Determine basic properties of soil/growing media	
Unit code RTF2504A	<p>This competency standard covers the process of determining the basic properties of soil or soil-less growing media. It requires the ability to collect samples and perform basic tests.</p> <p>It requires knowledge of sample collection techniques, basic soil/growing media properties, and basic understanding of soil/plant relationships. Determining the basic properties of soil or soil-less growing media is likely to be under supervision from others, with checking related to overall progress. The work is usually done within routines, methods and procedures where some discretion and judgement is required in the selection of equipment and materials, organisation of work, and the achievement of outcomes within time and budgetary constraints.</p>	HSC Indicative Hours 10

Evidence Guide

What evidence is required to demonstrate competence for this standard as a whole?

Competence in determining basic properties of soils/media requires evidence that sampling, testing, interpreting and recording techniques have been successfully and appropriately carried out. The skills and knowledge required to determine the basic properties of soils/media must be **transferable** to a range of work environments and contexts. For example, this could include different soil/media types tested for different properties for a range of crops or plants.

What specific knowledge is needed to achieve the performance criteria?	What specific skills are needed to achieve the performance criteria?	Are there other competency standards that could be assessed with this one?	Assessment guide	HSC Requirements and Advice
<p>Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this unit are listed below:</p> <ul style="list-style-type: none"> • soil sampling techniques • soil/media physical properties • soil/media chemical properties • soil/media plant relationships • basic soil/media field tests • interpreting laboratory results • techniques to ameliorate soil properties. 	<p>To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complimentary skills are required. These include the ability to:</p> <ul style="list-style-type: none"> • collect soil/media samples • perform basic soil/media tests • interpret results from own or laboratory results • record and store information. 	<p>This competency standard <u>could</u> be assessed on its own or in combination with other competencies relevant to the job function.</p>	<p>There is essential information about assessing this competency standard for consistent performance and where and how it may be assessed, in the Assessment Guidelines for this Training Package. All users of these competency standards must have access to the Assessment Guidelines. Further advice may also be sought from the relevant Sector Booklet.</p>	<p>Key Terms and Concepts</p> <ul style="list-style-type: none"> • analysis • cores • field tests • growing media • hazard identification • labelling • occupational health and safety (OHS) • personal protective equipment (PPE) • physical and chemical properties • risk assessment • sampling sites • sampling techniques • services • site plans • soil

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				<ul style="list-style-type: none"> • soil profile • Standard Operating Procedures (SOP) • Tools, equipment and materials • topography • workplace records

Element	Performance Criteria	Range of Variables	HSC Requirements and Advice
1 Collect soil/media samples for testing	1.1 Tools and materials for collecting soil/media samples are prepared.	<p>The Range of Variables explains the context within which the performance and knowledge requirements of this standard may be assessed. The scope of variables chosen in training and assessment requirements may depend on the work situations available.</p> <p>For more information on contexts, environment and variables for training and assessment refer to the Sector Booklet.</p> <p>What tools and equipment may be relevant to this standard?</p> <p>Tools and equipment include spades, augers, soil/media sample storing and recording materials, field test kits and interpreting charts.</p> <p>What activities may be included in sampling?</p> <p>Sampling activities may include collecting, preparing, packaging and labelling soil samples for off-site testing and/or on-site testing and analysis.</p>	<p>Learning experiences for the HSC must address:</p> <p>An understanding of the use and preparation of a range of soil/media testing and sampling equipment including:</p> <ul style="list-style-type: none"> • soil probe • shovel/spade • plastic bucket • sample bags • waterproof marker • gloves • ruler • measuring tape • camera • soil augers • pH field test kit • Munsell soil colour charts • interpreting charts • spatula/knife • distilled water • water bottle • working board • stationery.
	1.2 Area from which soil/media samples are to be collected is identified from workplace records or supervisors instructions.		<p>Learning experiences for the HSC must address:</p> <p>Appropriate selection of soil/media sampling sites according to supervisors instructions including:</p> <ul style="list-style-type: none"> • representation of soil/media type • reference to maps • history of area • planned future use • topography • details of past soil/media test locations • paddock identifiers. <p>An awareness of poor sampling sites including:</p> <ul style="list-style-type: none"> • roads and vehicle tracks • fence lines • unrepresentative soil/media conditions • drainage lines • boundaries between soil/media types • stock camps.

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	<p>1.3 Services are located using site plans and in consultation with the supervisor.</p>	<p>What services may need to be located?</p> <p>Services may include water supply, gas, electricity, telecommunications, irrigation, stormwater and drainage.</p>	<p>Learning experiences for the HSC must address:</p> <p>Knowledge of methods for locating underground services including:</p> <ul style="list-style-type: none"> • power • water supply • irrigation • storm water • drainage • gas • telecommunications. <p>An understanding of potential risks caused by not identifying underground services including:</p> <ul style="list-style-type: none"> • power failure • loss of water • electrocution • explosion • gas leaks • flooding • isolation due to communication loss • financial loss.
	<p>1.4 OHS hazards are identified, risks assessed and controls implemented and reported to the supervisor.</p>	<p>What OHS hazards may be associated with performing a soil survey?</p> <p>Hazards may include disturbance or interruption of services, solar radiation, dust, noise, soil- and water-borne micro-organisms, chemicals and hazardous substances, sharp hand tools and equipment, manual handling, moving machinery and machinery parts, falling objects, and uneven surfaces.</p>	<p>Learning experiences for the HSC must address:</p> <p>Awareness of potential hazards including:</p> <ul style="list-style-type: none"> • physical <ul style="list-style-type: none"> – unsafe tools and equipment – uneven surfaces – fatigue – noise – dust – vehicles – exposed moving machinery parts – obstacles • biological <ul style="list-style-type: none"> – soil and water borne micro-organisms – plant allergy – hazardous substances – insects – spiders – snakes • ergonomic <ul style="list-style-type: none"> – inappropriate use of tools/equipment

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			<ul style="list-style-type: none"> - poor manual handling • environmental <ul style="list-style-type: none"> - climate - solar radiation • psychological <ul style="list-style-type: none"> - dealing with emergencies - working alone - isolation. <p>A basic understanding of risk assessment including:</p> <ul style="list-style-type: none"> • identify hazards • assess associated risks • strategies to control/eliminate risks. <p>An awareness of appropriate OHS strategies including:</p> <ul style="list-style-type: none"> • select, use and maintain appropriate personal protective equipment (PPE) • sufficient drinking water • basic first aid training • access to first aid kits • safe work practices and procedures • access to appropriate communication devices • emergency plan • safety signs • environmental policies • cleaning and disinfecting procedures.
	<p>1.5 Suitable safety equipment and personal protective equipment (PPE) are selected, used and maintained.</p>	<p>What PPE may be required to perform a soil survey?</p> <p>PPE may include hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, hearing protection, sunscreen lotion and hard hat.</p>	<p>Learning experiences for the HSC must address:</p> <p>The selection, use, maintenance and storage of PPE appropriate to the work task including:</p> <ul style="list-style-type: none"> • footwear • head protection – hard hat, sun hat and helmet • overalls • gloves • apron • respirator • face mask • hearing protection • eye protection – goggles, safety glasses and face guard • sunscreen • waterproof clothing.

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			<p>Maintenance of PPE according to manufacturer's instructions and enterprise Standard Operating Procedures (SOP) including:</p> <ul style="list-style-type: none"> • cleaning and decontamination • correct storage • regular checks for damage • repair/replacement of worn, malfunctioning or damaged equipment/parts • disposal of single-use equipment.
	<p>1.6 Samples are taken randomly from the designated area according to recognised sampling techniques and are prepared for on site or off site analysis.</p>	<p>What activities may be included in sampling?</p> <p>Sampling activities may include collecting, preparing, packaging and labelling soil samples for off-site testing and/or on-site testing and analysis.</p> <p>What tests may be performed?</p> <p>Soils/media may be tested for depth, colour, texture, structure, compaction, air-filled porosity, pH, salinity and nutrients.</p>	<p>Learning experiences for the HSC must address:</p> <p>An understanding of a range of sampling techniques for collecting representative soil/media including:</p> <ul style="list-style-type: none"> • combining multiple cores to make a bulk sample • cores taken from a representative area • cores taken from across the representative area • cores taken at constant depth. <p>Procedures for handling soil/media samples for off-site analysis including:</p> <ul style="list-style-type: none"> • cores from one sample are bulked together into sealed bags • appropriate storage • accurate labelling. <p>Procedures for handling soil/media samples for on-site analysis including:</p> <ul style="list-style-type: none"> • cores from one sample are bulked together • crushing bulked sample is into smaller particles and mixing • sub-sample analysed by testing.
	<p>1.7 Samples are labelled and recorded according to organisational procedures.</p>		<p>Learning experiences for the HSC must address:</p> <p>Requirements for labelling soil/media sample including:</p> <ul style="list-style-type: none"> • sampling date and location • details about person collecting the sample • depth of sample • description of soil type and surrounding vegetation • topography of sampling site

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			<ul style="list-style-type: none"> • geographical district • soil parent material • intended use for sampled area • history of area sampled.
2 Perform basic soil/media tests	2.1 Soil profile is determined, where appropriate.		<p>Learning experiences for the HSC must address:</p> <p>Techniques for describing soil profiles:</p> <ul style="list-style-type: none"> • identification of boundaries between soil horizons • labelling of horizons into broad groups • identification of sub-horizons • field tests for each horizon including <ul style="list-style-type: none"> – depth – colour using Munsell colour chart – soil structure – soil texture – pH – organic matter presence.
	2.2 Soils/media are tested or inspected for physical properties.	<p>What activities may be included in sampling?</p> <p>Sampling activities may include collecting, preparing, packaging and labelling soil samples for off-site testing and/or on-site testing and analysis.</p> <p>What tests may be performed?</p> <p>Soils/media may be tested for depth, colour, texture, structure, compaction, air-filled porosity, pH, salinity and nutrients.</p> <p>What tools and equipment may be relevant to this standard?</p> <p>Tools and equipment include spades, augers, soil/media sample storing and recording materials, field test kits and interpreting charts.</p>	<p>Learning experiences for the HSC must address:</p> <p>Physical properties of soil/media including:</p> <ul style="list-style-type: none"> • soil texture • soil structure • soil colour. <p>An understanding of the properties of soil/media including:</p> <ul style="list-style-type: none"> • water holding capacity • water infiltration rate • plant root penetration • ease of cultivation • susceptibility to erosion • susceptibility to compaction • soil management requirements.
	2.3 Soils/media is tested for chemical properties.		<p>Learning experiences for the HSC must address:</p> <p>Knowledge of the procedures for testing chemical properties of soil/media including:</p> <ul style="list-style-type: none"> • pH • electrical conductivity.

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			Interpretation of soil/media chemical properties including: <ul style="list-style-type: none"> • level of soil salinity • plant nutritional problems • soil chemical treatment requirements • soil management requirements.
	2.4 Results are recorded according to organisational procedures.		Learning experiences for the HSC must address: Recording soil/media testing results including: <ul style="list-style-type: none"> • sampling location and details • soil profile description • physical analysis results • chemical test results • test results from off-site soil analysis • test analysis interpretation • management history.

What processes should be applied to this competency standard?

There are a number of processes that are learnt throughout work and life, which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the **key competencies**, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the level to which the key competency needs to be demonstrated where

0 = not required 1 = perform the process 2 = perform and administer the process 3 = perform, administer and design the process

1. How can communication of ideas and information (1) be applied?	Through reporting results of soil/media tests to supervisor or others orally or in writing.
2. How can information be collected, analysed and organised (2) ?	Through recording, interpreting and filing soil/media results.
3. How are activities planned and organised (2) ?	According to workplace procedures.
4. How can team work (1) be applied?	Through working with other to achieve an outcome.
5. How can the use of mathematical ideas and techniques (2) be applied?	Through the use of accepted soil/media tests and by carrying out the required number of samples from a designated area and in a manner that is random across the designated area.
6. How can problem-solving skills (2) be applied?	Through identifying and resolving problems with the sampling process.
7. How can the use of technology (2) be applied?	Through the use of standard soil/media testing equipment.