

## Australian Society of Soil Science Inc. Standards for Professionals in Soil Science

### 1. PROFESSIONAL PRACTICE VALUES

Engages in responsible and ethical practice, directed to the enhancement of the role and effectiveness of the profession in the scientific, educational, environmental and social sustainability of industries and activities served through the application of soil science.

Stage 1 Standard		Stage 2 Standard		Stage 3 Standard	
Meets performance criteria - limited experience		Competent at unsupervised work		Demonstrated mature and autonomous work	
<b>1.1 OBSERVES SOCIAL AND ETHICAL RESPONSIBILITY</b>					
1.1.1	Gives due regard to relevant legal, contractual, intellectual property, safety, time and cost-effectiveness aspects of work.	Effectively applies an understanding of relevant aspects of legal, contractual, intellectual property, safety, time and cost-effectiveness obligations.	Effectively applies an understanding of aspects of regulations and standards pertinent to the work role.	Undertakes professional practice with a full awareness of responsibility and accountability for legal, contractual, environmental, intellectual property, safety, time and cost-effectiveness.	
1.1.2	Gives due regard to aspects of regulations and standards pertinent to the work role.	Effectively applies an understanding of aspects of regulations and standards pertinent to the work role.	Effectively applies an understanding of aspects of regulations and standards pertinent to the work role.	Maintains a high level of knowledge and understanding of relevant regulations, standards and ethics, and applies this effectively.	
1.1.3	Understands and meets professional, social and ethical responsibilities to employers, clients, colleagues and the community, and seeks advice on particular issues.	Observes well developed commitment to the professional, social and ethical aspects of responsibilities to employers, clients, colleagues and the community.	Observes well developed commitment to the professional, social and ethical aspects of responsibilities to employers, clients, colleagues and the community.	Observes highly developed commitment to the professional, social and ethical aspects of responsibilities to employers, colleagues and the community.	
1.1.4	Contributes effectively to discussions affecting the profession in urban and/or rural environments through participation in professional and/or industry committees, groups or associations.	Initiates and contributes effectively to decisions affecting the profession in urban and/or rural environments through participation in professional and/or industry committees, groups or associations.	Initiates and contributes effectively to decisions affecting the profession in urban and/or rural environments through participation in professional and/or industry committees, groups or associations.	Represents the profession and/or employing organisation in decision-making concerning issues arising in urban and/or rural environments at a State or Territory level (or similar).	
1.1.5	Exercises sound judgment in assessing ethical considerations.	Exercises sound judgment in assessing ethical considerations.	Exercises sound judgment in assessing ethical considerations.	Exercises high level judgment in assessing ethical considerations.	
<b>1.2 PURSUES CONTINUING PROFESSIONAL DEVELOPMENT</b>					
1.2.1	Seeks advice on opportunities for professional development through challenging work experience.	Pursues opportunities for professional development through challenging work experience.	Pursues opportunities for professional development through challenging work experience.	Pursues opportunities for professional development through high level work experience.	
1.2.2	Seeks opportunities to extend knowledge and skills in fulfillment of an awareness of professional obligations.	Observes the professional obligation for continuing effort in extending knowledge and skills in depth and breadth in relevant aspects of professional practice and industry.	Observes the professional obligation for continuing effort in extending knowledge and skills in depth and breadth in relevant aspects of professional practice and industry.	Observes the professional obligation for continuing effort in extending knowledge and skills in depth and breadth in professional and industry fields.	
1.2.3	Encourages personal development and fosters vocational satisfaction among staff for whom responsibilities are exercised.	Provides advice and guidance on personal development to staff for whom responsibilities are exercised.	Provides advice and guidance on personal development to staff for whom responsibilities are exercised.	Provides leadership on professional values and practices, and advice and guidance on personal development to junior colleagues and staff for whom responsibilities are exercised.	
<b>1.3 ASSUMES PERSONAL RESPONSIBILITY FOR OWN ACTIONS</b>					

1.3.1	Understands and meets liabilities and obligations arising from occupational health and safety legislation and regulations relevant to the area of work.	Understands and meets liabilities and obligations arising from occupational health and safety legislation and regulations relevant to the position held.	Is accountable for and meets liabilities and obligations arising from occupational health and safety legislation and regulations within the responsibility of the position held.
1.3.2	Understands and meets professional and statutory liabilities and risk relevant to the work being undertaken.	Understands and meets professional and statutory liabilities including risk management.	Is accountable for and meets professional and statutory liabilities and the management of risk.
1.3.3	Maintains confidentiality and fiduciary responsibility to the client and employer.	Exercises confidentiality and fiduciary responsibility to the client and employer in a professional manner.	Is accountable for and effectively discharges confidentiality and fiduciary responsibilities.
1.3.4	Applies the principles of equal opportunity in all aspects of business practice.	Applies the principles of equal opportunity in all aspects of business practice.	Is accountable for and effectively discharges equal opportunity responsibilities in all aspects of professional business practice.
<b>1.4 FOSTERS SOCIAL AND ENVIRONMENTAL SUSTAINABILITY</b>			
1.4.1	Gives due regard to the relevant sociological and environmental factors in those industries in which soil science is applied.	Gives full regard to the relevant sociological, environmental and political considerations in those industries in which soil science is applied.	Is responsible for ensuring due recognition is given to relevant sociological, environmental and political factors in those industries in which soil science is applied.
1.4.2	Gives due regard to the relevant social and environmental aspects of natural resource use in those industries in which soil science is applied.	Gives full regard to the relevant social and environmental aspects of natural resource use in those industries in which soil science is applied.	Is responsible for ensuring due recognition is given to relevant social and environmental aspects of natural resource use in those industries in which soil science is applied.

## 2. COMMUNICATION

Engages in effective communication for the application and dissemination of scientific, educational, economic, business and managerial information on soil science in all its applications.

	<b>Stage 1 Standard</b>	<b>Stage 2 Standard</b>	<b>Stage 3 Standard</b>
	Meets performance criteria - limited experience	Competent at unsupervised work	Demonstrated mature and autonomous work
<b>2.1 COMMUNICATES WITH A VARIETY OF AUDIENCES</b>			
2.1.1	Writes accurate, relevant and effective reports, documentation, papers and correspondence to inform colleagues, supervisors and clients on day-to-day or routine matters.	Produces accurate, relevant and effective reports, documentation, papers and correspondence to inform clients, colleagues and supervisors of new developments or on matters of significant interest.	Produces accurate, relevant and effective reports, documentation, papers and correspondence to inform clients, colleagues and others of new developments or on matters of significant interest.
2.1.2	Communicates orally to a range of audiences on matters relevant to the work role, conveying ideas in a clear, concise and comprehensive manner suiting the occasion.	Effectively communicates orally to a range of audiences on matters relevant to the work role, conveying ideas and specific objectives in a clear, concise and comprehensive manner suiting the occasion.	Communicates orally to a range of audiences on matters relevant to the work role, conveying ideas and specific objectives in a highly developed manner suiting the occasion.
2.1.3	Prepares accurate draft reports for presentation and interpretation of information and data.	Prepares, interprets and presents accurate information and data in a timely and effective manner.	Prepares, interprets and communicates accurate information to a range of colleagues, clients and others in reports, documentation, papers for publication and correspondence, and achieves effective message impact.

2.1.4	Exchanges ideas with colleagues, clients, students and the general public, through the effective exercise of basic interpersonal skills.	Exercises well-developed interpersonal skills, and the skills required for effective negotiation, conflict resolution, counseling, exchange of ideas and the conveying of convictions and attitudes.	Exercises highly-developed interpersonal skills, and the skills required for effective negotiation, conflict resolution, counseling, exchange of ideas, and conveying convictions and attitudes, tactfully dealing with sensitive issues.
2.1.5	Liaises effectively with colleagues and others within and external to the employing organisation.	Liaises effectively with colleagues and experts within and external to the employing organisation.	Liaises effectively with a network of colleagues and experts on a range of subjects.
<b>2.2 PREPARES AND PRESENTS TALKS AND PAPERS</b>			
2.2.1	Assembles accurate information and prepares drafts for talks, using language and concepts appropriate to the audience, including lectures to lay or professional audiences.	Prepares and delivers talks and lectures to laypersons, students and professionals, at a level of understanding appropriate to the audience, and effectively responds to audience feedback.	Organises, prepares and delivers talks and lectures to laypersons, students and professionals, at a level of understanding appropriate to the audience, and effectively responds to audience feedback.
2.2.2	Gathers and accurately analyses information and prepares drafts of papers for publication in professional journals and technical reports of a similar standard.	Prepares accurate, comprehensive papers for publication in professional journals and technical reports of a similar standard, with effectiveness gauged in terms of impact rather than on number of publications.	Prepares and reviews advanced papers for professional journals and technical reports of a similar standard, with effectiveness gauged in terms of impact rather than on number of publications.
<b>2.3 USES VARIOUS MEDIA FOR COMMUNICATION</b>			
2.3.1	Collects relevant, accurate information, prepares draft articles for appropriate publications, press releases, conferences and posters, using effective writing and graphic skills (including arranging for artwork as appropriate).	Prepares articles, press releases, conferences and posters, using accurate, logical, clear and concise writing and graphic skills (including co-ordinating artwork and publication as appropriate).	Prepares and approves articles, press releases, conferences and posters, using accurate logical, clear and concise writing and graphic skills (including commissioning artwork and publishing as appropriate).
2.3.2	Prepares accurate, effective, concise material as drafts for presentations in radio and television segments.	Prepares and presents radio talks and television segments, using accurate, concise information presented in a manner suitable to the audience and the medium.	Organises, prepares and presents radio talks and television segments, using accurate, concise information presented in a manner suitable to the audience and the medium.
2.3.3	Collects accurate, relevant information and data required for development of communication and promotion strategies for specific objectives.	Develops effective proposals for achievement of specific objectives in communication and promotion.	Develops and recommends effective communication and promotion strategies for specific objectives.
<b>2.4 DISSEMINATES TECHNICAL INFORMATION</b>			
2.4.1	Gathers relevant, accurate and comprehensive information and data required for analysing and investigating needs and priorities in information and technology transfer.	Investigates and accurately analyses needs and priorities in information and technology transfer.	Reviews, reports and makes sound recommendations on needs and priorities in information and technology transfer.
2.4.2	Assembles and accurately analyses facts and relevant data on information dissemination techniques and strategies for a limited range of soil technology-based products and services appropriate to urban and/or rural environments.	Makes sound recommendations on strategies for information dissemination for complex soil technology-based products and services appropriate to urban and/or rural environments.	Leads the development of information dissemination strategies for soil technology-based products or services appropriate to urban and/or rural environments.
2.4.3	Collects relevant, accurate and comprehensive information and data on aspects of analysis required for selecting dissemination media, techniques and strategies.	Evaluates, and makes sound recommendations for applying new dissemination techniques, media and strategies.	Evaluates and selects new dissemination techniques, media and strategies.

2.4.4	Collects relevant, accurate and comprehensive information and data for evaluation of alternative dissemination media, techniques and strategies.	Analyses effectively evaluation activities for alternative dissemination media, techniques and strategies.	Leads evaluations of alternative dissemination media, techniques and strategies and makes sound recommendations based on these evaluations.
<b>2.5 DISSEMINATES INFORMATION TO THE WIDER COMMUNITY</b>			
2.5.1	Gathers relevant, accurate information and prepares concise and accurate drafts of media releases and articles for the press and other general publications, using a style of writing appropriate for the general community.	Prepares accurate, concise and timely press releases and articles for the press and other general publications, using a style of writing appropriate for the general community.	Approves or prepares accurate, relevant and timely press releases and articles for the press and other general publications, using a style of writing appropriate for the general community.
2.5.2	Gathers relevant, accurate information and prepares draft scripts for radio and television segments for the general community.	Exercises well-developed media skills and contributes effectively to preparing and presenting radio and television segments for the general community.	Applies advanced media skills in preparing and presenting radio and television segments for the general community.
2.5.3	Gathers relevant and accurate information on communication and promotion strategies for informing the general community on issues concerning soils in relevant industries.	Reports and makes sound recommendations on the development of communication and promotion strategies for informing the general community on issues concerning soils in relevant industries.	Develops and makes sound recommendations on communication and promotion strategies for informing the general community on issues concerning soils in relevant industries.
2.5.4	Seeks opportunities to contribute to the promotion of soil science and good soil management to the rural and/or urban community.	Undertakes activities that contribute effectively to the promotion of soil science and good soil management to the rural and/or urban community.	Makes authoritative contributions to the promotion of soil science and good soil management to the rural and/or urban community.
<b>2.6 PROVIDES ADVICE TO THE COMMUNITY</b>			
2.6.1	Gives due regard to the relevant social, demographic and economic structures in dealings with sections of the urban and/or rural communities and relevant industries.	Undertakes activities that contribute to the development of better understanding of the social, demographic and economic issues facing the urban and/or rural communities and relevant industries.	Makes significant contributions to the development of better understanding of the social, demographic and economic issues facing the urban and/or rural communities and relevant industries.
2.6.2	Prepares draft questionnaires for surveys and social research to yield accurate, relevant information in matters such as attitudes to land-use, adaptation to change, economic circumstances, and social and structural change.	Plans surveys and social research activities, yielding valid, accurate and relevant information in matters such as attitudes to land-use, adaptation to change, economic circumstances, and social and structural change.	Leads and directs the preparation and conduct of surveys and social research, yielding valid, accurate, relevant information in matters such as attitudes to land-use, adaptation to change, economic circumstances, and social and structural change.
2.6.3	Gives due regard to the ethos of social influence in dealings with those in urban and/or rural sectors.	Undertakes activities that contribute to the development of understanding of the ethics of social influence in the context of the urban and/or rural sectors, and applies ethical standards in counseling work.	Makes significant contributions to the development of understanding of the ethics of social influence in the context of the urban and/or rural sectors, and applies ethical standards in counseling work.
2.6.4	Gives accurate, relevant advice to individuals and rural and/or industry leaders to assist them in adapting to change and in making better decisions on business and/or resource management	Counsels individuals and rural and/or industry leaders on adapting to change and in making better decisions, using counseling skills effectively, and providing accurate, relevant information.	Counsels individuals and rural and/or industry leaders on difficult problems in adapting to change and in making better decisions, using counseling skills effectively, and providing accurate, relevant information.
2.6.5	Counsels land users and others concerning soil management, using basic interpersonal skills and providing accurate, relevant information.	Counsels land users and others concerning soil management, using counseling skills effectively and providing accurate, relevant information.	Counsels land users and others in making difficult decisions concerning soil management, using counseling skills effectively, and providing accurate, relevant information.

2.6.6	Provides accurate information relevant to consumer demand requirements, the importance of marketing and recognising the relationship of soil science to the rural and/or urban communities and relevant industries.	Undertakes activities that contribute to alerting industry to consumer demand requirements, the importance of marketing and recognising the relationship of soil science to the rural and/or urban communities and relevant industries.	Makes significant contribution in alerting industry to consumer demand requirements and the importance of marketing. Recognises the relationship of soil science to the rural and/or urban communities and relevant industries and professions.
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### 3. MANAGEMENT

Manages and leads integration and utilisation of resources to achieve specified scientific, educational, economic, business or social goals in rural and/or urban industries through the application of soil science.

<b>Stage 1 Standard</b>				<b>Stage 2 Standard</b>				<b>Stage 3 Standard</b>			
Meets performance criteria - limited experience				Competent at unsupervised work				Demonstrated mature and autonomous work			
<b>3.1 PLANS PROJECTS AND WORK PROGRAMS</b>											
3.1.1	Plans personal time within a defined project to meet agreed goals and deadlines.	Plans project time to achieve goals and deadlines.	Exercises advanced skills in planning program time to meet goals and deadlines effectively and efficiently.								
3.1.2	Plans a minor program or an aspect of a defined project or program, to achieve objectives in an effective and efficient manner.	Plans a work program within a defined project or overall program to achieve objectives in an effective and efficient manner.	Exercises advanced skills in planning time and resources for meeting agreed goals and deadlines effectively and efficiently.								
3.1.3	Accurately prepares aspects of cost estimates for allotment of funds and other resources.	Prepares accurate cost estimates for allotment of funds and other resources and makes sound recommendations based on these estimates.	Plans and allocates resources for projects and programs, including planning allotment of funds and other resources, so as to achieve desired results within budget and the desired time frame.								
3.1.4	Gathers accurate information relevant to resource requirements.	Makes sound recommendations on prioritising activities to make the most efficient use of resources and staff.	Organises program activities to make the most efficient use of resources and staff.								
3.1.5	Provides accurate information on client needs.	Analyses and makes sound recommendations on client needs, and actions and strategies to foster client satisfaction.	Identifies client needs, and develops plans and strategies to foster client satisfaction in an effective and efficient manner.								
<b>3.2 MAKES MANAGEMENT DECISIONS</b>											
3.2.1	Collects accurate, relevant data, analyses information, makes a sound assessment of options in making management decisions.	Investigates and analyses information and makes sound decisions on matters pertinent to the work role.	Analyses information and assesses options, using a range of techniques including consultation, and makes sound management decisions.								
<b>3.3 MANAGES HUMAN RESOURCES</b>											
3.3.1	Analyses skills needed for minor work project.	Analyses skills needed for work programs and other activities, writes job specifications, position specifications and advertisements, interviews and makes sound recommendations on staff appointments.	Accurately analyses skills needed for work programs and other activities, writes job specifications, position specifications/ advertisements, interviews, makes sound recommendations on staff appointments that will effectively contribute to achieving the objectives of the employing organisation.								

3.3.2	Supervises small teams and allocates work to team members including para-professionals, technicians, assistants and casual labour and is responsible for effective and efficient team performance.	Leads and co-ordinates the work of para-professionals, assistants and casual labour allocated to a project, work program or other activities, with responsibility for effective and efficient performance of the team in relation to the project, work program or other activity.	Leads and co-ordinates a small number of professional and support staff, with responsibility for effective and efficient performance of the group.
3.3.3	Exercises basic interpersonal skills for effective relationships with team members and colleagues.	Exercises mature interpersonal skills in relationships with team members and colleagues.	Exercises highly developed interpersonal skills in relationships with professionals, team members and colleagues.
3.3.4	Makes suggestions on appraisal of staff, and in their training for efficiency and effectiveness.	Appraises junior colleagues and makes sound recommendations on appropriate personal development activities for them.	Accurately appraises and reports on staff performance, fosters effective staff development, and organises appropriate training, experiential and practical development programs, taking into account individual differences.
3.3.5	Develops, delivers and evaluates aspects of training programs to achieve improved staff performance.	Formulates and delivers limited training programs in an effective manner, achieving improved staff performance.	Prepares and presents training courses in an effective manner, and supervises continuing professional development programs, achieving improved staff performance.
3.3.6	Formulates and supervises experiential and practical development programs for junior colleagues, including evaluating and reporting on resultant improvements in performance.	Accurately evaluates the effectiveness of a range of training and development programs.	Accurately evaluates the effectiveness of a range of training, experiential and practical development programs, taking into account individual differences, making sound recommendations on future programs.
<b>3.4 MANAGES PHYSICAL RESOURCES</b>			
3.4.1	Prepares financial and resource budgets for minor projects and monitors performance against these budgets.	Manages financial and resource budgets for projects and small programs, ensuring satisfactory progress.	Manages programs and projects within agreed financial and resource budgets and reports on performance.
3.4.2	Manages small projects and own work, including physical resources, achieving objectives.	Manages projects and small programs, including physical, financial and human resources, within available time, meeting agreed objectives.	Manages projects, programs or aspects of services, in an effective and efficient manner.
3.4.3	Provides accurate and complete reports on progress and achievements in management responsibilities.	Accurately analyses achievements against plans and provides accurate and complete reports on progress and performance.	Obtains meaningful feedback from within the program or service area managed, and provides accurate complete reports on progress and achievements.
<b>3.5 MANAGES QUALITY ASSURANCE</b>			
3.5.1	Understands and complies effectively with quality assurance procedures and systems.	Operates according to quality assurance procedures and systems.	Develops and implements effective quality assurance procedures and systems.
<b>3.6 COMPLIES WITH LEGAL AND REGULATORY REQUIREMENTS</b>			
3.6.1	Complies with legal and regulatory requirements relating to individuals and industries operating in rural and/or urban environments.	Applies an understanding of legal, regulatory and political issues relating to individuals and industries operating in rural and/or urban environments.	Applies an understanding of legal, regulatory and political issues relating to property and companies, and the law as it relates to individuals and industries operating in rural and/or urban environments.
3.6.2	Observes basic legal requirements in employment and occupational health and safety.	Applies a working knowledge of industrial awards, equal opportunity and occupational health and safety.	Observes relevant industrial awards, equal opportunity and occupational health and safety regulations.

## 4. KNOWLEDGE

Exercises a high level of knowledge of science, education, economics, business and management in the application of soil science in a range of relevant rural and/or urban industries.

	<b>Stage 1 Standard</b>	<b>Stage 2 Standard</b>	<b>Stage 3 Standard</b>
	Meets performance criteria - limited experience	Competent at unsupervised work	Demonstrated mature and autonomous work
<b>4.1 APPLIES THEORETICAL KNOWLEDGE IN AREA OF EXPERTISE</b>			
4.1.1	Applies knowledge and understanding of the problems and opportunities to achieve effective outcomes in a particular industry segment or area of expertise.	Applies well-developed knowledge and understanding of the problems and opportunities, and of problem identification and solution, to achieve effective outcomes in a particular industry segment or area of expertise.	Applies high-level ability to integrate, communicate and disseminate knowledge to the overall benefit of relevant rural and/or urban industries.
4.1.2	Recognises the limits of personal knowledge, and develops the skills to extend knowledge and to identify and seek advice from experts.	Extends the limits of personal knowledge using experts and others.	Accumulates new knowledge through interaction with experts and by other means, and makes this available to others.
4.1.3	Makes decisions that affect personal performance, directed to the achievement of agreed goals.	Makes sound decisions that affect personal performance and the performance of others, based upon well developed knowledge, and directed to the achievement of agreed goals.	Makes sound decisions that affect personal performance and the performance of others, based upon high level knowledge and expertise, and directed to the achievement of agreed goals.
4.1.4	Provides advice based on sound knowledge of specific area.	Provides advice based upon well developed knowledge in a range of areas.	Provides specialised advice based upon knowledge that is accepted as authoritative.
<b>4.2 PURSUES CONTINUING EXTENSION OF KNOWLEDGE</b>			
4.2.1	Exercises a range of techniques and skills for extending knowledge and skills in depth through reading and research.	Extends knowledge and skills in depth through specialised reading and research.	Extends knowledge and skills in depth through reading advanced and specialised publications and research.
4.2.2	Exercises the range of skills needed to extend knowledge and skills in breadth through activities such as attending seminars and conferences, and networking.	Extends knowledge and skills in breadth through attending seminars and conferences, and through networking and other means of professional development.	Extends knowledge and skills in breadth through a wide range of professional development activities.
<b>4.3 ACCESSES KNOWLEDGE AND EXPERTISE</b>			
4.3.1	Accesses relevant databases, libraries and literature and other information sources retrieving desired information.	Maintains a broad knowledge of relevant research findings through accessing databases, newly-published literature and other information sources, implements or disseminates information on relevant new procedures or methodologies.	Exercises high-level skills in accessing data and newly-published literature and other information, and implements or disseminates information on new procedures or methodologies as they become available.
4.3.2	When working in a multi-disciplinary team, acquires relevant knowledge of related fields of expertise.	Extends personal knowledge of related disciplines and co-operation between disciplines.	Maintains expert knowledge in areas relating to complex issues that may influence policy, the business environment, or change procedures.
4.3.3	Maintains and applies up-to-date knowledge of relevant research findings and/or business management practices in Australia and other countries.	Maintains and applies up-to-date knowledge of relevant specialised research findings and/or business management practices in Australia and other countries.	Maintains and applies expert and up-to-date knowledge of relevant specialised research findings and/or business management practices in Australia and other countries.
4.3.4	Consults and applies relevant standards, regulations, codes of practice and industry information.	Consults, interprets and applies relevant standards, regulations, codes and industry information.	Develops effective policy advice and drafts appropriate changes to standards, regulations, codes and industry information.

## 5. THE PRACTICE OF SOIL SCIENCE

Engages in the practice of research, education, extension, advising, business, economics or management in soil science relevant to the rural and/or urban industries and other activities.

<b>Stage 1 Standard</b>		<b>Stage 2 Standard</b>	<b>Stage 3 Standard</b>
Meets performance criteria - limited experience		Competent at unsupervised work	Demonstrated mature and autonomous work
<b>5.1 CONDUCTS AND LEADS DEVELOPMENTS IN THE SCIENCE AND TECHNOLOGY OF SOILS</b>			
5.1.1	Interprets, applies and makes minor contributions to developing soil science knowledge.	Interprets, applies and contributes to soil science knowledge.	Interprets, applies and develops soil science knowledge.
5.1.2	Contributes to scientific endeavour and/or business management in a particular field.	Motivates and stimulates scientific endeavour and/or business management in a particular field.	Motivates and stimulates scientific endeavour and/or business management, and assumes an effective leadership role.
5.1.3	Analyses, investigates and makes realistic suggestions on needs and priorities in scientific work.	Develops sound proposals for determining needs and priorities in scientific work.	Accurately identifies needs and priorities in scientific work and makes sound, relevant recommendations based on identified needs.
5.1.4	Investigates and analyses specific aspects of science-based problems and opportunities relating to rural and/or urban environments, and makes reasonable deductions based on this analysis.	Investigates and analyses science-based problems and opportunities relating to rural and/or urban environments, and prepares reports containing justifiable, rational conclusions.	Investigates and analyses science-based problems and opportunities relating to rural and/or urban environments and prepares reports including sound recommendations based on justifiable, rational conclusions.
5.1.5	Prepares schedules for specific tasks within a project or program, and reviews effectiveness and progress in such tasks applying science-based interpretative judgment and skills.	Prepares limited project schedules and reviews effectiveness, efficiency and progress in science-based projects, and applies well-developed science-based interpretative skills for project evaluation.	Prepares project schedules and reviews effectiveness, efficiency and progress in science-based projects, and applies specialised science-based interpretative skills for project evaluation.
5.1.6	Applies innovation and basic scientific judgment in suggesting new scientific techniques and departures from established methods and practices.	Acquires, and introduces relevant and cost-effective new techniques and improvements to established protocols, methods and practices, exercising innovation and judgment.	Acquires develops and introduces relevant and cost-effective new techniques and improvements to established protocols, methods and practices, exercising innovation and expert judgment.
5.1.7	Applies scientific ability, together with planning and organisational skills and capacity for effectively utilising limited funds.	Applies scientific ability and judgment, together with planning and organisational skills and capacity for effectively utilising funding.	Applies scientific ability, judgment and leadership, together with planning and organisational skills and capacity for effectively utilising funding.
5.1.8	Exercises scientific judgment in the effective conduct of limited inspection and regulatory duties.	Conducts or supervises inspection and regulatory duties, exercising mature scientific judgment.	Manages inspection and regulatory activities and provides advice on changes in inspection systems and regulations.
5.1.9	Utilises effectively computer-based quantitative tools and techniques in modelling soil and/or land systems.	Utilises and contributes to the development of cost-effective computer-based quantitative tools and techniques in modelling soil and/or land systems.	Develops and applies cost-effective computer-based quantitative tools and techniques in modelling soil and/or land systems.
5.1.10	Applies effective business management principles related to soil science and technology in the workplace.	Applies business management principles and practices related to soil science and technology in rural and/or urban industries.	Applies advanced business management principles and practices related to soil science and technology in rural and/or urban industries.
<b>5.2 PROVIDES EDUCATION, ADVISORY AND/OR EXTENSION SERVICES</b>			

5.2.1	Provides integrated advice on improving specific aspects of soil and/or land management to achieve profitable and environmentally sustainable outcomes.	Provides integrated advice to the rural and/or urban communities and others, using cost-effective techniques to improve soil and/or land management and sustainability and to facilitate adaptation to change.	Provides expert advice to the rural and/or urban communities and others, using cost-effective techniques to improve soil and/or land management and sustainability and to facilitate adaptation to change.
5.2.2	Provides relevant and accurate advice to land users and others on specific aspects of soil and/or water and/or land management related to rural and/or urban environments.	Advises land users and others on aspects of soil and/or water and/or land management related to rural and/or urban environments.	Provides expert advice to land users and others on specific aspects of soil and/or water and/or land management related to rural and/or urban environments.
5.2.3	Contributes to the productivity, efficiency and environmental sustainability of the organisation.	Provides advice to company or organisation management and staff to improve company or organisation productivity, efficiency and environmental sustainability.	Provides expert advice to company or organisation management and staff to improve company or organisation productivity, efficiency and environmental sustainability, and facilitate adaptation to change.
5.2.4	Undertakes specific aspects of field days, field excursions, group discussions, seminars, lectures and demonstrations using appropriate techniques effectively to meet the objectives of participants.	Organises and conducts field days, field excursions, group discussions, seminars, lectures and demonstrations using a range of cost-effective techniques to meet the objectives of participants.	Oversees the presentation of field days, field excursions, group discussions, seminars, lectures and demonstrations using a range of cost-effective techniques to meet the objectives of participants.
5.2.5	Tutors students of soil science and/or related subjects using group facilitation and similar processes to help them learn.	Educates students of soil science and/or related subjects utilising the full range of lecturing, communication, group facilitation and other education techniques to achieve desired outcomes.	Designs, develops and delivers education programs to students and empowers them to learn about soil science and/or related subjects.
5.2.6	Provides relevant and accurate advice on the basis of analytical ability, knowledge of information and technology transfer techniques, and an understanding of environmental issues.	Provides accurate, complete and relevant advice on the basis of well-developed analytical ability, knowledge of information and technology transfer techniques, and a broad understanding of environmental issues.	Provides expert advice on the basis of highly-developed analytical ability, specialised understanding of problem-identification and solving processes and techniques of information and technology transfer.
5.2.7	Provides accurate, relevant advice to aid decision-making by clients engaged in rural and/or urban industries or other relevant activities.	Provides accurate, relevant advice to clients by on-site consultation, telephone or at the office, resulting in improved decision-making by clients engaged in rural and/or urban industries or other relevant activities.	Provides accurate, relevant advice on important or complex issues by on-site consultation, telephone or at the office resulting in improved decision-making by clients engaged in rural and/or urban industries or other relevant activities.
5.2.8	Demonstrates effective soil and/or water and/or land management.	Uses well developed knowledge in demonstrating effective soil and/or water and/or land management.	Assumes a leadership role in demonstrating soil and/or water and/or land management.
5.2.9	Investigates land management systems and problems associated with soils and contributes to field trials.	Investigates land and management systems and problems associated with soils and conducts field trials.	Investigates land management systems and problems associated with soils and organises and leads field trials.
<b>5.3 INVESTIGATES SOIL AND RELATED PROBLEMS</b>			
5.3.1	Investigates aspects of projects, undertakes experimental tasks, and plans, implements, reports and evaluates results within the total project framework, on the basis of a professional understanding of problem-solving processes in the context of rural and/or urban environments.	Plans, implements, reports and evaluates limited investigation projects and undertakes experimental activities on the basis of a well-developed understanding of problem-solving processes in the context of rural and/or urban environments.	Plans, implements, reports and evaluates significant investigation projects and undertakes significant experimental activities on the basis of an expert understanding of problem-solving processes and information transfer techniques in the context of rural and/or urban environments.
5.3.2	Provides information on a particular area of specialisation to investigation and research.	Contributes expertise in a particular area of specialisation to investigation and research.	Provides expert advice on investigation and research programs conducted.

5.3.3	Liaises effectively with relevant research scientists in the workplace to develop cost-effective solutions to problems and experimental work.	Liaises effectively with research scientists in the relevant discipline to develop cost-effective solutions to problems and experimental work.	Liaises effectively with research scientists and experts in the relevant discipline to develop cost-effective solutions to problems and experimental work.
5.3.4	Prepares draft material and participates in extension programs to accurately and cost-effectively disseminate results of investigations and experimental work.	Disseminates accurate and relevant results of investigations and experimental work through cost-effective extension work.	Disseminates accurate and relevant results and information through organising and personally conducting cost-effective extension activities.
5.3.5	Analyses commercial opportunities of research.	Analyses and makes recommendations regarding potential commercial developments.	Effectively translates research outcomes into profitable commercial developments in rural and/or urban environments.
<b>5.4 CONDUCTS SCIENTIFIC AND TECHNOLOGICAL RESEARCH INTO SOIL AND/OR LAND PROBLEMS</b>			
5.4.1	Undertakes limited research and investigation activities into specific areas of soil science on the basis of a knowledge of experimental design and field-testing, and sound basic knowledge of particular aspects of soil and/or land problems, processes and systems.	Organises and undertakes cost-effective research, investigations and demonstrations on the basis of well-developed expertise in experimental design and field-testing, and in soil and/or land problems, processes and systems.	Organises and undertakes cost-effective research, investigations and on-farm trials and demonstrations with expert knowledge of experimental design and of agricultural soil and/or land problems, processes and systems.
5.4.2	Prepares information on the direction of an aspect of a research project using independent judgment in deciding realistic and relevant objectives.	Plans the general direction of aspects of research projects using independent judgment in deciding realistic and relevant objectives and cost-effective methods of approach.	Defines opportunities, and plans, organises, makes decisions and undertakes projects within overall programs, using initiative and independent judgment to set realistic and relevant objectives and priorities and cost-effective use of resources.
5.4.3	Recommends relevant, cost-effective techniques and procedures appropriate to the research projects in hand.	Makes decisions and recommendations on relevant, cost-effective techniques in research projects.	Leads research and investigations on the basis of broadly-recognised knowledge of experimental design and field-testing, and of a range of soil and/or soil land problems and processes, achieving cost-effective outcomes.
5.4.4	Interacts effectively with individuals and/or organisations to identify opportunities, problems and priorities	Interacts effectively with individuals and/or organisations to identify opportunities, problems and priorities.	Interacts effectively with individuals and/or organisations in identifying and resolving opportunities, problems and priorities.
5.4.5	Applies scientific knowledge, judgment and skills in the conduct of field trials and on-farm research to improve adoption of new technology.	Conducts cost-effective field trials and on-farm research to improve adoption of new technology.	Designs and manages cost effective field trials and on-farm research to improve adoption of new technology.
5.4.6	Collects and accurately analyses scientific data, soil and/or plant and/or animal samples, and provides accurate, reliable and comprehensive reports.	Supervises, or personally undertakes, collection and preparation of soil and/or plant and/or animal samples and other scientific data for analysis, ensuring accurate and reliable results.	Organises collection of soil and/or plant and/or animal samples and other scientific data for analysis, ensuring accurate and reliable results.
5.4.7	Undertakes cost-effective extension appropriate to a research project.	Plans, initiates and undertakes cost-effective extension appropriate to a research project.	Plans, initiates and undertakes cost-effective extension appropriate to a research program.
5.4.8	Makes limited but effective scientific decisions during the progress of projects.	Exercises scientific judgment and leadership in the conduct of research to achieve cost-effective outcomes.	Exercises well-developed judgment and qualities of scientific leadership to achieve cost-effective outcomes.
5.4.9	Provides accurate, relevant and timely reports to supervisors on the results of research undertaken.	Provides accurate, relevant and timely advice to other soil scientists on the results of research undertaken.	Provides expert advice to other scientists and end-users on the results of the particular field of research undertaken.

5.4.10	Provides accurate and relevant advice to colleagues on an area of scientific work.	Provides integrated advice to other scientists on the conduct of a research project, to improve cost-effectiveness and overall performance.	Provides expert advice to other scientists on the conduct of research programs and projects, to improve cost-effectiveness and overall performance.
5.4.11	Investigates basic scientific processes involving soils with one or more of water, plants, animals and the environment.	Investigates and models scientific processes involving soils with one or more of water, plants, animals and the environment.	Investigates and models more complex scientific processes involving soils with one or more of water, plants, animals and the environment.
<b>5.5 DEVELOPS PRODUCTS OR SERVICES FOR RURAL AND/OR URBAN SCIENCE, TECHNOLOGY OR BUSINESS MANAGEMENT USING A KNOWLEDGE OF SOIL SCIENCE</b>			
5.5.1	Understands the markets available for products or services.	Applies an understanding of specific sectors of markets in rural and/or urban environments to exploiting opportunities for marketing products or services and resolving problems related to soils.	Applies an expert understanding of specific sectors of markets in rural and/or urban environments to exploiting opportunities for marketing products or services and resolving problems related to soils.
5.5.2	Analyses and investigates needs and priorities in specific aspects of development of a soil science product or service.	Analyses, investigates and reports on needs and priorities in product or service development.	Analyses, investigates and recommends on needs and priorities in product or service development.
5.5.3	Develops specific aspects of technology-based or business-based soil science products or services that have to be integrated into complex management practices for rural and/or urban environments.	Develops aspects of technology-based or business-based soil science products or services for integration into complex management practices in a cost-effective manner, to meet market demand.	Manages the cost-effective development of technology-based or business-based soil science products or services.
5.5.4	Makes reasonable suggestions for new products or services, and techniques in their application, that are likely to be profitable.	Develops proposals for new products or services and techniques in their application, demonstrating likely market demand and profitability.	Makes sound recommendations for new products or services that demonstrate likely market demand and profitability.
5.5.5	Gathers and accurately analyses information pertinent to commercial and market evaluation of new products.	Analyses and makes sound recommendations on aspects of the commercial and market evaluation of new products, and applies interpretative skills for product evaluation.	Leads and makes sound recommendations on the commercial and market evaluation of new products, and applies advanced interpretative skills for product evaluation.
5.5.6	Gathers information pertinent to commissioning research and development of soil science products or services identified as potentially marketable, beneficial and commercially viable.	Develops proposals for the commissioning of research and development of soil science products or services identified as potentially marketable, beneficial and commercially viable.	Makes sound recommendations on the commissioning of research and development of soil science products or services, leading to a profitable range of products and services.
<b>5.6 OPERATES AND MANAGES SPECIALISED EQUIPMENT</b>			
5.6.1	Operates or advises on herbicide application and other chemical application equipment used in soil management with full regard to safety and effectiveness.	Organises safe and effective use of herbicide and other chemical applications for soil management.	Develops procedures for the safe and effective use of herbicide and other chemical applications for soil management.
5.6.2	Operates or advises on the operation of agricultural and agri-industry plant and equipment used in soil management with full regard to safety and effectiveness.	Organises safe and effective use of agricultural and agri-industry plant and equipment for soil management.	Develops procedures for the safe and effective use of agricultural and agri-industry plant and equipment for soil management.
5.6.3	Operates and supervises the operation of laboratory and field instruments and equipment with full regard to accuracy, safety and effectiveness.	Organises safe and effective use of laboratory and field instruments and equipment.	Develops procedures for the safe and effective use of laboratory and field instruments and equipment.

5.6.4	Analyses soil properties, soil strength, load bearing capacity, for suitability for construction (structures, roads).	Analyses and evaluates soil properties, soil strength, load bearing capacity, for suitability for construction (structures, roads).	Evaluates soil properties, soil strength, load bearing capacity, for suitability for construction (structures, roads) and develops guidelines.
<b>5.7 CONDUCTS AND LEADS WORK IN BUSINESS MANAGEMENT RELATED TO THE APPLICATION OF SOIL KNOWLEDGE</b>			
5.7.1		Exercises leadership in a particular aspect of business related to soil issues.	Exercises well-developed leadership in an area of business related to soil issues.
5.7.2	Investigates and accurately analyses particular aspects of needs and priorities in business related to soil issues.	Investigates, analyses and reports on needs and priorities in business related to soil issues.	Investigates, reports and makes sound recommendations on needs and priorities in business related to soil issues.
5.7.3	Reviews effectiveness of and progress in particular aspects of minor business projects.	Accurately analyses and reports on effectiveness of and progress in business projects, and applies interpretative skills for project evaluation.	Develops business projects or programs, and reviews their effectiveness and progress.
5.7.4	Suggests new techniques, methods and practices to be applied profitably in business.	Develops proposals for new techniques, methods and practices to be applied profitably in business.	Recommends and/or adopts new techniques, methods and practices to be applied profitably in business.
5.7.5		Correctly interprets particular aspects of business concepts and knowledge for other soil scientists.	Correctly interprets business concepts and knowledge for other soil scientists.
5.7.6	Applies principles of computer science in the understanding and operation of models appropriate for financial analysis and other applications in business related to soil issues.	Applies principles of computer science in the cost-effective development and operation of models for business and financial analysis.	Applies principles of computer science in the cost-effective development and operation of complex models for business and financial analysis and related applications.
<b>5.8 CARRIES OUT BUSINESS PLANNING AND APPRAISALS</b>			
5.8.1	Assembles and analyses information and prepares draft reports contributing to the formulation and planning of sound enterprise business development strategies.	Collaborates in formulating and planning enterprise business development strategies leading to improved profitability.	Formulates and plans industry or enterprise business development strategies leading to improved profitability.
5.8.2	Evaluates specific aspects of enterprise business decisions and long-term business programs.	Evaluates enterprise business decisions and long-term business programs.	Evaluates industry business decisions and long-term business programs.
5.8.3	Collects and accurately analyses data for monitoring and evaluation of enterprise business development plans and strategies.	Collaborates in the monitoring and evaluation of enterprise business development plans and strategies.	Monitors and evaluates complex industry or enterprise business development strategies, making sound recommendations based on the evaluation.
5.8.4	Collects and accurately analyses data for appraising enterprise performance and evaluating proposals for changes in methods of production and organisation directed to enhanced performance.	Appraises enterprise performance and evaluates proposals for changes in methods of production and organisation directed to enhanced performance.	Appraises industry performance and evaluates significant proposals for changes in methods of production and organisation directed to enhanced performance.
5.8.5	Collects and accurately analyses data for identifying opportunities in investment, property, products or services.	Investigates and accurately analyses opportunities in investment, property, products or services.	Identifies, analyses and makes sound recommendations on significant opportunities in investment, property, product or services.
5.8.6	Prepares specific aspects of long-term budgets in business operations.	Prepares aspects of long-term budgets, and provides analyses of factors such as risk and uncertainties, market demand and supply, consumer wants, machinery economics, labour planning, indebtedness and taxation.	Prepares long-term budgets, taking account of factors such as risk and uncertainties, market demand and supply, consumer wants, machinery economics, labour planning and taxation.

5.8.7		Applies decision analysis theory and related techniques to develop effective solutions to urban and/or rural problems involving risk.	Applies decision analysis theory and related techniques and develops cost-effective solutions to urban and/or rural problems involving risk.
<b>5.9 APPLIES COMPUTER SCIENCE KNOWLEDGE AND SKILLS</b>			
5.9.1	Uses general and specialised software to investigate and report on scientific, business, educational, economic or management issues relevant to soils.	Adapts as appropriate and uses general and specialised software to investigate and report on scientific, business, educational, economic or management issues relevant to soils.	Selects, develops and uses general and specialised software to investigate and report on scientific, business, educational, economic or management issues relevant to soils.
5.9.2	Sets up particular aspects of computerised management information systems for cost-effective control of scientific, farm, industry and/or environmental data, or for marketing information relevant to soils or their use.	Establishes a computerised management information system for cost-effective control of scientific, farm, industry and/or environmental data, or for marketing information relevant to soils or their use.	Establishes and manages a computerised management information system for cost-effective control of scientific, farm, industry and/or environmental data, or for marketing information relevant to soils or their use.
<b>5.10 CONDUCTS AND LEADS ACTIVITIES IN ENVIRONMENTAL PROTECTION, MONITORING AND MANAGEMENT RELATED TO SOIL AND/OR WATER AND LAND RESOURCES</b>			
5.10.1	Collects accurate soil data relevant to environmental impact.	Analyses soil data for environmental impact, making sound recommendations.	Prepares soil aspects of environmental impact statements, providing justifiable and rational conclusions.
5.10.2	Collects data and carries out basic modelling of the effects of effluent, sewage, sludge or industrial wastes on soils and/or aquatic environments.	Models or predicts the effects of effluent, sewage, sludge or industrial wastes on soils and/or aquatic environments making sound recommendations.	Models or predicts the effects of effluent, sewage, sludge, or industrial wastes on soils and aquatic environments making sound recommendations based on expert knowledge.
5.10.3	Collates data on soil contaminants, soil erosion, nutrient loss, acidity, structure decline, salinity or sodicity.	Monitors, investigates and maps soil contaminants, soil erosion, nutrient loss, acidity, structure decline, salinity or sodicity.	Manages and leads programs investigating and mapping soil contaminants, soil erosion, nutrient loss, acidity, structure decline, salinity or sodicity.
5.10.4	Is involved with the application, amelioration techniques to affected soils in rural and/or urban environments.	Applies amelioration techniques to affected soils in rural and/or urban environments with future assessment of success.	Designs and applies amelioration techniques to affected soils in rural and/or urban environments, providing complete and accurate reports on achievements.
5.10.5	Monitors an investigates nutrient and/or soil loss at the catchment level.	Monitors an investigates nutrient and/or soil loss at the catchment level.	Designs and leads programs investigating nutrient and/or soil loss at the catchment level.
<b>5.11 CONDUCTS AND LEADS ACTIVITIES IN SOIL AND WATER ENGINEERING AND MANAGEMENT</b>			
5.11.1	Monitors hydrological impacts associated with developments, industry, irrigation and agricultural practices.	Monitors, investigates and models hydrological impacts with developments, industry, irrigation and agricultural practices.	Manages and leads investigations to model and/or evaluate hydrological impacts associated with developments, industry, irrigation and agricultural practices.
5.11.2	Analyses soil properties for suitability for irrigation.	Analyses and evaluates soil properties for suitability for irrigation.	Evaluates soil properties for suitability for irrigation making sound recommendations on management procedures based on expert knowledge.
5.11.3	Uses irrigation schedules.	Uses and evaluates irrigation schedules.	Develops and evaluates irrigation schedules.
<b>5.12 CONDUCTS AND LEADS WORK IN SOIL SURVEY, SOIL CLASSIFICATION AND LAND EVALUATION</b>			
5.12.1	Gathers relevant, accurate and comprehensive information to describe soils.	Gathers relevant, accurate and comprehensive information to describe soils and classify them based on a sound knowledge of current classification systems.	Gathers relevant, accurate and comprehensive information to describe soils and classify them based on an expert knowledge of current classification systems.

5.12.2	Collects information for soil survey and/or land evaluation, land capability or natural resource surveys.	Conducts soil surveys or land evaluation, land capability or natural resource surveys.	Develops methodology for and conducts soil surveys and/or land evaluation, land capability or natural resource surveys.
5.12.3	Analyses soil chemical, biological and/or physical properties.	Analyses and interprets soil chemical, biological and/or physical properties.	Develops methods for, and analyses and interprets, soil chemical, biological and/or physical properties.
5.12.4	Gathers accurate information relevant to soil practices and sustainability of land-use.	Investigates the sustainability of practices involving soils based on accurate information.	Investigates the sustainability of practices involving soils, making recommendations relevant to achieving sustainability of soil and/or land-use.
5.12.5	Collects data and/or Geographic Information Systems (GIS) information on soils and/or landscapes.	Conducts and interprets database and/or GIS exercises on soils and/or landscapes.	Prepares, leads and interprets database and/or GIS exercises on soils and/or landscapes.
5.12.6	Maps soils and/or their properties, uses and/or limitations.	Maps and interprets the behaviour of soils and/or their properties, uses and/or limitations.	Maps and interprets the behaviour of soils and/or properties, uses and/or limitations, making recommendations relevant to land management.
5.12.7	Maps landscapes and/or geomorphic features.	Maps and interprets landscapes and/or geomorphic features.	Maps and interprets landscapes and/or geomorphic features, making recommendations relevant to land management.