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Soil Information Transfer and Evaluation System (SITES) – Database design and exchange protocols
Version 2.0

David Jacquier[1], Peter Wilson[1], Ted Griffin[2] and Daniel Brough[3]

CSIRO Land and Water[1]
Department of Agriculture and Food, Western Australia[2]
Department of Environment and Resource Management, Queensland[3]

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aclep
Australian Collaborative Land Evaluation Program

Enquiries should be addressed to:
David Jacquier, Database Manager, National Soil Information
CSIRO Land and Water, GPO Box 1666, Canberra, ACT, 2601

Distribution list

Michele Barson — Department of Agriculture, Fisheries and Forestry

Mike Grundy — CSIRO, Sustainable Agriculture Flagship

National Committee on Soil and Terrain

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Important Disclaimer

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Preface to Version 2.0

The Soil Information Transfer and Evaluation System (SITES) database schema (ACLEP 1995) was originally developed to overcome problems associated with soil data collation by developing a national standard for data exchange. The SITES schema was adopted for data collation and management by a number of State and Territory agencies responsible for the collection of soil information. It is still currently in use by a several agencies (particularly within Queensland, Western Australia, South Australia, Tasmania, the Northern Territory and CSIRO) albeit with some modification to suit local requirements.

The SITES schema was used in the late 1990's for the collation of national soil site data for the National Land and Water Resources Audit. This collation was used to produce the first national soil attribute maps since the Atlas of Australian Soils (CSIRO Division of Soils 1969). These detailed soil information datasets where used as inputs to assess changes in landscape water and farm nutrient balances and the extent and impact of soil acidification on Agricultural soils (NLWRA 2001).

The rational for updating the SITES schema is a result of:

- Agreement by agencies that the SITES model needed to be modified to be able to cope with temporal variation of soil properties, and
- The need to expand the scope of the traditional site model as outlined in the Australian Soil and Land Survey Field Handbook (NCST 2009) to include soil monitoring, carbon assessment and other types of soil data.

Monitoring of soil condition is being conducted at a number of government levels across the country. The purposes include soil carbon assessment, rate of soil acidification and loss of soil by erosion. To make more effective use of data now and in the future, more specific details pertaining to the geometry and the explicit location of sites and individual monitoring observations need to be captured along with the soils data. Depending on the purpose of the monitoring activity the nature of the site will vary (i.e. 25m x 25m plots, 100m x 100m plots, transects, roadside survey etc).

The Australian Soil Resource Information System (ASRIS) maintained at CSIRO Land and Water, through the Australian Collaborative Land Evaluation Program (ACLEP), uses the SITES schema for a national collation of soil site information. These data will form the basis of new national assessments of soil attributes and condition such as through the Terrestrial Ecosystems Research Network (TERN) Soil and Landscape Facility. In the future soil site data will be used for reporting and forecasting changes to the soil resource. The updated SITES schema provides a reference implementation for new national soil information models and can be used as a transfer standard by the State and Territory agencies as well as by users of national soil information.

The CSIRO National Soil Archive which currently houses over 70,000 soil samples also uses the SITES schema for storing, managing and transferring all site, soil morphology, sample and analytical data.

Currently, data transfer between users will most likely be as whole databases or as exports of tables as individual files (CSV format). In the future it is expected that data will be transferred as XML documents or delivered as on-line web services to provide on demand access to the most recent and best available soil data across the country.

Appendix D documents the changes that have been made to the original SITES schema.

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1. INTRODUCTION

Land resource agencies in Australia have been collecting soil and vegetation information in a standard format for a number of years. The *Australian Soil and Land Survey Field Handbook* 3rd edition (NCST 2009) is widely adopted as the Australian standard for describing site and soil attributes. This handbook was largely based on similar publications, and much of the soil information collected prior to the emergence of the Handbook series has also been described in standard formats.

The Soil Information Transfer and Evaluation System (SITES) was developed out of the need for a standard database design to capture data collected according to the Handbook and to facilitate national data collation. This data was mainly collected for mapping and soil inventory projects. The scope of SITES now also includes the capture of soil monitoring and other types of soil data (e.g. carbon assessment) that is being collected by many State and Territory agencies as well as research, agricultural industry, land development and private organisations and individuals.

The purpose of SITES is:

- to define a national standard soil database design
- to define the protocols for data exchange within Australia.

The previous version of SITES included a custom windows-based tool for querying and analysing soil information. This software is no longer available, however The Australian Collaborative Land Evaluation Program (ACLEP) provides access to a Microsoft Access database that complies with the SITES schema. All code lists are populated and maintained by ACLEP through endorsement by the National Committee on Soil and Terrain (NCST). The database is available for download from the ACLEP website (http://www.clw.csiro.au/aclep/).

2. SYSTEM DEFINITION

2.1 Scope

2.1.1 Data collection standards

The database is designed to capture data collected according to the *Australian Soil and Land Survey Field Handbook* 3rd edition (NCST 2009), *Soil Chemical Methods - Australasia* (Rayment and Lyons 2011), *Soil Physical Measurement and Interpretation for Land Evaluation* (McKenzie et al. 2002) and *The Australian Soil Classification* revised edition (Isbell 2002). The design is flexible enough to accommodate future additions, modifications or deletions from these survey and analysis standards.

2.1.2 Data inclusions

The database design also includes chemistry, physical, mineralogical and soil biota attributes which have been historically collected by the CSIRO.

2.1.3 Entity-relationship model

An entity-relationship model is defined, and a set of SQL scripts has been produced to create tables and indexes.

2.1.4 Code sources

A codes table has been populated for validation and decoding, based on the reference books mentioned in section 2.1.1. The codes table will be maintained by ACLEP as endorsed by the NCST.

2.2 Constraints and assumptions

2.2.1 Database design

The database design is based on ANSI standard SQL.

2.2.2 Primary keys

Primary key fields are based on the natural key fields such as the Site ID and Observation ID, rather than artificial key fields.

3. DATA MODEL

3.1 The entity-relationship model

The entity-relationship model for SITES is shown in Figure 1.

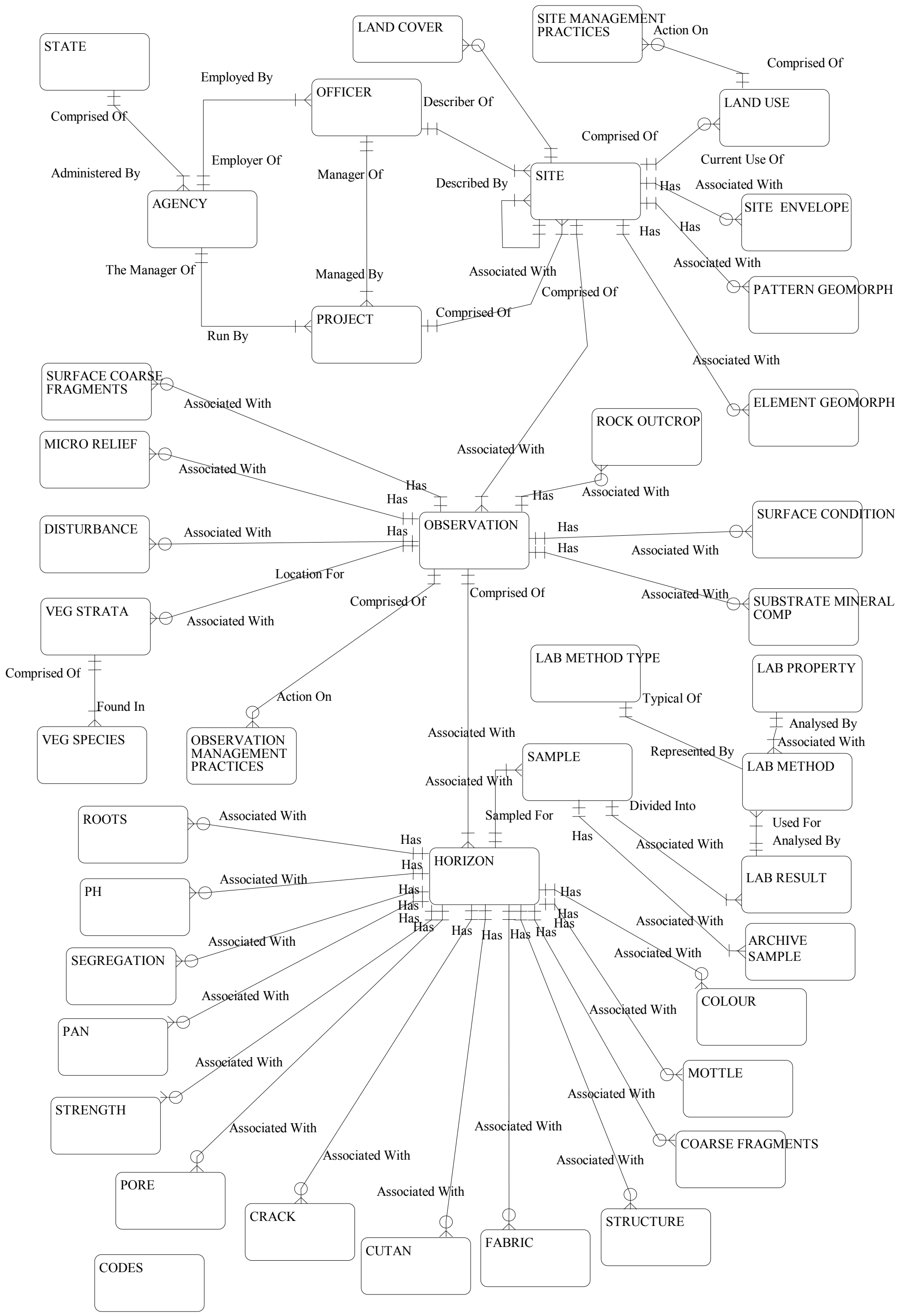

Figure 1 SITES Entity Relationship diagram

3.2 Detailed description of entities

3.2.1 State

State, territory or national jurisdiction of responsibility or authority.

3.2.2 Agency

Government, federal or state, or private organisation.

3.2.3 Project

A project is usually a soil survey being conducted in a discrete area. It can also be a specific study which may not be bound by administrative boundaries, for example, a study investigating salinity levels in soils. Each project has an identifier which is unique within each agency. The project also has a short description, a manager, a bibliographic reference and a commencement and completion date.

3.2.4 Officer

An officer has a four character identifier which is unique within each agency. The officer may be the manager of one or more projects and the describer of one or more sites.

3.2.5 Site

A site as described in the *Australian Soil and Land Survey Field Handbook* 3rd edition (NCST 2009), 'is a small area of land considered representative of the landform, vegetation, land surface and other land features associated with the soil observation'. A site is associated with one project and is described by one officer (although in practice this may be a team). Depending on its size, a site may have many land uses (both spatially and temporally), and each land use may have many management practices. A site may have many land pattern and element geomorphologies and many land covers. Land and soil features at a site may be recorded through a number of observations that may have been measured and recorded through time.

The Handbook site concept within the SITES database has now been broadened to include sites which may have any defined geometry (site envelope) and may be nested (i.e. a point or grid cell within a 25x25m monitoring site or a point along a transect).

3.2.6 Observation

In the majority of cases a site is described by only one observation. However, there are instances where a site may consist of more than one observation, such as the case in some gilgai, where the vegetation, land surface and soil all differ between the mound and depression. An observation may be the location for a number of vegetation strata, each of which may also contain a number of vegetation species. An observation may consist of a number of the following attributes: horizons, management practices, disturbances, microreliefs, rock outcrops, surface coarse fragments, surface conditions, and substrate mineral compositions. In addition, where the site (envelope) describes an area (rather than an explicit coordinate location), such as a 25x25m monitoring site, a number of

observations may be used to describe the site, both spatially (such as through a number of discreetly located observations at a point in time) or temporally (as observations of the site over time).

3.2.7 Horizon

A horizon (or depth slice) must be associated with an observation. A horizon may also have a number of samples used for laboratory analyses. Additionally, a horizon may have a number of the following soil properties: colours, mottles, coarse fragments, structures, fabrics, cutans, cracks, pores, strengths, pans, segregations, pH, and roots. A horizon maybe recorded as a depth slice or layer, defined by upper and lower depths, without any horizon designation or subdivision, indicating a portion of interest within the soil profile rather than any pedologic organisation.

3.2.8 Sample

A sample must be associated with a horizon. Samples are usually taken over discrete portions of the horizon. For example, a horizon may span a depth from 0.2 to 0.5 m. Sample 1 may be taken from 0.2 to 0.35 m, and sample 2 may range from 0.35 to 0.5 m. A sample may also have a number of laboratory results.

3.2.9 Archive sample

An archive sample must be associated with a sample. It is a physical sample that exists at a known location in a sample repository such as the CSIRO National Soil Archive.

3.2.10 Lab result

A lab result be associated with a sample and is for a particular soil property. A lab result may be of the subtype-entities: chemical, physical or mineral analysis. A laboratory result must be analysed through a laboratory method. The laboratory method indicates what type of property is being analysed and is represented by a laboratory method type. A laboratory result may also be recorded as a range of values, rather than an absolute value.

3.2.11 Laboratory codes entities

The Lab Method, Lab Method Type and Lab Property entities are essentially codes entities. The following example illustrates the use of these entities.

In the Lab Results entity below, the site GTN 0014 has had a chemical analysis done on the first horizon layer using a laboratory method. The analysis has been done in replicate, namely, replicate numbers 1 and 2 and yielded results of 7.5 and 7.6 respectively. The site GTN 0193 has only one replicate, and has used the laboratory method 4B2.

The Lab Method entity reveals that methods 4B1 and 4B2 are a pH analysis in calcium chloride. Method 4B1 has a property code of PH, which the Lab Property entity simply describes as pH. The Lab Method type code for 4B1 is 4.2. The Lab Method Type entity has another entry for this method type, namely, method 4B2. Methods 4B1 and 4B2 are equivalent methods, and therefore have been assigned the same Method type code. The assignment of a Lab Method type to each laboratory method makes it possible to directly compare results that have slightly different methods but are essentially of the same type.

Agency code	Project code	Site ID	Obs ID	Hor no.	Samp no.	Lab method	Rep no.	Value pref	Value	Low	High	Analysis type
501	**GTN**	**0014**	**1**	**1**	**1**	**4B1**	**1**		**7.5**			**Chem**
501	**GTN**	**0014**	**1**	**1**	**1**	**4B1**	**2**		**7.6**			**Chem**
501	**GTN**	**0193**	**1**	**1**	**1**	**4B2**	**1**		**6.3**			**Chem**

Table 1: Lab Results example

Lab method code	Lab property code	Method type code	Method description	Method short name	Value mask
4A1	**PH**	**4.1**	**pH of 1:5 soil/water suspension**	**PH SOIL/WATER**	**99.99**
4B1	**PH**	**4.2**	**pH of 1:5 soil/0.01M calcium chloride extract - direct**	**PH SOIL/CACL2 DIR**	**99.99**
4B2	**PH**	**4.2**	**pH of 1:5 soil/0.01M calcium chloride extract - following Method 4A1**	**PH SOIL/CACL2 -4A1**	**99.99**

Table 2: Lab Method example

Lab property code	Description
PH	**pH**

Table 3: Lab Property example

Lab method type code	Description
4.1	**pH of 1:5 soil/water suspension**
4.2	**pH of 1:5 soil/0.01M calcium chloride extract**

Table 4: Lab Method Type example

4. DATABASE

4.1 Physical Database Overview

4.1.1 Database mapping

In the design of the physical database, there is a one-to-one mapping of entities to tables.

4.1.2 Lab result entity

The lab result entity is made up of three sub-types: chemical analysis, physical analysis and mineral analysis. Each of these sub-types is mapped to a record within the lab_results table and a column called labr_analysis_type is used to identify each lab analysis result.

4.1.3 Natural primary keys

At the higher levels of the model, the primary key of each table consists of the natural key fields. For example, the primary key of the table horizon is agency_code, project_code, s_id, o_id and h_no.

4.1.4 Sequence number primary keys

Tables at the extremities of the model, such as rock_outcrops and cutans, have a sequence number field to replace the non-foreign key fields of the primary key. This has been done for two reasons: (1) Often the fields constituting the non-foreign key component of the primary key have null values; (2) The assignment of a numeric key field will aid the retrieval of data when using SQL.

4.1.5 Laboratory data

The laboratory data component of the database has a number of features which warrant particular discussion. A horizon is made of a number of samples based on the sampling depth range. For example, horizon 1 which spans the depth 0 to 0.4 m may be divided into two samples: sample 1 which ranges from 0 to 0.2 m and sample 2 which covers the 0.2 to 0.4 m depth range. In the lab_results table, each sample may have replicate tests done, hence the field laboratory replicate number, labr_no.

4.1.6 Laboratory results

Each laboratory result is the outcome of analysis by a particular lab method. The lab_methods table holds a lab method code, the format mask, and allowable lowest and highest values. The lab_methods table is linked to the lab_properties and lab_method_types tables. The function of the lab_properties table is to allow queries on the lab_results table using the type of laboratory property. For example, the various pH methods are associated with the laboratory property PH. It would thus be possible to quickly determine which observations have had pH analysis in water and calcium chloride. The lab_method_types table allows grouping of equivalent laboratory results regardless of the method used. Hence, whilst there may be a number of CEC determination methods used, the laboratory method type code is used as a flag to indicate that although the methods vary, they yield comparable results. This feature is particularly important for the statistical reports.

4.1.7 Codes table

The codes table contains the entire codes data set. For practical purposes, in the entity-relationship diagram, the codes table is shown in isolation from the rest of the model. In fact, almost every table is associated with the codes table.

4.2 Tables, Indexes and Views

4.2.1 Database creation script

The database creation script is shown in Appendix A.

4.2.2 Description of tables

A description of the tables and attributes is shown in Appendix B**.** The desciption of the attributes contains a page reference to the *Australian Soil and Land Survey Field Handbook* (NCST 2009).

4.2.3 Table and column names

Table and column names have been limited to the ANSI standard of 18 characters.

4.2.4 Data types

The data types used are VARCHAR, INTEGER and FLOAT.

4.2.5 Column name prefixes

Column names are prefixed by a short table name. Columns that are codes are associated with a domain. The domain name is prefixed with a *N_* for codes that have numeric translations and a *C_* for all others.

4.2.6 Unique indexes

Unique indexes based on the primary key for each table are part of the database design.

5. GUIDELINES FOR SOIL SITE AND SAMPLE DATA

5.1 Background

The multitude of reasons for collecting soil and land site data complicates the specification of a simple minimum data set. For example:

- Some soil and land attributes attain more significance in particular environments. E.g. water repellence can have significant management practice implications for southern parts of South Australia and Western Australia.
- The applicability of a method for soil measurement can depend on the nature of the soil. E.g. CEC methods buffered at high pH are inappropriate for highly weathered soils with low pH.
- Some forms of land use require specific information which may be significant in only a few regimes. E.g. Boron deficiencies have a major impact on the growth of *Pinus radiata*.
- The reason that a site has been sampled may be to serve a very narrow objective. E.g. A pH monitoring project may only capture the site/observation location, the depth of sampling and the associated pH value.

There is however, great value in identifying a flexible data framework that can accommodate a full range of site and soil characterisation, sampling and monitoring data. Defining a minimum set of required attributes allows the national collation of consistent and useable soil data within ASRIS.

Three different scenarios are given below as examples and a minimum list of site and soil attributes is detailed for each case. ***This listing should in no way limit the detail of the land and soil attributes recorded.*** Most soil site investigations will fit into one of the following categories: Sampling Site, Monitoring Site and Reference Site. Each one will be considered in more detail below.

5.2 General Principles

The recording of land and soil properties ***must*** adhere to the recognised Australian data collection standards. All site and soil morphology data must be collected by the methods and coding conventions outlined in the *Australian Soil and Land Survey Field Handbook* 3rd edition (NCST 2009). Soil chemical and physical measurements must be accompanied by a nominated method from either *Soil Chemical Methods – Australasia* (Rayment and Lyons 2011) or *Soil Physical Measurement and Interpretation for Land Evaluation* (McKenzie et al. 2002). If a new measurement method is not included in these publications, the method reference (for published methods) or complete method procedure needs to be stored with the data.

5.3 Site Types

A site is the location of soil observation and/or sampling events. A site can have a single coordinate pair (e.g. latitude/longitude) location or a spatial extent (an 'envelope' defined by area, length etc).

All sites must record location and site identification information (see table 1). Accurate location of a site is paramount. If the site has an extent (such as a 25x25m quadrat), record the location of all vertices (corners) as well as the specific locations at which all observations/samplings were made. Observations/samples relating to the entire site (eg a single soil profile description, a bulked set of samples, or observation of an attribute of the site such as slope) are given a single site location, usually the south-west corner or centre of the site. Linear sites (transects) should record the point of origin, end point, length and location of all discreet observation/sample points. Consult the location chapter of the Field Handbook (pp7-11) for additional attributes.

Variable	Comments
Latitude	**Coordinate recorded in decimal degrees (five decimal places) using GDA94 datum. (pp7-11)**
Longitude	**Coordinate recorded in decimal degrees (five decimal places) using GDA94 datum. (pp7-11)**
Agency	**Organisation responsible for the site (a national list of agency names and unique codes is maintained by ACLEP)**
Project	**A code for the project name**
Site identifier	**Unique within a project**
Described by	**Name of the person describing/sampling the site (p13)**
Date	**Date when the site was described (p13)**
Site type	**Erosion survey, soil property monitoring, etc (p13)**

Table 5: Minimum data set for location and site identification (page references are from the Australian Soil and Land Survey Field Handbook 3rd edition).

5.3.1 Sampling Site

A Sampling site is likely to have minimal or no site or soil data recorded in the field other than location and site identification data (see table 5) and the method and depth intervals at which the soil is sampled (see table 6). Soil samples taken from the site are usually analysed at a future date and may be stored within a soil archive. Analysis results should be added to the data record when available (see table 7).

Variable	Comments
Upper Depth	**Upper depth (m) of the sampled layer measured from the soil surface**
Lower Depth	**Lower depth (m) of the sampled layer measured from the soil surface**
Type of observation	**Soil pit, auger boring, etc (p147)**

Table 6: Minimum data set for samples

Individuals wishing to submit soil samples to the CSIRO National Soil Archive need to lodge a specimen submission form (http://www.clw.csiro.au/aclep/archive/index.htm). Before inclusion in the national collection, submissions are assessed on whether the specimens support priority initiatives, represent important landscapes or fill knowledge gaps.

5.3.2 Monitoring Site

In general terms this is a site established to monitor changes in a soil properties over time. Monitoring sites are required to have data recorded for location and site identification (table 5), samples (table 6) and laboratory analyses (table 7). Monitoring sites will have at least one measurement for a soil property and the method by which it was analysed. Analysis of multiple soil chemical and physical properties is preferred but not essential and may, in some instances, be carried out by new methods (such as infra-red spectrometry) on archived samples. Ideally, Monitoring sites would have full site and soil characterisation data associated with them also, to allow spatial extrapolation of results by soil type, but the need and resourcing of this collection would be determined by the project activity.

Variable	Comments
Result	**e.g. Total Potassium value**
Analytical method	**e.g. 9A1 (method code from Soil Chemical Methods)**
Analysis date	

Table 7: Minimum data set for laboratory analyses

5.3.3 Reference Site

A Reference site generally refers to a full soil characterisation site. It is expected that the site has detailed site and soil morphological data as well some laboratory analysis of soil samples. It follows that the Reference site has the same data capture requirements as the Monitoring site but has additional site and soil characterisation attribution. This type of site is typically one where detailed soil characterisation is required when establishing a

monitoring or trial site or, in the context of soil survey, it may be the type or reference site for a particular soil class or landscape unit.

It is a highly skilled and often arduous task to collect data for all the variables outlined in the Field Handbook. For this reason the following attribute listings provide a guide to what would constitute a comprehensively described Reference site. (Also see *Guidelines for Surveying Soil and Land Resources* – Minimum data sets for land resource survey in Australia p277-282).

Variable	Comments (page numbers refer to the Field Handbook)
Slope	**Recorded as % (p18)**
Morphological type	**Crest, hillock, ridge, etc (p19)**
Relief/Modal slope class	**Rolling hills, steep rises, etc (p45)**
Landform element	**Fan, hillslope, plain, etc (p31-44)**
Landform pattern	**Escarpment, pediment, tidal flat, etc (p55-72)**
Drainage	**Poorly drained, well-drained, etc (p202-204)**

Table 8: Minimum data set for landform

Tables 8, 9, and 10 provide a set of suggested attributes for collecting landform, land surface and soil morphological data. These attributes have been selected from the Field Handbook as they are regarded as the most important/useful variables for a range of applications. Depending on the broader framework within which the Reference site is located, additional variables may need to be captured.

Variable	Comments (page numbers refer to the Field Handbook)
Aspect	**Compass bearing to nearest 10 degrees (p127)**
Elevation	**Metres above sea level (p127)**
Microrelief	**Gilgai, biotic or other microrelief (p129-133)**
Erosion	**Presence and state of erosion (p133-138)**
Surface coarse fragments	**Presence of >2mm particles (p139-143)**
Rock Outcrop	**Recorded as % (p143)**

Table 9: Minimum data set for characterising land surface at a site

Variable	Comments (page numbers refer to the Field Handbook)
Horizon	**A1, A2, B2, etc (pp148-156)**
Boundary distinctness	**Abrupt, clear, gradual, etc (p199)**
Boundary shape	**Wavy, irregular, broken, etc (p200)**
Upper and lower depth	**(p156)**
Matrix colour	**Using Munsell Colour system (e.g. 10YR4/2) (p159)**
Mottles	**Colour, abundance, size and contrast (p159-161)**
Texture	**Loam, loamy sand, medium clay, etc (p163-167)**
Structure	**Distinctness, size and shape of peds (p171-181)**
Coarse fragments	**Abundance, size, shape, lithology and strength (p170)**
Segregations	**Discrete chemical or biological accumulations (p195-198)**
Pans	**Indurated or cemented soil horizon (p192-195)**
Reaction to HCl	**Presence of carbonate (p198)**
Field pH	**(p198)**
Australian Soil Classification	**Allocation to at least Suborder level (i.e. Red Kandosol) of the *Australian Soil Classification* (Isbell 2002).**

Table 10: Minimum data set for morphology of the soil profile

For most attributes, the *Australian Soil and Land Survey Field Handbook* makes provision for recording nil value or occurrence. In the past it has been assumed that the non-recording of an attribute simply meant that it was not present. A non-recording will always leave some doubt as to whether the describer of the profile did in fact examine for a particular attribute**. It is important that a nil value or occurrence is recorded when making an observation of an attribute**.

Additional data pertaining to regolith and geological materials of the site may be worthy inclusions in some cases. The collection of land use and land management practice information, including historic records, may also be important, particularly if the site is part of a soil condition monitoring program.

6. EXCHANGE FORMAT

6.1 General Principles

The format of the exchange protocol is closely related to the database design. Data is stored in text files, one table per file. The file name consists of the table name and a .DAT suffix. For example, the COARSE FRAGMENTS table would be exported in a file called COARSE_FRAGMENTS.DAT.

All fields are separated by a comma (",") character, which must not appear anywhere in the data. There are no enclosing quotes surrounding text fields.

6.2 Database Transfer

A SITES Version 2.0 database containing all codes can be downloaded from the ACLEP website (http://www.clw.csiro.au/aclep/). This empty database can be populated with soil site data and then forwarded to the intended government or private organisation.

6.3 XML Document Transfer

In the future data may be transferred as XML documents or delivered as web services to provide on demand access to soil data. Compliance to emerging soil data and information models (such as OzSoilML) for data transfer and web service provision will allow more streamlined collation and use of data from multiple sources. It will also facilitate the provision of online applications, such as mobile device apps and web-based data query and processing tools, through the provision of known data elements and responses.

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APPENDIX A – TABLE CREATION SCRIPTS

```
CREATE TABLE agencies(
 state_code                    VARCHAR(1)       NOT NULL,
 agency_code                   VARCHAR(3)       NOT NULL,
 agency_name                   VARCHAR(240)     NOT NULL,
 agency_acronym                VARCHAR(10)
)
;

CREATE TABLE archive_samples(
 agency_code                   VARCHAR(3)       NOT NULL,
 proj_code                     VARCHAR(10)      NOT NULL,
 s_id                          VARCHAR(10)      NOT NULL,
 o_id                          VARCHAR(2)       NOT NULL,
 h_no                          INTEGER          NOT NULL,
 samp_no                       INTEGER          NOT NULL,
 jar_no                        INTEGER          NOT NULL,
 samp_type                     VARCHAR(2),
 location                      VARCHAR(12),
 weight                        FLOAT,
 >2mm                          VARCHAR(1),
 spec_id                       INTEGER,
 subsample_date                VARCHAR(8),
 subsample_tray                VARCHAR(50),
)
;

CREATE TABLE coarse_frags(
 agency_code                   VARCHAR(3)       NOT NULL,
 proj_code                     VARCHAR(10)      NOT NULL,
 s_id                          VARCHAR(10)      NOT NULL,
 o_id                          VARCHAR(2)       NOT NULL,
 h_no                          INTEGER          NOT NULL,
 cf_no                         INTEGER          NOT NULL,
 cf_abun                       VARCHAR(1),
 cf_size                       VARCHAR(1),
 cf_shape                      VARCHAR(2),
 cf_lith                       VARCHAR(2),
 cf_strength                   VARCHAR(2),
 cf_distribution               VARCHAR(1)
)
;

CREATE TABLE codes(
 code_domain                   VARCHAR(20)      NOT NULL,
 code_value                    VARCHAR(10)      NOT NULL,
 code_value2                   VARCHAR(6),
 code_value3                   VARCHAR(6),
 code_desc                     VARCHAR(100)     NOT NULL,
 code_tech_ref                 VARCHAR(1),
 code_avg_no_value             FLOAT,
 code_low_no_value             FLOAT,
```

```
 code_high_no_value              FLOAT,
 agency_code                     VARCHAR(3)
)
;

CREATE TABLE colours(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 o_id                            VARCHAR(2)       NOT NULL,
 h_no                            INTEGER          NOT NULL,
 col_no                          INTEGER          NOT NULL,
 col_hue_val_chrom               VARCHAR(10),
 col_hue                         VARCHAR(5)       NOT NULL,
 col_value                       FLOAT,
 col_chroma                      FLOAT,
 col_moisture_stat               VARCHAR(1)
)
;

CREATE TABLE cracks(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 o_id                            VARCHAR(2)       NOT NULL,
 h_no                            INTEGER          NOT NULL,
 crack_no                        INTEGER          NOT NULL,
 crack_width                     VARCHAR(1)       NOT NULL
)
;

CREATE TABLE cutans(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 o_id                            VARCHAR(2)       NOT NULL,
 h_no                            INTEGER          NOT NULL,
 cutan_no                        INTEGER          NOT NULL,
 cutan_type                      VARCHAR(1),
 cutan_abun                      VARCHAR(1),
 cutan_distinct                  VARCHAR(1)
)
;

CREATE TABLE disturbances(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 o_id                            VARCHAR(2)       NOT NULL,
 dist_no                         INTEGER          NOT NULL,
 dist_type                       VARCHAR(1)       NOT NULL
)
;

CREATE TABLE elem_geomorphs(
 agency_code                     VARCHAR(3)       NOT NULL,
```

```
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 egm_no                         INTEGER          NOT NULL,
 egm_mode                       VARCHAR(2),
 egm_agent                      VARCHAR(2)
)
;

CREATE TABLE fabrics(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 fab_no                         INTEGER          NOT NULL,
 fab_type                       VARCHAR(1),
 fab_abun                       VARCHAR(1)
)
;

CREATE TABLE horizons(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 h_desig_num_pref               INTEGER,
 h_desig_master                 VARCHAR(3),
 h_desig_subdiv                 INTEGER,
 h_desig_suffix                 VARCHAR(5),
 h_upper_depth                  FLOAT,
 h_lower_depth                  FLOAT,
 h_texture                      VARCHAR(5),
 h_texture_qual                 VARCHAR(1),
 h_soil_water_stat              VARCHAR(1),
 h_stickiness                   VARCHAR(1),
 h_plasticity_type              VARCHAR(1),
 h_plasticity_deg               VARCHAR(1),
 h_water_repellence             VARCHAR(1),
 h_carbonate_eff                VARCHAR(1),
 h_bound_distinct               VARCHAR(1),
 h_bound_shape                  VARCHAR(1),
 h_permeability                 VARCHAR(1),
 h_notes                        VARCHAR(240)
)
;

CREATE TABLE lab_methods(
 labm_code                      VARCHAR(10)      NOT NULL,
 labp_code                      VARCHAR(20)      NOT NULL,
 labmt_code                     VARCHAR(20)      NOT NULL,
 labm_name                      VARCHAR(240)     NOT NULL,
 labm_short_name                VARCHAR(20)      NOT NULL,
 labm_ref                       VARCHAR(240)     NOT NULL,
 labm_mask                      VARCHAR(12),
 labm_units                     VARCHAR(20),
```

```
 labm_low_value                  FLOAT,
 labm_high_value                 FLOAT,
 agency_code                     VARCHAR(3)
)
;

CREATE TABLE lab_method_types(
 labmt_code                      VARCHAR(20)      NOT NULL,
 labmt_name                      VARCHAR(80)      NOT NULL
)
;

CREATE TABLE lab_properties(
 labp_code                       VARCHAR(20)      NOT NULL,
 labp_name                       VARCHAR(80)      NOT NULL
)
;

CREATE TABLE lab_results(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 o_id                            VARCHAR(2)       NOT NULL,
 h_no                            INTEGER          NOT NULL,
 samp_no                         INTEGER          NOT NULL,
 labm_code                       VARCHAR(10)      NOT NULL,
 labr_no                         INTEGER          NOT NULL,
 labr_value_prefix               VARCHAR(1),
 labr_value                      FLOAT,
 labr_low_value                  FLOAT,
 labr_high_value                 FLOAT,
 labr_analysis_type              VARCHAR(4),
 labr_date                       VARCHAR(8)
)
;

CREATE TABLE land_cover(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 lcov_no                         INTEGER          NOT NULL,
 lcov_date                       VARCHAR(8)       NULL,
 lcov_ref                        VARCHAR(10)      NOT NULL,
 land_cover                      VARCHAR(10)      NOT NULL
)
;

CREATE TABLE land_uses(
 agency_code                     VARCHAR(3)       NOT NULL,
 proj_code                       VARCHAR(10)      NOT NULL,
 s_id                            VARCHAR(10)      NOT NULL,
 luse_no                         INTEGER          NOT NULL,
 luse_date                       VARCHAR(8)       NULL,
 luse_end_date                   VARCHAR(8)       NULL,
 luse_ref                        VARCHAR(10)      NOT NULL,
 land_use                        VARCHAR(10)      NOT NULL
```

```
)
;


CREATE TABLE microreliefs(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 mr_no                          INTEGER          NOT NULL,
 mr_type                        VARCHAR(1),
 mr_prop_gilgai                 VARCHAR(1),
 mr_biotic_agent                VARCHAR(1),
 mr_biotic_comp                 VARCHAR(1),
 mr_vertical_int                FLOAT,
 mr_horiz_int                   FLOAT
)
;

CREATE TABLE mottles(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 mott_no                        INTEGER          NOT NULL,
 mott_type                      VARCHAR(1),
 mott_abun                      VARCHAR(1),
 mott_size                      VARCHAR(1),
 mott_contrast                  VARCHAR(1),
 mott_hue_val_chrom             VARCHAR(10),
 mott_hue                       VARCHAR(5),
 mott_value                     FLOAT,
 mott_chroma                    FLOAT,
 mott_moisture_stat             VARCHAR(1),
 mott_colour                    VARCHAR(1),
 mott_boun_distinct             VARCHAR(1)
)
;

CREATE TABLE observations(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 o_type                         VARCHAR(1),
 o_nature                       VARCHAR(1),
 o_desc_by                      VARCHAR(4),
 o_date_desc                    VARCHAR(8),
 o_amg_zone                     INTEGER,
 o_easting                      INTEGER,
 o_northing                     INTEGER,
 o_latitude                     FLOAT,
 o_longitude                    FLOAT,
 o_datum                        VARCHAR(10),
 o_latitude_GDA94               FLOAT,
```

```
o_longitude_GDA94               FLOAT,
o_state                         VARCHAR(3),
o_location_notes                VARCHAR(240),
o_photo_east                    INTEGER,
o_photo_north                   INTEGER,
o_land_use                      VARCHAR(4),
o_forest_type                   VARCHAR(1),
o_rf_complex                    VARCHAR(1),
o_rf_leafsize                   VARCHAR(1),
o_rf_flor_comp                  VARCHAR(1),
o_rf_indicator                  VARCHAR(1),
o_rf_emergents                  VARCHAR(1),
o_sclerophyll                   VARCHAR(1),
o_veg_notes                     VARCHAR(240),
o_aspect                        INTEGER,
o_elevation_eval                VARCHAR(1),
o_elevation_pf                  VARCHAR(1),
o_elevation                     INTEGER,
o_drainage_eval                 VARCHAR(1),
o_drainage_height               FLOAT,
o_drainage                      VARCHAR(1),
o_mr_sampled                    VARCHAR(1),
o_soil_disturb                  VARCHAR(1),
o_grnd_cov_level_min            INTEGER,
o_grnd_cov_level_max            INTEGER,
o_grnd_cov_height_min           INTEGER,
o_grnd_cov_height_max           INTEGER,
o_wind_state                    VARCHAR(1),
o_wind_deg                      VARCHAR(1),
o_wind_stability                VARCHAR(1),
o_wind_visibility               VARCHAR(1),
o_scald_state                   VARCHAR(1),
o_scald_deg                     VARCHAR(1),
o_sheet_state                   VARCHAR(1),
o_sheet_deg                     VARCHAR(1),
o_wave_state                    VARCHAR(1),
o_wave_deg                      VARCHAR(1),
o_rill_state                    VARCHAR(1),
o_rill_deg                      VARCHAR(1),
o_mass_state                    VARCHAR(1),
o_mass_deg                      VARCHAR(1),
o_gully_state                   VARCHAR(1),
o_gully_deg                     VARCHAR(1),
o_stbank_state                  VARCHAR(1),
o_stbank_deg                    VARCHAR(1),
o_tunnel_state                  VARCHAR(1),
o_tunnel_deg                    VARCHAR(1),
o_other_er_state                VARCHAR(1),
o_other_er_deg                  VARCHAR(1),
o_other_er_type                 VARCHAR(30),
o_gully_depth                   VARCHAR(1),
o_aggradation                   VARCHAR(1),
o_inund_freq                    VARCHAR(1),
o_inund_dur                     VARCHAR(1),
o_inund_depth                   VARCHAR(1),
o_inund_runon_vel               VARCHAR(1),
```

```
 o_depth_water                  FLOAT,
 o_depth_water_pref             VARCHAR(1),
 o_depth_rhorizon_pf            VARCHAR(1),
 o_depth_rhorizon               FLOAT,
 o_runoff                       VARCHAR(1),
 o_permeability                 VARCHAR(1),
 o_sb_obs_type                  VARCHAR(1),
 o_sb_distance                  FLOAT,
 o_sb_confidence                VARCHAR(1),
 o_sb_depth_pf                  VARCHAR(1),
 o_sb_depth                     FLOAT,
 o_sb_grain_size                VARCHAR(1),
 o_sb_texture                   VARCHAR(1),
 o_sb_structure                 VARCHAR(1),
 o_sb_porosity                  VARCHAR(1),
 o_sb_strength                  VARCHAR(2),
 o_sb_lith                      VARCHAR(2),
 o_sb_mass_spac_dis             VARCHAR(1),
 o_sb_mass_alt                  VARCHAR(1),
 o_sb_mass_strength             VARCHAR(2),
 o_sb_mass_gen_type             VARCHAR(2),
 o_substrate_notes              VARCHAR(240),
 o_ppf                          VARCHAR(9),
 o_gsg                          VARCHAR(3),
 o_asc_tech_ref                 VARCHAR(1),
 o_asc_conf                     VARCHAR(1),
 o_asc_ord                      VARCHAR(2),
 o_asc_subord                   VARCHAR(2),
 o_asc_gg                       VARCHAR(2),
 o_asc_subg                     VARCHAR(2),
 o_asc_fam1                     VARCHAR(1),
 o_asc_fam2                     VARCHAR(1),
 o_asc_fam3                     VARCHAR(1),
 o_asc_fam4                     VARCHAR(1),
 o_asc_fam5                     VARCHAR(1),
 o_asc_notes                    VARCHAR(240),
 o_uni_soil_class               VARCHAR(5),
 o_soil_taxonomy                VARCHAR(6),
 o_tax_unit_type                VARCHAR(3),
 o_tax_unit_name                VARCHAR(100),
 o_map_unit_type                VARCHAR(3),
 o_map_unit_name                VARCHAR(100),
 o_notes                        VARCHAR(240)
)
;

CREATE TABLE obs_mng_pracs(
 agency_code                    VARCHAR(3)      NOT NULL,
 proj_code                      VARCHAR(10)     NOT NULL,
 s_id                           VARCHAR(10)     NOT NULL,
 o_id                           VARCHAR(2)      NOT NULL,
 omp_no                         INTEGER         NOT NULL,
 omp_date                       VARCHAR(8)      NULL,
 omp_ref                        VARCHAR(10)     NOT NULL,
 omp_code                       VARCHAR(10)     NOT NULL
)
```

```
;

CREATE TABLE officers(
 agency_code                    VARCHAR(3)       NOT NULL,
 offr_code                      VARCHAR(4)       NOT NULL,
 offr_name                      VARCHAR(40)      NOT NULL
)
;

CREATE TABLE pans(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 pan_no                         INTEGER          NOT NULL,
 pan_cementation                VARCHAR(1),
 pan_type                       VARCHAR(1),
 pan_continuity                 VARCHAR(1),
 pan_structure                  VARCHAR(1)
)
;

CREATE TABLE patt_geomorphs(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 pgm_no                         INTEGER          NOT NULL,
 pgm_mode                       VARCHAR(2),
 pgm_agent                      VARCHAR(2),
 pgm_stat                       VARCHAR(1)
)
;

CREATE TABLE phs(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 ph_no                          INTEGER          NOT NULL,
 ph_value                       FLOAT            NOT NULL,
 ph_depth                       FLOAT,
 ph_method                      VARCHAR(1)
)
;

CREATE TABLE pores(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 pore_no                        INTEGER          NOT NULL,
 pore_abun                      VARCHAR(1),
 pore_diameter                  VARCHAR(1)
```

```
)
;

CREATE TABLE projects(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 proj_name                      VARCHAR(240)     NOT NULL,
 proj_manager_code              VARCHAR(4),
 proj_biblio_ref                VARCHAR(240),
 proj_start_date                VARCHAR(8),
 proj_finish_date               VARCHAR(8)
)
;

CREATE TABLE rock_outcrops(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 ro_no                          INTEGER          NOT NULL,
 ro_abun                        VARCHAR(1),
 ro_lith                        VARCHAR(2)
)
;

CREATE TABLE roots(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 root_no                        INTEGER          NOT NULL,
 root_abun                      VARCHAR(1),
 root_size                      VARCHAR(1)
)
;

CREATE TABLE samples(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 samp_no                        INTEGER          NOT NULL,
 samp_upper_depth               FLOAT,
 samp_lower_depth               FLOAT,
 samp_contrib                   INTEGER,
 samp_size                      VARCHAR(1),
 samp_notes                     VARCHAR (240)
)
;

CREATE TABLE segregations(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
```

```
 o_id                            VARCHAR(2)        NOT NULL,
 h_no                            INTEGER           NOT NULL,
 seg_no                          INTEGER           NOT NULL,
 seg_abun                        VARCHAR(1),
 seg_nature                      VARCHAR(1),
 seg_form                        VARCHAR(1),
 seg_size                        VARCHAR(1),
 seg_strength                    VARCHAR(1),
 seg_magnetic_attr               VARCHAR(1)
)
;

CREATE TABLE sites(
 agency_code                     VARCHAR(3)        NOT NULL,
 proj_code                       VARCHAR(10)       NOT NULL,
 s_id                            VARCHAR(10)       NOT NULL,
 s_orig_tech_ref                 VARCHAR(1),
 s_map_scale                     VARCHAR(1),
 s_map_sheet_no                  VARCHAR(10),
 s_map_ref_type                  VARCHAR(1),
 s_photo_film_no                 VARCHAR(11),
 s_photo_run_no                  VARCHAR(3),
 s_photo_frame_no                INTEGER,
 s_desc_by                       VARCHAR(4),
 s_date_desc                     VARCHAR(8),
 s_rainfall                      INTEGER,
 s_type                          VARCHAR(1),
 s_slope_pf                      VARCHAR(1),
 s_slope                         FLOAT,
 s_slope_eval                    VARCHAR(1),
 s_slope_class                   VARCHAR(2),
 s_morph_type                    VARCHAR(1),
 s_elem_inc_slope                VARCHAR(1),
 s_elem_length                   FLOAT,
 s_elem_width                    FLOAT,
 s_elem_height                   FLOAT,
 s_elem_location                 VARCHAR(1),
 s_elem_type                     VARCHAR(3),
 s_relief                        INTEGER,
 s_modal_slope                   VARCHAR(2),
 s_relief_class                  VARCHAR(1),
 s_rel_ms_class                  VARCHAR(2),
 s_strm_ch_spacing               VARCHAR(2),
 s_strm_ch_dev                   VARCHAR(1),
 s_strm_ch_dtow                  VARCHAR(1),
 s_strm_ch_mig                   VARCHAR(1),
 s_strm_ch_patt                  VARCHAR(1),
 s_strm_ch_net_int               VARCHAR(1),
 s_strm_ch_dir_net               VARCHAR(1),
 s_patt_type                     VARCHAR(3),
 s_notes                         VARCHAR(240),
 s_trans_author                  VARCHAR(4),
 s_trans_date                    VARCHAR(8),
 ref_agency_code                 VARCHAR(3),
 ref_project_code                VARCHAR(10),
 ref_s_id                        VARCHAR(10)
```

```
)
;

CREATE TABLE site_envelope(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 s_env_no                       INTEGER          NOT NULL,
 s_env_code                     VARCHAR (10)     NOT NULL,
 s_env_value                    VARCHAR(50)
)
;

CREATE TABLE site_mng_pracs(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 luse_no                        INTEGER          NOT NULL,
 smp_no                         INTEGER          NOT NULL,
 smp_date                       VARCHAR(8),
 smp_ref                        VARCHAR(10),
 smp_code                       VARCHAR(4)       NOT NULL
)
;

CREATE TABLE states(
 state_code                     VARCHAR(1)       NOT NULL,
 state_name                     VARCHAR(3)       NOT NULL
)
;

CREATE TABLE strengths(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 strg_no                        INTEGER          NOT NULL,
 strg_class                     VARCHAR(1)       NOT NULL,
 strg_moisture_stat             VARCHAR(1)
)
;

CREATE TABLE structures(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 h_no                           INTEGER          NOT NULL,
 str_no                         INTEGER          NOT NULL,
 str_ped_grade                  VARCHAR(1),
 str_ped_size                   VARCHAR(1),
 str_ped_type                   VARCHAR(2),
 str_compound_ped               VARCHAR(1),
 str_clods_frags                VARCHAR(2)
)
```

```
;

CREATE TABLE sub_mineral_comps(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 sb_no                          INTEGER          NOT NULL,
 sb_mineral_comp                VARCHAR(1)       NOT NULL
)
;

CREATE TABLE surf_coarse_frags(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 scf_no                         INTEGER          NOT NULL,
 scf_abun                       VARCHAR(1),
 scf_size                       VARCHAR(1),
 scf_shape                      VARCHAR(2),
 scf_lith                       VARCHAR(2),
 scf_strength                   VARCHAR(2)
)
;

CREATE TABLE surf_conditions(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 scon_no                        INTEGER          NOT NULL,
 scon_stat                      VARCHAR(1)
)
;

CREATE TABLE veg_species(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 vstr_code                      VARCHAR(2)       NOT NULL,
 vsp_no                         INTEGER          NOT NULL,
 vsp_species                    VARCHAR(90)      NOT NULL,
 vsp_code                       VARCHAR(8),
 vsp_anbg_id                    INTEGER,
 vsp_abun                       VARCHAR(3)
)
;

CREATE TABLE veg_strata(
 agency_code                    VARCHAR(3)       NOT NULL,
 proj_code                      VARCHAR(10)      NOT NULL,
 s_id                           VARCHAR(10)      NOT NULL,
 o_id                           VARCHAR(2)       NOT NULL,
 vstr_code                      VARCHAR(2)       NOT NULL,
```

```
 vstr_growth_form                VARCHAR(1),
 vstr_height_class               VARCHAR(1),
 vstr_cover_class                VARCHAR(1),
 vstr_crown_cover                FLOAT
)
;


CREATE UNIQUE INDEX AGENCY_PRIM ON AGENCIES
(
      agency_code )
;

CREATE UNIQUE INDEX AS_PRIM ON ARCHIVE_SAMPLES
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      samp_no ,
      jar_no )
;

CREATE UNIQUE INDEX CF_PRIM ON COARSE_FRAGS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      cf_no )
;

CREATE UNIQUE INDEX CODE_PRIM ON CODES
(
      code_domain ,
      code_value ,
      code_value2 ,
      code_value3 )
;

CREATE UNIQUE INDEX COL_PRIM ON COLOURS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      col_no )
;

CREATE UNIQUE INDEX CRACK_PRIM ON CRACKS
(
      agency_code ,
      proj_code ,
```

```
      s_id ,
      o_id ,
      h_no ,
      crack_no )
;


CREATE UNIQUE INDEX CUTAN_PRIM ON CUTANS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      cutan_no )
;

CREATE UNIQUE INDEX DIST_PRIM ON DISTURBANCES
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      dist_no )
;

CREATE UNIQUE INDEX EGM_PRIM ON ELEM_GEOMORPHS
(
      agency_code ,
      proj_code ,
      s_id ,
      egm_no )
;

CREATE UNIQUE INDEX FAB_PRIM ON FABRICS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      fab_no )
;

CREATE UNIQUE INDEX H_PRIM ON HORIZONS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no )
;

CREATE UNIQUE INDEX LMET_PRIM ON LAB_METHODS
(
      labm_code )
```

```
;

CREATE UNIQUE INDEX LMTYP_PRIM ON LAB_METHOD_TYPES
(
      labmt_code )
;

CREATE UNIQUE INDEX LPROP_PRIM ON LAB_PROPERTIES
(
      labp_code )
;

CREATE UNIQUE INDEX LRES_PRIM ON LAB_RESULTS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      samp_no ,
      labm_code ,
      labr_no )
;

CREATE UNIQUE INDEX LCOV_PRIM ON LAND_COVER
(
      agency_code ,
      proj_code ,
      s_id ,
      lcov_no )
;

CREATE UNIQUE INDEX LUSE_PRIM ON LAND_USES
(
      agency_code ,
      proj_code ,
      s_id ,
      luse_no )
;

CREATE UNIQUE INDEX MOTT_PRIM ON MOTTLES
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      mott_no )
;

CREATE UNIQUE INDEX MR_PRIM ON MICRORELIEFS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
```

```
      mr_no )
;

CREATE UNIQUE INDEX OFFR_PRIM ON OFFICERS
(
      agency_code ,
      offr_code )
;

CREATE UNIQUE INDEX OMP_PRIM ON OBS_MNG_PRACS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      omp_no )
;

CREATE UNIQUE INDEX O_PRIM ON OBSERVATIONS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id )
;

CREATE UNIQUE INDEX PAN_PRIM ON PANS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      pan_no )
;

CREATE UNIQUE INDEX PGM_PRIM ON PATT_GEOMORPHS
(
      agency_code ,
      proj_code ,
      s_id ,
      pgm_no )
;

CREATE UNIQUE INDEX PH_PRIM ON PHS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      ph_no )
;

CREATE UNIQUE INDEX PORE_PRIM ON PORES
(
```

```
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      pore_no )
;

CREATE INDEX PROJ_MANAGED_BY_FRGN ON PROJECTS
(
      proj_manager_code )
;

CREATE UNIQUE INDEX PROJ_PRIM ON PROJECTS
(
      agency_code ,
      proj_code )
;

CREATE UNIQUE INDEX ROOT_PRIM ON ROOTS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      root_no )
;

CREATE UNIQUE INDEX RO_PRIM ON ROCK_OUTCROPS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      ro_no )
;

CREATE UNIQUE INDEX SAMP_PRIM ON SAMPLES
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      samp_no )
;

CREATE UNIQUE INDEX SB_PRIM ON SUB_MINERAL_COMPS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      sb_no )
;
```

```
CREATE UNIQUE INDEX SCF_PRIM ON SURF_COARSE_FRAGS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      scf_no )
;

CREATE UNIQUE INDEX SCON_PRIM ON SURF_CONDITIONS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      scon_no )
;

CREATE UNIQUE INDEX SEG_PRIM ON SEGREGATIONS
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      seg_no )
;

CREATE UNIQUE INDEX S_ENV_PRIM ON SITE_ENVELOPE
(
      agency_code ,
      proj_code ,
      s_id ,
      s_env_no,
      s_env_code )
;

CREATE UNIQUE INDEX SMP_PRIM ON SITE_MNG_PRACS
(
      agency_code ,
      proj_code ,
      s_id ,
      luse_no ,
      smp_no )
;

CREATE UNIQUE INDEX STATE_PRIM ON STATES
(
      state_code )
;

CREATE UNIQUE INDEX STRG_PRIM ON STRENGTHS
(
      agency_code ,
      proj_code ,
```

```
      s_id ,
      o_id ,
      h_no ,
      strg_no )
;


CREATE UNIQUE INDEX STR_PRIM ON STRUCTURES
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      h_no ,
      str_no )
;

CREATE INDEX S_DESCRIBED_BY_FRGN ON SITES
(
      s_desc_by )
;

CREATE UNIQUE INDEX S_PRIM ON SITES
(
      agency_code ,
      proj_code ,
      s_id )
;

CREATE UNIQUE INDEX VSP_PRIM ON VEG_SPECIES
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      vstr_code ,
      vsp_no )
;

CREATE UNIQUE INDEX VSTR_PRIM ON VEG_STRATA
(
      agency_code ,
      proj_code ,
      s_id ,
      o_id ,
      vstr_code )
;
```

APPENDIX B – TABLE DEFINITIONS

Note: All page numbers refer to the *Australian Soils and Land Survey Field Handbook* (NCST 2009) unless otherwise stated.

AGENCIES

Column name	Domain name	Description	Data type	Length	Null
STATE_CODE		State code p7 Note: new codes	VARCHAR	1	NOT NULL
AGENCY_CODE		Agency unique identifier	VARCHAR	3	NOT NULL
AGENCY_NAME		Name of agency	VARCHAR	240	NOT NULL
AGENCY_ACRONYM		Acronym of agency, e.g. ACLEP	VARCHAR	10	NULL

ARCHIVE_SAMPLES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
SAMP_NO		Sample number	INTEGER		NOT NULL
JAR_NO		Jar number	INTEGER		NOT NULL
SAMP_TYPE	C_AS_SAMP_TYPE	Sample type, e.g. fine earth, whole soil	VARCHAR	2	NULL
LOCATION		Location of sample i.e. shelf number	VARCHAR	12	NULL
WEIGHT		Weight of the sample (in grams)	FLOAT		NULL
>2mm		Presence of coarse fragment sample	VARCHAR	1	NULL
SPEC_ID		Subsample ID for spectroscopy	INTEGER		NULL
SUBSAMPLE_DATE		Date of subsampling	VARCHAR	8	NULL
SUBSAMPLE_TRAY		Subsample tray identifier	VARCHAR	50	NULL

COARSE_FRAGS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
CF_NO		Coarse fragment number	INTEGER		NOT NULL
CF_ABUN	N_CF_ABUN	Coarse fragments abundance p139	VARCHAR	1	NULL
CF_SIZE	N_CF_SIZE	Coarse fragments size p140	VARCHAR	1	NULL
CF_SHAPE	C_CF_SHAPE	Coarse fragments shape p142	VARCHAR	2	NULL
CF_LITH	C_LITHOLOGY	Coarse fragment lithology p142	VARCHAR	2	NULL
CF_STRENGTH	C_CF_STRENGTH	Coarse fragments strength p142	VARCHAR	2	NULL
CF_DISTRIBUTION	C_CF_DISTRIBUTION	Coarse fragments distribution p170	VARCHAR	1	NULL

CODES

Column name	Domain name	Description	Data type	Length	Null
CODE_DOMAIN		Code domain, that is, code type	VARCHAR	20	NOT NULL
CODE_VALUE		Code value	VARCHAR	10	NOT NULL
CODE_VALUE2		Second code value	VARCHAR	6	NULL
CODE_VALUE3		Third code value	VARCHAR	6	NULL
CODE_DESC		Code description	VARCHAR	100	NOT NULL
CODE_TECH_REF	C_TECH_REF	Technical reference	VARCHAR	1	NULL
CODE_AVG_NO_VALUE		Average value of range	FLOAT		NULL
CODE_LOW_NO_VALUE		Low numeric value of range	FLOAT		NULL
CODE_HIGH_NO_VALUE		High numeric value of range	FLOAT		NULL

COLOURS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
COL_NO		Colour number	INTEGER		NOT NULL
COL_HUE_VAL_CHROM	C_MUNSELL_COLOUR	Colour for decode	VARCHAR	10	NOT NULL
COL_HUE		Colour hue p159	VARCHAR	5	NOT NULL
COL_VALUE		Colour value p159	FLOAT		NULL
COL_CHROMA		Colour chroma p159	FLOAT		NULL
COL_MOISTURE_STAT	C_MOISTURE_STAT	Colour moisture status p159	VARCHAR	1	NULL

CRACKS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
CRACK_NO		Crack number	INTEGER		NOT NULL
CRACK_WIDTH	N_CRACK_WIDTH	Crack width p184	VARCHAR	1	NOT NULL

CUTANS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
CUTAN_NO		Cutan number	INTEGER		NOT NULL
CUTAN_TYPE	C_CUTAN_TYPE	Type of cutan p182	VARCHAR	1	NULL
CUTAN_ABUN	N_CUTAN_ABUN	Abundance of cutan p183	VARCHAR	1	NULL
CUTAN_DISTINCT	C_CUTAN_DISTINCT	Distinctness of cutan p183	VARCHAR	1	NULL

DISTURBANCES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
DIST_NO		Disturbance number	INTEGER		NOT NULL
DIST_TYPE	C_DIST_TYPE	Disturbance of site p128	VARCHAR	1	NOT NULL

ELEM_GEOMORPHS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
EGM_NO		Element geomorphology number	INTEGER		NOT NULL
EGM_MODE	C_GEOMORPH_MODE	Element mode of geomorphological activity p29	VARCHAR	2	NULL
EGM_AGENT	C_GEOMORPH_AGENT	Element geomorphological agent p30	VARCHAR	2	NULL

FABRICS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
FAB_NO		Fabric number	INTEGER		NOT NULL
FAB_TYPE	C_FAB_TYPE	Fabric type p181	VARCHAR	1	NULL
FAB_ABUN	N_CF_ABUN	Fabric abundance	VARCHAR	1	NULL

HORIZONS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
H_DESIG_NUM_PREF		Horizon numeric prefix, p148	INTEGER		NULL
H_DESIG_MASTER		Master horizon designation, e.g. A1, B2 p148	VARCHAR	3	NULL
H_DESIG_SUBDIV		Horizon subdivision, 1, 2 etc p155	INTEGER		NULL
H_DESIG_SUFFIX		Horizon suffix, e.g., b, c, d p153	VARCHAR	5	NULL
H_UPPER_DEPTH		Upper depth (m) p156	FLOAT		NULL
H_LOWER_DEPTH		Lower depth (m) p156	FLOAT		NULL
H_TEXTURE	C_H_TEXTURE	Field texture (mineral soils), including modifiers p161	VARCHAR	5	NULL
H_TEXTURE_QUAL	C_H_TEXTURE_QUAL	Field texture qualification p166	VARCHAR	1	NULL
H_SOIL_WATER_STAT	C_SOIL_WATER_STAT	Soil water status p186	VARCHAR	1	NULL
H_STICKINESS	C_H_STICKINESS	Consistence, stickiness p187	VARCHAR	1	NULL
H_PLASTICITY_TYPE	C_H_PLASTICITY_TYPE	Consistence, type of plasticity p188	VARCHAR	1	NULL
H_PLASTICITY_DEG	C_H_PLASTICITY_DEG	Consistence, degree of plasticity p188	VARCHAR	1	NULL
H_WATER_REPELLENCE	C_H_WATER_REPELLENCE	Water repellence p191	VARCHAR	1	NULL
H_CARBONATE_EFF	C_H_CARBONATE_EFF	Effervescence of carbonate in fine earth p198	VARCHAR	1	NULL
H_BOUND_DISTINCT	N_H_BOUND_DISTINCT	Distinctness of boundary between horizons p199	VARCHAR	1	NULL
H_BOUND_SHAPE	C_H_BOUND_SHAPE	Shape of boundary between horizons p200	VARCHAR	1	NULL
H_PERMEABILITY	C_PERMEABILITY	Soil water regime, permeability p200	VARCHAR	1	NULL
H_NOTES		Free text notes, additional field	VARCHAR	240	NULL

LAB_METHODS

Column name	Domain name	Description	Data type	Length	Null
LABM_CODE		Lab method code, based on Rayment and Lyons (2011)	VARCHAR	10	NOT NULL
LABP_CODE		Lab property code	VARCHAR	20	NOT NULL
LABMT_CODE		Lab method type code	VARCHAR	20	NOT NULL
LABM_NAME		Lab method description	VARCHAR	240	NOT NULL
LABM_SHORT_NAME		Lab method short name	VARCHAR	20	NOT NULL
LABM_MASK		Lab method format mask e.g. 99.99 or 0.9999	VARCHAR	12	NULL
LABM_UNITS		Lab property units e.g. m	VARCHAR	20	NULL
LABM_LOW_VALUE		Lab property low value of range allowed	FLOAT		NULL
LABM_HIGH_VALUE		Lab property high value of range allowed	FLOAT		NULL
AGENCY_CODE		Agency code; used for exchange purposes	VARCHAR	3	NULL

LAB_METHOD_TYPES

Column name	Domain name	Description	Data type	Length	Null
LABMT_CODE		Lab method type code	VARCHAR	20	NOT NULL
LABMT_NAME		Lab method type name	VARCHAR	80	NOT NULL

LAB_PROPERTIES

Column name	Domain name	Description	Data type	Length	Null
LABP_CODE		Lab property code	VARCHAR	20	NOT NULL
LABP_NAME		Name of laboratory property	VARCHAR	80	NOT NULL

LAB_RESULTS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
SAMP_NO		Sample number e.g. Hrz 1 = 0-0.4 m Samp 1 = 0-0.2 Samp 2 = 0.2-0.4 m	INTEGER		NOT NULL
LABM_CODE		Lab method code	VARCHAR	10	NOT NULL
LABR_NO		Replicate number of sample	INTEGER		NOT NULL
LABR_VALUE_PREFIX		Prefix of value e.g. >, <, t for trace, etc	VARCHAR	1	NULL
LABR_VALUE		Value of lab result	FLOAT		NULL
LABR_LOW_VALUE		Low value of range	FLOAT		NULL
LABR_HIGH_VALUE		High value of range	FLOAT		NULL
LABR_ANALYSIS_TYPE	C_LABR_ANALYSIS_TYPE	Lab analysis type, CHEM, PHYS or MIN	VARCHAR	4	NULL
LABR_DATE		Date analysis undertaken	VARCHAR	8	NULL

LAND _COVER

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
LCOV_NO		Land cover number	INTEGER		NOT NULL
LCOV_DATE		Date land cover observed ddmmyyyy	VARCHAR	8	NULL
LCOV_REF	C_LAND_COVER_REF	Land cover reference e.g. FAO Land Cover Version 2	VARCHAR	10	NOT NULL
LAND_COVER	C_LAND_COVER	Land cover code	VARCHAR	10	NOT NULL

LAND _USES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
LUSE_NO		Land use number	INTEGER		NOT NULL
LUSE_DATE		Date land use observed or started	VARCHAR	8	NULL
LUSE_END_DATE		End date for land use ddmmyyyy	VARCHAR	8	NULL
LUSE_REF	C_LAND_USE_REF	Land use reference e.g. ALUM Version 6	VARCHAR	10	NOT NULL
LAND_USE	C_LAND_USE	Land use code	VARCHAR	10	NOT NULL

MICRORELIEFS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
MR_NO		Microrelief number	INTEGER		NOT NULL
MR_TYPE	C_MR_TYPE	Type of microrelief p129	VARCHAR	1	NULL
MR_PROP_GILGAI	C_MR_PROP_GILGAI	Proportions of gilgai components p130	VARCHAR	1	NULL
MR_BIOTIC_AGENT	C_MR_BIOTIC_AGENT	Biotic microrelief (agent) p131	VARCHAR	1	NULL
MR_BIOTIC_COMP	C_MR_BIOTIC_COMP	Component of biotic microrelief p133	VARCHAR	1	NULL
MR_VERTICAL_INT		Vertical interval (m) p133	FLOAT		NULL
MR_HORIZ_INT		Horizontal interval (m) p133	FLOAT		NULL

MOTTLES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
MOTT_NO		Mottle number	INTEGER		NOT NULL
MOTT_TYPE	C_MOTT_TYPE	Mottle type p160	VARCHAR	1	NULL
MOTT_ABUN	N_MOTT_ABUN	Mottle abundance p160	VARCHAR	1	NULL
MOTT_SIZE	N_MOTT_SIZE	Mottle size p160	VARCHAR	1	NULL
MOTT_CONTRAST	C_CONTRAST	Mottle contrast p160	VARCHAR	1	NULL
MOTT_HUE_VAL_CHROM	C_MUNSELL_COLOUR	Colour for decode	VARCHAR	10	NOT NULL
MOTT_HUE		Mottle hue p159	VARCHAR	5	NULL
MOTT_VALUE		Mottle value p159	FLOAT		NULL
MOTT_CHROMA		Mottle chroma p159	FLOAT		NULL
MOTT_MOISTURE_STAT	C_MOISTURE_STAT	Mottle colour moisture status p159	VARCHAR	1	NULL
MOTT_COLOUR	C_MOTT_COLOUR	Mottle colour i.e. old colours R, O, B etc p161	VARCHAR	1	NULL
MOTT_BOUN_DISTINCT	C_MOTT_BOUN_DISTINCT	Distinctness of boundaries (colour boundaries) p161	VARCHAR	1	NULL

OBSERVATIONS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
O_TYPE	C_O_TYPE	Type of soil observation, e.g. Soil pit, etc p147	VARCHAR	1	NULL
O_NATURE	C_O_NATURE	Nature of observation e.g. characterisation, single, etc	VARCHAR	1	NULL
O_DESC_BY		Officer code p13	VARCHAR	4	NULL
O_DATE_DESC		Date site described p13 ddmmyyyy	VARCHAR	8	NULL
O_AMG_ZONE		Australian map grid zone p8	INTEGER		NULL
O_EASTING		AMG easting (m) p8	INTEGER		NULL
O_NORTHING		AMG northing (m) p8	INTEGER		NULL
O_LATITUDE		Latitude decimal degrees p9	FLOAT		NULL
O_LONGITUDE		Longitude decimal degrees p9	FLOAT		NULL
O_DATUM		Datum of the coordinates p7	VARCHAR	10	NULL
O_LATITUDE_GDA94		Latitude decimal degrees	FLOAT		NULL
O_LONGITUDE_GDA94		Longitude decimal degrees	FLOAT		NULL
O_LOCATION_STATE		State e.g. TAS, NSW, VIC etc	VARCHAR	3	NULL
O_LOCATION_NOTES		Free text location notes	VARCHAR	240	NULL
O_PHOTO_EAST		Air photo site reference mm east p11	INTEGER		NULL
O_PHOTO_NORTH		Air photo site reference mm north p11	INTEGER		NULL

O_LAND_USE	C_LAND_USE	Land use code	VARCHAR	4	NULL
O_FOREST_TYPE	C_O_FOREST_TYPE	Type of forest p73 (2nd Ed)	VARCHAR	1	NULL
O_RF_COMPLEX	C_O_RF_COMPLEX	Rainforest complexity p77 (2nd Ed)	VARCHAR	1	NULL
O_RF_LEAFSIZE	C_O_RF_LEAFSIZE	Rainforest leaf size of tallest stratum trees p81 (2nd Ed)	VARCHAR	1	NULL
O_RF_FLOR_COMP	C_O_RF_FLOR_COMP	Rainforest floristic composition of tallest stratum trees p83 (2nd Ed)	VARCHAR	1	NULL
O_RF_INDICATOR	C_O_RF_INDICATOR	Rainforest indicator growth form p84 (2nd Ed)	VARCHAR	1	NULL
O_RF_EMERGENTS	C_O_RF_EMERGENTS	Rainforest emergents p85	VARCHAR	1	NULL
O_SCLEROPHYLL		Sclerophyll presence in canopy p63,85 (2nd Ed)	VARCHAR	1	NULL
O_VEG_NOTES		Free text vegetation notes	VARCHAR	240	NULL
O_ASPECT		Aspect (nearest 10 degrees) p127	INTEGER		NULL
O_ELEVATION_EVAL	C_O_EVALUATION	Elevation evaluation p127	VARCHAR	1	NULL
O_ELEVATION_PF		Elevation prefix	VARCHAR	1	NULL
O_ELEVATION		Elevation (m above sea level) p128	INTEGER		NULL
O_DRAINAGE_EVAL	C_O_EVALUATION	Drainage height evaluation p128	VARCHAR	1	NULL
O_DRAINAGE_HEIGHT		Drainage height value (m) p128	FLOAT		NULL
O_DRAINAGE	C_O_DRAINAGE	Drainage, soil water regime, p202	VARCHAR	1	NULL
O_MR_SAMPLED	C_O_MR_SAMPLED	Component of microrelief sampled p133	VARCHAR	1	NULL
O_SOIL_DISTURB	C_O_SOIL_DISTURB	Soil disturbance from Forward (2009)	VARCHAR	1	NULL
O_GRND_COV_LEVEL_MIN		Minimum level of flattened groundcover from Forward (2009)	INTEGER		NULL
O_GRND_COV_LEVEL_MAX		Maximum level of flattened groundcover from Forward (2009)	INTEGER		NULL
O_GRND_COV_HEIGHT_MIN		Minimum height of groundcover from Forward (2009)	INTEGER		NULL
O_GRND_COV_HEIGHT_MAX		Maximum height of groundcover from Forward (2009)	INTEGER		NULL
O_WIND_STATE	C_O_ER_STATE	Wind erosion state p134	VARCHAR	1	NULL
O_WIND_DEG	C_O_WIND_DEG	Wind erosion degree p134	VARCHAR	1	NULL
O_WIND_STABILITY	C_O_WIND_STABILTY	Wind erosion stability from Forward (2009)	VARCHAR	1	NULL
O_WIND_VISIBILITY	C_O_WIND_VISIBILITY	Wind erosion occurring on the day from Forward (2009)	VARCHAR	1	NULL
O_SCALD_DEG	C_O_SCALD_DEG	Scald erosion degree p135	VARCHAR	1	NULL
O_SHEET_STATE	C_O_ER_STATE	Sheet erosion state p135	VARCHAR	1	NULL
O_SHEET_DEG	C_O_SHEET_DEG	Sheet erosion degree p135	VARCHAR	1	NULL
O_WAVE_STATE	C_O_ER_STATE	Wave erosion state p137	VARCHAR	1	NULL
O_WAVE_DEG	C_O_WAVE_DEG	Wave erosion degree p137	VARCHAR	1	NULL
O_RILL_STATE	C_O_ER_STATE	Rill erosion state p136	VARCHAR	1	NULL
O_RILL_DEG	C_O_RILL_DEG	Rill erosion degree p136	VARCHAR	1	NULL
O_MASS_STATE	C_O_ER_STATE	Mass movement erosion state p138	VARCHAR	1	NULL
O_MASS_DEG	C_O_MASS_DEG	Mass movement erosion degree p138	VARCHAR	1	NULL
O_GULLY_STATE	C_O_ER_STATE	Gully erosion state p137	VARCHAR	1	NULL
O_GULLY_DEG	N_O_GULLY_DEG	Gully erosion degree p137	VARCHAR	1	NULL
O_STBANK_STATE	C_O_ER_STATE	Stream bank erosion state p137	VARCHAR	1	NULL
O_STBANK_DEG	C_O_STBANK_DEG	Stream bank erosion degree p137	VARCHAR	1	NULL
O_TUNNEL_STATE	C_O_ER_STATE	Tunnel erosion state p137	VARCHAR	1	NULL
O_TUNNEL_DEG	C_O_TUNNEL_DEG	Tunnel erosion degree p137	VARCHAR	1	NULL
O_OTHER_ER_STATE	C_O_ER_STATE	Other erosion state, p134	VARCHAR	1	NULL
O_OTHER_ER_DEG	C_O_OTHER_ER_DEG	Other erosion degree, p134	VARCHAR	1	NULL
O_OTHER_ER_TYPE	C_O_OTHER_ER_TYPE	Other erosion type, free text, Additional field	VARCHAR	30	NULL
O_GULLY_DEPTH	N_O_GULLY_DEPTH	Gully depth p137	VARCHAR	1	NULL
O_AGGRADATION	C_O_AGGRADATION	Aggradation p138	VARCHAR	1	NULL
O_INUND_FREQ	C_O_INUND_FREQ	Inundation frequency p138	VARCHAR	1	NULL
O_INUND_DUR	N_O_INUND_DUR	Inundation duration (annual) p139	VARCHAR	1	NULL
O_INUND_DEPTH	N_O_INUND_DEPTH	Inundation depth (annual) p139	VARCHAR	1	NULL

O_INUND_RUNON_VEL	N_O_INUND_RUNON_VEL	Inundation runon velocity p139	VARCHAR	1	NULL
O_DEPTH_WATER		Depth to free water (m) p144	FLOAT		NULL
O_DEPTH_WATER_PREF	C_O_DEPTH_WATER_PREF	Depth to free water prefix: +,-,0 p144	VARCHAR	1	NULL
O_DEPTH_RHORIZON_PF		Depth to R horizon prefix	VARCHAR	1	NULL
O_DEPTH_RHORIZON		Depth to R horizon or strongly cemented pan p156	FLOAT		NULL
O_RUNOFF	C_O_RUNOFF	Runoff p144	VARCHAR	1	NULL
O_PERMEABILITY	C_PERMEABILITY	Permeability p200	VARCHAR	1	NULL
O_SB_OBS_TYPE	C_O_SB_OBS_TYPE	Substrate type of observation p205	VARCHAR	1	NULL
O_SB_DISTANCE		Substrate distance (m) p206	FLOAT		NULL
O_SB_CONFIDENCE	C_O_SB_CONFIDENCE	Substrate confidence p206	VARCHAR	1	NULL
O_SB_DEPTH_PF		Substrate depth prefix	VARCHAR	1	NULL
O_SB_DEPTH		Substrate depth (m) p206	FLOAT		NULL
O_SB_GRAIN_SIZE	N_O_SB_GRAIN_SIZE	Substrate grain size p206	VARCHAR	1	NULL
O_SB_TEXTURE	C_O_SB_TEXTURE	Substrate texture p207	VARCHAR	1	NULL
O_SB_STRUCTURE	C_O_SB_STRUCTURE	Substrate structure p207	VARCHAR	1	NULL
O_SB_POROSITY	C_O_SB_POROSITY	Substrate porosity p208	VARCHAR	1	NULL
O_SB_STRENGTH	C_STRENGTH	Substrate strength p209	VARCHAR	2	NULL
O_SB_LITH	C_LITHOLOGY	Substrate lithology p209	VARCHAR	2	NULL
O_SB_MASS_SPAC_DIS	N_O_SB_MASS_SPAC_DIS	Substrate mass spacing of discontinuities p210	VARCHAR	1	NULL
O_SB_MASS_ALT	C_O_SB_MASS_ALT	Substrate mass alteration p211	VARCHAR	1	NULL
O_SB_MASS_STRENGTH	C_O_SB_MASS_STRENGTH	Substrate mass strength p211	VARCHAR	2	NULL
O_SB_MASS_GEN_TYPE	C_O_SB_MASS_GEN_TYPE	Substrate mass genetic type p216	VARCHAR	2	NULL
O_SUBSTRATE_NOTES		Free text substrate notes	VARCHAR	240	NULL
O_PPF		Principal profile form	VARCHAR	9	NULL
O_GSG	C_O_GSG	Great soil group	VARCHAR	3	NULL
O_ASC_TECH_REF	C_O_ASC_TECH_REF	Aust soil classification technical reference	VARCHAR	1	NULL
O_ASC_CONF	C_O_ASC_CONF	Aust soil classification confidence	VARCHAR	1	NULL
O_ASC_ORD	C_O_ASC_ORD	Aust soil classification order p255	VARCHAR	2	NULL
O_ASC_SUBORD	C_O_ASC	Aust soil classification suborder	VARCHAR	2	NULL
O_ASC_GG	C_O_ASC	Aust soil classification great soil group	VARCHAR	2	NULL
O_ASC_SUBG	C_O_ASC	Aust soil classification subgroup	VARCHAR	2	NULL
O_ASC_FAM1	C_O_ASC_FAM	Aust soil classification family; likely to be horizon thickness	VARCHAR	1	NULL
O_ASC_FAM2	C_O_ASC_FAM	Aust soil classification family; likely to be gravel content	VARCHAR	1	NULL
O_ASC_FAM3	C_O_ASC_FAM	Aust soil classification family; likely to be A1 texture	VARCHAR	1	NULL
O_ASC_FAM4	C_O_ASC_FAM	Aust soil classification family; likely to be B texture	VARCHAR	1	NULL
O_ASC_FAM5	C_O_ASC_FAM	Aust soil classification family; likely to be soil depth	VARCHAR	1	NULL
O_ASC_NOTES		Aust soil classification notes	VARCHAR	240	NULL
O_UNI_SOIL_CLASS		Unified soil classification	VARCHAR	5	NULL
O_SOIL_TAXONOMY	C_O_SOIL_TAXONOMY	Soil taxonomy p226	VARCHAR	6	NULL
O_TAX_UNIT_TYPE	C_O_TAX_UNIT_TYPE	Taxonomic unit type: Soil type-ST soil series-SS soil profile class-SPC	VARCHAR	3	NUL
O_TAX_UNIT_NAME		Taxonomic unit name, free text	VARCHAR	100	NULL
O_MAP_UNIT_TYPE	C_O_MAP_UNIT_TYPE	Mapping unit type: Land sys-LS land unit-LU soil landscape-SL soil assoc-SA soil cpx-SC	VARCHAR	3	NULL
O_MAP_UNIT_NAME		Map unit name, free text	VARCHAR	100	NULL
O_NOTES		Free text notes, additional field	VARCHAR	240	NULL

OBS_MNG_PRACS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
OMP_NO		Observation mngt practice number	INTEGER		NOT NULL
OMP_DATE		Date mngt practice observed ddmmyyyy	VARCHAR	8	NULL
OMP_REF	C_MP_REF	Management practice reference e.g. LUMIS Version 1	VARCHAR	10	NOT NULL
OMP_COVER	C_MP_CODE	Observation mngt practice type, e.g. liming, fertiliser	VARCHAR	10	NOT NULL

OFFICERS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
OFFR_CODE		Officer code p13. Code is unique within each state	VARCHAR	4	NOT NULL
OFFR_NAME		Officer name	VARCHAR	40	NOT NULL

PANS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
PAN_NO		Pan number	INTEGER		NOT NULL
PAN_CEMENTATION	C_PAN_CEMENTATION	Pan cementation p192	VARCHAR	1	NULL
PAN_TYPE	C_PAN_TYPE	Type of pan p192	VARCHAR	1	NULL
PAN_CONTINUITY	C_PAN_CONTINUITY	Continuity of pan p195	VARCHAR	1	NULL
PAN_STRUCTURE	C_PAN_STRUCTURE	Structure of pan p195	VARCHAR	1	NULL

PATT_GEOMORPHS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
PGM_NO		Pattern geomorphology number	INTEGER		NOT NULL
PGM_MODE	C_GEOMORPH_MODE	Pattern, mode of geomorphological activity p52	VARCHAR	2	NULL
PGM_AGENT	C_GEOMORPH_AGENT	Pattern geomorphological agent p52	VARCHAR	2	NULL
PGM_STAT	C_PGM_STAT	Pattern status of geomorphological activity p54	VARCHAR	1	NULL

PHS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
PH_NO		pH number	INTEGER		NOT NULL
PH_VALUE		Field pH value p198	FLOAT		NOT NULL
PH_DEPTH		Depth at which pH recorded (m) p198	FLOAT		NULL
PH_METHOD	C_PH_METHOD	Field pH method	VARCHAR	1	NULL

PORES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
PORE_NO		Pore number	INTEGER		NOT NULL
PORE_ABUN	N_PORE_ABUN	Abundance of macropores p184	VARCHAR	1	NULL
PORE_DIAMETER	N_PORE_DIAMETER	Diameter of macropores p185	VARCHAR	1	NULL

PROJECTS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier (unique within each agency)	VARCHAR	10	NOT NULL
PROJ_NAME		Name of project	VARCHAR	240	NOT NULL
PROJ_MANAGER_CODE		Officer code p13	VARCHAR	4	NULL
PROJ_BIBLIO_REF		Bibliographic reference	VARCHAR	240	NULL
PROJ_START_DATE		Date of commencement of project ddmmyyyy	VARCHAR	8	NULL
PROJ_FINISH_DATE		Date of completion of project ddmmyyyy	VARCHAR	8	NULL

ROCK_OUTCROPS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
RO_NO		Rock outcrop number	INTEGER		NOT NULL
RO_ABUN	N_RO_ABUN	Rock outcrop abundance p143	VARCHAR	1	NULL
RO_LITH	C_LITHOLOGY	Rock outcrop lithology p214	VARCHAR	2	NULL

ROOTS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
ROOT_NO		Root number	INTEGER		NOT NULL
ROOT_ABUN	N_ROOT_ABUN	Root abundance (per 0.01 m2) p199	VARCHAR	1	NULL
ROOT_SIZE	N_ROOT_SIZE	Root size (diameter) p199	VARCHAR	1	NULL

SAMPLES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
SAMP_NO		Sample number E.g. Hrz 1 = 0-0.4 m Samp 1 = 0-0.2 m Samp 2 = 0.2-0.4 m	INTEGER		NOT NULL
SAMP_UPPER_DEPTH		Sample upper depth (m)	FLOAT		NULL
SAMP_LOWER_DEPTH		Sample lower depth (m)	FLOAT		NULL
SAMP_CONTRIB		Number of contributing samples	INTEGER		NULL
SAMP_SIZE		Size of final sample	VARCHAR	1	NULL
SAMP_NOTES		Free text notes	VARCHAR	240	NULL

SEGREGATIONS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
SEG_NO		Segregation number	INTEGER		NOT NULL
SEG_ABUN	N_SEG_ABUN	Segregation abundance p196	VARCHAR	1	NULL
SEG_NATURE	C_SEG_NATURE	Segregation nature p196	VARCHAR	1	NULL
SEG_FORM	C_SEG_FORM	Segregation form p196	VARCHAR	1	NULL
SEG_SIZE	N_SEG_SIZE	Segregation size p197	VARCHAR	1	NULL
SEG_STRENGTH	C_SEG_STRENGTH	Segregation strength p197	VARCHAR	1	NULL
SEG_MAGNETIC_ATTR	C_SEG_MAGNETIC_ATTR	Segregation magnetic attributes p198	VARCHAR	1	NULL

SITES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
S_ORIG_TECH_REF	C_TECHNICAL_REF	Technical reference used	VARCHAR	1	NULL
S_MAP_SCALE	C_S_MAP_SCALE	Map scale p9	VARCHAR	1	NULL
S_MAP_SHEET_NO		Map sheet number	VARCHAR	10	NULL
S_MAP_REF_TYPE	C_S_MAP_REF_TYPE	Map reference type p8	VARCHAR	1	NULL
S_PHOTO_FILM_NO		Air photo film number p10	VARCHAR	11	NULL
S_PHOTO_RUN_NO		Air photo run number p10	VARCHAR	3	NULL
S_PHOTO_FRAME_NO		Air photo frame number p11	INTEGER		NULL
S_DESC_BY		Officer code p13	VARCHAR	4	NULL
S_DATE_DESC		Date site described p13 ddmmyyyy	VARCHAR	8	NULL
S_TYPE	C_S_TYPE	Type of site p13	VARCHAR	1	NULL
S_RAINFALL		Annual rainfall (mm) p13	INTEGER		NULL
S_SLOPE_PF		Slope prefix	VARCHAR	1	NULL
S_SLOPE		Slope value, % p18	FLOAT		NULL
S_SLOPE_EVAL	C_S_SLOPE_EVAL	Slope, means of evaluation p18	VARCHAR	1	NULL
S_SLOPE_CLASS	C_S_SLOPE_CLASS	Slope class, p18	VARCHAR	2	NULL
S_MORPH_TYPE	C_S_MORPH_TYPE	Slope morphological type p19	VARCHAR	1	NULL
S_ELEM_INC_SLOPE	C_S_ELEM_INC_SLOPE	Relative inclination of slope elements p21	VARCHAR	1	NULL
S_ELEM_LENGTH		Length of landform element (m) p27	FLOAT		NULL
S_ELEM_WIDTH		Width of landform element (m) p27	FLOAT		NULL
S_ELEM_HEIGHT		Height of landform element (m) p27	FLOAT		NULL
S_ELEM_LOCATION	C_S_ELEM_LOCATION	Location within landform element p27	VARCHAR	1	NULL
S_ELEM_TYPE	C_S_ELEM_TYPE	Element type p31	VARCHAR	3	NULL
S_RELIEF		Pattern relief (m) p45	INTEGER		NULL
S_MODAL_SLOPE	N_S_MODAL_SLOPE	Modal slope p45	VARCHAR	2	NULL
S_RELIEF_CLASS	N_S_RELIEF_CLASS	Relief class p48	VARCHAR	1	NULL
S_REL_MS_CLASS	C_S_REL_MS_CLASS	Relief/modal slope class p47	VARCHAR	2	NULL
S_STRM_CH_SPACING	N_S_STRM_CH_SPACING	Stream channel spacing p48	VARCHAR	2	NULL
S_STRM_CH_DEV	C_S_STRM_CH_DEV	Stream channel development p49	VARCHAR	1	NULL
S_STRM_CH_DTOW	N_S_STRM_CH_DTOW	Channel depth relative to width p49	VARCHAR	1	NULL
S_STRM_CH_MIG	C_S_STRM_CH_MIG	Stream channel migration p50	VARCHAR	1	NULL
S_STRM_CH_PATT	C_S_STRM_CH_PATT	Stream-wise channel pattern p50	VARCHAR	1	NULL
S_STRM_CH_NET_INT	C_S_STRM_CH_NET_INT	Stream channel network integration p50	VARCHAR	1	NULL
S_STRM_CH_DIR_NET	C_S_STRM_CH_DIR_NET	Stream channel network directionality p52	VARCHAR	1	NULL
S_PATT_TYPE	C_S_PATT_TYPE	Pattern type p55	VARCHAR	3	NULL
S_NOTES		Free text notes	VARCHAR	240	NULL
S_TRANS_AUTHOR		Translation of format author	VARCHAR	4	NULL
REF_AGENCY_CODE		Parent site agency identifier (used for nested sites)	VARCHAR	3	NULL
REF_PROJ_CODE		Parent site project identifier (used for nested sites)	VARCHAR	10	NULL
REF_S_ID		Parent site site identifier (used for nested sites)	VARCHAR	10	NULL

SITE_ENVELOPE

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
S_ENV_NO		Site envelope number	INTEGER		NOT NULL
S_ENV_CODE		Site envelope parameter code (e.g. latitude or longitude of vertices)	VARCHAR	10	NOT NULL
S_ENV_VALUE		Value of site envelope parameter	VARCHAR	50	NULL

SITE_ENVELOPE_CODE

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
S_ENV_ CODE		Site envelope parameter code (e.g. latitude or longitude of vertices)	VARCHAR	10	NOT NULL
S_ENV_DESC		Site envelope description	VARCHAR	50	NOT NULL
S_ENV_UNITS		Site envelope parameter units e.g. m	VARCHAR	5	NULL

SITE_MNG_PRCS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
LUSE_NO		Land use number	INTEGER		NOT NULL
SMP_NO		Site mngt practice number	INTEGER		NOT NULL
SMP_DATE		Date mngt practice observed	VARCHAR	8	NULL
SMP_REF	C_MP_REF	Management practice reference e.g. LUMIS Version 1	VARCHAR	10	NULL
SMP_CODE	C_MP_CODE	Site mngt practice type, e.g. liming, fertiliser	VARCHAR	4	NOT NULL

STATES

Column name	Domain name	Description	Data type	Length	Null
STATE_CODE		State code p7 Note: new codes	VARCHAR	1	NOT NULL
STATE_NAME		State name, p7	VARCHAR	3	NOT NULL

STRENGTHS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
STRG_NO		Strength number	INTEGER		NOT NULL
STRG_CLASS	C_STRG_CLASS	Strength p187	VARCHAR	1	NOT NULL
STRG_MOISTURE_STAT	C_SOIL_WATER	Moisture status p187	VARCHAR	1	NULL

STRUCTURES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
H_NO		Horizon identifier	INTEGER		NOT NULL
STR_NO		Structure number	INTEGER		NOT NULL
STR_PED_GRADE	C_STR_PED_GRADE	Grade of pedality p171	VARCHAR	1	NULL
STR_PED_SIZE	N_STR_PED_SIZE	Size of peds p172	VARCHAR	1	NULL
STR_PED_TYPE	C_STR_PED_TYPE	Type of pedality p173	VARCHAR	2	NULL
STR_COMPOUND_PED	C_STR_COMPOUND_PED	Compound pedality p180	VARCHAR	1	NULL
STR_CLODS_FRAGS	C_STR_CLODS_FRAGS	Clods and fragments p181	VARCHAR	2	NULL

SUB_MINERAL_COMPS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
SB_NO		Substrate number	INTEGER		NOT NULL
SB_MINERAL_COMP	C_SB_MINERAL_COMP	Mineral composition p208	VARCHAR	1	NOT NULL

SURF_COARSE_FRAGS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
SCF_NO		Surface coarse fragment number	INTEGER		NOT NULL
SCF_ABUN	N_CF_ABUN	Surface coarse fragment abundance p139	VARCHAR	1	NULL
SCF_SIZE	N_CF_SIZE	Surface coarse fragment size p140	VARCHAR	1	NULL
SCF_SHAPE	C_CF_SHAPE	Surface coarse fragment shape p142	VARCHAR	2	NULL
SCF_LITH	C_LITHOLOGY	Surface coarse fragment lithology p214	VARCHAR	2	NULL
SCF_STRENGTH	C_CF_STRENGTH	Surface coarse fragment strength p209	VARCHAR	2	NULL

SURF_CONDITIONS

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
SCON_NO		Surface condition number	INTEGER		NOT NULL
SCON_STAT	C_SCON_STAT	Condition of surface when dry p189	VARCHAR	1	NULL

VEG_SPECIES

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
VSTR_CODE	C_VSTR_CODE	Stratum, T=tallest, M=mid, L=lower, U=undescribed	VARCHAR	2	NOT NULL
VSP_NO		Vegetation species number	INTEGER		NOT NULL
VSP_SPECIES		Genus and species	VARCHAR	90	NOT NULL
VSP_CODE		Vegetation species	VARCHAR	8	NULL
VSP_ANBG_ID		Vegetation species ID used by Australian National Botanic Gardens	INTEGER		NULL
VSP_ABUN		Vegetation species abundance	VARCHAR	3	NULL

VEG_STRATA

Column name	Domain name	Description	Data type	Length	Null
AGENCY_CODE		Agency identifier	VARCHAR	3	NOT NULL
PROJ_CODE		Project identifier	VARCHAR	10	NOT NULL
S_ID		Site identifier	VARCHAR	10	NOT NULL
O_ID		Observation identifier	VARCHAR	2	NOT NULL
VSTR_CODE	C_VSTR_CODE	Stratum, T=tallest, M=mid, L=lower, U=undescribed , CM=continuum mid	VARCHAR	2	NOT NULL
VSTR_GROWTH_FORM	C_VSTR_GROWTH_FORM	Growth form	VARCHAR	1	NULL
VSTR_HEIGHT_CLASS	N_VSTR_HEIGHT_CLASS	Height	VARCHAR	1	NULL
VSTR_COVER_CLASS	C_VSTR_COVER_CLASS	Crown and foliage cover class NB Values different for Lower	VARCHAR	1	NULL
VSTR_CROWN_COVER		Crown cover percentage	FLOAT		NULL

APPENDIX C – CODES TABLES

Table States

Code	State
1	NSW
2	VIC
3	QLD
4	SA
5	WA
6	TAS
7	NT
8	ACT
9	No state

Table Agencies

State	Code	Description	Acronym
1	101	NSW Department of Agriculture	
1	102	NSW Conservation and Land Management	
1	103	NSW State Forests	SFNSW
1	103	NSW Department of Infrastructure, Planning and Natural Resources	
1	104	Department of Land and Water Conservation (NSW)	DLWC
1	105	Department of Infrastructure, Planning and Natural Resources (NSW)	
1	199	CSIRO Division of Soils (NSW)	
2	201	VIC Department of Agriculture	
2	202	VIC Department of Conservation and Natural Resources	
2	203	VIC Department of Primary Industries	
2	299	CSIRO Division of Soils (VIC)	
3	301	QLD Department of Primary Industries	QDPI
3	302	QLD Environment and Heritage	QEH
3	303	QLD Department of Natural Resources and Mines	
3	397	CSIRO Sustainable Ecosystems (QLD)	CSE
3	398	CSIRO Land and Water (QLD)	
3	399	CSIRO Division of Soils (QLD)	
4	401	SA Department of Primary Industries	
4	402	Department Water, Land and Biodiversity Conservation (SA)	DWLBC
4	498	CSIRO Land and Water (SA)	
4	498	CSIRO Land and Water (SA)	
4	499	CSIRO Division of Soils (SA)	
5	501	Agriculture Western Australia	AgWA
5	502	WA Department of Conservation and Land Management	
5	599	CSIRO Division of Soils (WA)	
6	601	TAS Department of Primary Industries and Fisheries	
6	602	TAS Forestry Commission	
6	603	Department of Primary Industries, Water and Environment (TAS)	
6	603	TAS Department of Primary Industries, Water and Environment	
6	699	CSIRO Division of Soils (TAS)	
7	701	Conservation Commission of the Northern Territory	
7	702	Department of Infrastructure, Planning and Environment (NT)	
7	703	NT Natural Resources, Environment and the Arts	

7	799	CSIRO Division of Soils (NT)	
8	801	ACT Environment Land and Planning	
8	802	Soil and Land Conservation Consulting	CPSS
8	889	CSIRO Forestry and Forest Products	CSIRO FFP
8	898	CSIRO Land and Water (ACT)	
8	899	CSIRO Division of Soils (ACT)	
9	998	Geoscience Australia	
9	999	Australian Collaborative Land Evaluation Program	ACLEP

Table codes: Domain C_AS_SAMP_TYPE

Value	Description
CF	Coarse Fragments
FE	Fine earth
WS	Whole soil

Table codes: Domain N_CF_ABUN

Value	Description	Numeric value	Low value	High value
0	No coarse fragments	0	0	0
1	very few	1	0	2
2	few	6	2	10
3	common	15	10	20
4	many	35	20	50
5	abundant	70	50	90
6	very abundant	95	90	100

Table codes: Domain C_CF_DISTRIBUTION

Value	Description
D	Dispersed
R	Reoriented
S	Stratified
U	Undisturbed

Table codes: Domain C_CF_SHAPE

Value	Description
A	Angular
AP	Angular platy
AT	Angular tabular
R	Rounded
RP	Rounded platy
RT	Rounded tabular
S	Subangular
SP	Subangular platy
ST	Subangular tabular
U	Subrounded
UP	Subrounded platy
UT	Subrounded tabular

Table codes: Domain N_CF_SIZE

Value	Description	Numeric value	Low value	High value
1	fine gravelly, 2-6mm	4	2	6
2	medium gravelly, 6-20mm	13	6	20
3	coarse gravelly, 20-60mm	40	20	60
4	cobbly, 60-200mm	130	60	200
5	stony, 200-600mm	400	200	600
6	bouldery, 600mm-2m	1300	600	2000
7	large Boulders, >2m	2000	2000	

Table codes: Domain C_CF_STRENGTH

Value	Description
M	moderately strong
S	strong
VS	very strong
VW	very weak
W	weak

Table codes: Domain C_CONTRAST

Value	Description
D	Distinct
F	Faint
P	Prominent

Table codes: Domain N_CRACK_WIDTH

Value	Description	Numeric value	Low value	High value
1	Fine, (0 - 5) mm	2.5	0	5
2	Medium, (5 - 10) mm	7.5	5	10
3	Coarse, (10 - 20) mm	15	10	20
4	Very coarse, (20 - 50) mm	35	20	50
5	Extremely coarse, (50 - 100) mm	75	50	100

Table codes: Domain N_CUTAN_ABUN

Value	Description	Numeric value	Low value	High value
0	No cutans	0	0	0
1	Few; <10% of ped faces or walls coated	5	0	10
2	Common; 10-50% of ped faces or walls coated	30	10	50
3	Many; >50% of ped faces or walls coated	75	50	100

Table codes: Domain C_CUTAN_TYPE

Value	Description
C	Clay skins
K	Slickensides
M	Mangans
O	Other cutans
S	Stress cutans
U	Unspecified
Z	Zero or no cutans

Table codes: Domain C_DIST_TYPE

Value	Description
0	No effective disturbance. Natural
1	No effective disturbance other than grazing by hoofed animals
2	Limited clearing, for example selective logging
3	Extensive clearing, for example poisoning, ringbarking
4	Complete clearing. Pasture, native or improved, but never cultivated
5	Complete clearing. Pasture, native or improved, cultivated at some stage
6	Cultivation. Rainfed
7	Cultivation. Irrigated, past or present
8	Highly disturbed, for example, quarrying, roadworks, mining, landfill, urban

Table codes: Domain C_FAB_TYPE

Value	Description
E	Earthy
G	Sandy (grains prominent)
R	Rough-ped
S	Smooth-ped

Table codes: Domain C_GEOMORPH_AGENT

Value	Description
BI	Non-human biological agents; coral
CH	Channelled stream flow
DI	Diastrophism; earth movements
EU	Eustasy; changes in sea level
FR	Frost, including freeze-thaw
GL	Glacier flow
GR	Gravity
HU	Human agents
IM	Impact by meteors
OV	Over bank stream flow, unchannelled
SH	Sheet flow; sheet wash, surface wash
SM	Soil moisture status changes: creep
SO	Solution
TI	Tides
VO	Volcanism
WA	Waves
WI	Wind
WM	Water-aided mass movements; landslides

Table codes: Domain C_GEOMORPH_MODE

Value	Description
AG	Aggraded
BU	Built up
EA	Eroded or aggraded
ER	Eroded
EX	Excavated or dug out
HU	Heaved up or elevated
SU	Subsided or depressed

Table codes: Domain N_H_BOUND_DISTINCT

Value	Description	Numeric value	Low value	High value
A	Abrupt	12.5	5	20
C	Clear	35	20	50
D	Diffuse	100	100	
G	Gradual	75	50	100
S	Sharp	2.5	0	5

Table codes: Domain C_H_BOUND_SHAPE

Value	Description
B	Broken
I	Irregular
S	Smooth
T	Tongued
W	Wavy

Table codes: Domain C_H_CARBONATE_EFF

Value	Description
H	Highly calcareous
M	Moderately calcareous
N	Non-calcareous
S	Slightly calcareous
V	Very highly calcareous

Table codes: Domain C_H_PLASTICITY_DEG

Value	Description
0	Non-plastic
1	Slightly plastic
2	Moderately plastic
3	Very plastic

Table codes: Domain C_H_PLASTICITY_TYPE

Value	Description
N	Normal plasticity
S	Superplastic
T	Strongly subplastic
U	Subplastic

Table codes: Domain C_H_SOIL_WATER_STAT

Value	Description
D	Dry
M	Moist
T	Moderately moist
W	Wet

Table codes: Domain C_H_STICKINESS

Value	Description
0	Non-sticky
1	Slightly sticky
2	Moderately sticky
3	Very sticky

Table codes: Domain C_H_TEXTURE

Value	Description
AP	Sapric peat
CFS	Clayey fine sand
CKS	Clayey coarse sand
CL	Clay loam
CLFS	Clay loam, fine sandy
CLKS	Clay loam, coarse sandy
CLMS	Clay loam, medium sandy
CLS	Clay loam, sandy
CMS	Clayey medium sand
CP	Clayey peat
CS	Clayey sand
FS	Fine sand
FSC	Fine sandy clay
FSCL	Fine sandy clay loam
FSHC	Fine sandy heavy clay
FSL	Fine sandy loam
FSLC	Fine sandy light clay
FSLMC	Fine sandy light medium clay
FSMC	Fine sandy medium clay
FSMHC	Fine sandy medium heavy clay
FSS	Fine pure sand
GP	Granular peat
GR	Gravel
HC	Heavy clay
HP	Hemic peat
IP	Fibric peat
KS	Coarse sand
KSC	Coarse sandy clay
KSCL	Coarse sandy clay loam
KSHC	Coarse sandy heavy clay
KSL	Coarse sandy loam
KSLC	Coarse sandy light clay
KSLMC	Coarse sandy light medium clay
KSMC	Coarse sandy medium clay
KSMHC	Coarse sandy medium heavy clay
KSS	Coarse pure sand
L	Loam
LC	Light clay
LFS	Loamy fine sand
LFSY	Loam fine sandy
LKS	Loamy coarse sand
LMC	Light medium clay
LMS	Loamy medium sand
LP	Loamy peat
LS	Loamy sand
MC	Medium clay

MHC	Medium heavy clay
MS	Medium sand
MSC	Medium sandy clay
MSCL	Medium sandy clay loam
MSHC	Medium sandy heavy clay
MSL	Medium sandy loam
MSLC	Medium sandy light clay
MSLMC	Medium sandy light medium clay
MSMC	Medium sandy medium clay
MSMHC	Medium sandy medium heavy clay
MSS	Medium pure sand
S	Sand
SC	Sandy clay
SCL	Sandy clay loam
SCLFS	Sandy clay loam, fine sandy
SHC	Sandy heavy clay
SL	Sandy loam
SLC	Sandy light clay
SLMC	Sandy light medium clay
SMC	Sandy medium clay
SMHC	Sandy medium heavy clay
SP	Sandy peat
SS	Pure sand
ST	Stones
VWCFS	Very weak clayey fine sand
VWCKS	Very weak clayey coarse sand
VWCMS	Very weak clayey medium sand
VWCS	Very weak clayey sand
WCFS	Weak clayey fine sand
WCKS	Weak clayey coarse sand
WCMS	Weak clayey medium sand
WCS	Weak clayey sand
ZC	Silty clay
ZCL	Silty clay loam
ZHC	Silty heavy clay
ZL	Silty loam
ZLC	Silty light clay
ZLMC	Silty light medium clay
ZMC	Silty medium clay
ZMHC	Silty medium heavy clay

Table codes: Domain C_H_QUAL

Value	Description
+	Heavy
-	Light
A	Sapric
I	Fibric

Table codes: Domain C_H_WATER_REPELLENCE

Value	Description
N	Non-repellent
R	Water repellent
S	Strongly water repellent

Table codes: Domain C_LAND_USE

Value	Description
0	Unknown
1	Conservation and Natural Environments
1.1	Nature conservation
1.1.0	Nature conservation
1.1.1	Strict nature reserves
1.1.2	Wilderness area
1.1.3	National park
1.1.4	Natural feature protection
1.1.5	Habitat/species management area
1.1.6	Protected landscape
1.1.7	Other conserved area
1.2	Managed resource protection
1.2.0	Managed resource protection
1.2.1	Biodiversity
1.2.2	Surface water supply
1.2.3	Groundwater
1.2.4	Landscape
1.2.5	Traditional indigenous uses
1.3	Other minimal use
1.3.0	Other minimal use
1.3.1	Defence land - natural areas
1.3.2	Stock route
1.3.3	Residual native cover
1.3.4	Rehabilitation
2	Production from Relatively Natural Environments
2.1	Grazing native vegetation
2.1.0	Grazing native vegetation
2.2	Production forestry
2.2.0	Production forestry
2.2.1	Wood production
2.2.2	Other forest production
3	Production from Dryland Agriculture and Plantations
3.1	Plantation forestry
3.1.0	Plantation forestry
3.1.1	Hardwood plantation
3.1.2	Softwood plantation
3.1.3	Other forest plantation
3.1.4	Environmental forest plantation
3.2	Grazing modified pastures
3.2.0	Grazing modified pastures
3.2.1	Native/exotic pasture mosaic
3.2.2	Woody fodder plants
3.2.3	Pasture legumes
3.2.4	Pasture legume/grass mixtures
3.2.5	Sown grasses
3.3	Cropping
3.3.0	Cropping
3.3.1	Cereals
3.3.2	Beverage and spice crops
3.3.3	Hay and silage
3.3.4	Oil seeds
3.3.5	Sugar
3.3.6	Cotton
3.3.7	Alkaloid poppies
3.3.8	Pulses

3.4	Perennial horticulture
3.4.0	Perennial horticulture
3.4.1	Tree fruits
3.4.2	Oleaginous fruits
3.4.3	Tree nuts
3.4.4	Vine fruits
3.4.5	Shrub nuts, fruits and berries
3.4.6	Perennial flowers and bulbs
3.4.7	Perennial vegetables and herbs
3.4.8	Citrus
3.4.9	Grapes
3.5	Seasonal horticulture
3.5.0	Seasonal horticulture
3.5.1	Seasonal fruits
3.5.2	Seasonal nuts
3.5.3	Seasonal flowers and bulbs
3.5.4	Seasonal vegetables and herbs
3.6	Land in transition
3.6.0	Land in transition
3.6.1	Degraded land
3.6.2	Abandoned land
3.6.3	Land under rehabilitation
3.6.4	No defined use
3.6.5	Abandoned perennial horticulture
4	Production from Irrigated Agriculture and Plantations
4.1	Irrigated plantation forestry
4.1.0	Irrigated plantation forestry
4.1.1	Irrigated hardwood plantation
4.1.2	Irrigated softwood plantation
4.1.3	Irrigated other forest plantation
4.1.4	Irrigated environmental forest production
4.2	Grazing irrigated modified pastures
4.2.0	Grazing irrigated modified pastures
4.2.1	Irrigated woody fodder plants
4.2.2	Irrigated pasture legumes
4.2.3	Irrigated legume/grass mixtures
4.2.4	Irrigated sown grasses
4.3	Irrigated cropping
4.3.0	Irrigated cropping
4.3.0	Irrigated cropping
4.3.1	Irrigated cereals
4.3.1	Irrigated cereals
4.3.2	Irrigated beverage and spice crops
4.3.3	Irrigated hay and silage
4.3.4	Irrigated oil seeds
4.3.5	Irrigated sugar
4.3.6	Irrigated cotton
4.3.7	Irrigated alkaloid poppies
4.3.8	Irrigated pulses
4.3.9	Irrigated rice
4.4	Irrigated perennial horticulture
4.4.0	Irrigated perennial horticulture
4.4.1	Irrigated tree fruits
4.4.2	Irrigated oleaginous fruits
4.4.3	Irrigated tree nuts
4.4.4	Irrigated vine fruits
4.4.5	Irrigated shrub nuts, fruits and berries
4.4.6	Irrigated perennial flowers and bulbs

4.4.7	Irrigated perennial vegetables and herbs
4.4.8	Irrigated citrus
4.4.9	Irrigated grapes
4.5	Irrigated seasonal horticulture
4.5.0	Irrigated seasonal horticulture
4.5.1	Irrigated seasonal fruits
4.5.2	Irrigated seasonal nuts
4.5.3	Irrigated seasonal flowers and bulbs
4.5.4	Irrigated seasonal vegetables and herbs
4.5.5	Irrigated turf farming
4.6	Irrigated land in transition
4.6.0	Irrigated land in transition
4.6.1	Degraded irrigated land
4.6.2	Abandoned irrigated land
4.6.3	Irrigated land under rehabilitation
4.6.4	No defined use (irrigation)
4.6.5	Abandoned irrgated perennial horticulture
5	Intensive Uses
5.1	Intensive horticulture
5.1.0	Intensive horticulture
5.1.1	Shadehouses
5.1.2	Glasshouses
5.1.3	Glasshouses (hydroponic)
5.1.4	Abandoned intensive horticulture
5.2	Intensive animal husbandry
5.2.0	Intensive animal husbandry
5.2.1	Dairy sheds and yards
5.2.2	Cattle feedlots
5.2.3	Sheep feedlots
5.2.4	Poultry farms
5.2.5	Piggeries
5.2.6	Aquaculture
5.2.7	Horse studs
5.2.8	Stockyards/saleyards
5.2.9	Abandoned intensive animal husbandry
5.3	Manufacturing and industrial
5.3.0	Manufacturing and industrial
5.3.1	General purpose factory
5.3.2	Food processing factory
5.3.3	Major industrial complex
5.3.4	Bulk grain storage
5.3.5	Abattoirs
5.3.6	Oil refinery
5.3.7	Sawmill
5.3.8	Abandoned manufacturing and industrial
5.4	Residential and farm infrastructure
5.4.0	Residential and farm infrastructure
5.4.1	Urban residential
5.4.2	Rural residential with agriculture
5.4.3	Rural residential without agriculture
5.4.4	Remote communities
5.4.5	Farm buildings/infrastructure
5.5	Services
5.5.0	Services
5.5.1	Commercial services
5.5.2	Public services
5.5.3	Recreation and culture
5.5.4	Defence facilities - urban

5.5.5	Research facilities
5.6	Utilities
5.6.0	Utilities
5.6.1	Fuel powered electricity generation
5.6.2	Hydro electricity generation
5.6.3	Wind farm electricity generation
5.6.4	Electricity substations and transmission
5.6.5	Gas treatment, storage and transmission
5.6.6	Water extraction and transmission
5.7	Transport and communication
5.7.0	Transport and communication
5.7.1	Airports/aerodromes
5.7.2	Roads
5.7.3	Railways
5.7.4	Ports and water transport
5.7.5	Navigation and communication
5.8	Mining
5.8.0	Mining
5.8.1	Mines
5.8.2	Quarries
5.8.3	Tailings
5.8.4	Extractive industry not in use
5.9	Waste treatment and disposal
5.9.0	Waste treatment and disposal
5.9.1	Effluent pond
5.9.2	Landfill
5.9.3	Solid garbage
5.9.4	Incinerators
5.9.5	Sewage/sewerage
6	Water
6.1	Lake
6.1.0	Lake
6.1.1	Lake - conservation
6.1.2	Lake - production
6.1.3	Lake - intensive use
6.2	Reservoir
6.2.0	Reservoir/dam
6.2.1	Reservoir
6.2.2	Water storage - intensive use/farm dams
6.2.3	Evaporation basin
6.2.4	Effluent pond
6.3	River
6.3.0	River
6.3.1	River - conservation
6.3.2	River - production
6.3.3	River - intensive use
6.4	Channel/aqueduct
6.4.0	Channel/aqueduct
6.4.1	Supply channel/aqueduct
6.4.2	Drainage channel/aqueduct
6.4.3	Stormwater
6.5	Marsh/wetland
6.5.0	Marsh/wetland
6.5.1	Marsh/wetland - conservation
6.5.2	Marsh/wetland - production
6.5.3	Marsh/wetland - intensive use
6.5.4	Marsh/wetland - saline
6.6	Estuary/coastal waters

6.6.0	Estuary/coastal waters
6.6.1	Estuary/coastal waters - conservation
6.6.2	Estuary/coastal waters - production
6.6.3	Estuary/coastal waters - intensive use

Table codes: Domain C_LAND_USE_REF

Value	Description
ALUMV5	ALUM Version 5
ALUMV6	ALUM Version 6

Table codes: Domain C_LITHOLOGY

Value	Description
AC	Alcrete (bauxite)
AD	Adamellite
AF	Ash (fine)
AG	Agglomerate
AH	Anhydrite
AL	Alluvium
AM	Amphibolite
AN	Andesite
AP	Aplite
AR	Arkose
AS	Ash (sandy)
BA	Basalt
BB	Bombs (volcanic)
BR	Breccia
BS	Beach sediment
C	Clay
CC	Charcoal
CD	Creep deposit
CG	Conglomerate
CH	Chert
CL	Colluvium
CN	Concrete
CO	Coal
CR	Coral reef
CU	Consolidated rock (unidentified)
DI	Diorite
DM	Dolomite
DR	Dolerite
ES	Eolian sand
FC	Ferricrete
GA	Gabbro
GD	Granodiorite
GE	Greenstone
GN	Granite
GR	Granulite
GS	Gneiss
GV	Gravel
GW	Graywacke
GY	Gypsum
HA	Halite
HO	Hornfels
IG	Igneous rock (unidentified)
IS	Ironstone

JA	Jasper
KA	Calcarenite
KC	Calcrete
KL	Calcilutite
KM	Calcareous mudstone
KR	Calcirudite
KS	Calcareous sand
LA	Lacustrine Sediment
LC	Silcrete
LD	Landslide Deposit
LI	Limestone
LO	Loess
M	Substrate material
MB	Marble
MD	Microdiorite
ME	Metamorphic rock (unidentified)
MF	Mudflow deposit
MG	Microgranite
MI	Migmatite
ML	Marl
MS	Microsyenite
MU	Mudstone
MY	Mylonite
OT	Other
OW	Opalised wood
PA	Parna
PC	Porcellanite
PE	Peridotite
PG	Pegmatite
PH	Phyllite
PL	Phonolite
PO	Porphyry
PT	Peat
PU	Pumice
PY	Pyroxenite
PZ	Pelagic ooze
QP	Quartz porphyry
QS	Quartz sandstone
QU	Quartzite
QZ	Quartz
R	Rock outcrop
RB	Red-brown hardpan
RD	Rock dump
RH	Rhyolite
S	Sand
SA	Sandstone
SD	Detrital sedimentary rock (unidentified)
SE	Scree
SF	Sheetflow deposit
SH	Shale
SK	Scoria
SL	Slate
SM	Metasandstone
SO	Stabilised soil
SR	Serpentinite
SS	Shells
ST	Schist
SY	Syenite

SZ	Metasiltstone
TI	Till
TR	Trachyte
TU	Tuff
UC	Unconsolidated material (unidentified)
VB	Volcanic breccia
VG	Volcanic glass
WD	Waste dump
Z	Silt
ZS	Siltstone

Table codes: Domain C_MOISTURE_STAT

Value	Description
D	Dry
M	Moist

Table codes: Domain N_MOTT_ABUN

Value	Description	Numeric value	Low value	High value
0	No mottles	0	0	0
1	Very few	1	0	2
2	Few	6	2	10
3	Common	15	10	20
4	Many	35	20	50

Table codes: Domain C_MOTT_BOUND_DIST

Value	Description
D	Distinct
F	Faint
P	Prominent

Table codes: Domain C_MOTT_COLOUR

Value	Description
B	Brown
D	Dark
G	Grey
L	Gley
O	Orange
P	Pale
R	Red
Y	Yellow

Table codes: Domain N_MOTT_SIZE

Value	Description	Numeric value	Low value	High value
1	Fine	2.5	0	5
2	Medium	10	5	15
3	Coarse	22.5	15	30
4	Very coarse	30	30	

Table codes: Domain C_MOTT_TYPE

Value	Description
M	Mottles
X	Biological mixing
Y	Mechanical
Z	Substrate influence

Table codes: Domain C_MP_CODE

Value	Description
1	Plants / Vegetation
1.1	Establishment and rehabilitation
1.1.1	Site selection
1.1.2	Breeding / selecting
1.1.3	Pre-planting
1.1.4	Planting
1.1.5	Regenerating
1.2	Maintenance of growth and condition
1.2.1	Promoting growth
1.2.2	Controlling disease
1.2.3	Controlling pests
1.3	Plant, product and residue removal
1.3.1	Harvesting
1.3.2	Storage
1.3.3	Transporting
1.3.4	Handling residues
1.3.5	Removing unproductive biomass
1.3.6	Hazard reduction
2	Animals
2.1	Establishment
2.1.1	Breeding / selecting
2.2	Growth and development
2.2.1	Promoting growth
2.2.2	Controlling and preventing disease
2.3	Animal, product and waste removal
2.3.1	Harvesting
2.3.2	Transporting
2.3.3	Handling effluent
2.4	Protection
2.5	Monitoring
2.5.1	Populations
2.5.2	Infestations
3	Soil
3.1	Site preparation / modification and/or rehabilitation
3.1.1	Tillage / cultivation / machine operations
3.2	Maintenance of soil condition
3.2.1	Amelioration
3.2.2	Change of use
3.2.3	Protection
3.3	Removal of products, residues and waste
3.3.1	Mining / quarrying
3.3.2	Handling residues
3.3.3	Surface waste management
3.4	Monitoring
3.4.1	Chemical
3.4.2	Physical

3.4.3	Biological
4	Water
4.1	Interception
4.1.1	Surface drainage
4.1.2	Impoundment
4.1.3	Subsurface drainage
4.1.4	Condensation
4.1.5	Extraction
4.2	Reticulation
4.2.1	Open surface waterways
4.2.2	Enclosed canals / drains
4.2.3	Pipes / aqueducts
4.2.4	Troughs
4.3	Application
4.3.1	Surface irrigation
4.3.2	Spray (sprinkler) irrigation
4.3.3	Drip (trickle) irrigation
4.4	Treatment
4.4.1	Physical
4.4.2	Chemical
4.4.3	Biological
4.4.4	Technological
4.5	Monitoring
4.5.1	Physical
4.5.2	Chemical
4.5.3	Biological
4.5.4	Metering
4.5.5	Scheduling
5	Air
5.1	Treatment / protection
5.2	Monitoring
5.2.1	Air quality
5.2.2	Noise
6	Business
6.1	Business establishment
6.1.1	Business structure
6.1.2	Business planning
6.2	Maintenance of business growth and viability
6.2.1	Inventory
6.2.2	Access to capital
6.3	Monitoring system processes and resources
6.3.1	Finances
6.3.2	Human resources
6.3.3	Product quality
6.4	Risk protection
6.4.1	Production
6.4.2	Price or market
6.4.3	Human or personal
7	Infrastructure and Built Environment
7.1	Design and planning
7.1.1	Site selection and survey
7.2	Construction
7.2.1	Site preparation
7.2.2	Building / facility construction
7.3	Maintenance
7.3.1	Building / facility maintenance
7.3.2	Site maintenance
7.4	Demolition

7.4.1	Building / site demolition
7.4.2	Site cleanup
7.4.3	Site decontamination

Table codes: Domain C_MP_REF

Value	Description
LUMISV1	LUMIS Version 1

Table codes: Domain C_MR_BIOTIC_AGENT

Value	Description
A	Ant
B	Bird
M	Man
N	Animal
O	Other
T	Termite
V	Vegetation

Table codes: Domain C_MR_BIOTIC_COMP

Value	Description
D	Depression
E	Elongate mound
H	Hole
L	Elongate depression
M	Mound
O	Other
T	Terrace

Table codes: Domain C_MR_PROP_GILGAI

Value	Description
A	Mound=depression,no shelf
B	Mound>depression,no shelf
C	Mound<depression,no shelf
D	Mound, shelf and depressions

Table codes: Domain C_MR_TYPE

Value	Description
A	Lattice gilgai
C	Crabhole gilgai
D	Debil-debil
G	Contour gilgai
H	Spring hollow
I	Sinkhole
K	Karst microrelief
L	Linear gilgai
M	Melonhole gilgai
N	Normal gilgai
O	Other
P	Spring mound
R	Terracettes
S	Mass movement microrelief

T	Contour trench
U	Mound/depression microrelief
W	Swamp hummock
Z	Zero or no microrelief

Table codes: Domain C_MUSELL_COLOUR

Hue	Value	Chroma	Description
10R20	2	0	Black
10R21	2	1	Reddish black
10R22	2	2	Very dusky red
10R23	2	3	Very dusky red
10R24	2	4	Very dusky red
10R25	2	5	Dark red
10R26	2	6	Dark red
10R27	2	7	Dark red
10R28	2	8	Dark red
10R30	3	0	Very dark grey
10R31	3	1	Dark reddish grey
10R32	3	2	Dusky red
10R33	3	3	Dusky red
10R34	3	4	Dusky red
10R35	3	5	Dark red
10R36	3	6	Dark red
10R37	3	7	Dark red
10R38	3	8	Dark red
10R40	4	0	Dark grey
10R41	4	1	Dark reddish grey
10R42	4	2	Weak red
10R43	4	3	Weak red
10R44	4	4	Weak red
10R45	4	5	Red
10R46	4	6	Red
10R47	4	7	Red
10R48	4	8	Red
10R50	5	0	Grey
10R51	5	1	Reddish grey
10R52	5	2	Weak red
10R53	5	3	Weak red
10R54	5	4	Weak red
10R55	5	5	Red
10R56	5	6	Red
10R57	5	7	Red
10R58	5	8	Red
10R60	6	0	Grey
10R61	6	1	Reddish grey
10R62	6	2	Pale red
10R63	6	3	Pale red
10R64	6	4	Pale red
10R65	6	5	Light red
10R66	6	6	Light red
10R67	6	7	Light red
10R68	6	8	Light red
10R71	7	1	Reddish grey
10YR20	2	0	Black
10YR21	2	1	Black
10YR22	2	2	Very dark brown
10YR23	2	3	Very dark brown

10YR24	2	4	Dark yellowish brown
10YR25	2	5	Dark yellowish brown
10YR26	2	6	Dark yellowish brown
10YR27	2	7	Dark yellowish brown
10YR28	2	8	Dark yellowish brown
10YR30	3	0	Very dark grey
10YR31	3	1	Very dark grey
10YR32	3	2	Very dark greyish brown
10YR33	3	3	Dark brown
10YR34	3	4	Dark yellowish brown
10YR35	3	5	Dark yellowish brown
10YR36	3	6	Dark yellowish brown
10YR37	3	7	Dark yellowish brown
10YR38	3	8	Dark yellowish brown
10YR40	4	0	Dark grey
10YR41	4	1	Dark grey
10YR42	4	2	Dark greyish brown
10YR43	4	3	Brown
10YR44	4	4	Dark yellowish brown
10YR45	4	5	Dark yellowish brown
10YR46	4	6	Dark yellowish brown
10YR47	4	7	Dark yellowish brown
10YR48	4	8	Dark yellowish brown
10YR50	5	0	Grey
10YR51	5	1	Grey
10YR52	5	2	Greyish brown
10YR53	5	3	Brown
10YR54	5	4	Yellowish brown
10YR55	5	5	Yellowish brown
10YR56	5	6	Yellowish brown
10YR57	5	7	Yellowish brown
10YR58	5	8	Yellowish brown
10YR60	6	0	Grey
10YR61	6	1	Grey
10YR62	6	2	Light brownish grey
10YR63	6	3	Pale brown
10YR64	6	4	Light yellowish brown
10YR65	6	5	Brownish yellow
10YR66	6	6	Brownish yellow
10YR67	6	7	Brownish yellow
10YR68	6	8	Brownish yellow
10YR70	7	0	Light grey
10YR71	7	1	Light grey
10YR72	7	2	Light grey
10YR73	7	3	Very pale brown
10YR74	7	4	Very pale brown
10YR75	7	5	Yellow
10YR76	7	6	Yellow
10YR77	7	7	Yellow
10YR78	7	8	Yellow
10YR80	8	0	White
10YR81	8	1	White
10YR82	8	2	White
10YR83	8	3	Very pale brown
10YR84	8	4	Very pale brown
10YR85	8	5	Yellow
10YR86	8	6	Yellow
10YR87	8	7	Yellow

10YR88	8	8	Yellow
2.5Y20	2	0	Black
2.5Y21	2	1	Black
2.5Y22	2	2	Black
2.5Y23	2	3	Olive brown
2.5Y24	2	4	Olive brown
2.5Y25	2	5	Olive brown
2.5Y26	2	6	Olive brown
2.5Y27	2	7	Olive brown
2.5Y28	2	8	Olive brown
2.5Y30	3	0	Very dark grey
2.5Y31	3	1	Very dark grey
2.5Y32	3	2	Very dark greyish brown
2.5Y33	3	3	Olive brown
2.5Y34	3	4	Olive brown
2.5Y35	3	5	Olive brown
2.5Y36	3	6	Olive brown
2.5Y37	3	7	Olive brown
2.5Y38	3	8	Olive brown
2.5Y40	4	0	Dark grey
2.5Y41	4	1	Dark grey
2.5Y42	4	2	Dark greyish brown
2.5Y43	4	3	Dark greyish brown
2.5Y44	4	4	Olive brown
2.5Y45	4	5	Olive brown
2.5Y46	4	6	Olive brown
2.5Y47	4	7	Olive brown
2.5Y48	4	8	Olive brown
2.5Y50	5	0	Grey
2.5Y51	5	1	Grey
2.5Y52	5	2	Greyish brown
2.5Y53	5	3	Greyish brown
2.5Y54	5	4	Light olive brown
2.5Y55	5	5	Light olive brown
2.5Y56	5	6	Light olive brown
2.5Y57	5	7	Light olive brown
2.5Y58	5	8	Light olive brown
2.5Y60	6	0	Grey
2.5Y61	6	1	Grey
2.5Y62	6	2	Light brownish grey
2.5Y63	6	3	Light brownish grey
2.5Y64	6	4	Light yellowish brown
2.5Y65	6	5	Olive yellow
2.5Y66	6	6	Olive yellow
2.5Y67	6	7	Olive yellow
2.5Y68	6	8	Olive yellow
2.5Y70	7	0	Light grey
2.5Y71	7	1	Light grey
2.5Y72	7	2	Light grey
2.5Y73	7	3	Pale yellow
2.5Y74	7	4	Pale yellow
2.5Y75	7	5	Yellow
2.5Y76	7	6	Yellow
2.5Y77	7	7	Yellow
2.5Y78	7	8	Yellow
2.5Y80	8	0	White
2.5Y81	8	1	White
2.5Y82	8	2	White

2.5Y83	8	3	Pale yellow
2.5Y84	8	4	Pale yellow
2.5Y85	8	5	Yellow
2.5Y86	8	6	Yellow
2.5Y87	8	7	Yellow
2.5Y88	8	8	Yellow
2.5YR20	2	0	Black
2.5YR21	2	1	Very dusky red
2.5YR22	2	2	Very dusky red
2.5YR23	2	3	Dark reddish brown
2.5YR24	2	4	Dark reddish brown
2.5YR25	2	5	Dark red
2.5YR26	2	6	Dark red
2.5YR27	2	7	Dark red
2.5YR28	2	8	Dark red
2.5YR30	3	0	Very dark grey
2.5YR31	3	1	Dusky red
2.5YR32	3	2	Dusky red
2.5YR33	3	3	Dark reddish brown
2.5YR34	3	4	Dark reddish brown
2.5YR35	3	5	Dark red
2.5YR36	3	6	Dark red
2.5YR37	3	7	Dark red
2.5YR38	3	8	Dark red
2.5YR40	4	0	Dark grey
2.5YR41	4	1	Weak red
2.5YR42	4	2	Weak red
2.5YR43	4	3	Reddish brown
2.5YR44	4	4	Reddish brown
2.5YR45	4	5	Red
2.5YR46	4	6	Red
2.5YR47	4	7	Red
2.5YR48	4	8	Red
2.5YR50	5	0	Grey
2.5YR51	5	1	Weak red
2.5YR52	5	2	Weak red
2.5YR53	5	3	Reddish brown
2.5YR54	5	4	Reddish brown
2.5YR55	5	5	Red
2.5YR56	5	6	Red
2.5YR57	5	7	Red
2.5YR58	5	8	Red
2.5YR60	6	0	Grey
2.5YR61	6	1	Pale red
2.5YR62	6	2	Pale red
2.5YR63	6	3	Light reddish brown
2.5YR64	6	4	Light reddish brown
2.5YR65	6	5	Light red
2.5YR66	6	6	Light red
2.5YR67	6	7	Light red
2.5YR68	6	8	Light red
2.5YR70	7	0	Grey
2.5YR71	7	1	Pale red
2.5YR72	7	2	Pale red
2.5YR73	7	3	Light reddish brown
2.5YR74	7	4	Light reddish brown
2.5YR75	7	5	Light red
2.5YR76	7	6	Light red

2.5YR77	7	7	Light red
2.5YR78	7	8	Light red
2.5YR80	8	0	White
2.5YR82	8	2	Pinkish White
2.5YR83	8	3	Pinkish White
5B41	4	1	Dark bluish grey
5B51	5	1	Bluish grey
5B61	6	1	Bluish grey
5B71	7	1	Light bluish grey
5BG41	4	1	Dark greenish grey
5BG51	5	1	Greenish grey
5BG61	6	1	Greenish grey
5BG71	7	1	Light greenish grey
5G41	4	1	Dark greenish grey
5G42	4	2	Greyish green
5G51	5	1	Greenish grey
5G52	5	2	Greyish green
5G61	6	1	Greenish grey
5G62	6	2	Pale green
5G71	7	1	Light greenish grey
5G72	7	2	Pale green
5GY41	4	1	Dark greenish grey
5GY51	5	1	Greenish grey
5GY61	6	1	Greenish grey
5GY71	7	1	Light greenish grey
5R20	2	0	Black
5R21	2	1	Reddish black
5R22	2	2	Very dark red
5R23	2	3	Very dark red
5R24	2	4	Very dark red
5R25	2	5	Very dark red
5R26	2	6	Dark red
5R27	2	7	Dark red
5R28	2	8	Dark red
5R30	3	0	Very dark grey
5R31	3	1	Dark reddish grey
5R32	3	2	Dusky red
5R33	3	3	Dusky red
5R34	3	4	Dusky red
5R35	3	5	Dusky red
5R36	3	6	Dark red
5R37	3	7	Dark red
5R38	3	8	Dark red
5R40	4	0	Dark grey
5R41	4	1	Dark reddish grey
5R42	4	2	Weak red
5R43	4	3	Weak red
5R44	4	4	Weak red
5R45	4	5	Weak red
5R46	4	6	Red
5R47	4	7	Red
5R48	4	8	Red
5R50	5	0	Grey
5R51	5	1	Reddish grey
5R52	5	2	Weak red
5R53	5	3	Weak red
5R54	5	4	Weak red
5R55	5	5	Weak red

5R56	5	6	Red
5R57	5	7	Red
5R58	5	8	Red
5R60	6	0	Grey
5R61	6	1	Reddish grey
5R62	6	2	Pale red
5R63	6	3	Pale red
5R64	6	4	Pale red
5R65	6	5	Pale red
5R66	6	6	Light red
5R67	6	7	Light red
5R68	6	8	Light red
5Y20	2	0	Black
5Y21	2	1	Black
5Y22	2	2	Black
5Y23	2	3	Dark olive
5Y24	2	4	Dark olive
5Y25	2	5	Dark olive
5Y26	2	6	Dark olive
5Y27	2	7	Dark olive
5Y28	2	8	Dark olive
5Y30	3	0	Very dark grey
5Y31	3	1	Very dark grey
5Y32	3	2	Dark olive grey
5Y33	3	3	Dark olive
5Y34	3	4	Dark olive
5Y35	3	5	Dark olive
5Y36	3	6	Dark olive
5Y37	3	7	Dark olive
5Y38	3	8	Dark olive
5Y40	4	0	Dark grey
5Y41	4	1	Dark grey
5Y42	4	2	Olive grey
5Y43	4	3	Olive
5Y44	4	4	Olive
5Y45	4	5	Olive
5Y46	4	6	Olive
5Y47	4	7	Olive
5Y48	4	8	Olive
5Y50	5	0	Grey
5Y51	5	1	Grey
5Y52	5	2	Olive grey
5Y53	5	3	Olive
5Y54	5	4	Olive
5Y55	5	5	Olive
5Y56	5	6	Olive
5Y57	5	7	Olive
5Y58	5	8	Olive
5Y60	6	0	Grey
5Y61	6	1	Grey
5Y62	6	2	Light olive grey
5Y63	6	3	Pale olive
5Y64	6	4	Pale olive
5Y65	6	5	Olive yellow
5Y66	6	6	Olive yellow
5Y67	6	7	Olive yellow
5Y68	6	8	Olive yellow
5Y70	7	0	Light grey

5Y71	7	1	Light grey
5Y72	7	2	Light grey
5Y73	7	3	Pale yellow
5Y74	7	4	Pale yellow
5Y75	7	5	Yellow
5Y76	7	6	Yellow
5Y77	7	7	Yellow
5Y78	7	8	Yellow
5Y80	8	0	White
5Y81	8	1	White
5Y82	8	2	White
5Y83	8	3	Pale yellow
5Y84	8	4	Pale yellow
5Y85	8	5	Yellow
5Y86	8	6	Yellow
5Y87	8	7	Yellow
5Y88	8	8	Yellow
5YR2.51	2.5	1	Black
5YR2.52	2.5	2	Dark reddish brown
5YR20	2	0	Black
5YR21	2	1	Black
5YR22	2	2	Dark reddish brown
5YR23	2	3	Dark reddish brown
5YR24	2	4	Dark reddish brown
5YR25	2	5	Yellowish red
5YR26	2	6	Yellowish red
5YR27	2	7	Yellowish red
5YR28	2	8	Yellowish red
5YR30	3	0	Very dark grey
5YR31	3	1	Very dark grey
5YR32	3	2	Dark reddish brown
5YR33	3	3	Dark reddish brown
5YR34	3	4	Dark reddish brown
5YR35	3	5	Yellowish red
5YR36	3	6	Yellowish red
5YR37	3	7	Yellowish red
5YR38	3	8	Yellowish red
5YR40	4	0	Dark grey
5YR41	4	1	Dark grey
5YR42	4	2	Dark reddish grey
5YR43	4	3	Reddish brown
5YR44	4	4	Reddish brown
5YR45	4	5	Yellowish red
5YR46	4	6	Yellowish red
5YR47	4	7	Yellowish red
5YR48	4	8	Yellowish red
5YR50	5	0	Grey
5YR51	5	1	Grey
5YR52	5	2	Reddish grey
5YR53	5	3	Reddish brown
5YR54	5	4	Reddish brown
5YR55	5	5	Yellowish red
5YR56	5	6	Yellowish red
5YR57	5	7	Yellowish red
5YR58	5	8	Yellowish red
5YR60	6	0	Grey
5YR61	6	1	Grey
5YR62	6	2	Pinkish grey

5YR63	6	3	Light reddish brown
5YR64	6	4	Light reddish brown
5YR65	6	5	Reddish yellow
5YR66	6	6	Reddish yellow
5YR67	6	7	Reddish yellow
5YR68	6	8	Reddish yellow
5YR70	7	0	Light grey
5YR71	7	1	Light grey
5YR72	7	2	Pinkish grey
5YR73	7	3	Pink
5YR74	7	4	Pink
5YR75	7	5	Reddish yellow
5YR76	7	6	Reddish yellow
5YR77	7	7	Reddish yellow
5YR78	7	8	Reddish yellow
5YR80	8	0	White
5YR81	8	1	White
5YR82	8	2	Pinkish white
5YR83	8	3	Pink
5YR84	8	4	Pink
5YR85	8	5	Reddish yellow
5YR86	8	6	Reddish yellow
5YR87	8	7	Reddish yellow
5YR88	8	8	Reddish yellow
7.5R20	2	0	Black
7.5R21	2	1	Black
7.5R22	2	2	Very dusky red
7.5R23	2	3	Very dusky red
7.5R24	2	4	Very dusky red
7.5R25	2	5	Dark red
7.5R26	2	6	Dark red
7.5R27	2	7	Dark red
7.5R28	2	8	Dark red
7.5R30	3	0	Very dark grey
7.5R31	3	1	Very dark grey
7.5R32	3	2	Dusky red
7.5R33	3	3	Dusky red
7.5R34	3	4	Dusky red
7.5R35	3	5	Dusky red
7.5R36	3	6	Dark red
7.5R37	3	7	Dark red
7.5R38	3	8	Dark red
7.5R40	4	0	Dark grey
7.5R41	4	1	Dark grey
7.5R42	4	2	Weak red
7.5R43	4	3	Weak red
7.5R44	4	4	Weak red
7.5R45	4	5	Weak red
7.5R46	4	6	Red
7.5R47	4	7	Red
7.5R48	4	8	Red
7.5R50	5	0	Grey
7.5R51	5	1	Grey
7.5R52	5	2	Weak red
7.5R53	5	3	Weak red
7.5R54	5	4	Weak red
7.5R55	5	5	Red
7.5R56	5	6	Red

7.5R57	5	7	Red
7.5R58	5	8	Red
7.5R60	6	0	Grey
7.5R61	6	1	Grey
7.5R62	6	2	Pale red
7.5R63	6	3	Pale red
7.5R64	6	4	Pale red
7.5R65	6	5	Light red
7.5R66	6	6	Light red
7.5R67	6	7	Light red
7.5R68	6	8	Light red
7.5R70	7	0	Grey
7.5R71	7	1	Grey
7.5R72	7	2	Pale red
7.5R73	7	3	Pale red
7.5R74	7	4	Pale red
7.5R75	7	5	Light red
7.5R76	7	6	Light red
7.5R77	7	7	Light red
7.5R78	7	8	Loght red
7.5YR20	2	0	Black
7.5YR21	2	1	Black
7.5YR22	2	2	Very dark brown
7.5YR23	2	3	Very dark brown
7.5YR24	2	4	Very dark brown
7.5YR25	2	5	Strong brown
7.5YR26	2	6	Strong brown
7.5YR27	2	7	Strong brown
7.5YR28	2	8	Strong brown
7.5YR30	3	0	Very dark grey
7.5YR31	3	1	Very dark grey
7.5YR32	3	2	Dark brown
7.5YR33	3	3	Dark brown
7.5YR34	3	4	Dark brown
7.5YR35	3	5	Strong brown
7.5YR36	3	6	Strong brown
7.5YR37	3	7	Strong brown
7.5YR38	3	8	Strong brown
7.5YR40	4	0	Dark grey
7.5YR41	4	1	Dark grey
7.5YR42	4	2	Brown
7.5YR43	4	3	Brown
7.5YR44	4	4	Brown
7.5YR45	4	5	Strong brown
7.5YR46	4	6	Strong brown
7.5YR47	4	7	Strong brown
7.5YR48	4	8	Strong brown
7.5YR50	5	0	Grey
7.5YR51	5	1	Grey
7.5YR52	5	2	Brown
7.5YR53	5	3	Brown
7.5YR54	5	4	Brown
7.5YR55	5	5	Strong brown
7.5YR56	5	6	Strong brown
7.5YR57	5	7	Strong brown
7.5YR58	5	8	Strong brown
7.5YR60	6	0	Grey
7.5YR61	6	1	Grey

7.5YR62	6	2	Pinkish grey
7.5YR63	6	3	Pinkish grey
7.5YR64	6	4	Light brown
7.5YR65	6	5	Reddish yellow
7.5YR66	6	6	Reddish yellow
7.5YR67	6	7	Reddish yellow
7.5YR68	6	8	Reddish yellow
7.5YR70	7	0	Light grey
7.5YR71	7	1	Light grey
7.5YR72	7	2	Pinkish grey
7.5YR73	7	3	Pinkish grey
7.5YR74	7	4	Pink
7.5YR75	7	5	Reddish yellow
7.5YR76	7	6	Reddish yellow
7.5YR77	7	7	Reddish yellow
7.5YR78	7	8	Reddish yellow
7.5YR80	8	0	White
7.5YR81	8	1	White
7.5YR82	8	2	Pinkish yellow
7.5YR83	8	3	Pinkish white
7.5YR84	8	4	Pink
7.5YR85	8	5	Reddish yellow
7.5YR86	8	6	Reddish yellow
7.5YR87	8	7	Reddish yellow
7.5YR88	8	8	Reddish yellow

Table codes: Domain C_O_AGGRADATION

Value	Description
0	No aggradation
1	Present
X	Not apparent

Table codes: Domain C_O_ASC

Value	Description
AA	Red
AB	Brown
AC	Yellow
AD	Grey
AE	Black
AF	Dystrophic
AG	Mesotrophic
AH	Eutrophic
AI	Acidic
AJ	Acidic-Mottled
AK	Andic
AL	Aeric
AM	Aquic
AN	Anthroposols
AO	Arenic
AP	Argic
AQ	Argillaceous
AR	Basic
AS	Bauxitic
AT	Bleached
AU	Bleached-Acidic

AV	Bleached-Ferric
AW	Bleached-Leptic
AX	Bleached-Magnesic
AY	Bleached-Manganic
AZ	Bleached-Mottled
BA	Bleached-Sodic
BB	Bleached-Vertic
BC	Calcareous
BD	Calcic
BE	Chernic
BF	Chernic-Leptic
BG	Chromosolic
BH	Crusty
BI	Densic
BJ	Duric
BK	Pedaric
BL	Endoacidic
BM	Endic
BN	Episodic
BO	Endic-Pedal
BP	Endohypersodic
BQ	Epic
BR	Epihypersodic
BS	Epic-Pedal
BT	Extratidal
BU	Ferric
BV	Arenaceous
BW	Fibric
BX	Fluvic
BY	Fragic
BZ	Gypsic
CB	Calcarosolic
CC	Halic
CD	Haplic
CE	Hemic
CF	Histic
CG	Humic
CH	Chromosol
CI	Humic/Humosesquic
CJ	Humic/Sesquic
CK	Humose
CL	Humose-Magnesic
CM	Humose-Mottled
CN	Humose-Parapanic
CO	Humosesquic
CP	Hypervescent
CQ	Hypercalcic
CR	Hypernatric
CS	Hypersalic
CU	Epihypersodic-Epiacidic
CV	Hypocalcic
CW	Intertidal
CX	Kurosolic
CY	Leptic
CZ	Lithic
DA	Lithocalcic
DB	Magnesic
DC	Manganic

DD	Marly
DF	Massive
DG	Melacic
DH	Melacic-Magnesic
DI	Melacic-Mottled
DJ	Melacic-Parapanic
DK	Melanic
DL	Melanic-Bleached
DM	Melanic-Mottled
DN	Melanic-Vertic
DO	Mellic
DP	Mesonatric
DQ	Mottled
DR	Subhumose
DS	Orthic
DT	Oxyaquic
DU	Paralithic
DV	Parapanic
DW	Peaty
DX	Peaty-Parapanic
DY	Pedal
DZ	Petrocalcic
EA	Petroferric
EB	Pipey
EC	Placic
ED	Redoxic
EE	Rendic
EF	Reticulate
EG	Salic
EH	Sapric
EI	Self-Mulching
EJ	Semiaquic
EK	Sesquic
EL	Shelly
EM	Silpanic
EN	Snuffy
EO	Sodic
EP	Episodic-Epiacidic
EQ	Sodosolic
ER	Stratic
ES	Subnatric
ET	Subplastic
EU	Sulfidic
EV	Sulfuric
EW	Supratidal
EX	Vertic
EY	Humose-Bleached
EZ	Melacic-Bleached
FA	Siliceous
FB	Supracalcic
FC	Melanic-Calcareous
FD	Natric
FF	Submelacic
FG	Submelanic
FH	Palic
FI	Ochric
FJ	Hypergypsic
FK	Ferric-Duric

FL	Gypsic-Subplastic
FM	Epicalcareous-Epihypersodic
FN	Mottled-Subnatric
FO	Mottled-Mesonatric
FP	Mottled-Hypernatric
FQ	Dermosolic
FR	Kandosolic
FS	Terric
FT	Humose-Basic
FU	Melacic-Basic
FV	Melanic-Acidic
FW	Faunic
FX	Lutaceous
FY	Epicalcareous
FZ	Endocalcareous
GA	Epiacidic
GB	Epicalcareous-Endohypersodic
GC	Melacic-Reticulate
GD	Peaty-Placic
GE	Ferric-Petroferric
GF	Regolithic
GG	Episodic-Endoacidic
GH	Episodic-Epicalcareous
GI	Episodic-Endocalcareous
GJ	Epicalcareous-Endoacidic
GK	Epiacidic-Mottled
GL	Endoacidic-Mottled
GM	Endocalcareous-Endohypersodic
GN	Epihypersodic-Endoacidic
GO	Epihypersodic-Endocalcareous
GP	Magnesic-Natric
GQ	Episodic-Gypsic
GR	Rudosolic
GS	Epipedal
GT	Tenosolic
GU	Humose-Calcareous
GV	Lutic
GW	Ferric-Acidic
GX	Manganic-Acidic
GY	Humose-Acidic
GZ	Bleached-Orthic
HA	Melanic-Sodic
HB	Mottled-Sodic
HC	Ferric-Sodic
HD	Rudaceous
HE	Endocalcareous-Mottled
HF	Tephric
HG	Carbic
HH	Clastic
HI	Colluvic
HJ	Lithosolic
HK	Supravescent
HL	Episulfidic
HM	Episulfidic-Petrocalcic
HN	Densic-Placic
HO	Acidic-Sodic
HP	Palic-Acidic
HQ	Ochric-Acidic

HR	Cumulic
HS	Hortic
HT	Garbic
HU	Urbic
HV	Dredgic
HW	Spolic
HX	Scalpic
HZ	Ashy
IA	Inceptic
IB	Epibasic
IC	Ceteric
ID	Subpeaty
IE	Effervescent
IF	Folic
IG	Humosesquic/Sesquic
IH	Humic/Alsilic
IJ	Modic
IK	Histic-Sulfidic
IL	Sequi-Nodular
IM	Calcenic
IN	Red-Orthic
IO	Brown-Orthic
IP	Yellow-Orthic
IQ	Grey-Orthic
IR	Black-Orthic
IS	Ferric-Reticulate
XX	Available Class Inappropriate
YY	Class Undetermined
ZZ	No Available Class

Table codes: Domain C_O_ASC_CONF

Value	Description
-	No confidence level recorded.
1	All necessary analytical data are available.
2	Analytical data are incomplete but reasonable confidence.
3	No analytical data are available but confidence is fair.
4	No analytical data and little or no knowledge of this soil.

Table codes: Domain C_O_ASC_FAM

Value	Description
-	Not recorded
A	Thin
B	Medium
C	Thick
D	Very thick
E	Non-gravelly
F	Slightly gravelly
G	Gravelly
H	Moderately gravelly
I	Very gravelly
J	Peaty
K	Sandy
L	Loamy
M	Clay-loamy
N	Silty

O	Clayey
P	Granular
Q	Fine
R	Medium fine
S	Very fine
T	Very shallow
U	Shallow
V	Moderately deep
W	Deep
X	Very deep
Y	Giant

Table codes: Domain C_O_ASC_VERSION

Value	Description
2	The Australian Soil Classification 2nd approximation
3	The Australian Soil Classification 3rd approximation
4	The Australian Soil Classification 1st Edition
5	The Australian Soil Classification Revised Edition

Table codes: Domain C_O_DEPTH_WATER_PREF

Value	Description
+	Above soil surface
-	Below soil surface
0	No free water

Table codes: Domain C_O_DRAINAGE

Value	Description
1	Very poorly drained
2	Poorly drained
3	Imperfectly drained
4	Moderately well drained
5	Well drained
6	Rapidly drained

Table codes: Domain C_O_ER_STATE

Value	Description
A	Active
P	Partially stabilised
S	Stabilised

Table codes: Domain C_O_EVALUATION

Value	Description
A	Determined by altimeter
E	Estimate
L	Levelled from survey datum
M	Interpolated from contour map with contour interval of 20 m or less

Table codes: Domain C_O_FOREST_TYPE

Value	Description
1	Non-rainforest
2	Rainforest
3	Mixture of rainforest and non-rainforest
4	Plantation
5	No vegetation

Table codes: Domain C_O_GSG

Value	Description
A	Alluvial soil
ACP	Acid peat
AH	Alpine humus soil
ALP	Alkaline peat
BC	Brown clay
BE	Black earth
BP	Brown podzolic soil
BRE	Brown earth
C	Chocolate soil
CM	Chernozem
DL	Desert loam
E	Euchrozem
ES	Earthy sand
GBK	Grey-brown calcareous soil
GBP	Grey-brown podzolic soil
GC	Grey clay
GE	Grey earth
GP	Gleyed podzolic soil
HG	Humic gley
HP	Humus podzol
K	Krasnozem
KRE	Calcareous red earth
KS	Calcareous sand
L	Lithosol
LP	Lateritic podzolic soil
NKB	Non-calcic brown soil
NP	Neutral peat
NSG	No suitable group
P	Podzol
PP	Peaty podzol
PS	Prairie soil
R	Rendzina
RBE	Red-brown earth
RBH	Red and brown hardpan soil
RC	Red clay
RE	Red earth
RK	Red calcareous soil
RP	Red podzolic soil
SB	Solonized brown soil
SC	Solodic soil
SDS	Solodized solonetz
SH	Soloth
SK	Solonchak
SS	Siliceous sand
SZ	Solonetz

TR	Terra rossa soil
W	Wiesenboden
X	Xanthozem
YE	Yellow earth
YP	Yellow podzolic soil

Table codes: Domain N_O_GULLY_DEPTH

Value	Description	Numeric value	Low value	High value
1	<1.5 m	.75	0	1.5
2	1.5-3.0 m	2.25	1.5	3
3	>3 m	3	3	

Table codes: Domain N_O_INUND_DEPTH

Value	Description	Numeric value	Low value	High value
1	<50mm	25	0	50
2	50-100mm	75	50	100
3	100-300mm	200	100	300
4	300mm-1m	650	300	1000
5	>1m	1000	1000	

Table codes: Domain N_O_INUND_DUR

Value	Description	Numeric value	Low value	High value
1	Less than 1 day	.5	0	1
2	Between 1 and 20 days	10.5	1	20
3	Between 20 and 120 days	70	20	120
4	More than 120 days	120	120	

Table codes: Domain C_O_INUND_FREQ

Value	Description
0	No inundation
1	Less than one per 100 years
2	One in 50-100 years
3	One in 10-50 years
4	One in 1-10 years
5	More than one per year

Table codes: Domain N_O_INUND_RUNON_VEL

Value	Description	Numeric value	Low value	High value
H	High velocity >300mm/s	300	300	
L	Low velocity <300mm/s	150	0	300

Table codes: Domain C_O_MASS_DEG

Value	Description
0	No mass movement
1	Present

Table codes: Domain C_O_MR_SAMPLED

Value	Description
D	Depression
E	Elongate mound
F	Flat
K	Hummock
L	Elongate depression
M	Mound
S	Shelf

Table codes: Domain C_O_NATURE

Value	Description
C	Characterisation
M	Composite
S	Single

Table codes: Domain C_O_OTHER_ER_DEG

Value	Description
0	No erosion
1	Minor or present
2	Moderate
3	Severe
4	Very severe
X	Not apparent

Table codes: Domain C_O_RF_COMPLEX

Value	Description
C	Complex
S	Simple
X	Simple-complex

Table codes: Domain C_O_RF_EMERGENTS

Value	Description
A	Emergent present is not sclerophyll
E	Emergent present is sclerophyll

Table codes: Domain C_O_RF_FLOR_COMP

Value	Description
M	Mixed
S	One or two species
X	Mixed + one species

Table codes: Domain C_O_RF_INDICATOR

Value	Description
1	Moss
2	Fern
3	Fan palm
4	Feather palm

5	Vine
6	No dominant indicator growth form

Table codes: Domain C_O_RF_LEAFSIZE

Value	Description
1	Macrophyll
2	Macrophyll-mesophyll
3	Mesophyll
4	Mesophyll-notophyll
5	Notophyll
6	Notophyll-microphyll
7	Microphyll
8	Microphyll-nanophyll
9	Nanophyll

Table codes: Domain C_O_RILL_DEG

Value	Description
0	No rill erosion
1	Minor
2	Moderate
3	Severe

Table codes: Domain C_O_RUNOFF

Value	Description
0	No runoff
1	Very slow
2	Slow
3	Moderately rapid
4	Rapid
5	Very rapid

Table codes: Domain C_O_SB_CONFIDENCE

Value	Description
A	Almost certain or certain
D	Dubious, doubtful
N	Not parent material
P	Probable

Table codes: Domain N_O_SB_GRAINSIZE

Value	Description	Numeric value	Low value	High value
1	<0.06mm	0.03	0	0.06
2	0.06-2mm	1.03	0.06	2.00
3	>2mm	2.00	2.00	

Table codes: Domain C_O_SB_MASS_ALT

Value	Description
F	Ferruginized
K	Calcified
L	Kaolinized
O	Other

Table codes: Domain C_O_SB_MASS_GEN_TYPE

Value	Description
AC	Alcrete
AH	Artificially hardened materials
AL	Alluvium
AT	Anthropic materials
BE	Beach Sediment
BG	Biogenic rocks and materials
CD	Creep deposit
CH	Chemically hardened materials
CN	Concrete
CO	Colluvium
DR	Decomposed rock
ED	Eolian sediment
ES	Eolian sand
ET	Eolianite
EV	Evaporite
FC	Ferricrete
FI	Fill
GY	Gypsum
HA	Halite (rock salt)
IG	Igneous rocks
IN	Ignimbrite
KC	Calcrete
LA	Lacustrine sediment
LC	Silcrete
LD	Landslide deposit
LO	Loess
MA	Marine sediment
ME	Metamorphic rocks
MD	Mudflow deposit
MH	Masses hardened in the regolith
PA	Parna
PC	Porcellanite
PL	Plutonic rocks
PW	Partially weathered rock
RB	Red-brown hardpan
SA	Saprolite
SC	Chemical and organic sidimentary rocks
SD	Detrital sedimentary rocks
SE	Scree
SH	Sheet flow deposit
SO	Stabilised soil
SP	Pyroclastic rocks (including ignimbrite)
SR	Sedimentary rocks
TI	Till
UR	Unweathered rocks of the bedrock zone
US	Unconsolidated sediments

VA	Volcanic ash
VO	Volcanic rocks
WR	Weathered rocks

Table codes: Domain N_O_SB_MASS_SPAC_DIS

Value	Description	Numeric value	Low value	High value
B	300 mm-1 m	.65	.3	1
C	<50 mm	.025	0	.05
F	50-300 mm	.175	.05	.3
M	1-3 m	2	1	3
S	>3 m	3	3	

Table codes: Domain C_O_SB_MASS_STRENGTH

Value	Description
E	Earth or soil
M	Moderately strong rock
S	Strong rock
VS	Very strong rock
VW	Very weak rock
W	Weak rock

Table codes: Domain C_O_SB_OBS_TYPE

Value	Description
A	Auger boring
C	Undisturbed soil core
E	Existing vertical exposure
O	Outcrop
P	Soil pit

Table codes: Domain C_O_SB_POROSITY

Value	Description
0	Non-porous, dense
1	Slightly porous
2	Porous

Table codes: Domain C_O_SB_STRUCTURE

Value	Description
B	Bedded
C	Concretionary
F	Fissile
L	Foliated
P	Platy
R	Vermicular
S	Vesicular
V	Massive

Table codes: Domain C_O_SB_TEXTURE

Value	Description
A	Amorphus
F	Fragmental
P	Porphyritic
X	Crystalline

Table codes: Domain C_O_SCALD_DEG

Value	Description
0	No scalding
1	Minor scalding
2	Moderate scalding
3	Severe scalding

Table codes: Domain C_O_SHEET_DEG

Value	Description
0	No sheet erosion
1	Minor
2	Moderate
3	Severe
X	Not apparent

Table codes: Domain C_O_SOIL_DISTURB

Value	Description
1	No significant disturbance apparent
2	Disturbance of some of the soil surface
3	Complete soil disturbance by cultivation, heavy grazing or both

Table codes: Domain C_O_SOIL_TAXONOMY

Value	Description
A	Alfisol
AAQ	Aqualf
AAQAL	Albaqualf
AAQDU	Duraqualf
AAQFR	Fragiaqualf
AAQGL	Glossaqualf
AAQKA	Kandiaqualf
AAQNA	Natraqualf
AAQOC	Ochraqualf
AAQPN	Plinthaqualf
AAQUM	Umbraqualf
ABO	Boralf
ABOCR	Cryoboralf
ABOEU	Eutroboralf
ABOFR	Fragiboralf
ABOGL	Glossoboralf
ABONA	Natriboralf
ABOPA	Paleboralf
AUD	Udalf
AUDAG	Agrudalf
AUDFE	Ferrudalf

AUDFR	Fragiudalf
AUDFS	Fraglossudalf
AUDGL	Glossudalf
AUDHA	Halpludalf
AUDKA	Kandiudalf
AUDKH	Kanhapludalf
AUDNA	Natrudalf
AUDPA	Paleudalf
AUDTR	Tropudalf
AUS	Ustalf
AUSDA	Durustalf
AUSHA	Haplustalf
AUSKA	Kandiustalf
AUSKH	Kanhaplustalf
AUSNA	Natrustalf
AUSPA	Paleustalf
AUSPN	Plinthustalf
AUSRH	Rhodustalf
AXE	Xeralf
AXEDU	Durixeralf
AXEFR	Fragixeralf
AXEHA	Haploxeralf
AXENA	Natrixeralf
AXEPA	Palexeralf
AXEPN	Plinthoxeralf
AXERH	Rhodoxeralf
D	Aridisol
DAR	Argid
DARDU	Durargid
DARHA	Haplargid
DARND	Nadurargid
DARNT	Natrargid
DARPA	Paleargid
DOR	Orthid
DORCL	Calciorthid
DORCM	Camborthid
DORDU	Durorthid
DORGY	Gypsiorthid
DORPA	Paleorthid
DORSA	Salorthid
E	Entisol
EAQ	Aquent
EAQCR	Cryaquent
EAQFL	Fluvaquent
EAQHA	Haplaquent
EAQHY	Hydraquent
EAQPS	Psammaquent
EAQSU	Sulfaquent
EAQTR	Tropaquent
EAR	Arent
EARAR	Arent
EFL	Fluvent
EFLCR	Cryofluvent
EFLTO	Torrifluvent
EFLTR	Tropofluvent
EFLUD	Udifluvent
EFLUS	Ustifluvent
EFLXE	Xerofluvent

EOR	Orthent
EORCR	Cryorthent
EORTO	Torriorthent
EORTR	Troporthent
EORUD	Udorthent
EORUS	Ustorthent
EORXE	Xerorthent
EPS	Psamment
EPSCR	Cryopsamment
EPSQU	Quartzipsamment
EPSTO	Torripsamment
EPSTR	Tropopsamment
EPSUD	Udipsamment
EPSUS	Ustipsamment
EPSXE	Xeropsamment
H	Histosol
HFI	Fibrist
HFIBO	Borofibrist
HFICR	Cryofibrist
HFILU	Luvifibrist
HFIME	Medifibrist
HFISP	Sphagnofibrist
HFITR	Tropofibrist
HFO	Folist
HFOBO	Borofolist
HFOCR	Cryofolist
HFOTR	Tropofolist
HHE	Hemist
HHEBO	Borohemist
HHECR	Cryohemist
HHELU	Luvihemist
HHEME	Medihemist
HHESI	Sulfihemist
HHESO	Sulfohemist
HHETR	Tropohemist
HSA	Saprist
HSABO	Borosaprist
HSACR	Cryosaprist
HSAME	Medisaprist
HSATR	Troposaprist
I	Inceptisol
IAN	Andept
IANCR	Cryandept
IANDU	Durandept
IANDY	Dystrandept
IANEU	Eutrandept
IANHY	Hydrandept
IANPK	Placandept
IANVI	Vitrandept
IAQ	Aqueot
IAQAN	Andaquept
IAQCR	Cryaquept
IAQFR	Fragiaquept
IAQHL	Halaquept
IAQHP	Haplaquept
IAQHU	Humaquept
IAQPK	Placaquept
IAQPN	Plinthaquept

IAQSU	Sulfaquept
IAQTR	Tropaquept
IOC	Ochrept
IOCCR	Cryochrept
IOCDU	Durochrept
IOCDY	Dystrochrept
IOCEU	Eutrochrept
IOCFR	Fragiochrept
IOCUS	Ustochrept
IOCXF	Xerochrept
IPL	Plaggept
IPLPL	Plaggept
ITR	Tropept
ITRDY	Dystropept
ITREU	Eutropept
ITRHU	Humitropept
ITRSO	Sombritropept
ITRUS	Ustropept
IUM	Umbrept
IUMCR	Cryumbrept
IUMFR	Fragiumbrept
IUMHA	Haplumbrept
IUMXF	Xerumbrept
M	Mollisol
MAL	Alboll
MALAR	Argialboll
MALNA	Natralboll
MAQ	Aquoll
MAQAR	Argiaquoll
MAQCA	Calciaquoll
MAQCR	Cryaquoll
MAQDU	Duraquoll
MAQHA	Haplaquoll
MAQNA	Natraquoll
MBO	Boroll
MBOAR	Argiboroll
MBOCA	Calciboroll
MBOCR	Cryoboroll
MBOHA	Haploboroll
MBONA	Natriboroll
MBOPA	Paleboroll
MBOVE	Vermiboroll
MRE	Rendoll
MRERE	Rendoll
MUD	Udoll
MUDAR	Argiudoll
MUDHA	Hapludoll
MUDPA	Paleudoll
MUDVE	Vermudoll
MUS	Ustoll
MUSAR	Argiustoll
MUSCA	Calciustoll
MUSDU	Durustoll
MUSHA	Haplustoll
MUSNA	Natrustoll
MUSPA	Paleustoll
MUSVE	Vermustoll
MXE	Xeroll

MXEAR	Argixeroll
MXECA	Calcixeroll
MXEDU	Durixeroll
MXEHA	Haploxeroll
MXENA	Natrixeroll
MXEPA	Palexeroll
O	Oxisol
OAQ	Aquox
OAQAC	Aeraquox
OAQPN	Plinthaquox
OAQUE	Eutraquox
OAQUM	Umbraquox
OPE	Perox
OPEAC	Acroperox
OPEEU	Eutroperox
OPEHA	Haploperox
OPEKA	Kandiperox
OPESO	Sombriperox
OTO	Torrox
OTOAC	Aerotorox
OTOEU	Eutrotorox
OTOHA	Haplotorox
OUD	Udox
OUDAC	Aerudox
OUDEU	Eutrudox
OUDHA	Hapludox
OUDKA	Kandiudox
OUDSO	Sombriudox
OUS	Ustox
OUSAC	Acrustox
OUSEU	Eutrustox
OUSHA	Haplustox
OUSKA	Kandiustox
OUSSO	Sombriustox
S	Spodosol
SAQ	Aquod
SAQCR	Cryaquod
SAQDU	Duraquod
SAQFR	Fragiaquod
SAQHA	Haplaquod
SAQPK	Placaquod
SAQSI	Sideraquod
SAQTR	Tropaquod
SFE	Ferrod
SFEFE	Ferrod
SHU	Humod
SHUCR	Cryohumod
SHUFR	Fragihumod
SHUHA	Haplohumod
SHUPK	Placohumod
SHUTR	Tropohumod
SOR	Orthod
SORCR	Cryorthod
SORFR	Fragiorthod
SORHA	Haplorthod
SORPK	Placorthod
SORTR	Troporthod
U	Ultisol

UAQ	Aquult
UAQAL	Albaquult
UAQFR	Fragiaquult
UAQKA	Kandiaquult
UAQKH	Kanhaplaquult
UAQOC	Ochraquult
UAQPA	Paleaquult
UAQPN	Plinthaquult
UAQTR	Tropaquult
UAQUM	Umbraquult
UHU	Humult
UHUHA	Haplohumult
UHUKA	Kandihumult
UHUKH	Kanhaplohumult
UHUPN	Plinthohumult
UHUSO	Sombrihumult
UUD	Udult
UUDFR	Fragiudult
UUDHA	Hapludult
UUDKA	Kandiudult
UUDKH	Kanhapludult
UUDPA	Paleudult
UUDPN	Plinthudult
UUDRH	Rhodudult
UUS	Ustult
UUSHA	Haplustult
UUSKA	Kandiustult
UUSKH	Kanhaplustukt
UUSPA	Paleustult
UUSPN	Plinthustult
UUSRH	Rhodustult
UXE	Xerult
UXEHA	Haploxerult
UXEPA	Palexerult
V	Vertisol
VTD	Torrert
VTOTO	Torrert
VUD	Udert
VUDCH	Chromudert
VUDPE	Pelludert
VUS	Ustert
VUSCH	Chromustert
VUSPE	Pellustert
VXE	Xerert
VXECH	Chromoxerert
VXEPE	Pelloxerert

Table codes: Domain C_O_STBANK_DEG

Value	Description
0	No stream bank erosion
1	Present
X	Not apparent

Table codes: Domain C_O_TUNNEL_DEG

Value	Description
0	No tunnel erosion
1	Present
X	Not apparent

Table codes: Domain C_O_TYPE

Value	Description
A	Auger boring
C	Undisturbed soil core
E	Existing vertical exposure
P	Soil pit

Table codes: Domain C_O_WAVE_DEG

Value	Description
0	No wave erosion
1	Present
X	Not apparent

Table codes: Domain C_O_WIND_DEG

Value	Description
0	No wind erosion
1	Minor or present
2	Moderate
3	Severe
4	Very severe
X	Not apparent

Table codes: Domain C_O_WIND_STABILITY

Value	Description
1	Unlikely to erode with >30 km/h wind
2	Likely to erode with >30 km/h wind

Table codes: Domain C_O_WIND_VISIBILITY

Value	Description
0	Full visibility
1	Visibility >100m
2	Visibility <100m

Table codes: Domain C_PAN_CEMENTATION

Value	Description
0	Uncemented
1	Weakly cemented
2	Moderately cemented
3	Strongly cemented
4	Very strongly cemented

Table codes: Domain C_PAN_CONTINUITY

Value	Description
B	Broken
C	Continuous
D	Discontinuous

Table codes: Domain C_PAN_STRUCTURE

Value	Description
C	Concretionary
L	Platy
N	Nodular
R	Vermicular
S	Vesicular
V	Massive

Table codes: Domain C_PAN_TYPE

Value	Description
A	Alcrete
C	Organic pan
D	Duripan
E	Ferricrete
F	Fragipan
I	Thin ironpan
K	Calcrete
L	Silcrete
M	Manganiferous pan
N	Densipan
O	Other pans
R	Red-brown hardpan
T	Ortstein
V	Cultivation pan
Z	Zero or no pan

Table codes: Domain C_PERMEABILITY

Value	Description
1	Very slowly permeable
2	Slowly permeable
3	Moderately permeable
4	Highly permeable

Table codes: Domain C_PGM_STAT

Value	Description
B	Barely active to inactive
C	Continuously active
F	Frequently active
R	Relict
S	Seldom active
U	Unspecified

Table codes: Domain N_PORE_ABUN

Value	Description	Numeric value	Low value	High value
0	None	0	0	0
1	Few; <1 per 100mm2	0.5	0	1
2	Common; 1-5 per 100mm2	3	1	5
3	Many; >5 per 100mm2	5	5	
4	Few; <1 per 0.01m2	0.5	0	1
5	Common; 1-5 per 0.01m2	3	1	5
6	Many; >5 per 0.01m2	5	5	

Table codes: Domain N_PORE_DIAMETER

Value	Description	Numeric value	Low value	High value
1	Very fine; 0.075-1mm	0.5375	0.075	1
2	Fine; 1-2mm	1.5	1	2
3	Medium; 2-5mm	3.5	2	5
4	Coarse; >5mm	5	5	

Table codes: Domain C_ROOT_ABUN

Value	Description
0	No roots
1	Few
2	Common
3	Many
4	Abundant

Table codes: Domain N_ROOT_SIZE

Value	Description	Numeric value	Low value	High value
1	Very Fine	0.5	0	1
2	Fine	1.5	1	2
3	Medium	3.5	2	5
4	Coarse	5	5	

Table codes: Domain N_RO_ABUN

Value	Description	Numeric value	Low value	High value
0	No bedrock exposed	0	0	0
1	<2% bedrock exposed	1	0	2
2	2-10% bedrock exposed	6	2	10
3	10-20% bedrock exposed	15	10	20
4	20-50% bedrock exposed	35	20	50
5	>50% bedrock exposed	75	50	100

Table codes: Domain C_SB_MINERAL_COMP

Value	Description
C	Carbonaceous material
D	Dark minerals
F	Feldspar
G	Glauconite
K	Carbonates (react with 1m HCl)
L	Clays (argillaceous)

M	Mica
Q	Quartz
S	Sesquioxides
Y	Gypsum

Table codes: Domain C_SCON_STATUS

Value	Description
C	Surface crust
F	Firm
G	Cracking
H	Hardsetting
L	Loose
M	Self-mulching
O	Other
P	Poached
R	Recently cultivated
S	Soft
T	Trampled
X	Surface flake
Y	Cryptogam surface
Z	Saline

Table codes: Domain N_SEG_ABUN

Value	Description	Numeric value	Low value	High value
0	No segregations	0	0	0
1	Very few	1	0	2
2	Few	6	2	10
3	Common	15	10	20
4	Many	35	20	50
5	Very many	75	50	100

Table codes: Domain C_SEG_FORM

Value	Description
C	Concretions
F	Fragments
L	Laminae
N	Nodules
R	Root linings
S	Soft segregations
T	Tubules
V	Veins
X	Crystals

Table codes: Domain C_SEG_MAGNETIC_ATTR

Value	Description
M	Magnetic
N	Non-magnetic

Table codes: Domain C_SEG_NATURE

Value	Description
A	Aluminous
E	Earthy
F	Ferruginous
G	Ferruginous-organic
H	Organic (humified)
K	Calcareous
L	Argillaceous
M	Manganiferous
N	Ferromanganiferous
O	Other
S	Sulphurous
U	Unidentified
Y	Gypseous
Z	Saline (visible salt)

Table codes: Domain N_SEG_SIZE

Value	Description	Numeric value	Low value	High value
1	Fine	1	0	2
2	Medium	4	2	6
3	Coarse	13	6	20
4	Very coarse	40	20	60
5	Extremely coarse	60	60	

Table codes: Domain C_SEG_STRENGTH

Value	Description
1	Weak
2	Strong

Table codes: Domain C_STRENGTH

Value	Description
M	Moderately strong
S	Strong
W	Weak

Table codes: Domain C_STRG_CLASS

Value	Description
0	Loose
1	Very weak
2	Weak
3	Firm
4	Very firm
5	Strong
6	Very strong
7	Rigid

Table codes: Domain C_STR_CLODS_FRAGS

Value	Description
CL	Clod
FR	Fragment

Table codes: Domain C_STR_COMPOUND_PED

Value	Description
1	Largest peds
2	Next size peds
3	Next size peds

Table codes: Domain C_STR_PED_GRADE

Value	Description
G	Single grain
M	Moderate
S	Strong
V	Massive
W	Weak

Table codes: Domain N_STR_PED_SIZE

Value	Description	Numeric value	Low value	High value
1	<2 mm	1	0	2
2	2-5 mm	3.5	2	5
3	5-10 mm	7.5	5	10
4	10-20 mm	15	10	20
5	20-50 mm	35	20	50
6	50-100 mm	75	50	100
7	100-200 mm	150	100	200
8	200-500 mm	350	200	500
9	>500 mm	500	500	

Table codes: Domain C_STR_PED_TYPE

Value	Description
AB	Angular blocky
CA	Cast
CO	Columnar
GR	Granular
LE	Lenticular
PL	Platy
PO	Polyhedral
PR	Prismatic
SB	Subangular blocky

Table codes: Domain C_S_ELEM_INC_SLOPE

Value	Description
A	Maximal
I	Minimal
N	Waning
X	Waxing

Table codes: Domain C_S_ELEM_LOCATION

Value	Description
B	Bottom third of height of landform element
M	Middle third of height of landform element
T	Top third of height of landform element

Table codes: Domain C_S_ELEM_TYPE

Value	Description
ALC	Alcove
BAN	Bank
BAR	Bar
BEA	Beach
BEN	Bench
BER	Berm
BKP	Backplain
BOU	Blow out
BRI	Beach ridge
BRK	Breakaway
CBE	Channel bench
CFS	Cliff-foot slope
CIR	Cirque
CLI	Cliff
CON	Cone
COS	Cut-over surface
CRA	Crater
CUT	Cutface
DAM	Dam
DBA	Deflation basin
DDE	Drainage depression
DOC	Collapse doline
DOL	Solution doline
DUB	Barchan dune
DUC	Dunecrest
DUF	Linear or longitudinal (seif) dune
DUH	Hummocky (weakly oriented) dune
DUN	Dune
DUP	Parabolic dune
DUS	Duneslope
EMB	Embankment
EST	Estuary
FAN	Fan
FIL	Fill-top
FLD	Flood-out
FOO	Footslope
FOR	Foredune
GUL	Gully
HCR	Hillcrest
HSL	Hillslope
ITF	Intertidal flat
LAG	Lagoon
LAK	Lake
LDS	Landslide
LEV	Levee
LUN	Lunette
MAA	Maar

MOU	Mound
OXB	Ox-bow
PED	Pediment
PIT	Pit
PLA	Plain
PLY	Playa
PST	Prior stream
REC	Risecrest
REF	Reef flat
RER	Residual rise
RES	Riseslope
RFL	Rock flat
RPL	Rock platform
SCA	Scarp
SCD	Scald
SCR	Scroll
SFS	Scarp-foot slope
SRP	Scroll plain
STB	Stream bed
STC	Stream channel
STF	Supratidal flat
SUS	Summit surface
SWL	Swale
SWP	Swamp
TAL	Talus
TDC	Tidal creek
TDF	Tidal flat
TEF	Terrace flat
TEP	Terrace plain
TOR	Tor
TRE	Trench
TUM	Tumulus
VLF	Valley flat

Table codes: Domain C_S_MAP_REF_TYPE

Value	Description
L	Latitude and longitude
M	Australian map grid (metric)

Table codes: Domain C_S_MAP_SCALE

Value	Description
1	1:1000
2	1:2500
3	1:5000
4	1:10000
5	1:25000
6	1:50000
7	1:100000
8	1:250000

Table codes: Domain N_S_MODAL_SLOPE

Value	Description	Numeric value	Low value	High value
GE	Gently inclined	6.5	3	10
LE	Level	0.5	0	1

MO	Moderately inclined	21	10	32
PR	Precipitous	100	100	
ST	Steep	44	32	56
VG	Very gently inclined	2	1	3
VS	Very steep	78	56	100

Table codes: Domain C_S_MORPH_TYPE

Value	Description
C	Crest
D	Closed Depression
F	Flat
H	Hillock
L	Lower-slope
M	Mid-slope
R	Ridge
S	Simple-slope
U	Upper-slope
V	Open depression (vale)

Table codes: Domain C_S_PATT_TYPE

Value	Description
ALF	Alluvial fan
ALP	Alluvial plain
ANA	Anastomatic plain
BAD	Badlands
BAR	Bar plain
BEA	Beach ridge plain
CAL	Caldera
CHE	Chenier plain
COR	Coral reef
COV	Covered plain
DEL	Delta
DUN	Dunefield
ESC	Escarpment
FLO	Flood plain
HIL	Hills
KAR	Karst
LAC	Lacustrine plain
LAV	Lava plain
LON	Longitudinal dunefield
LOW	Low hills
MAD	Made land
MAR	Marine plain
MEA	Meander plain
MET	Meteor crater
MOU	Mountains
PAR	Parabolic dunefield
PED	Pediment
PEP	Pediplain
PLA	Plain
PLT	Plateau
PLY	Playa plain
PNP	Peneplain
RIS	Rises
SAN	Sand plain

SHF	Sheet-flood fan
STA	Stagnant alluvial plain
TEL	Terraced land (alluvial)
TER	Terrace (alluvial)
TID	Tidal flat
VOL	Volcano

Table codes: Domain N_S_RELIEF_CLASS

Value	Description	Numeric value	Low value	High value
M	Very high	300	300	
H	High	195	90	300
L	Low	60	30	90
P	Extremely low	4.5	0	9
R	Very low	19.5	9	30

Table codes: Domain C_S_REL_MS_CLASS

Value	Description
B	Badlands <9m >32%
B1	Badlands 9-30m >56%
B2	Badlands 30-90m >100%
GP	Gently undulating plains <9m 1-3%
GR	Gently undulating rises 9-30m 1-3%
LP	Level plain <1%
PH	Precipitous hills 90-300m >100%
PM	Precipitous mountains >300m >100%
RH	Rolling hills 90-300m 10-32%
RL	Rolling low hills 30-90m 10-32%
RM	Rolling mountains >300m 10-32%
RP	Rolling plains <9m 10-32%
RR	Rolling rises 9-30m 10-32%
SH	Steep hills 90-300m 32-56%
SL	Steep low hills 30-90m 32-56%
SM	Steep mountains >300m 32-56%
SR	Steep rises 9-30m 32-56%
UH	Undulating hills 90-300m 3-10%
UL	Undulating low hills 30-90m 3-10%
UP	Undulating plains <9m 3-10%
UR	Undulating rises 9-30m 3-10%
VH	Very steep hills 90-300m 56-100%
VL	Very steep low hills 30-90m 56-100%
VM	Very steep mountains >300m 56-100%

Table codes: Domain N_S_SAMP_SIZE

Value	Description	Numeric value	Low value	High value
1	<100g	50	0	100
2	100-500g	300	100	500
3	500-1000g	750	500	1000
4	1000-5000g	3000	1000	5000
5	>5000g	5000	5000	

Table codes: Domain C_S_SLOPE_CLASS

Value	Description
CL	Cliffed
GE	Gently inclined
LE	Level
PR	Precipitous
ST	Steep
VG	Very gently sloped
VS	Very steep

Table codes: Domain C_S_SLOPE_EVAL

Value	Description
A	Abney level or clinometer and tape
E	Estimate
P	Contour plan at 1:10000 or larger scale
T	Tripod-mounted instrument and staff

Table codes: Domain C_S_STRM_CH_DEV

Value	Description
A	Alluvial
E	Erosional
I	Incipient
O	Absent

Table codes: Domain C_S_STRM_CH_DIR_NET

Value	Description
B	Bidirectional
C	Convergent
D	Divergent
F	Centrifugal
N	Non-directional
P	Centripetal
U	Unidirectional

Table codes: Domain N_S_STRM_CH_DTOW

Value	Description	Numeric value	Low value	High value
D	Deep	10	0	20
M	Moderately deep	35	20	50
S	Shallow	100	50	150
V	Very shallow	150	150	

Table codes: Domain C_S_STRM_CH_MIG

Value	Description
F	Fixed
R	Rapidly migrating
S	Slowly migrating

Table codes: Domain C_S_STRM_CH_NET_INT

Value	Description
D	Disintegrated
I	Integrated
P	Interrupted (partial integration)

Table codes: Domain C_S_STRM_CH_PATT

Value	Description
D	Distributary
N	Non-tributary
R	Reticulated
T	Tributary

Table codes: Domain N_S_STRM_CH_SPACING

Value	Description	Numeric value	Low value	High value
AB	Absent or very rare	2500	2500	
SP	Sparse	2042.5	1585	2500
VW	Very widely spaced	1292.5	1000	1585
WS	Widely spaced	812.5	625	1000
MS	Moderately spaced	512.5	400	625
CS	Closely spaced	325	250	400
VC	Very closely spaced	204	158	250
NU	Numerous	79	0	158

Table codes: Domain C_S_TYPE

Value	Description
F	Free survey site
G	Grid site
M	Soil property monitoring
T	Transect

Table codes: Domain C_TECH_REF

Value	Description
1	Australian Soil and Land Survey, Field Handbook First Edition
2	Australian Soil and Land Survey, Field Handbook Second Edition
3	Australian Soil and Land Survey, Field Handbook Third Edition

Table codes: Domain C_VSTR_CODE

Value	Description
CL	Continuum Lower
CM	Continuum Mid
L	Lower
M	Mid
T	Tallest

Table codes: Domain C_VSTR_COVER_CLASS

Value	Description
D	Closed or dense
I	Isolated plants
L	Isolated clumps
M	Mid-dense
S	Sparse
V	Very sparse

Table codes: Domain C_VSTR_GROWTH_FORM

Value	Description
A	Cycad
C	Chenopod shrub
D	Sod grass
E	Fern
F	Forb
G	Tussock grass
H	Hummock grass
L	Vine
M	Tree mallee
N	Lichen
O	Moss
P	Palm
R	Rush
S	Shrub
T	Tree
V	Sedge
W	Liverwort
X	Xanthorhea
Y	Malle shrub
Z	Heath shrub

Table codes: Domain N_VSTR_HEIGHT_CLASS

Value	Description	Numeric value	Low value	High value
1	<0.25m	0.125	0	0.25
2	0.26-0.5m	0.375	0.25	0.5
3	0.51-1m	0.75	0.5	1
4	1.01-3m	2	1	3
5	3.01-6m	4.5	3	6
6	6.01-12m	9	6	12
7	12.01-20m	16	12	20
8	20.01-35m	27.5	20	35
9	>35.01m	35	35	

Table LAB_METHODS

Code	Lab property code	Description	Units	Reference
10_BC	**SULFUR**	**Bicarbonate-extractable sulfur. Keay, Menage and Dean (1972)**		
10_HCL	**SULFUR**	**Total element - S(%) - By boiling HCl**	**%**	
10A_HF+	**SULFUR**	**Total element - S(%) - HF/HCl04 Digest**	**%**	
10A_NR	**SULFUR**	**Total element - S(%) - Not recorded**	**%**	
10A1	**SULFUR**	**Total sulfur - S(%) - X-ray fluorescence**	**%**	**ASLSH Vol 3**
10B	**SULFUR**	**Extractable sulfur (mg/kg) - Phosphate extractable sulfur**	**mg/kg**	
10B_NR	**SULFUR**	**Extractable sulfur (mg/kg) - Not recorded**	**mg/kg**	
10B1	**SULFUR**	**Calcium phosphate-extractable sulfur - manual distillation**	**mg/kg**	**ASLSH Vol 3**
10B2	**SULFUR**	**Calcium phosphate-extractable sulfur - automated distillation**	**mg/kg**	**ASLSH Vol 3**
10B3	**SULFUR**	**Calcium phosphate-extractable sulfur - ICPAES**	**mg/kg**	**ASLSH Vol 3**
10B4	**SULFUR**	**Calcium phosphate-extractable sulfur - ion chromatography**	**mg/kg**	**ASLSH SCM**
10C1	**SULFUR**	**Calcium phosphate-extractable sulfur - ICPAES, + charcoal (CPC-S)**	**mg/kg**	**ASLSH SCM**
10D1	**SULFUR**	**Potassium chloride - 40 sulfur (KCl-40)-S**	**mg/kg**	**ASLSH SCM**

11A1	**GYPSUM**	**Total gypsum**	**%**	**ASLSH Vol 3**
11A2	**GYPSUM**	**Total gypsum - MIR reflectance spectroscopy**	**%**	**ASLSH SCM**
12_HCL_CU	**TOTAL_ELEMENTS**	**Total element - Cu(mg/kg) - Total acid(HCl)**	**mg/kg**	
12_HCL_FE	**TOTAL_ELEMENTS**	**Total element - Fe(%) - Total acid(HCl) extractable Fe**	**%**	
12_HCL_FEO	**TOTAL_ELEMENTS**	**Total element - Fe(%) - Total acid(HCl) extractable Fe2O3**	**%**	
12_HCL_MN	**TOTAL_ELEMENTS**	**Total element - Mn(mg/kg) - Total acid(HCl)**	**mg/kg**	
12_HCL_ZN	**TOTAL_ELEMENTS**	**Total element - Zn(mg/kg) - Total acid(HCl)**	**mg/kg**	
12_HF_CU	**TOTAL_ELEMENTS**	**Total element - Cu(mg/kg) - HF/HClO4 Digest**	**mg/kg**	
12_HF_FE	**TOTAL_ELEMENTS**	**Total element - Fe(%) - HF/HClO4 Digest**	**%**	
12_HF_MN	**TOTAL_ELEMENTS**	**Total element - Mn(mg/kg) - HF/HClO4 Digest**	**mg/kg**	
12_HF_ZN	**TOTAL_ELEMENTS**	**Total element - Zn(mg/kg) - HF/HClO4 Digest**	**mg/kg**	
12_HF+_FEO	**TOTAL_ELEMENTS**	**Total element - Fe(%) - HF/HClO4 Digest(Fe2O3)**	**%**	
12_NR_CU	**TOTAL_ELEMENTS**	**Total element - Cu(mg/kg) - Not recorded**	**mg/kg**	
12_NR_FE	**TOTAL_ELEMENTS**	**Total element - Fe(%) - Not recorded**	**%**	
12_NR_MN	**TOTAL_ELEMENTS**	**Total element - Mn(mg/kg) - Not recorded**	**mg/kg**	
12_NR_ZN	**TOTAL_ELEMENTS**	**Total element - Zn(mg/kg) - Not recorded**	**mg/kg**	
12_XRF_CU	**TOTAL_ELEMENTS**	**Total element - Cu(mg/kg) - X-Ray Fuoresence**	**mg/kg**	
12_XRF_FE	**TOTAL_ELEMENTS**	**Total element - Fe(%) - X-Ray Fuoresence**	**%**	
12_XRF_FEO	**TOTAL_ELEMENTS**	**Total element - Fe(%) - X-Ray Fuoresence(Fe2O3)**	**%**	
12_XRF_MN	**TOTAL_ELEMENTS**	**Total element - Mn(mg/kg) - X-Ray Fuoresence**	**mg/kg**	
12_XRF_ZN	**TOTAL_ELEMENTS**	**Total element - Zn(mg/kg) - X-Ray Fuoresence**	**mg/kg**	
12A1_AL	**AL**	**DTPA - extractable aluminium**	**mg/kg**	
12A1_CU	**CU**	**DTPA - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH Vol 3**
12A1_FE	**FE**	**DTPA - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH Vol 3**
12A1_MN	**MN**	**DTPA - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH Vol 3**
12A1_ZN	**ZN**	**DTPA - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH Vol 3**
12B1_CU	**CU**	**Ammonium bicarbonate/EDTA - extractable copper and zinc**	**mg/kg**	**ASLSH Vol 3**
12B1_ZN	**ZN**	**Ammonium bicarbonate/EDTA - extractable copper and zinc**	**mg/kg**	**ASLSH Vol 3**
12C1	**BORON**	**Calcium chloride extractable boron - manual colour**	**mg/kg**	**ASLSH Vol 3**
12C2	**BORON**	**Calcium chloride extractable boron - ICPAES**	**mg/kg**	**ASLSH Vol 3**
12D1_CU	**CU**	**0.1 M HCl - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH SCM**
12D1_FE	**FE**	**0.1 M HCl - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH SCM**
12D1_MN	**MN**	**0.1 M HCl - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH SCM**
12D1_ZN	**ZN**	**0.1 M HCl - extractable copper, zinc, manganese and iron**	**mg/kg**	**ASLSH SCM**
12E1	**MO**	**Calcium chloride - extractable Mo**	**mg/kg**	**ASLSH SCM**
13_C_FE	**FE**	**Extractable Fe(%) - Method recorded as C**	**%**	
13_NR_AL	**AL**	**Extractable Al(%) - Not recorded**	**%**	
13_NR_FE	**FE**	**Extractable Fe(%) - Not recorded**	**%**	
13A1_AL	**AL**	**Oxalate-extractable iron, aluminium and silicon**	**%**	**ASLSH Vol 3**
13A1_FE	**FE**	**Oxalate-extractable iron, aluminium and silicon**	**%**	**ASLSH Vol 3**
13A1_MN	**MN**	**Oxalate-extractable manganese**	**%**	
13A1_SI	**SI**	**Oxalate-extractable iron, aluminium and silicon**	**%**	**ASLSH Vol 3**
13B1_AL	**AL**	**Pyrophosphate-extractable iron and aluminium**	**%**	**ASLSH Vol 3**
13B1_FE	**FE**	**Pyrophosphate-extractable iron and aluminium**	**%**	**ASLSH Vol 3**
13C_C_FE	**FE**	**Extractable Fe(Free) % - Method recorded as C**	**%**	
13C1_AL	**AL**	**Citrate/dithionite-extractable iron and aluminium**	**%**	**ASLSH Vol 3**
13C1_FE	**FE**	**Citrate/dithionite-extractable iron and aluminium**	**%**	**ASLSH Vol 3**
13C1_FE203	**FE**	**Extractable Fe (Free) % - Citrate/Dithionite Extractable Fe2O3**	**%**	
13C1_MN	**MN**	**Citrate/dithionite-extractable manganese**	**%**	
13C1_SI	**SI**	**Citrate/dithionite-extractable silicon**	**%**	
13D1	**SI**	**Acid-extractable soil silicon - automated colour**	**mg/kg**	**ASLSH SCM**
13D2	**SI**	**Acid-extractable soil silicon - ICPAES**	**mg/kg**	**ASLSH SCM**
14A1	**SE**	**Saturation extract - filter suction**		**ASLSH Vol 3**
14A2	**SE**	**Saturation extract - automatic extractor**		**ASLSH Vol 3**
14A3	**SE**	**Saturation extract - centrifuge, closed system**		**ASLSH Vol 3**
14A4	**SE**	**Saturation extract - centrifuge, Gillman**		**ASLSH Vol 3**
14B1	**EC**	**Electrical conductivity/SE**	**dS/m**	**ASLSH Vol 3**
14C1	**PH/SE**	**pH/SE**		**ASLSH Vol 3**
14D1_BC	**BICARB/SE**	**Bicarbonate/SE and carbonate/SE - potentiometric titration**	**mequiv/L**	**ASLSH Vol 3**
14D1_C	**CARB/SE**	**Bicarbonate/SE and carbonate/SE - potentiometric titration**	**mequiv/L**	**ASLSH Vol 3**
14D2_BC	**BICARB/SE**	**Bicarbonate/SE and carbonate/SE - indicator method**	**mequiv/L**	**ASLSH Vol 3**
14D2_C	**CARB/SE**	**Bicarbonate/SE and carbonate/SE - indicator method**	**mequiv/L**	**ASLSH Vol 3**
14E1	**CHLORIDE/SE**	**Chloride/SE - potentiometric titration**	**mequiv/L**	**ASLSH Vol 3**
14E2	**CHLORIDE/SE**	**Chloride/SE - ion chromatography**	**mequiv/L**	**ASLSH Vol 3**
14E2a	**CHLORIDE/SE**	**Chloride/SE - ion chromatography (chemical suppression of eluent conductivity)**	**mequiv/L**	**ASLSH SCM**
14E2b	**CHLORIDE/SE**	**Chloride/SE - ion chromatography (single column with electronic suppression of eluent conductivity)**	**mequiv/L**	**ASLSH SCM**
14E3	**CHLORIDE/SE**	**Chloride/SE - ICPAES**	**mequiv/L**	**ASLSH Vol 3**
14F1	**SULFATE/SE**	**Sulfate/SE - ICPAES**	**mequiv/L**	**ASLSH Vol 3**
14F2	**SULFATE/SE**	**Sulfate/SE - turbidimetric**	**mequiv/L**	**ASLSH Vol 3**
14F3	**SULFATE/SE**	**Sulfate/SE - gravimetric**	**mequiv/L**	**ASLSH Vol 3**
14F4	**SULFATE/SE**	**Sulfate/SE - automated colour**	**mequiv/L**	**ASLSH Vol 3**
14F5	**SULFATE/SE**	**Sulfate/SE - ion chromatography**	**mequiv/L**	**ASLSH Vol 3**
14F5a	**SULFATE/SE**	**Sulfate/SE - ion chromatography (chemical suppression of eluent conductivity)**	**mequiv/L**	**ASLSH SCM**
14F5b	**SULFATE/SE**	**Sulfate/SE - ion chromatography (single column with electronic suppression of eluent conductivity)**	**mequiv/L**	**ASLSH SCM**
14G1	**FLUORIDE/SE**	**Fluoride/SE - specific ion electrode**	**mequiv/L**	**ASLSH Vol 3**
14G2	**FLUORIDE/SE**	**Fluoride/SE - ion chromatography**	**mequiv/L**	**ASLSH Vol 3**
14G2a	**FLUORIDE/SE**	**Fluoride/SE - ion chromatography (chemical suppression of eluent conductivity)**	**mequiv/L**	**ASLSH SCM**
14G2b	**FLUORIDE/SE**	**Fluoride/SE - ion chromatography (single column with electronic suppression of eluent conductivity)**	**mequiv/L**	**ASLSH SCM**
14H1_CA	**SOL_BASES_CA**	**Soluble bases/SE (Ca,Mg,K,Na)**	**mg/L**	**ASLSH Vol 3**
14H1_K	**SOL_BASES_K**	**Soluble bases/SE (Ca,Mg,K,Na)**	**mg/L**	**ASLSH Vol 3**
14H1_MG	**SOL_BASES_MG**	**Soluble bases/SE (Ca,Mg,K,Na)**	**mg/L**	**ASLSH Vol 3**
14H1_NA	**SOL_BASES_NA**	**Soluble bases/SE (Ca,Mg,K,Na)**	**mg/L**	**ASLSH Vol 3**
15_BASES	**ECEC**	**Sum of Ex. cations + Ex. acidity - Sum of basic exch. cations**	**meq/100g**	
15_HSK_CEC	**CEC**	**CEC - meq per 100g of soil - HOSK**	**meq/100g**	
15_NR	**ECEC**	**Sum of Ex. cations + Ex. acidity - Not recorded**	**meq/100g**	
15_NR_AL	**EXCH_ACIDITY**	**Aluminium Cation - meq per 100g of soil - Not recorded**	**meq/100g**	
15_NR_CA	**EXCH_BASES_CA**	**Exch. basic cations (Ca++) - meq per 100g of soil - Not recorded**	**meq/100g**	
15_NR_CEC	**CEC**	**CEC - meq per 100g of soil - Not recorded**	**meq/100g**	
15_NR_H	**EXCH_H**	**Hydrogen Cation - meq per 100g of soil - Not recorded**	**meq/100g**	
15_NR_K	**EXCH_BASES_K**	**Exch. basic cations (K++) - meq per 100g of soil - Not recorded**	**meq/100g**	
15_NR_MG	**EXCH_BASES_MG**	**Exch. basic cations (Mg++) - meq per 100g of soil - Not recorded**	**meq/100g**	
15_NR_NA	**EXCH_BASES_NA**	**Exch. basic cations (Na++) - meq per 100g of soil - Not recorded**	**meq/100g**	
15_UB_CA	**EXCH_BASES_CA**	**Exch. basic cations (Ca++) - meq per 100g of soil - 1M Ammonium Chloride Un-buffered**	**meq/100g**	
15_UB_CEC	**EXCH_BASES_CEC**	**CEC - meq per 100g of soil - 1M Ammonium Chloride Un-buffered**	**meq/100g**	
15_UB_K	**EXCH_BASES_K**	**Exch. basic cations (K++) - meq per 100g of soil - 1M Ammonium Chloride Un-buffered**	**meq/100g**	
15_UB_MG	**EXCH_BASES_MG**	**Exch. basic cations (Mg++) - meq per 100g of soil - 1M Ammonium Chloride Un-buffered**	**meq/100g**	
15_UB_NA	**EXCH_BASES_NA**	**Exch. basic cations (Na++) - meq per 100g of soil - 1M Ammonium Chloride Un-buffered**	**meq/100g**	
15A1_CA	**EXCH_BASES_CA**	**Exchangeable bases (Ca2+,Mg2+,Na+,K+) - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts**	**meq/100g**	**ASLSH Vol 3**
15A1_K	**EXCH_BASES_K**	**Exchangeable bases (Ca2+,Mg2+,Na+,K+) - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts**	**meq/100g**	**ASLSH Vol 3**
15A1_MG	**EXCH_BASES_MG**	**Exchangeable bases (Ca2+,Mg2+,Na+,K+) - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts**	**meq/100g**	**ASLSH Vol 3**
15A1_NA	**EXCH_BASES_NA**	**Exchangeable bases (Ca2+,Mg2+,Na+,K+) - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts**	**meq/100g**	**ASLSH Vol 3**
15A2_CA	**EXCH_BASES_CA**	**Exchangeable bases- 1M ammonium chloride at pH 7.0, pretreatment for soluble salts**	**meq/100g**	**ASLSH Vol 3**
15A2_CEC	**EXCH_BASES_CEC**	**Exchangeable bases- 1M ammonium chloride at pH 7.0, pretreatment for soluble salts**	**meq/100g**	**ASLSH Vol 3**

15A2_K	EXCH_BASES_K	Exchangeable bases- 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15A2_MG	EXCH_BASES_MG	Exchangeable bases- 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15A2_NA	EXCH_BASES_NA	Exchangeable bases- 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15A3_CA	EXCH_BASES_CA	Exchangeable bases- 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15A3_CEC	EXCH_BASES_CEC	Exchangeable bases- 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15A3_K	EXCH_BASES_K	Exchangeable bases- 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15A3_MG	EXCH_BASES_MG	Exchangeable bases- 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15A3_NA	EXCH_BASES_NA	Exchangeable bases- 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15B1_CA	EXCH_BASES_CA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B1_CEC	CEC	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B1_K	EXCH_BASES_K	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B1_MG	EXCH_BASES_MG	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B1_NA	EXCH_BASES_NA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B2_CA	EXCH_BASES_CA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B2_CEC	EXCH_BASES_CEC	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B2_K	EXCH_BASES_K	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B2_MG	EXCH_BASES_MG	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B2_NA	EXCH_BASES_NA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15B3_CA	EXCH_BASES_CA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15B3_CEC	EXCH_BASES_CEC	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15B3_K	EXCH_BASES_K	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15B3_MG	EXCH_BASES_MG	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15B3_NA	EXCH_BASES_NA	Exchangeable bases and CEC - 1M ammonium chloride at pH 7.0, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15C1_CA	EXCH_BASES_CA	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15C1_CEC	EXCH_BASES_CEC	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15C1_K	EXCH_BASES_K	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15C1_MG	EXCH_BASES_MG	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15C1_NA	EXCH_BASES_NA	Exchangeable bases and CEC - alcoholic 1M ammonium chloride at pH 8.5, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15C2_CA	EXCH_BASES_CA	Exchangeable divalent cations and CEC - MIR diffuse reflectance spectroscopy	meq/100g	ASLSH SCM
15C2_CEC	EXCH_BASES_CEC	Exchangeable divalent cations and CEC - MIR diffuse reflectance spectroscopy	meq/100g	ASLSH SCM
15C2_MG	EXCH_BASES_MG	Exchangeable divalent cations and CEC - MIR diffuse reflectance spectroscopy	meq/100g	ASLSH SCM
15D1_CA	EXCH_BASES_CA	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; manual leach	meq/100g	ASLSH Vol 3
15D1_CEC	EXCH_BASES_CEC	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; manual leach	meq/100g	ASLSH Vol 3
15D1_K	EXCH_BASES_K	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; manual leach	meq/100g	ASLSH Vol 3
15D1_MG	EXCH_BASES_MG	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; manual leach	meq/100g	ASLSH Vol 3
15D1_NA	EXCH_BASES_NA	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; manual leach	meq/100g	ASLSH Vol 3
15D2_CA	EXCH_BASES_CA	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; automatic	meq/100g	ASLSH Vol 3
15D2_CEC	EXCH_BASES_CEC	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; automatic	meq/100g	ASLSH Vol 3
15D2_K	EXCH_BASES_K	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; automatic	meq/100g	ASLSH Vol 3
15D2_MG	EXCH_BASES_MG	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; automatic	meq/100g	ASLSH Vol 3
15D2_NA	EXCH_BASES_NA	Exchangeable bases and CEC - 1M ammonium acetate at pH 7.0, pretreatment for soluble salts; automatic	meq/100g	ASLSH Vol 3
15D3_CA	EXCH_BASES_CA	Exchangeable bases - 1M ammonium acetate at pH 7.0, rapid method with no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15D3_K	EXCH_BASES_K	Exchangeable bases - 1M ammonium acetate at pH 7.0, rapid method with no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15D3_MG	EXCH_BASES_MG	Exchangeable bases - 1M ammonium acetate at pH 7.0, rapid method with no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15D3_NA	EXCH_BASES_NA	Exchangeable bases - 1M ammonium acetate at pH 7.0, rapid method with no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_AEC	EXCH_BASES_AEC	Exchangeable bases , CEC and AEC by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_AL	EXCH_AL	Exchangeable Al - by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_CA	EXCH_BASES_CA	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_CEC	EXCH_BASES_CEC	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_H	EXCH_H	Exchangeable H - by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_K	EXCH_BASES_K	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_MG	EXCH_BASES_MG	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E1_NA	EXCH_BASES_NA	Exchangeable bases, CEC and AEC by compulsive exchange, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E2_AEC	EXCH_BASES_AEC	Exchangeable bases, CEC and AEC by compulsive exchange, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E2_CA	EXCH_BASES_CA	Exchangeable bases, CEC and AEC by compulsive exchange, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E2_CEC	EXCH_BASES_CEC	Exchangeable bases, CEC and AEC by compulsive exchange, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E2_K	EXCH_BASES_K	Exchangeable bases, CEC and AEC by compulsive exchange, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E2_MG	EXCH_BASES_MG	Exchangeable bases, CEC and AEC by compulsive exchange, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E2_NA	EXCH_BASES_NA	Exchangeable bases, CEC and AEC by compulsive exchange, pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15E3_AEC	EXCH_BASES_AEC	Exchangeable bases, CEC and AEC by compulsive exchange, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15E3_CA	EXCH_BASES_CA	Exchangeable bases, CEC and AEC by compulsive exchange, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15E3_CEC	EXCH_BASES_CEC	Exchangeable bases, CEC and AEC by compulsive exchange, adjusted for soluble sodium	meq/100g	ASLSH Vol 3

15E3_K	EXCH_BASES_K	Exchangeable bases, CEC and AEC by compulsive exchange, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15E3_MG	EXCH_BASES_MG	Exchangeable bases, CEC and AEC by compulsive exchange, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15E3_NA	EXCH_BASES_NA	Exchangeable bases, CEC and AEC by compulsive exchange, adjusted for soluble sodium	meq/100g	ASLSH Vol 3
15F1_CA	EXCH_BASES_CA	Exchangeable bases by 0.01m (AgTU)+, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15F1_CEC	EXCH_BASES_CEC	Exchangeable bases by 0.01m (AgTU)+, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15F1_K	EXCH_BASES_K	Exchangeable bases by 0.01m (AgTU)+, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15F1_MG	EXCH_BASES_MG	Exchangeable bases by 0.01m (AgTU)+, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15F1_NA	EXCH_BASES_NA	Exchangeable bases by 0.01m (AgTU)+, no pretreatment for soluble salts	meq/100g	ASLSH Vol 3
15F2	EXCH_AL	Exchangeable aluminium by 0.01m (AgTU)+	meq/100g	ASLSH Vol 3
15F2_AL	EXCH_AL	Extractable Al (%) - Silver Thiorea	%	
15F3	CEC	CEC by 0.01m (AgTU)+	meq/100g	ASLSH Vol 3
15F4	EXCH_AL	Exchangeable aluminium by 1M ammonium acetate (pH 5.8). Abdullah and Riley (1966).	meq/100g	
15G_C	EXCH_ACIDITY	Exchange acidity (hydrogen and aluminium) - meq per 100g of soil - By 1M KCl exch. acidity by titration to pH 8.4	meq/100g	
15G_C_AL1	EXCH_AL	Exchangeable aluminium - meq per 100g of soil - Aluminium By difference of C and A or B	meq/100g	
15G_C_AL2	EXCH_AL	Exchangeable aluminium - meq per 100g of soil - Aluminium By KCl extraction and detremination By AAS	meq/100g	
15G_C_H1	EXCH_H	Exchangeable hydrogen - meq per 100g of soil - Hydrogen By back titration of A or B	meq/100g	
15G_C_H2	EXCH_H	Exchangeable hydrogen - meq per 100g of soil - Hydrogen By lime water, P-nitrophenol buffer at pH 7.0	meq/100g	
15G_H	EXCH_H	Hydrogen Cation - meq per 100g of soil - 1M KCl Exch. acidity By titration to pH 8.4	meq/100g	
15G1	EXCH_ACIDITY	Exchange acidity (hydrogen + aluminium) by 1M potassium chloride	meq/100g	ASLSH Vol 3
15G1_AL	EXCH_AL	Aluminium Cation - meq per 100g of soil - 1M KCl Exch. Acidity By titration to pH 8.0	meq/100g	
15G1_H	EXCH_H	Hydrogen Cation - meq per 100g of soil - 1M KCl Exch. Acidity By titration to pH 8.0	meq/100g	
15H1	EXCH_ACIDITY	Exchange acidity by TEA	meq/100g	ASLSH Vol 3
15I1	CEC	CEC measurement - distillation of ammonium ions	meq/100g	ASLSH Vol 3
15I2	CEC	CEC measurement - automated determination of ammonium ions	meq/100g	ASLSH Vol 3
15I3	CEC	CEC measurement - automated determination of ammonium and chloride ions	meq/100g	ASLSH Vol 3
15I4	CEC	CEC measurement - titration of ammonium and chloride ions	meq/100g	ASLSH Vol 3
15J_BASES	BASES	Sum of Bases	meq/100g	
15J_CEC	CEC	Sum of Cations	meq/100g	
15J_H	ECEC	Sum of Ex. cations + Ex. acidity - Sum of basic exch. cations and exch. (Hydrogen)	meq/100g	
15J1	CEC	Effective CEC	meq/100g	ASLSH Vol 3
15JG	CEC	Effective CEC using 15G1 for exchangeable acidity	meq/100g	
15JH	CEC	Effective CEC using 15H1 for exchangeable acidity	meq/100g	
15K1	CEC	CEC measurement - pH 8.2	meq/100g	ASLSH Vol 3
15L1	BSP	Base saturation percentage (BSP)	%	ASLSH Vol 3
15M1	CATION_RATIO	Cation ratio		ASLSH Vol 3
15N1	ESP	Exchangeable sodium percentage (ESP)	%	ASLSH Vol 3
15O1	AL_SAT	Percenatge aluminium saturation	%	ASLSH Vol 3
16A1	LIME_RATE	Calculated lime rate - from exchangeable aluminium	kg/ha 10cm	ASLSH Vol 3
16B1	LIME_RATE	Calculated lime rate - Cregan	kg/ha 10cm	ASLSH Vol 3
16C1	LIME_REQ	Lime requirement - Mehlich single buffer	t/ha 20cm	ASLSH Vol 3
16D1	LIME_REQ	Lime requirement - Dunn titration curves	t/ha 20cm	ASLSH Vol 3
17A1	TOTAL_ELEMENT	Total element - X-ray fluorescence	%	ASLSH SCM
17A2	TOTAL_ELEMENT	Total element - microwave assisted digestion, determination by AAS	%	ASLSH SCM
17B1	TOTAL_ELEMENT	Psuedo-total element - reverse aqua regia block digestion, determination by AAS	%	ASLSH SCM
17B2	TOTAL_ELEMENT	Psuedo-total element - reverse aqua regia digestion, determination by atomic spectrometry	%	ASLSH SCM
17C1	TOTAL_ELEMENT	Psuedo-total element - conventional aqua regia block digestion, determination by atomic spectrometry	%	ASLSH SCM
18A1	POTASSIUM	Bicarbonate-extractable potassium	mg/kg	ASLSH Vol 3
18B1	POTASSIUM	Hydrochloric acid - extractable potassium	mg/kg	ASLSH Vol 3
18B2	POTASSIUM	Sulfuric acid (10%) - extractable potassium	mg/kg	
18C1	POTASSIUM	Boiling 1 M nitric acid - extractable potassium	mg/kg	ASLSH SCM
18D1	CD	0.1 M calcium chloride - extractable Cadmium	mg/kg	ASLSH SCM
18E1	CD	0.01 M calcium chloride - extractable Cadmium	mg/kg	ASLSH SCM
18E2	POTASSIUM	Fluoride-extractable potassium (Bray 1-K) - AAS	mg/kg	
18F1	EXTRACTABLE_ELEMENTS	Mehlich 3 - extractable elements (P, Ca, Mg, Na, K, Fe, Cu, Mn, Zn, B, S, Al)	mg/kg	ASLSH SCM
18F2	POTASSIUM	Mehlich 3 - extractable potassium - colour finish	mg/kg	ASLSH SCM
18G1	POTASSIUM	Reserve soil K+ by copper-modified sodium tetraphenylboron extraction	mg/kg	ASLSH SCM
19_COL	CARBONATES	Carbonates - Collins Calcimeter	%	
19A1	CARBONATES	Carbonates - rapid titration	%	ASLSH Vol 3
19B_NR	CARBONATES	Calcium Carbonate (CaCO3) - Not recorded	%	
19B1	CARBONATES	Carbonates - manometric	%	ASLSH Vol 3
19B2	CARBONATES	Carbonates - transducer	%	ASLSH SCM
19C1	CARBONATES	Spot field test for the presence of soil carbonates with dilute HCl		ASLSH SCM
19C2	CARBONATES	Field test for soil carbonates with dilute HCl and effervescence class assessment		ASLSH SCM
2_LOI	LOSS_ON_IGNITION	Loss on Ignition (%)	%	ASLSH SCM (method 6G1 SCM)
20A1	SULFUR	Chromium reducible S	%	ASLSH SCM
20B1	TAA	SPOCAS acid trail - titratable actual acidity (TAA)	mol(H+)/t	ASLSH SCM
20C1_ANC	ANC	SPOCAS acid trail - titratable peroxide acidity (TPA) and Net Acid Neutralising Capacity (ANC)	mol(H+)/t	ASLSH SCM
20C1_TPA	TPA	SPOCAS acid trail - titratable peroxide acidity (TPA) and net acid neutralising capacity (ANC)	mol(H+)/t	ASLSH SCM
20D1_CA	CA	1 M KCl - extractable S, Ca, Mg	%	ASLSH SCM
20D1_MG	MG	1 M KCl - extractable S, Ca, Mg	%	ASLSH SCM
20D1_S	SULFUR	1 M KCl - extractable S, Ca, Mg	%	ASLSH SCM
20E1_CA	CA	1 M KCl - extractable S, Ca, Mg after peroxide oxidation	%	ASLSH SCM
20E1_MG	MG	1 M KCl - extractable S, Ca, Mg after peroxide oxidation	%	ASLSH SCM
20E1_S	SULFUR	1 M KCl - extractable S, Ca, Mg after peroxide oxidation	%	ASLSH SCM
20F1	SULFUR	Sulfur - 4 M HCl extraction, ICPAES	%	ASLSH SCM
20F2	SULFUR	Sulfur - 4 M HCl extraction, ion chromatography	%	ASLSH SCM
20G1	SULFUR	Peroxide residual acid soluble sulfur	%	ASLSH SCM
20H1	ANC	Acid neutralising capacity - acid reacted and back titration	%	ASLSH SCM
20I1	ANC	Acid neutralising capacity - from SPOCAS	%	ASLSH SCM
20J1_RQNC	ASS_HAZARD	Field approximation of ASS hazard	mol/m3	ASLSH SCM
20J1_TAA	ASS_HAZARD	Field approximation of ASS hazard	mol/m3	ASLSH SCM
20J1_TSA	ASS_HAZARD	Field approximation of ASS hazard	mol/m3	ASLSH SCM
20K1	ASS_PRESENCE	Quick field approximation of ASS presence and associated lime reqirement for drain spoil		ASLSH SCM
2A1	MOISTURE_CONTENT	Air-dry moisture content	%	ASLSH Vol 3
2B1	MOISTURE_CONTENT	As received moisture content	%	ASLSH Vol 3
2C1	MOISTURE_CONTENT	Moisture content - 10 mm tension	%	ASLSH Vol 3
2D1	MOISTURE_CONTENT	Moisture content - 1approximate saturation paste	%	ASLSH Vol 3
3_C_B	EC	Electrical conductivity or soluble salts - Total soluble salts %	%	
3_NR	EC	Electrical conductivity or soluble salts - Not recorded		
3A_C_2.5	EC	EC of 1:2.5 soil/water extract	dS/m	
3A_TSS	EC	Electrical conductivity or soluble salts - Total soluble salts %	%	
3A1	EC	EC of 1:5 soil/water extract	dS/m	ASLSH Vol 3
3B1	SOLUBLE_SALT	Estimation of soluble salt concentration	%	ASLSH SCM
3C1	IONIC_STRENGTH	Estimation of soil ionic strength	nM	ASLSH SCM
3D1	REDOX_POTENTIAL	Redox potential (Eh; field)	mV	ASLSH SCM
4_NR	PH	pH of soil - Not recorded		

4A_C_1	PH	pH of soil - pH of 1:1 soil/water suspension		(method 4A2 SCM)
4A_C_2.5	PH	pH of soil - pH of 1:2.5 soil/water suspension		(method 4A3 SCM)
4A1	PH	pH of 1:5 soil/water suspension		ASLSH Vol 3
4A2	PH	pH of 1:1 soil/water suspension		ASLSH SCM
4A3	PH	pH of 1:2.5 soil/water suspension		ASLSH SCM
4B_C_2.5	PH	pH of soil - pH of 1:2.5 Soil/0.1M CaCl2 suspension		
4B1	PH	pH of 1:5 soil/0.01M calcium chloride extract - direct (without stirring during measurement)		ASLSH Vol 3
4B2	PH	pH of 1:5 soil/0.01M calcium chloride extract - following Method 4A1 (without stirring during measurement)		ASLSH Vol 3
4B3	PH	pH of 1:5 soil/0.01M calcium chloride extract - direct (with stirring during measurement)		ASLSH SCM
4B4	PH	pH of 1:5 soil/0.01M calcium chloride extract - following Method 4A1 (with stirring during measurement)		ASLSH SCM
4B5	PH	pH of 1:5 soil/0.01M calcium chloride extract equivalent - MIR		ASLSH SCM
4C_C_1	PH	pH of 1:1 soil/1M potassium chloride suspension		
4C1	PH	pH of 1:5 soil/1M potassium chloride extract - direct (without stirring during measurement)		ASLSH Vol 3
4C2	PH	pH of 1:5 soil/1M potassium chloride extract - following Method 4A1 (without stirring during measurement)		ASLSH Vol 3
4C3	PH	pH of 1:5 soil/1M potassium chloride extract - direct (with stirring during measurement)		ASLSH SCM
4C4	PH	pH of 1:5 soil/1M potassium chloride extract - following Method 4A1 (with stirring during measurement)		ASLSH SCM
4D1	PH	pH of sodium fluoride suspension		ASLSH Vol 3
4E1	PH	pH of hydrogen peroxide extract		ASLSH Vol 3
4F1	PH_CHANGE	pH change		ASLSH Vol 3
4G1	PH	Field determination of pH		ASLSH SCM
5_C_B	CHLORIDE	Water soluble Chloride - Method recorded as B	mg/kg	
5_NR	CHLORIDE	Water soluble Chloride - Cl(%) - Not recordede	%	
503.01	DENSITY	Bulk density Intact small core	g/cm3	ASLSH Vol 5
503.02	DENSITY	Bulk density Vertic properties, extruded small core	g/cm3	ASLSH Vol 5
503.03	DENSITY	Bulk density Intact clod	g/cm3	ASLSH Vol 5
503.04	DENSITY	Bulk density Field excavation and water replacement	g/cm3	ASLSH Vol 5
503.05	PSA	Soil with coarse fragments: Volumetric coarse fragment content		ASLSH Vol 5
503.06	DENSITY	Soil with coarse fragments: Gross bulk density (fine earth and coarse fragments)	g/cm3	ASLSH Vol 5
503.07	PSA	Soil with coarse fragments: Volume of porous coarse fragments		ASLSH Vol 5
503.08	DENSITY	Soil with coarse fragments: Bulk density of fine earth	g/cm3	ASLSH Vol 5
503.09	POROSITY	Soil with coarse fragments: Total pore space		ASLSH Vol 5
504.01	MOISTURE_RELEASE	Soil water characteristic Suction plate or table		ASLSH Vol 5
504.02	MOISTURE_RELEASE	Soil water characteristic Pressure plate		ASLSH Vol 5
504.03	MOISTURE_RELEASE	Soil water characteristic Filter paper		ASLSH Vol 5
505.01	WATER_REPELLENCE	Water repellence		ASLSH Vol 5
507.01	HYDRAULIC_COND	Field saturated hydraulic conductivity Twin ring		ASLSH Vol 5
507.02	HYDRAULIC_COND	Field saturated hydraulic conductivity Single ring		
508.01	HYDRAULIC_COND	Field unsaturated hydraulic conductivity Tension infiltrometer		ASLSH Vol 5
509.01	HYDRAULIC_COND	Field saturated hydraulic conductivity Well permeameter		ASLSH Vol 5
510.01	HYDRAULIC_COND	Laboratory saturated hydraulic conductivity Constant potential, large cores		ASLSH Vol 5
510.02	HYDRAULIC_COND	Laboratory saturated hydraulic conductivity Constant potential, large cores, very permeable soil		ASLSH Vol 5
510.03	HYDRAULIC_COND	Laboratory saturated hydraulic conductivity Constant potential, large cores, very impermeable soil		ASLSH Vol 5
510.04	HYDRAULIC_COND	Laboratory unsaturated hydraulic conductivity Constant potential, large cores		ASLSH Vol 5
510.05	HYDRAULIC_COND	Laboratory unsaturated hydraulic conductivity Constant potential, small cores		ASLSH Vol 5
513.01	DISPERSION	Emerson Dispersion Test		ASLSH Vol 5
514.01	DISPERSION	Clay dispersion		ASLSH Vol 5
514.02	DISPERSION	Simplified clay dispersion		ASLSH Vol 5
514.03	DISPERSION	Dispersive potential		ASLSH Vol 5
514.04	DISPERSION	Mechanical dispersive potential		ASLSH Vol 5
515.01	DISPERSION	Dry aggregate distribution		ASLSH Vol 5
516.01	PSA	Non-dispersed particle size analysis		ASLSH Vol 5
517.01	PSA	Particle size analysis No pretreatments		ASLSH Vol 5
517.02	PSA	Particle size analysis Organic matter removed		ASLSH Vol 5
517.03	PSA	Particle size analysis Soluble salts removed		ASLSH Vol 5
517.04	PSA	Particle size analysis Organic matter and soluble salts removed		ASLSH Vol 5
517.05	PSA	Particle size analysis Fe/Al oxides removed		ASLSH Vol 5
517.06	PSA	Particle size analysis Fe/Al and organic matter removed		ASLSH Vol 5
517.07	PSA	Particle size analysis Fe/Al and soluble salts removed		ASLSH Vol 5
517.08	PSA	Particle size analysis Fe/Al, organic matter and soluble salts removed		ASLSH Vol 5
517.09	PSA	Particle size analysis Carbonate removed		ASLSH Vol 5
517.10	PSA	Particle size analysis Carbonate and organic matter removed		ASLSH Vol 5
517.11	PSA	Particle size analysis Carbonate and soluble salts removed		ASLSH Vol 5
517.12	PSA	Particle size analysis Carbonate and Fe/Al removed		ASLSH Vol 5
517.13	PSA	Particle size analysis Carbonate, organic matter and soluble salts removed		ASLSH Vol 5
517.14	PSA	Particle size analysis Carbonate, organic matter and Fe/Al removed		ASLSH Vol 5
517.15	PSA	Particle size analysis Carbonate, soluble salts and Fe/Al removed		ASLSH Vol 5
517.16	PSA	Particle size analysis Carbonate, organic matter, soluble salts and Fe/Al removed		ASLSH Vol 5
518.01	LINEAR_SHRINKAGE	Soil Shrinkage Linear shrinkage		ASLSH Vol 5
518.02	LINEAR_SHRINKAGE	Soil Shrinkage Coefficient of linear shrinkage		ASLSH Vol 5
518.03	LINEAR_SHRINKAGE	Soil Shrinkage Modified linear shrinkage		ASLSH Vol 5
519.01	LIQUID_LIMIT	Liquid limit Casagrande		ASLSH Vol 5
519.02	LIQUID_LIMIT	Liquid limit Drop cone		ASLSH Vol 5
519.03	PLASTIC_LIMIT	Plastic limit (AS 1289.3.2.1)		ASLSH Vol 5
520.01	SOIL_STRENGTH	Soil strength characteristic		ASLSH Vol 5
521.01	MOD_RUPTURE	Modulus of rupture		ASLSH Vol 5
5A_C_2.5	CHLORIDE	Chloride - 1:2.5 soil/water extract	mg/kg	
5A1	CHLORIDE	Chloride - 1:5 soil/water extract, potentiometric titration	mg/kg	ASLSH Vol 3
5A2	CHLORIDE	Chloride - 1:5 soil/water extract, automated colour	mg/kg	ASLSH Vol 3
5A2b	CHLORIDE	Chloride - 1:5 soil/water extract, FIA	mg/kg	ASLSH SCM
5A3a	CHLORIDE	Chloride - 1:5 soil/water extract, ion chromatography (chemical suppression of eluent conductivity)	mg/kg	ASLSH SCM
5A3b	CHLORIDE	Chloride - 1:5 soil/water extract, ion chromatography (single column with electronic suppression of eluent conductivity)	mg/kg	ASLSH SCM
5A4	CHLORIDE	Chloride - 1:5 soil/water extract, ICPAES	mg/kg	ASLSH SCM
6_DC	ORGANIC_CARBON	Organic carbon (%) - Dry combustion	%	
6A1	ORGANIC_CARBON	Organic carbon - Walkley and Black	%	ASLSH Vol 3
6A1_UC	ORGANIC_CARBON	Organic carbon (%) - Uncorrected Walkley and Black method	%	
6B1	ORGANIC_CARBON	Total organic carbon - Heanes wet oxidation	%	ASLSH Vol 3
6B2	ORGANIC_CARBON	Total organic carbon - high frequency induction furnace, volumetric	%	ASLSH Vol 3
6B2a	ORGANIC_CARBON	Total organic carbon - high frequency induction furnace, volumetric (no soil pretreatment)	%	ASLSH SCM
6B2b	ORGANIC_CARBON	Total organic carbon - high frequency induction furnace, infared/thermal (no soil pretreatment)	%	ASLSH SCM
6B3	ORGANIC_CARBON	Total organic carbon - high frequency induction furnace, infrared	%	ASLSH Vol 3
6B4	ORGANIC_CARBON	Total organic carbon - infared diffuse reflectance spectroscopy	%	ASLSH SCM
6B4a	ORGANIC_CARBON	Total organic carbon - NIR reflectance spectroscopy	%	ASLSH SCM
6B4b	ORGANIC_CARBON	Total organic carbon - MIR reflectance spectroscopy	%	ASLSH SCM
6C1	ORGANIC_CARBON	Particulate organic C (POC)	%	ASLSH SCM
6D1	ORGANIC_CARBON	Pyrophosphate-extractable carbon	%	ASLSH SCM
6E1	ORGANIC_CARBON	Potassium permanganate oxidisable C (PPOC)	%	ASLSH SCM

6F1	CARBON	Charcoal-C	%	ASLSH SCM
6G1	CARBON	Total organic matter, organic C and carbonate by loss-on-ignition	%	ASLSH SCM
6Z	ORGANIC_CARBON	Organic carbon (%) - Not recorded	%	
7_C_B	NITROGEN	Total Nitrogen - method description not recorded	%	
7_NR	NITROGEN	Total nitrogen (%) - Not recorded	%	
7A1	NITROGEN	Total nitrogen - semimicro Kjeldahl, steam distillation	%	ASLSH Vol 3
7A2	NITROGEN	Total nitrogen - semimicro Kjeldahl , automated colour	%	ASLSH Vol 3
7A2a	NITROGEN	Total nitrogen - semimicro Kjeldahl , automated colour, continuous segmented flow	%	ASLSH SCM
7A2b	NITROGEN	Total nitrogen - semimicro Kjeldahl , automated colour, FIA	%	ASLSH SCM
7A3	NITROGEN	Total nitrogen (where nitrate > 20 mg N kg-1) - steam distillation	%	ASLSH Vol 3
7A4	NITROGEN	Total nitrogen (where nitrate > 20 mg N kg-1) - automated colour	%	ASLSH Vol 3
7A5	NITROGEN	Total nitrogen - high frequency induction furnace, thermal conductivity	%	ASLSH Vol 3
7A6	NITROGEN	Total nitrogen - infared diffuse reflectance spectroscopy	%	ASLSH SCM
7A6a	NITROGEN	Total nitrogen - NIR reflectance spectroscopy	%	ASLSH SCM
7A6b	NITROGEN	Total nitrogen - MIR reflectance spectroscopy	%	ASLSH SCM
7B1	NITRATE	Water soluble nitrate - automated colour	mg/kg	ASLSH Vol 3
7B1a	NITRATE	Water soluble nitrate - automated colour, continuous segmented flow	mg/kg	ASLSH SCM
7B1b	NITRATE	Water soluble nitrate - automated colour, FIA	mg/kg	ASLSH SCM
7B2	NITRATE	Water soluble nitrate - ion chromatography	mg/kg	ASLSH SCM
7C_CASO4	NITRATE	CaSO4 extractable nitrate. O'Brien and Fiore (1962)	mg/kg	
7C1	MIN_NITROGEN	Mineral nitrogen with 2M KCl - steam distillation	mg/kg	ASLSH Vol 3
7C1a	AMMONIUM-N	Ammonium-N, in presence or absence of nitrite	mg/kg	ASLSH Vol 3
7C1b	(NITRATE+NITRITE)-N	(Nitrate+nitrite)-N, in presence of nitrite	mg/kg	ASLSH Vol 3
7C1c	(AMMONIUM+NO3+NO2)-N	(Ammonium+nitrate+nitrite)-N, in presence of nitrite	mg/kg	ASLSH Vol 3
7C1d	(AMMONIUM+NITRATE)-N	(Ammonium+nitrate)-N, in presence of nitrite	mg/kg	ASLSH Vol 3
7C1e	NITRATE-N	Nitrate-N, in presence of nitrite	mg/kg	ASLSH Vol 3
7C1f	NITRATE-N	Nitrate-N, in absence of nitrite	mg/kg	ASLSH Vol 3
7C1g	(AMMONIUM+NITRATE)-N	(Ammonium+nitrate)-N, in absence of nitrite	mg/kg	ASLSH Vol 3
7C1h	NITRITE-N	Nitrite-N	mg/kg	ASLSH Vol 3
7C2	MIN_NITROGEN	Mineral nitrogen with 2M KCl - automated colour	mg/kg	ASLSH Vol 3
7C2a	MIN_NITROGEN	Mineral nitrogen with 2M KCl - automated colour, continuous segmented flow	mg/kg	ASLSH SCM
7C2b	MIN_NITROGEN	Mineral nitrogen with 2M KCl - automated colour, FIA	mg/kg	ASLSH SCM
7D1a	MIN_NITROGEN	Potentially mineralisable N, hot KCl extraction - automated colour, continuous segmented flow	mg/kg	ASLSH SCM
7D1b	MIN_NITROGEN	Potentially mineralisable N, hot KCl extraction - automated colour, FIA	mg/kg	ASLSH SCM
7D1c	MIN_NITROGEN	Potentially mineralisable N, hot KCl extraction - NIR diffuse reflectance spectroscopy	mg/kg	ASLSH SCM
7D2a	MIN_NITROGEN	Potentially mineralisable N, anerobic incubation - automated colour, continuous segmented flow	mg/kg	ASLSH SCM
7D2b	MIN_NITROGEN	Potentially mineralisable N, anerobic incubation - automated colour, FIA	mg/kg	ASLSH SCM
8A1	C/N_RATIO	Total organic carbon/total nitrogen ratio		ASLSH Vol 3
8B1	C/N_RATIO	Organic carbon - Walkley and Black/total nitrogen ratio		ASLSH SCM
9_NR	PHOSPHORUS	Available P (mg/kg) - Not recorded	%	
9A_HCL	PHOSPHORUS	Total element - P(%) - By boiling HCl	%	
9A_HCLP2O5	PHOSPHORUS	Total element - P(%) - By boiling HCl(P2O5)	%	
9A_HF+	PHOSPHORUS	Total element - P(%) - HF/HCl04 Digest	%	
9A_NR	PHOSPHORUS	Total element - P(%) - Not recorded	%	
9A1	PHOSPHORUS	Total phosphorus - P(%) -X-ray fluorescence	%	ASLSH Vol 3
9A1_P2O5	PHOSPHORUS	Total element - P(%) - X-ray fluoresence (P2O5)	%	
9A2	PHOSPHORUS	Total phosphorus - P(%) - sodium carbonate fusion	%	ASLSH Vol 3
9A3	PHOSPHORUS	Total Phosphorus (ppm) - semimicro kjeldahl, automated colour	mg/kg	ASLSH Vol 3
9A3a	PHOSPHORUS	Total Phosphorus (ppm) - semimicro kjeldahl, automated colour, FIA/continuous segmented flow	mg/kg	ASLSH SCM
9B_9C	PHOSPHORUS	Available P (mg/kg) - Bicarbonate P - 0.5M NaHCO3 extractable	mg/kg	
9B1	PHOSPHORUS	Bicarbonate-extractable phosphorus (Cowell P) - manual colour	mg/kg	ASLSH Vol 3
9B2	PHOSPHORUS	Bicarbonate-extractable phosphorus (Cowell P) - automated colour, FIA/continuous segmented flow	mg/kg	ASLSH Vol 3
9B2_COL	PHOSPHORUS	Bicarbonate-extractable phosphorus - automated colour. Based on Colwell (1965). Method no longer recommended	mg/kg	
9BUFF_0	PHOSPHORUS	Buffering Capacity by 0.01M CaCl2, solution of 0 ppm phosphorus added (CSIRO Div of Soil Tech Mem 63/1972)		
9BUFF_0.5	PHOSPHORUS	Buffering Capacity by 0.01M CaCl2, solution of 0.5 ppm phosphorus added (CSIRO Div of Soil Tech Mem 63/1972)		
9BUFF_1	PHOSPHORUS	Buffering Capacity by 0.01M CaCl2, solution of 1 ppm phosphorus added (CSIRO Div of Soil Tech Mem 63/1972)		
9BUFF_2	PHOSPHORUS	Buffering Capacity by 0.01M CaCl2, solution of 2 ppm phosphorus added (CSIRO Div of Soil Tech Mem 63/1972)		
9BUFF_4	PHOSPHORUS	Buffering Capacity by 0.01M CaCl2, solution of 4 ppm phosphorus added (CSIRO Div of Soil Tech Mem 63/1972)		
9C1	PHOSPHORUS	Olsen-extractable phosphorus - manual colour	mg/kg	ASLSH Vol 3
9C2	PHOSPHORUS	Olsen-extractable phosphorus - automated colour	mg/kg	ASLSH Vol 3
9C2a	PHOSPHORUS	Olsen-extractable phosphorus - automated colour, continuous segmented flow	mg/kg	ASLSH SCM
9C2b	PHOSPHORUS	Olsen-extractable phosphorus - automated colour, FIA	mg/kg	ASLSH SCM
9D1	PHOSPHORUS	Lactate-extractable phosphorus - manual colour	mg/kg	ASLSH Vol 3
9D2	PHOSPHORUS	Lactate-extractable phosphorus - automated colour	mg/kg	
9E	PHOSPHORUS	Available P (mg/kg) - Bray P	mg/kg	ASLSH Vol 3
9E1	PHOSPHORUS	Fluoride-extractable phosphorus (Bray 1-P) - manual colour	mg/kg	ASLSH Vol 3
9E2	PHOSPHORUS	Fluoride-extractable phosphorus (Bray 1-P) - automated colour, FIA/continuous segmented flow	mg/kg	ASLSH Vol 3
9F1	PHOSPHORUS	Calcium chloride-extractable phosphorus - manual colour	ug/kg	ASLSH Vol 3
9F2	PHOSPHORUS	Calcium chloride-extractable phosphorus - automated colour, FIA/continuous segmented flow	ug/kg	ASLSH Vol 3
9G_BSES	PHOSPHORUS	Available P (mg/kg) - Acid P - 0.005M H2SO4 (BSES)	mg/kg	(method 9G1 Vol 3)
9G1	PHOSPHORUS	Acid-extractable phosphorus - manual colour	mg/kg	ASLSH Vol 3
9G2	PHOSPHORUS	Acid-extractable phosphorus - automated colour, FIA/continuous segmented flow	mg/kg	ASLSH Vol 3
9H_NR	PHOSPHORUS	Posphate retention % - Not recorded	%	
9H1	ANION_STORAGE	Anion storage capacity	%	ASLSH SCM
9I1	PHOSPHATE_SORPTION	Phosphate sorption index		ASLSH Vol 3
9I2a	P_BUFFER_INDEX	P buffer index - PBI (+ColP) - Murphy and Riley		ASLSH SCM
9I2b	P_BUFFER_INDEX	P buffer index - PBI (+ColP) - ICPAES		ASLSH SCM
9I2c	P_BUFFER_INDEX	P buffer index - PBI (+ColP) - Vanadate		ASLSH SCM
9I3a	P_BUFFER_INDEX	P buffer index - PBI (+OlsenP) - Murphy and Riley		ASLSH SCM
9I3b	P_BUFFER_INDEX	P buffer index - PBI (+OlsenP) - ICPAES		ASLSH SCM
9I3c	P_BUFFER_INDEX	P buffer index - PBI (+OlsenP) - Vanadate		ASLSH SCM
9I4a	P_BUFFER_INDEX	P buffer index - PBI (unadj) - Murphy and Riley		ASLSH SCM
9I4b	P_BUFFER_INDEX	P buffer index - PBI (unadj) - ICPAES		ASLSH SCM
9I4c	P_BUFFER_INDEX	P buffer index - PBI (unadj) - Vanadate		ASLSH SCM
9J1	PHOSPHATE_SORPTION	Phosphate sorption curve - manual colour		ASLSH Vol 3
9J2	PHOSPHATE_SORPTION	Phosphate sorption curve - automated colour, FIA/continuous segmented flow		ASLSH Vol 3
9K1a	PHOSPHORUS_RATIO	Mehlich 3-P saturation ratio - colorimetric estimate of P		ASLSH SCM
9K1b	PHOSPHORUS_RATIO	Mehlich 3-P saturation ratio - ICPAES estimate of P		ASLSH SCM
9K2	PHOSPHORUS_RATIO	Colwell-P/PBI(+ColP) ratio		ASLSH SCM
9M	PHOSPHORUS	Available P (mg/kg) - Mehlich P	mg/kg	
9R1	PHOSPHORUS	Resin extractable phosphorus - automated colour (CSIRO Div of Soil Tech Mem 63/1972)		
M1a	SAR	Sodium absorption ratio (SAR)		
MIN_EC	CLAY_MINERAL	Exchange Capacity - Minerology		
MIN_NR_K2O	CLAY_MINERAL	Kaolin minerals		
P10_CF_C	PSA	Clay (%) - Coventry and Fett pipette method	%	
P10_CF_CS	PSA	Coarse sand (%) - Coventry and Fett pipette method	%	
P10_CF_FS	PSA	Fine sand (%) - Coventry and Fett pipette method	%	

P10_CF_Z	PSA	Silt (%) - Coventry and Fett pipette method	%
P10_GRAV	PSA	Gravel (%)	%
P10_HYD_C	PSA	Clay (%) - Hydrometer Method	%
P10_HYD_CS	PSA	Coarse Sand (%) - Hydrometer Method	%
P10_HYD_FS	PSA	Fine Sand (%) - Hydrometer Method	%
P10_HYD_Z	PSA	Silt (%) - Hydrometer Method	%
P10_NR_C	PSA	Clay (%) - Not recorded	%
P10_NR_CS	PSA	Coarse sand (%) - Not recorded	%
P10_NR_FS	PSA	Fine sand (%) - Not recorded	%
P10_NR_S	PSA	Sand (%) - Not recorded	%
P10_NR_Z	PSA	Silt (%) - Not recorded	%
P10_PB_C	PSA	Clay (%) - Plummet balance	%
P10_PB_CS	PSA	Coarse sand (%) - Plummet balance	%
P10_PB_FS	PSA	Fine sand (%) - Plummet balance	%
P10_PB_Z	PSA	Silt (%) - Plummet balance	%
P10_PB1_C	PSA	Clay (%) - Plummet balance (Acid digestion pretreatment)	%
P10_PB1_CS	PSA	Coarse sand (%) - Plummet balance (Acid digestion pretreatment)	%
P10_PB1_FS	PSA	Fine sand (%) - Plummet balance (Acid digestion pretreatment)	%
P10_PB1_Z	PSA	Silt (%) - Plummet balance (Acid digestion pretreatment)	%
P10_S_0.20	PSA	0.20 micron (cumulative %) - Sedigraph	%
P10_S_0.48	PSA	0.48 micron (cumulative %) - Sedigraph	%
P10_S_1	PSA	1 micron (cumulative %) - Sedigraph	%
P10_S_1000	PSA	1000 micron (cumulative %) - Sedigraph	%
P10_S_125	PSA	125 micron (cumulative %) - Sedigraph	%
P10_S_15.6	PSA	15.6 micron (cumulative %) - Sedigraph	%
P10_S_2	PSA	2 micron (cumulative %) - Sedigraph	%
P10_S_20	PSA	20 micron (cumulative %) - Sedigraph	%
P10_S_2000	PSA	2000 micron (cumulative %) - Sedigraph	%
P10_S_250	PSA	250 micron (cumlative %) - Sedigraph	%
P10_S_3.9	PSA	3.9 micron (cumulative %) - Sedigraph	%
P10_S_31.2	PSA	31.2 micron (cumulative %) - Sedigraph	%
P10_S_500	PSA	500 micron (cumulative %) - Sedigraph	%
P10_S_53	PSA	53 micron (cumulative %) - Sedigraph	%
P10_S_63	PSA	63 micron (cumulative %) - Sedigraph	%
P10_S_7.8	PSA	7.8 micron (cumulative %) - Sedigraph	%
P10A1_C	PSA	Clay (%) - Pipette	%
P10A1_CS	PSA	Coarse sand (%) - Pipette	%
P10A1_FS	PSA	Fine sand (%) - Pipette	%
P10A1_Z	PSA	Silt (%) - Pipette	%
P3A_NR	DENSITY	Bulk density - Not recorded	
P3A1	DENSITY	Bulk density - g/cm3	g/cm3
P3A1_CLOD	DENSITY	Bulk density g/cm3 - Clods at 0.1 Bar moisture content (McIntyre & Stirk, 1954, Aust. J. Agric. Res. 5:291-6)	g/cm3
P3A2	POROSITY	Macro Porosity %	%
P3A3	POROSITY	Total Porosity %	%
P3A4	MOISTURE_RELEASE	Particle Density g/cm3	g/cm3
P3B_GV_001	MOISTURE_RELEASE	0.01 BAR Moisture g/g - Gravimetric using suction plate	
P3B_GV_003	MOISTURE_RELEASE	0.03 BAR Moisture g/g - Gravimetric using suction plate	
P3B_GV_005	MOISTURE_RELEASE	0.05 BAR Moisture g/g - Gravimetric using suction plate	
P3B_GV_01	MOISTURE_RELEASE	0.1 BAR Moisture g/g - Gravimetric using suction plate	
P3B_GV_03	MOISTURE_RELEASE	0.3 BAR Moisture g/g - Gravimetric using suction plate	
P3B_GV_05	MOISTURE_RELEASE	0.5 BAR Moisture g/g - Gravimetric using suction plate	
P3B_GV_1	MOISTURE_RELEASE	1 BAR Moisture g/g - Gravimetric using pressure plate	
P3B_GV_15	MOISTURE_RELEASE	15 BAR Moisture g/g - Gravimetric using pressure plate	
P3B_GV_5	MOISTURE_RELEASE	5 BAR Moisture g/g - Gravimetric using pressure plate	
P3B_GV_SAT	MOISTURE_RELEASE	Saturated Moisture g/g - Gravimetric using suction plate	
P3B_NR_001	MOISTURE_RELEASE	0.01 BAR Moisture % - Not recorded	%
P3B_NR_003	MOISTURE_RELEASE	0.03 BAR Moisture % - Not recorded	%
P3B_NR_005	MOISTURE_RELEASE	0.05 BAR Moisture % - Not recorded	%
P3B_NR_01	MOISTURE_RELEASE	0.1 BAR Moisture % - Not recorded	%
P3B_NR_03	MOISTURE_RELEASE	0.3 BAR Moisture % - Not recorded	%
P3B_NR_05	MOISTURE_RELEASE	0.5 BAR Moisture % - Not recorded	%
P3B_NR_1	MOISTURE_RELEASE	1 BAR Moisture % - Not recorded	%
P3B_NR_15	MOISTURE_RELEASE	15 BAR Moisture % - Not recorded	%
P3B_NR_5	MOISTURE_RELEASE	5 BAR Moisture % - Not recorded	%
P3B_NR_SAT	MOISTURE_RELEASE	Saturated Moisture % - Not recorded	%
P3B_VL_001	MOISTURE_RELEASE	0.01 BAR Moisture m3/m3 - Volumetric using suction plate	
P3B_VL_003	MOISTURE_RELEASE	0.03 BAR Moisture m3/m3 - Volumetric using suction plate	
P3B_VL_005	MOISTURE_RELEASE	0.05 BAR Moisture m3/m3 - Volumetric using suction plate	
P3B_VL_01	MOISTURE_RELEASE	0.1 BAR Moisture m3/m3 - Volumetric using suction plate	
P3B_VL_03	MOISTURE_RELEASE	0.3 BAR Moisture m3/m3 - Volumetric using suction plate	
P3B_VL_05	MOISTURE_RELEASE	0.5 BAR Moisture m3/m3 - Volumetric using suction plate	
P3B_VL_1	MOISTURE_RELEASE	1 BAR Moisture m3/m3 - Volumetric using pressure plate	
P3B_VL_15	MOISTURE_RELEASE	15 BAR Moisture m3/m3 - Volumetric using pressure plate	
P3B_VL_5	MOISTURE_RELEASE	5 BAR Moisture m3/m3 - Volumetric using pressure plate	
P3B_VL_SAT	MOISTURE_RELEASE	Saturated Moisture m3/m3 - Volumetric using suction plate	
P3B1GV_15	MOISTURE_RELEASE	15 BAR Moisture g/g - Gravimetric of ground sample (<2mm) using pressure plate	
P3B1VL_1	MOISTURE_RELEASE	1 BAR Moisture m3/m3 - Volumetric using <2mm sample on pressure plate	
P3B1VL_15	MOISTURE_RELEASE	15 BAR Moisture m3/m3 - Volumetric using <2mm sample on pressure plate	
P3B2GV_1	MOISTURE_RELEASE	1 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate	
P3B2GV_15	MOISTURE_RELEASE	15 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate	
P3B2GV_5	MOISTURE_RELEASE	5 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate	
P3B2VL_1	MOISTURE_RELEASE	1 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate	
P3B2VL_15	MOISTURE_RELEASE	15 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate	
P3B2VL_5	MOISTURE_RELEASE	5 BAR Moisture m3/m3 - Volumetric using disturbed sample on pressure plate	
P3B3VLa001	MOISTURE_RELEASE	0.01 BAR Moisture m3/m3 - Volumetric using undisturbed 76mm diameter core on suction plate	
P3B3VLa005	MOISTURE_RELEASE	0.05 BAR Moisture m3/m3 - Volumetric using undisturbed 76mm diameter core on suction plate	
P3B3VLa01	MOISTURE_RELEASE	0.1 BAR Moisture m3/m3 - Volumetric using undisturbed 76mm diameter core on suction plate	
P3B3VLa03	MOISTURE_RELEASE	0.3 BAR Moisture m3/m3 - Volumetric using undisturbed 76mm diameter core on suction plate	
P3B3VLa06	MOISTURE_RELEASE	0.6 BAR Moisture m3/m3 - Volumetric using undisturbed 76mm diameter core on suction plate	
P3B3VLaSAT	MOISTURE_RELEASE	Saturated Moisture m3/m3 - Volumetric using undisturbed 76mm diameter core on suction plate	
P3B3VLb001	MOISTURE_RELEASE	0.01 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLb003	MOISTURE_RELEASE	0.03 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLb005	MOISTURE_RELEASE	0.05 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLb01	MOISTURE_RELEASE	0.1 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLb03	MOISTURE_RELEASE	0.33 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm	

		height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLb05	MOISTURE_RELEASE	0.5 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLb06	MOISTURE_RELEASE	0.66 BAR Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLbSAT	MOISTURE_RELEASE	Saturated Moisture m3/m3 - Volumetric using undisturbed 73mm diameter and 75mm height core on suction plate taken from center of large core (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	
P3B3VLc001	MOISTURE_RELEASE	0.01 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLc003	MOISTURE_RELEASE	0.03 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLc005	MOISTURE_RELEASE	0.05 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLc01	MOISTURE_RELEASE	0.1 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLc03	MOISTURE_RELEASE	0.3 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLc06	MOISTURE_RELEASE	0.6 BAR Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLcSAT	MOISTURE_RELEASE	Saturated Moisture m3/m3 - Volumetric using undisturbed 98mm diameter core on suction plate	
P3B3VLd06	MOISTURE_RELEASE	0.6 BAR Moisture m3/m3 - Volumetric using undisturbed 48mm diameter and 15mm height core on pressure plate	
P3B3VLd1	MOISTURE_RELEASE	1 BAR Moisture m3/m3 - Volumetric using undisturbed 48mm diameter and 15mm height core on pressure plate	
P3B3VLd15	MOISTURE_RELEASE	15 BAR Moisture m3/m3 - Volumetric using undisturbed 48mm diameter and 15mm height core on pressure plate	
P3B3VLd3	MOISTURE_RELEASE	3 BAR Moisture m3/m3 - Volumetric using undisturbed 48mm diameter and 15mm height core on pressure plate	
P3B3VLd5	MOISTURE_RELEASE	5 BAR Moisture m3/m3 - Volumetric using undisturbed 48mm diameter and 15mm height core on pressure plate	
P3B3VLe004	MOISTURE_RELEASE	0.04 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on suction plate	
P3B3VLe01	MOISTURE_RELEASE	0.1 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on suction plate	
P3B3VLe03	MOISTURE_RELEASE	0.3 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on suction plate	
P3B3VLe06	MOISTURE_RELEASE	0.6 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on pressure plate	
P3B3VLe15	MOISTURE_RELEASE	15 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on pressure plate	
P3B3VLe2	MOISTURE_RELEASE	2 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on pressure plate	
P3B3VLe7	MOISTURE_RELEASE	7 BAR Moisture m3/m3 - Volumetric using undisturbed 60mm diameter and 34mm height core on pressure plate	
P3B4GV_01	MOISTURE_RELEASE	0.1 BAR Moisture g/g - Gravimetric of soil clods (Soil Survey Staff,1967)	
P3B4VL_005	MOISTURE_RELEASE	0.05 BAR Moisture m3/m3 - Volumetric of soil clods (Soil Survey Staff,1967)	
P3B5GV_01	MOISTURE_RELEASE	0.1 BAR Moisture g/g - Gravimetric of soil clods (CSIRO Div. Of Soils TM 25/66)	
P4_10_McK	HYDRAULIC_COND	Unsaturated Hydraulic Conductivity - 10mm potential (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	mm/hr
P4_100_McK	HYDRAULIC_COND	Unsaturated Hydraulic Conductivity - 100mm potential (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	mm/hr
P4_100DMcK	HYDRAULIC_COND	Unsaturated Hydraulic Conductivity - 100mm potential - Using disk permeameter with method CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996	mm/hr
P4_10DMcK	HYDRAULIC_COND	Unsaturated Hydraulic Conductivity - 10mm potential - Using disk permeameter with method CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996	mm/hr
P4_50_McK	HYDRAULIC_COND	Unsaturated Hydraulic Conductivity - 50mm potential (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	mm/hr
P4_50DMcK	HYDRAULIC_COND	Unsaturated Hydraulic Conductivity - 50mm potential - Using disk permeameter with method CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996	mm/hr
P4_sat	HYDRAULIC_COND	Saturated Hydraulic Conductivity	
P4_sat_For	HYDRAULIC_COND	Saturated Hydraulic Conductivity (Forrest et al, 1985)	mm/hr
P4_sat_LOV	HYDRAULIC_COND	Saturated Hydraulic Conductivity - Modified (no de-aired water) Loveday falling head method using 98mm diameter cores	mm/hr
P4_sat_McK	HYDRAULIC_COND	Saturated Hydraulic Conductivity (CSIRO Div of Soil, DR 125, McKenzie and Jacquier, 1996)	mm/hr
P4D1	HYDRAULIC_COND	Saturated Hydraulic Conductivity	
P5_COLE	COLE	Coefficient of Linear Extensibility (Grossman et al. 1968)	
P5_LS	LINEAR_SHRINKAGE	Linear shrinkage (Standards Association of Australia 1977. AS 1289 C4.1)	
P5_LS_MOD	LINEAR_SHRINKAGE	Modified linear shrinkage (McKenzie, Jacquier and Ringrose-Voase, AJSR, 1994, 32, 931-8)	
P6_LP	DISPERSION	Dispersion Index (Loveday and Pyle, 1973)	
PWS1-2mm	PSA	1000-2000 micron fraction (%) - Wet Sieving after chemical dispersion	%
PWS20-63	PSA	20-63 micron fraction (%) - Wet Sieving after chemical dispersion	%
PWS212-425	PSA	212-425 micron fraction (%) - Wet Sieving after chemical dispersion	%
PWS425-1mm	PSA	425-1000 micron fraction (%) - Wet Sieving after chemical dispersion	%
PWS63-212	PSA	63-212 micron fraction (%) - Wet Sieving after chemical dispersion	%
TE_CD_AL	TOTAL_ELEMENTS	Total Element Al - by Citrate/Dithionite Extraction	%
TE_CD_CA	TOTAL_ELEMENTS	Total Element Ca - by Citrate/Dithionite Extraction	%
TE_CD_MG	TOTAL_ELEMENTS	Total Element Mg - by Citrate/Dithionite Extraction	%
TE_CD_NA	TOTAL_ELEMENTS	Total Element Na - by Citrate/Dithionite Extraction	%
TE_CD_SI02	TOTAL_ELEMENTS	Total Element SiO2 - by Citrate/Dithionite Extraction	%
TE_CD_TI02	TOTAL_ELEMENTS	Total Element TiO2 - by Citrate/Dithionite Extraction	%
TE_HF+_MG	TOTAL_ELEMENTS	Total Element Mg - by HF/HClO4 Digest	%
TE_HF+AL	TOTAL_ELEMENTS	Total Element Al - by HF/HClO4 Digest	%
TE_HF+CA	TOTAL_ELEMENTS	Total Element Ca - by HF/HClO4 Digest	%
TE_HF+NA	TOTAL_ELEMENTS	Total Element Na - by HF/HClO4 Digest	%
TE_HF+SIO2	TOTAL_ELEMENTS	Total Element SiO2 - by HF/HClO4 Digest	%
TE_HF+TIO2	TOTAL_ELEMENTS	Total Element TiO2 - by HF/HClO4 Digest	%
TE_NR_AL	TOTAL_ELEMENTS	Total Element Al - Not recorded	%
TE_NR_CA	TOTAL_ELEMENTS	Total Element Ca - Not recorded	%
TE_NR_MG	TOTAL_ELEMENTS	Total Element Mg - Not recorded	%
TE_NR_NA	TOTAL_ELEMENTS	Total Element Na - Not recorded	%
TE_NR_SI02	TOTAL_ELEMENTS	Total Element SiO2 - Not recorded	%
TE_NR_TI02	TOTAL_ELEMENTS	Total Element TiO2 - Not recorded	%
TE_XRF_MG	TOTAL_ELEMENTS	Total Element Mg - By XRF	%
TE_XRFAL	TOTAL_ELEMENTS	Total Element Al - By XRF	%
TE_XRFCA	TOTAL_ELEMENTS	Total Element Ca - By XRF	%
TE_XRFNA	TOTAL_ELEMENTS	Total Element Na - By XRF	%
TE_XRFSI02	TOTAL_ELEMENTS	Total Element SiO2 - By XRF	%
TE_XRFTIO2	TOTAL_ELEMENTS	Total Element TiO2 - By XRF	%
XRD_C_Ab	CLAY_MINERAL	Amphibole - X-Ray Diffraction	
XRD_C_Ah	CLAY_MINERAL	Allophane - X-Ray Diffraction	
XRD_C_An	CLAY_MINERAL	Anatase - X-Ray Diffraction	
XRD_C_Ap	CLAY_MINERAL	Apatite - X-Ray Diffraction	
XRD_C_Arg	CLAY_MINERAL	Argonite - X-Ray Diffraction	
XRD_C_At	CLAY_MINERAL	Alunite - X-Ray Diffraction	

XRD_C_Bd	**CLAY_MINERAL**	**Beidellite - X-Ray Diffraction**
XRD_C_Bm	**CLAY_MINERAL**	**Boehmite - X-Ray Diffraction**
XRD_C_Bt	**CLAY_MINERAL**	**Biotite - X-Ray Diffraction**
XRD_C_Cb	**CLAY_MINERAL**	**Cristobalite - X-Ray Diffraction**
XRD_C_Ch	**CLAY_MINERAL**	**Chlorite - X-Ray Diffraction**
XRD_C_Ch2	**CLAY_MINERAL**	**Chloritized 2:1 minerals - X-Ray Diffraction**
XRD_C_Crn	**CLAY_MINERAL**	**Corondum - X-Ray Diffraction**
XRD_C_Ct	**CLAY_MINERAL**	**Calcite - X-Ray Diffraction**
XRD_C_Dr	**CLAY_MINERAL**	**Dravite - X-Ray Diffraction**
XRD_C_Dt	**CLAY_MINERAL**	**Dolomite - X-Ray Diffraction**
XRD_C_Fd	**CLAY_MINERAL**	**Feldspar - X-Ray Diffraction**
XRD_C_Fh	**CLAY_MINERAL**	**Ferrihydrite - X-Ray Diffraction**
XRD_C_Fl	**CLAY_MINERAL**	**Flourite - X-Ray Diffraction**
XRD_C_Fo	**CLAY_MINERAL**	**Feroxyhite - X-Ray Diffraction**
XRD_C_Gb	**CLAY_MINERAL**	**Gibbsite - X-Ray Diffraction**
XRD_C_Gl	**CLAY_MINERAL**	**Glauconite - X-Ray Diffraction**
XRD_C_Gt	**CLAY_MINERAL**	**Geothite - X-Ray Diffraction**
XRD_C_Gy	**CLAY_MINERAL**	**Gypsum - X-Ray Diffraction**
XRD_C_Hl	**CLAY_MINERAL**	**Halite - X-Ray Diffraction**
XRD_C_Hm	**CLAY_MINERAL**	**Hematite - X-Ray Diffraction**
XRD_C_Hn	**CLAY_MINERAL**	**Huntite - X-Ray Diffraction**
XRD_C_Ht0	**CLAY_MINERAL**	**Halloysite (10 A`) - X-Ray Diffraction**
XRD_C_Ht7	**CLAY_MINERAL**	**Halloysite (7 A`) - X-Ray Diffraction**
XRD_C_Ig	**CLAY_MINERAL**	**Imogolite - X-Ray Diffraction**
XRD_C_Il	**CLAY_MINERAL**	**Illite - X-Ray Diffraction**
XRD_C_Im	**CLAY_MINERAL**	**Ilmenite - X-Ray Diffraction**
XRD_C_Is	**CLAY_MINERAL**	**Interstratified clay minerals - X-Ray Diffraction**
XRD_C_Jr	**CLAY_MINERAL**	**Jarosite - X-Ray Diffraction**
XRD_C_K2O	**CLAY_MINERAL**	**K2O - X-Ray Diffraction or Clay Fraction (air dry)**
XRD_C_Ka	**CLAY_MINERAL**	**Kaolin - X-Ray Diffraction**
XRD_C_Kt	**CLAY_MINERAL**	**Kaolinite - X-Ray Diffraction**
XRD_C_Lp	**CLAY_MINERAL**	**Lepidocrosite - X-Ray Diffraction**
XRD_C_Mh	**CLAY_MINERAL**	**Meghemite - X-Ray Diffraction**
XRD_C_Mi	**CLAY_MINERAL**	**Mica - X-Ray Diffraction**
XRD_C_Mm	**CLAY_MINERAL**	**Montmorillonite - X-Ray Diffraction**
XRD_C_Ms	**CLAY_MINERAL**	**Magnesite - X-Ray Diffraction**
XRD_C_Mt	**CLAY_MINERAL**	**Magnetite - X-Ray Diffraction**
XRD_C_Mu	**CLAY_MINERAL**	**Muscovite - X-Ray Diffraction**
XRD_C_Mz	**CLAY_MINERAL**	**Monozite - X-Ray Diffraction**
XRD_C_Nt	**CLAY_MINERAL**	**Nontronite - X-Ray Diffraction**
XRD_C_Ol	**CLAY_MINERAL**	**Olivine - X-Ray Diffraction**
XRD_C_Or	**CLAY_MINERAL**	**Orthoclase - X-Ray Diffraction**
XRD_C_Pg	**CLAY_MINERAL**	**Plagioclase - X-Ray Diffraction**
XRD_C_Pk	**CLAY_MINERAL**	**Palygorskite - X-Ray Diffraction**
XRD_C_Pl	**CLAY_MINERAL**	**Plombogummite - X-Ray Diffraction**
XRD_C_Pp	**CLAY_MINERAL**	**Phlogopite - X-Ray Diffraction**
XRD_C_Ps	**CLAY_MINERAL**	**Pseudorutile - X-Ray Diffraction**
XRD_C_Px	**CLAY_MINERAL**	**Pyroxene - X-Ray Diffraction**
XRD_C_Py	**CLAY_MINERAL**	**Pyrophyllite - X-Ray Diffraction**
XRD_C_Qz	**CLAY_MINERAL**	**Quartz - X-Ray Diffraction**
XRD_C_Rt	**CLAY_MINERAL**	**Rutile - X-Ray Diffraction**
XRD_C_Sd	**CLAY_MINERAL**	**Siderite - X-Ray Diffraction**
XRD_C_Sl	**CLAY_MINERAL**	**Saponite - X-Ray Diffraction**
XRD_C_Sp	**CLAY_MINERAL**	**Saponite - X-Ray Diffraction**
XRD_C_Spn	**CLAY_MINERAL**	**Sphene - X-Ray Diffraction**
XRD_C_Srp	**CLAY_MINERAL**	**Serpentine - X-Ray Diffraction**
XRD_C_St	**CLAY_MINERAL**	**Smectite - X-Ray Diffraction**
XRD_C_Tc	**CLAY_MINERAL**	**Talc - Tourmaline - X-Ray Diffraction**
XRD_C_Tr	**CLAY_MINERAL**	**Tridymite - X-Ray Diffraction**
XRD_C_Un	**CLAY_MINERAL**	**Unidentified - X-Ray Diffraction**
XRD_C_Vm	**CLAY_MINERAL**	**Vermiculte - X-Ray Diffraction**
XRD_C_Zi	**CLAY_MINERAL**	**Zircon - X-Ray Diffraction**
XRD_C_Zt	**CLAY_MINERAL**	**Zeolite - X-Ray Diffraction**

Table SITE_ENVELOPE_CODES

Value	Description	Numeric value	Low value
999	CENTRE_LAT	Centre point lattitude of circular site	DD
999	CENTRE_LON	Centre point longitude of circular site	DD
999	DATUM	Datum of location	
999	RADIUS	Radius of circular site	m
999	V1_LAT	Lattitude of vertice 1	DD
999	V1_LON	Longitude of vertice 1	DD
999	V2_LAT	Lattitude of vertice 2	DD
999	V2_LON	Longitude of vertice 2	DD
999	V3_LAT	Lattitude of vertice 3	DD
999	V3_LON	Longitude of vertice 3	DD
999	V4_LAT	Lattitude of vertice 4	DD
999	V4_LON	Longitude of vertice 4	DD

APPENDIX D – UPDATES TO THE SITES DATABASE SCHEMA

Overview

The changes to the Sites database include the addition of 3 new tables, the redesign of 2 existing tables and creation of additional fields in 4 tables.

By adding new tables for land cover (LAND_COVER) and site location/geometry (SITE_ENVELOPE), extending the purpose of exiting fields and adding new fields (particularly to OBSERVATIONS) a database implementation for storing monitoring data has also been achieved.

The addition of parent site identifiers to the SITES table (with a self-referencing join) facilitates the storage of nested sites (unlimited sub-sites) as well as maintaining relationships between sites and transects in the case of roadside erosion survey data. By definition, the measurements at these sites (and subsites) will be temporally invariant. To complement this, the OBSERVATIONS table would be reserved for temporally variant measurements.

The temporal variation in land use and land management is catered for by distinct tables which can be populated by dates different from the date of soil observations.

The ARCHIVE_SAMPLE table has been added to facilitate the management of soil samples in the CSIRO National Soil Archive. The table has been added to SITES version 2.0 so that the relevant soil sample data is transferred when physical soil samples are shipped to the soil archive.

To support these changes additional entries to the CODES table have been required.

Major table changes

Major changes have been made to the SITES, LAND_USE and SITE_MNG_PRACS tables.

SITES
The addition of a parent site identifier that has a self-join to the site identifier is a significant concept shift. This allows nesting of sites (i.e. a grid cell within a $25m^2$ monitoring site or a point along a transect) with the same attributes recorded (if necessary) against both parent and child.

LAND_USE
The LAND_USE table is underutilised in many implementations of the Sites data model. This table is to be reworked to capture data according to the ALUM classification (BRS 2006). Land use is to be recorded as an event so a result a date stamp is now required for each entry.

SITE_MNG_PRACS
This table is also seldom used and will be repurposed to capture land management practice data from the LUMIS scheme (http://adl.brs.gov.au/data/warehouse/pe_abares99001770/ACLUMP_StatusReport_20101216.pdf) or Roadside Erosion Survey Manual (Forward 2009). Land management practice is to be recorded as an event and a result a date stamp is required for each entry.

Additional tables

Two new tables, SITE_ENVELOPE and LAND_COVER have been added to the SITES schema as child tables to the Sites table. A third table, ARCHIVE_SAMPLES has been added as a child of the SAMPLES table.

SITE_ENVELOPE
The purpose of this table is to capture the location and geometry of sites and sub-sites. Locations of vertices are recorded for polygons and transects, and for circular sites the centre and radius are recorded.

LAND_COVER
This table is used to record land cover for any of the current recording schemes e.g. FAO Land Cover Classification System version 2 (FAO 2005). Land cover is to be recorded as an event and as a result a date stamp is required for each entry.

ARCHIVE_SAMPLES
This table is used to record data on the physical soil sample held in the CSIRO National Soil Archive. Details include type of soil material (e.g. whole earth), amount of sample and the archive location of the stored sample.

Additions/changes to fields

The OBSERVATIONS table is subject to the greatest number of changes. Fields relating to the describing officer and date of observation have already been added by a number of state and territory agencies to their implementation of Sites. Others fields arising from the roadside erosion survey specifications (wind stability and ground cover) are also proposed inclusions. Additions to the SAMPLES table are also up for consideration.

OBSERVATIONS table

New field - o_date_desc
Provides a needed date stamp for temporal observations. The date stamp in the SITES table will also remain.

New field - o_desc_by
Records the name of the officer that describes the observation. The describing officer field will also remain in the SITES table.

New field - o_datum
Records the datum used for the location coordinates.

New field - o_nature
Aims to record the nature of the observation. Possible entries include composite, characterisation, single.

New Field - o_soil_disturb
Captures soil disturbance in accordance with the roadside erosion survey specification (Forward 2009).

New Field - o_grnd_cov_level_min
Captures estimated minumim level of flattened groundcover in accordance with the roadside erosion survey specification (Forward 2009). Please note that other ground cover schemes are currently in development (see ACLUMP publication - http://adl.brs.gov.au/data/warehouse/pe_abares99001799/Groundcover_mapping-workshop_proc_11.pdf).

New Field - o_grnd_cov_level_max
Captures estimated maximum level of flattened groundcover in accordance with the roadside erosion survey specification (Forward 2009). Please note that other ground cover schemes are currently in development (see ACLUMP publication - http://adl.brs.gov.au/data/warehouse/pe_abares99001799/Groundcover_mapping-workshop_proc_11.pdf).

New Field - o_grnd_cov_height_min
Captures dominant minimum height of groundcover in accordance with the roadside erosion survey specification (Forward 2009).

New Field - o_grnd_cov_height_max
Captures dominant maximum height of groundcover in accordance with the roadside erosion survey specification (Forward 2009).

New Field - o_wind_stability
Captures wind erosion stability in accordance with the roadside erosion survey specification (Forward 2009).

New Field - o_wind_visibility
Captures visibility due to wind erosion in accordance with the roadside erosion survey specification (Forward 2009).

New Field - o_date_transfer
Capture the date the observation was transferred to the national inventory.

SAMPLES table

New field - samp_contrib
Used to record the number of contributing samples for bulked samples.

New field - samp_size
Used to record the size of the final sample size (5 classes of sample size).

New field – samp_notes
Captures extra information (free text) on the nature of the samples.

SITES table

Expand scope of field - s_type
Add additional codes relating to roadside erosion survey and soil property monitoring

LAB_RESULTS table

New field - labr_date
Used to record the date the analysis was undertaken.

Contact Us
Phone: 1300 363 400
+61 3 9545 2176
Email: enquiries@csiro.au
Web: www.csiro.au/flagships

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