DECOMMISIONING MANAGEMENT PLAN

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DEFINATIONS AND ABBREVIATIONS

Abbreviation	Description
AC	Alternating Current
CCTV	Closed Circuit Television
HV	High Voltage
PV	Photovoltaic
RAM	Rapid conservation Assessment Method

Table 1: Abbreviations

1 INTRODUCTION

1.1 PURPOSE

This Decommissioning Plan (Plan) provides a description of the decommissioning and restoration of the proposed Greentech Solar Project No.3 (Project). The Project is a solar PV generation facility consisting of the installation of the perimeter fencing; solar arrays and associated trackers, foundations, and steel piles; access and internal roads; and an electrical collection system.

This Plan includes an overview of the primary decommissioning Project activities; dismantling and removal of facilities, and restoration of the land. Summary statistics are provided for the Project's solar array design and battery containers.

The expected lifetime of the solar farm is 31 years. In the event that the modules are not retrofitted, or at the end of the Project's useful life, the panels and associated components will be decommissioned and removed from the Project site.

Components of the solar facility that have resale value may be sold in the wholesale market. Components with no resale value will be salvaged and sold as scrap for recycling or disposed of at an approved offsite licensed solid waste disposal facility (landfill). Decommissioning activities will include the removal of the arrays and associated components as listed in Subsection 1.3 and described in Section 2.

1.2 OBJECTIVES

The objectives of this Plan are to describe how project infrastructure will be removed after operations cease, and to establish the methodology by which the post-development soil conditions at the project site are capable of being returned to agricultural activities consistent with the present use. This plan outlines the following aspects:

- Identifies the final agricultural land use following cessation of the Solar PV Generation use;
- Describes the development process and how it will be integrated with rehabilitation;
- Identifies a benchmark analogue site that is used to determine realistic performance criteria for rehabilitation efforts;
- Adopts performance criteria for rehabilitation efforts;
- Includes an Action Plan, with timing for remedial works such as structure removal, removal of imported materials such as gravel, any soil erosion, drainage, and vegetation cover work, along with weed and pest animal control activities required to meet the adopted rehabilitation performance criteria;
- Outlines a program for monitoring rehabilitation success using appropriate indicators; and
- Includes an end-use Property Management Map, depicting the contents of the Plan.

1.3 SOLAR FARM COMPONENTS

The main components of the solar farm include

- The solar panel and mounting system
- Foundations and steel piles
- Central inverter and HV kiosk containers
- Electrical cabling and conduits
- Perimeter fencing, site access and internal roads
- CCTV poles and cameras
- Battery energy storage system (BESS) containers

1.4 PROJECT LOCATION

The proposal is for the development of a micro solar farm on part of Lot 5 on DP1210276 Tabbita Lane, Goolgowi. The site is zoned RU1 Primary Production and is currently utilised for agricultural purposes. Construction of the solar farm would be undertaken over a 6-month period with the site to operate over a 31-year lease period from the beginning of construction. The solar energy facility can be accessed using Tabbita Lane via Kidman Way as shown in Figure 1 below.

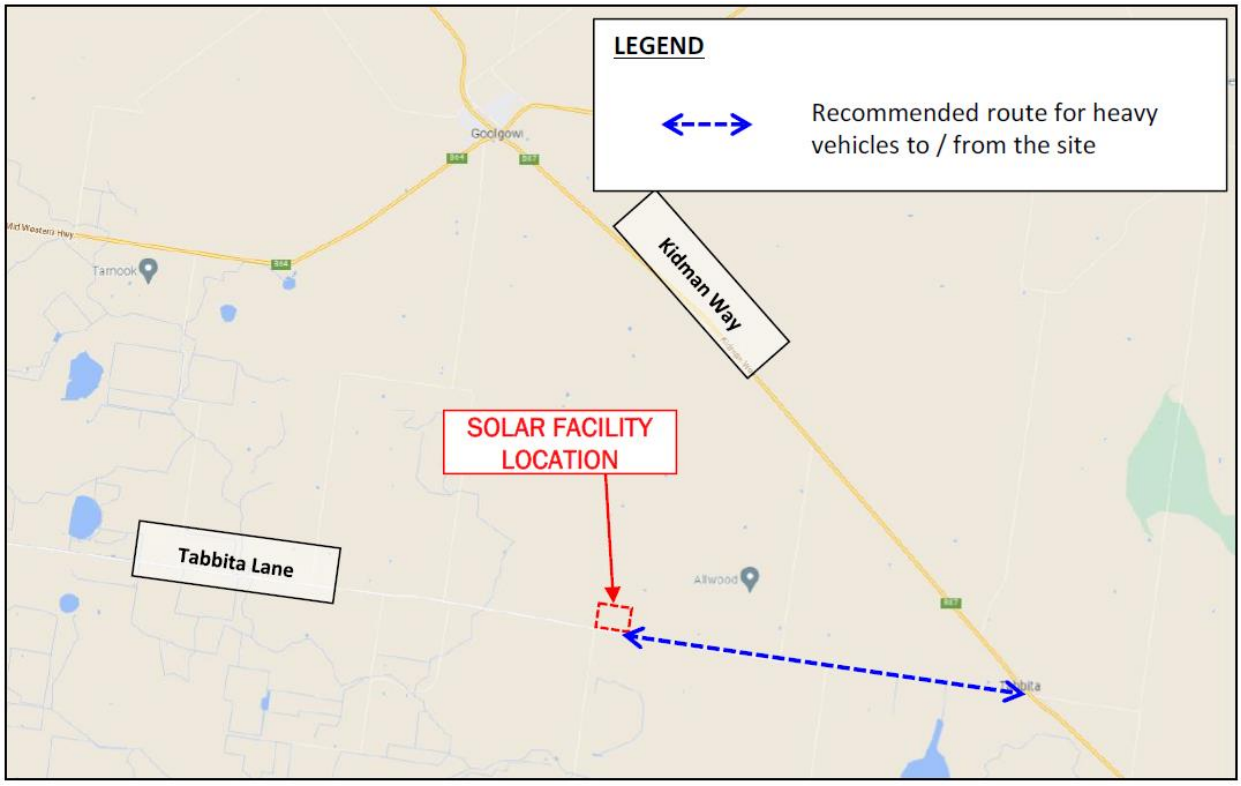


Figure 1 Locality Plan

The proposed development would be located within the southeastern corner of Lot 5 DP1210276 (subject lot).

Figure 2 Tile boundary of Lot 5, DP1210276 – Source: ePlanning Spatial Viewer

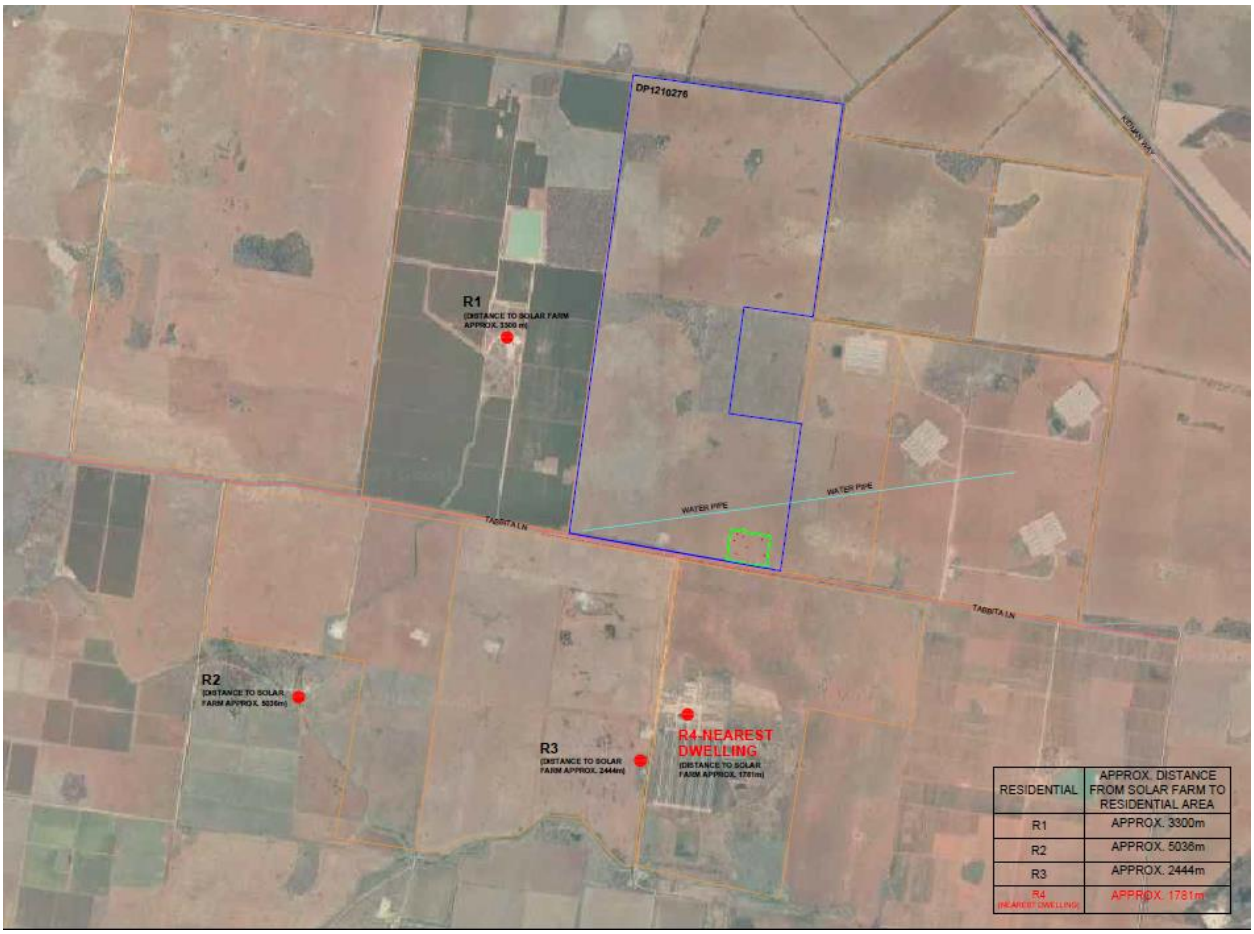


Figure 3 Proposal location (green) relative to tile boundary (blue), and summary of nearby residences

The subject site is surrounded by large farming lots, with sparsely located farm dwellings (see Figure 3 above). The closest of these receptors is approximately 1.78km south of the proposed facility, and therefore is unlikely to be affected by the proposal during construction and operation phases.

1.5 PROJECT DESCRIPTION

The Project would include the installation of solar panels mounted on single axis tracking systems. The solar panels would be supported by ancillary aspects including a central inverter; an HV kiosk consisting of HV switchgear; BESS containers; electrical poles; hardstand vehicle areas and site fencing and landscaping. The central inverter would act as the primary conduit for electricity from the facility prior to it being transferred via overhead powerlines to the nearby transformer.

The solar farm would have a 31 year lifespan from the beginning of construction with the project to be decommissioned and the site rehabilitated at the conclusion of its use which would allow the development footprint area to be re utilised for agricultural undertakings as appropriate.

The solar farm would be remotely monitored allowing for constant surveillance without the requirement of ongoing staff, however, a maximum of two staff would attend the site a maximum of three times per

month for general inspections and maintenance of equipment or landscaping or for security inspection purposes.

1.6 DECOMMISSIONING SEQUENCE

Decommissioning activities will begin within six months of the Project ceasing operation and are anticipated to be completed in twelve months. Monitoring and site restoration may extend beyond this period to ensure successful revegetation and rehabilitation. The anticipated sequence of decommissioning and removal are described below; however, an overlap of activities is expected.

- Reinforce access roads, if needed, and prepare the site for component removal
- Install temporary fencing and best management practices (BMPs) to protect sensitive resources
- De-energize solar arrays and battery containers
- Remove panels and dismantle racking for recovery/disposal
- Remove structural foundations.
- Remove inverters and transformers
- Remove the battery containers
- Remove underground electrical cables and conduits
- Remove access and internal roads (if requested by landowner) and grade site
- De-compact subsoils (if required), restore and revegetate (if desired by landowner at the time of decommissioning) disturbed land to pre-construction conditions to the extent practicable

1.7 EXPECTED TIMELINE FOR DECOMMISSIONING

The figure below is a tentative timeline for the decommissioning phase.

	Task	Task Name	Duration
1		**Decommisioning Sequence and Timeline**	**66.5 days**
2		Reinforce access roads, if needed, and prepare site for component removal	2 wks
3		Install temporary fencing	1 wk
4		De-energize solar arrays and battery cubicles	0.3 wks
5		Remove panels and dismantle racking for recovery / disposal	3 wks
6		Remove structural foundations a minimum of 1.2m below the surface.	2 wks
7		Remove inverters and transformers	1 wk
8		Remove the battery cubicles	1 wk
9		Remove electrical cables and conduits less than 0.6m below the surface	2 wks
10		Remove access and internal roads (if requested by landowner) and grade site	1 wk
11		De-compact subsoils	1 wk
12		Restore and revegetate	1 wk

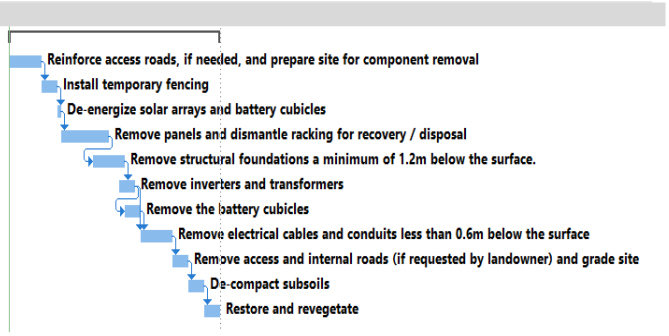


Figure 4 - Program for Decommissioning

2 PROJECT COMPONENTS AND DECOMMISSIONING ACTIVITIES

The solar facility components and decommissioning activities necessary to restore the Project area, as near as practicable, to pre-construction conditions are described within this section.

Note: The proposed quantity and specifications of the major components of the Project are tentative and will be finalised during the detailed design stage.

2.1 OVERVIEW OF SOLAR FACILITY SYSTEM

The Project anticipates utilizing approximately 550 Watt modules or other similar solar modules, with a total nameplate generating capacity of up to 4.95 MWac.

Foundations and steel piles up to approximately 1.2 m below the soil surface will be removed. Components and cabling deeper than approximately 0.6 m below the surface will be left in place, except where specific contracts with landowners require removal to a greater depth. Access roads may be left in place if requested and/or agreed to by the landowner. Public roads damaged or modified during the decommissioning and reclamation process will be repaired to pre-existing conditions upon completion of the decommissioning phase.

Estimated quantities of materials to be removed and salvaged or disposed of are included in this section. Most of the materials described have salvage value; although, some components will likely have none at the time of decommissioning.

All recyclable materials, salvaged and non-salvage, will be recycled to the furthest extent possible. All other non-recyclable waste materials will be disposed of in accordance with state and federal law in an approved licensed solid waste facility. Solar panels will have value in a resale market, decreasing over the life of the Project. For purposes of this report, salvage values only, not resale, were considered, as this is the more conservative estimate strategy.

Primary Components of Solar Farm to be Decommissioned Component Quantity Unit of Measure

Components	Quantity	Unit
Solar Modules	Approx. 16,000	pcs
Tracking System	Approx. 190	pcs
Steel Piles	Approx. 3,000	pcs
Central Inverter	Approx. 1	Container
Electrical Cables and Conduits	Approx. 72,000	m
Perimeter Fencing	Approx. 1,800	m
Access Road	Approx. 120	m
Battery Containers	Approx. 4	Container
CCTV cameras and poles	Approx. 2 cameras & 2 poles	pcs

Table 2 Quantity of Component

2.2 SOLAR MODULES

The Project is considering the 550 Watt modules or a similar model for the Project. Each module assembly (with frame) has a total weight of approximately 33 Kgs. The modules are approximately 2.3 meters by 1.1 meters in size and are mainly comprised of non-metallic materials such as silicon, mono- or polycrystalline silicon, glass, composite film, plastic, and epoxies, with an anodised aluminium frame.

At the time of decommissioning, module components in working condition may be refurbished and sold in a secondary market yielding greater revenue than selling as salvage material.

2.3 TRACKING SYSTEM AND SUPPORT

The solar arrays will be deactivated from the surrounding electrical system and made safe for disassembly. Liquid wastes, including oils and hydraulic fluids, will be collected and properly disposed of or recycled according to regulations current at the time of decommissioning. Electronic components and internal electrical wiring will be removed and salvaged. The steel piles will be pulled out or cut and removed to a minimum depth of 1.2m below the ground surface.

The steel foundations and steel components from the tracking system can be salvaged and sold.

2.4 CENTRAL INVERTER STATION

The central inverter station will be de-energised, cut from its steel foundations and removed from the site. Depending on the condition, the equipment may be sold for refurbishment and re-use. If not re-used, they will be salvaged or disposed of at an approved solid waste management facility. Oils, lubricants, and hazardous materials will be collected and disposed of at a licensed facility.

2.5 ELECTRICAL CABLING AND CONDUITS

The Project's underground electrical collection system will be installed at a depth of 0.6m or greater. Cabling will be removed and salvaged, while cable greater than 0.6m in depth will remain in place, except where specific contracts with landowners require removal to a greater depth. The system will not interfere with future farming activities because of the depth. If at the time of decommissioning, the salvage value of the underground cable exceeds the cost of extraction and restoration, the cables may be removed and salvaged.

2.6 HV KIOSK

The Project will include an HV kiosk as shown in the Site Plan in APPENDIX A. The HV kiosk footprint will be approximately 5 meters by 5 meters and will contain switches, breakers, buses, SCADA module, structural platform and the associated footings. The HV kiosk will service BESS and the solar farm.

2.7 CCTV, PERIMETER FENCING, SITE ACCESS AND INTERNAL ROADS

The Project will include a security fence around the perimeter of the site. An access road will allow access to the solar facility. An access road will be located within the site to allow access to the car park and offloading zone. The CCTV poles and cameras will be removed and the material can be salvaged and sold. The access road will be approximately 4 meters wide and total approximately 120 linear meters.

2.8 BATTERY CONTAINERS

The battery containers will be deactivated from the surrounding electrical system and made safe for disassembly. Liquid wastes, including oils and hydraulic fluids, will be collected and properly disposed of or recycled according to regulations current at the time of decommissioning. Electronic components and internal electrical wiring will be removed and salvaged.

3 RAPID ASSESSMENT METHOD

3.1 REQUIREMENT

A rapid assessment method to enable the rapid assessment of land agricultural condition that is based on scientific principles. The method shall identify a suite of indicators including those recommended by the Department of Primary Industries to identify the current condition of the development site. The indicators should be measurable to enable a rapid assessment and comparison of pre and post development site conditions to quantify and determine the sites suitability and productivity for agriculture. The indicators selected should include measures that are commonly used to assess the condition and productivity of land and water resources for agricultural production and include both chemical and physical properties. Measures could include hydraulic conductivity, compaction rates, cation exchange capacity, exchangeable sodium percentage, salinity, permeability and surface and ground water quality as an example. The pre development condition of the site for productive agriculture should be identified using the selected rapid appraisal method.

3.2 PURPOSE

The RAM is a relatively simple method of assessment that uses a three-part scoring system using conservation status and landscape context measures from existing spatial and data layers, and vegetation condition that is assessed and scored in the field. Other important information (non-scored) relevant to land management e.g. vegetation and habitat features and threats and disturbances are also recorded in the field.

RAM is a method to broadly categorise the vegetation condition of areas of native habitat. This will help basic management decisions based on the vegetation condition identified at the site.

3.3 IMPLEMENTATION

The rapid assessment method will be implemented pre development and post development of the project site to assess the conditions to quantify and determine the site's suitability and productivity for agriculture.

The indicators that will be used in the pre development and post development stages are:

- **Conservation status scoring** for the rarity of the vegetation community present and hence its priority for protection

- **Landscape context** considers the significance of the reserve in relation to the surrounding landscape attributes which include:
    - The proportion of Mitchell landscape remaining
      Mitchell landscapes are used in NSW as a method of determining the current extent of native vegetation and are based on areas of land with similar geomorphology, soil and broad vegetation type.
    - The vegetation patch such as the size and shape of a patch
    - Connectivity to other patches

    - The proportion of native vegetation in the neighbouring area
- **Vegetation Condition**
  The vegetation condition assessment is the field assessment component of the RAM and involves the application of a standard method to score a range of vegetation elements characteristic of the site.

The guide and method to record the RAM information can be found in the training package and guidelines from Appendix B.

4 WASTE MANAGEMENT DURING DECOMISSIONING

During decommissioning, all waste will be collected and stored in the appropriately segregated and labelled waste containers. There will be three waste bins located in the management hub area, one of them will be general waste bin, recycle waste bin and the third one would be liquid waste bin. The bins will be checked and logged every day by the responsible personnel. Once the bins are about to get full, all the waste be transported by a certified and licensed contractor and taken to a landfill/recycling facility in accordance with all local, State, and national regulations.

5 LAND USE AND ENVIRONMENT

5.1 SOILS AND FARMLAND

The proposed solar facility is predominantly located on land currently utilised for agricultural purposes. Areas of the Project that were previously utilised for agricultural purposes will be restored to their preconstruction condition and land use. Areas will be revegetated in consultation with the current landowner and in compliance with regulations in place at the time of decommissioning.

5.2 RESTORATION AND REVEGETATION

Project areas that have been excavated and backfilled will be re-graded. Disturbed areas will be seeded with appropriate vegetation or returned to crop production. Work will be completed to comply with the conditions agreed upon by the Council or as directed by other national, state and local regulations in effect at the time of decommissioning.

5.3 MAJOR EQUIPMENT REQUIRED FOR DECOMMISSIONING

The activities involved in decommissioning the Project include removal of the above ground components of the Project: solar modules, tracking system, foundations and piles (pulled out or cut and removed to a minimum depth below the surface; see Section 2.3 for details), inverters, transformers, access roads, perimeter fencing, Project substation, battery containers, and electrical cabling and conduits (to a minimum depth below the surface; see Section 2.5 for details).

Restoration activities may include de-compaction of subsoils; and re-grading project areas that have been excavated or backfilled. Equipment required for the decommissioning activities may include excavators, backhoes, bulldozers, front-end loaders, deep rippers, water trucks, disc ploughs and tractors to restore subgrade conditions and ancillary equipment.

6 APPENDICES

6.1 APPENDIX A – SITE LAYOUT PLAN

Below is the proposed site layout plan. The final plan will be available during detailed design stage.

North

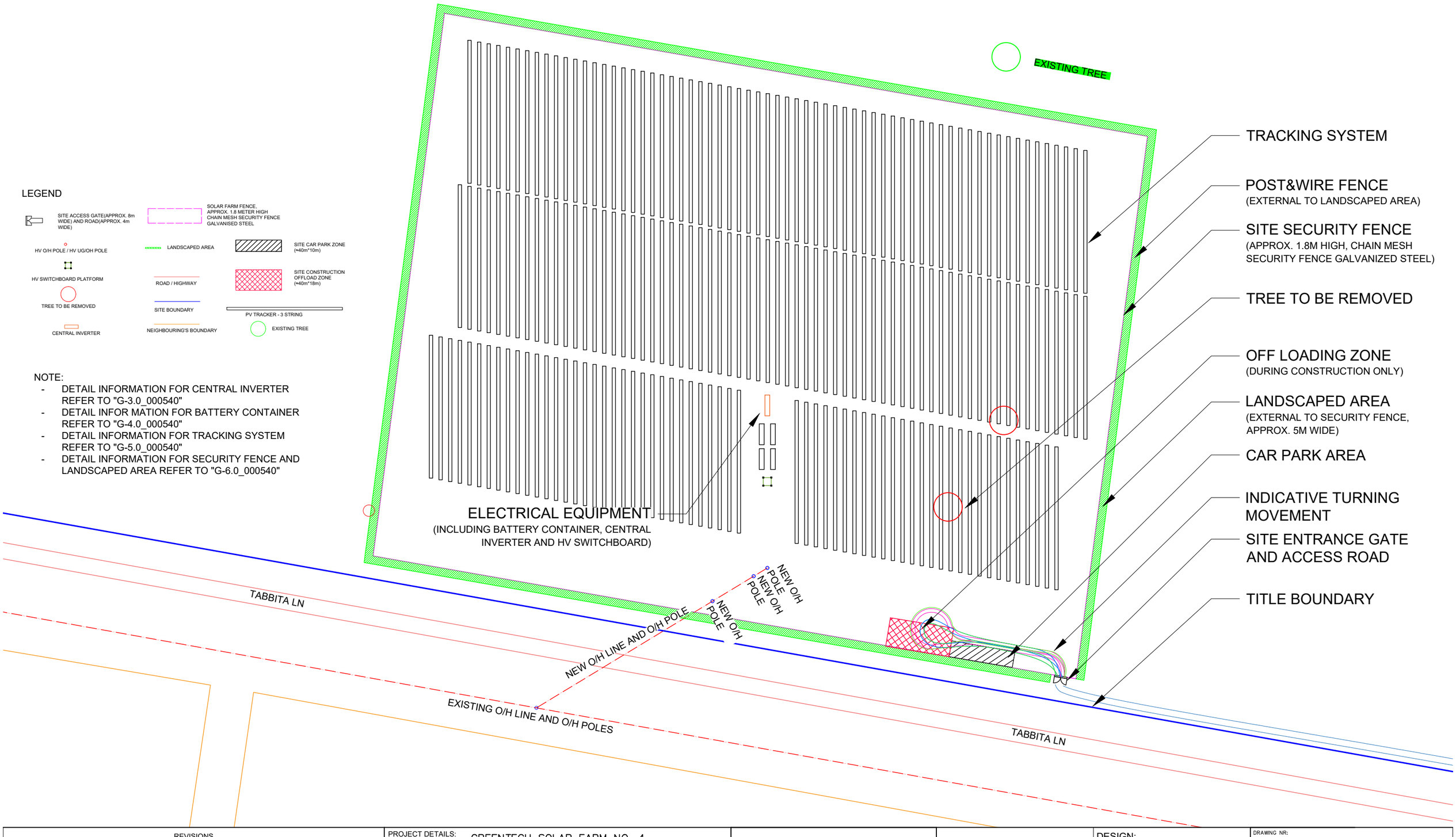
DP1210276

LEGEND

- SITE ACCESS GATE(APPROX. 8m WIDE) AND ROAD(APPROX. 4m WIDE)
- SOLAR FARM FENCE, APPROX. 1.8 METER HIGH CHAIN MESH SECURITY FENCE GALVANISED STEEL
- HV O/H POLE / HV UG/OH POLE
- LANDSCAPED AREA
- SITE CAR PARK ZONE (≈40m*10m)
- HV SWITCHBOARD PLATFORM
- ROAD / HIGHWAY
- SITE CONSTRUCTION OFFLOAD ZONE (≈40m*18m)
- TREE TO BE REMOVED
- SITE BOUNDARY
- PV TRACKER - 3 STRING
- CENTRAL INVERTER
- NEIGHBOURING'S BOUNDARY
- EXISTING TREE

NOTE:

- DETAIL INFORMATION FOR CENTRAL INVERTER REFER TO "G-3.0_000540"
- DETAIL INFOR MATION FOR BATTERY CONTAINER REFER TO "G-4.0_000540"
- DETAIL INFORMATION FOR TRACKING SYSTEM REFER TO "G-5.0_000540"
- DETAIL INFORMATION FOR SECURITY FENCE AND LANDSCAPED AREA REFER TO "G-6.0_000540"



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6.2 Appendix B – Rapid conservation Assessment Method – Training package and Guideline

Local Land Services

Rapid conservation assessment method

Training package and guidelines

NSW GOVERNMENT

This project has been funded by NSW Environmental Trust

Rapid Conservation Assessment Method Training Package and Guidelines
Prepared for NSW Local Land Services

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Introduction

What is the rapid conservation assessment method?

The rapid conservation assessment method (RAM) is part of a strategy to enable the recording of the conservation value of many discrete parcels of land (e.g. travelling stock reserve (TSR) or roadside reserve) across NSW.

The RAM is a relatively simple method of assessment that uses a three-part scoring system using conservation status (Part A) and landscape context (Part B) measures from existing spatial and data layers, and vegetation condition (Part C) that is assessed and scored in the field. Other important information (non-scored) relevant to land management e.g. vegetation and habitat features and threats and disturbances are also recorded in the field.

Why have the RAM?

The RAM enables land managers (e.g. Local Land Services or local government staff) to assess the conservation value of many sites in a relatively short time frame and collate and compare with other sites.

The RAM coupled with establishing photo monitoring points (PMPs) can be used to monitor changes in site condition over a period of time (e.g. regeneration, weeds, grazing impacts) on selected sites. Further information on the monitoring of TSRs is provided in the LLS "Travelling Stock Reserve Monitoring and Audit Strategy".

How will the RAM be applied?

Initially, the RAM will be applied as part of the Linear Reserve Project on selected TSRs and roadside reserves, however the RAM will be applicable to all managers of reserves:

The RAM Training Package and guidelines are to assist with State wide consistency where possible and enable key reserve management staff to undertake RAM assessments

The training package and guidelines are designed to be supplemented by locally relevant fact sheets (including regionally specific advice on Threatened Ecological Communities (TECs), vegetation formations, key over storey species, key woody, vine, herbaceous and grassy weeds, significant threatened plants and wildlife and timings for assessments) and regionally based local training.

Who will implement RAM?

Following adequate training, all relevant field staff and others involved in native vegetation and land management will be capable of undertaking assessment using the RAM. The basic competencies required will be the ability to use or access existing spatial vegetation data as provided in an ArcMap platform, and basic vegetation identification in the field e.g. main tree species and whether the ground layer is mostly native perennial grass or weedy.

Intent of the RAM?

The rapid field assessment component of the RAM is not a flora or fauna survey, but rather a method to broadly categorise the vegetation condition of the TSR estate, roadside reserves and other areas of native habitat. This will help inform basic management decisions based on the vegetation condition identified at the site.

Subsequent flora and fauna surveys of individual reserves is recommended if resources permit, to determine floristic diversity and the presence or absence of particular species e.g. threatened plants.

Completing the RAM

The RAM is completed using the ESRI Collector for ArcGIS application (app) downloaded on a smart phone or tablet. The app is available free of charge and Appendix 1 has the instructions for download and user guides for either IOS or Android devices. This app will enable the RAM to be completed in the field using a smart device with associated geographic positioning system and where possible, pre-populated landscape information related to TSR or reserves. The app has the capability to operate off line for areas outside mobile range.

An ArcGIS online account is necessary to access the maps and associated data which will enable the RAM to be completed electronically.

TSR / reserve general information

This section covers the general information required to be completed at the beginning of the RAM.

Scoring the RAM is based on three broad vegetation structures, i.e. forest/woodland, shrubland and grassland. Identification of the correct vegetation structure from Table 1 below enables the site to be categorised into either naturally treed, shrubland/heathland or grassland which prompts the correct vegetation condition (Part C) scoring to use.

Once the major vegetation structure is determined, this will be used to select either naturally treed, shrubland/ heathland or grassland vegetation structure .

Refer to attached link for further information www.anbg.gov.au/aust-veg/veg-map.html.

Table 1. Major Vegetation structure modified from Specht

	Percentage canopy cover			
Life form and height of tallest stratum	**> 70 %**	**> 30 %- 70 %**	**(10-30 %)**	**(< 10 %)**
Trees > 8 m	Closed forest	Open forest	Woodland	Open-woodland
No trees, shrubs < 8 m		Shrubland/ heathland	Open shrubland/heathland	
Grassy with sparse or no shrubs or trees				Grassland

- Assessor name - name of field assessor
- Date – date of field assessment
- Reserve name – record if known
- Crown reserve number – record
- Roadside name – record
- Road number –record if known
- Side of road – If the reserve is divided by a road, is the assessment zone on both sides of road? If not, select the direction to the assessment zone (e.g. zone lies to the NE of road).
  Both or N NE E SE S SW W NW.
- Vegetation formation – verify the vegetation formation as per vegetation spatial data, if known, for that region in the reserve/assessment zone. Table 2 below categorises the 16 NSW vegetation formations into broad vegetation structures consistent with RAM scoring.

Table 2. NSW Vegetation Formations in basic structure categories

NSW Vegetation Formation	Structure			
	Treed	Shrubland	Grassland	Other
Alpine complex				✓
Arid shrubland (acacia)		✓		
Arid shrubland (chenopod)		✓		
Dry sclerophyll (shrub/grass)	✓			
Dry sclerophyll (shrubby)	✓			
Forested wetlands	✓			
Freshwater wetlands				✓
Grasslands			✓	
Grassy woodlands	✓			
Heathlands		✓		
Rainforest	✓			
Saline wetlands				✓
Semi-arid woodlands (grassy)	✓			
Semi-arid woodlands (shrubby)	✓			
Wet sclerophyll (grassy)	✓			
Wet sclerophyll (shrubby)	✓			

- Vegetation class - verify the vegetation class as per vegetation spatial data, if known, for that region in the reserve/assessment zone.
- Plant community/No. if known – verify as per vegetation spatial data, if known, for that region.
- Reserve/assessment zone identification (GPS coordinates) – location automatically recorded when picture taken at the PMP. Refer to the RAM PMP establishment document for more information.

Part A: Conservation status scoring and guide

Part A of the RAM relates to environmental legislation at state and federal level that prioritise the protection of flora, fauna and ecological communities.

Extra protection is generally directed towards species and communities of high conservation status, such as those that are threatened or have exceptional ecological values.

The score from Part A provides the information to complete the first column of the conservation value assessment matrix (refer to the RAM scoring and conservation matrix Table 5).

Vegetation

This section establishes the rarity of the vegetation community present and hence its priority for protection.

Status	Score
Threatened ecological community/over-cleared veg community	2
Not present	0
Name if known	

Is the vegetation in the reserve a threatened ecological community (TEC), or an over-cleared vegetation community, i.e. over 70 % of pre-European extent has been cleared? Score 2

Record the name of the TEC from the desktop geographic information system (GIS) data from inferred mapping. Photo examples of these vegetation communities should be gathered at a regional scale to use in the field to assist in verifying the spatial vegetation data. The TEC will be validated following field assessment and be noted in the field as present as mapped or present not mapped..

For more information visit: www.environment.nsw.gov.au/projects/biometric-dataset.htm.

Wetlands

Wetlands have high essential biodiversity values and their protection is a high conservation priority.

Wetland definition - wetlands are low points/depressions in the landscape that hold water during wet periods. During dry periods when wetlands may be dry they can be identified by their sunken landform and/or the presence of hardy perennial wetland plants like sedges, rushes and reeds.

Status	Score
RAMSAR/DIWA/SEPP 14 etc	2
Other wetland > 2 ha	1
Not present (< 2ha)	0

Is there a wetland present? If so, is the site mapped as a RAMSAR wetland, a Directory of Important Wetlands of Australia (DIWA) or a SEPP 14 coastal wetland? Score 2

Otherwise, if a wetland(s) present is it > 2ha in area? Score 1

A wetland size of 2 ha was chosen for the RAM assessment scoring threshold because it is relatively easy to identify remotely and in the field.

For more information visit: www.environment.nsw.gov.au/wetlands/WhereAreWetlands.htm

Site managed species

Definition of a site-managed species are threatened plants and animals that can be secured by conservation projects at specific sites.

Status	Score
Present	2
Absent	0

Has a site-managed species been recorded in or within 250 m of the reserve?

The presence of site managed species (which are mostly threatened plant species) is based on data provided by the Office of Environment and Heritage.

Conservation status score = Threatened = 2+, Depleted =1, Common = 0

Part B: Landscape context

Landscape context (Part B) considers the significance of the reserve in relation to the surrounding landscape attributes which include:

- Proportion of Mitchell landscape remaining
- The vegetation patch such as the size and shape of a patch
- Connectivity to other patches
- The proportion of native vegetation in the neighbouring area.

The score from Part B provides the information to complete the second column of the conservation value assessment matrix Table 5.

Note: Sites that consist of only non-native vegetation score = 0

Mitchell landscape

Mitchell landscapes are used in NSW as a method of determining current extent of native vegetation and are based on areas of land with similar geomorphology, soil and broad vegetation type.

The Mitchell Landscapes were mapped in 2002 and are used for a variety of purposes including the determination of over-cleared landscapes (OCL).

For more information visit: www.environment.nsw.gov.au/resources/conservation/EcosystemsMethodology.pdf

Status	Score
> 70 % cleared	10
30-70 % cleared	5
< 30 % cleared	0

Use spatial information in the app or desktop mapping to determine the percentage of native vegetation cleared in the mapped Mitchell landscape.

Reserve/assessment zone vegetation width (width within assessment zone)

Vegetation width	Score
> 100 m	10
21-100 m	6
5-20 m	2
< 5 m	0

Determine the average width of native vegetation in the reserve/assessment zone only, from imagery in the app or via desktop mapping. See Figure 1.

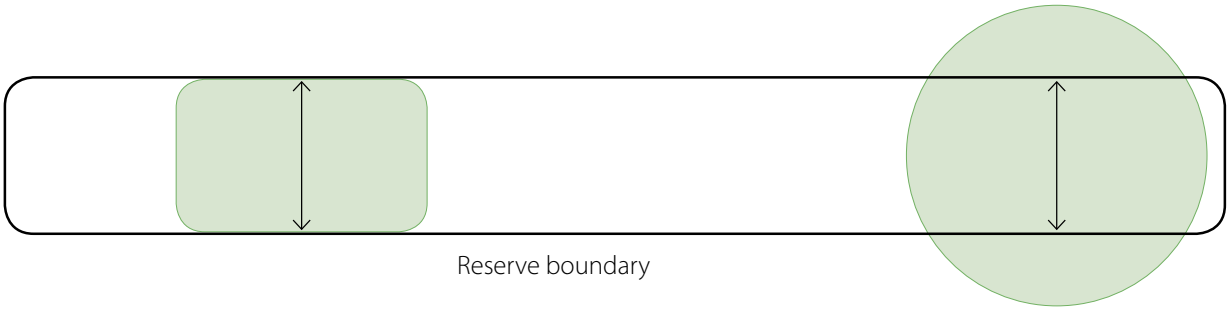
Reserve/assessment zone total native vegetation width (within and adjoining the reserve/assessment zone)

Native vegetation width	Score
> 100 m	10
20-100 m	6
< 20 m	0

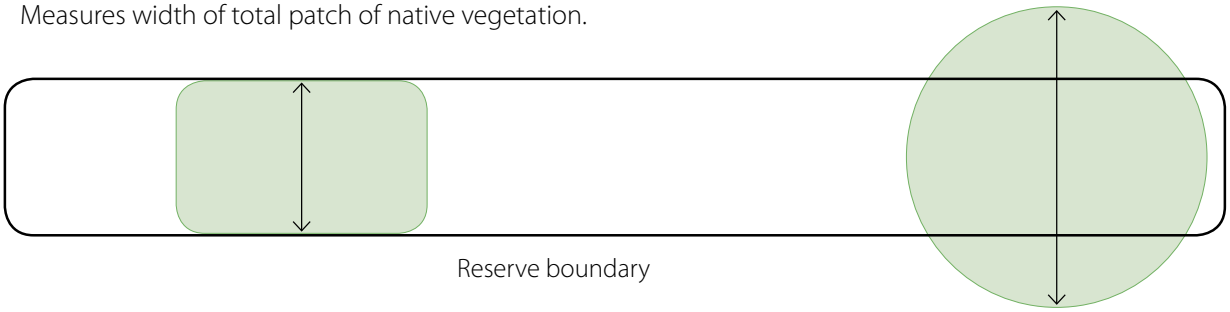
Determine the average width of the total native vegetation patch (reserve/assessment zone plus native vegetation connected to zone) from imagery in the app or via desktop mapping. See Figure 1.

Figure 1: Assessment of landscape context attributes – width measures

a. Assessment zone native vegetation width:
Measures width of native vegetation in reserve only.



b. Total native vegetation width:
Measures width of total patch of native vegetation.



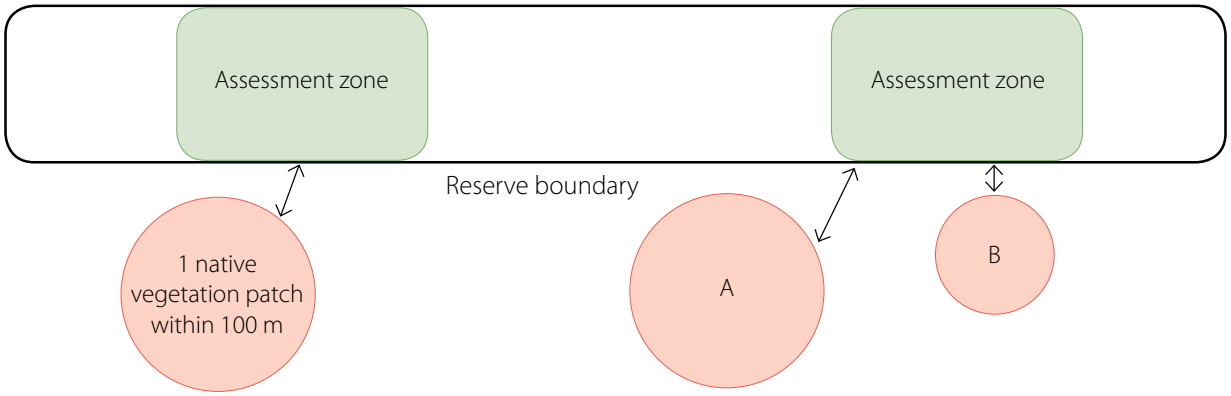
Reserve/assessment zone native vegetation within 100 m

Native vegetation within 100 m	Score
> 5 ha within 100m	10
1-5 ha	5
< 1 ha	0

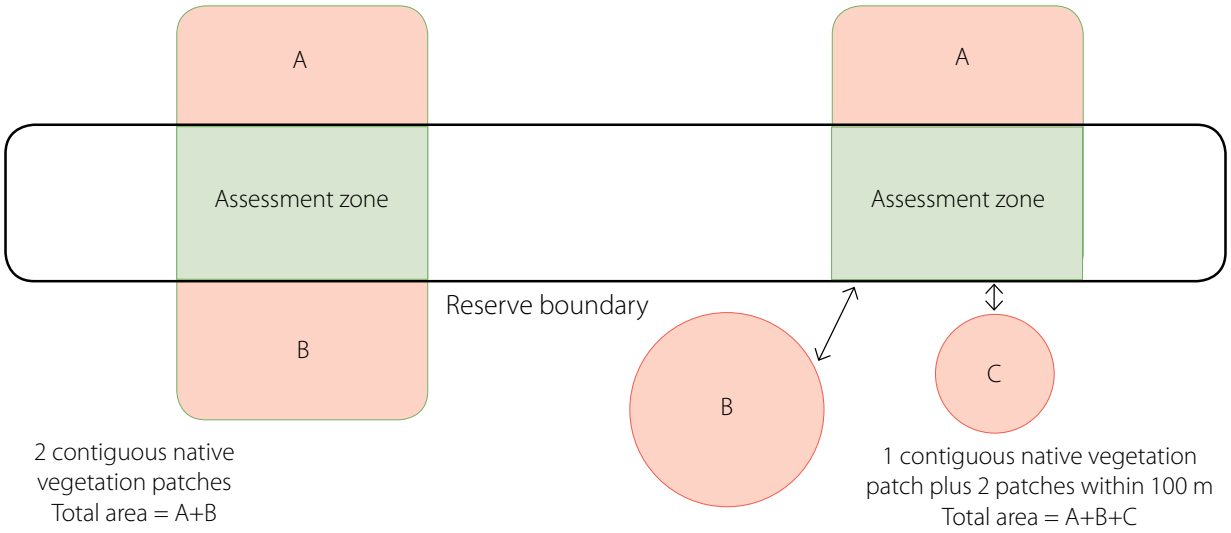
Determine the total area of native vegetation patches that are within 100 m of the reserve/assessment zone from imagery in the app or via desktop mapping. Include patches that are connected and those within 100 m of the reserve/assessment zone. Exclude patches that are smaller than 1 ha in size. See Figure 2.

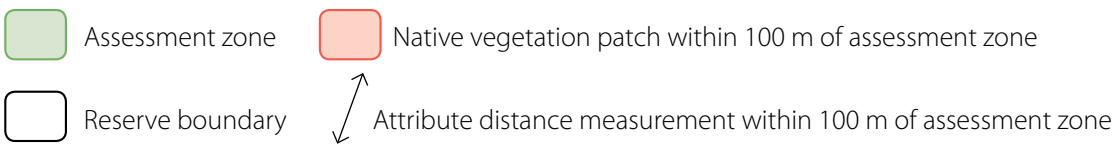
Figure 2: Assessment of landscape context attributes – area of native vegetation patches within 100 m of assessment zone

a. Examples where assessment zone is not connected to nearest native vegetation patch (i.e. not contiguous). Measure total area of all native vegetation patches that are within 100 m of assessment zone. Exclude patches < 1 ha.



b. Examples where assessment zone is connected to nearest native vegetation patch (i.e. contiguous). Measure total area of contiguous native vegetation patches plus other patches that are within 100 m of the assessment zone. Exclude patches < 1 ha.





Figures 1 and 2 from Ecosure Report Version 5 February 2017

Landscape context score = Large and or connected = 22+, Moderate = 10-21, Small or disconnected = 0-9

Part C: Vegetation condition

Note: Part C of the RAM assessment is based on the presumed natural type of the vegetation that occurred on a site (e.g. pre-European). For example, many areas have had their overstorey vegetation (mostly) removed resulting in only remnant scattered trees or shrubs over a more or less modified derived native grassland. These modified sites are to be assessed in Part C as being either naturally treed or shrubland for scoring purposes, with only natural grasslands using the grassland scoring.

Advice and references for natural grasslands will be provided at a regional scale through supplementary materials and fact sheets.

The vegetation condition assessment (Part C) is the field assessment component of the RAM and involves the application of a standard method to score a range of vegetation elements characteristic of the site. The RAM vegetation condition assessment is:

- A practical method that was developed to enable, with adequate training, all relevant field staff and others involved in native vegetation and land management, the ability to undertake assessment.
- Broadly similar to previous rapid assessments undertaken on TSRs and some roadside reserves and seeks to capture important growth stage characteristics e.g. tree and shrub regeneration that are difficult to identify remotely.

The basic competencies required will be the ability to use existing GIS spatial data systems and in the field the application of basic vegetation identification skills (e.g. main tree species and whether the ground layer is mostly native perennial grass or weedy).

Initially, the assessor is required to go through a simple decision pathway to determine which method of vegetation condition scoring is used, being:

1. Decide which of the 16 NSW vegetation formations in NSW does the site fall into.
   Refer to www.environment.nsw.gov.au/research/Visclassification.htm for more information.
2. Apply the correct vegetation structure assessment (Table 1) into either naturally treed, shrubland/heathland or grassland.

The same form is used for all assessments and scoring occurs automatically based on the chosen vegetation structure category selected. Sites are scored for either naturally treed, for shrubland/heathland with the large tree component excluded and for grasslands **with the** vegetation structure and large tree components excluded.

The field assessment score provides a vegetation condition rating at a point in time which can be, along with photo points, monitored over time to determine vegetation condition change. The condition assessment informs a modified Vegetation Assessment State and Transition (VAST) rating shown in Table 3.

The modified VAST model is used because it summarises the degree of change that has occurred to native vegetation relative to its estimated undisturbed condition. It is a useful model for land managers because it also incorporates an estimate of the regenerative capacity of modified native vegetation.

For further reading see:

Thackway R and Lesslie R (2006). Reporting vegetation condition using the Vegetation Assets, States, and Transitions (VAST) framework. Ecological Management and Restoration 7(Supp. l) 1 53-62.

Table 3. Modified VAST indicative table for woodland habitat

VAST					
Condition rating	**Vegetation cover**	**Regeneration potential**	**Trees and shrubs**	**Ground layer**	**Attributes**
High quality	**RESIDUAL** Native vegetation community near natural	Excellent potential for natural regeneration	All vegetation layers (stratum) present	Ground layer has high species diversity	Very rare, only small fragments remain
	MODIFIED A Native vegetation community intact	Good potential for natural regeneration	Most vegetation layers present	Ground layer has mostly high species diversity	Best examples of local native vegetation Few weeds are present
	MODIFIED B Native vegetation community mostly intact	Reasonable potential for natural regeneration	Overstorey vegetation present	Ground layer has low species diversity	Good examples of local native vegetation Weeds < 50 % and mostly annual pasture grasses and herbaceous weeds
Moderate quality	**TRANSFORMED A** Native vegetation community significantly altered	Some potential for natural regeneration	Overstorey vegetation mostly present	Ground layer has low species diversity	Moderate examples of local native vegetation Weeds > 50 % of groundlayer
	TRANSFORMED B Native vegetation community significantly altered	Little potential for natural regeneration	Dominant overstorey patchy	Ground layer has few native species Most groundlayer species are absent	Poor examples of local native vegetation Groundlayer dominated by weeds
Low quality	**REPLACED** Native vegetation replaced	No potential for natural regeneration	Natural vegetation layers absent	Native species absent-sparse	Native species absent-sparse Groundlayer dominated by weeds

Undertaking the RAM vegetation condition assessment

Note: Prior to undertaking the RAM vegetation condition assessment, regional training provided by a suitably qualified consultant or Local Land Services staff member is recommended.

The practical measures required to undertake a successful RAM assessment include:

Site overview and familiarisation

Where possible traverse the reserve/assessment zone in a vehicle using tracks, and stopping occasionally to look more closely at finer detail (e.g. general level of groundlayer weediness the main overstorey species etc).

Identifying the vegetation

Consider the TEC (if present) assigned by the GIS data and note if the information is not correct. If further clarification of the TEC occurrence is required then seek advice from someone with appropriate knowledge of local vegetation communities.

Characterising the vegetation

Identify a suitable location to complete and score the vegetation condition assessment and where there is a distinct feature that you want to monitor e.g. tree or shrub regeneration. Refer to Appendix 2 for more information.

Select assessment/monitoring point(s)

At least one photo should be taken at each site, preferably with a view of a distinct feature. Its location will automatically be recorded and may become a permanent photo monitoring point. If the site is a TSR, refer to the LLS TSR Monitoring and Audit Strategy for guidance on monitoring requirements for that site.

Completing the assessment

Is the TEC spatial layer correct? If not, state correct type(s).

The TEC spatial layer in Part A of the RAM is derived from inferred mapping and this field assessment provides verification or correction. If further clarification is required then refer to local a list of TECs and their key diagnostic features or seek advice from someone with knowledge of local vegetation communities.

Vegetation structure

Vegetation structure can differ across the state and the most appropriate settings should be compiled at a regional level with examples of local Vegetation Formations provided to assist assessors to best answer vegetation structure.

For example, in general, vegetation structure conditions for:

- Treed habitats consist ideally of several components, including trees of several age classes e.g. mature trees – young saplings, more or less scattered shrubs including regrowth and mostly tussocky native grass understorey with native forbs (herbaceous flowering plants).
- Shrubland habitats have an overstorey of more or less tall and dense shrubs with regrowth and an understorey that can vary from tussocky native grass with native forbs through to mostly sub-shrubs and bare ground.
- Natural grassland habitats mostly lack woody plants and consist of tussocky native grass with native forbs.

Four vegetation structure ratings are provided being; intact/natural, mostly intact, partially intact and sparse or absent.

Assign the most accurate of the four vegetation structure ratings:

Rating	Vegetation type
Intact/natural =6	All vegetation layers e.g. Mature trees and shrubs, some younger trees and shrubs and regeneration
Mostly intact =4	Most vegetation layers present but missing elements e.g. few mature trees or no shrubs
Partially intact =2	Missing two or more structural layers e.g. large trees, shrubs and regeneration
Sparse or absent =0	Only occasional or no trees or shrubs

Further information on vegetation structure and assessment is available at www.nrm.gov.au/publications/vegetation-assessment-guide.

These different vegetation structure condition ratings are depicted below in Figures 3-6 using examples from the NSW Riverina and are only indicative in this landscape.

Figure 3. Intact/natural – all vegetation layers present

Figure 4. Mostly intact – Most vegetation layers present

Figure 5. Partially intact – Missing 2 or more structural layers

Figure 6. Sparse or absent – Only occasional or no trees or shrubs

Large trees (mature hollow bearing trees)

Large old trees are irreplaceable habitat elements, especially those with hollows that often take centuries to develop and provide vital habitat resources for many wildlife including parrots, owls, possums and bats. TSRs and roadside reserves are often the best areas for these old trees because they were not actively removed for agriculture.

Heading	Heading
Common	Common =3
Sparse	Scattered or occasional patches = 1
Absent	Absent = 0

Non-indigenous woody weeds and vines

Woody weeds and vines are often invasive and if left uncontrolled can spread throughout natural habitats changing the structure of the vegetation. Early detection and intervention is ideal allowing relatively inexpensive eradication or control.

Heading	Heading
Absent	Absent = 3
Sparse	Scattered or occasional patches = 2
Common/abundant	Common = 0

Groundcover

The quality of the ground cover is very important because its condition often influences the resilience of a site, i.e. its capacity to self-regenerate. Groundcover is made up of two elements weediness and nativeness (native species diversity) as below.

Weediness # (exotic grass and herbaceous plants)

The overall cover of grass and herbaceous weeds in the groundlayer has a major influence on the capacity for a site to self-regenerate. The weeds compete for space with preferred native plants and limit opportunities for germination.

Weediness	Groundcover
Sparse	Weeds sparse or patchy throughout = 4
Common in parts	Weeds only common in parts and generally sparse elsewhere = 3
Common throughout	Weeds found commonly throughout =2
Abundant	Weeds dominate groundlayer and native grasses sparse at best =0

Nativeness # (general abundance and species diversity of native understorey)

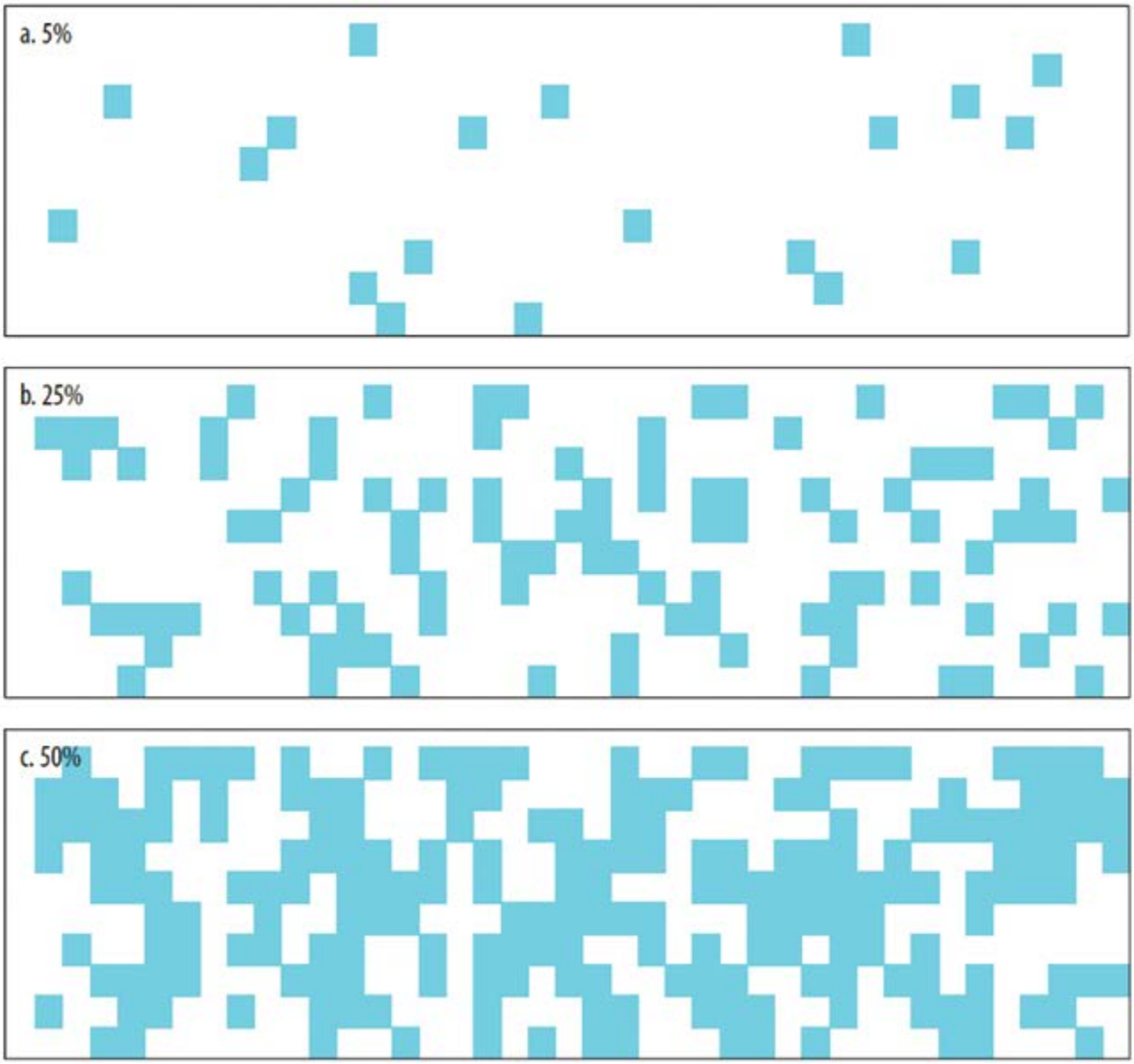
Sites where native species dominate the groundlayer have lower management requirements because it limits weed spread, provides ideal seed bed for native plant germination, provides higher quality feed year-round and compared with exotic pasture grasses has lower fire fuel hazard.

Nativeness	Groundcover
Diverse throughout	Mostly native species with many native grass and forb types (herbaceous flowering plant) = 4
Diverse in patches	Areas with many native grass and native forb types and mostly surrounded by areas of native grass with few species = 3
Few species common throughout	Mostly native grass with few species = 2
Patches only	Patches of native grass amongst otherwise exotic pasture grasses = 1
Absent/sparse	Only scattered or no native grass throughout = 0

Notes:

1. *For the purposes of rapid assessment field measurements are generally best avoided following wet cool season rains (e.g. winter and early spring) when exotic annual grasses can be prolific and mask the underlying native perennial grass base; and best undertaken in summer or autumn when the annuals have "hayed-off" or as advised by local experts.*
2. *For non-rapid assessment surveys, e.g. general flora and targeted threatened species surveying, spring is the best time to coincide with flowering native forbs.*
3. *Note the abundance ratings applied in the habitat and vegetation values for large trees, non-indigenous woody weeds and vines, groundcover weediness and nativeness of sparse, common, abundant are illustrated in Figure 7.*

Figure 7. Indicative visual guide of plant density a = sparse, b = common and c = abundant



Adapted from diagram on page 31 http://weeds.ala.org.au/WoNS/serratedtussock/docs/stbpmm.pdf

Scoring the RAM vegetation condition assessment

Scoring vegetation condition is divided into three categories determined from the vegetation structure category and vegetation formation assessment into either naturally treed, shrubland/heathland or grassland.

The same format is used for scoring assessments across all categories of vegetation formation. In the case of naturally treed formations all components are included, while for shrubland/heathland the large tree component is excluded and vegetation structure and large tree components are excluded for grasslands.

The total score for the RAM vegetation condition assessment (Table 4) is the sum of all relative component scores above and provides the overall RAM vegetation condition rating of high, moderate or low quality.

Further, the condition assessment score informs a modified Vegetation Assessment State and Transition (VAST) rating shown previously in Table 3.

Table 4. RAM vegetation condition assessment

Naturally treed vegetation	
HIGH QUALITY:	17+ = Residual or Modified A; 14-16 = Modified B
MODERATE QUALITY:	9-13 = Transformed A; 6-8 = Transformed B
LOW QUALITY:	0-5 = Replaced
Shrublands / heathlands	
HIGH QUALITY:	14+ = Residual or Modified A; 11-13 = Modified B
MODERATE QUALITY:	8-10 = Transformed A; 6-7 = Transformed B
LOW QUALITY:	0-5 = Replaced
Grasslands	
HIGH QUALITY:	7+ = Residual or Modified A; 5-6 = Modified B
MODERATE QUALITY:	4 = Transformed A; 3 = Transformed B
LOW QUALITY:	0-2 = Replaced

The conservation value assessment matrix

The scores from the three components Part A, B and C of the RAM are integrated into a conservation value assessment matrix calculated automatically in the app, to provide an overall conservation value.

Table 8 in Appendix 3 illustrates the conservation value assessment matrix.

Additional RAM information to be recorded

Other important information (non-scored) relevant to land management e.g. vegetation and habitat features and threats and disturbances that cannot be determined remotely are also recorded in the field. In many cases the advice to be collected will be informed by local fact sheets which will be provided as part of the training.

Other information recorded as part of RAM field component includes:

Major weed species present

List the main local weed species for each category e.g. woody weeds and vines, exotic grasses and herbaceous weeds.

Native species

List using free text:

- Main tree 1-5 species
- Main shrub 1-5 species (if known)
- Main understorey 1-5 genus (if known)

Other habitat features

Table 6 below, allows the collection of abundance measures of a range of important habitat features that are best recorded in the field.

Tick correct abundance rating e.g. abundant, common, sparse and if absent leave blank.

Table 6. Habitat features abundance

Habitat features	Sparse	Common	Abundant
Tree regeneration – regeneration is defined as a tree with a trunk diameter of less than 10 cm or a canopy height less than 50 % of adult trees.			
Shrub cover – woody plants, non-eucalypt and usually < 5 m e.g. wattles, saltbush.			
Shrub regeneration – shrub regeneration is defined as a shrub with a canopy height less than 50 % of adult shrubs.			
Logs and fallen timber – logs and fallen timber is defined as timber with a diameter greater than 10 cm lying on or adjacent to the ground.			
Wetlands/springs/gilgais – landforms that hold water during wet periods and are known to be important habitat features.			
Rocky outcrops – landforms with exposed rock and are known to be important habitat features.			
River/creek banks – drainage channels.			
Mistletoe – habitat features important to many wildlife.			
Cryptogams – non-flowering plants that are known as important indicators of soil crust health e.g. mosses, algae, ferns, lichens, and fungi.			
Rare plants – rare plants from the local list that are incidentally recorded. Note species in free text.			

Threats / disturbances

Note with a tick, obvious land management threats and disturbances to assist in local action planning.

Table 7. Site threats and disturbances

Threat/disturbance	Action priority	
	Minor	Significant
Illegal grazing e.g. free feeding		
Illegal firebreak e.g. ploughed fire break		
Illegal track(s) e.g. new earth works		
Illegal drainage e.g. drainage earthworks		
Cropping e.g. ploughed area		
Feral animals e.g. goat browsing		
Timber removal e.g. recently felled trees		
Active erosion e.g. active gullies forming		
Invasive weed e.g. identification and removal of minor infestation		
Flood/fire damage e.g. damaged fences		
Other (list)		

Cultural heritage

Use free text to record any potential cultural heritage observed on the site

Current management regime

Use free text, if known, to describe comments on grazing, fire and other management practices

Appendix 1:
User guides

TSR data capture collector for ArcGIS on iOS

1. The mobile application

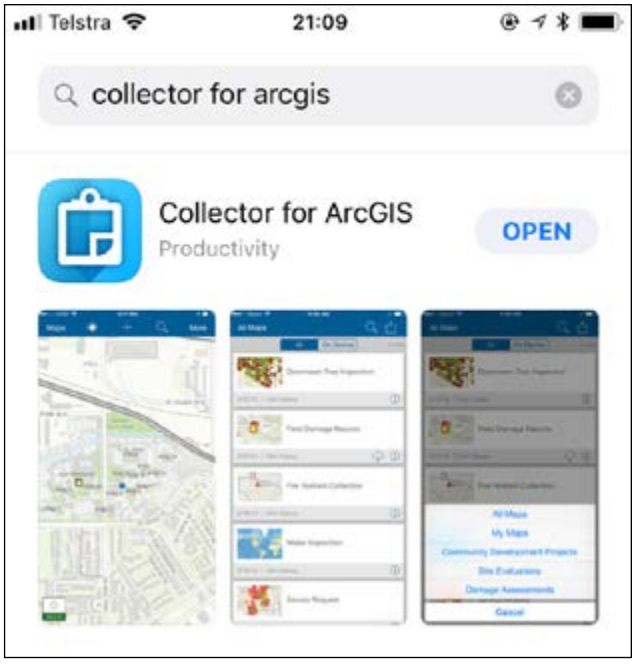
Collector for ArcGIS is Esri's map-based data collection native application available on Android, iOS and Windows devices and suitable for use in disconnected "offline" environments. It is accessed via a Level 2 named user (i.e. with editing privileges) of an ArcGIS organisational account.

Note: The final workflow may vary from the steps outlined below.

2. iOS workflow

2.1 Getting started

1. On your mobile device of choice, download Collector for ArcGIS from Apple's App Store.

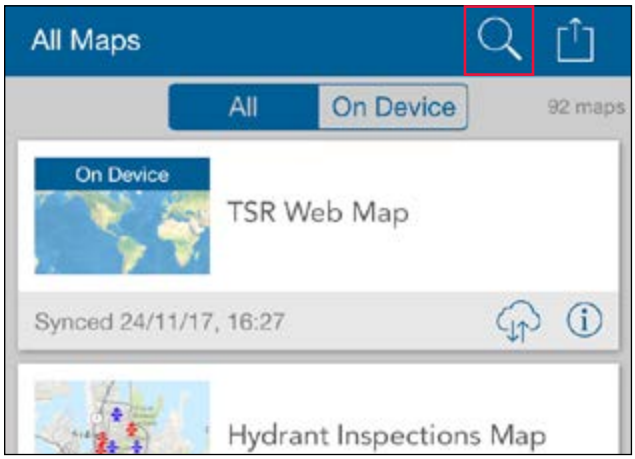


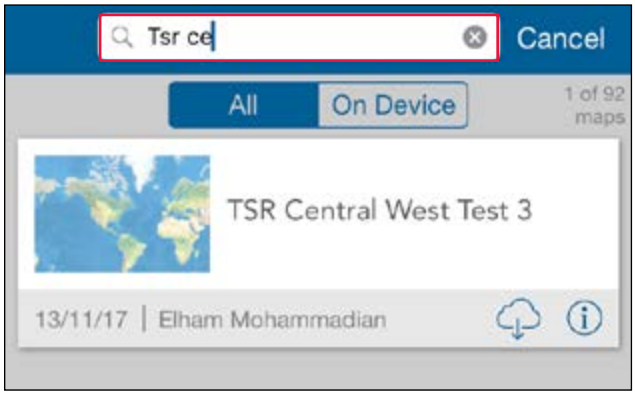
2. **Open** the app and choose **ArcGIS Online**.

3. **Sign in** with your ArcGIS Online named user. If you are unsure, please contact the TSR project's ArcGIS Online administrator.

4. Once signed in, a list of available maps will appear. You should be able to see a list of TSR maps categorised by LLS region e.g. TSR Central West NSW.

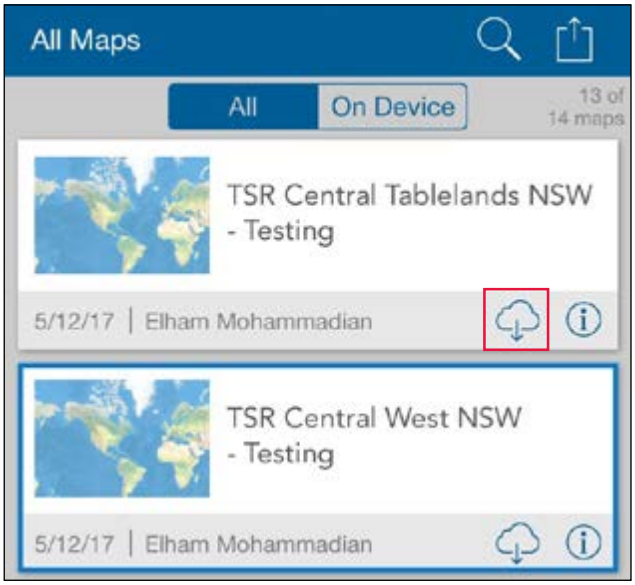
Tip: Use the search bar or scroll through the list.



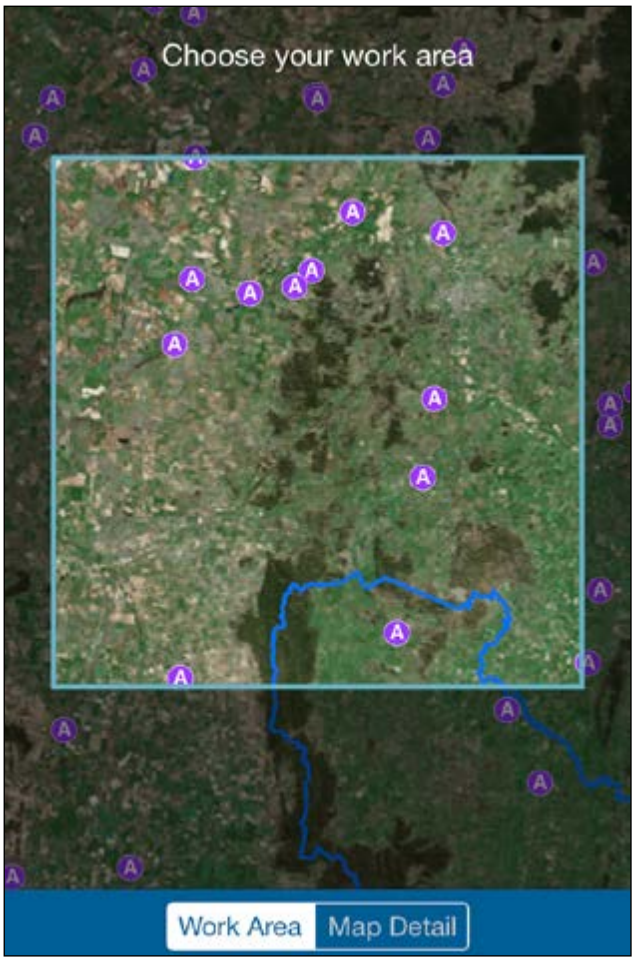


2.2 Going offline

1. Select the download icon to download an offline map for the area of interest.



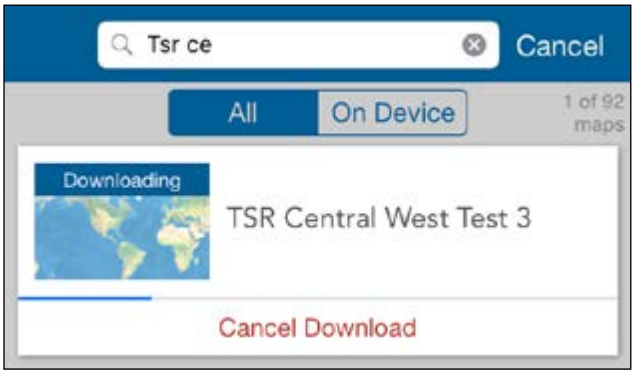
2. Choose the work area that you will need to have available to you in offline mode by zooming in and out on the map as needed.



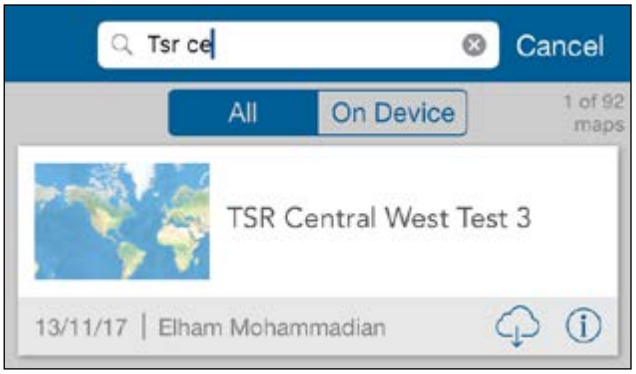
3. Select the map detail tab at the bottom and set the level of detail you will need of the aerial imagery by zooming in or out as appropriate.

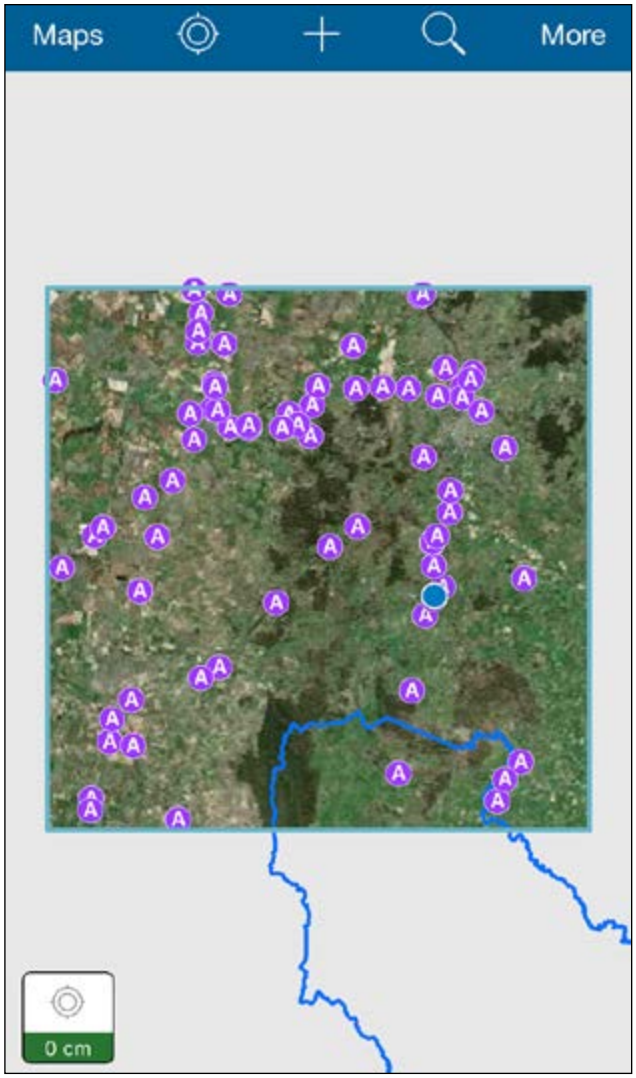
   Tip: Notice the estimated size of the download. If you reach the limit or the size is too large, consider downloading a smaller work area (zoom in) or less map detail (zoom out).

4. Click download. The map will begin to download onto your device.



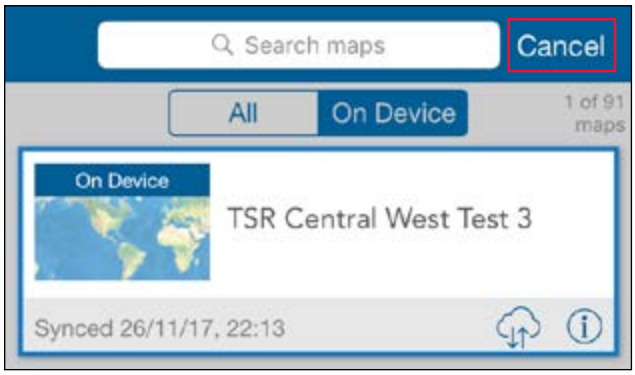
5. Once complete, click the map to open and start collecting data.



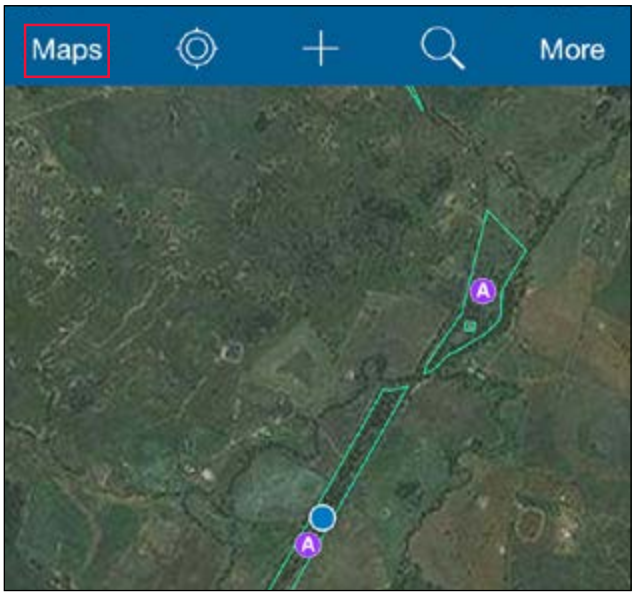


2.3 Remove offline map

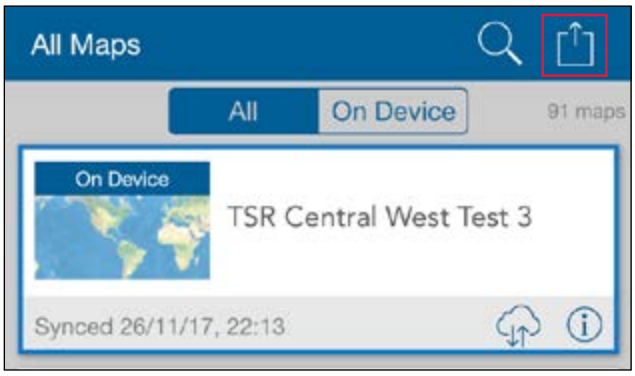
1. To remove a downloaded map from your device, back in the main maps list, click Cancel if shown in the top right-hand corner. This means it is still in search mode.



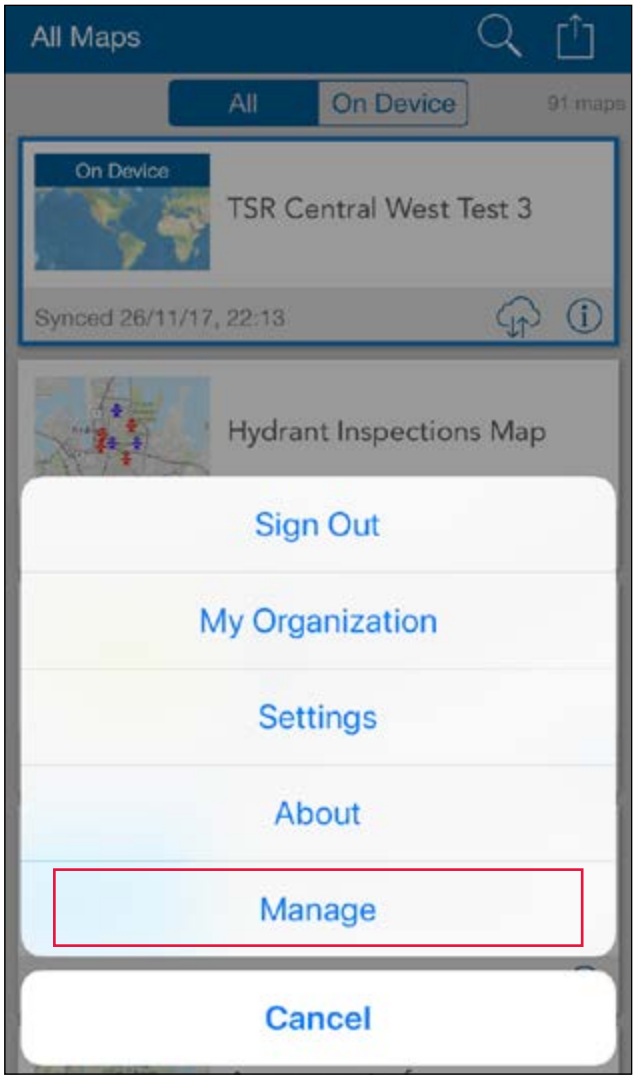
Note: If you are within a specific map, click Maps in the top left-hand corner to return to the main menu.



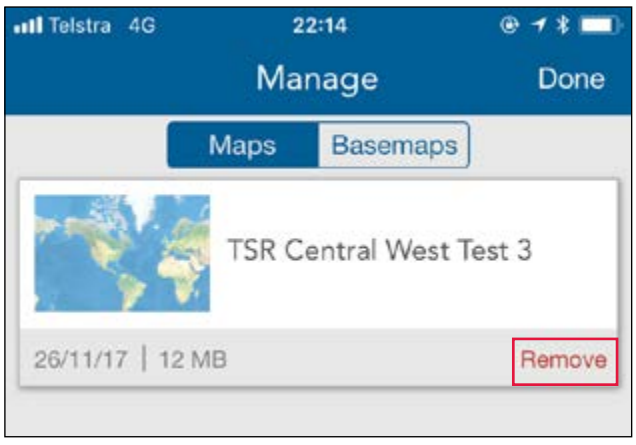
2. Select the options icon.



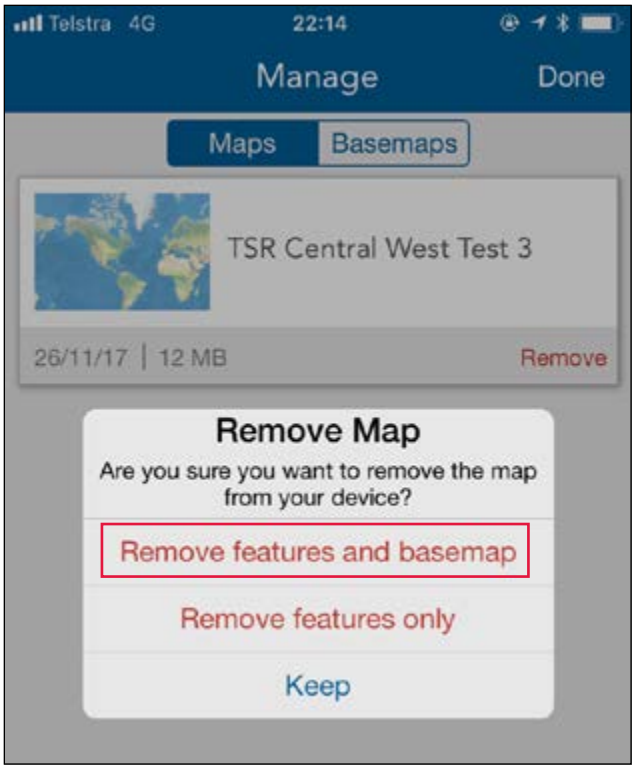
3. Choose Manage.



4. Click Remove on the appropriate map.



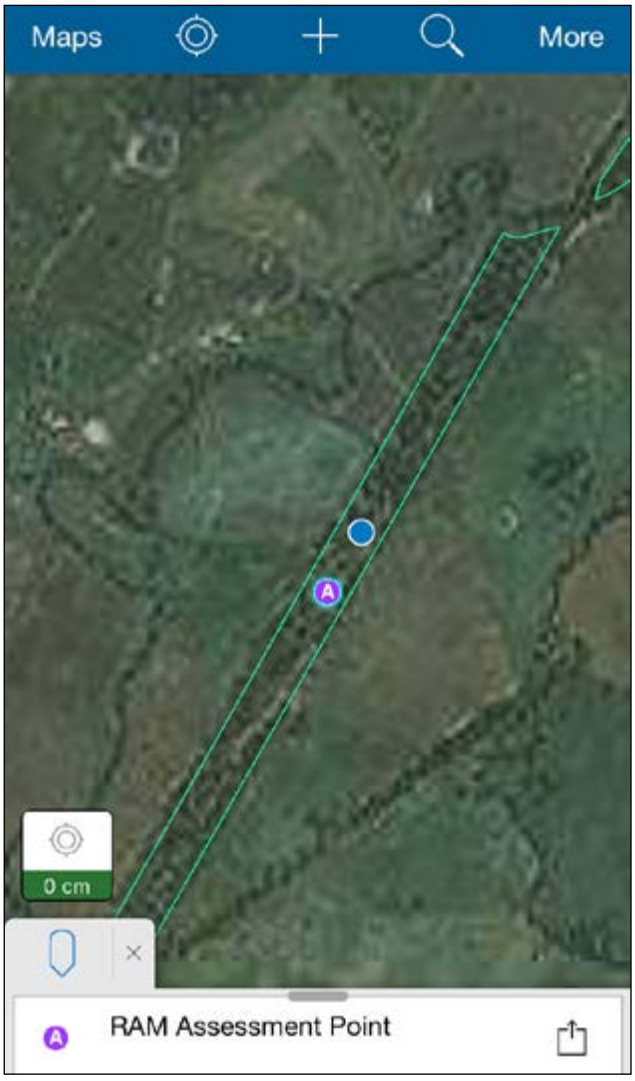
5. Select Remove features and basemap.



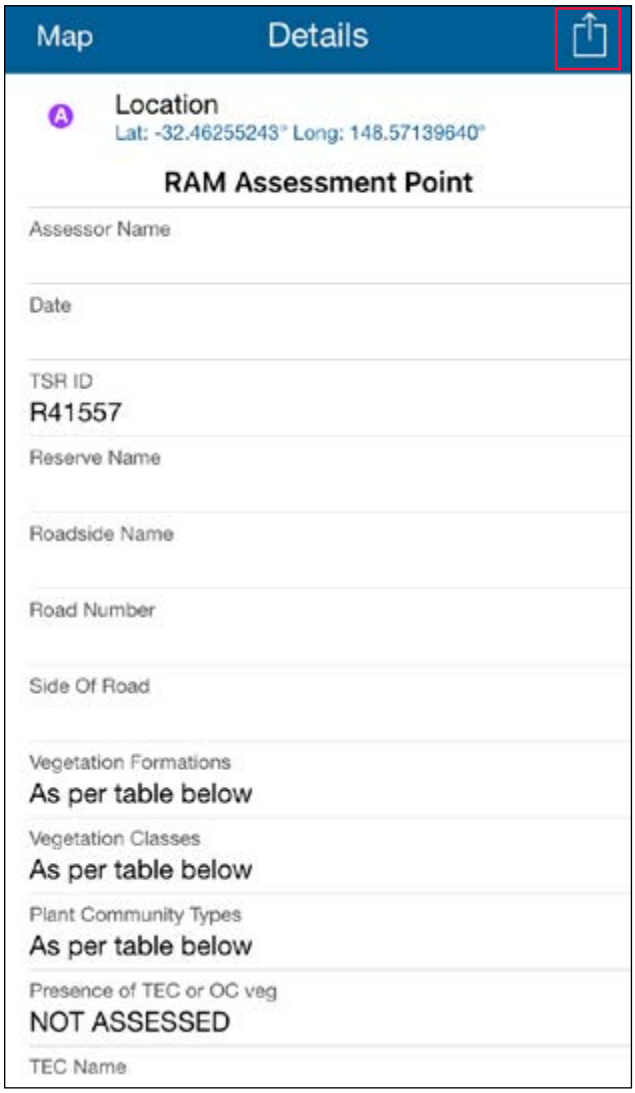
2.4 Editing an assessment point

Editing assessment points is **MANDATORY**. They appear on the map as a purple A symbol. The blue point is your current location determined by the device's GPS.

1. Select an existing assessment point by clicking on the point.

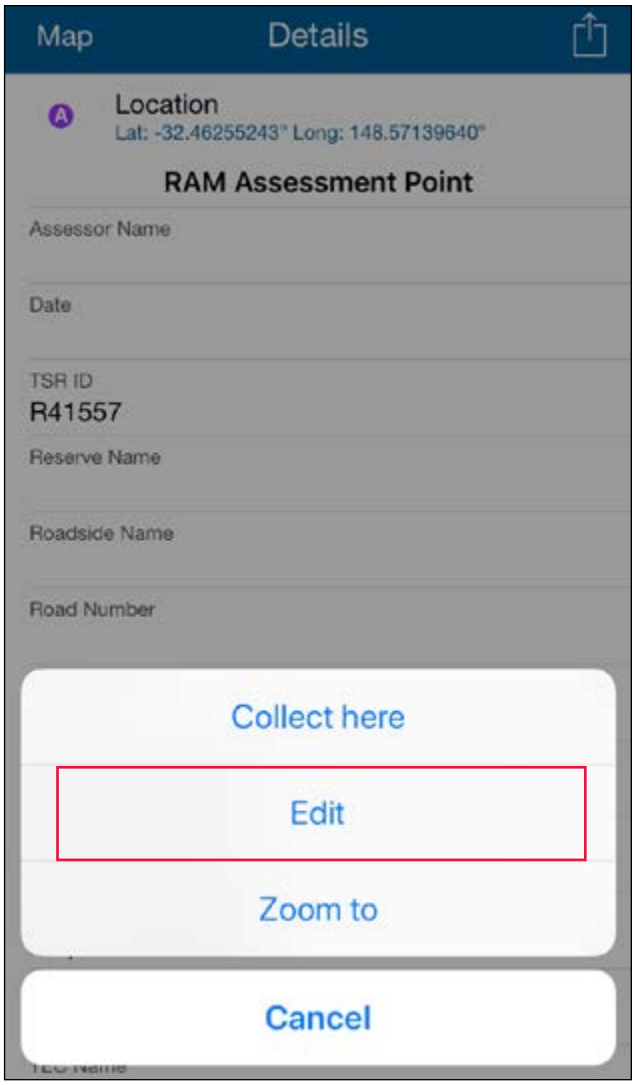


2. Click on the information panel that appears at the bottom of the screen to inspect the attributes associated with the selected point.



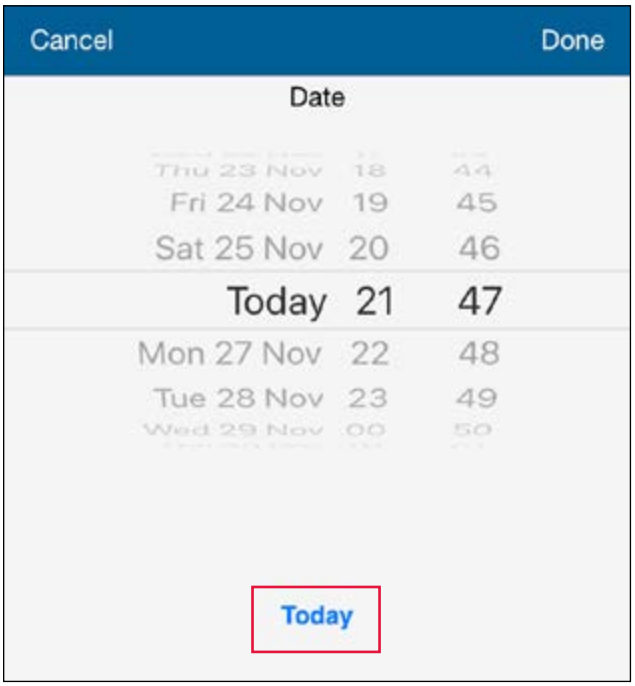
3. To edit the attributes, click on the **options** icon in the top right-hand corner. 

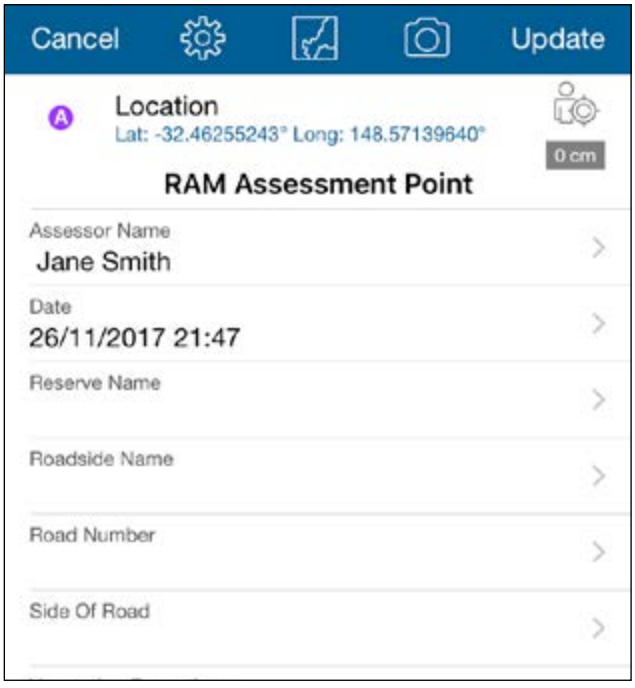
4. Click Edit.



5. Work your way through each of the details and edit as appropriate. For example, click on Assessor Name, type your name and click done.

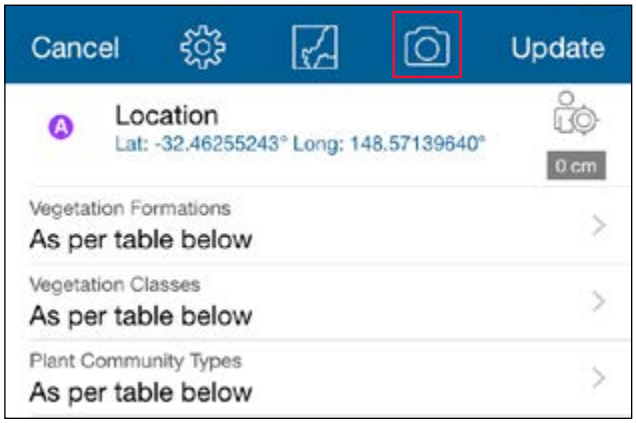
6. For Date, click on Date in the attribute list, click on the today button, then done.



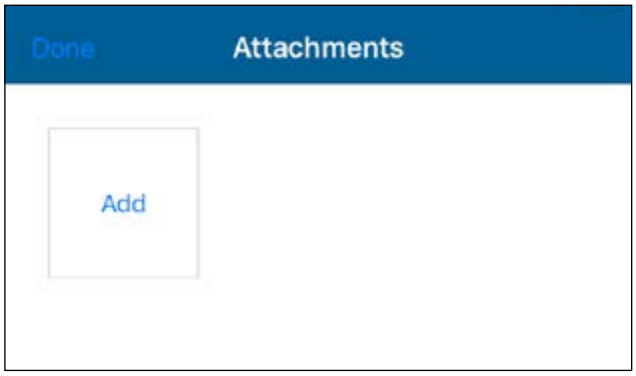


Note: Be sure to edit all details marked as "NOT ASSESSED".

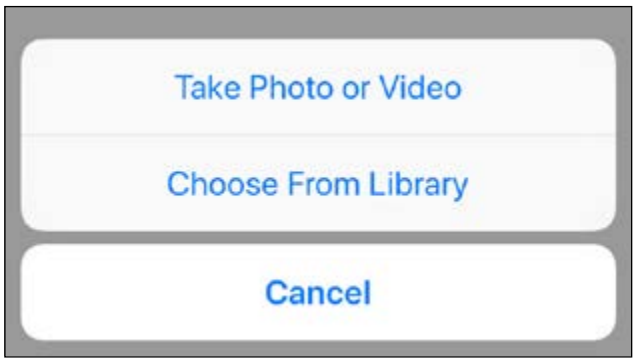
7. To add a photo, click the camera icon.



8. Click on Add in the attachments section.



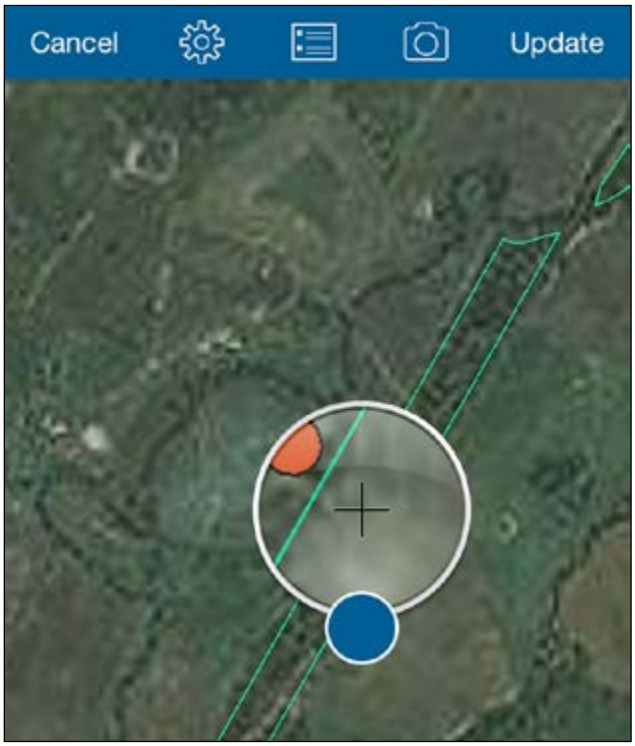
9. If you wish to attach a photo you previously took, select the Choose From Library option. Otherwise, select Take Photo or Video



10. If you need to edit the location of the assessment point, click the map icon 

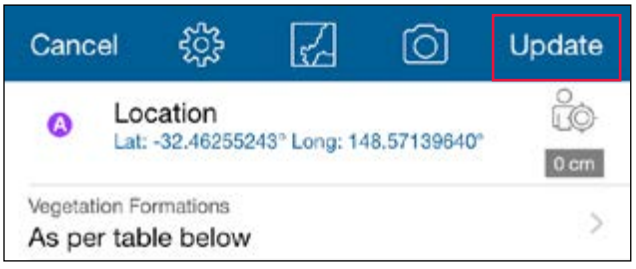
11. You will notice the point highlighted in red on the map, this shows it is in edit mode.

12. Press and hold your finger on the red point, then use the magnifying view to drag the assessment point to the correct location.



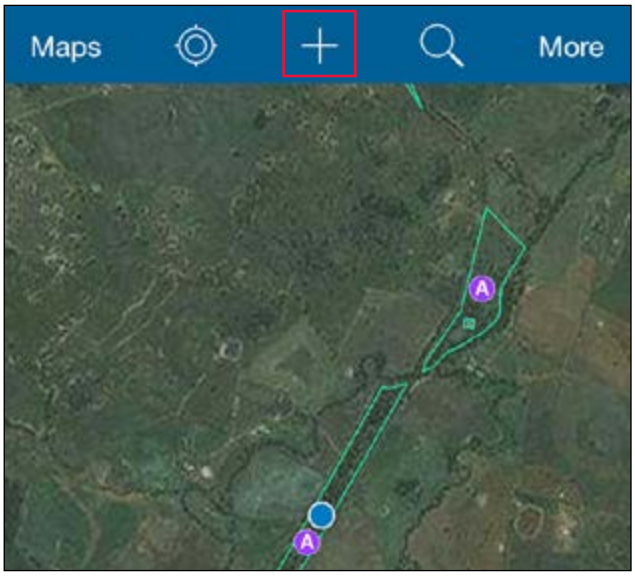
13. If needed, click the attribute icon to switch back to the attribute view. 

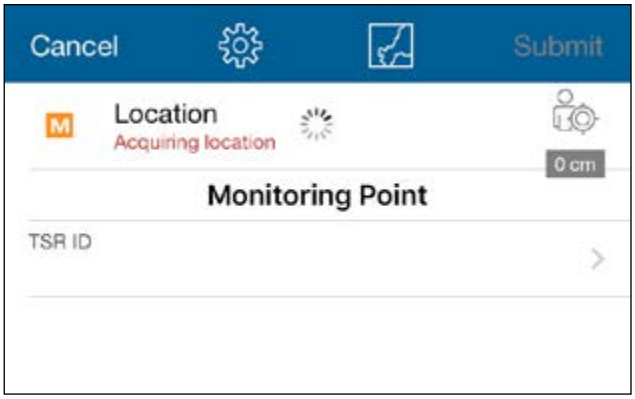
14. When you have finished editing the attributes (and if needed the point location), click the Update button.



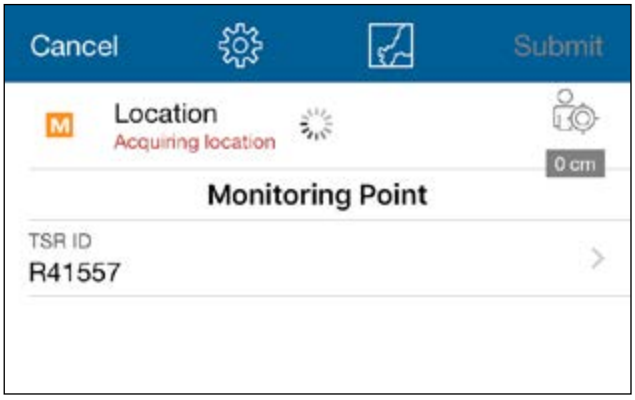
2.5 Creating a monitoring point

1. To add a new feature, click the + button.



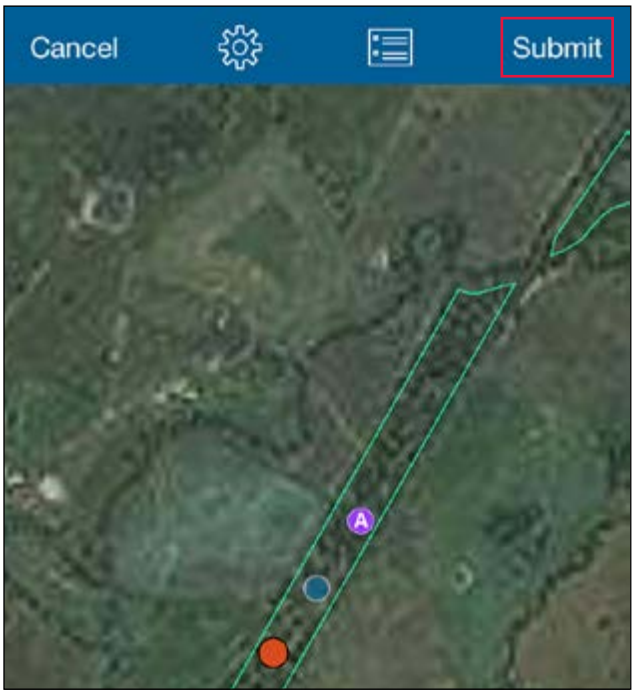


2. Type in the TSR ID if known.

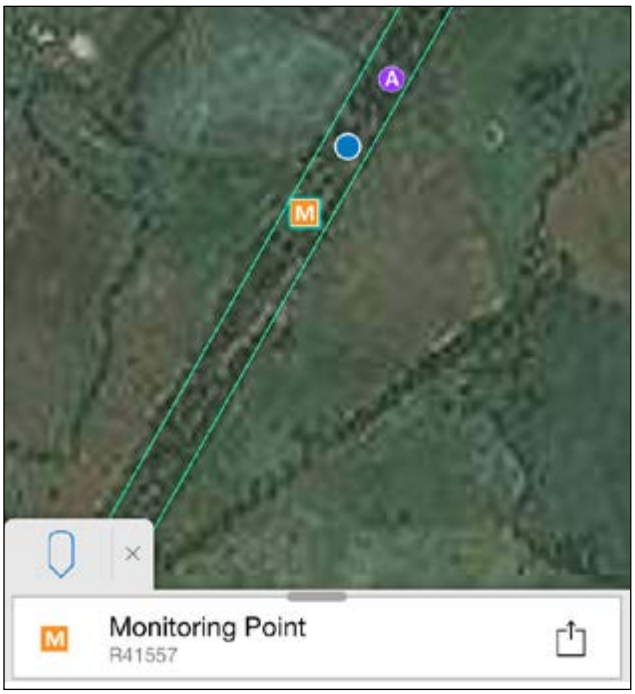


3. Switch to the map view to select the location of the new point feature on the map.

4. The location you pick on the map will appear as a red point.
5. Click submit.

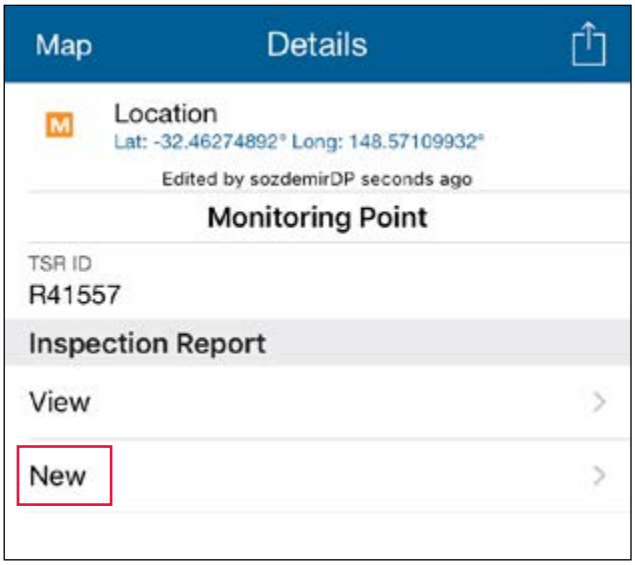


6. The submitted monitoring point will appear on the map as an orange M symbol. The blue point is your current location determined by the device's GPS.

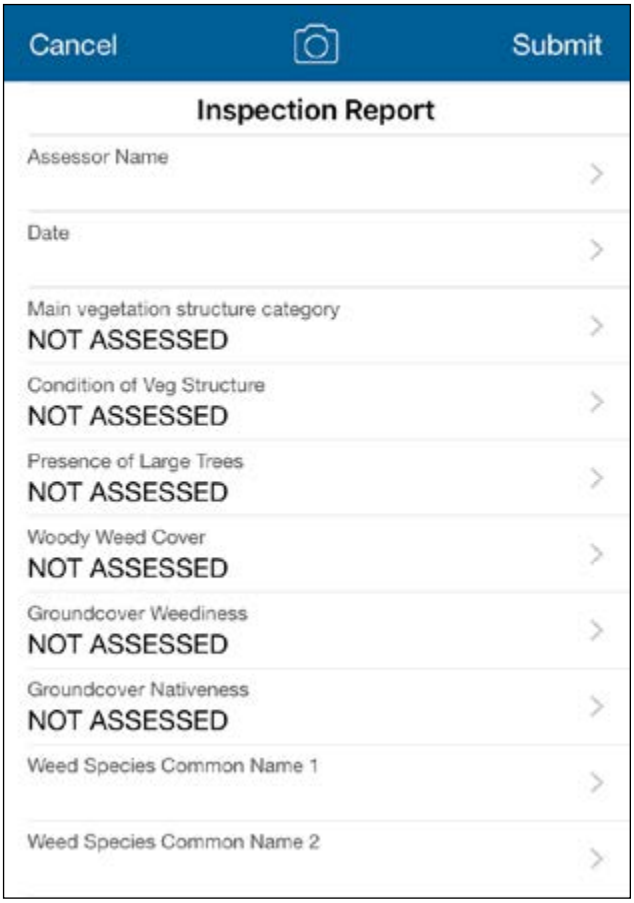


7. Click on the information panel at the bottom of the screen to view the attribute details.

8. Click on New Inspection Report.



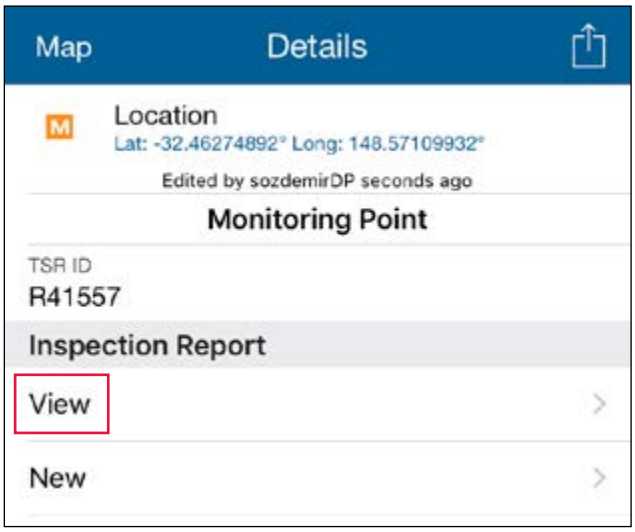
9. Fill in the details of the inspection report as appropriate then click Submit.



Note: Be sure to edit all details marked as "NOT ASSESSED".

10. To amend the TSR ID or location of an existing monitoring point, **select** the feature on the map and choose the options icon then **edit** from the list of options.

11. To amend an existing inspection report, go to the attribute details of the monitoring point in question, then click on View to see the existing inspection reports against the point.



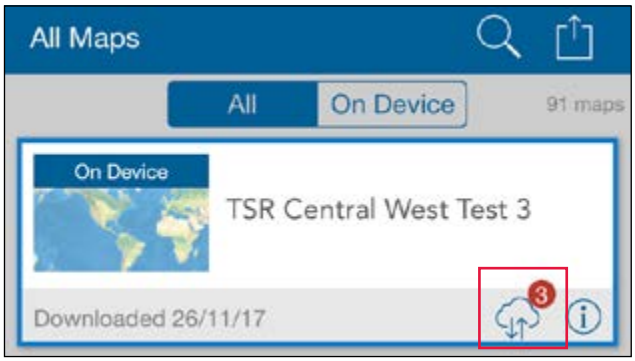
12. Click the options icon for the inspection report that you wish to edit. You can click on each inspection report if you need to see the full details.

2.6 Sync data

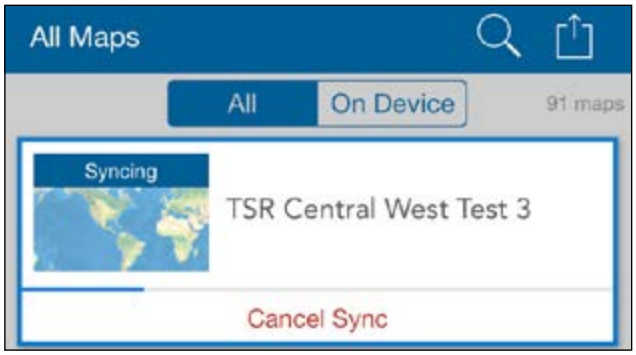
When you have completed your work and have a reliable mobile data connection (wi-fi or 3G/4G), you will need to sync your data off your device and into the LLS database.

1. In the map view (click if necessary), click on Maps in the top left corner.

2. In the list of maps view that you saw when you first opened the app, you will notice a sync icon with a figure showing how many edits need to be synced.



3. Click on the sync icon.



TSR data capture collector for ArcGIS on Android

1 The mobile application

Collector for ArcGIS is Esri's map-based data collection native application available on Android, iOS and Windows devices and suitable for use in disconnected "offline" environments. It is accessed via a Level 2 named user (i.e. with editing privileges) of an ArcGIS organisational account.

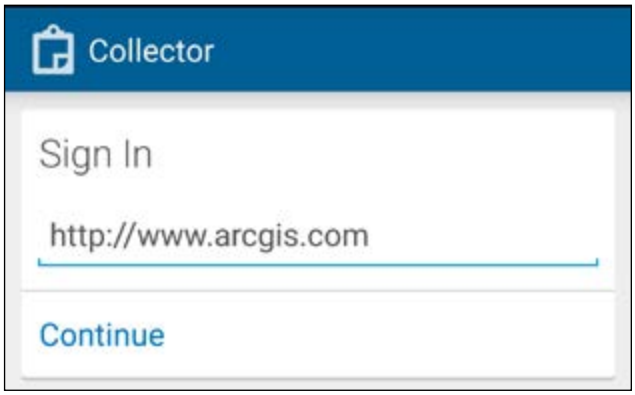
Note: The final workflow may vary from the steps outlined below.

2. Android workflow

2.1 Getting started

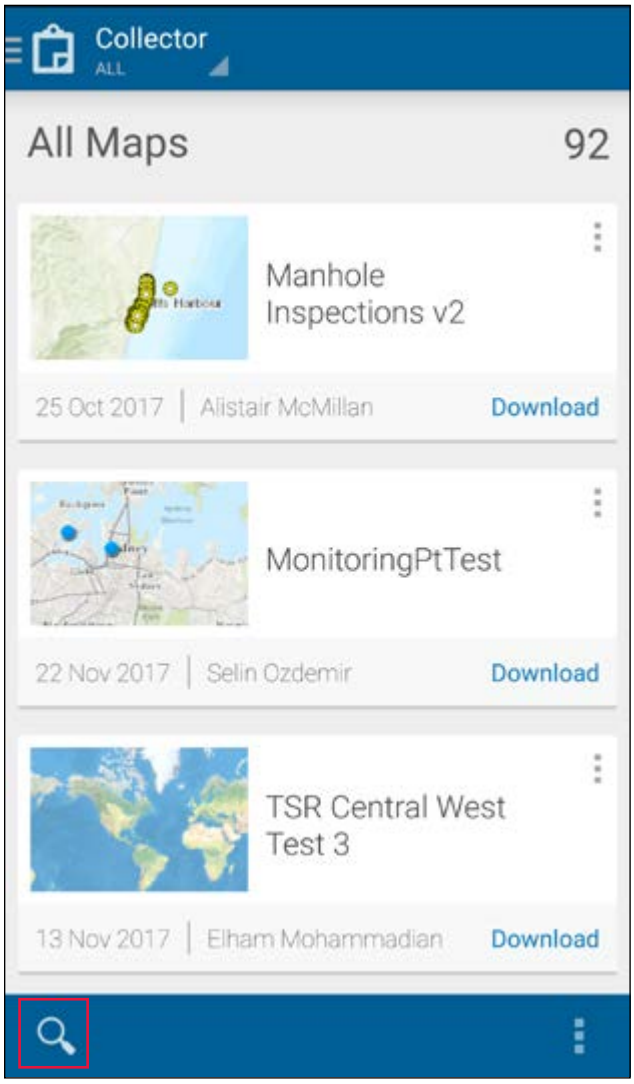
1. On your mobile device of choice, download Collector for ArcGIS from Google's Play Store.

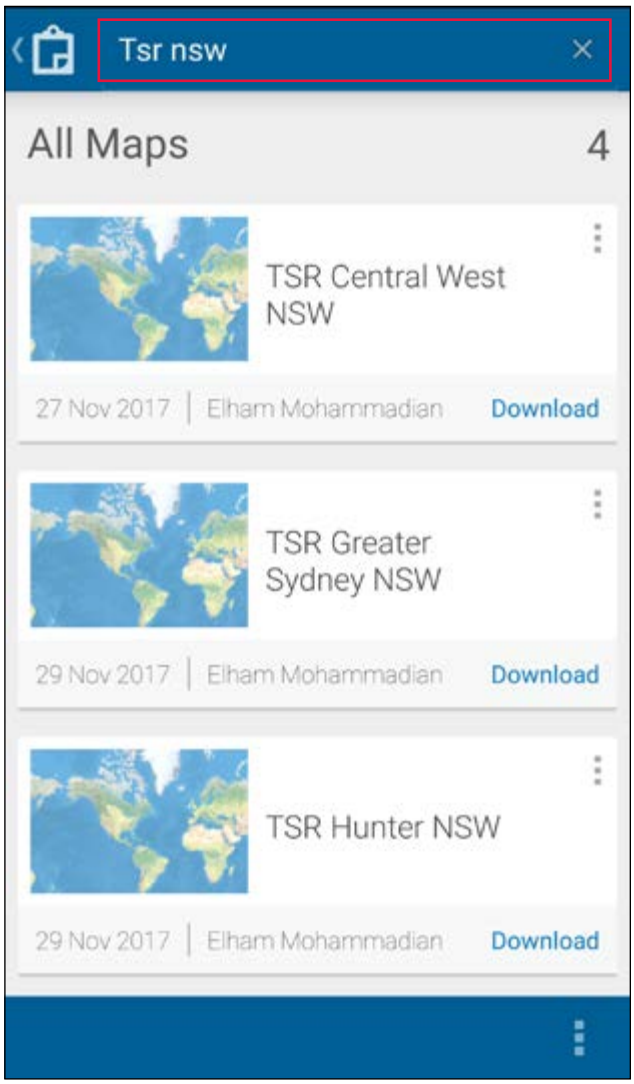
2. Open the app and choose ArcGIS Online.



3. Sign in with your ArcGIS Online named user. If you are unsure, please contact the TSR project's ArcGIS Online administrator.

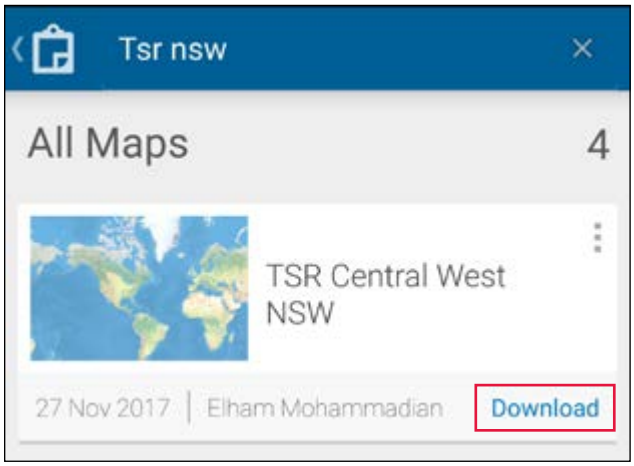
4. Once signed in, a list of available maps will appear. You should be able to see a list of TSR maps categorised by LLS region e.g. TSR Central West NSW.
Tip: Use the search bar or scroll through the list.





2.2 Going offline

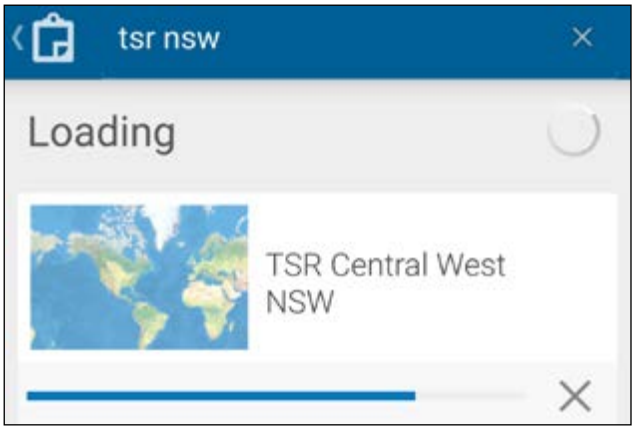
1. Select the download icon to download an offline map for the area of interest.



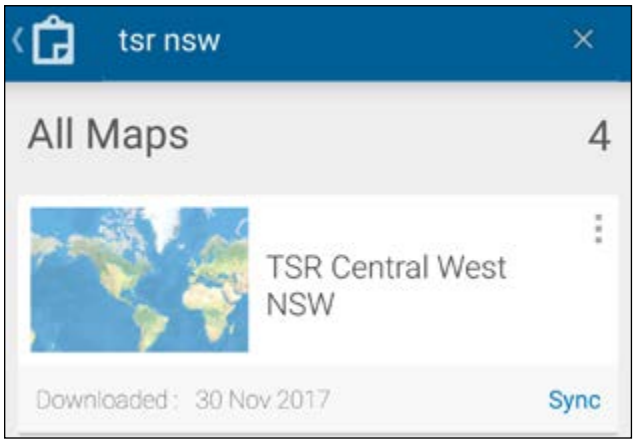
2. Choose the work area that you will need to have available to you in offline mode by zooming in and out on the map as needed.

3. Select the map detail tab at the bottom and set the level of detail you will need of the aerial imagery by zooming in or out as appropriate.
Tip: Notice the estimated size of the download. If you reach the limit or the size is too large, consider downloading a smaller work area (zoom in) or less map detail (zoom out).

4. Click download. The map will begin to download onto your device.



5. Once complete, click the map to open and start collecting data.

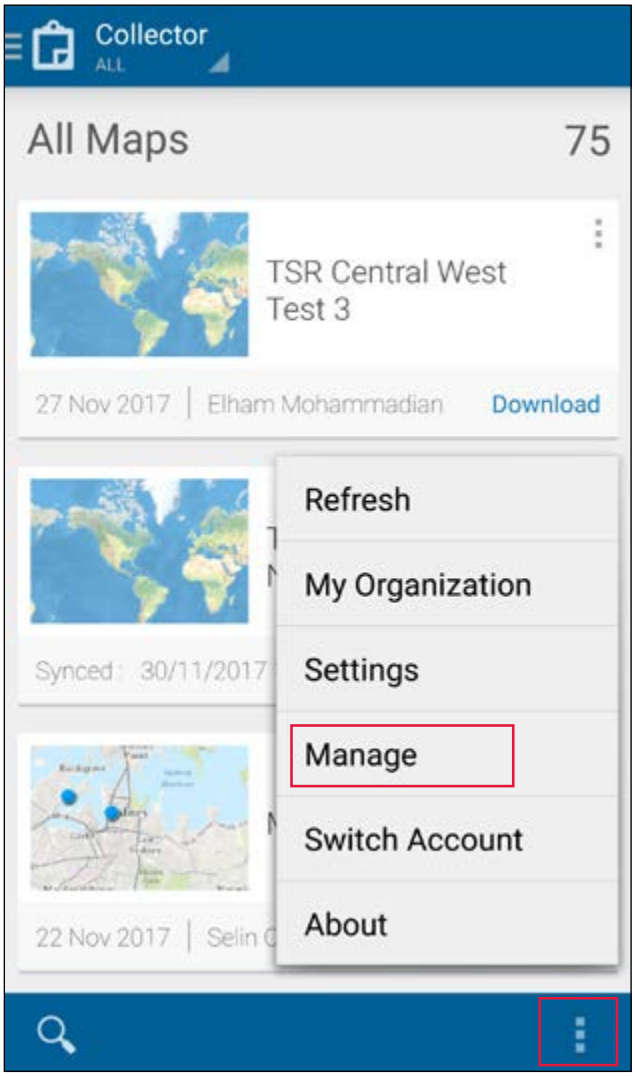


2.3 Remove offline map

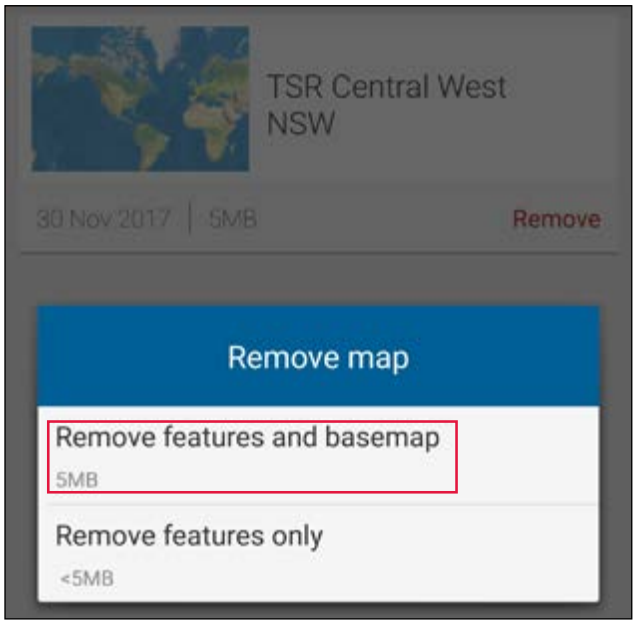
1. To remove a downloaded map from your device, go to the main maps list.
   Note: If you are within a specific map, click the arrow in the top left-hand corner to return to the main menu.

2. Select the options icon , then Manage.

3. Click Remove on the appropriate map.



4. Select Remove features and basemap.



2.4 Editing an assessment point

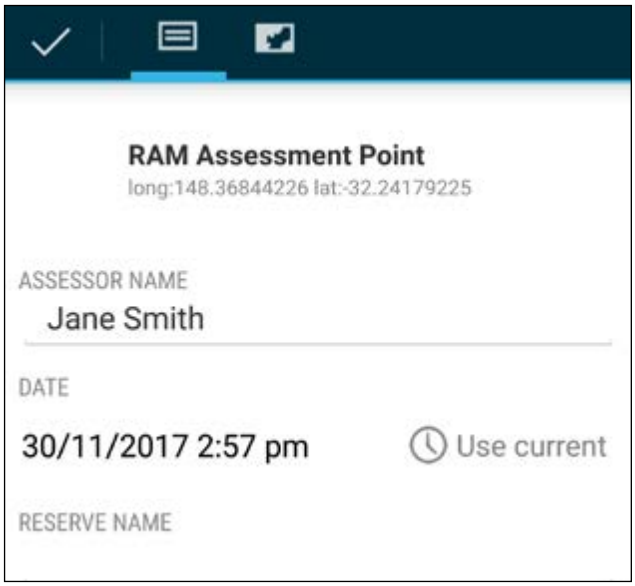
Editing assessment points is **MANDATORY**. They appear on the map as a purple A symbol. The blue point is your current location determined by the device's GPS.

1. Select an existing assessment point by clicking on the point.

2. Click on the information panel that appears at the bottom of the screen to inspect the attributes associated with the selected point.

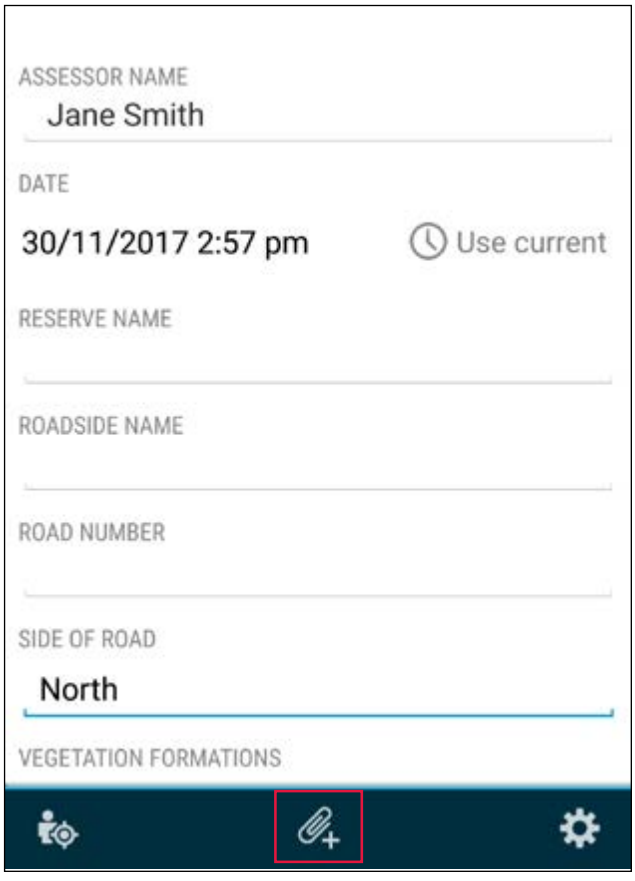
3. To edit the attributes, click the pencil icon in the bottom left-hand corner.

4. Work your way through each of the details and edit as appropriate.
   Tip: For the date and time, simple click Use Current.

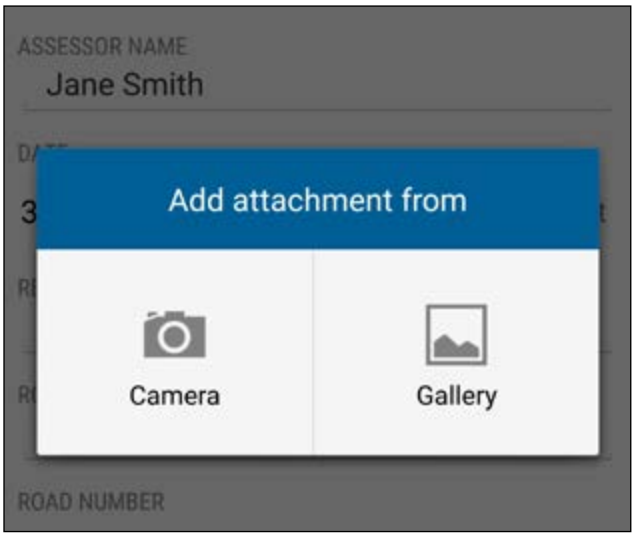


Note: Be sure to edit all details marked as "NOT ASSESSED".

5. To add a photo, click the attachments icon.



6. If you wish to attach a photo you previously took, select the Gallery option. Otherwise, select Camera.



7. If you need to edit the location of the assessment point, click the map icon 
8. The selected point is highlighted in blue on the map, this shows it is in edit mode.

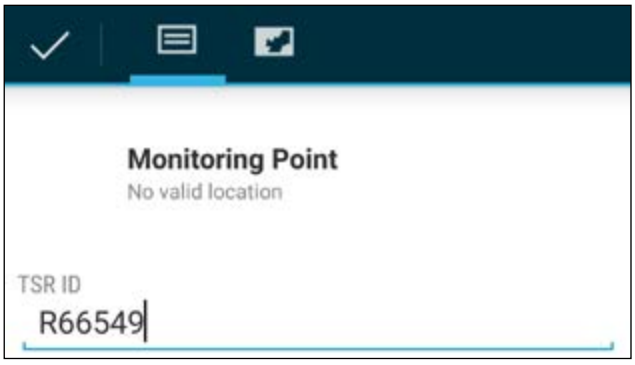
9. Press and hold your finger on the assessment point you wish to move, then use the magnifying view to drag the assessment point to the correct location.

10. If needed, click the attribute icon  to switch back to the attribute view.
11. When you have finished editing the attributes (and if needed the point location), click the Update button.

2.5 Creating a monitoring point

1. To add a new feature, click the + button.

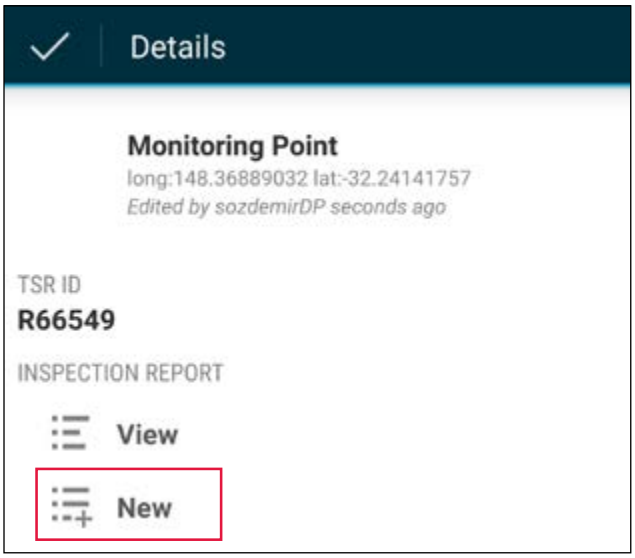
2. Type in the TSR ID if known.



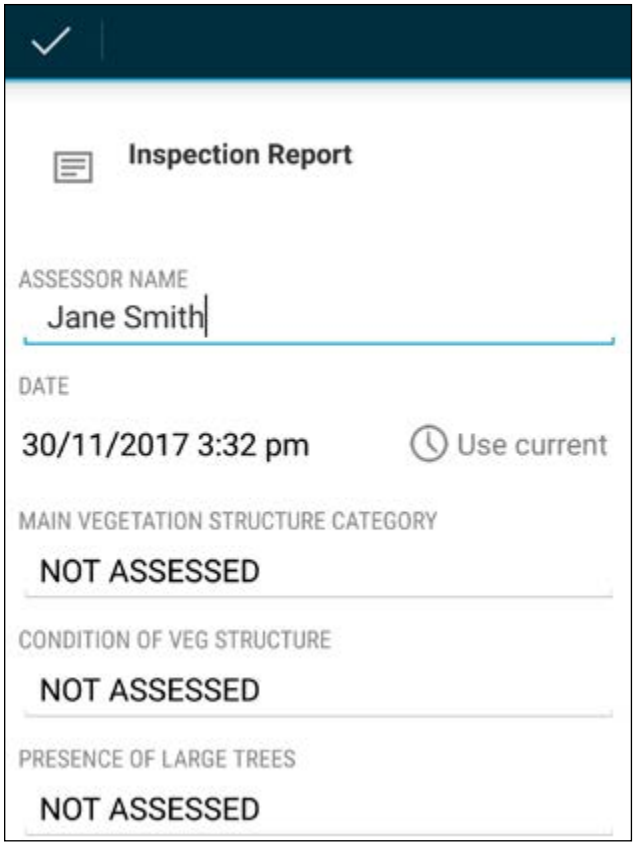
3. Switch to the map view  to select the location of the new point feature on the map.
4. The location you pick on the map will appear as an orange M symbol.

5. Click the tick icon  in the top left-hand corner to submit.

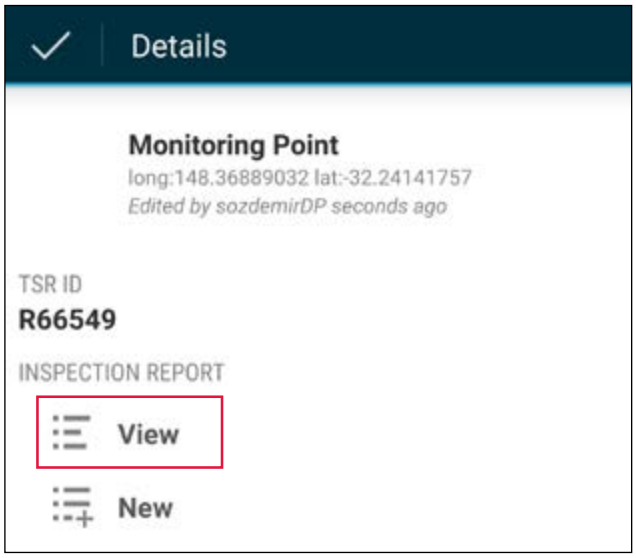
6. Click on the information panel at the bottom of the screen to view the attribute details.
7. Click on New Inspection Report.



8. Fill in the details of the inspection report as appropriate then click the tick icon.
Note: Be sure to edit all details marked as "NOT ASSESSED".

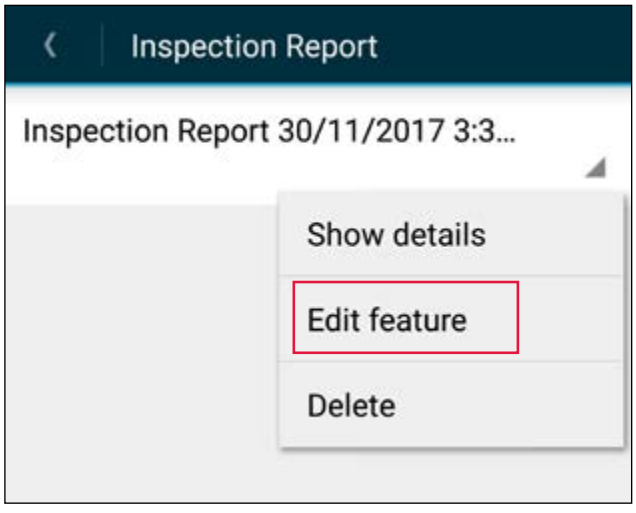


9. To amend an existing inspection report, go to the attribute details of the monitoring point in question, then click on View to see the existing inspection reports against the point.



10. Click the arrow for the inspection report that you wish to edit. You can click on each inspection report if you need to see the full details.

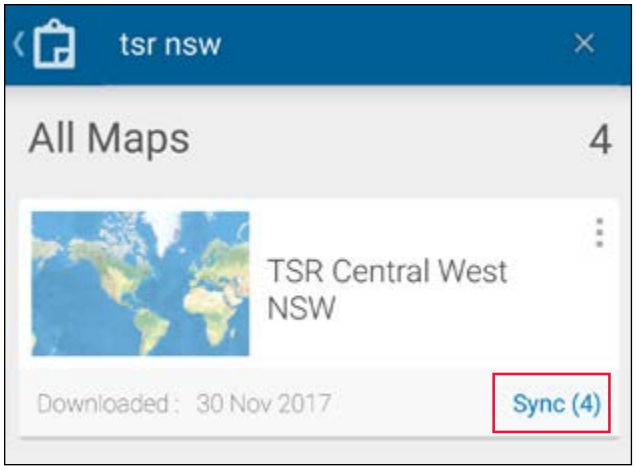
11. Then click on Edit Feature.



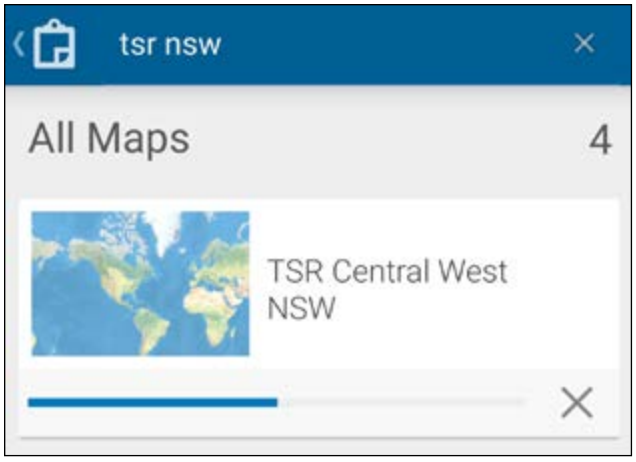
2.6 Sync data

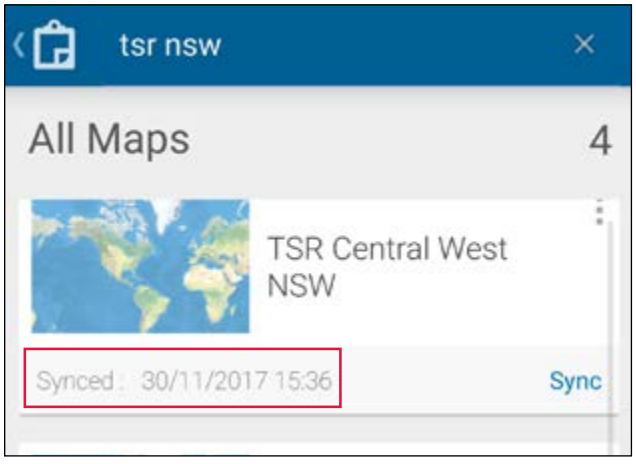
When you have completed your work and have a reliable mobile data connection (wi-fi or 3G/4G), you will need to sync your data off your device and into the LLS database.

1. Go to the main maps list that you saw when you first opened the app, you will notice a sync icon with a figure showing how many edits need to be synced.



2. Click on the sync icon.





Appendix 2:

Establishing RAM photo monitoring points

Establishing RAM photo monitoring points

What is a photo monitoring? point (PMP)?

PMPs are permanently located using GPS points for photographing the same view over time. PMP photos provide a permanent visual record of a site(s) and are an important tool to evaluate management objectives.

Figure 8. LLS officer taking regular PMP

Why have PMPs?

Establishing a PMP that is well located and is regularly monitored (annually or as determined by the Monitoring and Audit Strategy for your region) coupled with RAM vegetation condition assessments (Part C) over many years on a site is a simple and efficient way to illustrate a distinct feature that you want to monitor such as:

- Tree or shrub regeneration
- Revegetation such as direct seeding or where tree planting has occurred
- Active weed control
- Rabbit harbour destruction
- Areas of erosion.

This enables the land manager to review existing management periodically and adjust management where required to meet the site objectives. See comparison PMP sites illustrated in Figures 9 and 10.

Where to locate PMPs?

Good PMPs provide:

- Easily recognisable locations with minimal access issues (Proximity to a road or track will aid efficiency for future monitoring).
- Photo views to illustrate a distinct feature that you want to monitor, e.g. a boundary between grazed and un-grazed vegetation, an area subject to weed control, or the growth of revegetation or plants regenerating.
- A permanent distinguishable feature in the photo view to assist in photo comparison.

Try and avoid east-west PMPs because at certain times of year the rising or setting sun can obscure your photo views.

How to establish PMPs?

Steps to establish PMPs:

1. Determine desired view to illustrate the distinct feature selected e.g. location and direction.
2. Record GPS location via data collection tool and view direction (often automatic depending on the photo software).
3. Establish permanent physical point for easy identification in future (e.g. steel dropper(s)).

Figure 9. Cox's TSR 2013

Figure 10. Cox's TSR 2016

Appendix 3:

Conservation value assessment matrix

Conservation value assessment matrix

The conservation value assessment matrix below integrates the three components Part A, B and C of the RAM to provide an overall conservation value applicable state wide.

Note this occurs automatically once Part C is completed and all data is uploaded.

Table 8. Conservation value assessment matrix

Conservation status	**Landscape context**	**Condition and habitat**		
		High quality	Moderate quality	Low quality
Threatened	Large and/or connected	High HCV	High HCV	Medium MCV*
	Moderate	High HCV	Medium MCV	Medium MCV*
	Small and disconnected	High HCV	Medium MCV	Medium MCV*
Depleted	Large and/or connected	High HCV	Medium MCV	Low LCV
	Moderate	High HCV	Medium MCV	Low LCV
	Small and disconnected	High HCV	Medium MCV	Low LCV
Common	Large and/or connected	High HCV	Medium MCV	Low LCV
	Moderate	Medium MCV	Low LCV	Low LCV
	Small and disconnected	Medium MCV	Low LCV	Low LCV

*** Reserves that fall into these three categories will form part of the RAM matrix audit and may be revised in subsequent versions of this guide.**

Appendix 4:
RAM assessment sheets

The following RAM assessment sheets illustrate the layout of the digital Collector App used in the RAM.

Linear and Discreet Reserves **Major Vegetation Type** (Grasslands,Shrublands/Heathlands, Treed)

Assessor name | Date

Reserve Name | Crown Reserve Number

Roadside Name | Road Number

Side of Road Both or N NE E SE S SW W NW

Vegetation Formation **FREE TEXT** Vegetation Class **FREE TEXT** Plant Community/No. if known **FREE TEXT**

Assessment Zone Identification | GPS Coordinates

Start of Zone | End of Zone

Part A Conservation Status

Vegetation		**Wetlands**		**Site Managed Species**	
TEC/Over cleared veg community	2	Ramsar/DIWA/SEPP 14	2	Present	2
Not Present	0	Wetlands (>2ha)	1	Absent	0
Name if known		None (<2ha)	0		

TOTAL SCORE =

Threatened = 2+, Depleted =1, Common = 0

Part B Landscape Context (*Note any site with non-native vegetation scores 0*)

Mitchell Landscape		**Zone Vegetation Width** *(width within assessment zone)*		**Total Native Vegetation width** *(within and adjoining assessment zone)*	
>70% cleared	10	> 100m	10	>100m	10
30-70% cleared	5	21-100m	6	20-100m	6
<30% cleared	0	5-20m	2	<20m	0
		<5m	0		

Native Vegetation within 100m

>5 ha within 100m 10
1-5 ha 5
<1 ha 0

TOTAL SCORE =

Large and or connected = 22+, Moderate = 10-21,
Small or disconnected = 0-9

Part C Condition

Vegetation structure		**Large trees**		**Non- indigenous woody/vine weeds**	
Intact/natural	6	Common	3	Absent	3
Mostly intact	4	Sparse	1	Sparse	2
Partially intact	2	absent	0	Common/abundant	1
Sparse or absent	0				

Ground Cover

Weediness		**Nativeness**	
sparse	4	diverse throughout	4
common in parts	3	diverse in patches	3
common throughout	2	few species common throughout	2
abundant	0	patches only	1
		absent/sparse	0

TOTAL SCORE =

Naturally treed vegetation:
HIGH QUALITY: 17+ = Residual or Modified A;
14-16 = Modified B;
MODERATE QUALITY: 9-13 = Transformed A; 6-8 = Transformed B;
LOW QUALITY:0-5 = Replaced

Shrublands / Heathlands:
HIGH QUALITY: 14+ = Residual or Modified A;
11-13 = Modified B;
MODERATE QUALITY: 8-10 = Transformed A;
6-7 = Transformed B;
LOW QUALITY: 0-5 = Replaced

Grasslands:
HIGH QUALITY: 7+ = Residual or Modified A; 5-6 = Modified B;
MODERATE QUALITY:
4 = Transformed A; 3 = Transformed B;
LOW QUALITY:
0-2 = Replaced

Major weed species present

- 1-5 species

Main tree

- 1-5 species

Main shrub

- 1-5 species (if known)

Main understorey

- 1-5 species (if known)

Other indicators

- Tick if present

Habitat features	Sparse	Common	Abundant
Tree regeneration			
Shrub cover			
Shrub regeneration			
logs & fallen timber			
Wetlands/springs/gilgais			
Rocky outcrops			
River/creek banks			
Mistletoe			
Cryptogams			
Rare plants			

Threats/disturbances

Threats / Disturbances	Impact	
	Minor	Significant
Illegal grazing		
Illegal firebreak		
Illegal track(s)		
Illegal drainage		
Cropping		
Feral animals		
Timber removal		
Active erosion		
Invasive weed		
Flood/fire damage		
Other (list)		

Cultural heritage sites

- Note any significant cultural heritage sites located within the reserve.

Current management regime

- This can include comments on grazing, fire and other management practices. Note the current and any past management regime, if known.

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