

# Surveying the boundaries of Boodjamulla (Lawn Hill) National Park in remote North-Western Queensland

Jemma PICCO and Christopher SERPELL, Australia

**Key words:** Boodjamulla, Lawn Hill, Land Surveying, Aboriginal land, Queensland

## SUMMARY

Boodjamulla (Lawn Hill) National Park is an oasis in the outback of remote North-Western Queensland covering over 281,500 ha of land. Boodjamulla (rainbow serpent country) is the spiritual heart of the indigenous Waanyi people's land. The park features spectacular gorge country, sandstone ranges, open woodlands and spinifex communities, and World Heritage fossils. The land contained within the Boodjamulla (Lawn Hill) National Park is available state land that is claimable land under Schedule 2 of the Queensland *Aboriginal Land Regulation 2011*. The grant of Aboriginal freehold title over Boodjamulla (Lawn Hill) National Park, under the provisions of the *Aboriginal Land Act 1991*, is being facilitated by the Queensland Government's Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (the department). This is an Act providing for the grant, and the claim and grant, of land as Aboriginal land, and for other purposes.

Ownership of the land will be transferred to a Prescribed Body Corporate for the Waanyi People. The Waanyi people will lease the Aboriginal land, in perpetuity, to the State to manage under the *Nature Conservation Act 1992*. This is the first lease back arrangement that has been successfully negotiated on national park land in Queensland. The land, covering over 281,500ha of land, is being delivered in three tranches. The first tranche, consisting of the gorge and the southern section of the national park was finalised on 23 June 2023. The second tranche is proposed to be finalised, and the title deeds handed over by September 2025 and the third tranche to follow shortly afterwards.

Surveying provides accuracy and certainty of the land which is fundamental to the issue of freehold title in Queensland as well as certainty to the rights, responsibilities and restrictions associated with the land. The survey of this land and the preparation of the survey plans for the issue of freehold tenure under the provisions of the *Aboriginal Land Act 1991* provided many challenges. This paper will discuss the challenges that were faced from a land surveying perspective and how these challenges were overcome to successfully deliver a package of survey plans for the lodgement and issuing of tenure. Challenges included the remoteness and accessibility of the land; size of the survey; extreme weather conditions; historical surveys and boundary reinstatement; records searching; logistics and planning; resourcing; plan drafting; and the jurisdictional boundary of Queensland and the Northern Territory.

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## 1. INTRODUCTION

Surveying is fundamental to the issue of freehold title in Queensland, as well as the certainty of rights, responsibilities and restrictions associated with the land. A parcel of land in a fully surveyed state protects rights, obligations and restrictions on the title. A reliable land boundary framework underpins economic activity by preserving confidence in land rights and interests.

In Queensland, the *Aboriginal Land Act 1991* and the *Torres Strait Island Land Act 1991* provide mechanisms for land to be granted to groups of Indigenous people. The Minister can make declarations to facilitate the granting of land and about the management of the land. The purpose of these Acts is to enable Aboriginal and Torres Strait Island peoples to have ownership of land to manage according to their traditions or customs, recognising the spiritual, social, historical, customary, cultural and economic importance of land (Queensland Government, 2025). The land under this legislation is granted as ‘inalienable freehold’ which means that the land is held in trust for the benefit of the people connected to the land and cannot be sold or mortgaged. Australian federal legislation the *Native Title Act 1993* recognises that some Indigenous people have rights and interests in land and waters according to their traditional laws and customs. Native Title describes these rights and interests, and they are recognised by the common law, but this federal legislation does not grant tenure.

The survey of land and the preparation of the survey plans for the issue of freehold tenure under the provisions of the *Aboriginal Land Act 1991* provides the accuracy and certainty of the land and opportunities to the traditional owners in terms of managing their traditional lands including future development and tourism.

## 2. BOODJAMULLA (LAWN HILL) DEALING

Boodjamulla (Lawn Hill) National Park is an oasis in the outback of remote North-Western Queensland covering over 281,500 ha of land. Part of the National Park sits along the Queensland and Northern Territory border with the nearest city being Mt Isa some 260km to the south-east. The area is more than 1800km from Brisbane, the capital city of Queensland. Boodjamulla (Lawn Hill) National Park features spectacular gorge country, sandstone ranges, open woodlands and spinifex communities, and World Heritage fossils. The iconic gorge fed by freshwater springs from the limestone plateau to the west and the Riversleigh World Heritage Site, one of the top fossil deposits in the world dating back 15-25 million years, are part of the National Park. Boodjamulla (rainbow serpent country) is the spiritual heart of the indigenous Waanyi people’s land (Boodjamulla Cooperative Management Council, 2024).

The land contained within the Boodjamulla (Lawn Hill) National Park is available state land that is claimable land under Schedule 2 of the Queensland *Aboriginal Land Regulation 2011*. Claimable land is land that may be subject to a claim by Aboriginal people and the claim, if duly made, would be heard by the Aboriginal Land Tribunal (the Tribunal) to determine if the claim is established. The Tribunal would then make a recommendation to the Queensland Government Minister about the grant of the land and if the land was granted, it would be held as inalienable freehold for the benefit of a group of Aboriginal people. The Boodjamulla claim was heard by the Tribunal.

The grant of Aboriginal freehold title over Boodjamulla (Lawn Hill) National Park, under the claimable land provisions of the *Aboriginal Land Act 1991*, is being facilitated by the Queensland Government's Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development's (the department) Indigenous Land Operations team. Successfully claimed national park must be leased back to the State for the purposes of the management of the national park land under the *Nature Conservation Act 1992*, which is the responsibility of Queensland Government Department of the Environment, Tourism, Science and Innovation.

The department's Surveying Services team performs field surveys of state land to support departmental dealings such as this one. The initial survey advice for the survey of Boodjamulla (Lawn Hill) National Park was provided in May 2021 with the land approved to be surveyed by the Minister. The surveying project commenced in August 2021 and the first field campaign began in October 2021.

### 3. LAND SURVEYING CHALLENGES FOR THE BOODJAMULLA DEALING

The land surveying of the Boodjamulla dealing involved many challenges including the size and extent of the survey; remoteness and accessibility of the land; extreme weather conditions; logistics and planning; resourcing; surveying and tenure records searching; historical surveys and boundary reinstatement; plan drafting; and the jurisdictional boundary of Queensland and the Northern Territory.



*Figure 1 Cadastral Surveyors Scott Johnson, Chris Serpell, Daniel McCosker and Lyle van Tienhoven at the Boodjamulla National Park sign*

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### 3.1 Size and extent of survey

The Boodjamulla (Lawn Hill) National Park was previously unsurveyed and consists of three non-contiguous parcels of land with two of these parcels not having dedicated (gazetted) access. Therefore, the survey encompassed not only the National Park land but also adjoining state reserves providing continuity and access with the extent of area subject to survey totalling 377,500 ha of land (approximately 130km north to south and approximately 83km east to west). This area of land is larger than many countries around the world. Given the size of the dealing it was broken into three tranches.



*Figure 2 Location and size of the Boodjamulla (Lawn Hill) Survey*

### 3.2 Remoteness and accessibility of the land

The Boodjamulla (Lawn Hill) survey area is in remote North-Western Queensland within two local government authority areas being Mount Isa City Council and Burke Shire Council. These local government areas are sparsely populated within a total population of around 20,000 people (Queensland Treasury, 2025). On the first field campaign, a considerable amount of time was spent gaining knowledge of the land, the access tracks and undertaking reconnaissance for future survey work. The National Park is very remote and there were many areas where access by four-wheel drive vehicles was not possible, and considering the extensive distances required to travel in this very hot climate, walking too far from vehicles was often not safe. The corners that were accessed on foot were well planned with the staff, climate, topography, survey equipment, water and safety supplies considered. A helicopter charter was required to access many of the remote boundaries of the property.

Conventional access via four-wheel drive was generally restricted to minor tracks, many of which are rarely used and not maintained. Rangers who maintain the National Park provided information on track locations and conditions, even providing GPS tracks they had recorded. Many of the areas were not accessible from public roads or the main entrance to the National Park, and therefore access was arranged through adjoining properties, again drawing on local knowledge which proved to be invaluable.



*Figure 3 A photo of the four-wheel drive accessibility.*



*Figure 4 Helicopter access only into some boundary corners.*

### **3.3 Extreme weather conditions**

The North-West of Queensland has a semi-arid climate with hot humid summers and dry warm winters. In North-West Queensland there are two seasons, the ‘wet’ and the ‘dry’. The dry season (May to September) usually has clear skies and low humidity while the wet season (October to April) usually has heavy rain and high humidity. The first field campaign to survey Boodjamulla (Lawn Hill) National Park was planned, approved, and commenced in October 2021. The conditions for the first campaign fell within the hotter time of year, with daytime maximum temperatures regularly rising to 40 degrees Celsius, and with the occasional afternoon storm. From a safety perspective, the planning of future trips was then constrained to

the cooler months of May, June, July and August where daily temperatures are usually in the high 20 degrees Celsius. In early 2023, the area experienced widespread flooding which substantially affected the region and the ability to access the land and therefore the ability to perform field surveys. The National Park suffered extensive damage including the ranger base, visitor facilities and park infrastructure. Significant remediation works are still underway as the area rebuilds from this significant flooding event.

### **3.4 Logistics and field planning**

A project of this size required careful planning particularly in relation to logistics. It was imperative to coordinate the availability of staff trained to work in remote locations, ensuring suitably equipped four-wheel drive vehicles, engagement of helicopter operators, and coordinating appropriate accommodation and meals for staff. There are limited accommodation options in remote Australia. For this project a combination of staying with commercial accommodation providers, at the National Park ranger base and camping within the National Park was utilised. When large distances were required to travel from accommodation providers, a camp was set up closer to the work area. Such situations were also applied to reduce helicopter distances covered.

Careful planning was required when establishing a base camp in such isolated areas to ensure teams were carrying sufficient resources and supplies such as water, food and fuel to ensure participant's safety. Due to these constraints, camping was restricted to approximately a week at a time with the opportunity to depart and restock, usually from Mount Isa, before continuing the survey. The survey of Boodjamulla (Lawn Hill) National Park was completed over eight field campaigns between October 2021 and August 2024.

### **3.5 Resourcing**

This project was a significant undertaking for the department's Surveying Services team. The project was led from the Cairns office. Surveying Services is a small departmental team of around 50 staff based across Queensland. Over the course of the project more than twenty surveying staff (a mix of Registered Cadastral Surveyors, Surveyors, Graduate Surveyors and surveying support staff) were involved in the project.

Most field campaigns involved 6-8 staff in five four-wheel drive vehicles due to the amount of equipment and supplies that were required for the remote campaigns. A combination of regular participants for continuity, and irregular participants provided opportunity for fresh ideas and approaches to the job. Multiple experienced Cadastral Surveyors were chosen for each campaign so they could share their skills and knowledge on locating features and historical survey marks, then applying these discoveries to the reinstatement solution. Team members were also able to learn skills in safely working in remote areas including numerous tyre changes and repairs, from working in this remote and rugged landscape.

### 3.6 Records searching

The survey involved significant research of survey information in the Queensland plan archives (plans and field records), tenure records and other information on departmental files to ensure the surveyors had all the previous survey data in the area and data about the intention of the existing unsurveyed boundaries. The survey research and records searching revealed there were original survey reference trees from 1889 and 1925 from old run surveys of the area, water boundaries and natural feature boundaries such as cliffs, infrastructure boundary features such as fences, and the existence of other tenure such as mining interests and telecommunications.

Some of the tenures adjoining the National Park also included leases and mining permits so it was also important to understand the background and definition of these interests. In Queensland, the exploration permits are defined by sub-blocks which are areas of land bounded by parallels of latitude one minute apart and two meridians of longitude one minute apart. These latitudes and longitudes are defined by reference to the Australian Geodetic Datum 1966 (AGD 66), as prescribed by Section 11A of the *Mineral and Energy Resources (Common Provisions) Act 2014*. At times these permits were required to be surveyed for certainty as to their location in the lots adjoining the National Park.

### 3.7 Historical surveys and boundary reinstatement

Historical boundaries, both surveyed and unsurveyed, were prepared in accordance with the legislation and surveying standards of the time. As time has progressed, legislation and standards have evolved but so has the equipment and processes to perform land surveys with survey plans needing to comply with current legislation and standards. It is important to understand the historical survey and tenure requirements as part of the reinstatement and the survey of boundaries today.

This survey was split into eight campaigns. The first campaign focussed on establishing survey control across the broad extents and at key corners of the project. Where time permitted, searching commenced for historical survey monuments and initial boundary reinstatement strategies undertaken in the first campaign. The subsequent campaigns focused on sections of the National Park locating original survey marks and features, both natural and manmade, as identified from the survey searching before determining the boundary reinstatement. The survey was undertaken using traditional total station measuring and Global Navigation Satellite Systems (GNSS). Boundary corners were appropriately marked with white surveyors' pegs, stainless steel bolts in rocks or star pickets.

#### 3.7.1 Queensland Northern Territory Jurisdictional boundary reinstatement

The Queensland-Northern Territory border was originally proposed to run a line true north (360°) along the 138th meridian from the intersection of the 26th parallel (Poeppel Corner) in the south up to the Gulf of Carpentaria. However, it was later discovered there was a problem with the theodolite and the line was run at about 359°58'30" instead of 360° (Museum of Lands

Mapping and Surveying, 2018). The survey commenced in 1884 by Surveyor Augustus Poeppel and Lawrence Wells along with six assistants and two cameleers. At the 324-mile post, Poeppel left due to his health and John Carruthers took his place as survey leader in July 1885. The border survey was 650 miles 57 chains and was completed in September 1886. Along with field records and associated field records, the original survey included the instruction to place a survey post at every one mile commencing at the southern extent northward.

The section of the border reinstated by this project intersects in the vicinity just north of border mile post 507 and to the south of mile post 538 as surveyed by Surveyors Carruthers and Wells by theodolite and chain. Records of the survey are available, and the subject area is registered in departmental records as G25013. The terrain along this boundary is very remote and rugged, as was also reported during the original survey records. The survey records contain significant detail of the survey such as features along the boundary, waterholes, details of the marks placed and comments associated with the survey.

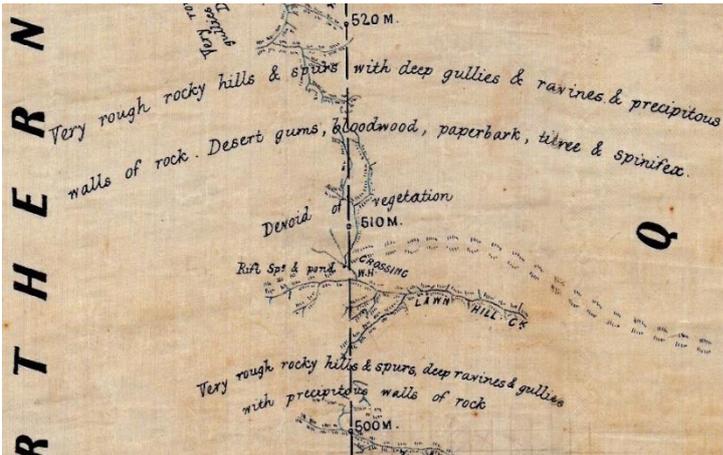


Figure 5 Extract of survey plan G25013 from 500M (mile post) to 520M (mile post)



Figure 6 Survey field records of the section north of the 508 Mile post indicating a “stonepile” depicted at the top of a range.



*Figure 7 Departmental surveyor Lyle van Tienhoven beside the stonepile found at the top of range north of 508 Mile post in 2022.*

It was found that most mile posts were placed in rock cairns with intermediate rock cairns also placed along the line at tops of ridges and prominent locations. Given the passing of nearly 140 years, in an environment that is subject to extreme weather and adverse events including regular fires and termites, only a small proportion original posts were found, either standing in a rock cairn or laying on rocks having fallen over. In other instances, burnt post butts were found below ground level, or post hole remains (typically darkened soft ground) found below the rock cairn.



*Figure 8 Some photos of some other mile posts located as part of this survey – the 507 mile post in rock cairn and departmental surveyor Scott Johnson with the 510 mile post in low rocks found lying over.*

Where original marks, or remnants were found, these have been adopted and held in the reinstatement of the boundary, following the intention of the boundary and the footsteps of Carruthers and Wells.

3.7.2 Original Run Surveys

In Queensland, run surveys were undertaken in remote areas for issue of tenure and to encourage the development of the land, particularly in the mid to late 1800's. Often the first surveys ran along watercourses to map the rivers and creeks, and to gain valuable information on the terrain and vegetation, for development. Following the watercourse run surveys, were the initial boundary surveys to create parcels of land. Many of these rural parcel boundaries are unsurveyed with their boundary corners derived from the survey marks placed on these original run surveys.

In this region, the surveys creating boundaries were generally undertaken around the 1880's, like the State border survey. The typical survey methods for these types of surveys in remote locations was by circumferentor (compass) and perambulator (wheel), or pacing. Records available for this project did not provide any information on what survey methods were used, and the rough and broken terrain would have proven very difficult to maintain accuracy using these methods, which made location of original marks and reinstatement challenging. The development of the land as a result of the early surveys did not proceed as originally expected and resulted in the establishment of larger holdings with no evidence of boundary fencing found in most of the original run boundaries.

Through overlaying imagery, topographic maps and ground location of common natural features with those located in the field records of the original surveys, an approximate fix was pre-calculated to enable searching of reference trees and other original marks. Adopting this approach from features resulted in the very rewarding discovery of numerous original surveying reference trees. However, at many corners no original marks were found and in the absence of these marks, a combination of features (many of which are significant to the area and have changed very little over time) and other corner marks were used to reinstate boundaries.

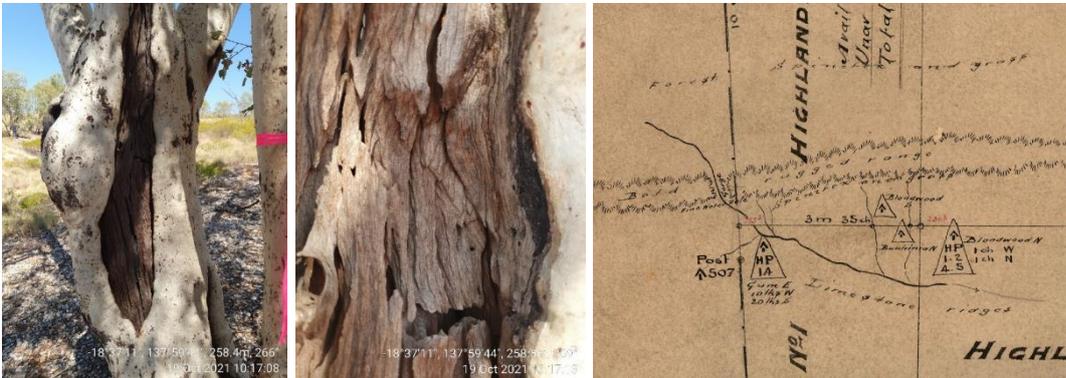


Figure 9 Photos of the Original Reference tree, HP14, found to reference station 235b on plan B144102 (extract of plan shown)

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### 3.7.3 Unsurveyed National Park Boundaries

National Parks and reserves in Queensland are State Land where the requirement for boundaries to be in a surveyed state is not always necessary. As the main objective of this project is to survey and define the boundaries of these areas, it was necessary to examine each survey plan currently defining the National Park as well as the adjoining reserves and term leases (pastoral purposes) to follow the intention defining these unsurveyed boundaries.

Some examples of intended boundaries included straight lines represented by “about” (unsurveyed) bearing and distances, while others were defined by an offset from a formed track, ridge line, a feature such as a watershed, cliff, escarpment or there was even a boundary of the National Park defined by a contour with height value.

Current cadastral surveying standards provide for defining boundaries based on ‘natural features’ that can be clearly defined such as edge of escarpment, cliff, top edge of creek bank, watershed, ridgeline, etc. The adoption of a contour value, as shown on some previous plans, does not comply with current requirements. Therefore, to follow the intention of previous definition of “contour” boundaries, a suitable natural feature or the marking of right line boundaries corresponding with the contour was necessary.

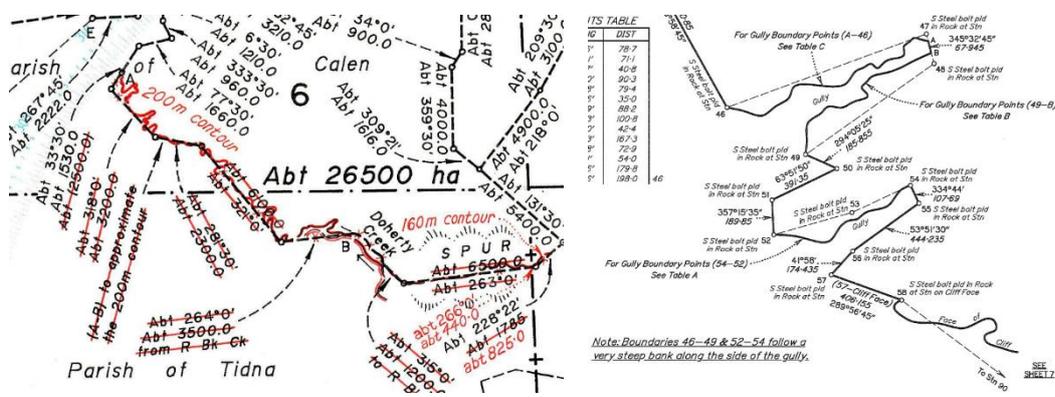


Figure 10 Extract of plan NPW503 showing an unsurveyed 200m contour boundary (left) and an extract of the survey plan (right) with the boundary surveyed by natural features (curvilinear lines) in combination with right line marked boundaries.

Further examples of seeking to follow the intentions of previous plans included instances where “about” dimensioned boundaries are represented on the plans, however a description of features or similar is described as well. In these cases, a similar approach was followed to continue defining the surveyed boundaries via dimensioned lines while attempting to follow the feature or description on the original survey plans. When a boundary is a nature feature, it is represented as a curvilinear line.

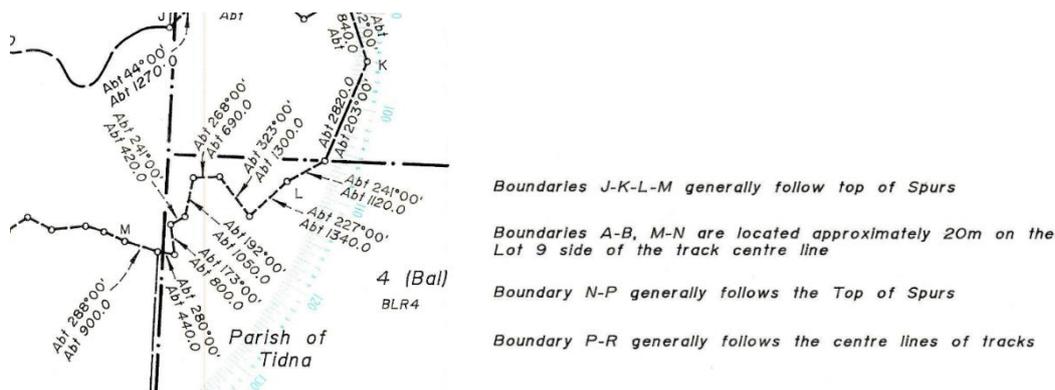


Figure 11 Extract of plan CP854027 representing about dimensioned lines in combination with descriptions of intended boundary features.

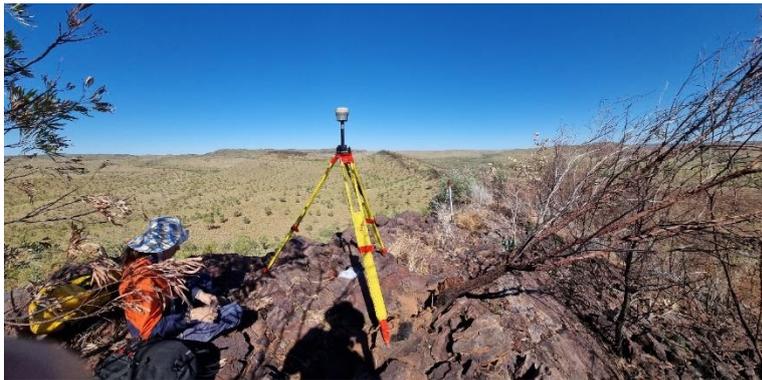


Figure 12 A photo of the Spur line in the vicinity of Station L on CP854027 and the marked placed as part of the survey.

### 3.8 Plan drafting

The surveys culminated in the preparation of numerous survey plans for the departmental dealing. Eleven survey plans have been lodged for registration making the plan drafting supporting the project a significant undertaking. The survey of the National Park was split into three survey plans. SP326433 and SP326431 were delivered as part of Tranche 1 of the dealing and encompassed the gorge and southern part of the National Park. SP349325, the survey of the rest of the National Park, was recently registered as part of Tranche 2. Another ten survey plans were also completed as part of this project for adjoining state land reserves.

### 3.9 The jurisdictional boundary of Queensland and the Northern Territory

As part of this survey, the project team liaised with the Northern Territory government survey office in relation to the survey control and reinstatement of the boundary from the mile posts found along the border. For any survey plans along the border to register in the Queensland

Titles Registry, it is important that the Surveyor-General of adjoining jurisdictions (Northern Territory, New South Wales or South Australia) agree to the registration of the plans. For this project, the survey plans lodged in the titles registry were accompanied by a statutory Form 18 consent form, signed by the Director of Surveys in Queensland and the Surveyor-General of the Northern Territory, for the registration of the plans along the jurisdictional boundary.

#### 4. CONCLUSION

The first survey campaign for the Boodjamulla (Lawn Hill) National Park commenced in October 2021 and after eight field campaigns the final survey plans were delivered ahead of schedule in November 2024. The first tranche, consisting of two survey plans incorporating the gorge and the southern section of the national park, was finalised on 23 June 2023. The second tranche is proposed to be finalised by September 2025 and the third tranche should follow shortly afterwards. In total, the department's surveying services team has delivered a package of eleven survey plans for registration in the title registry of Queensland. The land will be transferred under the *Aboriginal Land Act 1991* to the prescribed body corporate for the Waanyi people who will lease the land, in perpetuity, to the State to manage under the *Nature Conservation Act 1992*. This dealing is the first lease back arrangement successfully negotiated on national park land in Queensland.

The project involved more than twenty departmental surveying services team members and presented many challenges in land surveying including the size and extent of the survey; remoteness and accessibility; extreme weather conditions; logistics and field planning; resourcing; records searching; boundary reinstatement and marking; plan drafting; and jurisdictional border requirements for survey plans.

Due to these challenges, the Boodjamulla (Lawn Hill) National Park survey was considered a once-in-a-career opportunity with staff enthusiastic to be involved, rising to each challenge presented to them on the project. The Boodjamulla (Lawn Hill) National Park is now surveyed providing accuracy and certainty to the boundaries of this land in remote North-Western Queensland.

## ACKNOWLEDGEMENTS

The authors wish to acknowledge the support of all the departmental surveying services staff who have contributed to the project. In particular, they would like to acknowledge Lyle van Tienhoven who led the field surveys with Chris Serpell as well as Scott Johnson, Daniel McCosker and Graham Welsh who participated in all or most field campaigns over the past 3.5 years. Their expertise, enthusiasm, support and input have been invaluable to the successful delivery of this project.

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## BIOGRAPHICAL NOTES

Jemma Picco is a Principal Surveyor (Survey Projects) in the Queensland Government Department Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRD) based in Cairns. Jemma is a Registered Cadastral Surveyor with the Surveyors Board of Queensland.

Jemma has been actively involved in providing survey advice and land tenure solutions for land under the *Land Act 1994*, the *Aboriginal Land Act 1991*, the *Torres Strait Island Land Act 1991*, the *Cape York Peninsula Heritage Act 2007*, and the *Nature Conservation Act 1992* for over twenty years. Jemma is passionate about the surveying industry and has recently created the

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Queensland Women in Surveying network as a strategy to increase diversity in surveying. This network is an environment where women can share experiences, support, encourage and inspire one another.

Christopher (Chris) Serpell is also a Principal Surveyor in the DNRMMRRD based in Cairns. Chris is a Registered Cadastral Surveyor with the Surveyors Board of Queensland.

Chris has been involved in leading surveys such as Boodjamulla (Lawn Hill) National Park for the past five years. Chris has worked in private industry both in North Queensland and Victoria for more than 20 years prior to joining the department eight years ago.

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