

# AGRICULTURAL LAND CLASS ASSESSMENT

## Port Douglas - Proposed Wave Park



## REPORT

### Document status

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### Approval for issue

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7 April 2021

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# 1 INTRODUCTION

RPS Australia East Pty Ltd (RPS) was engaged by Graben Pty Ltd (Graben) to conduct an agricultural land assessment for a proposed wave park at Port Douglas, on land described as Lot 123 on SR687, hereafter referred to as 'the site' (**Figure 1**).

The site is currently used for sugar cane production, refer to **Plate 1** and **Plate 2** below, which has a modest annual production of approximately 1,400 tonnes of sugar cane and a minimal employment of 0.1FTE.

An Economic Assessment completed by RPS Group has determined that the current contribution of the site is 0.22% to the crush of the mill which is well within the 5% to 10% variation in the total volume that can be attributed to typical weather events and the loss of production from this land is not likely to materially affect the economic viability or operations of the Mossman Mill.



Figure 1 Site Locality (White Outline) (Qld Globe)



**Plate 1 Sugar Cane Production Looking South**



**Plate 2 Sugar Cane Production Looking East**

## 2 PROJECT OVERVIEW

Graben Pty Ltd are proposing the development of an integrated wave park at the site named Surf Port Douglas which is intended to be a major social, economic and financial investment located within close proximity to the high-profile tourist destination of Port Douglas. The proposed wave park design is to utilise approximately 25 hectares of the site for the wave park and associated accommodation and approximately 15 hectares of the site will be rehabilitated using native species.

Key development details reported by Graben (2021) that are of relevance to this assessment are summarised below (**Table 1**). Preliminary layout plans prepared by Hunt Design showing the proposed wave park design are provided in **Appendix A**.

**Table 1 Development details**

Aspect of Development	Proposal
Current use	Sugar Cane Production
Proposed development	Wave Park and Rehabilitation
Total site area	40.22 ha
No. of existing lots	1
Total rehabilitation area	Approximately 15 ha
Total developable area	Approximately 25 ha
Extent of built infrastructure within the developable area	Existing residence approximately 30m <sup>2</sup>

### 2.1 Construction Phase

The Economic Assessment undertaken by RPS Group determined that the proposed budget for the construction phase of the project is estimated at \$317.3m. This includes site preparation works, civil works, professional services and the construction of the hotel, residential, lagoons and wave pool.

It is estimated that the construction phase of the project will create a total of 1,247 FTE jobs, of which 453 are direct, and 794 are indirect (typically supply chain) jobs.

Total wages and salary are estimated to be \$117.5m (\$58.75 per annum) with almost all of the employment will be taken up by residents of the region with some specialist skills, equipment and other inputs (notably the wave pool) imported to Far North Queensland.

### 2.2 Operation

The Economic Assessment (RPS Group) determined that Surf Port Douglas was projected to host 128,680 visitor nights annually across all times of accommodation with guests and visitor projected to generate a direct expenditure of \$79.2 million per year.

The operational phase will generate an estimated 740 FTE jobs per annum with 644 direct jobs and 96 indirect (typically supply chase) jobs. The total annual wages and salaries are valued to be \$36 million and will be mainly directed to the retail and hospitality sectors.

### 3 SCOPE OF WORKS

A desktop assessment of available soil and land resources was undertaken to make a preliminary determination of the Agricultural Land Class (ALC) of the site.

The scope of works for the preliminary assessment include a review of the following:

- Historical aerial imagery;
- Topographic data;
- Soil and Land Information (SALI) database;
- Land Resource mapping;
- Soil mapping;
- QLD land use mapping;
- SCL & GQAL mapping; and
- QLD Agricultural Land Audit data.

Findings of the study provide a determination of the Agricultural Land Class and economic value to the region.

## 4 REVIEW OF MAPPED AGRICULTURAL LAND CLASSES

### 4.1 Mapped ALC Classes

There are two (2) ALC mapped within the site (**Figure 2**).

A description and the area of each ALC within the proposed lease areas at the site are provided at **Table 2**.

**Table 2 Mapped ALC within the proposed extent of built infrastructure footprint.**

ALC	Description	ALC within the site	
		Area (Ha)	Proportion (%)
A1	Crop land that is suitable for a wide range of current and potential crops with nil to moderate limitations to production.	4.47 ha	11%
B	Limited crop land that is suitable for a narrow range of current and potential crops due to severe limitations but is highly suitable for pastures. Land may be suitable for cropping with engineering or agronomic improvements.	30.84 ha	77%

**Figure 2** below shows that the proposed development area is dominated by ALC B (77%), with a small section of ALC A1 (11%) along the south western border, adjacent to Captain Cook Highway.



**Figure 2 Mapped ALC B and ALC A**

## 4.2 Regional geology and drainage

Regional geology of the site comprises the following:

- Quaternary age deposits comprising sand ridges in the lower lying areas;
- Quaternary/Tertiary age high-level alluvial deposits comprising sand, silt, clay and minor gravel to the south west;
- Quaternary/Tertiary age colluvial and residual soil deposits (generally on older land surfaces) comprising clay, silt sand and gravel to the south.

A major drainage line is present immediately to the north of the site (Mowbray River), refer to **Figure 3** below.

The site was likely drained to allow for cropping historically with a canal built around the site. The canal has a number of marine plant species present, indicating it is tidal, refer to **Plate 3** below.

Based on drainage lines, shallow groundwater is likely to flow towards the north and it may be brackish due to the saline influence of the river. It is recommended that EC is monitored within the groundwater to establish baseline conditions and confirm the presence of salinity.



**Plate 3 Mangrove Species in Canal Drainage Line**



### 4.2.1 Soils

The southern section of the lease area is mapped as ALC A1. Soil mapping for the Mossman-Julatten area (MJA) show soils within the site include: Hull, Clifton and Mangroves. Mapping of these soils is provided in the Queensland Government's Soil and Land Information (SALI) database (available via Queensland Globe).

### 4.2.2 Subsurface conditions

Subsurface conditions summarised from Golders 2021 are presented in **Table 3**.

**Table 3 Soil types mapped within ALC A1 and ALC B**

Sample Location	Subsurface profile
Test pit 1 within mapped ALC A1	Firm to stiff sand clay (inferred disturbed/reworked ground) to depths ranging from 0.2 m to 0.5 m underlain by stiff to hard sandy clay/clay to depths ranging from 3.2 m to 6.1 m (i.e., depth of investigation in test pits and boreholes). A layer of firm sandy clay (i.e., lower strength clay) was observed at depths ranging from 0.6 m to 1.6 m near creek inlet.
Test pit 2 within mapped ALC B	Medium dense to very dense clayey sand/sand (inferred disturbed/reworked ground) to depths ranging from about 0.2 m to 0.5 m underlain by medium dense to dense clayey sand/sand to depths ranging from 0.7 m to 1.2 m underlain by stiff to hard sandy clay/clay to depths ranging to 3.1 m (i.e., depth of investigation in test pits and boreholes). A layer of firm sandy clay (i.e. lower strength clay) was observed at depths ranging from about 1.7 m to 2.4 m near drain/creek.

### 4.2.3 Geotechnical laboratory testing

Laboratory results from soil testing summarised from Golders 2021 are presented in **Table 4** below.

**Table 4 Soil characteristics and classification within mapped ALC A1 and ALC B**

Sample Location	Sample depth (m bgl)	MC <sup>1</sup> (%)	Particle Size Distribution			Atterberg limits			LS <sup>2</sup> (%)	Material classification
			Fines (%)	Sand (%)	Gravel (%)	Liquid limit (%)	Plastic limit (%)	Plasticity Index (%)		
Test pit 1 within mapped ALC A1	0.80 - 0.90	13.7	66	32	2	36	20	16	7	Sandy Clay (CI)
Test pit 2 within mapped ALC B	1.10 - 1.20	19.1	94	6	0	37	20	17	8	Clay (CI)

Note: MC (moisture content), LS (linear shrinkage)

### 4.2.4 Assessment of soils against Strategic Cropping Land (SCL) criteria

The majority of the site is mapped as strategic cropping area (SCA) on the *Regional Planning Interests Act 2014* strategic cropping land trigger map (see **Figure 4** below and **Table 5**).

The section of the site mapped as ALC B is mapped on the SCL trigger map as SCL; however, ALC B is described as limited crop land under the ALC scheme.



**Figure 4 Mapped Strategic Cropping Land Trigger Map (Qld Globe)**

Data from soil samples collected by Golders 2021 were assessed against the Strategic Cropping Land (SCL) criteria for the Wet Tropics zone provided in the *Regional Planning Interests Regulation 2014*. Where soil data was lacking, soil descriptions reported by Martha (1989) and Wilson (1991) were assessed against the SCL criteria. For complete SCL assessment criteria please see **Appendix B**.

The purpose of this assessment was to determine if there would be any soil constraints to cropping in the area of land mapped as ALC A1 and B1.

The assessment found that the mapped ALC B and the small section of soils in the portion of the site mapped as ALC A are not suitable for cropping due to a range of limitations including the presence of potential acid sulfate soils (PASS), poor soil water availability, moderate moisture range for cultivation and unfavourable drainage (**Table 5**). Indeed, the current farmer has advised that a number of soil additives are required to obtain a crop on an annual basis including mill mud and fertilisers.

**Table 5 Cropping limitations of main soils in the site area mapped as ALC A1**

Soil Series for mapped ALC A	Great Soil Group	Landform	Mapped Soil Type	Limiting Factors
<b>ALC A</b>				
Clifton (Ct)	Yellow podzolic soil	Alluvial fans	Red, yellow or grey loam or	Clifton soils are described as having moderate soil water availability and moderate moisture range for cultivation due to being firm when dry and dispersive when wet

earth soils - (Wilson, 1991). Further, the soils are described as Kandasols imperfectly drained with low to moderate permeability and with massive, hard setting surface horizons (Wilson, 1991).

Golder Associates (2020) recorded the ground conditions of the area mapped as ALC A1 to be predominantly stiff to hard clays to depths greater than ~4 m, suggesting limited permeability. Further, soils were classified as CL sandy clay. Permeability rates are considered to be relatively slow for sandy clays (range of 0.25 – 1.52 in/hr). Further, pale brown, mottled soil horizons (from 2 m depth) indicate poor drainage.

Data from soil samples and soil descriptions suggest these soils do not meet the soil wetness criteria for the Wet Tropics Zone, which requires at least favourable soil profile drainage. If one criterion is not met, then the site area is not considered SCL and further assessment is not required.

#### ALC B

Hull (Hu)	Rudimentary podzol	Beach ridges	Deep sandy soils – Tenasols, Rudosols	<p>Hull soils are described as dominantly rapidly drained and highly permeable; however, occasionally poorly to imperfectly drained in low lying areas (Wilson, 1991). Further, Hull soils are associated with acid sulfate soils below the water table. It is important to note that PASS was present in soil samples tested below 0 m AHD in the area (Golders, 2020).</p>
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Golder Associates (2020) recorded the ground conditions of the area mapped as ALC B to be variable thickness of loose to dense sands to depths ranging to about 4 m, overlying stiff to hard clays, suggesting limited permeability at depths greater than 4 m. Further, mottled grey soil horizons (from 0.7 m) indicate poor drainage.

Data from soils samples and soil descriptions suggest these soils do not meet the soil wetness criteria for the Wet Tropics Zone, which requires at least favourable soil profile drainage. If one criterion is not met, then the site area is not considered SCL and further assessment is not required.

### 4.3 Review of historical aerial imagery

An analysis of historical aerial imagery (available via Queensland Globe) was undertaken to assist with better understanding the site history. Available historical aerial imagery shows the lot has remained largely unchanged since at least November 1979 (**Figure 5**).



**Figure 5 Land use at the site in November 1979 (Qld Globe)**

A site inspection was undertaken by Environmental Scientists Megan Davis and Natalie May on 22 January 2021 which identified a number of marine plant species across the site indicating saline intrusion both within surface waters and groundwaters around the periphery of the cane plantation.

## 5 POTENTIAL AGRICULTURAL IMPACTS AND MITIGATION MEASURES

Whilst the proposed project has the potential to reduce the available cropping land, the land is not considered to constitute high quality agricultural land, and the economic value of the proposed project far outweighs the value of the sugar cane production. Any potential impacts are unlikely to be significant as the risks to agricultural values can be managed throughout the life of the project by the implementation of impact management measures.

**Table 6 Potential impacts and mitigation measures**

Potential Agricultural Impact	Description of Impact	Impact Mitigation Measures
Reduced available cropping land	<p>More than 88% of Queensland's land is currently used for primary production (DAF, 2018). There is currently 3.5 million ha of broadacre cropping land in Queensland and there is potential to increase this to 10 million ha (DAF, 2018).</p> <p>The total lot area for the proposed development is 40.22 ha. Cropping will be excluded from this area during the construction and operational phase of the wave park; however, the proposed development will not have a significant impact on cropping land availability in Queensland.</p>	<p>The proposed development will be developed on cropping land (ALC A) and limited cropping land (ALC B).</p> <p>The proposed development will not permanently alienate the land from future agricultural use as the end of life for the wave park, the land occupied by the wave park could be returned to agricultural uses.</p>
Introduction of weeds	<p>The construction and operation phase of the proposed development has the potential to cause the proliferation of existing weeds and the introduction of additional species. Infestations of agricultural weeds could potentially impede agricultural production.</p> <p>The implementation of weed and pest management measures during all phases of the development will be adequate for managing biosecurity risks associated with the proposal.</p> <p>No significant impacts in relation to biosecurity are anticipated with the implementation of weed and pest management measures.</p>	<p>To meet the General Biosecurity Obligation (GBO) under the <i>Biosecurity Act 2014</i>, it is recommended that weed and pest control measures be outlined in the following documents to be prepared for the proposal by the proponent:</p> <ul style="list-style-type: none"> <li>• Construction Environmental Management Plan (CEMP); and</li> <li>• Operational Environmental Management Plan (OEMP).</li> </ul>
Impacts to soil	<p>The site is currently used for sugar cane production and the topsoil is inferred disturbed/reworked ground to depths ranging from about 0.2 m to 0.5 m.</p> <p>Impacts from construction and operation of the wave park include possible soil erosion, compaction, and inversion of soil profiles. The implementation of a soil management measures will be adequate for managing potential impacts.</p> <p>No significant impacts in relation to soil are anticipated with the implementation of relevant management measures during various phases of the project.</p>	<p>Excavations and dewatering in or adjacent to higher risk mangrove areas should be avoided.</p> <p>An erosion and sediment control plan (ESCP) should be prepared in accordance with Best Practice Erosion and Sediment Control (Aust IECA, 2008) guideline for the construction and decommissioning phases of the project to minimise soil erosion.</p> <p>The CEMP should include soil management measures to preserve topsoil resources at the site and minimise impacts to soil resources.</p>

The potential agricultural impacts of the proposed wave park can be adequately managed and don't present a risk of significant or permanent impact to agricultural values at the site or on the broader cropping industry in Queensland.

## 6 SUMMARY

Whilst the proposed project has the potential to reduce the available cropping land, the land is not considered to constitute high quality agricultural land, and the economic value of the proposed project far outweighs the value of the sugar cane production as 740 FTE operational jobs is significantly greater than the current 0.1 FTE generated by the subject site as a sugar cane farm.

The summary of findings from the agricultural land assessment indicates that:

- The wave park will be developed on mapped cropping land, however, the quality of the site is marginal given poor soil quality and saline intrusion through both surface and groundwaters.
- The proposed development will not have a significant impact on cropping land availability across Queensland as the land is negligible and only contributes approximately 0.22% to the crush of the mill on an annual basis.
- A number of weeds are present on the site and it is recommended that the implementation of weed and pest management measures during all phases of the wave park project will be adequate for managing biosecurity risks associated with the proposal.
- The implementation of soil management measures during the various phases of the project will be adequate for managing potential impacts to land resources.
- The proposed development will not significantly impact the cropping industry and will support business in Far North Queensland and is a higher and better use of the land from an economic perspective estimated to contribute a total economic output of \$116.8 million per annum.

## 7 REFERENCES

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Golders Associates Pty Ltd (2021). Geotechnical Studies Pork Douglas Wave Park. Golders Associates Pty Ltd.

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## Appendix A Master Plan



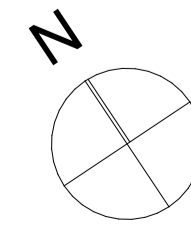
PORT DOUGLAS SURF PARK PRELIMINARY ISSUE

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DEVELOPMENT APPLICATION  
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CRAIGLEE, QLD, AUST

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## **Appendix B** Soil Assessment against SCL Criteria

**Table 7 Mapped ALC A1 - assessment against SCL criteria**

Site and soil data		Wet Tropics	
Site		Lot 123 on SR687	
Land use/cover		Sugar Cane	
Coordinates (test pit)		338377.0m, 8169175.0m MGA2020 55	
Soil classification		Kandosols	
Soil map unit name		Clifton	
Soil type correlation (and reference)		Soil and land suitability survey of the Mossman-Julatten area, North Queensland	
Surface rock		Colluvial and residual soil deposits	
Gilgai microrelief		Nil	
Slope and landform		~0% level plain	
Surface condition		Predominantly stiff to hard clays to depths greater than about 4m. Inferred disturbed/re-worked ground (cane farming)	
Soil profile description			
0 m – 0.5 m		Sandy Clay - medium plasticity, brown, fine to medium grained sand	
0.5 – 1.4 m		Red alluvial soil	
1.4 m – 2.4 m		Pale brown alluvial soil	
2.1 m - >3.2 m		Pale brown mottled red	
SCL Zone			
SCL Status as shown on trigger map		SCL	
SCL Criteria	Threshold assessed	Assessment method	Pass (P) or Fail (F)
1. Slope	≤ 5%	~0% level plain	Pass
2. Rockiness	≤ 20% for rocks > 60mm diameter	Trace gravel <19mm only 0% >60 mm	Pass
Gilgai microrelief	< 50% of land surface being Gilgai microrelief of > 500 mm in depth	Nil	Pass
Soil depth	≥ 0.6 m	>3.2 m	Pass
Soil wetness	Favourable drainage	Imperfectly drained (Wilson, 1991)	Fail
Soil pH	Non-rigid: > pH 5.0 Rigid: pH 5.1 – pH 8.9	pH 5.9 @ 0.3 - 0.6 m	Pass

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		pH 5.6 @ 0.60 – 0.90 m (Murtha, 1989)	
Salinity	EC < 0.56 mS/m	0.020 mS/cm @ 0.30 – 0.60 m 0.074 mS/cm @ 0.60 – 0.90 m (Murtha, 1989)	Pass
Soil water storage	≥ 50 mm to a soil depth or soil physico-chemical limitation of ≤ 1000 mm	No further assessment required.	

**Table 8 Mapped ALC B - assessment against SCL criteria.**

Site and soil data		Wet Tropics	
Site		Lot 123 on SR687	
Land use/cover		Sugar Cane	
Coordinates (test pit)		338520.0m, 8169325.0m MGA2020 55	
Soil classification		Tenasols, Rudosols	
Soil map unit name		Hull	
Soil type correlation (and reference)		Soil and land suitability survey of the Mossman-Julatten area, North Queensland	
Surface rock		Inferred re-worked ground underlain by alluvial soil	
Gilgai microrelief		Nil	
Slope and landform		~0% level plain	
Surface condition		Medium dense to very dense clayey sand/sand (inferred disturbed/reworked ground) to depths ranging from about 0.2 m to 0.5 m	
Soil profile description			
0 m – 0.4 m		Clay Sand – fine to medium grained, brown, low plasticity clay	
0.4 – 0.7 m		Sand – fine to medium grained, poorly graded, grey	
0.7 m – 1.1 m		Clay – medium plasticity, orange mottle grey, trace fine to medium grained sand	
1.1 m - >3.2 m		Clay - high plasticity, red mottled grey, with fine grained sand	
SCL Zone			
SCL Status as shown on trigger map		SCL	
SCL Criteria	Threshold assessed	Assessment method	Pass (P) or Fail (F)
1. Slope	≤ 5%	~0% level plain	Pass

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2. Rockiness	≤ 20% for rocks > 60mm diameter	100% passing through AS Sieve 19.0 mm 0% >60 mm	Pass
Gilgai microrelief	< 50% of land surface being Gilgai microrelief of > 500 mm in depth	Nil	Pass
Soil depth	≥ 0.6 m	> 3.1 m	
Soil wetness	Favourable drainage	Dominantly rapidly drained; poorly drained to imperfectly drained in low lying areas (Wilson, 1991)	<b>Fail</b>
Soil pH	Non-rigid: > pH 5.0 Rigid: pH 5.1 – pH 8.9	pH 5.7- 5.8 @ 0.3 - 0.6 m pH 5.6 @ 0.60 – 0.90 m (Murtha, 1989)	Pass
Salinity	EC < 0.56 mS/m	0.014 – 0.011 mS/cm @ 0.30 – 0.60 m 0.017 mS/cm @ 0.60 – 0.90 m (Murtha, 1989)	Pass
Soil water storage	≥ 50 mm to a soil depth or soil physico-chemical limitation of ≤ 1000 mm	No further assessment required.	