Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
Unit 2, 3 Distribution Avenue
Molendinar QLD 4214
Phone (07) 5568 8900

Investigation Summary Report

Client	Winslow Queensland Pty Ltd	**Project No.**	215518.03
Project	Harvest Estate Stage 1, Lot Classifications	**Date**	19 Sep 23
Address	Lot 12, Harvest Estate, Byron Bay	**Doc No.**	IR.012.Rev0

Introduction: This report presents the results of an investigation carried out to assess the foundation conditions at the above site and to classify the proposed residential site in accordance with AS 2870 (2011). The investigation for this site was carried out as part of a larger investigation across the estate, the results of which have been used in part for this assessment, where relevant.

The aim of the investigation was to provide site classifications for residential slabs covering 54 lots at Harvest Estate Stage 1, Byron Bay. The works were carried out in accordance with DP's "Conditions of Engagement".

'Level 1' inspection and testing was carried out by DP during the bulk earthworks operation within Harvest Estate Stage 1 and is detailed in DPs report "*215518.00.R.001.Rev1*" dated 25 July 2023. As such, the fill placed, is considered "controlled" fill.

This report must be read in conjunction with the attached notes "About this Report" and must be kept in its entirety without separation of individual pages or sections.

Description of Site and Regional Geology: Harvest Estate Stage 1, is bound by Ewingsdale Road to the north and undeveloped farmland to the south, east and west (refer Drawing 1 attached). At the time of investigation, the site was flat, and comprised individually pegged lots comprising exposed sand fill.

The Geological Survey of New South Wales 1:250,000 scale geological map indicates that the estate is located in an area underlain by Quaternary alluvium and coastal sand deposits comprising *"fine to coarse grained quartz lithic carbonate sand, shell and shell fragment rich beds"*.

Field Work Methods: Field work was carried out on the 14 to 30 August and comprised the drilling of 55 boreholes. The boreholes were drilled using a 4WD or 6WD utility mounted drilling rig using solid flight augers fitted with a tungsten carbide drill. Boreholes were drilled to 2 m depth (or prior refusal). Dynamic cone penetrometer tests were carried out adjacent to each borehole to 2 m depth (or prior refusal). On completion of drilling, the boreholes were backfilled with drill spoil.

The test locations were nominated by DP and recorded using a hand-held GPS receiver accurate to within approximately 5 m. The GPS coordinates for the test locations are recorded on the borehole logs and the test locations are indicated on Drawing 1, attached. Surface levels were interpolated from client provided survey data.

Field Work Results: In summary, the subsurface conditions encountered during the broad scale investigation comprised:

- **Topsoil (Fill):** comprising silty sand was encountered up to 0.2 m depth.
- **Fill:** comprising sands to depths of up to 2 m were encountered below the topsoil. The fill mostly appeared well compacted, however appeared loose, in the upper fill profile (between 0.1 m thick to 0.2 m thick) in some boreholes, probably due to the lack of confining pressure. A 0.1 m thick sandy gravel stratum was encountered in one of the boreholes at the base of the fill profile. The fill was placed under 'controlled' conditions with 'Level 1' inspection and testing carried out by DP and as such, is considered 'controlled'.
- **Sand:** natural sands were encountered below fill in boreholes where fill depths were reached prior to termination.

The subsurface conditions pertinent to this lot are described in detail on the attached boreholes logs.

Groundwater was not encountered during the investigation, however, it should be noted, that groundwater depths and ground moisture conditions are affected by climatic conditions, surface and subsurface drainage and human influences, and will therefore, vary with time.

Laboratory Testing: Laboratory testing was performed on selected disturbed samples from bores drilled across the development in order to assess the properties of predominant soil types encountered during the investigation for site classification purposes.

The samples tested were representative of the predominant soil horizons encountered during the investigation and strata most likely to react to moisture content variations.

The results of the laboratory testing are attached and summarised in Table 1.

Table 1: Summary of Laboratory Test Results

Bore	Depth (m)	Material	Clay/Silt (%)	Sand (%)	Gravel (%)
16	0.4 – 0.5	Fill/Sand	1	99	0
20	1.3 – 1.4	Sand	1	99	0
36	0.0 – 0.1	Topsoil/Sand	1	99	0

Notes: W_L = Liquid Limit; W_P = Plastic Limit; PI = Plasticity Index; LS = Linear Shrinkage;
WPI = weighted plasticity index (i.e. PI x % passing 425 µm sieve).

Fill Settlements and Site Classification

Bores 15 and 16 (attached) were undertaken within (or adjacent to) Lot 12. In accordance with AS2870 (2011) 'Residential Slabs and Footings', a site with controlled sand fill to any depth, shall be the same as the natural site prior to filling, therefore the site can be classified as **'Class S'.**

High Level Footings and Slabs

Based on the existing site conditions, all load bearing footings and slabs (with stiffening to suit the site classification) could be supported on footings founded into the controlled fill with an allowable bearing pressure of 100 kPa. This bearing pressure assumes the footing excavations will be free of any loose, and/or water softened materials and/or ponded water at the time of pouring concrete. Pad or strip footings to maximum widths of 2 m and 1 m, respectively, are not expected to have settlements exceed 1%-2% of footing width.

Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at Harvest Estate, Byron Bay in accordance with DP's proposal dated 25 July 2023 and acceptance received from Jameson Wilson the same day. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Winslow QLD for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Alec Baxter
Geotechnical Engineer

Reviewed by

Chris Bell
Principal

Attachments:
About This Report
Sampling Methods
Symbols and Abbreviations
Drawing 1 – Site and Test Location Plan
Borehole Logs
Laboratory Test Results

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

The soil group symbol classifications are given as follows based on two major soil divisions:

- Coarse-grained soils
- Fine-grained soils

Major Divisions				Description	
				Group Symbol*	Typical Name
COARSE-GRAINED SOILS	More than 65% by dry mass, (excluding that larger than 63 mm) is greater than 0.075 mm	GRAVEL	More than 50% of coarse grains are greater than 2.36 mm	GW	Well graded gravels and gravel-sand mixtures, little or no fines.
				GP	Poorly graded gravels and gravel-sand mixtures, little or no fines.
		GRAVELLY SOILS		GM	Silty gravels, gravel-sand-silt mixtures.
				GC	Clay gravels, gravel-sand-clay mixtures.
		SAND	More than 50% of coarse grains are less than 2.36 mm	SW	Well graded sands and gravelly sands, little or no fines.
				SP	Poorly graded sands and gravelly sands, little or no fines.
		SANDY SOILS		SM	Silty sand, sand-silt mixtures.
				SC	Clayey sands, sand-clay mixtures.

* For coarse grained soils where the fines content is between 5% and 12%, the soil shall be given a dual classification eg GP-GM.

FINE-GRAINED SOILS	More than 35% by dry mass, (excluding that larger than 63 mm) is less than 0.075 mm	Liquid Limit less than 35%	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity
		35% <LL< 50%	CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		Liquid Limit greater than 50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity.
			Pt	Peat muck and other highly organic soils.

Soil Descriptions

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay, trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand, trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand, trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w <PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w >PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈LL' (i.e. near the liquid limit).
- 'Wet' or 'w >LL' (i.e. wet of the liquid limit).

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

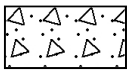
Symbols & Abbreviations

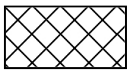
Graphic Symbols for Soil and Rock

General

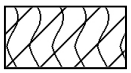

Asphalt

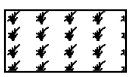

Road base

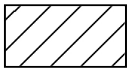

Concrete

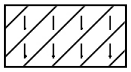

Filling

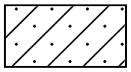
Soils


Topsoil

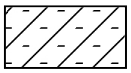

Peat

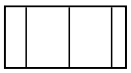

Clay

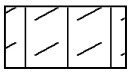

Silty clay

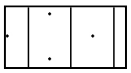

Sandy clay

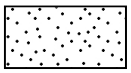

Gravelly clay

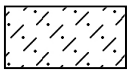

Shaly clay

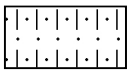

Silt


Clayey silt


Sandy silt

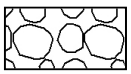

Sand

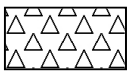

Clayey sand


Silty sand


Gravel

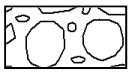

Sandy gravel


Cobbles, boulders

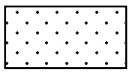

Talus

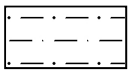
Sedimentary Rocks

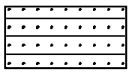

Boulder conglomerate

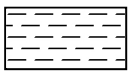

Conglomerate


Conglomeratic sandstone

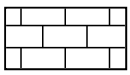

Sandstone


Siltstone

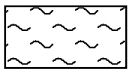

Laminite

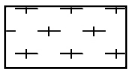

Mudstone, claystone, shale

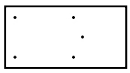

Coal


Limestone

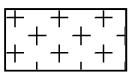
Metamorphic Rocks

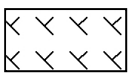

Slate, phyllite, schist

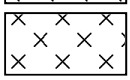

Gneiss

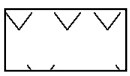

Quartzite

Igneous Rocks

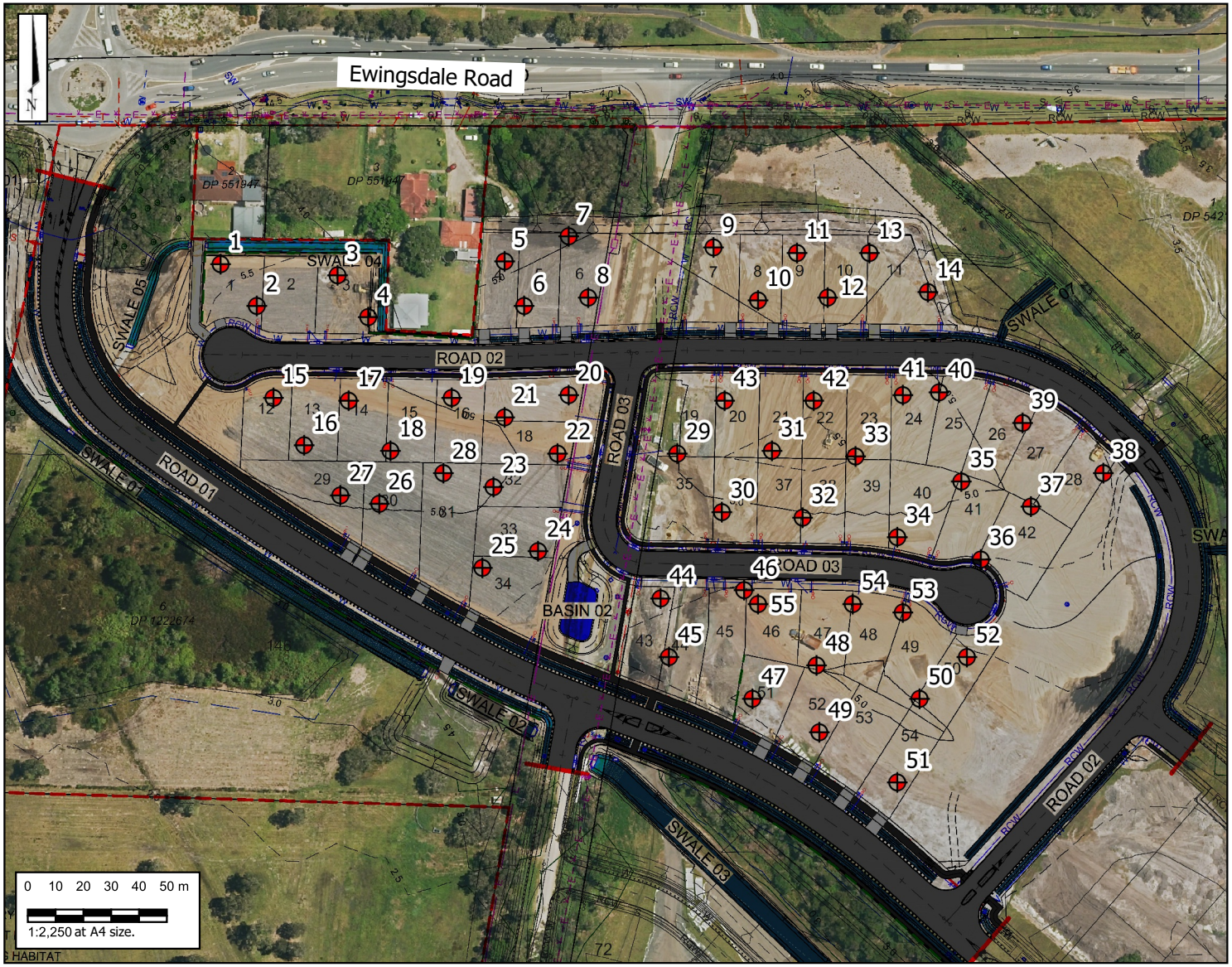

Granite

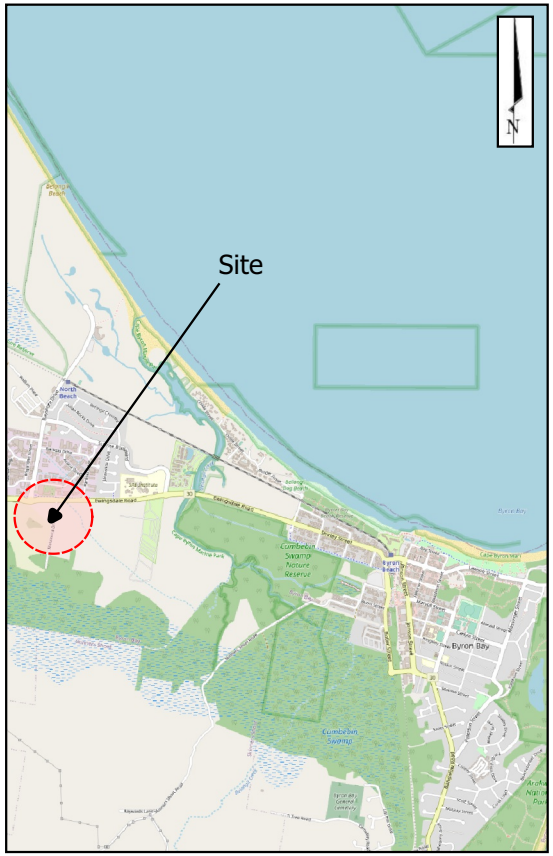

Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry





Site Locality

Legend:

Approximate borehole location and number

Drawing no. 1051 Rev A

Image taken from metromap dated 9/7/23

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Winslow Queensland Pty Ltd	**Site and Test Location Plan**	PROJECT No: 215518.03
	OFFICE: Gold Coast	**Harvest Estate Stage 1, Lot Classificiations**	DRAWING No: 1
	DATE: September 2023	**Harvest Estate, Byron Bay**	REVISION: 0

BOREHOLE LOG

CLIENT: Winslow QLD
PROJECT: Harvest Estate Stage 1, Lot Classifications
LOCATION: Harvest Estate, Byron Bay, New South Wales

SURFACE LEVEL: 5.2 AHD
EASTING: 556919
NORTHING: 6831866
DIP/AZIMUTH: 90°/--

BORE No: 15
PROJECT No: 215518.03
DATE: 16/8/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
									5 10 15 20
		Topsoil FILL Silty SAND (SM): fine grained, brown, moist, appeared generally loose, rootlets		D	0.0				
					0.1				
5	0.2	FILL Silty SAND (SM): fine, brown, moist, medium dense							
				D	0.3				
					0.4				
	1								1
4		- grey-brown							
		- very moist to wet							
				D	1.8				
					1.9				
	2	2.0 Bore discontinued at 2.0m depth - Limit of investigation							2
3									

RIG: Christie Soil Rig **DRILLER:** Geo-Serve **LOGGED:** BM/AB **CASING:** Uncased

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface level interpolated from client provided survey

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Winslow QLD
PROJECT: Harvest Estate Stage 1, Lot Classifications
LOCATION: Harvest Estate, Byron Bay, New South Wales

SURFACE LEVEL: 5.1 AHD
EASTING: 556930
NORTHING: 6831849
DIP/AZIMUTH: 90°/--

BORE No: 16
PROJECT No: 215518.03
DATE: 16/8/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
5	0.1	Topsoil FILL Silty SAND (SM): fine grained, brown, moist, appeared generally loose, rootlets							
		FILL Silty SAND (SM): fine grained, brown, moist, appeared well compacted		D	0.4 0.5				
4	1	- very moist to wet							1
	2	2.0 Bore discontinued at 2.0m depth - Limit of investigation							2
3									

Dynamic Penetrometer Test (blows per 100mm): 5, 10, 15, 20

RIG: Christie Soil Rig
DRILLER: Geo-Serve
LOGGED: BM/AB
CASING: Uncased

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface level interpolated from client provided survey

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Material Test Report

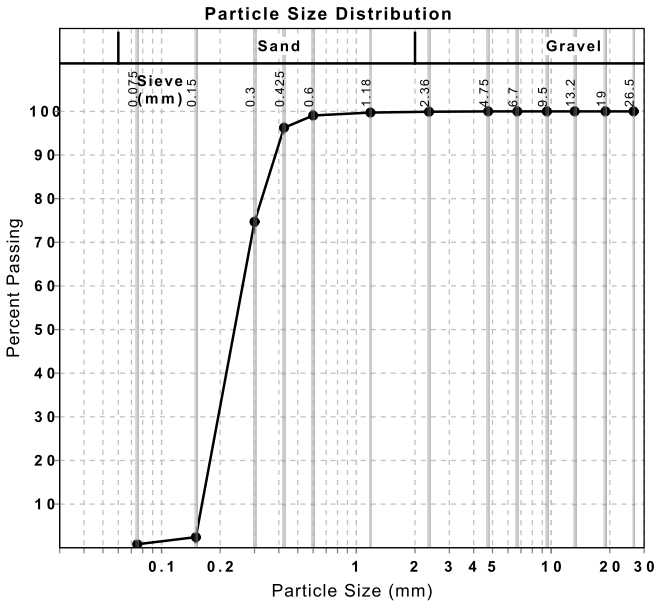
Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Gold Coast Laboratory
Unit 2/3 Distribution Avenue Molendinar QLD 4214
Phone: (07) 5568 8900
Email: chad.whatley@douglaspartners.com.au

Report Number:	**215518.03-1**
Issue Number:	1
Date Issued:	08/09/2023
Client:	Winslow QLD
	Building 4, G1, 107 Miles Platting Road, Eight Mile Plains QLD 4113
Contact:	Jameson Wilson
Project Number:	215518.03
Project Name:	Harvest Estate Stage 1, Lot Classifications
Project Location:	Harvest Estate, Byron Bay NSW
Work Request:	13937
Sample Number:	GL-13937A
Date Sampled:	29/08/2023
Dates Tested:	29/08/2023 - 31/08/2023
Sampling Method:	Sampled by Engineering Department
	The results apply to the sample as received
Site Selection:	Selected by Client
Sample Location:	**Bore 16 (0.4m - 0.5m)**
Material:	Fill / Sand

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chad Whatley
Lab Manager
Laboratory Accreditation Number: 828

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**99**			1		
0.425 mm	**96**			3		
0.3 mm	**75**			22		
0.15 mm	**2**			72		
0.075 mm	**1**			2		



Material Test Report

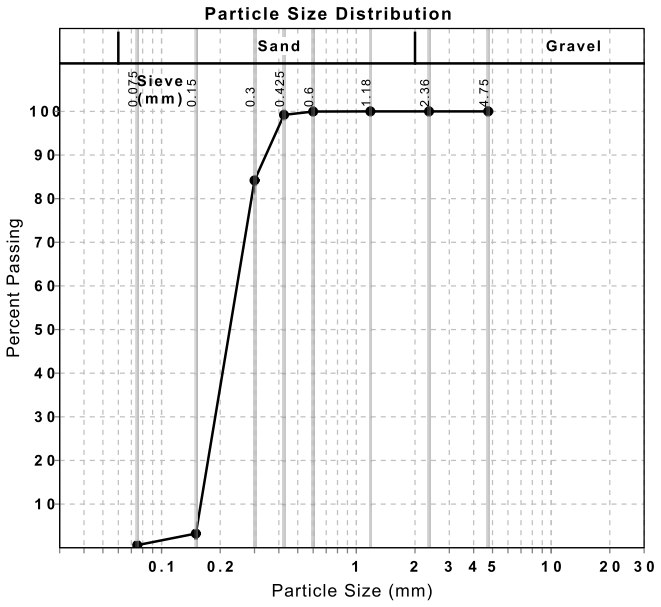
Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Gold Coast Laboratory
Unit 2/3 Distribution Avenue Molendinar QLD 4214
Phone: (07) 5568 8900
Email: chad.whatley@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chad Whatley
Lab Manager
Laboratory Accreditation Number: 828

Report Number: **215518.03-1**
Issue Number: 1
Date Issued: 08/09/2023
Client: Winslow QLD
Building 4, G1, 107 Miles Platting Road, Eight Mile Plains QLD 4113
Contact: Jameson Wilson
Project Number: 215518.03
Project Name: Harvest Estate Stage 1, Lot Classifications
Project Location: Harvest Estate, Byron Bay NSW
Work Request: 13937
Sample Number: GL-13937B
Date Sampled: 29/08/2023
Dates Tested: 29/08/2023 - 31/08/2023
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Site Selection: Selected by Client
Sample Location: **Bore 20 (1.3m -1.4m)**
Material: SAND

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**100**			0		
0.6 mm	**100**			0		
0.425 mm	**99**			1		
0.3 mm	**84**			15		
0.15 mm	**3**			81		
0.075 mm	**1**			3		



Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Gold Coast Laboratory
Unit 2/3 Distribution Avenue Molendinar QLD 4214
Phone: (07) 5568 8900
Email: chad.whatley@douglaspartners.com.au

Report Number:	**215518.03-1**
Issue Number:	1
Date Issued:	08/09/2023
Client:	Winslow QLD
	Building 4, G1, 107 Miles Platting Road, Eight Mile Plains QLD 4113
Contact:	Jameson Wilson
Project Number:	215518.03
Project Name:	Harvest Estate Stage 1, Lot Classifications
Project Location:	Harvest Estate, Byron Bay NSW
Work Request:	13937
Sample Number:	GL-13937C
Date Sampled:	29/08/2023
Dates Tested:	29/08/2023 - 31/08/2023
Sampling Method:	Sampled by Engineering Department
	The results apply to the sample as received
Site Selection:	Selected by Client
Sample Location:	**Bore 36 (0.0m - 0.1m)**
Material:	TOPSOIL / Silty SAND

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chad Whatley
Lab Manager
Laboratory Accreditation Number: 828

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
4.75 mm	**100**			0		
2.36 mm	**100**			0		
1.18 mm	**99**			0		
0.6 mm	**98**			2		
0.425 mm	**94**			3		
0.3 mm	**72**			22		
0.15 mm	**5**			68		
0.075 mm	**1**			3