



## Mackas Sand WM Sand

ADDRESSING THE NEEDS OF INDIVIDUAL AMENITY TURF AND LANDSCAPE MANAGERS.

- Fast infiltration rate (HC) of 925 mm/hr
- Bulk Density: 1.96 g/cm<sup>3</sup>
- Texture: sand
- Sand: 99.7%
- Clay: 1%; Silt: 0%
- Water-filled porosity (%v/v): 8; Air-filled porosity: 18
- Fineness modulus: 1.8
- Medium sand: 78.5% (retained by mass)
- Fine Sand: 20.8%

### SUITABILITY.

All sport fields including A-grade stadiums and golf greens. Maybe too expensive to maintain on standard sports fields

### SPECIAL MANAGEMENT REQUIREMENTS

Organic amendment for balanced plant nutrition

Please call for a free consultation



### Mackas Sand & Supplies

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# Turf Rootzone Assessment (USDA Sieves)

## - sport and amenity turf surfaces



Quality  
ISO 9001

**Sydney Environmental  
& Soil Laboratory Pty Ltd**  
ABN 70 106 810 708

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**Sydney  
Environmental and Soil  
Laboratory**

Specialists in Soil Chemistry, Agronomy  
and Contamination Assessments

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Batch N°: **19417**

Sample N°: **2**

Report Status: ☐ Draft ☒ Final

### CLIENT DETAILS:

Name: **Macka's Sand Pty Ltd**

Attn: **Robert Mackenzie**

Client Job N°:

Client Order N°:

Address: **2684 Nelson Bay Rd  
Salt Ash NSW 2318**

### PROJECT DETAILS:

Project Name: **Sample Received  
15/8/11**

Location:

SESL Quote N°:

Date Received: **15/8/11**

### SAMPLE DETAILS:

Sample Name: **WM Sand**

Test Type: **PSAUS, HCUSGA**

### DISCUSSION AND RECOMMENDATIONS

The physical properties of this material was assessed to determine its likely performance characteristics as turf underlay. Based on these results, the material is considered suitable for use as construction and topdressing material on sand based sportsfields as well as USGA specified sand-based golf greens.

The infiltration rate of water through the soil material is quite high, which reduces the chances of surface ponding or surface runoff, providing appropriate surface landforms and subsurface drainage has been put in place. However, high infiltration rate implies that the soil can be quite droughty because of reduced water holding capacity. Turf planted on this soil material will require frequent irrigations to ensure consistently adequate moisture in the profile for good turf health.

Suitability: A-grade stadiums and Golf greens

Special Management Requirement: organic amendment for balanced plant nutrition.

### PARTICLE SIZE ANALYSIS

Size (mm)	Fraction	% Passing by mass	% Retained by mass	D VALUES	
3.35	Medium gravel	100.0%	0.0%	D <sub>100</sub> :	2.000
2.00	Fine gravel	100.0%	0.0%	D <sub>90</sub> :	0.470
1.00	V. coarse sand	100.0%	0.0%	D <sub>85</sub> :	0.454
0.50	Coarse sand	99.3%	0.7%	D <sub>60</sub> :	0.375
0.25	Medium sand	20.8%	78.5%	D <sub>50</sub> :	0.343
0.15	Fine sand	0.8%	20.0%	D <sub>35</sub> :	0.295
0.106	Fine Sand	0.3%	0.5%	D <sub>30</sub> :	0.279
0.053	Very fine sand	0.2%	0.1%	D <sub>25</sub> :	0.263
0.02	Silt	0.5%	-0.3%	D <sub>15</sub> :	0.221
0.002	Fine Silt	1.0%	-0.5%	D <sub>10</sub> :	0.196
<0.002	Clay	0%	1.0%	D <sub>5</sub> :	0.171

**Coefficient of Uniformity (Cu):** 1.91 - Uniform particle grading, potential surface instability.

**Coefficient of Curvature (Cc):** 1.06

**Gradation Index (Gi):** 2.4 - Uniform particle grading, potential surface instability.

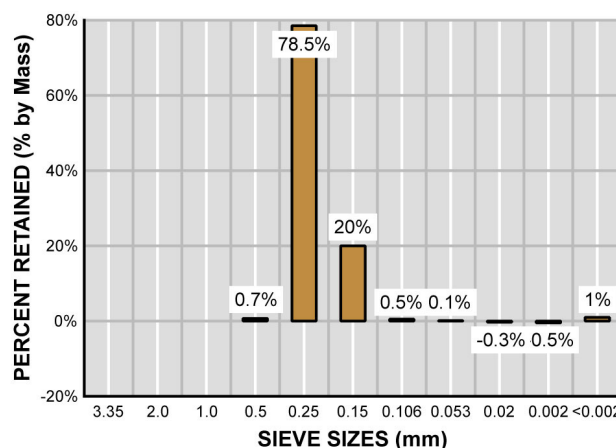
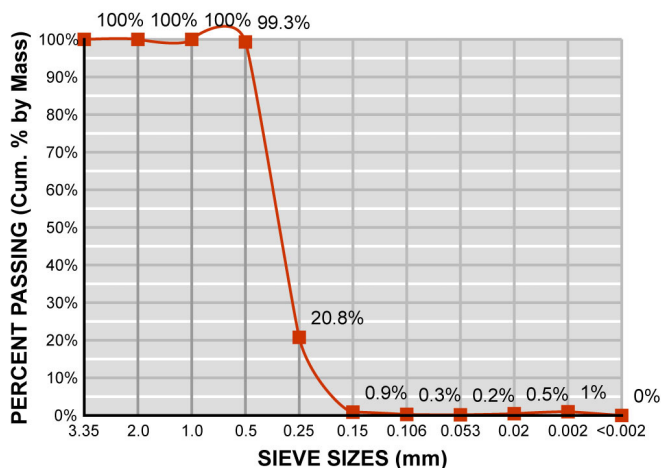
**Fineness Modulus (Fm):** 1.8 - Dominated by very fine to fine sand.

Note: Typical range for sportsfield rootzone is 1.7 to 2.5

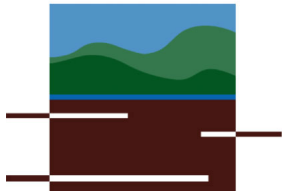
**Particle Distribution:** Poorly graded

Note: Poorly graded soils are either uniformly graded or gap graded. Well graded soils have even distribution of particles across a wide range of particle sizes and are prone to dense packing. As a rule, well graded soils should be avoided for sportsfields and other high traffic surfaces that are subject to considerable compactive forces.

### PARTICLE SIZE DISTRIBUTION GRAPHS







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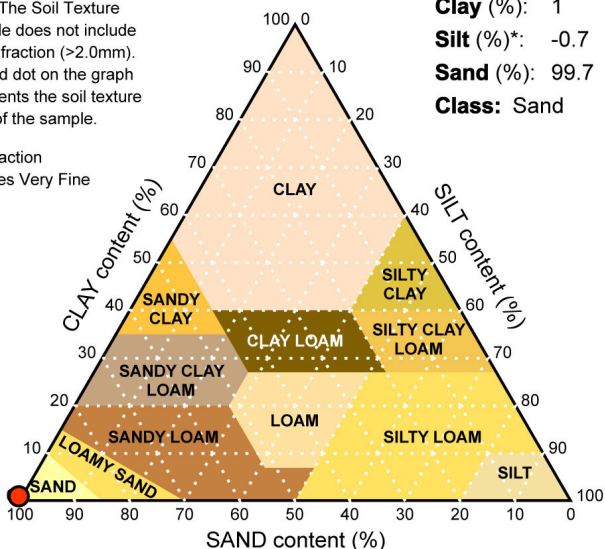
**Mailing Address:**  
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Pennant Hills NSW 1715

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### SOIL TEXTURE TRIANGLE AND DERIVED VALUES

**Note:** The Soil Texture Triangle does not include gravel fraction (>2.0mm). The red dot on the graph represents the soil texture class of the sample.

\*Silt fraction includes Very Fine Sand



**Clay (%)**: 1  
**Silt (%)**\*: -0.7  
**Sand (%)**: 99.7  
**Class**: Sand

#### Predicted soil properties calculated from PSA values

Fineness Modulus (Fm):	1.8
Effective particle diameter - $D_{eff}$ (mm):	0.295
Median particle diameter - $D_{med}$ (mm):	0.343 Medium sand
Saturation ( $cm^3$ water/ $cm^3$ ):	0.26
Field capacity ( $cm^3$ water/ $cm^3$ ):	0.08
Permanent wilting point ( $cm^3$ water/ $cm^3$ ):	0.03
Available water capacity ( $cm^3$ water/ $cm^3$ ):	0.05 (5% v/v)
Total porosity* (%v/v):	26 (Typically 25 – 35%v/v)
Water-filled porosity* (%v/v):	8 (Typically 8 – 15%v/v)
Air-filled porosity* (%v/v):	18 (Typically 10 – 28%v/v)
Critical Tension (mm):	242

\* at Field Capacity

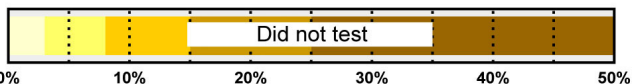
#### Predicted Ksat results (based on PSA)

Bulk Density ( $g/cm^3$ ):	1.96
Saturated Hydraulic Conductivity using $D_{eff}$ (mm/hr):	998
USGA Saturated Hydraulic Conductivity (mm/hr):	925

**Particle shape:** Shape not tested, sphericity not tested.

### ORGANIC MATTER

**Organic Matter (%w/v):** -  
Did not test



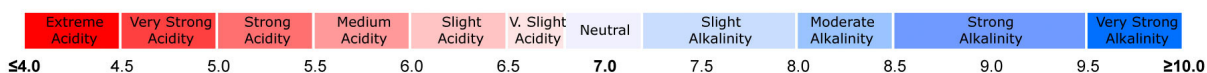
#### Actual Ksat results (Laboratory determination)

Field core method (cm/hr): Did not test.

Repacked	Point	Ksat (mm/hr)	Bulk Density ( $g/cm^3$ )
core method:	8 drops:	D.N.T.	Tube N°?
	16 drops:	D.N.T.	Tube N°?
	32 drops:	D.N.T.	Tube N°?

### pH and ELECTRICAL CONDUCTIVITY

#### pH Analysis



**pH in H<sub>2</sub>O (1:5)**

ND

**pH in CaCl<sub>2</sub> (1:5)**

ND

#### Electrical Conductivity (dS/m)



**Electrical Conductivity by Saturated Extract (EC<sub>s</sub> dS/m):** - Requires EC and Soil Texture result.

Consultant: Gus Manatsa

Authorised Signatory: Murray Fraser

Date of Report: 25/08/2011

#### METHOD REFERENCES:

**Particle Size Analysis:** ASTM F 1632-03

**Organic Matter:** Charman & Roper 2000

**Saturated Hydraulic Conductivity and Bulk Density:**

Department Urban Services, ACT Government 1993.

Canberra Landscape Guidelines, Soil Testing

Procedure LG B22.

**pH and Electrical Conductivity:** Bradley et al (1983)

**Effective Particle Diameter, Predicted Ksat, and**

**Predicted Critical Tension:** Stewart, V.I. (1994)

Sports Turf: Science, construction, and maintenance.

Sample was tested as received and comments pertain only to the sample shown. This test report contains confidential information and shall not be reproduced except in full, and with the express written approval of SESL. Copyright © 2009 Sydney Environmental & Soil Laboratory. All rights reserved.

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