SUMMARY AND RECOMMENDATIONS

This sample was assessed for its particle size grading and hydraulic conductivity.

The material is dominated by particles in the medium to fine sand range. Silt and clay fractions are low.

Hydraulic conductivity is very satisfactory.

These sands will be blended with organics to determine optimum blends for sportsfield turf.

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Fraction</th>
<th>% Passing by mass</th>
<th>% Retained by mass</th>
<th>USGA SPECIFICATION</th>
<th>RESULT</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.35</td>
<td>Medium gravel</td>
<td>99.99</td>
<td>&lt;0.01</td>
<td>&lt;0%</td>
<td>&lt;3%</td>
<td>Suitable</td>
</tr>
<tr>
<td>2.00</td>
<td>Fine gravel</td>
<td>99.72</td>
<td>0.27</td>
<td>&lt;10%</td>
<td>Suitable</td>
<td>Total: 3.07% Suitable</td>
</tr>
<tr>
<td>1.00</td>
<td>Very coarse sand</td>
<td>96.88</td>
<td>2.8</td>
<td>&lt;60%</td>
<td>Generally unsuitable</td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td>Coarse sand</td>
<td>83.1</td>
<td>14</td>
<td>&lt;20%</td>
<td>Generally unsuitable</td>
<td></td>
</tr>
<tr>
<td>0.25</td>
<td>Medium sand</td>
<td>52.58</td>
<td>31</td>
<td>&lt;5%</td>
<td>Suitable</td>
<td></td>
</tr>
<tr>
<td>0.15</td>
<td>Fine sand</td>
<td>19.22</td>
<td>33</td>
<td>&lt;10%</td>
<td>Suitable</td>
<td></td>
</tr>
<tr>
<td>0.106</td>
<td>Fine Sand</td>
<td>8.3</td>
<td>11</td>
<td>&lt;5%</td>
<td>Suitable</td>
<td></td>
</tr>
<tr>
<td>0.053</td>
<td>Very fine sand</td>
<td>4.03</td>
<td>4.3</td>
<td>&lt;10%</td>
<td>Suitable</td>
<td></td>
</tr>
<tr>
<td>0.02</td>
<td>Silt</td>
<td>2.98</td>
<td>1.1</td>
<td>&lt;5%</td>
<td>Suitable</td>
<td></td>
</tr>
<tr>
<td>0.002</td>
<td>Fine Silt</td>
<td>1.66</td>
<td>1.3</td>
<td>&lt;5%</td>
<td>Suitable</td>
<td></td>
</tr>
<tr>
<td>&lt;0.002</td>
<td>Clay</td>
<td>0%</td>
<td>1.66</td>
<td>&lt;3%</td>
<td>Suitable</td>
<td></td>
</tr>
</tbody>
</table>
USGA Rootzone Suitability
USGA Recommendations for Putting Green Construction
(2004 Revisions)

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

ABN 70 106 810 708

PARTICLE SIZE DISTRIBUTION GRAPHS

CUMULATIVE FRACTIONS (% by mass)
- Gravel (>2.0mm): 0.3%, Acceptable
- Sand (2.0mm to >0.053mm): 96.1%, Acceptable
- Silt (0.053mm to 0.002mm): 1.3%, Acceptable
- Clay (<0.002mm): 1.66%, Acceptable
- Total Fines (<0.15mm): N.D.

D VALUES
- D_{95}: 0.93
- D_{85}: 0.75
- D_{60}: 0.57
- D_{50}: 0.31
- D_{15}: 0.24
- D_{10}: 0.12
- D_{5}: 0.09
- D_{3.5}: 0.06

PERFORMANCE FACTORS
- BRIDGING FACTOR:
  A Drainage Gravel compatible with this material will have a D_{15} of ≤ 4.55
- PERMEABILITY FACTOR:
  A Drainage Gravel compatible with this material will have a D_{15} of ≥ 0.62
- GRADATION INDEX:
  D_{95}/D_{15}: 8.23 Generally unacceptable, prone to packing
- COEFFICIENT OF UNIFORMITY:
  D_{60}/D_{10}: 3.41 Generally acceptable
- FINENESS MODULUS:
  1.5 – Generally unacceptable, too fine

PORE DISTRIBUTION
- Total Porosity (%v/v): N.D.
- Gravitational Porosity (%v/v): N.D. (Air-filled Pore Space)
- Capillary Porosity (%v/v): N.D. (Volumetric Water)
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c) intra-laboratory comparisons; and,

d) repeatability studies.

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END OF REPORT
SUMMARY AND RECOMMENDATIONS

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Hydraulic conductivity is very satisfactory.

These sands will be blended with organics to determine optimum blends for sportsfield turf.

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Fraction</th>
<th>% Passing by mass</th>
<th>% Retained by mass</th>
<th>USGA SPECIFICATION</th>
<th>RESULT</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.35</td>
<td>Medium gravel</td>
<td>99.99</td>
<td>&lt;0.01</td>
<td>Suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>Fine gravel</td>
<td>99.93</td>
<td>0.06</td>
<td>Suitable</td>
<td></td>
<td>Total: 2.16%</td>
</tr>
<tr>
<td>1.00</td>
<td>Very coarse sand</td>
<td>97.81</td>
<td>2.1</td>
<td>Suitable</td>
<td></td>
<td>Suitable</td>
</tr>
<tr>
<td>0.50</td>
<td>Coarse sand</td>
<td>85.62</td>
<td>12</td>
<td>Generally unsuitable</td>
<td></td>
<td>Total: 44%</td>
</tr>
<tr>
<td>0.25</td>
<td>Medium sand</td>
<td>53.85</td>
<td>32</td>
<td>Generally unsuitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15</td>
<td>Fine sand</td>
<td>19.61</td>
<td>34</td>
<td>Generally unsuitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.106</td>
<td>Fine Sand</td>
<td>8.11</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.053</td>
<td>Very fine sand</td>
<td>3.59</td>
<td>4.5</td>
<td>Suitable</td>
<td></td>
<td>Total: 8.07%</td>
</tr>
<tr>
<td>0.02</td>
<td>Silt</td>
<td>2.17</td>
<td>1.4</td>
<td>Suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.002</td>
<td>Fine Silt</td>
<td>1.72</td>
<td>0.45</td>
<td>Suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;0.002</td>
<td>Clay</td>
<td>0%</td>
<td>1.72</td>
<td>Suitable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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PARTICLE SIZE DISTRIBUTION GRAPHS

D VALUES

<table>
<thead>
<tr>
<th>D Values</th>
<th>% by Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>D5%</td>
<td>0.88</td>
</tr>
<tr>
<td>D10%</td>
<td>0.68</td>
</tr>
<tr>
<td>D25%</td>
<td>0.50</td>
</tr>
<tr>
<td>D40%</td>
<td>0.30</td>
</tr>
<tr>
<td>D60%</td>
<td>0.24</td>
</tr>
<tr>
<td>D85%</td>
<td>0.12</td>
</tr>
<tr>
<td>D95%</td>
<td>0.09</td>
</tr>
<tr>
<td>D99%</td>
<td>0.06</td>
</tr>
</tbody>
</table>

PERFORMANCE FACTORS

BRIDGING FACTOR:
A Drainage Gravel compatible with this material will have a D15 of ≤ 3.96

PERMEABILITY FACTOR:
A Drainage Gravel compatible with this material will have a D15 of ≥ 0.61

GRADATION INDEX:
D50/D10: 7.4 Generally unacceptable, prone to packing

COEFFICIENT OF UNIFORMITY:
D60/D10: 3.25 Generally acceptable

FINENESS MODULUS:
1.4 – Generally unacceptable, too fine

PORE DISTRIBUTION

- Total Porosity (%v/v): N.D.
- Gravitational Porosity (%v/v): N.D. (Air-filled Pore Space)
- Capillary Porosity (%v/v): N.D. (Volumetric Water)
Starting at the upper end of the range may allow the mix to remain within the desired Ksat range over a greater number of years as the tendency is for the rate to slowly decline with time.

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DISCLAIMER OF ENDORSEMENT: The use of trade, firm or company names in this report is for the information and convenience of the reader. Such use does not necessarily constitute or imply an official endorsement or approval by SESL of any product or service to the exclusion of others that may be suitable. This report shall not be used for advertising or product endorsement purposes.

METHOD REFERENCES:

- Particle Density: ASTM D854-02
- Particle Size Analysis: ASTM F1632-03
- Bulk Density and Water Retention
  - ASTM F1815-06 Test method B
  - Saturated Hydraulic Conductivity: ASTM F1815-06 Test method A
  - Total Porosity and Pore Distribution: ASTM F1815-06 Test methods C and D
  - Sodium Sulphate Soundness: ASTM-C68
- LA Abrasion Test: ASTM-C131
- Organic Matter: Charman & Roper 2000
- Particle Shape: Brown & Thomas 1986
SUMMARY AND RECOMMENDATIONS

This sample was assessed for its particle size grading and hydraulic conductivity.

The material is dominated by particles in the medium to fine sand range. Silt and clay fractions are low.

Hydraulic conductivity is satisfactory.

These sands will be blended with organics to determine optimum blends for sportsfield turf.

PARTICLE SIZE EVALUATION

Client: Gippsland Premium Quarries Pty Ltd (GPO)
Client Contact: Ian McPherson
Client Order Nº: PO Box 1
Address: NERIM Junction VIC 3832

Project Name: PSA & USGA analysis
Sample Name: Fresh
Description: Soil
Test Type: PSA_US, HC_USGA

Batch Nº: 46540
Sample Nº: 3
Date Received: 30/1/18
Report Status:  Draft  Final

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>SIEVE DATA Fraction</th>
<th>% Passing by mass</th>
<th>% Retained by mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.35</td>
<td>Medium gravel</td>
<td>100</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>2.00</td>
<td>Fine gravel</td>
<td>99.82</td>
<td>0.18</td>
</tr>
<tr>
<td>1.00</td>
<td>Very coarse sand</td>
<td>96.57</td>
<td>3.3</td>
</tr>
<tr>
<td>0.50</td>
<td>Coarse sand</td>
<td>83.79</td>
<td>13</td>
</tr>
<tr>
<td>0.25</td>
<td>Medium sand</td>
<td>56.8</td>
<td>27</td>
</tr>
<tr>
<td>0.15</td>
<td>Fine sand</td>
<td>23.48</td>
<td>33</td>
</tr>
<tr>
<td>0.106</td>
<td>Fine Sand</td>
<td>10.04</td>
<td>13</td>
</tr>
<tr>
<td>0.053</td>
<td>Very fine sand</td>
<td>4.14</td>
<td>5.9</td>
</tr>
<tr>
<td>0.02</td>
<td>Silt</td>
<td>2.67</td>
<td>1.5</td>
</tr>
<tr>
<td>0.002</td>
<td>Fine Silt</td>
<td>2.27</td>
<td>0.39</td>
</tr>
<tr>
<td>&lt;0.002</td>
<td>Clay</td>
<td>0%</td>
<td>2.27</td>
</tr>
</tbody>
</table>

USGA SPECIFICATION:
Individual Group
- 0% <3% <10% <10% <20% <5% <5% <3%

RESULT Comments
- Suitable
- Total: 3.48% Suitable
- Total: 40% Generally unsuitable
- Generally unsuitable
- Total: 10.06% Generally unsuitable
- Generally unsuitable
- Suitable
- Suitable
- Suitable

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Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

PARTICLE SIZE DISTRIBUTION GRAPHS

CUMULATIVE FRACTIONS (% by mass)

- Gravel (>2.0mm): 0.2%, Acceptable
- Sand (2.0mm to >0.053mm): 95.2%, Acceptable
- Silt (0.053mm to 0.002mm): 0.39%, Acceptable
- Clay (<0.002mm): 2.27%, Acceptable
- Total Fines (<0.15mm):

D VALUES

- D$_{50}$: 0.94
- D$_{90}$: 0.74
- D$_{95}$: 0.55
- D$_{85}$: 0.28
- D$_{60}$: 0.23
- D$_{50}$: 0.11
- D$_{5}$: 0.08
- D$_{5}$: 0.06

PERFORMANCE FACTORS

- BRIDGING FACTOR:
  A Drainage Gravel compatible with this material will have a D$_{15}$ of ≤ 4.38
- PERMEABILITY FACTOR:
  A Drainage Gravel compatible with this material will have a D$_{15}$ of ≥ 0.54
- GRADATION INDEX:
  D$_{50}$/$D_{10}$: 9.02 Generally unacceptable, prone to packing
- COEFFICIENT OF UNIFORMITY:
  D$_{60}$/$D_{10}$: 3.39 Generally acceptable
- FINENESS MODULUS:
  1.4 – Generally unacceptable, too fine

PORE DISTRIBUTION

- Total Porosity (%v/v): N.D.
- Gravitational Porosity (%v/v): N.D. (Air-filled Pore Space)
- Capillary Porosity (%v/v): N.D. (Volumetric Water)

Client: Gippsland Premium Quarries Pty Ltd (GPQ)
Contact: Ian McPherson
Client Job Nº: , Client Order Nº: 
Project Name: PSA & USGA analysis, Test Type: 
Batch Nº: 46540, Sample Nº: 3, Sample Name: Fresh

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Batch Nº: 46540  Sample Nº: 3  Date Received: 30/1/18  Report Status: Draft

SATURATED HYDRAULIC CONDUCTIVITY (Ksat)

<table>
<thead>
<tr>
<th>Result (mm/hr)</th>
<th>Comment</th>
<th>Ksat (mm/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>Unacceptable</td>
<td></td>
</tr>
</tbody>
</table>

Starting out at the upper end of the range may allow the mix to remain within the desired Ksat range over a greater number of years as the tendency is for the rate to slowly decline with time.

OTHER PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Result</th>
<th>Comment</th>
<th>Property</th>
<th>Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle Density (g/cm³):</td>
<td></td>
<td>No requirement</td>
<td>Weathering Stability:</td>
<td>by Sodium Sulphate Soundness</td>
<td>Not determined</td>
</tr>
<tr>
<td>Bulk Density (g/cm³):</td>
<td>N.D.</td>
<td>No requirement</td>
<td>Mechanical Stability:</td>
<td>by LA Abrasion Test</td>
<td>Not determined</td>
</tr>
<tr>
<td>Organic Matter (%w/v):</td>
<td></td>
<td>Did not test</td>
<td>Particle Shape:</td>
<td>Shape not tested, sphericity not tested.</td>
<td></td>
</tr>
<tr>
<td>pH in H₂O (1:5):</td>
<td></td>
<td>Did not test</td>
<td>The USGA does not provide any recommendation on particle shape but the following general principles apply. Generally materials that are suitable for Greens construction cover the angular to sub-rounded group. Theoretically sphericity will have an impact but little is known or certainly written about the impact of particle sphericity on turf growth and material function.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH in CaCl₂ (1:5):</td>
<td></td>
<td>Did not test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC (dS/m) (1:5):</td>
<td></td>
<td>Did not test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liming Value (%CaCO₃):</td>
<td>-</td>
<td>Did not test</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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- Saturated Hydraulic Conductivity: ASTM F1815-06 Test method A
- Total Porosity and Pore Distribution: ASTM F1815-06 Test methods C and D
- Sodium Sulphate Soundness: ASTM-C68
- LA Abrasion Test: ASTM-C131
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- Particle Shape: Brown & Thomas 1986

END OF REPORT

Page 9