AGRICULTURAL LAND SUITABILITY OF THE SURVEYED AREAS

Figure 4
Class 3 land is 'grazing land that is well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall level of production is moderate as a result of edaphic [soil related] or environmental constraints. Erosion hazard or soil structural breakdown limit the frequency of ground disturbance, and conservation or drainage works may be required'.

Class 4 land is 'land suitable for grazing but not for cultivation. Agriculture is based on native pastures established using minimum tillage techniques. Production may be high seasonally but the overall level of production is low as a result of a number of major constraints, both environmental and edaphic [soil related]'.

13.2.2 Current Assessment

13.2.2.1 Proposed Reject Emplacement Area

After field assessments during the soil survey, it is evident that this area is Class 3 land.

13.2.2.2 Proposed Brine Storage Area

After field assessments during the soil survey, it is evident that this area is mainly Class 3 land with a small area of Class 4 land.

13.2.2.3 Proposed Pipeline Route

After field assessments during the soil survey, it is evident that this Route passes through mainly Class 3 and Class 4 and a small area of Class 2 lands as indicated by the existing Agricultural Land Suitability Mapping.

After field inspection during the soil survey, it is evident that, the I&NSW assessment of the agricultural land suitability of the Study Area is generally correct.

14 POST-DISTURBANCE LAND CAPABILITY AND AGRICULTURAL LAND SUITABILITY

14.1 Land Capability

14.1.1 Proposed Reject Emplacement Area

Given that this area would have a very different landform to that which currently exists. The rehabilitated emplacement would have sloping batters and a top surface with a series of drainage channels to remove rain water quickly to minimize infiltration below the capping material.

The Land Capability of the rehabilitated former Reject Emplacement Area would be Class VI.
Class VI land is land suitable for grazing with no cultivation along with implementation of soil conservation practices including structural works as required, limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin.

14.1.2 Proposed Brine Storage Area

It is proposed that this area would be returned to its former landform as much as possible by replacing the subsoil and topsoils after decommissioning. However, there will be an expansion in volume of soil material associated with the earthmoving activity and it is likely that the land surface may well be more undulating than it now is.

The probable Land Capability of the rehabilitated Brine Storage Area would be Class V.

Class V land is land suitable for grazing with occasional cultivation and which requires structural soil conservation works such as absorption banks, diversion banks and contour ripping and conservation practices such as pasture improvement, stock control, application of fertiliser and minimal cultivation for the establishment or re-establishment of permanent pasture.

14.1.3 The Proposed Pipeline Route

The Land Capability of the Pipeline Route is unlikely to change as a result of the disturbance associated with the laying of the proposed pipeline and so will remain the same as outlined in the current assessment.

14.2 Agricultural Land Suitability

14.2.1 Proposed Reject Emplacement Area

Given that this area would have a very different landform to that which currently exists. The rehabilitated emplacement would have sloping batters and a top surface with a series of drainage channels to remove rain water quickly to minimise infiltration below the capping material.

The Agricultural Land Suitability of the rehabilitated former Reject Emplacement Area would be Class 5.

Class 5 land is 'land unsuitable for agriculture or at best suited only to light grazing. Agricultural production is very low to zero as a result of severe constraints, including economic factors, which preclude improvement'.
14.2.2 Proposed Brine Storage Area

It is proposed that this area would be returned to its former landform as much as possible by replacing the subsoil and topsoils after decommissioning. However, there will be an expansion in volume of soil material associated with the earthmoving activity and it is likely that the land surface may well be more undulating than it now is.

The probable Land Capability of the rehabilitated Brine Storage Area would be Class 3.

Class 3 land is ‘grazing land that is well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall level of production is moderate as a result of edaphic [soil related] or environmental constraints. Erosion hazard or soil structural breakdown limit the frequency of ground disturbance, and conservation or drainage works may be required’.

14.2.3 The Proposed Pipeline Route

The Agricultural Land Suitability of the Pipeline Route is unlikely to change as a result of the disturbance associated with the laying of the proposed pipeline and so will remain the same as outlined in the current assessment.

15 ADDRESSING THE DIRECTOR-GENERAL'S REQUIREMENTS

A number of issues relating to soils and land capability have been raised in the Director-General's Requirements.

Table 16 lists the issues and indicates the section of this study where each issue is addressed.

<table>
<thead>
<tr>
<th>Government Agency</th>
<th>Paraphrased Requirement</th>
<th>Relevant Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCMA</td>
<td>Land use change and post-mining land use</td>
<td>Section 14</td>
</tr>
<tr>
<td>DPI</td>
<td>Details of post-mining land use</td>
<td>Section 14</td>
</tr>
<tr>
<td>DoP</td>
<td>Potential soil erosion</td>
<td>Sections 10 &amp; 11</td>
</tr>
</tbody>
</table>

16 CONCLUSION

The soils of the proposed Reject Emplacement Area, Brine Storage Area at the Narrabri Coal Mine have been sampled and subjected to field and laboratory testing. Similarly the soils along the proposed Pipeline Route from the Namoi River to the Narrabri Coal Mine have been sampled and filed and laboratory analysed.

A single soil mapping unit [SMU R1] was identified at the proposed Reject Emplacement Area while at the proposed Brine Storage Area there were three soil mapping units identified [SMUs B1, B2, B3].
Sampling along the proposed Pipeline Route revealed a further three soil mapping units [SMU P1, P2, P3].

In all, forty soil profiles were excavated and described and the horizons analysed to provide data on their physical and chemical properties. Five of these profiles were at the proposed Reject Emplacement Area site, twenty two within the proposed Brine Storage Area and thirteen along the proposed Pipeline Route.

Laboratory analyses were undertaken on samples from all horizons in all profiles from the proposed Reject Emplacement and Brine Storage Areas. This is a departure from normal procedures as usually only a representative proportion of samples would be analysed.

The additional analyses were undertaken at the request of Narrabri Coal Operations Pty Limited to ensure that the Company was fully briefed on the physical and chemical properties of the soils in these critical areas.

Soil stripping, storage and handling recommendations have been provided for all SOIL Mapping Units on the proposed Reject Emplacement and Brine Storage Areas.

As the proposed Pipeline Route soils would be replaced quickly after trench excavation, pipelaying and trench refilling, stripping recommendations as such were not provided. Instead, guidance on management of the soil materials during and after excavation and during refilling of the trench have been addressed.

Assessments of the erodibility of the soil mapping units identified within the proposed Reject Emplacement Area, Brine Storage Area and Pipeline Route have been undertaken using the SOILLOSS computer model. Results of the assessments have been provided.

The current Land Capability and Agricultural Suitability classifications for the land proposed to be disturbed have been provided as follows:

- proposed Reject Emplacement Area [Class III Land Capability; Class 3 Agricultural Land Suitability];
- proposed Brine Storage Area [Class III Land Capability; Classes 3 and 4 Agricultural Land Suitability]; and
- proposed Pipeline Route [Classes II and III Land Capability; Classes 2, 3 and 4 Agricultural Land Suitability].

In addition an assessment of the likely land classifications for the post-disturbance landscapes has been undertaken. The assessment is summarized as follows:

- proposed Reject Emplacement Area [Class VI Land Capability; Class 3 Agricultural Land Suitability];
- proposed Brine Storage Area [Class III Land Capability; Class 3 Agricultural Land Suitability]; and
- proposed Pipeline Route [Classes II and III Land Capability; Classes 2, 3 and 4 Agricultural Land Suitability] – unchanged.

Geoff Cunningham Natural Resource Consultants Pty Ltd
17 REFERENCES


Geoff Cunningham B.Sc.Agr.[Hons], FAIAST. 
Managing Director and Principal Soil Scientist, Geoff Cunningham Natural Resource Consultants Pty Ltd
27th October, 2009
Appendix 1

Reject Emplacement Soil Profile Descriptions from Backhoe Test Pits - Field Descriptions

(No. of pages excluding this page = 4)
Profile R1 [SMU R1] - lower to mid-slope location; surface condition loose; some rounded and angular surface stone 5-15cm present;

0-12cm - light to medium clay; many roots; no lime present; no manganese present; pH 6.5; some angular gravel to 2cm; not mottled; not bleached; reddish brown [5YR4/4] dry, dark reddish brown [5YR3/3] moist; peds rough - / smooth faced, moderately pedal [50%], polyhedral, <5-10 mm in size; very firm consistency dry; slightly hydrophobic; abrupt to:-

12-43cm - heavy clay; roots common; scattered lime nodules present; no manganese present; pH 8.0; gravel and stones absent; not mottled; not bleached; dark reddish brown [5YR3/3] dry, dark reddish brown [5YR3/2] moist; peds rough- / smooth faced, highly pedal [100%], polyhedral, 5-15mm in size; very strong consistency dry; not hydrophobic; gradual to:-

43-102cm - medium to heavy clay; few roots; many lime nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; reddish brown [2.5YR4/4] dry, red [2.5YR4/6] moist, weak red [10R4/4] moist; peds rough- / smooth faced, highly pedal [100%], polyhedral, <5-10 mm in size; very strong consistency dry; not hydrophobic.

Profile R2 [SMU R1] - midslope location; surface condition self mulching and cracked; medium amounts of rounded / angular surface stone 2-10cm and up to 50cm x 30cm present

0-20cm - medium clay; roots common; no lime visible; no manganese present; pH 8.0; some angular gravel to 2cm; not mottled; not bleached; red [2.5YR4/6] dry, red [2.5YR4/6] moist; massive, fabric rough / smooth, very strong coherence dry; not hydrophobic; abrupt to:-

20-57cm - medium to heavy clay; roots common; no lime visible; no manganese present; pH 8.5; some angular gravel to 2cm; not mottled; not bleached; red [2.5YR4/6] dry, red [2.5YR4/6] moist; massive, fabric rough / smooth, very strong coherence dry; not hydrophobic; clear to:-

57-110cm - medium to heavy clay; few roots; no lime visible; no manganese present; pH 9.0; some angular gravel to 2cm; not mottled; not bleached; red [2.5YR4/6] dry, red [2.5YR4/6] moist; massive, fabric rough / smooth, very strong coherence dry; not hydrophobic; gradual to:-

110-146cm - gritty medium clay; few roots; no lime visible; no manganese present; pH 9.5-10; mainly angular gravel to 3cm, floaters to 30x50cm; not mottled; not bleached; red [2.5YR5/6] dry, red [2.5YR4/6] moist; massive, fabric rough / smooth, very strong coherence dry; not hydrophobic; diffuse to:-

146-250cm - sandy clay loam [indurated]; few roots; no lime visible; no manganese present; pH 9.5-10; mainly stone 5 - 10 - 15cm; not mottled; not bleached; very pale brown [10YR7/4] dry, yellowish brown [10YR5/4] moist; massive, fabric rough / smooth, very strong coherence dry; not hydrophobic.
Profile R3 [SMU R1] - mid-slope location; surface condition self mulching and cracked; large amounts of angular surface stone to 10cm present

0-18cm - light to medium clay; many roots; no lime present; no manganese present; pH 6.0; much angular gravel to 3cm; not mottled; not bleached; dark reddish brown [2.5YR3/4] dry, dark reddish brown [2.5YR3/4] moist; peds rough-/smooth faced, highly pedal [100%], polyhedral, <5-10 mm in size; very firm consistence dry; not hydrophobic; abrupt to:-

18-79cm - light to medium clay; roots common; no lime present; no manganese present; pH 6.0; much angular gravel to 1-2cm; not mottled; not bleached; reddish brown [2.5YR2.5/4] dry, dark reddish brown [2.5YR3/4] moist; peds rough-/smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; very strong consistence dry; not hydrophobic; gradual to:-

79-150cm - medium to heavy clay; few roots; no lime present; no manganese present; pH 6.5; scattered lenses of angular gravel to 8cm; not mottled; not bleached; dark red [2.5YR3/6] dry, dark red [2.5YR3/6] moist; peds rough-/smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; very firm consistence dry; not hydrophobic; gradual to:-

Profile R4 [SMU R1] - mid-slope location; surface condition soft; large amounts of rounded /angular surface stone 2 to 10cm present;

0-25cm - light to medium clay; many roots; no lime present; no manganese present; pH 5.5; much angular gravel to 2cm; not mottled; not bleached; dark reddish brown [5YR3/4] dry, dark reddish brown [5YR3/3] moist; peds rough-faced, moderately pedal [60%], polyhedral, <5-10 mm in size; very strong consistence dry; not hydrophobic; abrupt to:-

25-77cm - heavy clay; few roots; no lime present; no manganese present; pH 7.5; much angular gravel to 3cm; not mottled; not bleached; dark reddish brown [5YR4/3] dry, reddish brown [5YR4/3] moist; peds smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; very strong consistence dry; not hydrophobic; gradual to:-

77-140cm - heavy clay; few roots; no lime visible; no manganese present; pH 9.0; much small angular gravel to 1cm; not mottled; not bleached; dark red [2.5YR3/6] dry, dark red [2.5YR3/6] moist; peds smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; very strong consistence dry; not hydrophobic; gradual to:-

140-220cm - medium clay; roots absent; some lime flecks present; no manganese present; pH 9.0; much rock with gravel to 1cm; not mottled; not bleached; brown [7.5YR5/4] dry, strong brown [7.5YR5/6] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-10 mm in size; very strong consistence dry; not hydrophobic; diffuse to:-

220-250cm - decomposing rock with crystalline quartz stones to 10-15cm; roots absent; not sampled.

Profile R5 [SMU R1] - midslope location; surface condition cracked; medium to high amounts of rounded and angular surface stone 2-10cm present

0-10cm - medium to heavy clay; many roots; no lime present; no manganese present; pH 6.0; much gravel to 1cm; not mottled; not bleached; dark brown [7.5YR3/4] dry, very dark
brown [7.5YR2.5/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; very strong consistence dry; not hydrophobic; abrupt to:-

10-47cm - heavy clay; few roots; no lime present; no manganese present; pH 7.0; much round and angular gravel to 10cm; not mottled; not bleached; dark brown [7.5YR3/3] dry, dark brown [7.5YR3/4] moist; peds smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; very strong consistence dry; not hydrophobic; clear to:-

47-170cm - medium to heavy clay; few roots; no lime visible; manganese stains present; pH 8.0; mainly gravel / stone / rock with soil in between; not mottled; not bleached; dark reddish brown [2.5YR3/4] dry, dark reddish brown [2.5YR3/4] moist; peds rough- / smooth- faced, highly pedal [100%], polyhedral / platy, <5 mm in size; very strong consistence dry; not hydrophobic

170+ cm; bedrock
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Appendix 2

Water Pipeline Soil Profile Descriptions from Backhoe Test Pits - Field Descriptions

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Profile P1 [SMU P2] - crest location; surface condition soft; surface stone absent

0-30cm - light to medium clay; many roots; no lime present; no manganese present; pH 6.5; some small gravel and some rounded stone to 10cm; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR4/3] moist; peds rough-faced, highly pedal [100%], polyhedral, <5-10mm in size; firm consistence dry; not hydrophobic; clear to:-

30 - 82cm - medium to heavy clay; roots common; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, brown [7.5YR4/4] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-15 mm in size; very strong consistence dry; not hydrophobic; gradual to:-

82-179cm - sandy clay loam; few roots; no lime visible; no manganese present; pH 8.0; gravel and stones absent; not mottled; not bleached; yellowish brown [10YR5/4] dry, brown [7.5YR4/4] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-20 mm in size; very firm consistence dry; not hydrophobic; gradual to:-

179-290cm - sandy clay loam; few roots; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; strong brown [7.5YR4/6] dry, dark yellowish brown 10YR4/4 moist; massive, fabric rough, firm coherence dry; not hydrophobic.

Profile P2 [SMU P2] - floodplain location; surface condition self mulching and racked; surface stone absent

0-15cm - light to medium clay; many roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; very dark greyish brown [10YR3/2] dry, very dark greyish brown [10YR3/2] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-15 mm in size; very strong consistence dry; hydrophobic; clear to:-

15-92cm - medium to heavy clay; few roots; lime flecks present; no manganese present; pH 9.5-10; gravel and stones absent; not mottled; not bleached; brown [7.5R4/2] dry, brown [7.5R4/2] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-15 mm in size; very firm consistence dry; not hydrophobic; gradual to:-

92-180cm - heavy clay; few roots; lime flecks present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, brown [7.5YR4/3] moist; peds rough-faced, highly pedal [100%], polyhedral, <5-10 mm in size; very strong consistence dry; not hydrophobic;

Profile P3 [SMU P2] - depression location; surface condition firm; some small surface gravel present

0-20cm - medium clay; many roots; no lime present; no manganese present; pH 6.5; some small angular gravel; not mottled; not bleached; brown [7.5YR4/3] dry, dark brown [7.5YR3/3] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; hydrophobic; clear to:-

20-82cm - heavy clay; roots common; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, brown [7.5YR4/3] moist; peds rough-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-
82-180cm - medium clay; few roots; no lime visible; no manganese present; pH 8.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P4 [SMU P3] - lower slope location; surface condition firm; surface stone absent

0-16cm - sandy clay loam; many roots; no lime present; no manganese present; pH 5.5; some small rounded gravel to 2cm; not mottled; not bleached; brown [7.5YR5/3] dry, black [5YR2.5/2] moist; massive, fabric rough, very firm coherence dry; not hydrophobic; abrupt to:-

16-62cm - medium to heavy clay; roots common; no lime present; no manganese present; pH 9.5/10; some small rounded gravel to 2cm; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

62-100cm - medium clay; roots common; occasional lime nodules present; some manganese concretions present; pH 9.5/10; some angular gravel to 1cm; not mottled; not bleached; reddish brown [5YR4/4] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

100-170cm - medium to heavy clay; few roots; many lime nodules present; no manganese present; pH 9.5/10; some rounded and angular gravel; not mottled; not bleached; yellowish brown [10YR5/4] dry, yellowish brown [10YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P5 [SMU P3] - upper slope location; surface condition soft; surface stone absent

0-24cm - sandy clay loam; many roots; no lime present; no manganese present; pH 5.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/4] moist; massive, fabric rough, very weak coherence dry; not hydrophobic; sharp to:-

24-39cm - clayey sand; roots common; no lime present; no manganese present; pH 6.0; some gravel to 5mm; not mottled; bleached; pink [7.5Yr7/3] dry, brown [7.5YR5/4] moist; massive, fabric rough, very firm coherence dry; not hydrophobic; sharp to:-

39-103cm - light to medium clay; few roots; no lime visible; flecks of manganese present; pH 8.0; gravel and stones absent; not mottled; not bleached; light brown [7.5R6/4] dry, brown [7.5YR5/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

103-200cm - medium to heavy clay; few roots; zone of lime nodule accumulation; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not leached; brown [10YR5/3] dry, light yellowish brown [10YR6/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; very firm consistence dry; not hydrophobic.

Profile P6 [SMU P2] - depression location; surface condition self mulching and cracked; surface stone absent
0-22cm - medium clay; many roots; no lime present; no manganese present; pH 6.5; round and angular gravel to 5-8cm; not mottled; not bleached; dark reddish brown [5YR3/5] dry, dark reddish brown [5YR2.5/2] moist; peds rough- / smooth-faced, highly pedal [100%], olyhedral, <5-15 mm in size; very strong consistence dry; not hydrophobic; abrupt to clear to:-

22-107cm - medium to heavy clay; few roots; no lime present; no manganese present; pH 6.5; some rounded and angular gravel to 3cm; not mottled; not bleached; brown [7.5YR4/3] dry, brown [7.5YR4/3] moist; peds smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; very strong consistence dry; not hydrophobic; gradual to:-

107-180cm - heavy clay; few roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; mottled; not bleached; 80% brown [7.5YR5/3, 20% brown [7.5YR4/2] dry, 80% brown [7.5YR5/3, 20% brown [7.5YR4/2] moist; peds smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; very strong consistence dry; not hydrophobic.

Profile P7 [SMU P3] - lower slope location; surface condition hard setting; surface stone absent

0-11cm - sandy clay loam; many roots; no lime present; no manganese present; pH; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry,dark brown [7.5YR3/3] moist; massive, fabric rough, weak coherence dry; slightly hydrophobic; clear to:-

11-30cm - light to medium clay; many roots; no lime present; no manganese present; pH; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, dark brown [7.5YR3/2] moist; peds smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; firm consistence dry; not hydrophobic; clear to:-

30-59cm - medium clay; few roots; no lime present; some manganese concretions present; pH; gravel and stones absent; not mottled; not bleached; reddish brown [2.5YR4/4] dry, reddish brown [2.5YR4/4] moist; peds smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

59-100cm - medium to heavy clay; few roots; no lime present; no manganese present; pH; gravel and stones absent; not mottled; not bleached; reddish brown [5YR4/4] dry, reddish brown [5YR4/4] moist; peds smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; very firm consistence dry; not hydrophobic; clear to:-

100-180cm - medium to heavy clay; few roots; no lime present; manganese stains present; pH; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/4] moist; peds smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P8 [SMU PP1] - depression location; surface condition hardsetting; surface stone absent

0-22cm - sandy loam; many roots;no lime present; no manganese present; pH 6.0; some round gravel to 2cm; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR4/3] moist; massive, fabric rough, weak coherence dry; not hydrophobic; abrupt to:-

22-74cm - clayey sand; roots common; no lime present; no manganese present; pH 6.0; round and angular gravel to 5-10cm present; not mottled; not bleached; brown [7.5YR5/3] dry,
dark brown [7.5YR3/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; weak consistence dry; not hydrophobic; clear to:-

74-111cm - clayey sand; few roots; no lime present; no manganese present; pH 6.0; layer of rounded gravel, some waterwashed; not mottled; not bleached; brown [7.5YR4/3] dry, reddish brown [5YR4/3] moist; massive, fabric rough, strong coherence dry; not hydrophobic; clear to:-

111-150cm - medium clay; few roots; no lime present; some manganese stains present; pH 7.5; gravel and stones absent; mottled; not bleached; 95% pale brown [10YR6/3], 5% yellowish brown [10YR5/6] dry, 95% brown [10YR5/3], 5% strong brown [7.5YR4/6] moist; peds rough-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

150-210cm - indurated sand; few roots; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; pale brown [10YR6/3] dry, yellowish brown [19YR5/4] moist; massive, fabric rough, very strong coherence dry; not hydrophobic.

Profile P9 [SMU P3] - crest location; surface condition soft; surface stone absent;

0-19cm - clayey sand; many roots; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, very dark brown [7.5YR2.5/3] moist; massive, fabric rough / smooth, slightly hydrophobic; abrupt to:-

19-41cm - clayey sand; roots common; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; pinkish grey [5YR6/2] dry, dark reddish grey [5YR4/2] moist; massive, fabric rough / smooth, not hydrophobic; abrupt to:-

41-60cm - light to medium clay; few roots; no lime visible; no manganese present; pH 9.0; some round and angular gravel to 2cm;not mottled; not bleached; yellowish brown [10YR5/4] dry, yellowish brown [10YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

60-135cm - medium to heavy clay; few roots; no lime present; no manganese present; pH 7.5; gravel and stones absent; mottled; not bleached; 95% brown [10YR5/3], 5% brownish yellow [10YR6/8] dry, 95% pale brown 10YR6/3], 5% strong brown [7.5YR5/6 moist; peds rough- / smooth faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

135-180cm - medium clay; few roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; mottled; not bleached; 95% brown [10YR5/3], 5% brownish yellow [10YR6/8] dry, 95% pale brown 10YR6/3], 5% strong brown [7.5YR5/6 moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P10 [SMU P3] - upper slope location; surface condition soft; surface stone absent

0-10cm - light to medium clay; many roots; no lime present; no manganese present; pH 5.5; some round gravel to 5mm; not mottled; not bleached; brown [7.5YR4/4] dry, dark brown [7.5YR3/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; very firm consistence dry; not hydrophobic; abrupt to:-

10-31cm - sandy loam; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR5/3]
moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

31-60cm - sandy light to medium clay; many roots; no lime present; no manganese present; pH 8.0; some rounded gravel <5mm; not mottled; not bleached; reddish brown [5YR5/4] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

60-107cm - medium to heavy clay; roots common; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; yellowish brown [10YR5/4] dry, yellowish brown [10YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

107-180cm - medium clay; roots common; many lime nodules and stains present; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; light yellowish brown [10YR6/4] dry, pale brown [10YR6/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P11 [SMU P3] - crest location; surface condition loose to firm; some surface gravel present

0-20cm - fine sandy clay loam; many roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR3/4] moist; massive, fabric rough, very firm coherence dry; not hydrophobic; abrupt to:-

20-50cm - medium to heavy clay; many roots; no lime present; some manganese stains and concretions present; pH 7.5; gravel and stones absent; not mottled; not bleached; dark reddish brown [2.5YR3/3] dry, dark brown [7.5YR3/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

50-140cm - medium clay; few roots; lime concretions present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/6] dry, brown [7.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

140-180cm - medium to heavy clay; few roots; major zone of lime accumulation, many nodules present; some manganese stains present; pH 9.5/10; some angular gravel to 4cm; mottled; not bleached; 50% brown [7.5YR5/4], 50% pale brown [10YR6/3] dry, 50% pale brown [10YR6/3], 50% light brownish grey [2.5Y6/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P12 [SMU P3] - level area on crest location; surface condition firm; surface stone absent

0-10cm - fine sandy clay loam; roots common; no lime present; no manganese present; pH 4.5; some rounded and angular gravel to 1cm; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/4] moist; massive, fabric rough / smooth, firm coherence dry; slightly hydrophobic; sharp to:-

10-50cm - medium clay; few roots; no lime present; no manganese present; pH 6.0; some small angular gravel to 5mm; not mottled; not bleached; reddish brown [5YR4/4] dry, reddish
brown [5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

50-117cm - medium to heavy clay; few roots; occasional scattered flecks and nodules of lime present; some manganese stains present; pH 9.5/10; some small rounded gravel to 5mm; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral / platy, 5-15mm in size; strong consistence dry; not hydrophobic; clear to:-

117-190cm - heavy clay; few roots; major zone of lime nodules; some small manganese nodules present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic.

Profile P13 [SMU P1] - drainage line location; surface condition firm; surface stone absent

0-10cm - clayey sand; roots common; no lime present; no manganese present; pH 6.0; much angular gravel to 1cm; not mottled; not bleached; brown [7.5YR4/2] dry, dark brown [7.5YR3/2] moist; massive, fabric rough, very firm coherence dry; hydrophobic; abrupt to:-

10-32cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.0; odd small gravel to 5mm; not mottled; not bleached; brown [7.5YR4/3] dry, dark brown [7.5YR3/3] moist; peds rough-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; abrupt to:

32-60cm - clayey sand; few roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; bleached; pink [7.5YR7/3] dry, brown [7.5YR4/4] moist; massive, fabric rough / smooth, firm coherence dry; not hydrophobic; abrupt to:

60-110cm - gritty light clay; few roots; no lime present; no manganese present; pH 6.0; some gravel fragments to 1cm; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

110-180cm - gritty medium clay; few roots; no lime visible; no manganese present; pH 8.0; gravel and stones absent; not mottled; not bleached; yellowish brown [10YR5/4] dry, brown [10YR5/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; strong consistence dry; not hydrophobic.
Appendix 3

Brine Storage Area Soil Profile Descriptions from Backhoe Test Pits - Field Descriptions

(No. of pages excluding this page = 12)
Profile B1 [SMU B3] - level plain location; surface condition loose; surface stone absent

0-25cm - sandy clay loam; roots common; no lime present; no manganese present; pH 5.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, dark brown [7.5YR3/3] moist; massive; fabric rough; firm coherence dry; not hydrophobic; clear to:-

25-40cm - clayey sand; many roots; no lime present; no manganese present; pH 6.0; some small rounded gravel to 5mm; not mottled; bleached; pinkish grey [7.5YR7/2] dry, brown [7.5YR5/4] moist; massive; fabric rough; firm coherence dry; not hydrophobic; sharp to:-

40-66cm - medium clay; few roots; no lime present; no manganese present; pH 7.0; gravel and stones absent; not mottled; not bleached; yellow [10YR5/4] dry, yellow [10YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

66-120cm - medium clay; few roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; mottled; not bleached; 90% very pale brown [10YR7/3], 10%yellowish red [10YR5/6] dry, 90% pale brown [10YR6/3], 10% yellowish red [10YR5/6] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

120-250cm - medium clay; few roots; many lime nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [10YR5/3] dry, pale brown [10YR6/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic.

Profile B2 [SMU B2] - level plain location; surface condition firm; surface stone absent

0-40cm - sandy loam; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; light yellowish brown [10YR6/4] dry, dark yellowish brown [10YR4/4] moist; peds rough- faced, weakly pedal [15%], polyhedral, 5-15 mm in size; weak consistence dry; not hydrophobic; gradual to:-

40-110cm - clayey sand; roots common; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; bleached; light grey [10YR7/2] dry, brown [7.5YR5/3] moist; massive; fabric rough; firm coherence dry; not hydrophobic; abrupt to:-

110-250cm - fine sandy clay loam; few roots; no lime visible; no manganese present; pH 8.0; gravel and stones absent; not mottled; not bleached; brownish yellow 10YR6/6 dry, yellowish brown [10YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 10-15 mm in size; firm consistence dry; not hydrophobic.

Profile B3 [SMU B3] - level plain location; surface condition loose; surface stone absent

0-23cm - sandy loam; many roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; strong brown [7.5YR4/6] dry, dark brown [7.5YR3/4] moist; peds rough-faced, weakly pedal [10%], polyhedral, 5-10 mm in size; weak consistence dry; not hydrophobic; abrupt to:-

23-72cm - sandy light clay; few roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; mottled; not bleached; 70% reddish brown [2.5YR4/4], 30%light reddish brown [5YR6/3] dry, 70% reddish brown [2.5YR5/4], 30% light reddish brown [5YR6/3 moist;
peds rough-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

72-114cm - heavy clay; few roots; no lime visible; manganese stains present; pH 9.0; gravel and stones absent; not mottled; not bleached; yellowish red [5YR5/6] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral / platy, 5-15 mm in size; strong consistence dry; not hydrophobic; clear to:-

114-174cm - heavy clay; few roots; no lime visible; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; strong brown [7.5YR5/6] dry, strong brown [7.5YR4/6] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral / platy, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

174-260cm - sandy clay loam; few roots; no lime visible; no manganese present; pH 9.5/10; some angular gravel to 5cm; not mottled; not bleached; light brown [7.5YR6/4] with light grey staining dry, strong brown [7.5YR4/6] moist; peds rough- / smooth-faced, highly pedal [90%], polyhedral, up to 5 mm in size; very firm consistence dry; not hydrophobic.

Profile B4 [SMU B3] - level plain location; surface condition firm; some water worn and rounded / angular surface stone present

0-20cm - fine sandy clay loam; many roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/4] moist; peds rough-faced, highly pedal [80%], polyhedral, 10-15 mm in size; weak consistence dry; not hydrophobic; abrupt to:-

20-64cm - heavy clay; few roots; no lime visible; some manganese stains present; pH 9.0; gravel and stones absent; not mottled; not bleached; reddish brown [5YR4/4] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

64-106cm - medium to heavy clay; few roots; scattered lime stains present; some manganese stains present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; reddish brown [5YR5/4] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

106-192cm - heavy clay; roots absent; many large lime nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brownish yellow [10YR6/6 dry, dark yellowish brown [10YR4/6] moist; massive, rough / smooth fabric, strong coherence dry; not hydrophobic; gradual to:-

192-250cm - heavy clay; roots absent; many large lime nodules present; some manganese concretions present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; reddish brown [7.5YR5/4] dry, dark brown [7.5YR3/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral / platy, <5-10 mm in size; strong consistence dry; not hydrophobic.

Profile B5 [SMU B3] - level plain location; surface condition firm; surface stone absent

0-24cm - sandy clay loam; roots common; no lime present; no manganese present; pH 4.5; rounded and angular gravel to 5mm present; not mottled; not bleached; brown [7.5YR4/4] dry, dark reddish brown [2.5YR3/3] moist; massive, rough fabric, weak coherence dry; not hydrophobic; abrupt to:-
24-39cm: gritty medium to heavy clay; few roots; no lime present; no manganese present; pH 6.0; some rounded gravel to 1cm; not mottled; not bleached; brown [7.5YR5/4] dry, brown 7.5YR4/4) moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

39-75cm - medium to heavy clay; few roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; mottled; not bleached; 50% strong brown [7.5YR5/6], 50% red [10YR4/6] dry, 50% brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; strong consistence dry; not hydrophobic; clear to:-

75-130cm - heavy clay; roots absent; some lime concretions present; manganese stains and concretions present; pH 9.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, brown 7.5YR4/6) moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

Profile B6 [SMU B3] - level plain location; surface condition hardsetting; surface stone absent

0-34cm - sandy clay loam; many roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; yellowish brown [10YR3/3] moist; massive, fabric rough, firm coherence dry; not hydrophobic; clear to:-

34-81cm - gritty medium to heavy clay; roots common; no lime present; no manganese present; pH 4.5; gravel and stones absent; not mottled; not bleached; brownish yellow [10YR5/6] dry, dark yellowish brown [10YR5/4] moist; peds rough-faced, highly pedal [80%], polyhedral, 5-20 mm in size; weak consistence dry; not hydrophobic; gradual to:-

81-160cm - medium clay; few roots; no lime present; no manganese present; pH 5.5; rounded and angular decomposing gravel to 4cm; not mottled; not bleached; brownish yellow [10YR5/6] dry, yellowish brown [10YR5/6] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-20 mm in size; strong consistence dry; not hydrophobic; gradual to:-

160-260cm - medium to heavy clay; few roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; mottled; not bleached; 60% brownish yellow [10YR6/6], 40% light brownish grey [10YR6/2] dry, 60%yellowish brown [10YR5/6], 40% light grey [10YR7/2] moist; massive, fabric smooth, strong coherence dry; not hydrophobic.

Profile B7 [SMU B1] - crest location; surface condition firm; surface stone absent

0-20cm - medium to heavy clay ; roots common; no lime present; no manganese present; pH 5.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, dark brown [7.5YR3/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; very firm consistence dry; slightly hydrophobic; abrupt to:-

20-37cm - heavy clay; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, dark brown [7.5YR3/3]
moist; peds rough- / smooth-faced, highly pedal [100%], angular blocky; 10-20 mm in size; strong consistence dry; not hydrophobic; abrupt to:-

37-85cm - heavy clay; few roots; many lime nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/2] dry, dark brown [7.5YR3/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; clear to:-

85-137cm - heavy clay; roots absent; many lime nodules present present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/4] moist; peds smooth-faced, highly pedal [100%), polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

137-250cm - medium clay; roots absent; scattered large lime nodules present; small manganese stains and concretions present; pH 9.5/10; pockets of decomposing rock exposed in base of pit; mottled; not bleached; 95% pale brown [10YR6/3], 5% reddish yellow [7.5YR6/6] dry, 95% brown [10YR5/3], strong brown [7.5YR5/6] moist; peds smooth- faced, highly pedal [100%), polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic.

Profile B8 [SMU B3] - crest location; surface condition hardsetting and cracked; some rounded / angular surface stone to 4-10cm present

0-15cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/4] moist; peds rough-faced, moderately pedal [50%], polyhedral, 5-15 mm in size; firm consistence dry; not hydrophobic; abrupt to:-

15-50cm - heavy clay; roots common; no lime visible; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; brown [7.5R4/4] dry, dark brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; abrupt to:-

50-96cm - heavy clay; few roots; many lime nodules present; no manganese present; pH 9.5/10; much round gravel to 8cm; not mottled; not bleached; reddish brown [5YR5/4] dry, brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

96-210cm - heavy clay; few roots; scattered lime nodules present; no manganese present; pH 9.5/10; probably decomposing rock material; mottled; not bleached; 50% light grey [10YR7/2], 50% pinkish grey [7.5YR6/2] dry, 50% light brownish grey [10YR6/2], 50% light brown [7.5YR6/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic.

Profile B9 [SMU B3] - mid-slope location; surface condition hardsetting; medium amounts of rounded / angular surface stone 5-20cm present

0-15cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.5; small angular and round gravel to 1-2cm present; not mottled; not bleached; brown [7.5YR4/3] dry, dark brown [7.5YR3/2] moist; peds rough-faced, moderately pedal [40%], polyhedral, 5-10 mm in size; very firm consistence dry; slightly hydrophobic; abrupt to:-

15-47cm - heavy clay; roots common; no lime visible; many manganese stains present; pH 9.0; rounded gravel to 2cm; not mottled; not bleached; reddish brown [5YR4/3] dry, reddish
brown [5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-20 mm in size; strong consistence dry; not hydrophobic; clear to:-

47-121cm - heavy clay; few roots; many lime concretions present; some manganese concretions present; pH 9.5/10; some scattered round and angular gravel to 4cm; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

121-260cm - medium to heavy clay; roots absent; many lime concretions present; some manganese stains present; pH 9.5/10; scattered rounded and angular gravel to 5cm; not mottled; not bleached; light brownish grey [2.5Y6/2] dry, light brownish grey [2.5Y6/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic.

Profile B10 [SMU B3] - upper slope location; surface condition hardsetting; some rounded / angular surface stone 2-10cm present

0-10cm - sandy loam; roots common; no lime present; no manganese present; pH 5.5; some rounded gravel to 1cm; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/3] moist; peds rough-faced, moderately pedal [50%], polyhedral, 10-15 mm in size; weak consistence dry; not hydrophobic; abrupt to:-

10-30cm - medium clay; roots common; no lime present; no manganese present; pH 7.0; gravel and stones absent; not mottled; not bleached; reddish brown 5YR4/4 dry, reddish brown [5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 10-20 mm in size; strong consistence dry; not hydrophobic; clear to:-

30-48cm - medium clay; few roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; reddish brown [5YR4/4] dry, yellowish brown [5YR4/6] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-20 mm in size; strong consistence dry; slightly hydrophobic; gradual to:-

48-85cm - medium clay; few roots; some lime flecks present; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; yellowish red [5YR4/6] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

85-154cm - heavy clay; roots absent; no lime present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry; brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; diffuse to:-

154-195cm - decomposing rock - not sampled.

Profile B11 [SMU B1] - crest location; surface condition firm; some rounded / angular surface stone to 10cm present

0-10cm - medium clay; roots common; no lime present; no manganese present; pH 6.5; occasional angular gravel <5mm; not mottled; not bleached; reddish brown [5YR4/3] dry, dark reddish brown [5YR3/2] moist; peds rough-faced, moderately pedal [70%], polyhedral, 5-10 mm in size; firm consistence dry; not hydrophobic; abrupt to:-
10-31 cm - medium clay; roots common; no lime visible; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; dusky red [10R3/2] dry, dusky red [10R3/2] moist; peds rough- / smooth-faced, highly pedal [100%], angular blocky; 15-20 mm in size; strong consistence dry; not hydrophobic; abrupt to:-

31-102 cm - heavy clay; few roots; many lime stains and nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; reddish brown [2.5YR5/4] dry, reddish brown [2.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; very firm consistence dry; not hydrophobic; clear to:-

102-191 cm - heavy clay; roots absent; no lime present; some manganese stains present; pH 6.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR5/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

191-250 cm - medium clay; roots absent; no lime present; no manganese present; pH 4.5; gravel and stones absent; mottled; not bleached; 50% yellowish red [5YR4/6], 50% light grey [10YR7/2] dry, 50% yellowish red [5YR4/6], 50% pinkish grey [7.5YR6/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; weak consistence dry; not hydrophobic;

Profile B12 [SMU B3] – lower slope / depression location; surface condition firm; some rounded / angular surface stone 2-5 cm present

0-16 cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.0; some rounded gravel to 1.5 cm; not mottled; not bleached; reddish brown [5YR4/3] dry, dark reddish brown [5YR3/3] moist; peds rough-faced, moderately pedal [50%], polyhedral, 5-10 mm in size; weak consistence dry; not hydrophobic; abrupt to:-

16-61 cm - heavy clay; few roots; scattered lime nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; reddish brown [2.5YR4/4] dry, reddish brown [2.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

61-107 cm - heavy clay; few roots; no lime present; some manganese stains present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, reddish brown [5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

107-180 cm - heavy clay; roots absent; no lime visible; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; light brown [7.5YR6/4] dry, light brown [7.5YR6/4] moist; peds rough- / smooth-faced, highly pedal 100%), polyhedral, <5-10 mm in size; very firm consistence dry; not hydrophobic; gradual to:-

180-250 cm - heavy clay; roots absent; some lime concretions present; some manganese stains present; pH 9.0; gravel and stones absent; mottled; not bleached; 60% light yellowish brown [10YR6/4], 40% brown [7.5YR5/4] dry, 60% light yellowish brown [10YR6/4], 40% brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic.

Profile B13 [SMU B3] - depression location; surface condition soft and cracked; surface stone absent
0-15cm - sandy clay loam; many roots; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, dark brown [7.5YR3/2] moist; peds rough-faced, weakly pedal [10%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

15-38cm - sandy clay; few roots; no lime present; no manganese present; pH 6.5: gravel and stones absent; not mottled; not bleached; dark reddish brown [5YR3/3] dry, dark reddish brown [5YR2.5/2] moist; peds rough-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; clear to:-

38-70cm - medium clay; few roots; lime nodules present; some manganese stains present; pH 9.5/10; some small angular gravel <1cm; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

70-160cm - medium to heavy clay; few roots; lime nodules present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; dark yellowish brown [10YR4/4] dry, brown [7.5YR5/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; diffuse to:-

160-250cm - gritty heavy clay; roots absent; no lime visible; no manganese present; pH 9.0; gravel and stones absent; mottled; not bleached; 70% reddish brown [5YR5/3], 30% brown [7.5YR5/3] dry, 70% reddish brown [5YR5/3], 30% brown [7.5YR5/3] moist; massive, fabric rough, strong coherence dry; not hydrophobic.

Profile B14 [SMU B1] - mid-slope of depression location; surface condition hardsetting and cracked; some rounded / angular surface stone to 8cm present

0-18cm- medium clay; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, very dark brown [7.5YR2.5/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; clear to:-

18-50cm - medium to heavy clay; few roots; no lime visible; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; dark reddish brown [5YR3/2] dry, dark reddish brown [5YR3/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

50-99cm - medium to heavy clay; few roots; some lime concretions present; manganese stains present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; reddish brown [5YR4/4] dry, reddish brown [2.5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

99-170cm - heavy clay; roots absent; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, brown [7.5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

170-250cm - light to medium clay; roots absent; no lime present; no manganese present; pH 4.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR5/3] moist; peds smooth-faced, highly pedal [100%], polyhedral, <5-15 mm in size; strong consistence dry; not hydrophobic.
Profile B15 [SMU B3] - upper slope of main creek line location; surface condition firm; some rounded surface stone to 5cm present

0-16cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/3] moist; massive, fabric rough, weak coherence dry; not hydrophobic; sharp to:--

16-20cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; bleached; brown [7.5YR5/3] dry, brown [7.5YR4/3] moist; massive, fabric rough, strong coherence dry; not hydrophobic; abrupt to:--

20-70cm - medium clay; roots common; no lime visible; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 10-20 mm in size; strong consistency dry; not hydrophobic; clear to:--

70-180cm - medium to heavy clay; few roots; scattered lime concretions present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR5/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistency dry; not hydrophobic; gradual to:--

180-210cm - sandy clay loam; roots absent; no lime visible; extensive manganese staining present; pH 8.0; gravel and stones absent; mottled; not bleached; 50% light yellowish brown [10YR6/4], 50% yellowish red [5YR5/6] dry, 50% brown [10YR5/3], 50% weak red [10R4/4] moist; massive, fabric rough, strong coherence dry; not hydrophobic.

Profile B16 [SMU B1] - mid-slope location; surface condition hardsetting; some surface stone present, rounded, some chert;

0-10cm - gritty light to medium clay; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] dry, dark brown [7.5YR3/2] moist; peds rough-faced, highly pedal [80%], polyhedral, <5-10 mm in size; weak consistence dry; slightly hydrophobic; abrupt to:--

10-29cm - medium clay; roots common; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; reddish brown [5YR4/3] dry, dark reddish brown [5YR3/2] moist; peds rough- / smooth-faced, highly pedal [100%], angular blocky; 10-20 mm in size; strong consistence dry; not hydrophobic; clear to:--

29-63cm - medium clay; roots common; no lime visible; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; strong brown [7.5YR4/6] dry, brown [7.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; clear to:--

63-99cm - medium to heavy clay; few roots; some lime concretions present; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/3] with reddish tinge dry, brown [7.5YR5/3] with reddish tinge moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:--

99-260cm - medium to heavy clay; few roots; many lime concretions present; no manganese present; pH 9.5/10; occasional rounded gravel to 1cm; not mottled; not bleached; yellowish brown [10YR5/4] with red stains dry, yellowish brown [10YR5/4] with red stains moist; peds
Profile B17 [SMU B3] - mid-slope location; surface condition hardsetting; some rounded / angular surface stone to 15cm present

0-14cm - sandy clay loam; roots common; no lime present; no manganese present; pH 6.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [5YR3/4] moist; peds rough-faced, weakly pedal [30%], polyhedral, 5-15 mm in size; very firm consistence dry; not hydrophobic; abrupt to:-

14-56cm; sandy medium clay; few roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; brown [10YR5/3] dry, dark yellowish brown [10YR4/4] moist; peds rough- / smooth-faced, highly pedal [90%], polyhedral, 10-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

56-93cm - medium to heavy clay; few roots; no lime present; no manganese present; pH 9.0; some rounded gravel to 1.5cm; not mottled; not bleached; brown [7.5YR5/3] dry, brown [7.5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 10-20 mm in size; strong consistence dry; not hydrophobic; gradual to:-

Profile B18 [SMU B1] - floodplain location; surface condition firm; some round and rounded / angular surface stone to 20cm present

0-10cm - light clay; many roots; no lime present; no manganese present; pH 6.5; flat angular gravel to 4cm present; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR4/2] moist; massive, fabric rough, firm coherence dry; not hydrophobic; abrupt to:-

10-68cm - heavy clay; many roots; some lime present; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/2] dry, dark brown [7.5YR3/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-20 mm in size; strong consistence dry; not hydrophobic; gradual to:-

68-180cm - medium to heavy clay; few roots; no lime visible; no manganese present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, yellowish brown [10YR5/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

120-180cm - sandy clay; roots absent; no lime visible; manganese common; pH 9.5/10; layer of rounded waterwashed sandstone to 20cm present; not mottled; not bleached; brown
[7.5YR5/4] dry, brown [7.5YR5/4] moist, peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; diffuse to:-

180-220cm - layer of waterwashed sandstone stones to 20cm.

Profile B19 [SMU B1] - floodplain location; surface condition hardsetting; surface stone absent;

0-16cm - silty clay; many roots; no lime present; no manganese present; pH 6.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark brown [7.5YR3/2] moist; massive, fabric rough, strong coherence dry; not hydrophobic; abrupt to:-

16-63cm - medium to heavy clay; many roots; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; reddish brown [5YR4/4] dry, dark reddish brown [5YR3/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

63-173cm - medium clay; many roots; no lime visible; no manganese present; pH 8.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, strong brown [7.5YR4/6] moist; peds rough- / smooth-faced, highly pedal [80%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

173-245cm - heavy clay; roots absent; no lime present; no manganese present; pH 9.5/10; rounded stones to 10cm present; not mottled; not bleached; brown [7.5YR5/6] dry, brown [7.5YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

245+cm; sandy light to medium clay; roots absent; no lime visible; no manganese present; pH 9.5/10; decomposing rock; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR4/4] moist; massive, fabric rough, very firm coherence dry; not hydrophobic.

Profile B20 [SMU B1] - floodplain location; surface condition firm; surface stone absent;

0-18cm - light to medium clay; many roots; no lime present; no manganese present; pH 5.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, dark brown [7.5YR3/2] moist; peds rough-faced, highly pedal [80%], polyhedral, 5-10 mm in size; weak consistence dry; not hydrophobic; abrupt to:-

18-97cm - sticky light to medium clay; many roots; scattered lime stains present; no manganese present; pH 9.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/2] dry, dark brown [7.5YR3/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; gradual to:-

97-192cm - medium clay; few roots; scattered lime stains present; some small manganese concretions present; pH 9.5/10; gravel and stones absent; not mottled; not bleached; yellowish brown [10YR5/4] dry, dark yellowish brown [10YR4/4] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-20 mm in size; strong consistence dry; not hydrophobic; gradual to:-

192-250cm - sandy clay; roots absent; no lime visible; many manganese concretions present; pH 9.5/10; rounded water-washed gravel to 5-6cm; mottled; not bleached; 50% yellowish red [5YR4/6], 50% brown [10YR5/3] dry, 50% brown [7.5YR4/4], 50% brown [10YR5/3] moist;
peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic.

Profile B21 [SMU B3] - floodplain location; surface condition firm; surface stone absent;

0-12cm - clayey sand; many roots; no lime present; no manganese present; pH 5.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, dark brown [7.5YR3/3] moist; peds rough-faced, weakly pedal [20%], polyhedral, 5-10 mm in size; weak consistence dry; not hydrophobic; abrupt to:-

12-60cm - clayey sand; roots common; no lime present; no manganese present; pH 7.5; some rounded gravel to 2cm; not mottled; not bleached; light brown [7.5YR6/4] dry, brown [7.5YR4/4] moist; massive, fabric rough, weak coherence dry; not hydrophobic; clear to:-

60-87cm - clayey sand; few roots; no lime present; no manganese present; pH 7.5; angular and rounded gravel to 4cm; not mottled; not bleached; red [5YR4/6] dry, red [5YR4/6] moist; massive, fabric rough, weak coherence dry ; not hydrophobic; clear to:-

87-153cm - medium clay; few roots; no lime visible; many manganese stains present; pH 9.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/3] dry, brown [7.5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic; clear to:-

153-215cm - clayey sand; few roots; no lime visible; no manganese present; pH 9.5/10; some small gravel <5mm; mottled; not bleached; 90% pale brown [10YR6/3] dry, 90% brown [7.5YR4/4], 10% greyish brown [10YR5/2] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-15 mm in size; strong consistence dry; not hydrophobic.

Profile B22 [SMU B1] - floodplain location; surface condition hardsetting; surface stone absent

0-14cm - medium clay; roots common; no lime present; no manganese present; pH 7.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR4/4] dry, dark brown [7.5YR3/3] moist; massive, fabric rough, strong coherence dry; not hydrophobic; abrupt to:-

14-44cm - silty clay; roots common; no lime present; no manganese present; pH 5.5; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, dark reddish brown [5YR3/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; clear to:-

44-79cm - medium clay; few roots; no lime present; no manganese present; pH 7.0; gravel and stones absent; not mottled; not bleached; brown [7.5YR5/4] dry, brown [7.5YR4/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, <5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

79-197cm - medium clay; roots common; no lime present; much manganese staining present; pH 6.5; gravel and stones absent; not mottled; not bleached; brown [10YR4/3] dry, dark brown [10YR3/3] moist; peds rough- / smooth-faced, highly pedal [100%], polyhedral, 5-10 mm in size; strong consistence dry; not hydrophobic; gradual to:-

197-250cm - sandy medium clay [indurated]; roots absent; no lime present; no manganese present; pH 8.0; some small gravel <5mm; mottled; not bleached; 50% brown [7.5YR5/3], 50% strong brown [7.5YR4/6] dry, 50% brown [7.5YR4/2], 50% strong brown [7.5YR4/6] moist; massive, fabric rough, strong coherence dry; not hydrophobic.
Appendix 4

Topsoil Stripping Suitability Key
[after Elliott and Veness, 1981]

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Procedure for the selection of material for use in topdressing of disturbed areas.

**STRUCTURE GRADE OF MATERIAL**

A  I  II  III

Not suitable

< 30% peds  30–50% peds  50–80% peds  > 80% peds

**COHERENCE**

Coherent, dry, not coherent wet
Not coherent, wet or dry.

Not suitable

Coherent, wet and dry

MOTTLE

Not suitable

Present  Absent

MACROSTRUCTURE

In situ macrostructure dimension in X-Y plane

< 10 cm  > 10 cm

Not suitable

**FORCE TO DISRUPT PEDS**

1–3  4–5

Not suitable

TEXTURE

As fine or finer than FSL  As coarse or coarser than SL

**GRAVEL AND SAND CONTENT**

> 60%  < 60%

Not suitable

pH

< 4.5  or > 8.4  4.5 to 8.4

Not suitable

**SALT CONTENT**

Measured as electrical conductivity (S cm⁻¹)

> 1.5 x 10⁻³  < 1.5 x 10⁻³

Not suitable  SUITABLE