



Our Reference 2576/5

Date 11 June 2018

Booth Ventures Ltd
Harwood Quarry Landfill Site
Brookfold Lane
Harwood
Bolton
BL2 4LT

For the attention of G Stratford Esq.

Dear Mr Stratford

Re: Type 1 Unbound Mixture Ex Ravenhead Quarry, Skelmersdale.

Further to the testing carried out to the samples provided by yourselves from Ravenhead Quarry, Skelmersdale, we write to confirm the materials physical properties have been found to fully comply with the requirements of the Manual of Contract Documents for Highways Works, Volume 1 Specification for Highways Works (SHW), Series 800 Clause 801 & 803 for a Type 1 Mixture.

However, with regard to its chemical properties the material was found to have an elevated level of Sulfide if placed within 500mm or any other distances described in contract specific specifications of concrete, cement bound materials or other Cementous mixtures or stabilised capping forming part of the permanent works.

The results found are as summarised below:

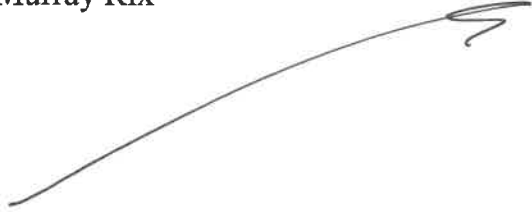
Constituent Materials	100% First Generation Stone – Bullion Mine Rock – Sandstone (Advised)
Particle Size Distribution (Grading)	In compliance with overall grading range as shown in SHW series 800, Clause 803 Table 8/5.



Water-soluble sulfate	Found range from five samples 200 to 280mg/l. SHW requirement from Clause 801 < 1500 mg/l, or <300 mg/l if placed within 500mm of metallic structural elements.
Total sulfur	Found range from five samples 0.346 to 0.629%. SHW requirement from Clause 801 < 1%.
Sulfide content	Found range from five samples 0.986 to 1.83%. SHW requirement from Clause 801 < 0.5%, or 0.06% if placed within 500mm of metallic structural elements.
pH	Found range from five samples 6.8 to 8.2 SHW requirement from Clause 801 value to be stated.
Resistance to Fragmentation Los Angeles test	Found value = 30 SHW requirement from Clause 803 table 8/2 LA ₅₀ i.e. value to be <50
Resistance to Wear Micro-Deval Test	Found value = 25 SHW requirement from Clause 803 table 8/2 No requirement value to be stated
Resistance to freezing and thawing Magnesium sulfate soundness	Found value = 25% SHW requirement from Clause 803 table 8/2 MS ₃₅ i.e. value to be <35
Water Absorption	Found value = 3.8% SHW requirement from Clause 803 table 8/2 No requirement value to be stated
Plasticity	Non-Plastic SHW requirement from Clause 803, Non-Plastic.
Frost Heave	Found value = 12.7mm SHW requirement from Clause 801 ≤ 15mm

The certificates of test can be found in our reports 3219/1, 3219/2 and 3219/3.

Yours Faithfully
For Murray Rix

A handwritten signature in black ink, consisting of a long, sweeping curve that ends in a small, stylized flourish.

S.J. Hutchings
Director