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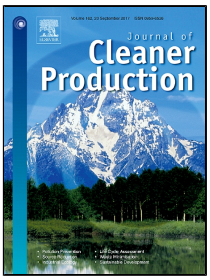

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PII:	S0959-6526(17)31707-9
DOI:	10.1016/j.jclepro.2017.07.250
Reference:	JCLP 10253
To appear in:	*Journal of Cleaner Production*
Received Date:	13 May 2017
Revised Date:	30 July 2017
Accepted Date:	31 July 2017

Please cite this article as: Abbas Mohajerani, Stephen Lound, George Liassos, Halenur Kurmus, Aruna Ukwatta, Mohammadamin Nazari, Physical, Mechanical and Chemical Properties of Biosolids and Raw Brown Coal Fly Ash, and their Combination for Road Structural Fill Applications, *Journal of Cleaner Production* (2017), doi: 10.1016/j.jclepro.2017.07.250

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ABSTRACT

Worldwide, 100 to 125 million tonnes of biosolids are produced annually, and this number is continuously increasing with millions of dollars expended on the treatment and management processes. Biosolids are nutrient-rich materials comprising a mix of inorganic, organic and water materials that are a by-product of the sewage treatment process. This paper investigates the combination of Raw Brown Coal Fly Ash (BCFA) with biosolids samples from the Eastern Treatment Plant (ETP) and Western Treatment Plant (WTP) in Melbourne, to form a material that can be used as a substitute for engineering applications. Biosolids samples were prepared along with samples of biosolids mixed with 10%, 25% and 50% BCFA by dry weight. The mechanical, chemical and physical properties of ETP22, WTP10 and BCFA were investigated using X-Ray Fluorescence (XRF), X-Ray Diffraction (XRD), Standard Compaction and California Bearing Ratio (CBR) to assess their suitability for use in engineering applications. A Leachate Analysis was conducted using the Toxicity Characteristic Leaching Procedure (TCLP) and Australian Bottle Leachate Procedure (ABLP) to classify the wastes and determine the possibility of ground or surface water contamination through the possible leaching of heavy metals. The CBR testing aimed to analyse the relationship between mixes by preparing samples at OMC cured for 24 hours, OMC cured for 7 days and OMC soaked for 48 hours for investigating the effect of moisture conditions and time on the strength of the materials. The results showed that the load bearing capacity of ETP biosolids samples, with an organic content of 7.1%, significantly improved with the addition of BCFA, producing strong CBR values of 10%, 13% and 19% after 7 days curing with the addition of 10%, 25% and 50% BCFA. The WTP biosolids