

## **Abstract**

**Title:** Sustainable Pavement Construction

**Sub-Title:** An investigation into sustainable pavement options available to Bam to remain competitive as a civil engineering contractor

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**Purpose:** This research is to investigate sustainable pavement options available to Bam as a civil engineering contractor. The research stemmed from the author's involvement with pavements on a major project which has high sustainability targets. Traditionally primary aggregates are used in pavements and when considering sustainable materials there can be concerns over the quality of the end product. It was expected that this research and recommendations would be used by Bam to broaden their knowledge of pavements which fulfil a sustainable criteria and produce a highly engineered product. This study is limited to the upper pavement layers and does not include the sub-base or capping layers.

**Methodology:** A thorough Literature Review was undertaken to determine the use of recycled and secondary materials for both flexible and rigid pavements. Semi-structured interviews with industry professionals were undertaken to determine the industry consensus on sustainable pavements. A case study was implemented to follow the approvals process of a sustainable product. These research methods determined further understanding of the opportunities and limitations of sustainable pavements. Recommendations were made for future reference for Bam.

**Findings:** Site won materials are the first option for Bam but careful testing and quantifying is required to ensure no contamination and a consistent end product. The research determined other pavement alternatives; cold mixes, recycled aggregates, CBM and concrete mixes. Early supply chain and designer involvement, when tendering for a project, was recommended along with knowledge sharing between sites to ascertain what materials have been successfully implemented previously. There can often be a reluctance to use sustainable products by a client due to both ignorance and lack of previous examples. The approvals processes need to have short timelines and be carefully planned to ensure no failures and material availability. The interviews showed that high tolerances are a limitation on the approvals processes and that cost will often over rule sustainability. Increased knowledge on the DMRB criteria is recommended for Bam. A recycled material may not be the most sustainable if long haulage is required. The research concluded that due to government policies now imposed a sustainable portfolio for a contractor is highly recommended to keep competitive.

**Keywords:** sustainable pavements, recycled materials, secondary materials, approvals process, sustainability, cost.