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Explanation of Bentonite Usage Rate

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Document history and status

Revision	Date	Description	Author	Checker	Reviewer	Approver
01	28/02/24	Initial Draft	MG	MT (ALG)	MT (ALG)	MT (ALG)

The Inspector requested an explanation of the usage rate for bentonite (which is set out in Table 2.1 of Appendix 5.14 -TBM Consummables) on Thursday 22 February 2024.

The purpose of this short note is to explain the figure provided in Table 2.1.

1. The use of bentonite in the tunnelling process is well understood and the bentonite itself, being a natural soil, is considered non-hazardous.
2. All typical types of TBM consumables have been assessed and included in EIAR A5.14. This document includes reference to 15kg of bentonite being utilised per metre with 10% of that figure being “lost” into the ground.
3. This estimate has been based on experience provided by our specialists and caters for numerous variables, namely:
    a. The proposed TBM is a Variable Density Machine and can be operated in different modes to suit the prevailing geology.
    b. When mining in the clays, bentonite is not generally needed with a foam used to assist the excavation process.
    c. In mixed face conditions (rock bottom half/ sands and gravels or clays in top half) a dense bentonite will be utilised to support the looser ground. This dense support fluid is designed not to penetrate excessively through the ground.
    d. In the sands and gravel or limestone bentonite will be used to provide both a support fluid and transport medium if in slurry mode.

The above quantities reflect the variable geology along the route and the loss of material into the ground. The figures do not include the overall loss of material due to the separation process where additional losses are associated with the residue on the excavated material and any bentonite needed to be discarded by tanker to approved disposal locations. These losses have additionally been included within the EIAR.