1. Introduction

General Overview

Structure Type: Single span overbridge

Superstructure Form: Semi-elliptical masonry stone arch (skewed).

Substructure Form: Gravity type stone abutments and wingwalls.

Span: Skew: 8.45m

Assessment Code: CS 454

Live Load Capacity: Normal Traffic Loading (subject to satisfactory completion of masonry repairs)

Minimum Adequacy Factor: 3.43

Restriction: None

Condition: The assessment is based upon the anticipated condition of the bridge following completion of the refurbishment works in October 2023. An inspection following completion of the works is required to confirm the condition of the structure meets with the assumptions made within this assessment.

Local Authority: Westmorland and Furness Council

OS Reference: NY 765 136

This report presents the load carrying capacity for the bridge and has been assessed based on assumed condition data in anticipation of completion of a refurbishment scheme at the bridge. It has been prepared by Jacobs for the exclusive use by HRE and should not be relied on by third parties. It has been based on site measurements and investigation by Jacobs or historical information provided by HRE, as appropriate.

At the time of survey, the bridge structure was partially buried and only the north elevation down to springing level was visible.

The assessment assumes the refurbishment works will address any previous concerns regarding the condition of the bridge therefore no structural defects have been accounted for in the analysis model.

The arch barrel extrados and the soil faces of the spandrel walls were considered to be built-in parts not amenable to inspection except in localised areas where investigation trenches were excavated. Assessment followed standard methods based on appraisal of the visible parts of the bridge.

A MEXE assessment to BD21/97 was done by Cumbria County Council (CCC) in 1998. This returned a live load rating of 17T GVW with the proviso that if repairs were carried out to the pointing in the arch barrel, then a 40T rating might be achieved. Pointing repairs were subsequently carried out but, a few years later, they had failed thus theoretically returning the bridge to the 17T GVW capacity assessed in 1998. The CCC assessment had assumed a uniform arch barrel thickness throughout the elliptical arch profile which complies with the MEXE method. When Jacobs initially did an assessment based on the CCC data but using a LimitState RING analysis, the result was similar, if not somewhat worse than the MEXE analysis. Elliptical arches are often problematical in assessment when the assumptions about the internal construction are not necessarily correct. The recent closure of the bridge afforded the opportunity to further investigate the arch barrel thickness and the extrados profile and this data has made possible an updated, more refined analysis.