

STRUCTURAL CALCULATIONS

For:

Masonry Arch Bridge Assessment

At:

Cygnet Hospital, Bury

On Behalf Of:

Cygnet Group

Project No.: 12402				
Issue Date	Revision	Status	Issued By	Checked By
27.03.26	A	FINAL	KLH	SJR

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Calculations By KLH		Checked By SJR	Date March 2026	

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1.0 **PREAMBLE**

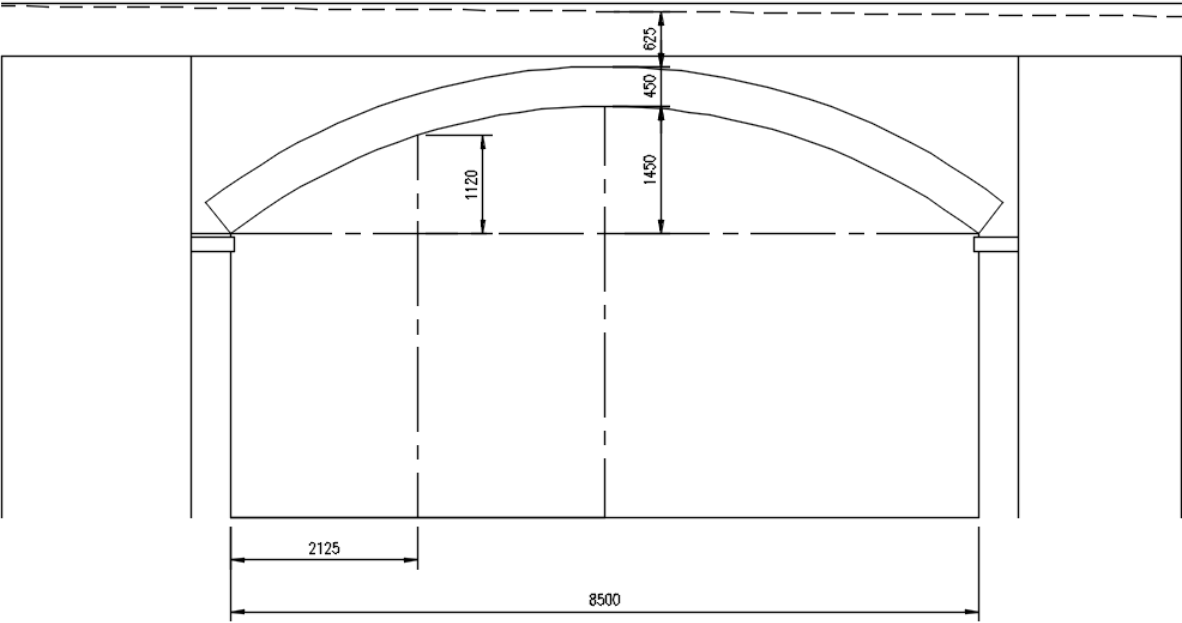
Reid Jones Partnership has been appointed to assess the capacity of the brick arch bridge owned by the client giving access to Cygnet Hospital to determine the maximum allowable axle load. The Gate House is being demolished and demolition rubble/soil will be transported across the bridge as part of this work.

The bridge has been assessed using the MEXE method in accordance with site measurements taken in March 2026.

Vehicle tracking has been carried out to check vehicle access to the site for a skip lorry.

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2.0
SURVEY



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3.0 LOAD ASSESSMENT BRICK ARCH

Provisional Assessment

$$PAL = [740 (d + h)^2] / L^{1.3}, < 70 \text{ tonnes}$$

$$PAL = [740 (0.45 + 0.625)^2] / 8.5^{1.3} = 52.94 \text{ tonnes}$$

Modification Factors

Span/ rise factor – F_{SR}

$$L / R_c = 8.5 / 1.45 = 5.86$$

Therefore $F_{SR} = 0.76$

Profile Factor – F_P

$$R_Q / R_c = 1.12 / 1.45 = 0.77$$

$$F_P = 2.3[(R_c - R_Q) / R_c]^{0.6}$$

$$F_P = 2.3[(1.45 - 1.12) / 1.45]^{0.6}$$

$$F_P = 0.946$$

Material Factor – F_m

$$F_m = \frac{F_b d + F_f h}{d + h}$$

$$F_b = 0.7 \text{ (masonry)}$$

$$F_f = 0.7 \text{ (well compacted material)}$$

$$F_m = \frac{0.7 \times 0.45 + 0.7 \times 0.625}{0.45 + 0.625} = 0.7$$

Joint Factor - F_j

$$F_j = F_w F_d F_{mo}$$

$$F_w = 0.9 \text{ – joint width 6-12.5mm}$$

$$F_d = 0.8 \text{ – some poor pointing (conservative value)}$$

$$F_{mo} = 0.9 \text{ – loose and friable mortar}$$

$$F_j = 0.9 \times 0.8 \times 0.9 = 0.648$$

Arch Barrel condition F_{cm}

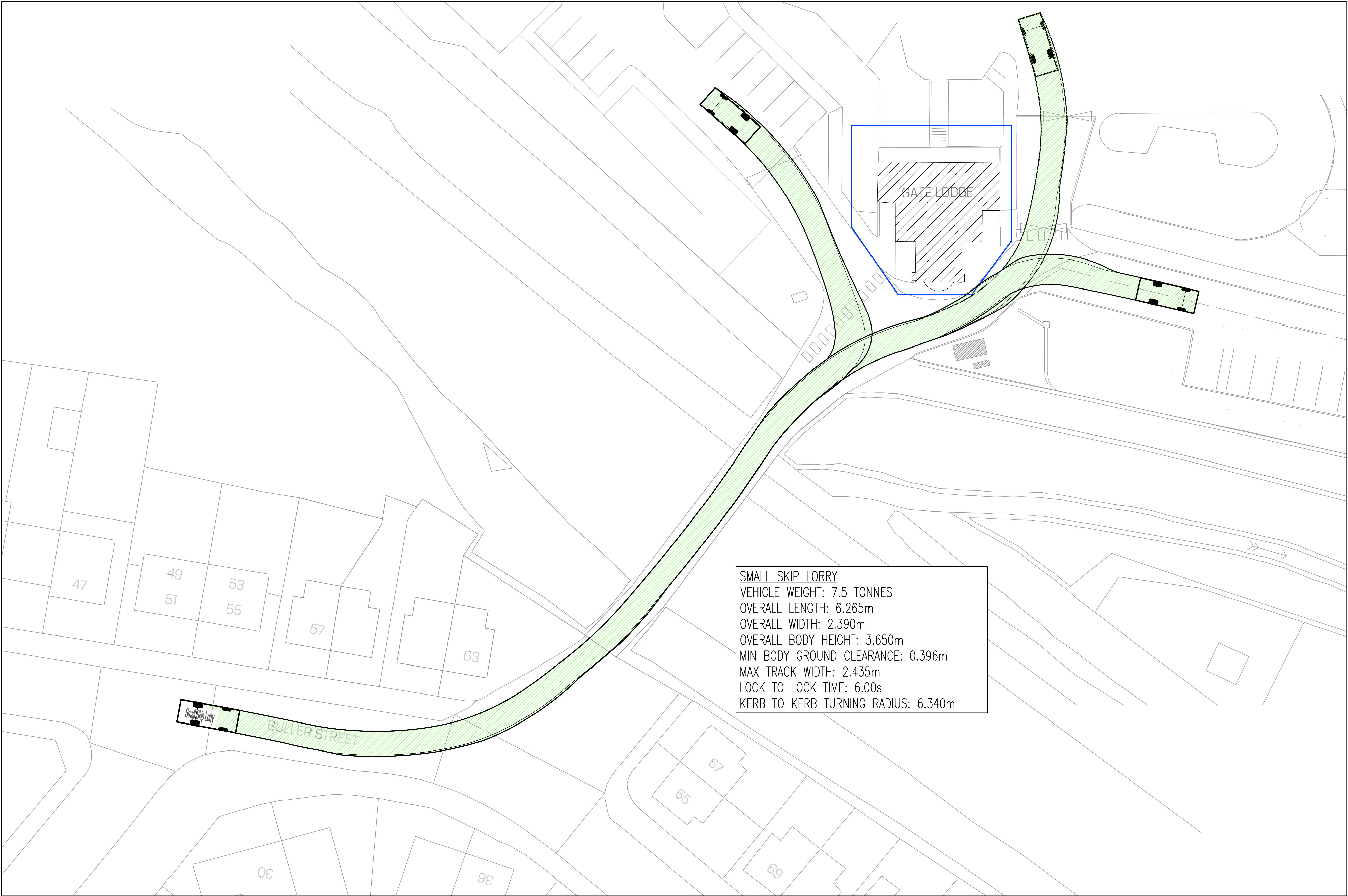
$$F_{cm} = 0.7 \text{ – brick coursing shows some permanent deformation of the arch}$$

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4.0 VEHICLE TRACKING

Vehicle tracking has been undertaken to determine the suitability of the existing road configuration to allow access for a skip lorry to the site to remove spoil and demolition rubble.

A small skip lorry as specified on the attached drawing can manouvre around site during the works. It is recommended that the hoarding line does not extend beyond the existing kerb line to allow all other vehicles already accessing the site to be able to continue to access the hospital/ sailing club.



SMALL SKIP LORRY
VEHICLE WEIGHT: 7.5 TONNES
OVERALL LENGTH: 6.265m
OVERALL WIDTH: 2.390m
OVERALL BODY HEIGHT: 3.650m
MIN BODY GROUND CLEARANCE: 0.396m
MAX TRACK WIDTH: 2.435m
LOCK TO LOCK TIME: 6.00s
KERB TO KERB TURNING RADIUS: 6.340m

LEGEND

INDICATES A SWEEP PATH ANALYSIS
OF A SMALL SKIP LORRY CROSSING
DAISYFIELD GREENWAY AND
ENTERING CYGNET HOSPITAL

P1	ISSUED FOR INFORMATION	LR	KLH	27.03.26
Rev	Details	Drawn By	Chk/App By	Date

Client:
CYGNET GROUP

Project:
CYGNET HOSPITAL,
BURY

Title:
VEHICLE TRACKING

Issued For:
INFORMATION

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Scale:	1:200	@	(A1)
Project No:	12042	Drawing No:	01
		Issue:	P1

PRELIMINARY DRAWING.
NOT FOR CONSTRUCTION.

DO NOT SCALE - USE FIGURED DIMENSIONS ONLY.
This drawing is confidential and is the property of Reid Jones Partnership. It must not be disclosed to any third party, copied or lent without prior written consent. The contractor is to check all dimensions on site prior to commencement of works.

