

## STRUCTURAL CALCULATIONS

FOR

**BRIDGE 2 – SELF WEIGHT**

AT

**BOURTON PARK,  
BUCKINGHAM**

CLIENT

**BUCKINGHAM TOWN COUNCIL**

JOB No.

**3674-ABDS-XX-XX-RP-S-0001**

INT CHECKS BY:

**M Allen** BEng (Hons), CEng MStructE

DATE

**NOVEMBER 2022**

**DIMENSIONS WITHIN CALCULATIONS ARE FOR CALCULATION PURPOSES ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.  
(SITE MEASURE REQUIRED BY CONTRACTOR PRIOR TO ORDERING MATERIALS).**

**CDM REGULATIONS 2015. THIS PROJECT IS SUBJECT TO CDM 2015. REFER TO NOTES ON ABDS DRAWINGS ACCOMPANYING THESE CALCULATIONS.**

**ALL STRUCTURAL WORK IS SUBJECT TO BUILDING REGULATIONS APPROVAL TO ENSURE WORK IS CARRIED OUT TO A SATISFACTORY STANDARD.**

**IT IS THE CLIENT'S RESPONSIBILITY TO ENSURE A FULL PLANS OR BUILDING NOTICE APPLICATION HAS BEEN MADE TO LOCAL AUTHORITY BUILDING CONTROL OR OTHER APPROVED INSPECTORS PRIOR TO STARTING WORKS ON SITE.**

LOADINGS - BRIDGE 2

SELF WEIGHT

TROPICAL HARDWOOD - OPEPE/ EKKI HARDWOOD =  $750 - 1100 \text{ Kg/m}^3$

PRIMARY BEAMS -  
 $1100 \text{ kg/m}^3 \times 9.81 \times 10^{-3} = 10.80 \text{ KN/m}^3 \times 0.20 \text{ m} \times 0.96 \text{ m} \times 22 \text{ m}$   
 $= 45.62 \text{ KN} \times 2 \text{ No} = \underline{91.25 \text{ KN}}$

CROSS BEAMS -  
 $1100 \text{ kg/m}^3 \times 9.81 \times 10^{-3} = 10.80 \text{ KN/m}^3 \times 0.135 \text{ m} \times 0.540 \text{ m} \times 1.60 \text{ m}$   
 $= 1.25 \text{ KN} \times 10 \text{ No} = \underline{12.50 \text{ KN}}$

DIAGONALS -  
 $= 10.80 \text{ KN/m}^3 \times 0.10 \text{ m} \times 0.075 \text{ m} \times 2.60 \text{ m}$   
 $= 0.25 \text{ KN} \times 9 \text{ No} = \underline{2.25 \text{ KN}}$

KEEB BEAM -  
 $= 10.80 \text{ KN/m}^3 \times 0.075 \text{ m} \times 0.10 \text{ m} \times 22 \text{ m}$   
 $= 1.80 \text{ KN} \times 2 \text{ No} = \underline{3.60 \text{ KN}}$

FASCIA -  
 $= 10.80 \text{ KN/m}^3 \times 0.018 \text{ m} \times 0.215 \text{ m} \times 1.12 \text{ m}$   
 $= 0.05 \text{ KN} \times (2 \times 18) = \underline{1.80 \text{ KN}}$

DECKING BOARDS -  
 $= 10.80 \text{ KN/m}^3 \times 0.140 \text{ m} \times 0.065 \text{ m} \times 1.80 \text{ m}$   
 $= 0.18 \text{ KN} \times 146 \text{ No} = \underline{26.50 \text{ KN}}$

BALUSTERS -  
 $= 10.80 \text{ KN/m}^3 \times 0.04 \text{ m} \times 0.04 \text{ m} \times 1.15 \text{ m}$   
 $= 0.02 \text{ KN} \times (8 \times 18 \times 2) = \underline{5.76 \text{ KN}}$

BALUSTRADE POSTS -  
 $= 10.80 \text{ KN/m}^3 \times 0.095 \text{ m} \times 0.095 \text{ m} \times 1.50 \text{ m}$   
 $= 0.15 \text{ KN} \times (2 \times 19) = \underline{5.70 \text{ KN}}$

HANDBAIL -  
 $= 10.80 \text{ KN/m}^3 \times 0.135 \text{ m} \times 0.10 \text{ m} \times 22 \text{ m}$   
 $= 3.25 \text{ KN} \times 2 \text{ No} = \underline{6.50 \text{ KN}}$

TOTAL SELF WEIGHT =  $156.00 \text{ KN} = 15,600 \text{ Kg}$   
 $= \underline{15.60 \text{ TONNES}}$

LOADINGS - BRIDGE 2

SELF WEIGHT

TROPICAL HARDWOOD - OPEPE / EKKI HARDWOOD =  $750 = 1100 \text{ Kg/m}^3$

PRIMARY BEAMS -  
 $750 \text{ Kg/m}^3 \times 9.81 \times 10^{-3} = 7.35 \text{ kN/m}^3 \times 0.20 \text{ m} \times 0.96 \text{ m} \times 22 \text{ m}$   
 $= 31.05 \text{ kN} \times 2 \text{ No} = \underline{62.10 \text{ kN}}$

CROSS BEAMS -  
 $750 \text{ Kg/m}^3 \times 9.81 \times 10^{-3} = 7.35 \text{ kN/m}^3 \times 0.135 \text{ m} \times 0.540 \text{ m} \times 1.60 \text{ m}$   
 $= 0.85 \text{ kN} \times 10 \text{ No} = \underline{8.60 \text{ kN}}$

DIAGONALS -  
 $= 7.35 \text{ kN/m}^3 \times 0.10 \text{ m} \times 0.075 \text{ m} \times 2.60 \text{ m}$   
 $= 0.15 \text{ kN} \times 9 \text{ No} = \underline{1.30 \text{ kN}}$

KEEB BEAM -  
 $= 7.35 \text{ kN/m}^3 \times 0.075 \text{ m} \times 0.10 \text{ m} \times 22 \text{ m}$   
 $= 1.25 \text{ kN} \times 2 \text{ No} = \underline{2.50 \text{ kN}}$

FASCIA -  
 $= 7.35 \text{ kN/m}^3 \times 0.018 \text{ m} \times 0.215 \text{ m} \times 1.12 \text{ m}$   
 $= 0.03 \text{ kN} \times (2 \times 18) = \underline{1.15 \text{ kN}}$

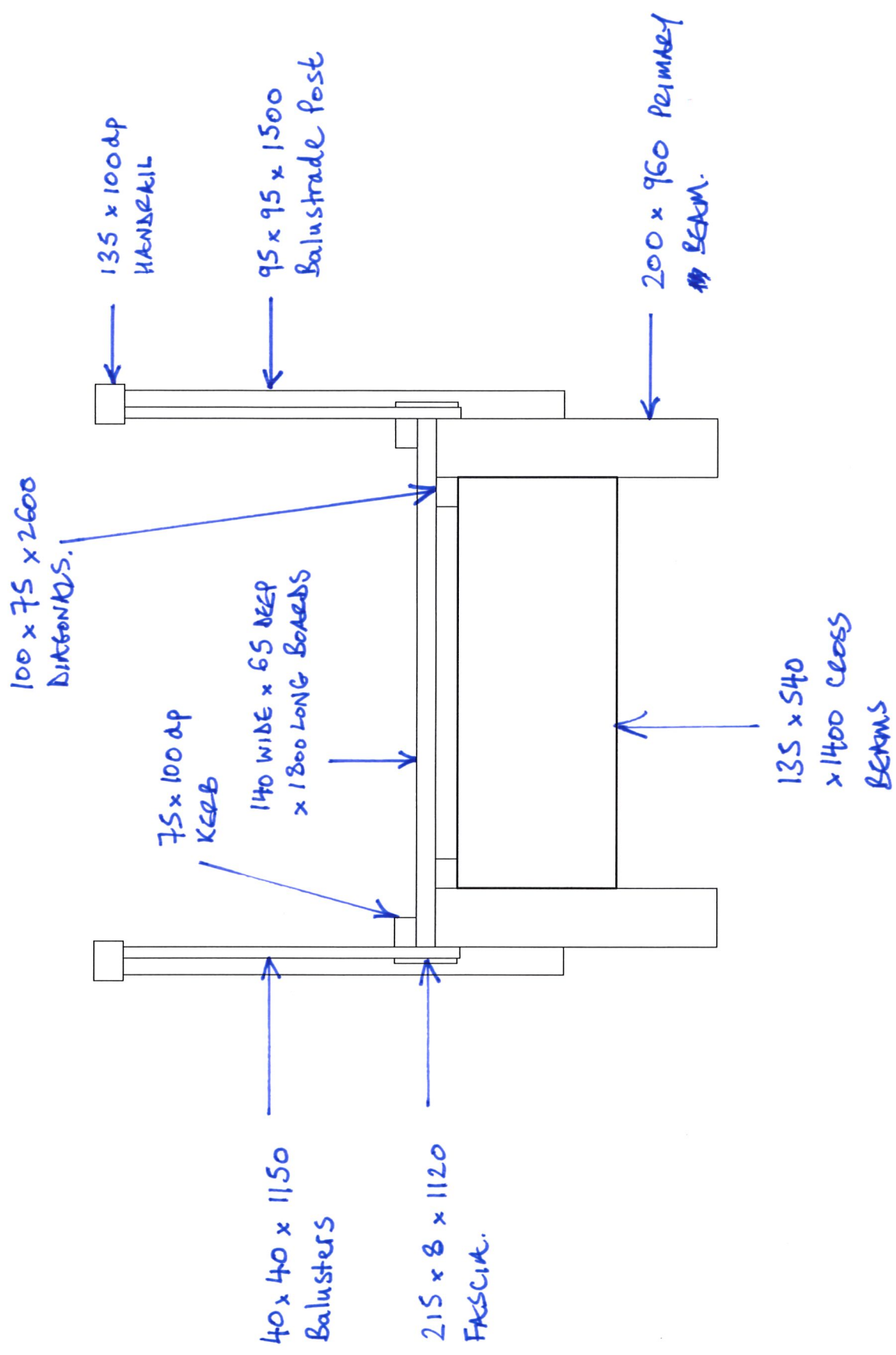
DECKING BOARDS -  
 $= 7.35 \text{ kN/m}^3 \times 0.140 \text{ m} \times 0.065 \text{ m} \times 1.80 \text{ m}$   
 $= 0.12 \text{ kN} \times 146 \text{ No} = \underline{17.60 \text{ kN}}$

BALUSTERS -  
 $= 7.35 \text{ kN/m}^3 \times 0.04 \text{ m} \times 0.04 \text{ m} \times 1.15 \text{ m}$   
 $= 0.015 \text{ kN} \times (8 \times 18 \times 2) = \underline{3.90 \text{ kN}}$

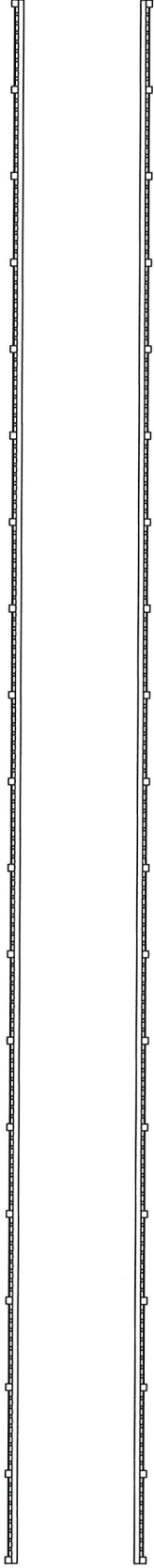
BALUSTRADE POSTS -  
 $= 7.35 \text{ kN/m}^3 \times 0.095 \text{ m} \times 0.095 \text{ m} \times 1.50 \text{ m}$   
 $= 0.10 \text{ kN} \times (2 \times 19) = \underline{3.80 \text{ kN}}$

HANDBAIL -  
 $= 7.35 \text{ kN/m}^3 \times 0.135 \text{ m} \times 0.10 \text{ m} \times 22 \text{ m}$   
 $= 2.20 \text{ kN} \times 2 \text{ No} = \underline{4.40 \text{ kN}}$

TOTAL SELF WEIGHT =  $105.35 \text{ kN} = 10,535 \text{ kg}$   
 $= \underline{10.535 \text{ TONNES}}$

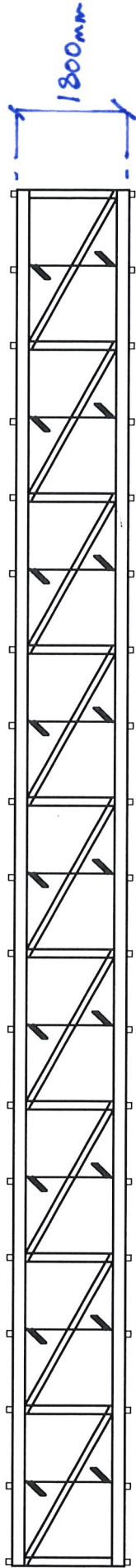


SECTION  
 1:20



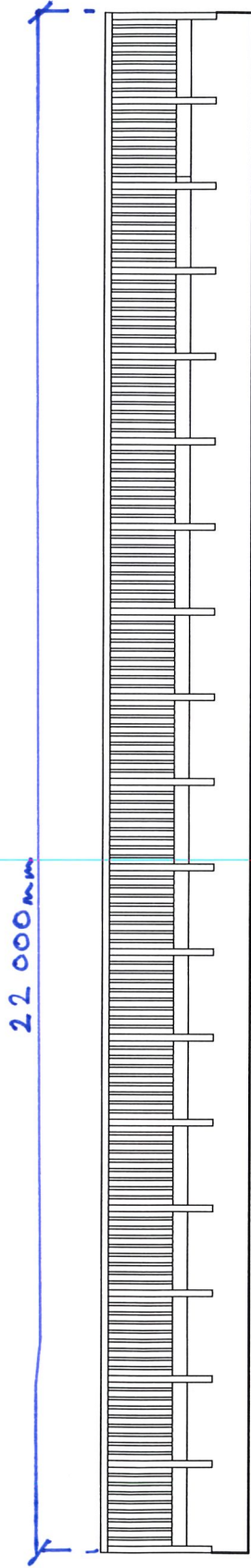
BAUSTRASSE PLAN

1:100



STRUCTURAL PLAN

1:100



ELEVATION

1:100

**Bourton Park Bridge no.2 - In summary:**

The bridge weighs between 10-16 Tonnes.

The variation in the actual figure is because we don't know the exact species of timber for this bridge.

We know it is a tropical hardwood, but we are not certain which species.

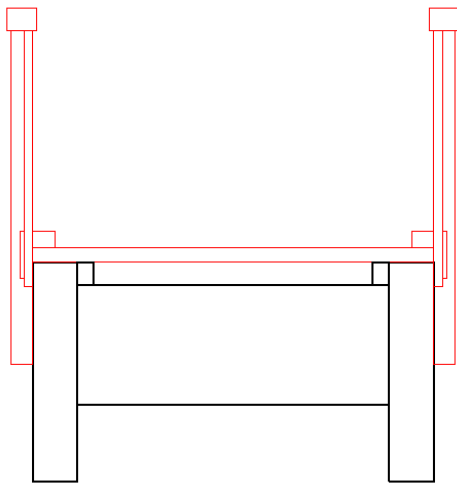
The lightest tropical hardwood has a density of 750kg/m<sup>3</sup> and the heaviest has a density of 1100kg/m<sup>3</sup>. Hence the range on the total figure given above.

To break the weights down further:

Secondary Members (Red in image below)

(Handrail, Balustrade Posts, Balusters, Decking Boards, Fascia, Kerb beam)

3.50-5.0 Tonnes



Primary Members (Red in image below)

(Primary Beams, Cross Beams, Diagonal Braces)

7.0-11.0 Tonnes

