SPECIFICATION

OF A

BRIDGE

Proposed to be built over the River Witham,

AT BOSTON.

1. The Abutments to be founded at the Depth of 4 Feet under the deepest Part of the Bed of the Witham. It is expected that at this Depth a good solid Bed of Clay will be found; if not, it must either be taken deeper, until the good Clay is found, or such Piling and Planking must be used as shall be judged requisite for making a good and firm Foundation.

2. The Abutments are to be faced with good Stone, (such as is got from *Bramley Fall* near *Leeds,)* laid in Beds, Header and Streacher; the Headers not being more than 4 Feet asunder, nor less in Breadth than 2 Feet, binding into the Wall from $3\frac{1}{2}$ to 4 Feet; none of the Streachers to be shorter than 1 Foot 6 Inches in the Face, nor binding less into the Work, on the Average, than 2 Feet; but no Stone must bind less than 18 Inches.

The Courses of Stone must be drove with a Chissel round the whole Bed, Top, and Ends, for about 2 Inches broad, and fair dressed between, and they must have an Aris taken round the Face, *i. e.* bevelled off for about $1\frac{1}{2}$ Inch at each upper and under Joint, but square at the Ends, the Face being left rough, so that the Faces of the Courses of Stone may appear to be regular Stratums of Rock. The Stones both in the Headers and Streachers, must be as full in their Size at the Inner End as at the Face, and the Joints and Laying must be done in the best Manner.

3. The Hearting and Counterforts must be of Brickwork; but great Care must be taken to make the Joints of the Brickwork as thin as possible, not exceeding, at most, $\frac{1}{4}$ of an Inch; and the Courses of Stone in the Face must correspond to the Courses of Brickwork: therefore from the Level of low Water to the Foundation, the Courses of Stone may be 15, 12, 9, and 6 Inches thick; and of these respective Sizes the whole of each Course must be throughout.

From the Surface of low Water, upwards, they must all be of one Thickness, *i. e.* a Foot, or 15 Inches.

In the Middle of these Abutments, between the Foundation and the Spring of the Arch, a Course of Stone must be carried through the whole thickness of the Abutments and Counterforts: which Course must be of large Dimensions, containing from Half a Ton to a Ton in each Stone; and these Stones must be well bedded and jointed at the Sides, and connected together by Iron Cramps sunk into the Stone, and covered over with Lead.

From this Course of Stone to the Spring of the Arch, the Beds of the Brick and Stonework should gradually incline towards the Arch. The Brick can be raised by putting in Beds of plain Tiles; and the Stone by making the Courses a little radiated: the Courses, however, must appear on the Outside as if Level.

4. Just under the Spring of the Arch must be a String Course of Stone 18 Inches thick, smoothly dressed in the Face, well jointed in the Beds, and projecting about 4 Inches beyond the rest of the Work. The Depth of the Beds of those Stones to be, on the Average, $3\frac{1}{2}$ Feet, except those next the Arch, which must be, at least, 5 Feet. And Stonework must be continued through the whole of the Abutments and Counterforts, for the whole Depth of the Rings of the Iron Arch, into which the Ribs must be set. From the Rings up to the Cornice, the Courses of Stones must be Header and Streacher, as before described, and the Hearting of Brickwork.

5. From the String-Courses, the Faces of the Abutments must be done as in the Drawings, having four Pilasters with a Nick on each Face; the Back Part being French Rustic, and a Capital and Cornice, as in the Drawings. As the Iron Ribs are put up, the Contractor for the Masonry and Brickwork must cut out and fit the Stones answerable to the Iron; and he must make the Stone Part above the Cornice in the Parapet as there represented, and fix the Lamp-Irons in them.

6. The Foundation and Spaces for the Abutments must be excavated by the Contractor, and a Cofferdam of Piles made of whole Baulks about a Foot Square, and a Groove to receive a Tongue, to be afterwards drove into it, to make the Dam Watertight: one Groove need only be in each Pile, and about 4 Inches Wide, and 4 Inches Deep.

These Piles must be drove into the River, about 3 Feet deeper than the Foundation is intended; and their Heads must be sufficiently high, to prevent the Tide from getting over them: they must therefore be about 30 Feet long each. This Dam must be well braced, or supported within; and proper Pumps must be prepared and worked by the Contractor, for taking out the Water while the Works are in Hand. When one Abutment is compleated, the Piles may be drawn and used for the other.

7. The Mortar for the Face of this Work, for the whole Depth of the Stone, must be composed of one Part of Barrow Lime, one Part of Pozzolano, and two Parts of clear River Sand. The Lime, Pozzolano, and Sand, to be mixed together during the Operation of slacking. This is done by laying the Sand and Lime, in its due Proportions, in Beds, and throwing the Water on it; after which, another Bed is laid on, and watered, till a Heap is thus formed; when the whole should be covered with Sand; and in this State it must lie for about 24 Hours: and when it is to be used, the Quantity taken, must be put through a fine Screen (the rest being again covered with Sand).

The Backing Mortar may be made with one Part of *Bennington* Lime, and from three to four Parts of clear River Sand; to be slacked and mixed as before-mentioned.

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All the Mortar must be well and sufficiently beat and mixed up together, before used. A Horse Machine will answer this Purpose the best. The whole Lime must be used as hot as possible; and every Course must be grouted, so that the whole be as one solid Mass.

8. The Contractor shall not have it in his power to let the making of the Mortar, or the Building of any Part of the Work, by the Piece, to his Men, or any others; but shall have the whole of this Part done by Days Wages.

9. When any Deviation or Alteration from the Plan and Section or Specification, as the Case may be, is proposed by the Mayor and Incorporation of *Boston*, or their Engineer, or by the Contractor or Contractors, whereby the Masonry or Brickwork may be increased, altered, or diminished, or the Foundation in any respect be made different, due Notice, in Writing, shall be given of the same, by the Party proposing such Deviation or Alteration to the other. And the Contractor shall not begin to execute any Part of the same until a Price is fixed, and an Agreement made, otherwise he shall have no Payment for what he does; and in Case the Deviation is resolved on, and the Demand made by the Contractor, for executing the same, be more than the Mayor and Incorporation, or their Engineer shall think reasonable, then the said Mayor and Incorporation shall have it in their Power to contract and agree with any other Person, for the same, at such under-Price as they may think proper, the Contractor having no demand against them for such Deviation; and he shall deduct out of his Contract-Price, such Sums of Money as may be saved by such Deviation.

Should it appear at any Time during the Execution of this Work, that the Contractor is not executing it, in the Opinion of the Engineer, agreeably to his Contract, the Engineer shall then give him Notice of such deficiency, and in case he does not immediately remedy the same, the Engineer shall have it in his Power to stop the Work, until the Contractor shall shew him, satisfactorily, that he can and will remedy the Defects complained of; and should he fail in so doing, the Engineer shall have it in his Power to discharge the Contractor, and take the Work out of his Hands: the Value of the Work executed, and Materials and Tools, in Hand, being first valued by the Engineer, and which the Mayor and Incorporation shall cause to be immediately paid; but should the said Contractor be possessed of Tools or Materials of any Sort which the Engineer shall not think necessary for the Work, the Mayor and Incorporation may, should they think proper, reject such Tools, Implements, or Materials.

All the Work must be done to the Satisfaction of the Engineer, for the Time being, and under his Directions, and such Alterations may be made by him, in the Work and Materials, as he from Time to Time may judge proper, Agreements being previously made, as above-specified. And in case any misunderstanding should arise, respecting the Explanation or Meaning of any Part of the above Specification, the same shall be determined by the Engineer, whose Explanation shall be final.

10. The whole Work to be measured by the Plans, and the Contractor to be paid according to said Measurement, unless Written Orders can be shewn from the Engineer, directing it to be done otherways; and this to be added to or deducted from the Plan as the Case may be.

11. The Proposals for the Masonry and Brickwork, to be delivered by the Cubic Yard or Foot. The Mayor and Incorporation to furnish the Contractor with Pozzolano at 2*s*. 6*d*. *per* Bushel.

The Proposals for the Cofferdam, Excavation, and Pumping Water, to be given in separately.

John Rennie.

London, *9th August*, 1802.

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