

Cattle stops, as shown in Drawing No. 5, are to be put in where directed, not *Cattle stops.* exceeding thirty-four in number, besides those at level crossings.

MATERIALS.

12. Except where otherwise specified, all the materials used under this contract shall be of the following kinds and descriptions :—

All masonry, except archwork, coping, and string courses, to be of rubble *Masonry.* laid in cement mortar. Bond stones, 2 feet long, to be put in every square yard of both face and back of work. All spalls are to be set in mortar, and not laid dry, and afterwards grouted. Facework must have no stone containing less than one-quarter of a cubic foot. The work shall be grouted every foot in height.

All timber shall be of black birch, totara, or other timber specially approved ; *Timber.* it shall be heart-wood, except as shown on Drawing No. 9, and shall be straight and sound, free from shakes, large knots, and other imperfections.

The whole of the straps and bolts shall be made of B.B. crown iron, or other *Malleable iron.* iron of equal quality, of the dimensions shown ; the whole to be finished and fixed in a workmanlike manner.

Bolts shown or specified shall have a square head, of which the thickness *Bolts and nuts.* shall be equal to the diameter of the bolt, and the width twice the diameter of the bolt. They are to be tapped with a good clean thread, and shall have a nut equal in size to the head of the bolt, and shall be provided with one or more washers 3 inches in diameter.

BRIDGES AND TIMBER OPENINGS.

13. Bridges, as per detail drawings, shall be erected where shown on longi- *Bridges.* tudinal section.

All joints, abutments, shoulders, and sides of tenons and scarfs to be worked *Joints.* perfectly true, and to fit accurately, and to be covered with red lead before being put together. Tenons generally to be 5 inches long, and to be draw-bored to receive trenails of hard wood made with hollow auger or trenailing machine. All trenails to be well seasoned and kept dry, and to be one-sixteenth of an inch more in diameter than the hole bored for them, and to be covered with red lead before being driven. All capsills and mudsills to be morticed on to posts or piles. All string pieces to be accurately notched down to capsills or floor beams by notching $\frac{3}{4}$ inch from each, to be scribed and accurately fitted. Diagonal braces, where placed inside the panel, are to be notched together as described for string pieces.

All piles are to be rung before driving with a three inch by $\frac{3}{4}$ inch round *Piling.* hoop. The piles are to be shod with a substantial iron shoe weighing not less than 30 lbs., securely fixed ; the point of the pile to be cut true, and to be squared off at the end to 3 inches square, and to have true bearing against the shoe. No pile-driving is to be commenced at any bridge, opening, or other work without giving six days' notice previously to the Engineer in charge of the works.

In erecting the timber opening shown on drawings with mudsills and plankings, piling is to be substituted where, in the opinion of the Engineer, the nature of the foundation requires it.

The Contractor shall provide all proper rods and gauges for setting out and *Contractor to supply* testing the dimensions of bridges and timber openings that the Engineer may *rods and gauges.* require.

CULVERTS AND DRAINS.

14. Timber culverts shall be erected where shown on longitudinal section. *Timber culverts.*

The frames shall be accurately mortised, and tenoned, and pinned ; the plank- ing to be securely spiked on to the frames, the whole of the timber to be heart of black birch or totara ; the outer side of the planking need not be reduced to the dimensions given, but there must in every case be the full thickness specified of heart timber ; the edges of the planking must fit truly for the whole thickness, and the planks must extend over at least two panels, and break joints as much as possible.

Sufficient catchwater and out-fall drains are to be dug at culverts, and all *Masonry culverts.* stumps and roots occurring in the line of ditch to be taken out.