

with the turns as easy as could be judged by the eye, so that the section does not show exactly the features of the ground over which the railway will have to be made. This is especially the case on steep sidling ground, where a deviation of a few feet would make as much difference in the level. I have therefore considered it better to delineate the ground on each side of the line, as far as could be conveniently done without materially adding to the cost of the survey.

By reference to the plan and section, it will readily be perceived that there is no more difficulty in obtaining a grade of 1 in 57 (dotted on section) between the points marked A and B, near Whenuakura, by taking the railway along the line dotted on the plan, than there would be in taking it along the firm lines on the plan and section, on which the grades are 1 in 40 and 1 in 1,624. And, again, between the points marked "A" and "B" on the 1 in 40 grade, the section shows a very large embankment, which would not appear if the section were taken on the black line between the same points.

These remarks will also apply to that part of the line marked C to D on the descending grade to the Ingahape, and H to I at the Iangahoe, and in a less degree to all the levels taken on sidling ground, excepting where the section line and railway line are identical.

The portion of line marked E to F at the crossing of the Ingahape is not traversed or levelled, but I am confident that it is the best way of crossing the stream, and that it is practicable. It was my intention to have taken the line across the stream near E, and then along the foot of the cliff, following nearly the course of the stream, and then curve back to F. A good line, with a grade of about 1 in 50, could have been got in this way, but the distance between F and the stream was too short to give even the minimum radius of 5 chains.

The dotted red line marked on the plan "Abandoned Line" is a line cut, surveyed, and levelled, but I was forced to abandon it on account of not finding a sufficiently easy place to cross the Iangahoe, and also the very expensive work it would have entailed in ascending from the Iangahoe.

The curved line from G to H would be preferable to the traverse line, as it would considerably lessen the cutting shown near H, and would require less embankment at the stream near the fifteenth mile.

At the point marked J it will be necessary to cross the Tawiti Stream twice in order to make the curve of a sufficiently large radius. The bridges required for this purpose will be from 20 to 30 feet span, according to the obliquity at which they cross the stream. The cutting through the neck will be considerably diminished from what is shown by keeping a little lower down the hill.

The line from the point J up the valley will cross the Tawiti several times. The stream may be either bridged or turned so as not to cross the line, there being no difficulties in the way of either, so that the most economical would appear to be the best plan to adopt, and with this view I have shown, in dotted blue lines, where it appears to me the cheapest and best to turn the stream, and where no deviation is shown I have estimated for bridges. The earth removed in cutting the races to turn the stream would be required in forming the line along the valley, and has been estimated for as part of the earthwork.

The Tawiti Stream differs from most of the others in this neighbourhood in not being subject to heavy freshets, as it rises and flows entirely through a flat country.

Referring to the deviations shown on the tracing, that marked A would, I think, strike the gully leading to the Patea River nearer its source, and enable the railway to reach a lower level before arriving at the cross gullies marked C and D on the tracing, and shown on the plan and section at 3 miles 60 chains and 4 miles 10 chains respectively, and thereby reduce the expense of crossing them at so high an elevation.

The deviation marked EF on the tracing would have its chief advantage in passing through less private property and in crossing the Mangaroa Stream at a lower level, but would be considerably longer than the one surveyed. I should not, therefore, recommend this deviation unless it offered very decided advantages over the other.

The line surveyed is one which, at first sight, appears the most practicable and direct, and, with the questions I have mentioned settled, I do not think a better can be found between the two points. The steepest grade on the line will be 1 in 40, and the sharpest curve 5 chains radius.

For a general description of the line I beg to refer you to my report of the 9th June last.

Enclosed is an approximate estimate of the cost of constructing the line, exclusive of rolling stock, stations, turn-tables, points, switches, signals, &c.

O. Carrington, Esq.,
In Charge of Public Works, West Coast.

I have, &c.,
C. W. HURSTHOUSE,
Surveyor.

APPROXIMATE ESTIMATE of Cost of Constructing 25½ Miles of Railway from Whenuakura, Province of Wellington, to Waingongoro, Province of Taranaki, 3 feet 6 inches Gauge.

	£	s.	d.	£	s.	d.
Earthwork—						
Mostly ordinary side cuttings, 685,000 cubic yards, at 9d. per cubic yard	25,687	10 0
Clearing Line—						
240 chains Bush, 5 chains wide, at £4 per acre	480	0	0	
110 chains Scrub, 2 chains wide, at £2 per acre	44	0	0	
1,670 chains Fern, 2 chains wide, at £1 per acre	334	0	0	
					858	0 0
Bridges—						
At 3 miles 60 chains, 1 60-foot opening, at £10 per foot	600	0	0	
" " 8 22-foot openings, at £7 per foot	1,232	0	0	
					1,832	0 0
Carried forward			