

EASTERN ROUTE.

Mr. G. P. WILLIAMS to the ENGINEER-IN-CHIEF, Wellington.

SIR,—

Public Works Office, Wellington, May, 1884.

I have the honour to make the following final report upon the proposed trunk line of railway from Hastings, on the Wellington-Napier line, to Te Awamutu, the present terminus of the southern line from Auckland. I have completed the reconnaissance survey of the country through which such a line would pass, and I attach to this report general plan and sections of the line.

For the purpose of comparing this route with others that have been proposed for the trunk line I have indicated upon the general section the probable lengths of the principal stretches of gradients that are as steep or steeper than 1 in 50, and the probable dimensions of any important bridges and tunnels.

The length of the line is estimated at 170 miles. The chief difficulties on the line are in the Hawke's Bay portion, between 16 miles and 58 miles. The ranges which lie all along the south and east bank of the Mohaka River are a formidable barrier for a line running westwards from the coast. The coach-road goes over the Titikura Hill, which is some 500ft. higher than the saddle at the Puketitiri Bush, where the line would go, and which is the only feasible gap in the range for railway purposes. The Mohaka cuts the general slope of the country into two, and, after the line has dropped down with a sharp descent to its bed, the main watershed has still to be surmounted. To do this the proposed line follows up the Repia, which runs into the Mohaka, and has a good general direction, cutting down deeply through very high and broken country, covered with bush.

The route described by Mr. Ellman as being peculiarly favourable for railway purposes, an account of which appeared in the *Hawke's Bay Herald*, is only adapted for a road, though it is suggested that it would answer equally well for railway purposes. I except the portion up the Repia, where for a great length the difficulties for a railway are probably no greater than they would be for the construction of a road. "The long ridge separating the waters of the Mangahouhou from those of the Mangaone," along which the present road goes to Patoka Station, rises far too steeply for ordinary railway gradients, and falls and rises again without any advantage of level being gained; it is also too narrow and crooked for railway curves. Further on in the account of the route mentioned the line is described as going from the Anawhenua "flats [which are really only a few broken terraces] by light cuttings to the south-west bank of the Makahu." Now the Anawhenua, before joining the Makahu, enters into a very narrow gorge with steep slopes, about $\frac{3}{4}$ to 1, and several hundred feet high, so that neither a road nor railway could follow it down and the line must therefore pass over or tunnel through a saddle which rises 270ft. above the creek at $39\frac{1}{2}$ miles on section, while on the other side of the saddle the Mohaka River runs about three miles off and 700ft. below it. Yet, in spite of this very rapid descent down to the Mohaka, it is stated, in the description of the bridge site at the Mohaka, that "up to this point the whole road has been almost a gradual rise." This is misleading, as is also the description of the Repia, which is treated as if it were an ordinary valley, any exceptional difficulties being ignored, although for at least eight miles of its length it can only be utilized by means of works of the heaviest description.

I do not wonder however, that the Repia was not fully understood, as I found that no one had ever been right through it before I went. For six miles its slopes are covered with dense bush, principally *Fagus*, and this had prevented any passage between its upper and lower ends, until I had a rough foot-track cut through it, though there was an old disused Maori track, now grown over, which led over the hill-tops out of sight of the gorge.

I will now describe the route which is in my opinion the most practicable, premising that, on account of the great summit-levels to be surmounted, long stretches of steep gradients are unavoidable, and that, in order to make them as even as possible, certain river-courses must be followed, the country generally being much too broken up by confused spurs and gullies to admit of grading being carried out otherwise. After leaving Hastings the line passes through easy country to the crossing of the present channel of the Ngaruroro River, at about 5 miles on section. This river has a shingle-bed similar to those in Canterbury, and can be crossed at a height of 15ft. above the bed, with seven or eight spans of 40ft., nearly opposite Mr. Donnelly's house. The line would then strike through easy open country, Native land, to the Tutaikuri River, which it would follow up on its south bank, and, commencing to rise at a point opposite where the road strikes off to Rissington on the north bank, it would continue, without any difficulty but a few small cuttings, up to the terrace opposite Seale's homestead, at the junction of the Mangaone with the Tutaikuri River near 15 miles. Now, to reach the Puketitiri Bush the natural course would be to follow up the Tutaikuri to the mouth of the Mangatutu, and then all the way up the Mangatutu but this is impracticable, as the features of the banks of the Tutaikuri are on too large a scale, consisting often of *papa* reef-terraces two or three hundred feet in height, intersected by deep ravines, or of steep spurs running down from adjacent hills. I propose therefore to follow up the Waihou Creek, whose banks are on a smaller scale, from above its junction with the Mangahouhou up to its source, and, although to follow it up would involve heavy cuttings along its whole distance, yet, by keeping about 100ft. above its bed, in ground sloping on an average between 2 to 1 and 3 to 1, a line may be got following generally on the south-west side. The Mangahouhou is worse, if anything, and besides by going more to the north the line would be approaching too near the high country about the Patoka Hill, where the gradients would be inadmissible. In order to get to the Waihou from the river junction at 15 miles the line must go round one side of Mount Cameron. The Waihou and the Mangahouhou after their junction form one stream called the Wai-iti, which flows in a deep broken gorge on the north and east of Mount Cameron, and this would be too difficult to follow. I propose therefore to keep the line on the south-west side, and, crossing the Tutaikuri at a favourable site near 16 miles, at a height of about 60ft., to rise on to the terrace on the north bank, making use of the channel of