

P A P E R S

RELATING TO THE

CONSTRUCTION OF RAILWAYS.

(NORTH ISLAND).

II.—REPORTS AND CORRESPONDENCE.

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PRESENTED TO BOTH HOUSES OF THE GENERAL ASSEMBLY BY COMMAND OF  
HIS EXCELLENCY.

---

WELLINGTON.

—  
1871.



## SCHEDULE OF CORRESPONDENCE.

## AUCKLAND.

No.	Date.	From.	To.	Subject.
1	1870. Aug. 20	Superintendent Auckland	of Hon. Colonial Treasurer	Submitting information relative to the line from Auckland to Waikato, and from Riverhead to Helensville.
2	Nov. 19	Hon. Colonial Secretary	Superintendent of Auckland	Mr. Blackett has been instructed to wait on His Honor in reference to Auckland railways.
3	Nov. 28	Superintendent Auckland	of Hon. Colonial Secretary	Will afford Mr. Blackett every information.
4	Dec. 7	Hon. Colonial Secretary	Superintendent of Auckland	Acknowledges receipt.
5	Dec. 26	Mr. Blackett	... Hon. Colonial Secretary	Has made examination of Auckland and Waikato line. It will bear modifications to cheapen it.
6	Dec. 30	Superintendent Auckland	of Hon. Colonial Secretary	Enclosing letter to His Excellency the Governor, containing Provincial Council resolutions relative to continuing the branch line to Onehunga to wharf at Geddes' Point.
7	1871. Feb. 21	Mr. Cooper	... Superintendent of Auckland	Forwards Mr. Blackett's memorandum thereon for consideration.
8	Mar. 8	Superintendent Auckland	of Hon. Colonial Secretary	Provincial Council has no objection to offer to Mr. Blackett's memorandum.
9	1870. Dec. 31	Mr. Blackett	... Mr. Wrigg	... Inquiring whether he will undertake proposed survey from Auckland to Tuakau, with branch to Onehunga.
10	1871. Jan. 3	Mr. Wrigg	... Mr. Blackett	... Is ready to undertake above survey.
11	Jan. 6	Mr. Blackett	... Mr. Wrigg	... Tender for survey has been accepted. Enclosing instructions.
12	Jan. 6	Mr. Blackett	... Hon. Colonial Secretary	Has carefully examined ground around Auckland, with a view to avoid the tunnel; two other lines present themselves. Examination of plans shows that considerable alterations will have to be made in whole line.
13	Feb. 9	Mr. Blackett	... Mr. Wrigg	... Desirable to use plant in possession of Provincial Government, and so reduce cost.
14	March 4	Mr. Wrigg	... Mr. Blackett	... In reply: Superintendent out of town for a few days.
15	March 13	Mr. Wrigg	... Mr. Blackett	... The Superintendent has no recollection of offering plant. It, or other in lieu of it, will be required for the Kaipara line.
16	April 3	Mr. Cooper	... Mr. Wrigg	... Government only require a portion of the plant; but it will be sufficient to indicate to Superintendent the wishes of Government in this matter.
17	April 12	Mr. Wrigg	... Mr. Cooper	... Superintendent is willing to enter into arrangements for supply of plant.
18	1870. Dec. 20	Hon. D. Pollen	... Hon. Colonial Secretary	Forwards letter from Mr. Jackson, of Onehunga, relative to proposed extension of Onehunga branch to Bluff. (See Enclosures to No. 6.)
19	1871. Jan. 3	Hon. Colonial Secretary	Hon. D. Pollen	... Requesting him to inform the petitioner of the rescission by the Provincial Council of their resolution relative to the proposed extension of the Onehunga branch.
20	Jan. 9	Hon. D. Pollen	... Hon. Colonial Secretary	Acknowledging receipt.
21	Feb. 8	Mr. Wrigg	... Mr. Blackett	... <i>Ad interim</i> report relative to the Auckland and Newmarket portion of the line. As to negotiating with land owners for purchase of necessary lands.
22	Feb. 22	Mr. Blackett	... Hon. Colonial Secretary	Remarks thereon.
23	Feb. 22	Mr. Blackett	... Mr. Wrigg	... It has been recommended that Mr. Wrigg should be empowered to treat with land-owners.
24	April 11	Mr. Knowles	... Mr. Wrigg	... Authorizing him to make arrangements, under Hon. D. Pollen's sanction, for purchase of lands.
25	April 11	Mr. Knowles	... Hon. D. Pollen	... Requesting him to act on behalf of Government in sanctioning arrangements that may be entered into by Mr. Wrigg.
26	May 4	Hon. D. Pollen	... Hon. Colonial Secretary	Acknowledges receipt.
27	Feb. 18	Superintendent Auckland	of Hon. Colonial Secretary	Inquiry as to the form, size, weight, &c., of rails to be used on Government Lines, with a view to the order about to be given for the Kaipara plant. Suggests a 3-foot gauge.
28	Mar. 6	Hon. Colonial Secretary	Superintendent of Auckland	Subject is under consideration.
29	Mar. 6	Mr. Wrigg	... Mr. Blackett	... Requests that as soon as gauge for Waikato Railway is determined, he may be informed.
30	Mar. 25	Mr. Blackett	... Mr. Wrigg	... A 3½-foot gauge is to be adopted. Instruction as to width of cutting.

SCHEDULE OF CORRESPONDENCE.—*continued.*AUCKLAND.—*continued.*

## AS TO TERMINUS.—TUAKAU OR MERCER.

No.	Date.	From.	To.	Subject.
31	Mar. 27	Mr. Wrigg	Mr. Blackett	As to several lines of original survey and deviation.
32	Mar. 23	Hon. D. Pollen	Hon. Colonial Secretary	Forwarding letter from Mr. James Runciman, offering to point out a better terminus at Mercer than that at Tuakau.
33	April 12	Mr. Knowles	Mr. Blackett	Calling his attention to Mr. Runciman's proposal.
34	April 12	Mr. Knowles	Hon. D. Pollen	Survey of section to Tuakau terminus to be stopped until Mr. Wrigg has reported on Mercer Line.
35	April 13	Mr. Knowles	Hon. D. Pollen	Mr. Wrigg instructed to make a preliminary report on the Mercer Line before survey can be authorized.
36	April 17	Mr. Knowles	Mr. Blackett	As to the suspension of survey.
37	April 18	Mr. Blackett	Mr. Knowles	Proposed change of terminus will add to the cost, but will be glad to find that a good line may be found to Mercer.
38	April 22	Mr. Knowles	Hon. D. Pollen	Suspension of survey decided on until question of terminus settled.
39	May 4	Hon. D. Pollen	Hon. Colonial Secretary	Mr. Wrigg will make a rapid inspection of country between Drury and Mercer.
40	May 24	Hon. D. Pollen	Hon. Colonial Secretary	Forwarding Mr. Wrigg's report recommending Mercer terminus.
41	June 6	Hon. Colonial Secretary	Superintendent of Auckland	Requesting His Honor's opinion on Mr. Wrigg's report.
42	June 13	Superintendent of Auckland	Hon. Colonial Secretary	If terminus can be placed at Mercer within the amount per mile available, it will be better than at Tuakau.
43	June 21	Mr. Knowles	Hon. D. Pollen	Mr. Wrigg to be instructed to lay off the line to Mercer proposed in his report (No. 40).
44	June 22	Hon. Colonial Secretary	Superintendent of Auckland	Informing him of the above instructions having been given.
45	June 10	Mr. Wrigg	Mr. Blackett	Forwards plan of Waikato Railway to date. Remarks as to the line through the Domain and neighbourhood of Auckland.
46	June 17	Mr. Knowles	Hon. D. Pollen	Government hope to receive Superintendent's reply to No. 41 as early as possible.
47	June 17	Hon. Colonial Secretary	Superintendent of Auckland	Enclosing copies of Nos. 45 and 46, and requesting early reply.
48	June 24	Superintendent of Auckland	Hon. Colonial Secretary	Not in a position to give an opinion on the Domain route, but the original Tunnel route ought, if possible, to be avoided.

## DOMAIN, COAST, AND TUNNEL LINES.

49	July 5	Mr. Wrigg	Mr. Blackett	Forwards plans in connection with the Waikato railway. Wishes instructions as to Domain Line.
50	July 20	Mr. Blackett	Mr. Wrigg	Minister of Public Works and Hon. D. Bell condemn the Domain Line, but in order to arrive at a correct decision, an approximate estimate of the Domain, Coast and Tunnel routes is required.

## PLAN.

Diagram showing state of surveys, Waikato Line, up to 10th June ... .. No. 45.

## TARANAKI.

51	1870. Aug. 21	Mr. Kelly, M.G.A.	Hon. J. Vogel	Urging importance of a West Coast line of railway.
52	1871. Feb. 13	Mr. Blackett	Mr. O. Carrington	West Coast survey to be under his direction as far south as Wanganui.
53	Mar. 24	Mr. O. Carrington	Mr. Blackett	Mr. Hursthouse and Mr. Hogg have been put on survey. Hopes to be able to report favourably on line in a few weeks.
54	June 15	Mr. O. Carrington	Mr. Knowles	Forwards reports from Mr. Hogg and Mr. Hursthouse. Line from Wanganui to Kai Iwi and from Whenuakura to Waingongoro, completed.

## PLANS.

Nos. 1 and 2, showing railway surveys, Wanganui to Kai Iwi, and from Whenuakura River to Waingongoro River ... No. 54.

## HAWKE'S BAY.

55	1870. Oct. 18	His Honor J. D. Ormond	Hon. Colonial Secretary	Forwards a report of Mr. Weber relating to available lines of railway from Napier to the Seventy-Mile Bush.
56	Oct. 25	Hon. Colonial Secretary	His Honor J. D. Ormond	Authorized to have surveys made of the several lines suggested by Mr. Weber.
57	Nov. 11 1871.	Mr. Blackett	Mr. Weber	Suggesting three lines of exploration.
58	Jan. 2	His Honor J. D. Ormond	Hon. Colonial Secretary	Forwards Mr. Weber's report of exploration.

SCHEDULE TO CORRESPONDENCE.—*continued.*

v D.—No. 6A.

HAWKE'S BAY.—*continued.*

No.	Date.	From.	To.	Subject.
59	Jan. 11	Superintendent of Hawke's Bay	Hon. Colonial Secretary	Urging that plant may be procured in anticipation of the assent of the Assembly for line from Napier to Paki Paki, about twenty miles.
60	April 14	Hon. Colonial Secretary	Superintendent of Hawke's Bay	Government will be prepared to make all necessary arrangements for the importation of the plant, so that delay may not occur when the line is ready for it.
61	June 1	Superintendent of Hawke's Bay	Hon. Colonial Secretary	Forwarding copy of a resolution passed by Provincial Council, undertaking to appropriate waste lands for railway purposes.
62	June 6	Superintendent of Hawke's Bay	Hon. Colonial Secretary	Forwarding copy of a resolution undertaking to include in reservation of waste land such portions of the Seventy-Mile Bush, when purchased, as may be necessary.
63	June 26	Hon. Colonial Secretary	Superintendent of Hawke's Bay	Acknowledging receipt.

PLANS.

Sketch illustrative of Mr. Blackett's instructions to Mr. Weber	...	...	...	...	No. 57.
Plan showing the three lines explored by Mr. Weber	...	...	...	...	No. 58.

WELLINGTON.

64	1871. Jan. 24	Hon. Colonial Secretary	Superintendent of Wellington	Calling the attention of His Honor to the necessity for taking steps for reservation of Crown lands for railway lines.
65	July 11	Superintendent of Wellington	Hon. Colonial Secretary	Forwarding copy of memorandum on railway works recommended by Provincial Council.
66	July 17	Hon. Colonial Secretary	Superintendent of Wellington	Acknowledging receipt. Plans of lines to Patea through the Wairarapa and Manawatu Gorge, will be submitted to the Assembly.

MANAWATU GORGE THROUGH WANGANUI TO PATEA.

67	1871. Jan. 3	Mr. Blackett	Mr. Stewart	Assistant Engineer to be appointed on survey, as it is important line should be proceeded with without delay.
68	Feb. 8	Mr. Blackett	Mr. Stewart	Mr. Fitzgerald appointed Assistant Engineer.

THROUGH WAIRARAPA TO MANAWATU GORGE.

69	1870. Oct. 25	Mr. Rochfort	Mr. Blackett	Report of exploration for pass into the Wairarapa Valley.
70	Dec. 1	Mr. Rochfort	Hon. Colonial Secretary	Reports having completed trial line from Featherston to the Hutt.
71	1871. Jan. 17	Mr. Rochfort	Hon. Colonial Secretary	Examination of route suggested by Mr. Hugh Sinclair. Both it and the Coast route may now be considered as finally set at rest.
72	Feb. 15	Mr. Allen	Hon. Colonial Secretary	Suggesting improvement of line.
73	April 10	Mr. Rochfort	Mr. Blackett	Has examined Mr. Allen's suggestion. Finds it would add to the length of line, and be otherwise objectionable.
74	April 10	Mr. Rochfort	Mr. Blackett	Report of exploration between Masterton and Manawatu Gorge.
75	May 5	Superintendent of Hawke's Bay	Hon. Colonial Secretary	Acknowledging receipt of copy of Mr. Rochfort's report (No. 75), suggesting that Mr. Rochfort should consult Mr. Weber as to an improvement at the Manawatu end of the line.
76	May 25	Mr. Rochfort	Hon. Colonial Secretary	Has examined suggested improvement, but finds it has counterbalancing objections.
77	May 30	Hon. Colonial Secretary	Superintendent of Wellington	Forwarding copies of railway correspondence.
78	June 1	Mr. Knowles	Mr. Rochfort	Reminding him that plans will be necessary.
79	April 7	Mr. Rochfort	Mr. Blackett	Report of examination of Rimutaka with reference to tunnel.
80	July 25	Superintendent of Wellington	Hon. Colonial Secretary	Forwarding report of Mr. O'Neill, in reference to the practicability and cost of a tunnel through the Rimutaka.
81	July 26	Hon. Colonial Secretary	Superintendent of Wellington	Acknowledging receipt.

PLANS.

Sketch railway to Patea (in Taranaki division of Papers)	...	...	...	...	No. 54.
Sketch illustrating Mr. Rochfort's line of railway survey from Featherston to Manawatu	...	...	...	...	No. 75.



## PAPERS RELATING TO THE CONSTRUCTION OF RAILWAYS.

## AUCKLAND.

## AUCKLAND TO TUAKAU AND MERCER.

## No. 1.

His Honor T. B. GILLIES to the Hon. J. VOGEL.

SIR,—

Wellington, 20th August, 1870.

Referring to the statements made by you in the House concerning the willingness of Government to procure authority to proceed with some of the lines of railway about which adequate information is available, and especially concerning the willingness of the Government to ask authority for the construction of a line between Auckland and the Waikato, I have the honor to submit the following information relative to important works in the Province of Auckland.

*First*, The railway from Auckland to Tuakau, on the Waikato River, with branch to Onehunga.

This line has been surveyed and plans, &c., carefully prepared. An Act already exists for the construction of the line as far as Drury, and there are already between six and seven miles completed, with the exception of laying down the permanent way. At the last meeting of the Provincial Council a sum was voted for the completion of the plans between Drury and Tuakau, and to enable me to enter into contracts for the construction of the whole line by means analogous to those proposed by you. It was then intended only to complete from Newmarket (three miles from Auckland) to Tuakau, a distance (inclusive of the Onehunga branch) of about thirty-seven miles, which, being easy country, could be well done for £3,500 per mile, using a 3 feet 6 inch gauge. Herewith I hand you a detailed estimate, by James Stewart, Esq., C.E., of the cost. I would propose, however, that the line should be completed to Auckland, but these three miles involving some heavy works, I think it would be well to take power to construct the whole (about forty miles) at a cost not exceeding £4,000 per mile. I may state that the lands required for the line from Auckland to Onehunga have already been acquired, and a large portion of the remaining land has been granted by the proprietors, free of cost, upon condition of the works being proceeded with without delay.

I feel satisfied that this would be a highly remunerative line, and if not taken up and proceeded with at once under your scheme, I would feel bound to proceed with it under the authority of the Provincial Council and of the Act already existing.

*Second*, A line from Riverhead to Helensville, connecting the Waitemata and Kaipara Waters, distance about seventeen miles.

This line, though not so immediately remunerative as the previous one, is even of greater importance for development of the resources of the country. At present the road is impassable for the winter between these two points, and all traffic has to be by sea, round the North Cape. Two-thirds of the line has been surveyed, and a few days before coming to Wellington I went with the surveyor over the line, to satisfy myself of the character of it, and of the practicability of a very cheap line being made. The country is almost level; the only cost in forming the line would be a few bridges of no great width, and ditches to drain the swampy portions. So very favourable are the conditions on this line, that it has been estimated as being capable of being constructed for not more than £2,000 per mile. Of such urgent necessity is this line, that the Provincial Council at its last session authorized me to contract for the construction, guaranteeing 6 per cent. interest, and I hope in the course of a very short time to be in a position to do so. At the same time I shall be glad if you will take the matter up under your general scheme, the Province finding the funds necessary for its construction. I am prepared to satisfy you that the Province has funds which it can and will set aside for that purpose, so that no liability will be incurred by the Colony. Should you prefer not to include this I shall be prepared to proceed with it solely on the Provincial account.

So soon as I return to Auckland I shall be happy to forward to you the plans, sections, specifications, and estimates for both of these works.

I have, &amp;c.,

THOMAS B. GILLIES,  
Superintendent.

The Hon. the Colonial Treasurer.

## Enclosure in No. 1.

Mr. STEWART, C.E., to His Honor T. B. GILLIES.

SIR,—

Auckland, 22nd January, 1870.

In compliance with your request, I have much pleasure in handing you herewith an estimate of the cost of the proposed Waikato Railway.

In framing the same, I have kept in view the general points of construction recommended by your Honor in our conversation on the subject. These are, the adoption of a narrower gauge than the English standard, for which the Auckland and Drury Railway was designed, and, mainly, the reduction of the earthworks and permanent way to an extent consistent with the safe working of a moderately heavy traffic.

With this view I have carefully restudied the working sections to Drury, and the trial section to Tuakau. The former is of course the result of repeated surveys and improvements; but by the

adoption of sharper curves and gradients, it is capable of very considerable reduction in works. But the latter section gives a very crude idea of the levels and works which may be obtained by a complete examination of the ground. The levels are run merely on the traverse lines, without any attempt at ranging curves. Although it is more than five years since I explored this extension, I have a sufficient recollection of the ground, which has enabled me to make what I fully believe to be a very close estimate of the amount of earthworks necessary to obtain a maximum gradient of 1 in 40; and by the free use of curves in many places where the trial levels were run in straight courses, a practically surface line can be obtained in places where heavy works are now shown.

The trial section does not show the line nearer to Tuakau than by about four miles, diverging at about the eleventh mile to Mangatawhiri, in accordance with the instructions under which I then acted. The ground thence to Tuakau is, however, of very similar nature to the first eleven miles, and I have estimated for it at something over the rate of the latter, and feel confident that when the ground is fully surveyed, a good working section will be obtained, showing less than the total amount of works now estimated.

The estimate is from Newmarket, from whence the line is ready for ballast and rails for a distance of four miles six furlongs. The total length from Newmarket to Tuakau is thirty-four miles six furlongs, and including the Onehunga branch thirty-six miles six furlongs. The length of line to be formed is exactly thirty miles, the other six and three-quarter miles being ballasting and permanent way only.

The gauge I have estimated is three feet, but a few inches more or less will make very little difference in the cost of works.

The main saving consequent on adopting a narrow gauge lies in the sleepers and ballast, although, rigidly viewed, both those items should be a function of the weight of traffic. By the adoption of Fairlie's patent locomotives, however, and limiting their weight to eighteen or twenty tons (almost the least possible with this design), the use of thirty-pound rails becomes possible, as each wheel would have only  $2\frac{1}{4}$  to  $2\frac{1}{2}$  tons load. The ballast I have taken at 9 inches, the very least which will enable the road to be packed. I propose no boxing at first, but the ballast can be gradually increased as found desirable in the maintenance. The sleepers may be of kauri or any other suitable timber, much of which can be found alongside the line at Pukekohe.

I might be allowed a few suggestions regarding the plant at present on the ground, as affected by any change of gauge. A great part of it consists of the ironwork merely of carriages and trucks, and very little alteration would make the axles suit any gauge, and even the carriages which are finished might be altered at little cost.

The locomotives of course are unalterable, and the best way that I can think of to utilize them would be to put them both, or one of them, on a Waikato steamer. Both would propel a suitable steamer at the rate of 10 knots per hour in still water, or one of them at 8 knots, under the same circumstances. Another alternative is, to use the 4 ft. 8 $\frac{1}{2}$  in. gauge to Onehunga, and mix the gauges from Newmarket to the junction. I do not advocate such a course, but merely throw it out as a suggestion. Being merely of the class called "Contractors' Locomotives," I am afraid, if exported to New South Wales, the returns over freight and expenses would be very small.

In conclusion, I would only add that though the estimate works out at a low rate per mile for a railway, yet the prices are ample, and in all the principal items are more than those at which I am aware the works now done on the line were executed for, and at a profit. When it is considered that not a single engineering difficulty exists beyond Newmarket, and that six miles and a half are ready for ballast, and that of the thirty miles remaining to be formed no less than about nine miles and a half will have earthwork under an average of one foot, it will readily be seen that the whole line is exceptionally easy.

The speed which may be safely attained with the proposed plant may be put at 25 miles per hour, and at this rate a very great traffic can be carried on.

I shall only be too glad to further the work in any way in my power, by verification of the estimates or considering any modification which may be thought to expedite the formation of a Company to take the matter up.

His Honor the Superintendent, Auckland.

I have, &c.,

JAMES STEWART, A.J.C.E.

ESTIMATE of the Cost of a Light Railway from Newmarket to the Waikato at Tuakau.

Description of Work.	Amount.	
	£	s. d.
170,000 yards cubic, general earth cuttings, @ 1s. 6d. ... ..	12,750	0 0
24,800 " " stone embankment, @ 2s. ... ..	2,480	0 0
1,040 " " rock cuttings, @ 5s. ... ..	260	0 0
5,820 feet lineal culverts, 1 ft. to 2 ft. 6 in., @ 20s. ... ..	5,820	0 0
1,180 " " timber bridges, @ £5 ... ..	5,900	0 0
9 $\frac{1}{2}$ miles forming, 12 feet wide, @ £100 ... ..	950	0 0
	<hr/>	
30 miles fencing, ditching, and gates, @ £350 ... ..	28,160	0 0
	10,500	0 0
<i>Permanent Way, per mile.</i>		
1,320 yards cubic, ballast, @ 4s. ... ..	£264	0 0
60 tons rails and fastenings @ £11 ... ..	660	0 0
2,100 sleepers, @ per hundred, £7 ... ..	147	0 0
1,760 yards lineal plate-laying, @ 2s. ... ..	176	0 0
	<hr/>	
36 m. 6 f. above Newmarket, Onehunga, and Tuakau, @ ... ..	1,247	0 0
	45,827	5 0
Carried forward ... ..	£84,487	5 0



CONSTRUCTION OF RAILWAYS.

3 D.—No. 6A.

Description of Work.	Amount.		
	£	s.	d.
Brought forward ... ..	£84,487	5	0
2 m. 0 f. sidings, at same rate ... ..	2,494	0	0
Stations, buildings, and gate-crossings ... ..	5,000	0	0
20 sets switches and crossings ... ..	300	0	0
10 „ signals and locking gear ... ..	200	0	0
8 1½ ton goods shed cranes ... ..	240	0	0
2 cast-iron tanks, 5,400 gallons each ... ..	150	0	0
2 Fairlie's locomotives ... ..	6,000	0	0
6 carriages, American bogie ... ..	2,400	0	0
30 trucks and waggons (ironwork in stock) ... ..	4,500	0	0
	105,771	5	0
Contingencies and engineering, 10 per cent. ... ..	10,577	0	0
Total ... ..	£116,348	5	0

Auckland, 22nd January, 1870.

JAMES STEWART, A.J.C.E.

No. 2.

The Hon. W. GISBORNE to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 19th November, 1870.

I have to inform your Honor that in a few days Mr. Blackett, C.E., Engineer in the Public Works Department, will proceed to Auckland, with a view to the completion of the survey of a railway line from Auckland to Tuakau, with branch to Onehunga, commencing from and terminating at a point to be determined by the Governor in Council, as authorized to be constructed by "The Railways Act, 1870."

Mr. Blackett will wait on your Honor, and I shall feel obliged by your directing him to be furnished with such information and assistance as it may be in the power of the Provincial Government to afford in the performance of this service.

Your Honor will perceive from the 26th section of "The Immigration and Public Works Act, 1870," that the Governor may, on the request of the Superintendent and Provincial Council of a Province, cause works to be constructed for the supply of water to a gold field. I understand, though unofficially, that such a request has been or is about to be made by your Honor and the Auckland Provincial Council in respect of the gold fields at the Thames, and in that case Mr. Blackett is instructed, after consultation with your Honor, to cause the necessary steps to be taken forthwith for the requisite survey and other measures, for the purpose of ascertaining what waterworks ought to be constructed, and the mode of their construction.

I have, &c.,

W. GISBORNE.

His Honor the Superintendent, Auckland.

No. 3.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Auckland, 28th November, 1870.

I have the honor to acknowledge the receipt of your letter of the 19th instant, No. 275, reporting that Mr. J. Blackett, C.E., Engineer in the Public Works Department, would proceed hither, with a view to the completion of the survey of a railway from Auckland to Tuakau, with branch to Onehunga, and requesting that he may be furnished with such information and assistance as it may be in the power of the Provincial Government to afford, in the performance of this service. In reply, I have to inform you that I shall be happy to afford Mr. Blackett every assistance and information in the power of the Provincial Government for the above-named service.

With reference to the water supply for the Thames Gold Fields, I have to thank you for intimating to me that Mr. Blackett is instructed, after consultation with me, to cause the necessary steps to be taken forthwith for the requisite survey and other measures, for the purpose of ascertaining what waterworks ought to be constructed, and the mode of their construction.

I have, &c.,

THOMAS B. GILLIES,

Superintendent.

The Hon. the Colonial Secretary.

No. 4.

The Hon. H. SEWELL to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 7th December, 1870.

I have to acknowledge the receipt of your Honor's letter No. 43, of the 28th ultimo, and to thank your Honor for your promise of assistance to Mr. Blackett in completing the survey of a railway from Auckland to Tuakau and Onehunga.

I have &c.,

HENRY SEWELL

(in the absence of Mr Gisborne).

His Honor the Superintendent, Auckland.

## PAPERS RELATING TO THE

## No. 5.

Mr. BLACKETT to the Hon. W. GISBORNE.

SIR,—

Auckland, 26th December, 1870.

I have the honor to inform you that on my arrival here, I proceeded at once to obtain the necessary information for the completion of the survey of the line of railway from Auckland to Waikato.

I spent last week in examining the line on foot, (accompanied by Mr. J. Stewart, C.E.) from end to end, and returned to Auckland on Saturday evening by coach from Mercer, which latter place I reached by canoe from Tuakau on the morning of the same day.

The Auckland end of the line will yet require some more examination and consideration; and some portions of the revised survey of the line, lately made by the Provincial Government, will bear some further modifications, tending to cheapen the cost of construction, and generally to improve the line.

As soon as possible after making the necessary arrangements for completing the survey, I shall proceed to the Thames, to obtain the necessary information relative to the proposed water supply for that district.

Up to this time I have not learnt that the Provincial Government are prepared to submit for approval any detailed plans or estimates for any specific scheme, excepting one for supplying water to the towns of Grahamstown and Shortland. The question may thus be one that will demand a lengthened and careful consideration. I shall however return to Wellington at the very earliest possible opportunity, consistent with such an examination as the importance of the subject demands.

I have, &amp;c.,

JOHN BLACKETT,

Acting Engineer-in-Chief.

Hon. W. Gisborne, Wellington.

## No. 6.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Auckland, 30th December, 1870.

I have the honor to transmit to you herewith an application made by me in terms of section 6 of "The Immigration and Public Works Act, 1870," to His Excellency the Governor, for the continuation of the branch line to Onehunga of the Waikato Railway to the wharf at Geddes Point, Onehunga.

I have, &amp;c.,

THOMAS B. GILLIES,

Superintendent.

The Hon. the Minister for Public Works, Wellington.

## Enclosure in No. 6.

His Honor T. B. GILLIES to His Excellency Sir G. F. BOWEN, G.C.M.G., Governor of New Zealand.

SIR,—

Superintendent's Office, Auckland, 30th December, 1870.

I have the honor to enclose copies of resolutions, as per margin, passed by the Auckland Provincial Council, with reference to the continuation of the railway line to Onehunga, and in pursuance of section 6 of "The Immigration and Public Works Act, 1870," I have the honor to request that your Excellency will be pleased to cause such works as you may think fit, to be constructed for continuing the branch line to Onehunga of the Waikato Railway to the wharf at Geddes Point, Onehunga.

I have, &amp;c.,

THOMAS B. GILLIES,

Superintendent.

His Excellency Sir G. F. Bowen, G.C.M.G.,  
Governor of New Zealand.

## Sub-Enclosure to Enclosure in No. 6.

ADDRESS No. 48.—Session XXVI., 1870.

(Extract from the Journals of the Auckland Provincial Council, Friday, 25th November, 1870.)

*Resolved*, That, in the opinion of this Council, the branch line of the Waikato Railway leading to Onehunga should be continued to the Bluff, and that the construction of that extension should be commenced as early as possible.

*Resolved*, That an Address be presented to His Honor the Superintendent, requesting him to forward this resolution to His Excellency the Governor, in accordance with the terms of the 6th section of "The Immigration and Public Works Act, 1870."

MAURICE O'ROKKE,

Speaker.

His Honor the Superintendent.

ADDRESS 66.—Session XXVI., 1870.

(Extract from the Journals of the Auckland Provincial Council, Thursday, 8th December, 1870.)

*Resolved*.—1. That the resolution of this Council with reference to the continuation of Onehunga Railway to Bluff, passed on the 25th of November last, be rescinded.

2. That, in the opinion of this Council, the proposed railway to Onehunga should have an extension of the line made from the present site of the railway terminus, opposite the Police Office, to the new Government Wharf, at Geddes Point, where all the steamers frequenting the Manukau now lie.

Address, No. 48,  
Session XXVI.,  
dated Nov. 25,  
1870.

Address, No. 66,  
Session XXVI.,  
dated Dec. 8,  
1870.

## CONSTRUCTION OF RAILWAYS.

5 D.—No 6A.

3. That an Address be presented to His Honor the Superintendent, requesting him to forward these resolutions to His Excellency the Governor, in accordance with the terms of the 6th section of "The Immigration and Public Works Act, 1870."

His Honor the Superintendent.

G. MAURICE O'RORKE,  
Speaker.

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### No. 7.

Mr. COOPER to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 21st February, 1871.

I have the honor to acknowledge the receipt of your letter, No. 357, of the 30th December last, transmitting an application made by your Honor, in terms of section 6 of "The Immigration and Public Works Act, 1870," to His Excellency the Governor, for the continuation of the branch line to Onehunga of the Waikato Railway to the wharf at Geddes Point, Onehunga.

In reply, I transmit herewith for your Honor's information, the enclosed copy of a memorandum by Mr. Blackett, the Civil Engineer of the Public Works Department, on the subject; and I have to request you to be good enough to inform me whether you have any objection to offer to his proposal.

I have, &c.,

G. S. COOPER  
(in the absence of Mr. Gisborne).

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### Enclosure in No. 7.

MEMORANDUM by Mr. BLACKETT.

TERMINATION of branch at Onehunga, as above described, at Wharf at Geddes Point.

Termination of southern end of railway on the bank of the River Waikato at Tuakau (about eleven miles below Point Russell); cannot describe exact point until plans are received.

Termination in Auckland (City), a piece of ground lying between the breakwater and the northern boundary line of Custom House Street, which boundary line will be the actual termination.

15th February, 1871.

JOHN BLACKETT, C.E.

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### No. 8.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Auckland, 16th March, 1871.

I have the honor to acknowledge the receipt of your letter No. 49, dated 21st ultimo, transmitting copy of a Memorandum by Mr. Blackett, the Civil Engineer of the Public Works Department, on the subject of the continuation of the branch line to Onehunga of the Waikato Railway to the wharf at Geddes Point, Onehunga, and in reply to inform you that the Provincial Government has no objection to offer to Mr. Blackett's proposal as set forth in the Memorandum.

I have, &c.,

THOMAS B. GILLIES,  
Superintendent.

The Hon. the Colonial Secretary, Wellington.

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### No. 9.

Mr. BLACKETT to Mr. WRIGG.

SIR,—

Public Works Office, Auckland, 31st December, 1870.

I have the honor to inform you that I am authorized by the Minister for Public Works to proceed with the survey of the line of railway from Auckland to Tuakau, with a branch to Onehunga, and I now address you for the purpose of inquiring whether you will undertake the proposed survey.

The line, as you are aware, has been already surveyed and pegged off throughout, and a portion of it formed ready for the ballast and rails.

The survey now to be executed will be for the purpose of modifying the present line to the requirements of a narrow gauge, say 3 feet 6 inches, and reducing the cost of the line in every possible way, in order to bring it within the terms of "The Railways Act, 1870," which provides for a maximum rate of construction not exceeding £4,000 per mile.

This sum will include everything necessary to put the line in proper working order, stations, rolling stock, telegraph, fencing, gates, &c., &c., but will not include the purchase of the land required for the railway.

You will be required to furnish complete working plans and sections of the railway, accompanied by a specification for the works throughout, from which the work can be contracted for.

The line also must be properly pegged from end to end.

Also, you will furnish a complete estimate of the cost of the work in detail, showing that it may be completed for the amount provided for in the Act; and as all the land necessary for the railway has not been acquired, you will also prepare and furnish a general plan of the line, showing how it affects the properties of the several owners and occupiers of land along its course. On this plan should be shown also the several stations and all the railway and gravel reserves, quarries, &c., which may be available for railway purposes.

I have had placed at my disposal all the plans made hitherto in connection with this railway, by His Honor the Superintendent of Auckland, who also offers to supply every kind of information in his possession that may be useful in the future survey.

These plans will be handed over to you in order to assist you as much as possible in the required work; you will not however be bound by them in any way, but you will be held entirely responsible for the correctness and completeness of all the plans, &c., you may furnish.

Amongst the modifications I propose to make as to the direction of the line, and of which I will hand over to you my notes taken on the ground, is one to avoid the present unfinished tunnel, and the very costly works in the loose ground to the north and south of it, by leaving the present line, say near the Newmarket Station, and curving round to the east descend to Hobson's Bay, skirting the spurs and high cliffs beyond, and following generally in a series of curves the line of coast in the harbour to the terminus, say near the wharf or breakwater.

Another line might also be examined, commencing with a rising gradient from Newmarket, thence through the Government Domain, with a descending gradient, and along the Strand Road to the site of the present viaduct; thence, as before described, to the wharves.

Your estimate will show the cost of these lines as compared with that of completing the present line by the tunnel; and, for convenience, the chainage might be reckoned each way from Newmarket, say from the third mile, as now chained, forwards to Tuakau, and backwards by each of the three lines to the harbour and wharf. You will oblige me by stating, at an early opportunity, whether you will undertake this work, and on what terms, say, so much per mile.

I have, &c.,

JOHN BLACKETT,  
Acting Engineer-in-Chief.

Henry Wrigg, Esq., C.E., Auckland.

### No. 10.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 3rd January, 1871.

I have the honor to acknowledge the receipt of your communication of the 31st ultimo, in which you ask me if I will undertake the works described in your letter having reference to the preparation of plans, sections, &c., necessary for the purpose of letting the works on the Waikato Railway by contract.

In reply, I beg to state that I am willing to do so. My proposal is, that I am paid £25 per mile for the length of line from Auckland to Tuakau, with the branch to Onehunga, and for such alternate lines as may be examined under your instructions. Payments to be made on account as the work proceeds. I have brought the amount down to the lowest figure that will enable me to produce satisfactory documents.

If my proposal is accepted, I think I shall be able to have the whole matter completed in fifteen or sixteen weeks from the time my proposal is accepted, and every effort will be made to do so.

I have, &c.,

John Blackett, Esq., C.E., Acting Engineer-in-Chief,  
Auckland.

HENRY WRIGG.

### No. 11.

Mr. BLACKETT to Mr. WRIGG.

SIR,—

Public Works Office, Auckland, 6th January, 1871.

I have the honor to acknowledge the receipt of your letter of the 3rd instant, in which you engage to complete the survey and estimate for the Auckland and Waikato Railway, according to the terms of my letter of the 31st December to you, for the sum of £25 per mile, and to have it completed in say fifteen or sixteen weeks from date of acceptance of tender. I have now to inform you that your tender for this work is accepted, and that you may at once proceed with it.

I enclose a note to the Provincial Engineer, Auckland, stating that you have been appointed to complete the survey, and requesting him to place at your disposal all the plans, &c., connected with the railway.

On the other side are a few general notes for your guidance in making the survey and estimate, subject to such alterations as may be necessary and practicable to bring the cost within the sum named per mile.

Economize whenever practicable, but not so as to impair efficiency of work.

I have, &c.,

JOHN BLACKETT,  
Acting Engineer-in-Chief.

Henry Wrigg, Esq., C.E., Auckland.

### MEMORANDUM.

#### *Railway Line Auckland to Waikato.*

Gradients not to exceed 1 in 50, or in extreme cases 1 in 40 if short.

Curves not to be less than 5 chains radius.

Sleepers, 9" × 5" × 6' 6". Centres, 3 feet, all dressed.

Rails, about 40 lbs. to the yard.

Fish-plates at joints are flanged.

Bridges on timber framing, say on stone foundation if available at small cost.

Culverts in embankments of stone.

Culverts, small, say of brick.

Ballast, thickness under sleepers, say not less than 12" to 15".

Formation, say 12 feet.

Adopt contour work where practicable, to make work light.

Over bridges to be made for probable future second line, thus, 6 feet clear of outer rails on each side.

## No. 12.

Mr. BLACKETT to the Hon. W. GISBORNE.

SIR,—

Public Works Office, Auckland, 6th January, 1871.

In my letter of 26th December, 1870, I reported to you that I had gone over the proposed line of railway, Auckland to Waikato. Since then I have carefully examined the ground in and around Auckland, with a view to avoid the very expensive works connected with a tunnel, unfinished, and some heavy slips situated at each end of the tunnel.

Two other lines present themselves, which I propose to have carefully surveyed and the comparative costs estimated before deciding on the exact line.

I have examined all the plans, surveys, and sections which have been made for this railway, some of them very recently, and some yet unfinished; the latter for the extensions beyond Drury have been executed by four different surveyors, but I do not find that any one individual is responsible for the correctness of the work.

There will be required also several considerable alterations in the direction of the line, principally to reduce the cost of construction by adopting easier ground, besides the alterations already described in Auckland itself.

There will also be required a general plan of the line as altered, showing how it affects the different properties along its course.

The work yet to be done in order to produce proper working plans and sections, with specifications and estimates for the work, will really involve a complete resurvey of the line; and seeing the necessity of intrusting this to one individual, who shall be responsible for the completeness and correctness of the work, I sought the services of Henry Wrigg, Esq., C.E., who has accordingly tendered for the whole, and undertakes to have it complete, say within fifteen or sixteen weeks.

His tender at the rate of £25 per mile being thought reasonable has been accepted, and he will commence the survey without delay. I have directed his attention specially to the necessity for having the trial lines surveyed and levelled, that is those in Auckland, as soon as possible, and the results, with estimates, &c., forwarded to the Public Works Office, Wellington, for your consideration.

I have, &amp;c.,

The Hon. the Minister for Public Works,  
Wellington.JOHN BLACKETT,  
Acting Engineer-in-Chief.

P.S.—I have been much delayed in Auckland by wet weather and other causes, and start for Thames to-day.—J.B.

## No. 13.

Mr. BLACKETT to Mr. WRIGG.

SIR,—

Public Works Office, Wellington, 9th February, 1871.

In a conversation with the Hon. the Minister for Works, he informed me that he distinctly understood in reference to the Auckland and Waikato Railway that all the plant in the hands of the Provincial Government would be placed at the disposal of the General Government, in order to reduce the cost of construction as much as possible. Should we therefore be able to use the old rails, &c., as far as Onehunga, it will make a material difference in our estimate. I think you had better take an opportunity of seeing Mr. Gillies about this, so that we may have the option of using the rails, &c., should we desire to do so.

I have, &amp;c.,

Henry Wrigg, Esq., C.E., Auckland.

JOHN BLACKETT,  
Acting Engineer-in-Chief.

## No. 14.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 4th March, 1871.

I have the honor to acknowledge the receipt of your communication under date of 9th February, 1871, No. 26.

As I did not return from Pukekohe until yesterday, I was unable to reply in due course. I now find Mr. Gillies is absent, and will be for some days; but upon his return I shall see him. I have, however, already obtained from the Provincial Government a list of all the plant and rolling stock, and the invoice cost of the same. These, I have no doubt, will be handed over if you desire it, and instruct me on what conditions I am to receive them. At present there is a cost of £2 2s. a week to the Provincial Government for a care-taker. If you accept the transfer, this cost will be a charge on your Department I presume; and as the checking of the list which they produce will be a most costly affair, I shall accept them, if you so instruct, subject to final stock-taking, if the conditions of transfer require this.

I have, &amp;c.,

John Blackett, Esq., Engineer-in-Chief, Wellington.

HENRY WRIGG.

## No. 15.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 13th March, 1871.

I have the honor to inform you, in further reference to your letter dated 9th February, and No. 26, that on my return from Pukekohe I waited on Mr. Gillies, according to your instructions, regarding the railway plant at Newmarket.

## PAPERS RELATING TO THE

I am informed by His Honor the Superintendent that he has no recollection whatever of any conversation in which he undertook to place the plant at the disposal of the General Government, and that he intends the rails now lying at Newmarket to be used on the Kaipara Railway.

He is, however, willing to transfer the rails, and such other portions of the plant as we may require, on the Government supplying similar plant of a lighter weight—not weight for weight, but length for length. On this latter point I was particular in understanding him clearly.

John Blackett, Esq., Engineer-in-Chief,  
Public Works Department, Wellington.

I have, &c.,  
HENRY WRIGG.

## No. 16.

Mr. COOPER to Mr. WRIGG.

SIR,—

Public Works Office, Wellington, 3rd April, 1871.

I have the honor, by direction of Mr. Gisborne, to acknowledge the receipt of your letter of the 4th ultimo, addressed to Mr. Blackett, stating that you had obtained from the Provincial Government of Auckland a list of all the railway plant and rolling stock in their possession, which you have no doubt would be handed over to the General Government, if desired; also your letter of the 13th ultimo, stating that the Provincial Government will hand over plant lying at Newmarket to the General Government, if latter will provide plant of lighter weight for Kaipara Railway.

In reply, I am to inform you that the Government only wish to have the rails, fish-plates, bolts, and other fittings, switches, points, crossings, &c., and not the rolling stock.

As the rails, &c., are all lying outside, it is not considered that the care-taker employed by the Provincial Government will be required; and if you make arrangements with His Honor the Superintendent that the General Government can have the rails, &c., as required, no other special arrangement will be necessary.

You will not, however, press this question of plant upon His Honor; it will be sufficient to indicate the wishes of the Government in the matter; and I am to request you, meanwhile, to prepare and forward estimates for new rails and plant throughout.

Mr. Blackett will reply to your queries as to gauge, &c.

I have, &c.,  
G. S. COOPER,  
Under Secretary.

Henry Wrigg, Esq., in charge of Waikato Railway Survey,  
Auckland.

## No. 17.

Mr. WRIGG, C.E., to Mr. COOPER.

SIR,—

Auckland, 12th April, 1871.

I have the honor to acknowledge the receipt of your letter, dated 3rd instant (No. 169), referring to rails, &c., for the Waikato Railway.

In consequence of your communication, I this day waited upon His Honor the Superintendent, from whom I gather that he is perfectly willing to exchange rails, points, crossings, &c. (exclusive of rolling stock) length for length, for a lighter rail that would suit the purposes of the Kaipara Railway, or that the rails should be taken at a valuation; and he is willing to enter into arrangements with the General Government for that purpose.

Estimates will be prepared for the rails and rolling stock required as soon as the details of the line are more fully decided upon.

G. S. Cooper, Esq., Under Secretary, Wellington.

I have, &c.,  
HENRY WRIGG.

## No. 18.

The Hon. Dr. POLLEN to Hon. W. GISBORNE.

SIR,—

General Government Offices, Auckland, 20th December, 1870.

I have the honor to transmit herewith a letter from Mr. Jackson, of Onehunga, and its enclosure, a petition to His Excellency the Governor from landowners and residents of that place, relative to a proposed extension of the Onehunga branch of the Waikato Railway to the Bluff.

A Ministerial crisis having occurred shortly after the resolution complained of was adopted by the Provincial Council, and the question having been subsequently reconsidered, the resolution was formally rescinded.

Annexed is an extract from the Journals of the Auckland Provincial Council.\*

The Hon. the Colonial Secretary, Wellington.

I have, &c.,  
DANIEL POLLEN,  
Agent for General Government.

## Enclosure 1 in No. 18.

Mr. JACKSON to the Hon. Dr. POLLEN.

SIR,—

Onehunga, 8th December, 1870.

I have been requested to forward the enclosed petition to you, with the request that you will be good enough to bring it before His Excellency the Governor in Council.

\* See Enclosure to No. 6.

## CONSTRUCTION OF RAILWAYS.

9 D.—No. 6A.

The petition itself is signed by 255 landowners, &c., of Onehunga, and by masters of steam and other vessels frequenting the Manukau; and the prayer of it is against carrying out a recommendation of the Provincial Council of Auckland to extend the Onehunga branch of the Waikato Railway to the Bluff.

The Hon. Dr. Pollen, Auckland.

I have, &c.,  
J. D. JACKSON.

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### Sub-Enclosure to Enclosure 1 in No. 18.

#### PETITION.

To His Excellency Sir GEORGE FERGUSON BOWEN, G.C.M.G., &c., &c., Governor of New Zealand,  
and the EXECUTIVE COUNCIL thereof,

*The humble Petition of the undersigned Landowners, Traders, and Residents of the Town of Onehunga, and Shipowners and Masters of Vessels frequenting the Port of Manukau.*

HUMBLY SHOWETH,—

1. That your petitioners, being deeply interested in the prosperity of the town of Onehunga, view with alarm and regret the passing of the following resolution by the Provincial Council of Auckland, viz., "That the Onehunga branch of the Waikato Railway should be continued to the Bluff," which, if carried into effect, will seriously injure the trade and materially depreciate the value of property in this neighbourhood.

2. Your petitioners are of opinion that this resolution was passed without full information or due consideration of the facts, and being entirely unaware of any intention to bring such a scheme before the Provincial Council, were thereby prevented from expressing their views by petition, and showing that the proposed plan was most damaging to the interests of the town, and totally unnecessary for the requirements of the port.

3. Your petitioners would draw attention to the fact that the Government Wharf being amply sufficient for the present or a largely increased traffic, is quite equal to any accommodation that could be obtained at the Bluff, and being most centrally situated with regard to the town, is also within a very short distance of the terminus of the Onehunga Branch Railway as at present laid out, and from which a tramway for goods traffic could be easily laid down.

Your petitioners therefore humbly pray that your Excellency, with the advice of your Executive Council, will be pleased not to give effect to the recommendation of the said resolution of the Provincial Council.

And your petitioners will, as in duty bound, ever pray.

JNO. BYCROFT.  
(And 254 others.)

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### Enclosure 2 in No. 18.

ADDRESS No. —.—Session XXVI., 1870.

(Extract from the Journals of the Auckland Provincial Council, Thursday, 8th December, 1870.)

*Resolved*, 1. That the resolution of this Council with reference to the continuation of Onehunga Railway to Bluff, passed on the 25th of November last, be rescinded.

*Resolved*, 2. That, in the opinion of this Council, the proposed railway to Onehunga should have an extension of the line made from the present site of the railway terminus opposite the Police Office to the new Government wharf at Geddes Point, where all the steamers frequenting the Manukau now lie.

*Resolved*, 3. That an address be presented to His Honor the Superintendent, requesting him to forward these resolutions to His Excellency the Governor, in accordance with the terms of section 6 of "The Immigration and Public Works Act, 1870."

His Honor the Superintendent.

G. MAURICE O'ROKKE,  
Speaker.

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### No. 19.

The Hon. W. GISBORNE to the Hon. Dr. POLLEN.

SIR,—

Colonial Secretary's Office, Wellington, 3rd January, 1871.

I have the honor to acknowledge the receipt of your letter of the 20th December ultimo, No. 549, transmitting a letter from Mr. Jackson, covering a petition from certain landowners at Onehunga to His Excellency the Governor, relative to a proposed extension of the Onehunga branch of the Waikato Railway to the Bluff, and reporting that a Ministerial crisis had occurred after the resolution complained of was adopted by the Provincial Council, and the question having been subsequently reconsidered, the resolution was formally rescinded.

In reply, I have to request you to be good enough to inform the petitioners of the rescission of the resolution by the Provincial Council.

The Hon. Dr. Pollen, Auckland.

I have, &c.,  
W. GISBORNE.

## PAPERS RELATING TO THE

## No. 20.

The Hon. Dr. POLLEN to the Hon. W. GISBORNE.

SIR,—

General Government Offices, Auckland, 9th January, 1871.

In compliance with the instructions conveyed to me in your letter No. 54, of date 3rd January instant. I have requested Mr. Jackson to inform the petitioners against the extension of the Onehunga Railway to the Bluff, that the resolution of the Auckland Provincial Council recommending that extension had been rescinded.

I have, &amp;c.,

DANIEL POLLEN,

Agent, General Government.

The Hon. the Colonial Secretary, Wellington.

## No. 21.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 8th February, 1871.

It was not my intention to have communicated with you on the subject of that portion of the line extending from Auckland to Newmarket, until such time as the whole of the alternate lines were fully completed, but the result of my examinations are so very important that I deem it proper to give you this interim report.

The tracing which I enclose will point out the result of my second trials through the domain. As far as this trial line goes, there is no doubt but that we can avoid the tunnel, the great slip, and the very heavy embankment in Mechanics Bay. I have no doubt in my own mind (though I have not as yet minutely calculated), that we shall save from £16,000 to £20,000 by this diversion. I have so arranged the work, as you will perceive, that its chief cost will be centred on the Stanley Street viaduct.

The diversion will be somewhat more expensive than the average on this account; but the immense importance of bringing the line into the centre of the trade of the city, without further serious cost for land, will justify the cost of this viaduct: of this, however, I will say more in my next report.

The amount of cutting I propose on the Parnell Road will be quite safe. If you recollect the place, it is a ridge having rapid drainage right and left, so that no slips may be expected here; while its depth will enable me to carry the present road with its level unaltered, by a lattice or other approved form of timber bridge, without the use of much if any masonry.

With regard to the question of damage to the domain, this ought not to be a source of uneasiness, for, as I pointed out to you when here, the line can be made to beautify it, at the expense of £300 or £400, of this I am quite sure.

My peculiar position prevents me from freely seeing what terms could be made with the Domain Board, as I am not an officer of the Government, but as far as I have felt myself justified to act, I have done so, and I am glad to say that I have from the Provincial authorities the assurance that they will reserve the Grammar School lands at A to such an extent as I may require. I have the same assurance from the City Board regarding their land at B, so that you see I have not been unmindful of doing that which I thought might be approved by you, though this forms no part of my agreement with you.

His Honor the Superintendent has shown to me the greatest desire to facilitate the work as much as possible, and purposes to place in my hands the deed referring to the free gift of land on the line, which has been signed by a number of landowners. But under the present order of things, this deed will have to take another form, I think (as I read it). At all events, without special instructions, I could not act with effect in procuring consents to the free use of land for the purposes of the railway, being, as it were, without authority, but I think I could make the matter generally right if authorized to do so. If you think further on the matter, I would suggest that I see Dr. Pollen regarding the present deed, and consult with him as to the form a new deed should take, as the land question is of much consequence, in my judgment, to settle as quickly as possible.

The land questions will be continually cropping up and should be dealt with as they arise. As an instance, there is no eligible site available for a station at Otahuhu for want of an approach; but if I could act, I have no doubt but that I could get a grant of five acres, and an approach to it, on conditions as to the mode of laying out the approach that on investigation might be found not objectionable. But I cannot act with effect.

I have, &amp;c.,

HENRY WRIGG, C.E.

John Blackett, Esq., Acting Engineer-in-Chief,  
Wellington.

## No. 22.

Mr. BLACKETT to the Hon. W. GISBORNE.

22nd February, 1871.

THE above is the first of a series of *ad interim* reports I requested Mr. Wrigg to make as his survey progressed, although they do not form part of his contract work.

My wish was to keep the Government fully informed on the progress of the survey, and more especially as to that part of it now reported on, it being the part where our great difficulty lies, and which I was extremely anxious to avoid altogether, if possible. Mr. Wrigg's report shows that it is more than probable that we can surmount this difficulty, and avoid entirely the tunnel and slips, which caused the abandonment of the former works on this railway, as well as obviating the necessity of an enormous embankment in Mechanics Bay. Before leaving Auckland I began to perceive that it would have been desirable to have given Mr. Wrigg authority, say under the approval of Dr. Pollen, to negotiate with



owners of land as to the terms on which certain pieces might be acquired. On this subject it might be said that it would be time enough to negotiate when we had determined on the actual line to be adopted; but it will be seen that were these inquiries or negotiations conducted during the survey, it would enable Mr. Wrigg to lay before the Government a more full and correct estimate of the cost of any lands likely to be required, and would undoubtedly save much time.

I have therefore to suggest, that it would be well to give Mr. Wrigg authority, on behalf of the Government, to make arrangements of this kind, definite on those parts of the line where no deviation is requisite, and conditional on those parts where an alternative line exists; also, that Mr. Wrigg's suggestion as to the preparation of a new deed, under approval of Dr. Pollen, be acted on. An allowance might be made to Mr. Wrigg over and above his contract price for this duty, the amount to be settled after his work is complete. A perusal of his report will show to what extent his authority should be limited.

The Hon. Minister of Public Works, Wellington.

I have, &c.,  
JOHN BLACKETT.

No. 23.

Mr. BLACKETT to Mr. WRIGG.

SIR,—

Christchurch, 22nd February, 1871.

I have the honor to acknowledge the receipt of your report of the 8th February, on that portion of the Auckland and Waikato Railway lying between the City and Newmarket, and to state that I consider it to be eminently satisfactory.

In reference to your suggestion that you could act with more advantage to the Government if you had authority to treat with owners of land, I have recommended to the Minister for Works that you should be empowered to act in this way, and that your other suggestion, relative to a new form of deed to be prepared with the approval of Dr. Pollen, should also be acted upon.

I have certified for the payment of a second advance on account of your contract to the amount of £300.

Henry Wrigg, Esq., C.E.,  
Auckland and Waikato Railway, Auckland.

I have, &c.,  
JOHN BLACKETT.

No. 24.

Mr. KNOWLES to Mr. WRIGG.

SIR,—

Public Works Office, Wellington, 11th April, 1871.

Referring to that portion of your report of the 8th February last, addressed to Mr. Blackett, which relates to the acquisition of land for the Auckland and Tuakau Railway, I have the honor, by direction of Mr. Gisborne, to convey to you authority, on behalf of the Government, to make arrangements, under the sanction of Dr. Pollen, for acquiring the necessary lands. Any agreement you may enter into for this purpose can be made definite on those parts of the line where no deviations are requisite, and conditional on those parts where an alternative line exists.

Your suggestion as to the preparation of a new deed, under the approval of Dr. Pollen, is approved.

The question of remuneration to you for this extra service can stand over until your present contract for the railway survey is finished.

Henry Wrigg, Esq., C.E., Auckland.

I have, &c.,  
JOHN KNOWLES.

No. 25.

Mr. KNOWLES to the Hon. Dr. POLLEN.

SIR.—

Public Works Office, Wellington, 11th April, 1871.

I have the honor, by direction of Mr. Gisborne, to enclose an extract from a report of Mr. H. Wrigg relative to acquiring land for the Auckland and Tuakau Railway, together with a copy of a letter I have this day sent in reply.

The Government will feel obliged if you will act on its behalf in sanctioning any agreements entered into by Mr. Wrigg in terms of my letter to him.

The Hon. Dr. Pollen, Auckland.

I have, &c.,  
JOHN KNOWLES.

No. 26.

The Hon. Dr. POLLEN to the Hon. W. GISBORNE.

SIR,—

General Government Offices, Auckland, 4th May, 1871.

I have the honor to acknowledge the receipt of Mr. Knowles' letter of date 11th April ultimo, No. 182, covering copy of correspondence with Mr. Wrigg, relative to the acquisition of land for the Auckland and Tuakau Railway, and requesting me to act on behalf of the Government in sanctioning arrangements made by Mr. Wrigg.

I have given directions for the preparation of a new deed, and think that the agitation of the question of a rival line will facilitate the acquisition of the land required.

The Hon. the Minister for Public Works, Wellington.

I have, &c.,  
DANIEL POLLEN.

## PAPERS RELATING TO THE

No. 27.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Auckland, 18th February, 1871.

I have the honor to request that you will be good enough to inform me whether the General Government have as yet ordered any part of the railway plant for the railways about to be undertaken under "The Public Works and Immigration Act, 1870," and also whether the form, size, and weight of the rails to be used on such railways have yet been determined upon, as the Provincial Government are about to order plant for the Kaipara Line, and desire, in the event of such line being ultimately brought under the general scheme, to assimilate, if possible, the works thereon with those on the main lines throughout the Colony.

The Provincial Government have made careful inquiries relative to the construction of railways, and would suggest that a three-foot gauge would best attain their objects of united efficiency and economy; but, upon this point they will be glad to receive an expression of opinion from the General Government.

I have, &amp;c.,

THOMAS B. GILLIES,  
Superintendent.

The Hon. the Colonial Secretary, Wellington.

No. 28.

The Hon. Mr. Fox to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 6th March, 1871.

I have the honor to acknowledge the receipt of your letter No. 75, of the 18th ultimo, requesting information as to the plant for the railways about to be undertaken by the Government under "The Public Works and Immigration Act, 1870," and to inform your Honor that the subject is under consideration and not yet decided.

I have, &amp;c.,

WILLIAM FOX  
(in the absence of Mr Gisborne).

His Honor the Superintendent, Auckland.

No. 29.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 6th March, 1871.

I have the honor to request that as soon as you have determined on what gauge the Waikato Railway is to be, that you will be good enough to communicate the same to me, in order that I may proceed as opportunity arises with the design of the bridges necessary.

If the gauge is to be 3 feet 6 inches, then I arrive at following proportions:—Gauge, 3 feet 6 inches; sleepers, 7 feet; ballast, 9 feet; top of embankments, 11 feet 6 inches; bottom of cuttings, 13 feet 6 inches; span of over-bridges, 25 feet. If the gauge is 3 feet, then I arrive at the following proportions:—Gauge, 3 feet; sleepers, 6 feet; ballast, 8 feet; top of embankment, 10 feet 6 inches; bottom of cuttings, 12 feet 6 inches; over-bridges, 23 feet.

In each case, the side widths are 4 feet 3 inches from the overhang of the carriage, and a clear space of 2 feet 6 inches between carriage sides on the centre way when the line is double.

I have, &amp;c.,

HENRY WRIGG.

John Blackett, Esq.  
Acting Engineer-in-Chief.

No. 30.

Mr. BLACKETT to Mr. WRIGG.

SIR,—

Public Works Office, Dunedin, 25th March, 1871.

I have the honor to acknowledge receipt of your letter of the 6th March, in which you ask to be informed as to the width of gauge for the Waikato Railway, and also as to widths of cuttings and embankments, &c.

You will please to make your calculations for a 3½-foot gauge; the top of the embankments may be 11½ feet, slopes 1½ to 1; and the cuttings 13½ feet at bottom, slopes 1 to 1.

Sleepers may be reckoned as 7 feet long, by 8 inches by 4½ inches, and 2 feet 8 inches apart centres; and the amount of ballast will be about 27 to 30 cubic feet per yard forward, or perhaps a little more. Over-bridges, 25 feet span as specified.

I have just had under consideration what the minimum widths of cuttings and embankments should be for the Dunedin and Clutha Line, and have arrived at the conclusion that for cuttings 14 feet, and embankments 12 feet, would be sufficient; these dimensions are each within 6 inches of those proposed by you, and you can use either. I should prefer the greater widths if they do not increase the estimate too much.

I do not remember whether these sizes agree with memorandum made whilst in Auckland, but you must take these as the guide.

I have, &amp;c.,

JOHN BLACKETT,  
Acting Engineer-in-Chief.Henry Wrigg, Esq., C.E.,  
Waikato Railway, Auckland.

## No. 31.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 27th March, 1871.

I have the honor to draw your attention to the enclosed tracing, which is a reduction of the lines of construction of that portion of the Waikato Railway between Drury and Tuakau.

The blue lines are the traverse lines which we have surveyed, following as near as may be the lines of the previous survey.

The red lines are further surveyed lines made since, to secure improvements at local points.

The green lines are routes which I think should be surveyed, as they appear, as far as I can judge, to present most important improvements upon the line as now surveyed.

I did not venture on such extensive additional surveys without your special instructions, as they will of course add further to the costs of my charge on the mileage; but I have ventured upon making a second survey from I to K, by the red line, because I not only save a considerable amount of cutting, but I secure the object I had in view of avoiding crossing on the level both the Great South and Waiuku Roads, the former having very considerable traffic. I thus avoid cost of constructing gate-houses, annual charge of gate-keepers, more security to the public, and a far better line at the same time.

The blue line from C to B will give a gradient of 1 in 50, at the expense of heavy and nearly continuous cutting throughout; that at the summit will perhaps be 25 feet deep. This length is the key to this division of the line, and in a reconnaissance which I have made this week I find it very possible that a less costly line, and one that would avoid the very numerous culverts which the line C B requires, would be found by either C B (green), or that of A B (green); the latter would perhaps be the easiest, the difficulty at the pass at X being small apparently.

Regarding the Tuakau end, the line previously selected by my predecessor, and now surveyed by me, appears to have been carried there solely that it might follow generally the slip of land reserved for railway purposes. I have since made some local alterations here, as shown in red, but they are far from satisfying me, and what I suggest to you is that surveys and levels be made of the green lines D E F G and H I.

These surveys would add considerably to the length of mileage chargeable by me against the Government; and as I shall be a loser by the price per mile agreed upon, I am by no means anxious for further work on the same terms; but my professional duty compels me to say that I am convinced that the line D F, or perhaps D H I, will be far the best line to follow for the Tuakau end.

I am strongly against the line following the Railway Reserve. It is clearly a mistake, requiring no levels to point it out; and as the levels are not yet taken on this part, I shall refrain from doing so until I hear from you by telegraph. A saving of £5 a mile will thus be saved to you on that portion, should you instruct me to survey and otherwise complete the lines I have suggested at the price already agreed upon.

John Blackett, Esq.,  
Acting Engineer-in-Chief.

I have, &c.,  
HENRY WRIGG.

## No. 32.

The Hon. Dr. POLLEN to the Hon. W. GISBORNE.

SIR,—

General Government Offices, Auckland, 28th March, 1871.

I have the honor to enclose copy of a letter from Mr. James Runciman relative to the proposed terminus of the Auckland and Drury Railway at Tuakau, in which he offers his services to point out a line for the railway by which the river may be reached about Mercer.

Mr. Runciman's knowledge of the country between Drury and Mangatawhiri is, I believe, very accurate, his father having been the first settler there; and the question which he raises is very important, and just now much discussed.

The Hon. the Minister for Public Works, Wellington.

I have, &c.,  
DANIEL POLLEN.

## Enclosure in No. 32.

Mr. JAMES RUNCIMAN to the Hon. Dr. POLLEN.

SIR,—

Mangere, 20th March, 1871.

I take the liberty of addressing this note to you to make you aware that there is a sort of universal regret respecting the present proposed terminus of the Auckland and Waikato Railway being at Tuakau, which is considered by many of the up-country settlers will be virtually of much less use to the Upper Waikato country than if the terminus was at Point Russell; and practically knowing that country between Drury and Mangatawhiri, I am of opinion there is no engineering difficulty of any moment (as it would not touch the much-dreaded Razorback by about half a mile), and I believe the distance to Mangatawhiri to be about the same as to Tuakau; and, by striking the Waikato River eight or ten miles further up, that distance on the river of one of the most unnavigable parts would be saved.

I consider it ought to be the desire of every right-minded man to see a permanent work of this kind put in the proper place irrespective of individual prejudice, and from your previous acquaintance of me you are aware that I look upon the progress of the country as my progress. You are aware I lived in that neighbourhood over ten years, and I flatter myself I know that locality better than most people, and I will most be happy to go and point out a practical line (in my opinion) within about half a mile of the Great South Road; and other settlers along the line, Messrs. Martyn, Rutherford, Rhodes, and Austin, are willing to give assistance to point out the route, and join me in considering it perfectly practicable.

The Hon. Dr. Pollen, Auckland.

I have, &c.,  
JAMES RUNCIMAN.

## PAPERS RELATING TO THE

## No. 33.

Mr. KNOWLES to Mr. BLACKETT.

(Telegram.)

Wellington, 12th April, 1871.

MR. WRIGG proposes extensive changes in the Tuakau line. Did you contemplate this under his contract, and what is he to be paid for trial surveys? The question has been raised by Mr. Runciman, of Mangere, whether the line should go to Tuakau, as he says the same length will reach to a point ten miles further up the river, and above the bad part of the navigation. Mr. Wrigg has been instructed to see him on the subject, and to suspend the survey of the Tuakau section for the present.

JOHN KNOWLES.

## No. 34.

Mr. KNOWLES to the Hon. Dr. POLLEN.

(Telegram.)

Wellington, 12th April, 1871.

RE Mr. Wrigg's report Waikato Railway survey, 27th March.—Please instruct him to stop the survey of section D to Tuakau terminus for the present, and see Mr. James Runciman, of Mangere, on the subject of his letter to you of 20th March, and ask Mr. Wrigg to report his opinion.

JOHN KNOWLES.

## No. 35.

Mr. KNOWLES to the Hon. Dr. POLLEN.

SIR,—

Public Works Office, Wellington, 13th April, 1871.

Referring to your letter of the 28th ultimo, No. 207, and to my telegram of yesterday, respecting Mr. James Runciman's letter to you, in which he states that Point Russell would be a more suitable terminus for the Waikato Railway than Tuakau, I have the honor, by direction of Mr. Gisborne, to request you to instruct Mr. Wrigg to communicate with Mr. Runciman on the subject, for the purpose of ascertaining—

1. Whether the same length of line will strike the Waikato ten miles further up and above a difficult part of the navigation?

2. Whether the engineering difficulties are not unduly increased by the proposed change?

Mr. Wrigg should make a preliminary report on these points before any survey can be authorized.

I have, &amp;c.,

The General Government Agent, Auckland.

JOHN KNOWLES.

P.S.—I annex copy of a telegram I have just received from Mr. Blackett on this subject for your information and guidance.—J.K.

## Enclosure in No. 35.

Mr. BLACKETT to Mr. KNOWLES.

(Telegram.)

Invercargill, 13th April, 1871.

WAIKATO Railway Survey.—Certain changes were contemplated and described to Mr. Wrigg, who was also authorized to improve the line wherever practicable; but it must be borne in mind that "The Public Works Act, 1870," provides for a railway line from Auckland to Tuakau on the Waikato, and not to Mercer, ten miles above, on the bend.

This point was decided by survey made by Mr. Stewart, who first tried to reach Mercer, as being the most desirable place, but found very difficult country, which would increase the cost of the line per mile beyond the sum authorized by the Act.

This obliged him to select Tuakau, which is the point on the river really nearest to Auckland, and easily accessible. I think it will be better to finish the survey as contracted for to Tuakau, and in order to satisfy the Government get Mr. Wrigg meanwhile only to explore the country to the bend, confirming or rejecting Mr. Stewart's report of it.

Should he find a practicable line at moderate cost, then to report and await instructions as to survey.

I should explain that I have already, with Mr. Stewart, examined the right river bank from Tuakau to the bend, and believe that this will probably be the best and easiest line, an extension in fact of that already contemplated to Tuakau.

Any new line of survey over fresh country must, I suppose, be the subject of another contract, and the exploration proposed must be paid for as an extra, according to the time spent on it.

JOHN BLACKETT.

## No. 36.

Mr. KNOWLES to Mr. BLACKETT.

(Telegram.)

Wellington, 17th April, 1871.

RE Wrigg's survey, Waikato Railway.—As it is proposed to change the line from the Railway Reserve, at the Tuakau end of the line, Dr. Hector is of opinion that such change may greatly add to the cost of the railway in the purchase of land, and he still thinks it advisable that that part of the survey should be suspended until the question raised by Mr. Runciman as to terminus has been settled. Your telegram of 13th instant has been communicated to Mr. Wrigg.

JOHN KNOWLES.

## No. 37.

Mr. BLACKETT to Mr. KNOWLES.

(Telegram.)

Dunedin, 18th April, 1871.

WAIKATO Railway.—Proposed change of line at Tuakau will undoubtedly add to the cost, not only for purchase of land but difficulty of ground, sections of which I have seen. I do not wish to oppose survey of another line or suspension of present survey, but think it will confirm Stewart's report.

The question raised by Mr. Runciman is not a new one, and had, according to the information I received in Auckland, and from what I saw, been already decided. I shall be glad to find that a good line may be found to Mercer.

JOHN BLACKETT.

## No. 38.

Mr. KNOWLES to the Hon. Dr. POLLEN.

(Telegram.)

Wellington, 22nd April, 1871.

UNDER all circumstances, it is decided that the suspension of the Tuakau section will be advisable until the result of survey of suggested deviation to Mercer is ascertained. Please, therefore, to suspend Tuakau survey, if not already done.

JOHN KNOWLES.

## No. 39.

The Hon. Dr. POLLEN to the Hon. W. GISBORNE.

SIR,—

General Government Offices, Auckland, 4th May, 1871.

With reference to Mr. Knowles' letter No. 183, of 13th April ultimo, I have the honor to inform you that the survey work on that portion of the line of the Auckland and Waikato Railway lying between Drury and Tuakau has been suspended, and that Mr. Wrigg has been instructed to put himself in communication with Mr. Runciman, and to make a rapid inspection of the country between Drury and Mercer, in order to be able to report to the Government upon the points specified in the letter now under reply, previously to any expense for survey of the proposed line being authorized.

I have, &amp;c.,

The Hon. Minister for Public Works, Wellington.

DANIEL POLLEN.

## No. 40.

The Hon. Dr. POLLEN to the Hon. W. GISBORNE.

SIR,—

General Government Offices, Auckland, 24th May, 1871.

With reference to Mr. Knowles' letter No. 183, of 13th April ultimo, and to mine in reply, No. 293, of date 4th May instant, I have now the honor to transmit Mr. Wrigg's report upon the points referred to him regarding the question of the terminus of the Waikato Railway.

The line from Drury by way of Tuakau to Mercer would pass through a settled and moderately populous district, and, if practicable at a reasonable cost, would secure so many advantages that the cost of an accurate survey, estimated at £500, might I think properly be incurred.

I have, &amp;c.,

The Hon. Minister for Public Works, Wellington.

DANIEL POLLEN.

## Enclosure in No. 40.

Mr. WRIGG to the Hon. Dr. POLLEN.

WAIKATO RAILWAY TERMINUS.

SIR,—

Auckland, 16th May, 1871.

In accordance with your communication dated 28th ultimo, No. 276, instructing me to ascertain, "1st, Whether the same length of line will strike the Waikato ten miles further up, above a difficult part of the navigation; 2nd, Whether the engineering difficulties are not unduly increased by the proposed change,"—

I have now the honor to lay before you, for the information of the Hon. Minister for Public Works, the result of my investigations, and the recommendation I have founded upon them.

On the accompanying tracing, which is a sketch map of the districts passed through by the several lines I have had under consideration, I have shown three routes by which it is possible to take the line of railway from Auckland to the Waikato River; but Drury being a point common to all the lines, the sketch does not extend further north than that point.

The continuous red line indicates the route from Drury to Tuakau, as now surveyed.

The green line represents the line from Drury to Mercer *via* the western spurs of Pokeno Hill.

The continuous red and broken line, that from Drury to Mercer *via* Pukekohe, Tuakau, and Pokeno.

*Line from Drury to Tuakau.*

With regard to the first of these routes, the ground survey is fully completed to Tuakau, but none of the levels have as yet extended beyond the Cape settlement, for reasons stated in my report to the Colonial Engineer-in-Chief, dated 27th March last, in which I recommended for consideration the diversion of the line, so as to approach Tuakau by a more easily constructed line with better gradients.

The length of the line from Drury to Tuakau (indicated in red) may be taken for the purposes of this report at fifteen and a half miles. It passes in this length over a number of swamps, and a considerable length of wet bush, very difficult to drain, and also through some considerable extent of prime land.

The gradients will generally be easy, with the exception of one, where there will be 1 in 50 for about one mile in length; and the cost of construction, mile for mile, will be less than any other line from Auckland to the Waikato River.

*Line from Drury to Mercer.*

The route from Drury to Mercer *via* the Pokeno Range is indicated in its general direction by a green line.

This is the line to which your instructions chiefly refer, and upon which I have to observe that the gentlemen who accompanied me over the difficult portions of this route did point out to me what they conceived would be a pass, through what is known as "Fitness's Road," at B on the tracing. There are some difficulties presenting themselves before this supposed pass is reached, but they are, I think, surmountable without the necessity of tunnelling. But, assuming I am correct in my judgment that the summit may be passed without tunnelling, there is no possibility of reaching the Pokeno Valley by the basin of Austin's farm, except with gradients so severe and curves so sharp as not to be useable for railway purposes except by the aid of locomotives specially constructed for the purpose.

So far then as the line pointed out to me by the gentlemen who were good enough to accompany me over the ground is concerned, it cannot be constructed, if the commercial results are to be considered.

I did, not however, let my investigation of this line rest here; for, considering how much the value of a line of communication is enhanced when it accommodates the largest area of country abounding with soil of the finest quality, I entered into the question whether it would be possible at all to carry a line of railway from Drury to Mercer, through any part of the spurs on the western side of Pokeno Hill; and I found that, by following generally the continuous green line shown on the tracing, I could pass, as far as the aneroid would enable me to judge, from the foot of the range at A, with gradients that would in all probability rule as follows:—

Rising gradients—

Martin's Hotel to Kempthorne's Road, 1 in 80.

Kempthorn's Road to Fitness's Hill, 1 in 45.

Falling Gradients—

Fitness's Hill to Tuakau Road at C, 1 in 40.

Tuakau Road to Pokeno (Queen's Redoubt), 1 in 50.

The length of this line from Drury to Mercer would be about seventeen and a half miles.

The country from Drury to Martin's Hotel at A is of an average quality of soil, and presents no difficulties; but from this point the works through the range to the Tuakau Road at C would be heavy, though no tunnel would, I think, be necessary. Long lengths of bush, on very rough sidelong ground, have to be dealt with; but so far as this portion is concerned, the land generally is of first-class quality, very sound and entirely free from swamps, forming a great contrast in the latter respect with the character of the line to Tuakau; but the gradients would be much more costly to work than those on the Tuakau line, because they are not only more severe, but are much longer.

From the Tuakau Road at C to Mangatawhiri Creek at D, the works would be light; and from thence to Mercer, side-cutting in indurated sand or imperfect sandstone as far as the present tunnel, and a swamp from thence to Mercer. This length would be somewhat expensive; but as the present tunnel can be made available without much if any further expense, and the swamp being shallow and resting on a firm clay bottom, no trouble or unusual expense will have to be incurred.

From what I have stated, it is perfectly clear that Mercer cannot be reached from Drury by a line of railway of the same length as the one from Drury to Tuakau, the excess of distance being about two miles; but there is no doubt that the line on the western side of Pokeno Hill (shown in green on tracing) would insure the largest amount of good if the conditions were equal to the Tuakau line, because it is more central with the settled districts, having the Bombay settlement on the east, and Pukekohe and Tuakau on the west, from the latter of which it would be a distance of about three and a quarter miles.

But the conditions are not equal, because this line (green) over the range, would be worked only at an increased cost over that of the Tuakau line; this is an important consideration, and, we must recollect, would be a permanent annual charge in excess of what would be required on the Tuakau line.

*Best Terminus.*

Seeing that the portion of the green line extending over the spurs of Pokeno Hill, from A to C on tracing, would be costly in construction and expensive to work, as compared with the line to Tuakau, the next question is, whether it is desirable to leave the terminus at Tuakau undisturbed?

To arrive at this, I first examined generally the River Waikato from Mercer to Tuakau. I was told the river might then be considered in an average condition as to depth of water; and in this state I found, at what is known as the "Bullock Bend," eight feet of water, so that it is probable that, in dry seasons, there are times when the water, at some points of this length of the river, does not exceed five feet in depth. I could not learn that any of the present class of steamers now plying on the Waikato get aground in this length, but the "Sturt" has been frequently so, as I am informed.

The time occupied by the "Bluenose" steamer (which I chartered for the purpose of the investigation) in taking me and my assistant from Mercer to Tuakau, having first discharged her cargo, was 55 minutes, and the return journey up stream occupied 1 hour and 45 minutes: hence, whatever time a train takes from Drury to Tuakau, these respective times must be added to the up-and-down journey between Drury and Mercer, if Tuakau was the terminus.

Taking the starting point from Drury, which is a point common to any line that may be constructed to the Waikato country, and say that the train travels at the rate of 20 miles an hour, the distance from Drury by rail being fifteen and a half miles, then the up-journey to Mercer would occupy time as follows:—

By railway from Drury to Tuakau	...	...	...	46½	minutes
By steamboat from Tuakau to Mercer	...	...	...	105	„
Total	...	...	...	151½	„

The down-journey would be as follows:—

By steamboat from Mercer to Tuakau	...	...	...	55	minutes
By railway from Tuakau to Drury	...	...	...	46½	„
Total	...	...	...	101½	„

Now, as the line from Drury to Mercer *via* the spurs of Pokeno Hill will not exceed seventeen and a half miles in length, the time occupied by a train from Drury to Mercer by this route would, at the same rate of travelling, be 52½ minutes; so that in the up-journey 99 minutes would be saved, and in the down-journey 49 minutes: therefore a train would travel from Drury to Mercer and back again in the same time that it would make a single journey between these points by rail and steamboat.

There can be no doubt, therefore, but that, if time alone was the only element in the calculation, that Mercer ought to be the terminus of the length of line now to be constructed. But there are other considerations of much importance to be taken into account; for assuming that Tuakau be retained as the terminus for the present, then, as the country required the extension of railway communication, the line from the Tuakau terminus up the right bank of the river would be exceedingly expensive to construct, and would add six miles to the length of line as compared with that from Drury to Mercer *via* Pokeno Hill, and two miles to the length of line between the same points *via* Tuakau settlement—to which I shall presently refer—with very little, if any, benefit to the district it would pass through. This is always supposing that the Upper Waikato must be approached ultimately by a railway passing through the districts settled, or in the process of settlement, by Europeans; but if this principle be set aside, it is more than probable that, passing almost exclusively through lands in possession of the Natives, the Waikato might be crossed at Tuakau, and the interior of the country entered by the valley of Ohiroa, marked E on tracing.

In looking, however, to the ultimate extension of the railway to the Upper Waikato, by any route that may be selected, we must not lose sight of what would be the immediate effect if the terminus were fixed at Tuakau.

There is no coach road nearer to the Tuakau terminus than the Great South Road at Pokeno, a distance of about six miles; hence without a good metalled road were made to connect these points, one of two things must take place,—either the whole of the passenger and goods traffic of the Upper Waikato must be thrown into the hands of the Navigation Company, by which the general public might be losers, or a portion of the traffic due to the railway between Drury and Tuakau would be diverted by coach at Drury, from which the Government would be losers.

Now it is very desirable that neither of these things should occur, and that the terminus should be so placed, if practicable at a moderate cost, so that the railway can be made use of by the public to its fullest extent, with the least consumption of time, and at the smallest cost for transit.

The great object of railway construction is to secure rapid and cheap transit of passengers and goods, and this should not be lost sight of in the desire to limit the present expenditure. But this will be the case if the terminus were fixed at Tuakau.

The terminus, for the present, should be at some point where water and road communication are already established; and that point, in my judgment, is Mercer, also known as Point Russell.

If I am correct in my conclusions, the object should be to construct a line of railway from Drury to Mercer that shall be the cheapest, mile for mile,—the most easily worked,—least costly in its maintenance,—and afford the largest amount of accommodation to the country.

Such a line, best approaching these conditions, is indicated by the firm and broken red line extending from Drury to Mercer *via* the Cape, Pukekohe, Tuakau, and Pokeno settlements.

It must be observed that though this line would diverge from that having its terminus at Tuakau on the Waikato, at about four miles from that point, it still would pass through the Tuakau Block, and within one mile of the heart of the settled portion; so that the full benefit of railway communication would still be secured to that district, as well as with established lines of traffic to the Upper Waikato.

The lengths and approximate cost of the several lines I have considered will be about as follows:—

	£	s.	d.
Drury to Tuakau, 15½ miles at £4,000	...	...	62,000 0 0
Drury to Mercer <i>via</i> Pokeno Hills, 17½ miles at £5,000	...	...	87,500 0 0
Drury to Mercer <i>via</i> Tuakau, 21½ miles at £4,300	...	...	92,450 0 0

The latter line would, I conceive, serve the districts of the Cape, Pukekohe, Tuakau, and Pokeno, effectually; it would also, as far as my judgment goes, be generally satisfactory to the owners of property lying south of Mercer; and I believe it best calculated to secure the greatest amount of good at the least cost by affording direct railway communication with Auckland from Mercer, and so reducing the cost of through transit from the Upper Waikato, either by road or river.

The survey and levels of the extension of the line I have recommended for the consideration of the Hon. Minister of Works could not be satisfactorily executed in this season under about £500.

I have, &c.,

HENRY WRIGG,

Engineer in Charge, Waikato Railway Survey.

The Hon. Dr. Pollen,  
Agent to General Government, Auckland.

## PAPERS RELATING TO THE

## No. 41.

The Hon. W. GISBORNE to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 6th June, 1871.

I have the honor to forward a copy of a letter from Dr. Pollen, enclosing a report recently received from Mr. Wrigg, relative to a question that has been raised as to whether the present terminus of the line to Waikato should be at Tuakau or Mercer.

I shall be obliged if your Honor will favour the Government with an expression of your views on the proposals made as early as your convenience will allow.

As the tracing accompanying Mr. Wrigg's report is sent in original, may I request its return when done with.

His Honor the Superintendent, Auckland.

I have, &amp;c.,

W. GISBORNE.

## No. 42.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Auckland, 13th June, 1871.

I have the honor to acknowledge the receipt of your letter No. 168, of the 6th instant, requesting an expression of my opinion as to whether the present terminus of the line to Waikato should be at Tuakau or Mercer, and in reply to inform you that, if the line can be made to have its terminus at Mercer, within the amount per mile available, that is the proper place for the terminus, and not Tuakau.

The latter was originally recommended to avoid the expensive portion between it and Mercer. On the whole, I quite concur with the recommendation of Mr. Wrigg, as expressed in his report enclosed in your letter.

I beg to return herewith, as requested, the tracing accompanying Mr. Wrigg's report.

I have, &amp;c.,

THOMAS B. GILLIES,

Superintendent.

The Hon. the Colonial Secretary, Wellington.

## No. 43.

Mr. KNOWLES to the Hon. Dr. POLLEN.

(Telegram.)

Wellington, 21st June, 1871.

His Honor the Superintendent, Auckland, fully concurs in the necessity for fixing the terminus at Mercer instead of Tuakau. Mr. Gisborne wishes you, therefore, to instruct Mr. Wrigg to lay off with all possible despatch the line to Mercer proposed in his report of 16th May.

JOHN KNOWLES.

## No. 44.

The Hon. W. GISBORNE to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 22nd June, 1871.

Adverting to your Honor's letter No. 520, of the 13th instant, recommending Mercer as a proper place for the terminus of the railway line to Waikato, I have the honor to state that the Hon. Dr. Pollen and Mr. Blackett have been informed of your Honor's concurrence in the necessity for fixing the terminus at Mercer, and Mr. Wrigg will be instructed to lay off with all possible despatch the line to Mercer.

His Honor the Superintendent, Auckland.

I have, &amp;c.,

W. GISBORNE.

## No. 45.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Auckland, 10th June, 1871.

I have the honor to report that the annexed diagram represents at the present time the exact state of the survey of the Waikato Railway.

You are aware that the detailed levels from Drury to Tuakau were stopped by instructions from Dr. Pollen on the 29th April last, pending the decision of the Government upon my report referring to the terminus at Mercer, handed to the Government Agent on the 16th May, since which nothing has been done on the diversion from Drury to Tuakau, waiting instructions. My assistants have been kept under pay, to be ready to proceed the moment I receive further instructions.

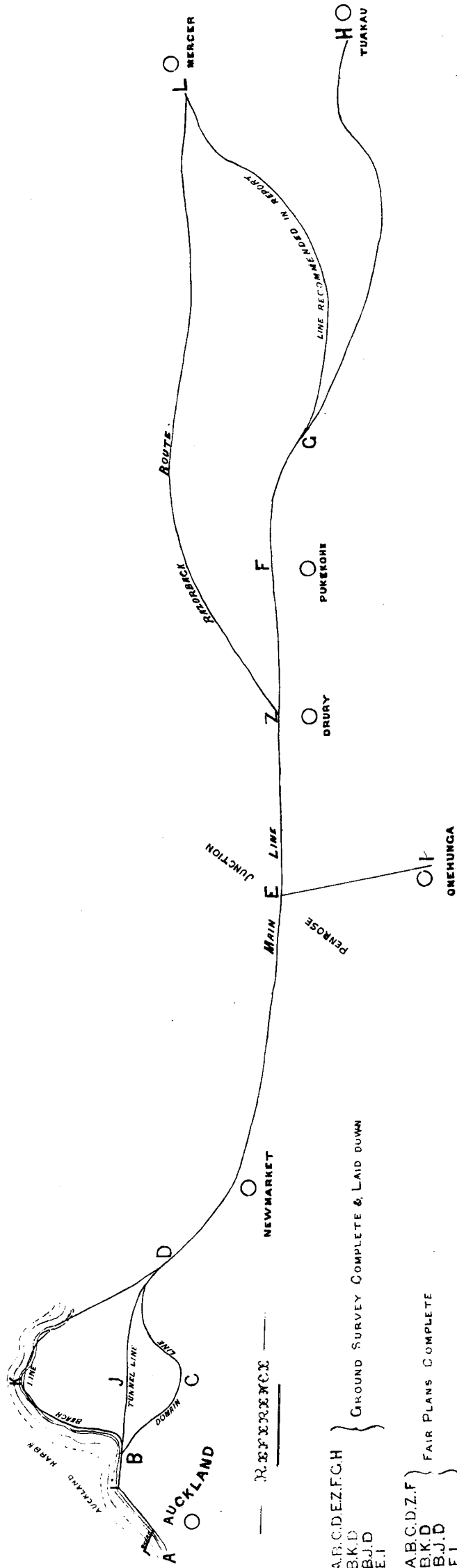
Regarding the state of the work, the diagram will explain more fully than I can describe the state of the surveys under my charge.

I have at last been enabled, after very considerable delay and expense, to complete the survey and levels through the Domain, and I think you will be compelled to take that line, for the coast line would be a very long one, and being for a great portion of its length within the influence of the tides, the works would be very expensive. Respecting the Tunnel line, if it were adopted, we must, for perfect security against the present very extensive and dangerous slip, extend the tunnel through that portion of the line affected by it, which would make the tunnel 530 yards long, of which about 60 yards are done, leaving the balance to be done 470 lineal yards. This will be a very costly and a very difficult



WAIKATO RAILWAY

DIAGRAM Showing state of Survey & Levels up to 10th June 1877



REFERENCE

- A.B.C.D.E.Z.F.G.H } GROUND SURVEY COMPLETE & LAID DOWN
- B.K.D } FAIR PLANS COMPLETE
- B.J.D } PEGGED OUT & SECTIONED
- E.I } CHECK LEVELS TAKEN
- A.B.C.D.E.Z } REPORTED UPON 16th MAY - (NO INSTRUCTIONS SINCE RECEIVED REGARDING IT)



work to complete, and there would be no reliance to be placed on any ordinary estimate of its cost, on account of the peculiar nature of the soil at the western end of the work.

Regarding the line through the Domain, I have, after extensive trials, succeeded in getting a gradient of 1 in 40, with a depth of cutting, in what I expect will be indurated sand, at Parnell Road, of 27 feet, having concentrated the heavy portion of the work at Stanley Street, where the embankment would be 28 feet deep. Here the chief expense would be the long bridge to cross the street, the line on the skew being  $4\frac{1}{2}$  chains.

This line would be, I think, by far the cheapest, and the objection which the Domain Board have to the line can be easily overcome. I propose the slopes through the Domain, both in cutting and filling, shall have slopes of 2 to 1, to be grassed and planted. The work then would, I am sure, be a decided ornament to the Domain; of this there can be no doubt.

The line from Newmarket to Onehunga would be best let in one contract, and details would be ready for contractors in a month if necessary.

The line from Auckland to Newmarket would have all details ready in five weeks for contractors.

The line from Penrose Junction to Drury would have all details ready for contractors in six weeks if necessary.

The line from Drury to Tuakau or Mercer awaits instructions; and the Tuakau, if adhered to, would take for sections four weeks; the other, for survey and sections, about eight weeks.

Accounts for payment up to date are enclosed.

J. Blackett, Esq., C.E., Engineer-in-Chief,  
Wellington.

I have, &c.,  
HENRY WRIGG,  
Engineer in Charge.

## No. 46.

Mr. KNOWLES to the Hon. Dr. POLLEN.

SIR,—

Public Works Office, Wellington, 17th June, 1871.

In a report addressed to the Acting Chief Engineer by Mr. Wrigg, dated the 10th instant—which will be laid before Mr. Blackett on his return from the West Coast—it is stated that since Mr. Wrigg handed to you his report of 16th May, referring to the terminus at Mercer, he has kept his assistants under pay awaiting the decision of the Government.

Although these assistants are not paid by the Government, Mr. Gisborne directs me to say that pending the receipt of the remarks which His Honor the Superintendent of Auckland has been asked to make for the information of the Government, no decision can be come to, and he will be obliged if you will inform Mr. Wrigg to that effect.

I am also directed to say, that, looking to the importance of an early completion of the survey, Mr. Gisborne hopes to receive His Honor the Superintendent's opinion as early as possible.

The Hon. Dr. Pollen, General Government Agent,  
Auckland.

I have, &c.,  
JOHN KNOWLES,  
Under Secretary.

## No. 47.

The Hon. W. GISBORNE to His Honor T. B. GILLIES.

SIR,—

Colonial Secretary's Office, Wellington, 17th June, 1871.

I have the honor, in continuation of my letter of 6th instant, to forward to your Honor a copy of a further report I have received from Mr. Wrigg, the contractor for the survey of certain deviations proposed with reference to the Auckland and Tuakau Railway, together with the copy of a letter I have directed to be addressed to the Government Agent at Auckland in reference thereto. Nos. 45 and 46.

I shall be obliged if your Honor will transmit to me as early as possible a reply to my letter above quoted.

His Honor the Superintendent, Auckland.

I have, &c.,  
W. GISBORNE.

## No. 48.

His Honor T. B. GILLIES to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Auckland, 24th June, 1871.

In reply to your letter No. 184, of the 17th instant, I have the honor to inform you that your letter of the 6th instant was received here on the 10th, and my reply thereto sent on the 13th, so that no delay has occurred on my part.

As to the deviations at the Auckland end of the line, I am not in a position yet to give an opinion as to the Domain route proposed, but will take an early opportunity of forming an opinion thereon. At the same time I quite concur in the view expressed by Mr. Wrigg, that the original Tunnel route ought to be avoided if at all possible.

The Hon. Colonial Secretary, Wellington.

I have, &c.,  
THOMAS B. GILLIES,  
Superintendent.

## No. 49.

Mr. WRIGG to Mr. BLACKETT.

SIR,—

Waikato Railway, Auckland, 5th July, 1871.

I have the honor to forward you, per steamer "Wellington," documents in connection with the Waikato Railway, as follows:—

Plan of the line from Auckland to Otahuhu.

Section from Newmarket to Otahuhu.

Section—Newmarket to Auckland, Tunnel line.

Ditto ditto Coast line.

Ditto ditto Domain line.

Bridge drawings Nos. 1, 2, 6a, 7a, and sheet of general drawings.

Seven sheets of cross sections on the Domain line containing cross sections from 1a to 95a.

The Coast and Tunnel line do not require cross sections.

The object in forwarding these drawings to you is to enable you to instruct me as to which of the three alternate lines at the Auckland end I am to specify and design for—the difficulty about which I alluded to in my telegram stating I was coming down, and which I still think would be desirable.

It will not be safe to reduce the length of the tunnel on the old line below what I have shown on the section, and the cost of this work will be at least £16,000, with great risk attending the construction.

The timber viaduct on the Domain line will probably cost £3,300, to which must be added the earthworks, &c., which may raise the cost to about £7,000 against the cost of the tunnel.

From the cross sections of the Domain line, you will observe that I propose, in all cases where practicable, to adopt slopes of 2 to 1, both in cuttings and embankments, so as to enable these slopes to be planted if required by the Domain Board.

It is clear that I cannot draw any specification until the mode of approaching Auckland has been decided upon; and I need scarcely say that it will be necessary for the plans, sections, and drawings, to be returned to me for the purpose of enabling me to do so.

The bridge drawings are sent to show the plain but substantial class of bridges I propose to erect, where iron work is reduced to the minimum amount.

I have not received any definite instructions regarding the line on the Tuakau end beyond a verbal one from the General Government Agent, on the 29th ultimo, that I was to complete the detailed levels as far as the point where I considered the line should diverge to Mercer (which will be somewhere near Pukekohe), and I am acting on those instructions, but my assistants are all ready to proceed further when required.

John Blackett, Esq., Engineer-in-Chief, Wellington.

I have, &c.,  
HENRY WRIGG.

## No. 50.

Mr. BLACKETT to Mr. WRIGG.

SIR,—

Public Works Office, Wellington, 20th July, 1871.

I have the honor to acknowledge receipt of large tin case, containing plans of Waikato Railway, in accordance with list contained in your letter of 5th instant, and to inform you that I have laid them before the Hon. the Minister for Works and the Hon. F. D. Bell, who are unanimous in condemning the proposed adoption of the line through the Domain.

Before, however, coming to any decision on this matter, I am directed to request that you will, at your earliest convenience, prepare and forward to this office an approximate estimate of the cost and length of each line by Domain, Coast, and Tunnel, in order that a correct decision may be arrived at, as was provided for in my letter to you dated 31st December, 1870.

I have sent back all the plans received, as requested by you, to enable you to make the necessary calculations. Please to send a tracing on cloth of the large plan—that is, as much of it as will show the three lines from the terminus to Newmarket; also outline tracings of the three sections between the same points, but with only the lengths and gradients marked on them.

I am further directed to request that when you have prepared the above estimate, you will lay it, with the necessary plans, before His Honor the Superintendent of Auckland, in order that he may be prepared to form an opinion on this matter; and state also to him that the Hon. the Minister for Works will address him officially on the same subject, after he has had an opportunity of examining your estimates and tracings.

Henry Wrigg, Esq., C.E., Auckland.

I have, &c.,  
JOHN BLACKETT,  
Acting Engineer-in-Chief.

## T A R A N A K I .

No. 51.

Mr. KELLY to the Hon. J. VOGEL.

SIR,—

Wellington, 21st August, 1870.

I very much regret that in your statement to the House of the several lines of railway which it was the intention of the Government to make provision for, all reference to the West Coast was omitted. I am the more surprised at this, as it is admitted by both sides of the House that in no other district can the Colony be so largely benefited by the construction of a railway as in that fertile tract of country which lies between Wanganui and New Plymouth.

This district requires a large accession of population for the twofold purposes of developing its great natural resources and overawing a hitherto hostile Native population. It has over a million acres of agricultural land yet undisposed of and lying waste, waiting to reward the toil of an industrious population. Being destitute of harbours or inland communication with any natural outlet, and good roads being practically impossible through the richness of the soil, a light line of railway is thus rendered an absolute condition to a successful agricultural settlement of the country. There are no engineering difficulties along this route to contend with, no heavy cuttings or expensive bridges necessary. There is the advantage of an abundant supply of durable timber, at convenient distances, to satisfy all requirements of construction; and abundance of shingle or agglomerate, suitable for the ballasting of a light line, is to be found north of Patea.

The effect on the Native population should not be overlooked. It would find them employment of which they would gladly avail themselves. These Natives (the Taranaki and Ngatiruanui) have been great obstacles to the extension of settlement in Taranaki, having hitherto maintained an isolated existence and offered a determined opposition to the advancement of the European population. This feeling is now gradually giving way. Large flax manufactories have been established in the very heart of the district, at Opunake, and a line of road has been taken through the greater portion of the district with their consent and co-operation. All that is now wanted to finish the good work and render progressive settlement possible, is to tie New Plymouth to Wanganui with iron rails, and storm this stronghold of Maori seclusion with the irresistible humanizing influences of an advanced civilization.

I therefore strongly urge the Government to reconsider their proposals, and take such action as will convince the House and the country that in any scheme for settling its waste lands through the instrumentality of railways that that magnificent district shall not be overlooked; a district where such a plan is calculated to succeed beyond the most sanguine expectations, and to reflect credit on the Government who were sagacious enough to propose its adoption.

The Hon. the Colonial Treasurer, Wellington.

I have, &amp;c.,

THOMAS KELLY, M.G.A.

No. 52.

Mr. BLACKETT to Mr. CARRINGTON.

SIR,—

Public Works Office, Wellington, 13th February, 1871.

In reference to the survey of the railway line on the West Coast, I am directed by the Hon. the Minister for Works to state that it will be under your direction as far south as Wanganui, and that you are authorized to employ competent surveyors to carry it on as speedily as possible. Mr. Hogg, under your direction, might survey the portion from the Wanganui, say, to the Whenuakura (after he has prepared sections and specifications for the Manutahi cuttings and pointed out to you what other work is necessary), and then might survey that portion from Whenuakura to Waingongoro. The rate of pay should not exceed £6 per week.

It may be necessary, in order to expedite the survey of the unfinished road work left by Mr. Hogg, for you to engage another surveyor; this you will be also authorized to do as long as his services may be required, observing due economy in rate of pay. The railway survey should be pushed on so as to have all plans and estimates of cost ready for the meeting of the General Assembly.

I have, &amp;c.,

JOHN BLACKETT,

Acting Engineer-in-Chief.

O. Carrington, Esq.

No. 53.

Mr. CARRINGTON to Mr. BLACKETT.

SIR,—

Public Works Office, Taranaki, 24th March, 1871.

Referring to your letter of the 13th ultimo, I have the honor to report that I was unable to commence the exploration and survey of the railway line before the 9th instant, in consequence of the unfavourable weather and the difficulty in procuring an efficient surveyor for the work.

I beg to inform you that I have engaged Mr. Wilson Hursthouse (formerly one of my pupils and subsequently a district surveyor employed on the military settlers' survey in this district), who is well qualified for the work, his remuneration to be at the rate of £6 per week, to date from the 9th instant, the day on which he commenced.

## PAPERS RELATING TO THE

I have given him the survey of the line between Whenuakura and Waingongoro, and have instructed him to use every endeavour to push on the field work during the fine weather. Since he commenced on the 18th he has been principally employed exploring, which he has done to Mokoia, and reports that there is every appearance of an easy line across the Tangahoe. If so, there will be no difficulty from the Whenuakura to the Waingongoro.

Before leaving Patea, on Thursday, the 16th instant, I directed Mr. Hogg, as soon as he had completed the road work in hand (delayed in consequence of the wet weather), to give over to Mr. Morrison the works, sections, plans, instruments, &c., connected with the road works, and proceed without delay with the survey towards Wanganui, commencing at Whenuakura, at a point previously arranged.

I hope in the course of a few weeks to have the survey well advanced, and to be able to report favourably on the proposed line.

With regard to the plans and sections, will you have the goodness to inform me what the scales, horizontal and vertical, are to be?

John Blackett, Esq., Acting Engineer-in-Chief,  
Wellington.

I have, &c.,  
OCT. CARRINGTON.

## No. 54.

Mr. CARRINGTON to Mr. KNOWLES.

SIR,—

Public Works Office, Taranaki, 15th June, 1871.

With reference to the survey of the proposed line of railway between Wanganui and Waingongoro, I have the honor to enclose reports from Mr. Hogg and Mr. Hursthouse, at present engaged on that work.

In the report from Mr. Hogg it will be seen that the line has been completed to the Kai Iwi Stream, a distance of about eight miles from Wanganui, leaving between there and Whenuakura about twenty-three miles to be surveyed. The accompanying tracing, with the report from Mr. Hogg, shows the work as far as completed to date.

Mr. Hursthouse has completed the field work between the Whenuakura and Waingongoro Rivers; but as some weeks will elapse before he can complete the plans and sections, I am unable, at present, to furnish the Government with more information than that contained in the report, with its accompanying tracing. From my own knowledge of the country, I feel assured that the line has been well and carefully selected.

I would suggest that Mr. Hursthouse, on completion of the work he has in hand, be employed to continue the line from where he commenced at Whenuakura until he meets Mr. Hogg, who, it will be perceived, is carrying forward his portion of the line to that place.

At present I am unable to report on the nature of the ground through which the line will have to pass between the Waingongoro and Hangatahua Rivers, as no reconnaissance of that portion of that country has been made, on account of Native difficulties, alluded to in my letter to Mr. Blackett, of the 26th December, 1870.

It will be seen from the foregoing remarks why I have not considered it advisable to recommend the survey to be proceeded with between Hangatahua and New Plymouth, being unable to connect the line of railway where it now terminates at Waingongoro, and where it would cross the Hangatahua River.

The Under Secretary, Public Works Office,  
Wellington.

I have, &c.,  
OCT. CARRINGTON,  
In Charge of Road Works, West Coast.

## Enclosure 1 in No. 54.

Mr. HOGG to Mr. CARRINGTON.

SIR,—

Wanganui, 19th June, 1871.

I have the honor to enclose to you a rough tracing of that portion of the Wanganui district, extending from the Wanganui River to the Kai Iwi Stream, and through which I have taken the proposed line of railway.

The red dotted line shows the route of the first line I cut, about three and a half miles.

The other red line shows the route I have adopted, which is principally average side-cutting, and with abundance of the best red conglomerate gravel along nearly the whole length of it.

The height to rise from the valley of the Wanganui to the top of the Goat Valley is 433 feet, which will give a grade of 1 in 40, with a cutting at the top 14 chains long and 22 feet deep, and an embankment at the bottom 14 chains and 22 feet high.

The fall from the low saddle at the crossing of the Goat Valley down to the Kai Iwi, is 280 feet in two miles.

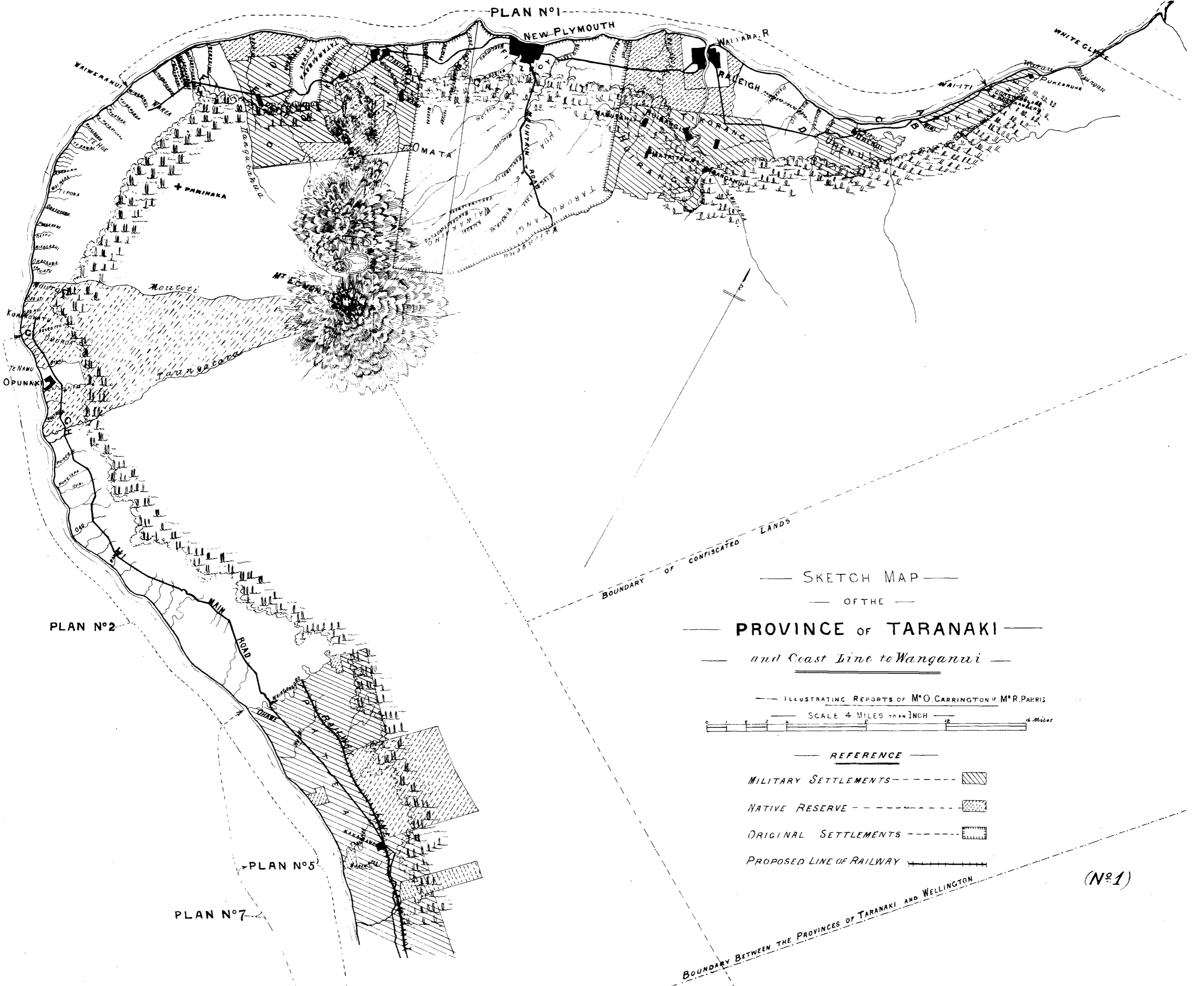
Would you wish the plan and section plotted on one continuous sheet or on separate sheets?

We have had a few fine days since I last wrote you, but it has again begun to rain hard.

I am now anxious that you should send me drawing paper, that I may be able to plot a part of

O. Carrington, Esq., in Charge of Road Works,  
West Coast.

I have, &c.,  
JAMES HOGG, C.E.



PLAN N°1-

NEW PLYMOUTH

WAIARA R.

WHITE CLIFFS

OMATA

RAKEIGH

TORANGA

WAI-ITI

DUKERRUNE

MOITOTI

MT. EGMONT

OPUNAKI

MAIN ROAD

PLAN N°5

PLAN N°7

BOUNDARY OF CONFISCATED LANDS

— SKETCH MAP —  
 — OF THE —  
**PROVINCE OF TARANAKI**  
 — and Coast Line to Wanganui —

— ILLUSTRATING REPORTS OF M<sup>o</sup> CARRINGTON & M<sup>o</sup> R. PARRIS

SCALE 4 MILES TO AN INCH

16 Miles

— REFERENCE —

- MILITARY SETTLEMENTS — [diagonal hatching]
- NATIVE RESERVE — [cross-hatching]
- ORIGINAL SETTLEMENTS — [dotted pattern]
- PROPOSED LINE OF RAILWAY — [line with cross-ticks]

BOUNDARY BETWEEN THE PROVINCES OF TARANAKI AND WELLINGTON

(N°1)

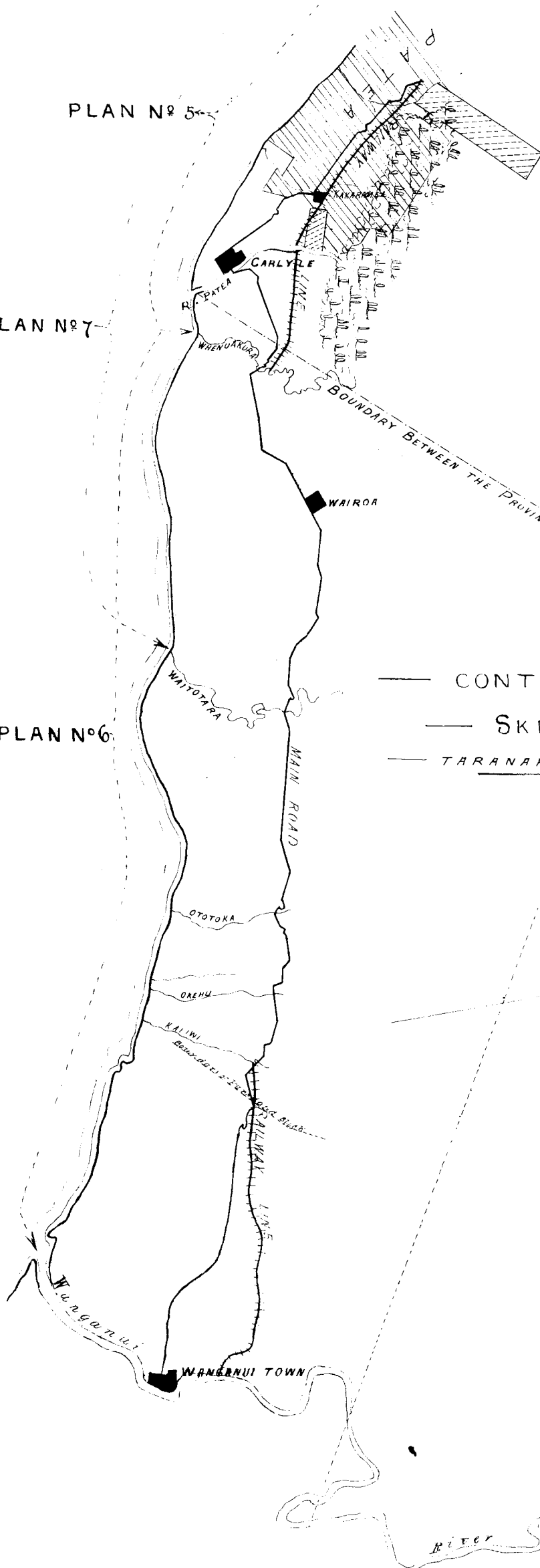




PLAN N<sup>o</sup> 5

PLAN N<sup>o</sup> 7

PLAN N<sup>o</sup> 6



— CONTINUATION —  
 — OF —  
 — SKETCH MAP —  
 — TARANAKI TO WANGANUI —

(N<sup>o</sup> 2)

River



## Enclosure 2 in No. 54.

Mr. HURSTHOUSE to Mr. CARRINGTON.

SIR,—

New Plymouth, 9th June, 1871.

I beg to inform you that the preliminary survey of the railway through the Patea district, from Whenuakura to Waingongoro, is completed on the "ground," and that I am now engaged in preparing the plan and section of the same.

The line commences about half a mile above the present ferry on the Whenuakura. According to your directions I consulted with Mr. Hogg with respect to the best crossing-place of that river, and in company with that gentleman explored the banks, finally selecting the junction of the Kokako Stream, as offering the greatest advantages in approaching the river from both sides.

In crossing the different rivers that intersect the country, advantage has been taken of the tributary gullies where found practicable, by running the line along which much heavy cutting and some viaducts are avoided. The greatest part of the earthwork required in the undertaking will be side-cutting.

The line crosses the Patea at Hukatere, about two and a half miles above Carlyle, passes through the township of Kakaramea, thence just inland of the Old Camp at Manutahi, and crosses the Ingahape immediately below its junction with the Ohoki, and the Tangahoe at its confluence with the Tawiti, follows up the valley of the last-named stream to near Hawera, and then takes nearly a direct course to the Waingongoro, which river it strikes in allotment No. 69, where there appears to be an equally good ascent on the north-west side.

The line is twenty-four and three-quarter miles long, and is approximately shown on the accompanying sketch by a thick black line. I cannot, until the section is plotted, inform you what will be the steepest grade, but think that it will not in any case be steeper than 1 in 50.

As far as I can judge from the banks of streams and the general appearance of the surface, the nature of the earth to move will be found good, the hardest and toughest which shows itself being a kind of hard blue marl clay and some sandstone.

No gravel beds are visible along the line, although in several places loose gravel may be seen cropping up to the surface. In one place in the Tawiti Valley a reef of cement with large boulders crops up, from which good ballast could be obtained, but, without prospecting, I cannot say to what extent.

The country through which the line passes is open fern land, the gullies only being wooded or covered with dense scrub and branches.

In conclusion, I have to state that I expect to complete the plan and section in from four to six weeks from this date.

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

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



## HAWKE'S BAY.

No. 55.

His Honor J. D. ORMOND to the Hon. W. GISBORNE.

SIR,—

Napier, 18th October, 1870.

I have the honor to transmit a report by Mr. Weber, accompanied by plans giving some description of the lines available for railway lines from Napier to the Seventy-Mile Bush. The first portion of Mr. Weber's report gives information respecting two lines from Napier to Paki Paki through the Ahuriri Plains. I am of opinion that it is desirable Mr. Weber should survey both these lines sufficiently to enable an estimate of their relative cost to be made.

From Paki Paki to the Seventy-Mile Bush, three lines are open, and here again I think Mr. Weber should make a running survey of each, in order that the relative difficulties and advantages may be more definitely ascertained than can be done from the information at present available.

I have, &amp;c.,

J. D. ORMOND.

The Hon. Minister for Public Works, Wellington.

## Enclosure in No. 55.

Mr. WEBER to His Honor J. D. ORMOND.

SIR,—

Napier, 17th October, 1870.

In compliance with your instructions, I have collected during the last week, information respecting the most practicable lines for a railway between Napier and the Manawatu Bush, prior to actual survey of the trial lines.

As I have the advantage from my long connection with the Engineer and Survey Department, of being pretty well acquainted with the features of this Province, it was not necessary for me to go over the whole ground, and I have confined my field-work to the taking of soundings across the Ahuriri Lake or Inner Harbour, and of running levels over the low flats subject to floods bordering on the Ahuriri Lake, so as to be able to select the least expensive and least exposed line. I have been materially assisted by the plan showing the levels taken by Mr. Rochfort, of the Ahuriri Plains, a tracing of which plan I have the honor to enclose, with the two trial lines proposed across the Ahuriri Plains.

I likewise enclose a lithographic plan of the Province of Hawke's Bay, showing the three lines practicable from the Ahuriri Plains to the Ruataniwha Plains.

In starting from Napier, which practically consists of two distinct places, viz., Napier proper and Port Ahuriri, which are about one mile and a half apart, and separated by a limestone island which cannot be crossed by a railway without considerable expense, lines of very different character are obtainable from the two starting points. I have called the two lines A and B on the enclosed tracing.

Line A, from Port Ahuriri, runs for 100 chains over the Ahuriri Lake, with average depth at high water of 4 feet, varying from 2 feet 6 inches to 5 feet 6 inches, and soft mud bottom of about 5 feet, below which there is (as far as ascertained) everywhere very good holding-ground for piles—of stiff blue clay. A timber viaduct on piles, 3 feet above high water, would be quite safe, the current being neither very strong, nor does it carry large and heavy timber in floods.

Thence the line runs for two and a half miles over land (partly under tidal influence) subject to floods from the Tutaekuri, requiring embankments from 1 to 4½ feet, broken at several places by open timber viaducts so as to allow escape of storm water. The material for the embankments would probably have to come from the Bluff at Napier.

The next 125 chains run over sound level ground without obstruction. Then the Tutaekuri will have to be crossed by a bridge of about 300 feet long. A pile bridge of 20-foot span stands well about one mile and a half below this place. The bridge will strike the low land on the proper right bank of the river, much subject to the overflow of the river, which breaks heavily over its right bank below Pawhakauro, flooding our line for a distance of about one mile. To allow of the escape of the storm water, which has carried heavy timber during the high floods in May, 1867, at least 30 chains of the line should be carried on timber viaducts, the remainder on embankments from 1 to 3 feet high, for which good soil is obtainable at the upper end. The next 50 chains to the Tutaekuri Waimata run over level sound ground.

From the Tutaekuri Waimata, which can be spanned by a bridge about 86 feet in length, the land is again subject to being flooded for a distance of about two and a half miles. This portion offers in my opinion rather serious difficulties, and will be rather costly as the storm water is caused by the overflow of the Ngaruroro by the Waitio (as shown on the tracing), which overflow has rapidly increased within the last few years, and which will continue to increase, the fall in that direction being considerably greater in proportion than by the present river-bed, which has been filled up for a considerable distance with shingle above the head of the Waitio. In fact it appears very probable that the bulk of the Ngaruroro water will come that way. Any works undertaken here will have to be planned with that view, and about one mile of the two and a half miles shown as flooded should be constructed as open timber viaducts to provide for the storm waters, which have considerable power, but do not carry any timber.

From the high land to Paki Paki (at the nineteen mile post) the country is sound and level, but a portion between the Ngaruroro and Paki Paki should be raised 2 feet above the natural level. The Ngaruroro is confined here between sound high banks, and can be spanned with about 180 feet.

The stations required on this line would be—(1.) Meanee Flats, on the crossing of the main road, which would serve the Meanee, Puketapu, and Papakura districts. (2.) At Heretaunga, on the centre of the flats, which would serve that block (the best agricultural one in the Province), and with a bridge across the Ngaruroro at Havelock would give access to the Havelock and Pukahu settlers. (3.) At Paki Paki, which would serve as terminus, not only for the settlers in the neighbourhood, but likewise for those on the Aorangi District, and by connecting Paki Paki with the middle road at Foster's, likewise to those from Kohinorakau and Patangata.

Line B starts from the Government Reserve at Brewster Street (very centrally in Napier proper), runs along the high sea beach to Waitangi, crosses that creek at a span of about 100 feet, follows then the high ground along the left bank of the Ngaruroro, the whole of which is sound and level.

Above Pakowai the line will cross the two creeks formed by the overflow of Ngaruroro (the Waitio); and as the two creeks are not capable to carry the water in time of floods, it will be necessary to connect the two bridges of 160 feet and 98 feet respectively with an open timber viaduct to provide for the surplus water, and to continue that work for about 150 feet beyond the bridge over the Ohura; thence an embankment of about one mile and a half (averaging about 2 feet 6 inches) will be required to carry the line on to the high ground. No obstacle exists thence to Paki Paki, the site for the bridge over the Ngaruroro, and the rest of the line being as described on line A.

Stations would be required—(1.) At the Ngaruroro Bridge, to accommodate the Clive, Waitangi, and Pakowhai districts; (2.) At the Heretaunga Plains, as described before; (3.) At Paki Paki, as described on line A.

To connect Port Ahuriri with the Town terminus a street tramway, by way of Marine Parade, Coote Road, and Shakespeare Road, would have to be constructed. The cost of that tramway would probably not exceed £1,000, and the cost of transfer to Port Ahuriri should not exceed 1s. per ton. The distance of line A, from Port Ahuriri to Paki Paki (the head of the Ahuriri Plains), is sixteen miles; that of B, from Napier, is nearly eighteen miles. Line A will accommodate the Meanee, Puketapu and Papakura districts, but exclude Clive, Waitangi, and Kidnappers; line B will serve the latter, but exclude the former. Line A will be considerably more expensive than B, and more subject to accidents from floods.

The cost of construction of B will, exclusive of rails, fencing, lands, rolling stock, and buildings, not exceed £1,000 per mile,—perhaps the cheapest line to be constructed in New Zealand.

From the head of the Ahuriri Plains are three lines practicable to the Ruataniwha Plains, which must be crossed to reach the Manawatu Bush. The three lines are shown on the lithographed plan, and described as Patangata Line, Te Aute Line, and Hampden Line. All three lines have been opened up by roads and run through thriving homesteads, and all three are practicable for gradients of one in fifty (1 in 50), as ascertained by aneroid observations taken some years ago; but I am unable to state at present which will be the least expensive. Under these circumstances I beg to request leave for taking levels over the three lines (after having finished the Ahuriri Plains), and then to report the general result.

His Honor J. D. Ormond, Napier.

I have, &c.,  
C. WEBER.

#### No. 56.

The Hon. W. GISBORNE to His Honor J. D. ORMOND.

SIR,—

Public Works Office, Wellington, 25th October, 1870.

I have the honor to acknowledge the receipt of your letter of the 18th instant, transmitting reports and plans from Mr. Weber, descriptive of the different lines available for a railway from Napier to the Seventy-Mile Bush.

In reply, I have to inform your Honor that you are authorized to engage Mr. Weber to make a preliminary survey of the two lines from Napier to Paki Paki, and of the three lines from Paki Paki to the Seventy-Mile Bush, as suggested in his report and recommended by your Honor.

His Honor J. D. Ormond, Napier.

I have, &c.,  
W. GISBORNE.

#### No. 57.

Mr. BLACKETT to Mr. WEBER.

SIR,—

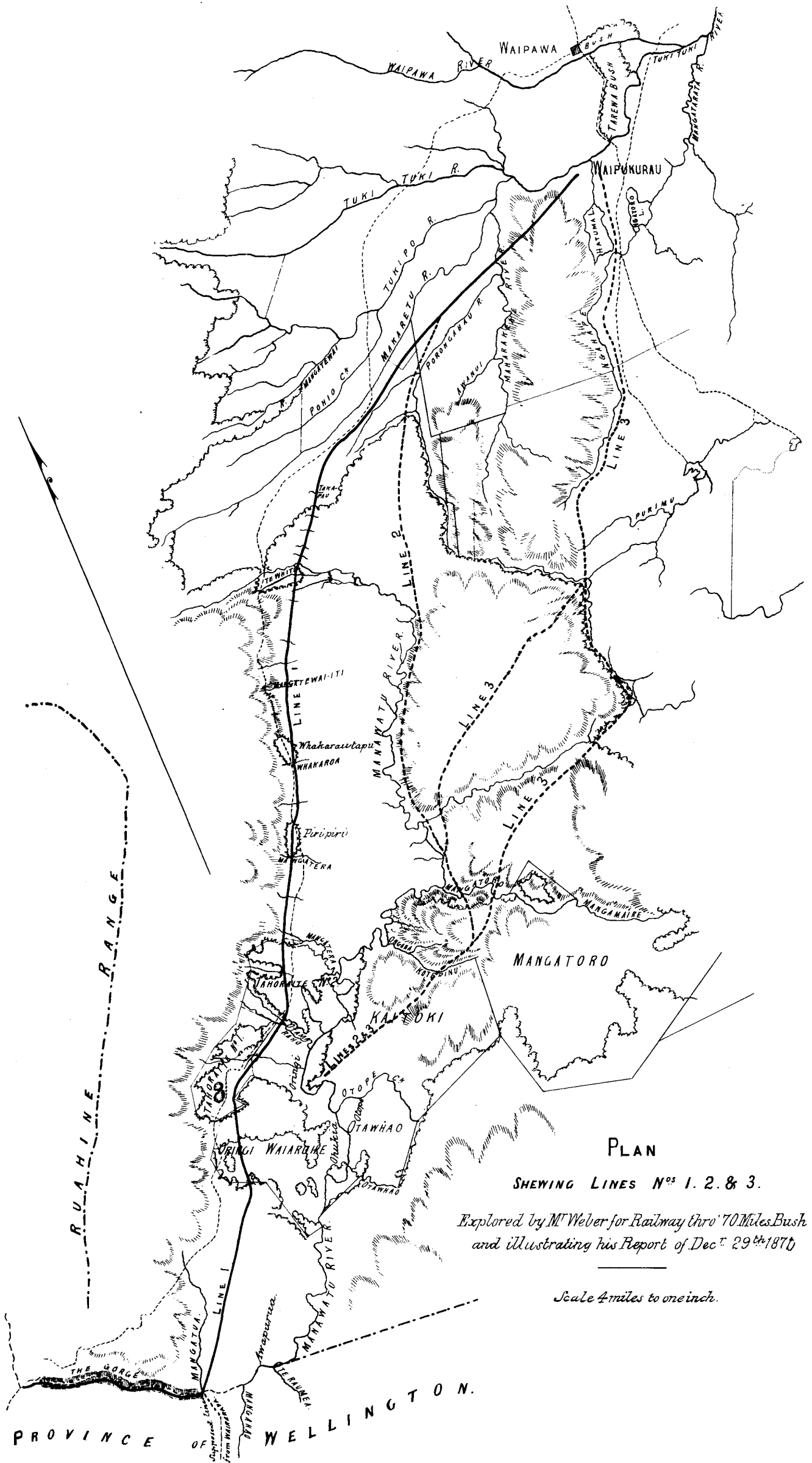
Public Works Office, 11th November, 1870.

I am directed by the Minister of Public Works to forward to you instructions relative to the exploration for the proposed railway and road from Napier to the Manawatu Gorge. This exploration should be as complete as possible, and to assist you in this matter I enclose a tracing of a portion of the country, showing the rivers, roads, &c.

In a conference with the Board it was suggested that we had choice of three lines: First, a line lying between the main range and the Manawatu; second, a line lying between the Manawatu and the Puketoi Range; third, a line lying eastward of the northern portion of the same range, and crossing it at a point convenient for joining the line proposed to come through the Gorge of the Manawatu. These are marked on the tracing 1, 2, 3.

It may probably be found that from the points A or A' on the present coach road, or thereabouts, the proposed extension of road might commence.





PLAN

SHOWING LINES N<sup>OS</sup> 1. 2. & 3.

Explored by Mr Weber for Railway thro' 70 Miles Bush and illustrating his Report of Dec<sup>r</sup>. 29<sup>th</sup> 1876

Scale 4 miles to one inch.

PROVINCE OF WELLINGTON.



It is presumed that a geological section of the basin of the Upper Manawatu from east to west would show that gravel and shingle will be found west of the Manawatu, and limestone on the east of it. This will influence you in deciding between lines 1 and 2, as to which will be the most permanent road when formed, taking into account also the value of the land passed through, as well as the facility of construction.

Mr. J. T. Stewart has instructions to proceed with the exploration and formation of the road on the west side of the main range and through the Gorge, and to confer with you as to the best means of getting through the latter, in which it is particularly desirable that a low level line should be obtained, if not at too great a cost, which may answer for the dray road in the first instance, and afterwards be used wholly or in part for a railway. You will have due notice when and where to meet Mr. Stewart.

The suggestion made in reference to this road, that it should be laid off on the future line of railway, is practicable only to a certain, and probably only to a small extent; and the expense of making the dray road must not be augmented needlessly by making the lines conform, where it can be carried on easy ground and with sharper curves and gradients than would be allowed on the line of railway.

I propose that we should have gradients on the road not exceeding 1 in 13. It will, however, be advisable to make the exploration answer the double purpose of fixing the exact position of the dray road, and the probable future line of railway.

You will please to report from time to time on your progress in this exploration, illustrating your report by rough sketches, when necessary, for explanation.

Your final report will contain recommendation of the best line for adoption, with a full statement of the character and particular merits of each; and before any work is commenced—that is, beyond the exploration—further instructions will be sent to you.

I have, &c.,

JOHN BLACKETT,  
Acting Engineer-in-Chief.

Charles Weber, Esq., Napier.

### No. 58.

His Honor J. D. ORMOND to the Hon. W. GISBORNE.

SIR,—

Wallingford, Hawke's Bay, 2nd January, 1871.

I have the honor to enclose, under separate cover, Mr Weber's report to the Engineer-in-Chief on the line from Ruataniwha to the Manawatu Gorge.

A perusal of that report will, I think, satisfy you that the line described as No. 1 is the only practicable line, and I shall hope to get an early authority from you to cause the road works upon that line to be proceeded with. Mr. Weber describes the line to me as really good. The height at the Takapau, where the road enters the bush, is about 900 feet above the sea level, and from there to the Manawatu Gorge, a distance of about thirty-five miles, the fall is about 600 feet; Messrs. Weber and Stewart fixing the height at the upper entrance of the Manawatu Gorge at 300 feet. I mention this to show that the natural facilities for either road or railroad of this line are extremely good. The principal difficulties found by Mr Weber in exploring the line arose from the gulches running from the Ruahine to the Manawatu River. These chasms were so great anywhere near the Manawatu River that the line is forced up to near the base of the Ruahine Ranges. On the line fixed upon there are five of these large gulches to cross, each from 115 to 130 feet deep, and from 4 to 5 chains wide at the top.

With the exception of these difficulties, the whole line is easy and good, and most of the road work would be available for railway, should such be hereafter determined upon.

[Note.—The remainder of this letter is printed in "Papers Relating to the Construction of Roads."]

I have, &c.,

J. D. ORMOND.

The Hon. the Minister for Public Works, Wellington.

### Enclosure in No. 58.

Mr. WEBER to Mr. BLACKETT.

SIR,—

Napier, 29th December, 1870.

In compliance with your instructions, No. 49, of the 11th ultimo, I have explored the three lines indicated for road and railway from Waipukurau (point A on your tracing) to the Manawatu Gorge, viz., No. 1, between the Ruahine and the Manawatu; No. 2, between the Manawatu and the Puketoi Range; No. 3, east of the northern portion of the Puketoi Range, crossing the range at a point convenient for joining the line proposed to come through the gorge of the Manawatu. The last line, after crossing the Tukituki near Waipukurau, would have to follow generally the present line of road between Hatuma and Ngatoro Lakes to the Ngahape Stream, and follow up the rather narrow valley of that stream to its source, offering very trifling difficulties so far; but thence it would have either to cross the broken timbered northern spurs of the Puketoi in a westerly direction to the Manawatu, or the line would have to turn south, crossing a series of short spurs to the southern portion of R. Collins's run, and thence over the main shoot of the Puketoi to the open country at Mangatora, whence a leading valley can be obtained to the Manawatu at Otawahao. The only two breaks in this range, viz., that of the Mangatoro and of the Mangapoaka, are so tortuous and so precipitous that the crossing of the range is unavoidable; and the face of the range, although it could be crossed at about 600 feet above the head of the Ngahape, is so broken on both sides, the limestone being laid bare in many places by gullies, that the cost for road or railroad would be without question too high.

Line No. 2, between the Manawatu and the Puketoi Range, would after crossing the Tuki Tuki at Waipukurau run over level country north of Lake Hatuma, through a break in the most northern spur of the Puketoi Range, over the Maraekake by a bridge of about 80 feet span; then for seven miles over the upper portion of the Ruataniwha without any obstacle excepting a bridge of 50 feet over the Porangahau, enter the Manawatu Bush at its north-eastern extremity, and follow up the left bank of the Manawatu to the open land at Mangatora; thence over rather steep undulating country to Kaitoki and by a leading valley to the Manawatu. This line offers no impediment until it strikes the Manawatu near the great southern bend of that river; but thence, the spurs from the range run so close to the river, that the line for a distance of twelve miles would be very expensive. The portion through the bush to the bend of the Manawatu is perfectly level, but the length of bush line exceeds No. 1 by about six miles, although there is a saving of about one mile in the whole distance to the Gorge. For a road the line is objectionable, as the flat bush on the first six miles is so wet that upon the greater part planking or corduroy would have to be used.

Line No. 1, between the Ruahine and the Manawatu, is the one which, after general exploration of all three, appeared to me without question the most suited, and I have therefore explored it more in detail, by cutting lines in different directions.

Upon examination of the whole country from a prominent spur of the Ruahine, and from the high bare ranges on the southern part of J. Johnston's run, it appeared to me clear that the Ruataniwha basin extends between the present road track and the Manawatu to the open country at Matahiwi, where the spurs from the Ruahine seem to meet those from the Puketoi. From those points I could trace out a line nearly level from Takapau to Matahiwi. The first seven miles from the north-east point of the bush to the little clearing below Tawhiti appeared perfectly level, but on examination I found that the flat bush was so wet as to be (although best suited for a railway) unfit for a road without corduroy or planking.

Under these circumstances I cut a line entering the bush about three miles east of the present road track, and striking the clearing Tawhiti nearly at the eastern extremity, and thence with an average bearing of  $192^{\circ}$  to Mangatiwai-nui, at  $195^{\circ}$  to Piri Piri, thence  $207^{\circ}$  to Tahoraiti. In doing so, the steep spurs from the Ruahine which are crossed by the present track have been avoided, and only few low very wet places have been met with.

The whole line as far as Tahoraiti is nearly level, and the only difficulties are the crossing of the watercourses, which have been worn out very deep and precipitous in the Ruahine gravel. The Manawatu, Mangatiwai-nui, the Mangatiwai-iti, the Whakaroa, and the Mangatera, are all from 115 to 150 feet deep, and require long side-cuttings for a road. For a railway they would require timber viaducts, as over the Canons on the Sierra Nevada. The greater part of the line to Tahoraiti could be utilized for railway. About 80 chains of corduroy work, 22 bridges 18 to 24 feet span, and 45 culverts, will be required on this portion of the line.

From Tahoraiti to Pukerangi at Matahiwi the line will run over level and undulating open country (about a quarter of a mile east of present track), with the exception of two belts of bush of two miles in the aggregate; four small bridges and 20 chains side-cuttings are required on this portion.

From Pukerangi a line is being now cut bearing about south-south-west, so as to strike the upper end of the Manawatu Gorge, which will be distant about ten miles. I was induced to do so as, upon examination of the country conjointly with Mr. Stewart, who is well acquainted with the country about the Gorge, we came to the conclusion that the only practicable line for road or railway to the West Coast can only be obtained by following the Manawatu Gorge.

The present track runs over the saddle at Te Ahua o Turanga, rising from Matahiwi about 800 feet, and from the Puhanga, on the West Coast, about 1,150 feet. This rise should not appear an insuperable difficulty, and would under ordinary circumstances be overcome; but the face of the hill on both sides is so broken, that to obtain the gradient of 1 in 13 a great many dips will be unavoidable, bringing up the aggregate rise to little under 2,000 feet, necessitating many bridges or viaducts over dry gullies, and several miles of side-cuttings.

On the other hand, a very easy gradient appears to be obtainable from Matahiwi to the entrance of the Gorge; no difficulties of any moment, as far as we could judge on viewing the line from a commanding position. The line would strike the Manawatu at the Mangahua, about 100 yards above the upper entrance of the Gorge. The Gorge is a fissure in the range averaging about 60 yards in width at the bottom (in some places only 36 yards), nearly six miles in length, with general bearing of about west, through which the Manawatu flows with great velocity over many rapids (one with 4 feet fall in 40 feet). The sides are Ruahine sandstone, from 200 to 600 feet high, with an average angle of about  $25^{\circ}$  from the perpendicular, but in many places like walls, and even overhanging. The sides are covered with scrub, fern, and scanty timber, very little soil being in crevasses and on shelves for larger growth. The rise of the river in heavy freshes seems to reach 24 feet in narrow parts. The west side (proper right bank of the river) being broken by five gullies, it would be necessary to make use of the east side for road or railway. This would necessitate a bridge of about 170 feet above the Gorge, and one below the Gorge; but as that below the Gorge, under all circumstances, would be required for the line from Wairarapa, and as in addition to this probably the Puhanga would have to be crossed, the difference between a bridge over the Puhanga and that over the Manawatu above the Gorge will only be required, which will be very trifling.

\* \* \* \* \*

The length of bush on Line 1 is about twenty-eight miles to the Gorge. The soil along the bush line varies very much, from rich loam to poor shingle, the greater part being of very fair quality and well suited for agriculture. The timber consists principally of rimu, totara, matai, white pine, black and white birch. Rimu is generally prevalent; while totara is principally in patches, but abundant. The trees are well grown, and underwood is generally light. The bush is well watered, running streams being rarely more than a mile apart. The larger streams carry heavy timber when flooded, and seem to be blocked up frequently by masses of large trees.

The road can cross the shingle-beds, but a centre-span of about 100 feet will be required for a railway. This will make the viaducts across the wide gullies perfectly safe. All small watercourses have, as a rule, soft bottoms, and require bridges.

In conclusion, I may add that very rarely a dividing range will be crossed with less difficulties than that between the East and West Coasts by the line proposed

John Blackett, Esq., Acting Engineer-in-Chief,  
Wellington.

I have, &c.,  
CHARLES WEBER.

## No. 59.

His Honor J. D. ORMOND to the Hon. W. GISBORNE.

(Telegram.)

Napier, 11th January, 1871.

ON reference to Railway Act, clause 13, I see material and plant may be procured in anticipation of assent of Assembly, and would urge that plant for railway to Paki from Napier, about twenty miles, should be sent for now, so that no delay may occur in the work when approved. There is no question Hawke's Bay Provincial Council will agree to set aside land for that purpose.

Hon. W. Gisborne, Wellington.

ORMOND.

## No. 60.

The Hon. W. GISBORNE to His Honor J. D. ORMOND.

SIR,—

Colonial Secretary's Office, Wellington, 14th April, 1871.

In reference to your telegram of the 11th of January last, in which you urge that the necessary plant for the railway from Napier to the Paki Paki, a distance of twenty miles, should be ordered from England, in anticipation of the reservation by the Provincial Council of Hawke's Bay of land for the purpose, I have to inform your Honor that the Government will be prepared to make all necessary arrangements for the importation of the plant, so that delay may not occur when the line is ready for such plant.

His Honor the Superintendent, Napier.

I have, &c.,  
W. GISBORNE.

## No. 61.

His Honor J. D. ORMOND to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Napier, 1st June, 1871.

On the 4th May I had the honor to send you the draft of a Bill I purposed submitting to the Provincial Council of this Province on the subject of setting aside lands for railways, and requesting the favour of a reply as to whether the proposed Act provided sufficiently for the object desired.

On the 13th May you were good enough to send me the opinion of the Attorney-General, who thought the Bill premature, and recommended the passing of resolutions agreeing to set aside lands.

I now enclose copy of a resolution passed unanimously by the Provincial Council, by which that body undertakes to appropriate by Act, in terms of the 17th and 20th clauses of "The Immigration and Public Works Act, 1870," such waste lands of the Crown in this Province as may be required to secure the construction of the proposed railways. As the purchase of the Seventy-Mile Bush is now virtually completed, this undertaking includes those lands. I shall be glad to hear from you by telegraph, on receipt of this letter, whether you consider the resolution sufficient for the purpose it is intended for, in order that, if it requires amendment, it may be done before the Session of the Provincial Council terminates.

The Hon. the Colonial Secretary, Wellington.

I have, &c.,  
J. D. ORMOND,  
Superintendent.

## Enclosure in No. 61.

RESOLUTION of Provincial Council of Hawke's Bay.

MR. ORMOND moved—"Whereas by the 12th clause of "The Railways Act, 1870," the Governor is authorized to cause such inquiries, reports, and surveys to be made, and such acts and proceedings to be taken, as may be necessary to enable him to submit to the General Assembly during its next Session proposals for the construction of a railway from Napier to Wellington and from Wellington to Wanganui and New Plymouth: And whereas by the 17th and 20th clauses of "The Immigration and Public Works Act, 1870," it is provided that the waste lands of the Crown in any Province may be set aside, sold, or given in lieu of payment for the construction of railways: And whereas this Council desires to express its willingness to make provision for the construction of the railway from Napier to Wellington and the West Coast,—It is resolved, that this Council undertakes to set aside and appropriate by Act, in terms of the 17th and 20th clauses of "The Immigration and Public Works Act, 1870," such parts of the waste lands of the Crown situate within the Province of Hawke's Bay as may be required for the construction of the railways above referred to; and further undertakes, that, on the completion of the purchase of the lands known as the Seventy-Mile Bush, such portion of those lands as may be required shall be included in such appropriation for the purpose aforesaid."

Mr. Tanner seconded the resolution. Carried unanimously.

JNO. BUCHANAN,  
Speaker.

## PAPERS RELATING TO THE

## No. 62.

His Honor J. D. ORMOND to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Napier, 6th June, 1871.

I have the honor to transmit copy of resolution unanimously agreed to by the Provincial Council, undertaking to set aside such lands as may be required in terms of the 17th and 20th clauses of "The Immigration and Public Works Act, 1870," for the construction of the railways that may be agreed to by the General Assembly within the boundaries of this Province.

Now that the purchase of the Seventy-Mile Bush is virtually completed, a very large and valuable estate will be available; and, by the resolution of the Council, whatever portion of these lands may be required is agreed to be set aside and granted.

I trust the early assent of the General Assembly will be given for the construction of the railway from Wellington to Napier and from the Seventy-Mile Bush to the West Coast, so that the colonization and settlement of the extensive district it will open may be proceeded with.

I have, &amp;c.,

J. D. ORMOND,

Superintendent.

The Hon. the Colonial Secretary, Wellington.

## Enclosure in No. 62.

RESOLUTION of Provincial Council, Hawke's Bay.

Mr. ORMOND moved—"Whereas by the 12th clause of "The Railway Act, 1870," the Governor is authorized to cause such inquiries, reports, and surveys to be made, and such acts and proceedings to be taken, as may be necessary to enable him to submit to the General Assembly, during its next Session, proposals for the construction of a railway from Napier to Wellington and from Wellington to Wanganui and New Plymouth: And whereas by the 17th and 20th clauses of "The Immigration and Public Works Act, 1870," it is provided that the waste lands of the Crown in any Province may be set aside, sold, or given in lieu of payment for the construction of railways: And whereas this Council desires to express its willingness to make provision for the construction of the railway from Napier to Wellington and the West Coast,—It is resolved, that this Council undertakes to set aside and appropriate by Act, in terms of the 17th and 20th clauses of "The Immigration and Public Works Act, 1870," such parts of the waste lands of the Crown situate within the Province of Hawke's Bay as may be required for the construction of the railways above referred to; and further undertakes, that, on the completion of the purchase of the lands known as the Seventy-Mile Bush, such portion of those lands as may be required shall be included in such appropriation for the purposes aforesaid."

The resolution was agreed to unanimously.

GEO. T. FANNIN,

Clerk of Council.

## No. 63.

The Hon. W. GISBORNE to His Honor J. D. ORMOND.

SIR,—

Colonial Secretary's Office, Wellington, 26th June, 1871.

I have the honor to acknowledge with satisfaction the receipt of your Honor's letter of 6th instant, enclosing a resolution unanimously agreed to by the Provincial Council of Hawke's Bay, undertaking to set aside such lands as may be required in terms of the 17th and 20th clauses of the Immigration and Public Works Act of last Session, for the construction of such railways as may be agreed to by the General Assembly within the boundaries of that Province.

I have, &amp;c.,

W. GISBORNE.

His Honor J. D. Ormond, Napier.

## WELLINGTON.

No. 64.

The Hon. W. GISBORNE to His Honor I. E. FEATHERSTON.

SIR,—

Colonial Secretary's Office, Wellington, 24th January, 1871.

The 12th section of "The Railways Act, 1870," authorizes the Governor to cause surveys to be made and other proceedings to be taken for enabling him to submit to the General Assembly during next Session proposals for the construction of the railways specified in the Third Schedule to that Act, and that Schedule includes lines from Wellington to Seventy-Mile Bush, thence to Napier, and from New Plymouth to Wanganui, and thence to the Wellington and Napier line.

Your Honor is no doubt aware that at present the lines referred to are partly in progress of survey, with a view to the authority of the Assembly being requested next Session for their construction.

The 19th section of the Immigration and Public Works Act provides that the expenditure under that Act on the survey and construction of railways shall (excepting moneys paid out of the Middle Island Railway Fund Account) be charged provincially, and that the Province concerned shall be charged with the interest and sinking fund of moneys raised out of the loan, and the proportion of cost of raising the same for such purpose.

The 17th section of the same Act authorizes the Provincial Legislature to recommend land to be set apart for the construction of a railway or any part thereof; and the 20th section authorizes that body to agree with the Governor, subject to the approval of the General Assembly, that Crown lands, to be specified, shall be accepted in lieu of the Provincial charge on account of such railways.

I have accordingly to request your Honor to be good enough to bring this subject under the consideration of the Provincial Council, in order that steps may be taken for the reservation of Crown lands, either for the purpose of being employed in direct payment for the construction of such railways, or, as would appear to be a preferable course, for providing the General Assembly with an adequate security that the construction, when authorized, of the railway will not entail a charge on the Colony, but will be defrayed, as required by the Act, out of Provincial resources.

It is hardly necessary for me to point out to your Honor that it will mainly depend upon the General Assembly being satisfied on this point whether or not the requisite authority for the construction of the railway will be given.

His Honor the Superintendent, Wellington.

I have, &c.,  
W. GISBORNE.

No. 65.

The Hon. W. FITZHERBERT to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Wellington, 11th July, 1871.

I have the honor to forward you herewith copy of a Memorandum of Railway Works recommended by the Provincial Council of Wellington be undertaken by the General Government; and I beg to state that it expresses the wishes of the Provincial Council, and has my entire approval.

I have, &c.,  
W. FITZHERBERT,  
Superintendent.

The Hon. the Colonial Secretary, Wellington.

## Enclosure in No. 65.

MEMORANDUM of Railway Works recommended by the Provincial Council of Wellington to be undertaken by the General Government.

A MAIN line of railway from Wellington to Patea, passing through Wairarapa, Manawatu Gorge, and Wanganui, having been surveyed by the General Government, this Council recommends to the General Assembly the adoption of the said line, and is of opinion that the following portions of the line should be immediately proceeded with:—

1. Wellington to Masterton.
2. Wanganui to Waitotara.
3. Wanganui to the Village of Marton, or to such point nearest to Marton as the line may run.

This Council is also of opinion that it will greatly facilitate and encourage the more speedy settlement of large areas of valuable bush country, and be of high value to the operations of defence, if the intermediate portions of the aforesaid main line are opened up as soon possible by means of a light tramroad, preparatory to the formation of the permanent way, which would by this means be formed when required with far greater ease, economy, and despatch, through labourers being already settled along the line of way, through the saving in cost of transit of materials and supplies, and through the expenditure on the tramroad being really only a prior instalment of the necessary labour on the permanent way.

## PAPERS RELATING TO THE

## No. 66.

The Hon. W. GISBORNE to His Honor W. FITZHERBERT.

SIR,—

Colonel Secretary's Office, Wellington, 17th July, 1861.

I have the honor to acknowledge the receipt of your letter of the 11th instant, in which you forwarded a memorandum of the Railway Works recommended by the Provincial Council of Wellington to be undertaken by the General Government, and which you state have your entire approval.

The plans of the survey of the line of railway to Patea, through the Wairarapa and the Manawatu Gorge, are now in course of preparation, and will be submitted to the Assembly at the approaching Session.

His Honor the Superintendent, Wellington.

I have, &amp;c.,

W. GISBORNE.

## No. 67.

Mr. BLACKETT to Mr. STEWART.

SIR,—

Auckland, 3rd January, 1871.

I have to acknowledge receipt of your letter of 7th December, 1870, informing me that you consider it will be necessary to have an Assistant Engineer to act under your direction in surveying the line of proposed railway in your district, and requesting permission to secure such assistance.

In reply, I beg to state that it is of importance the proposed survey should be proceeded with without delay, in order that the necessary plans and estimates may be ready for the next Assembly, and you are authorized to engage temporarily such assistance as you may deem necessary for the purpose of pushing forward the work. Should you not be able to find any really capable engineering surveyor in your district, you will please to communicate with me at an early opportunity to that effect, in order that some one may be selected to act under your orders. I will endeavour to procure in Auckland a prismatic compass, as you desire, for the proposed survey.

J. T. Stewart, Esq., District Engineer, Manawatu.

I have, &amp;c.,

JOHN BLACKETT.

*Note.*—Mr. Stewart has charge of the railway survey from Manawatu Gorge through Manawatu towards Wanganui, and Mr. Carrington of the survey from Wanganui northwards towards New Plymouth. See previous section of these papers, under the head "Taranaki."

## No. 68.

Mr. BLACKETT to Mr. STEWART.

SIR,—

Public Works Office, Wellington, 8th February, 1871.

I have the honor to inform you that Mr. M. Fitzgerald, surveyor, has been engaged to assist you in the survey of the railway line Manawatu to Wanganui. He has instructions to place himself under your orders. He has expressed a wish to do the work by contract at so much per mile, and I have no objection to an arrangement of this kind; indeed I should prefer it, under fair and reasonable terms, if equally convenient to you.

I have, &amp;c.,

JOHN BLACKETT,

J. T. Stewart, Esq., District Engineer, Manawatu.

Acting Engineer-in-Chief.

*Note.*—In addition to Mr. Fitzgerald, Mr. James Mitchell has also been appointed under Mr. Stewart on this line of railway survey.

## No. 69.

Mr. ROCHFORD to Mr. BLACKETT.

SIR,—

Featherston, 25th October, 1870.

In accordance with your instructions, I proceeded to explore for a suitable pass for a railway into the Wairarapa Valley. I first examined the present road through the Rimutaka, and found that starting from the level of the Mangaroa Hill (a much lower point can be got, or the hill avoided altogether by going down the river, but this would lengthen the line unnecessarily) the summit can be attained with the gradients you limited me to; about ten miles distance could be made by going up the Pakuratahi three or four miles, and crossing more than sufficient for the height (about 877 feet).

A short tunnel of 200 yards or thereabouts would cut off a little, perhaps 100 feet in height, and reduce the difficulty on the other side, where a much greater fall has to be overcome (1,663 feet) to Featherston. This height would require a distance of about twelve miles and a half at a gradient of 1 in 40, and would fall in with the valley level some three or four miles up the Tauherenikau, and most probably come in contact with a very awkward slip, which I will describe presently; it would also leave out Featherston.

Captain Smith's line by the Tauherenikau is lower than the road by some 230 to 280 feet; like the former line from the Pakuratahi side, no difficulty exists to the summit.

On however descending the east side of the Tauherenikau River (the main branch breaks in on the west), the hills are very steep, rough, and broken by deep gullies; and about three miles from where the hills end, a high long slip occurs, about 200 feet in height, and nearly perpendicular, apparently very loose and said to have been made by the great earthquake. A low terrace has formed along its foot, and it appears to be a quarter of a mile long. The whole distance, as the line would go, is from twelve to sixteen miles. The bottom of the valley is a long tortuous gorge, enclosed by high slate cliffs. The slip, with some of the worst features, might or might not be avoided,—this could only be determined by a trial line. In any case, the line over the hills must pass over much country which would return no traffic to the railway.

I omitted to state that from where Captain Smith's line crosses the Rimutaka Range it steadily rises both ways, southwards to the road, and northwards where I followed it until the range joins the snowy mountains of the Tararua, attaining an altitude of 3,200 feet. No saddle occurs throughout the whole length, but several rivers take their rise in it, branches of the Akaterewa and Tauherenikau. I could see the houses in Wellington distinctly. I was led to explore this range because Dr. Hector thought a pass might co-exist with a change of formation, but I regret to say it is not so.

Not satisfied with these routes, and receiving a telegram from the Colonial Secretary, relative to a Maori pass by way of Pakuratahi, I next started from the Rimutaka southwards to explore the leading range, and crossed two saddles, each of which is considerably lower than the road; the first, I believe, goes by the name of Lucena's, and which I thought would do, but I was doubtful whether there would be sufficient distance to Featherston to run out the gradient. From a high point I had seen the third low place and followed out the range to it. I was much surprised by the length of the descent, so much so that I thought I must be going down into the valley; the character of the timber and soil also belonged to a lower level, fern trees growing abundantly. On trying the aneroid I found the saddle to be some 400 feet below the coach road, and so narrow on the top that a cutting of 30 feet would bear expense against length, making the available saddle 430 feet below the road, and leaving plenty of distance to get down to the level of Featherston, where the first station would probably be. The fall to the latter place would be 1,232 feet approximately, and the distance, with a gradient of 1 in 40, nine and one-third miles; the hills also appear not so rough.

The fall to overcome to reach Pakuratahi is about 570 feet, and I think, from the look of the country, will not be difficult. After that the river can either be followed out, or a lower part of the Mangaroa Hill crossed; but I have not examined this part of the country sufficiently as yet to venture an opinion. I can only further say that this line appeared so promising that I have commenced to cut it out to Featherston and Pakuratahi, beginning at the saddle, and going first Featherston-wise, as I consider that the side of greatest difficulty. I hope to get done in from two to three weeks, but will write you every week how I progress.

Since writing the above I have cut three and a half miles down, and have met with very little rock. By Saturday next, if the weather holds fine, I expect to complete the Featherston side. As yet, I have been much delayed by stormy weather.

J. Blakett, Esq., Wellington.

I have, &c.,

JOHN ROCHFORD.

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## No. 70.

Mr. ROCHFORD to the Hon. W. GISBORNE.

SIR,—

Wellington, 1st December, 1870.

I have the honor to report that I have completed the trial line from Featherston to the Hutt Valley, choosing an exit from the bush at Mr. Cruickshank's tunnel, as suggested by Dr. Hector, for reasons which I will refer to presently. Commencing at Featherston the line runs nearly level, working gradually on to the terrace at the rear of Mr. Lucena's house; this part is open, and without any difficulty worth referring to, and is about two and a half miles.

From thence the line will make a slight bend into Mr. Lucena's valley, to preserve the level, and continue on to the low downs, on the south side. Crossing them about one mile from Mr. Lucena's, the gradient changes to about 1 in 43 (the clinometer was set at 1 in 40, but a liberal allowance was made on each observation, which might perhaps decrease the grade to 1 in 45), and winds round the next valley, which has two branches, and then creeps around the several branches of Cross's Valley, until it reaches the saddle with the same constant gradient, excepting the upper parts of the valleys, which are made level to facilitate bridging.

The saddle is distant about eleven miles from Lucena's Valley. There are many gullies which will require bridging at the points of crossing, and also spurs, which will have to be cut back or through to form the curves with a minimum radius of 5 chains. On the other hand there is very little rock, and many miles of side-cuttings on hills, with easy slopes and natural ballast. Another favourable feature is the large supply of black birch timber all along the line, available for sleepers, bridges, &c.

I estimate the height of the saddle to be 1,230 feet above Abbott's at Featherston, without the cutting; but aneroid observations cannot be relied on to within a few feet. I also ascertained the Pass to be 401 feet below the coach road, or, with the cutting, 431 feet. The saddle is narrow, and slate rock is found a foot below the surface at the spot where the tents stood on your visit.

Descending the Pakuratahi with the same gradient, the features are somewhat similar to those on the west slope for about a mile down. Here the line crosses another saddle, being part of a spur which divides two branches of the river, obviating the necessity of circumventing a long rough-looking range. This was fortunately crossed without altering the gradient, allowing a small cutting of 7 feet. After this the hills have easier slopes, and about half-way down the line winds round a flat valley, having three branches, one of which lies exactly behind the roadmen's houses on the Rimutaka Road,

which at this point cannot be more than a mile distant. Thence the line approaches the Pakuratahi River, follows down to its level without any difficulty of importance, and crosses at a favourable point for a bridge, which will be about 2 chains long. The distance from the saddle is approximately seven miles, and the fall 483 feet. I may here mention that the whole valley is full of wild cattle, and the soil generally is good. In Nelson the settlers are clearing far worse land under the Leasing Act.

From the bridge site the line drops about 32 feet, to the top level of the Mangaroa Hill; but as this height was taken in the river bed, the bridge level will make the two points about equal. The Mangaroa Hill is crossed about a third of a mile to the east of the road, with a cutting of 32 feet. The ground is far better on this side of the river, with gentle slopes and fewer gullies, and chiefly gravel. The line crosses the coach road twice, the first time about a mile from the Golden Fleece Hotel, which may serve as a station for the district. There is a very fine bush flat between the line and the hotel, which will doubtless be rendered productive by its owners when the line is made. The highest point of the Mangaroa Hill is about four miles from the river crossing, and is nearly all level.

From the Mangaroa Hill the line descends 1 in 55, crossing a valley at a white pine flat. This is the only swampy piece of ground on the line, but it has a hard bottom 2 feet down, and is only 5 chains long, and will drain easily into the creek close by. Once across this swamp, the falling gradient follows the hill side of the main valley; and about two miles from the Mangaroa Hill changes to level, to strike the Kaitoki Hill a mile and a half further on. This hill, which starts from the main range, has a low dip, through which I cross; and then rising, continues its course quite to the gorge of the Mangaroa, ending in the bluff high cliffs and terraces on the north side of the gorge of that river. This obstacle required me to cut the line three times, before I could cross in a place which satisfied me that I was making the line as short as possible. No difficulty occurs from the nature of the ground. Indeed, once across the Pakuratahi River, the gullies become fewer and the hill slopes more gentle, and in many places one might describe them as flats.

From the Kaitoki Hill, lowered by a cutting of 30 feet, it was found necessary to change the gradient again to 1 in 43 for a mile and a quarter; all good easy hills, until the level land of the Mangaroa Valley was reached; thence keeping along the foot of the hills a quarter of a mile level. A straight line two miles long, bearing S. 57° W. magnetic, leads direct to Mr. Cruickshank's tunnel. A large stream with steep banks 30 feet deep is crossed in a good place for a bridge about the centre of the straight line.

Throughout the whole length of this flat, the level scarcely varies, and it is remarkably uniform and unbroken by terraces. The ground is hard gravel all through. The bush looks thin, as all the timber is small except the rimu trees, which are unusually fine, and spotted over the ground at intervals of about a chain apart.

Immediately before reaching the tunnel, the Mangaroa is crossed with a small bridge of about a chain in length; thence a short cutting, 50 feet in the deepest part, leads into the Hutt Valley, from whence the level flat is reached by a gradient of 1 in 50 nearly opposite the Criterion Hotel. You will remember that, when discussing the best crossing-place of the Range between the Mangaroa and Hutt Rivers, Mr. Cruickshank mentioned a lower part of the hill, near the Horse Shoe Bend. This, however, on closer examination, proved to be a mistake, being only the saddle of a spur leading from the main hill, which is itself higher than at the mill; but if it were otherwise, it would be impossible to get at it, on account of the terrace and cliffy character of the lower part of the Mangaroa Valley.

In obedience to Mr. Blackett's recent instructions, I yesterday examined the pass directly at the back of the Criterion Hotel, with a view of finding a lower part of the hill than at Mr. Cruickshank's. Already a tramway exists over it, but it would require almost exactly the same depth of cutting and much longer, and would in addition, being lower down, leave a greater fall to the level land of the Hutt by 50 feet. Other objections are a long spur striking out easterly between the two dips of the range, at the junction of the bush and swamp; which, besides increasing the distance, would bring the line among hills of a softer nature, owing to their proximity to the swamp.

Following down the Hutt, the best place for crossing the river appears to be about the Silver Stream—I think just above, from a marked point of the river bank. There appears to be no difficulty beyond, except supplying a station to the Taita; this might be met by a short road and bridge across the Hutt.

The length of the line from the Criterion Hotel to Featherston will be from eight to eleven miles more than the coach road; but it is probable that in coming down the Hutt, the line will gain a mile or two on the road.

I enclose a table of approximate aneroid heights, also a section of the line drawn to a natural scale.

I have, &c.,  
JOHN ROCHFORD.

I have left Mr. Lewis in charge, to superintend the clearing out the line, to facilitate the survey, marking the parts only which are open, or likely to be burnt, with the grubbing axe. He has three men.

*Altitudes reduced to Dr. Hector's level of Mangaroa Bridge.*

Feet.	
54	Abbott's, Featherston.
1687	Rimutaka.
1256	Rochford's Pass (with cutting of 30 feet).
1286	Ditto (without cutting).
686	Golden Fleece Hotel.
773	Line crossing River Pakuratahi (33 feet bridge).



Feet.	
835	Rochfort's line over Mangaroa Hill (without cutting).
805	Ditto ditto (with cutting).
906	Knob near Mangaroa Hill.
265	Mangaroa Bridge.
603	Kaitoki Range (without cutting).
571	Ditto (with cutting).
416	Level of Mangaroa Flat.
405	Level of Mr. Cruickshank's tunnel.
202	Level of tunnel.

The Hon. the Minister of Public Works.

No. 71.

Mr. ROCHFORD to the Hon. W. GISBORNE.

Wellington, 17th January, 1871.

SIR,—

I have the honor to inform you that, agreeably with your instructions, I called on Mr. Hugh Sinclair, for the purpose of examining a route to the Wairarapa discovered by his sons. Mr. John Sinclair at once offered to guide me through, and I have to thank them both for the way in which they furthered my object.

Commencing my description from the Hutt, this route crosses the dividing range at an elevation of 567 feet, and falls 314 feet to Mr. Sinclair's house in the Wai-nui-omata. It then follows up the river about six miles and a half, rising 491 feet more. Here it ascends the range dividing the last-named river from the Orongorongo, an additional 751 feet. This is the lowest part of the range, and is 1,495 feet above the sea, or 1,242 feet above Mr. Sinclair's house, and is the highest point of the route. To gain this elevation with a gradient of 1 in 40 would require nine miles and a half of distance, whereas there are only six miles and a half: a line would therefore have to begin to ascend three miles below Mr. Sinclair's house.

I omitted to say that we ascended a hill about 2,200 feet high, from whence we could see all over the line, and ascertained that there was no lower place.

Mr. Sinclair's route now follows down a branch of the Orongorongo in a southerly direction for about three miles, to its confluence with another stream which leads to the saddle dividing this river from the Wairongomai (N. 30° E., and two miles distant). This pass is 365 feet below the other, or 1,130 feet above the sea, and might be easily reached from the Wai-nui-omata Range by heading the first branch, and following the hills round gradually to the lower elevation.

At this point an unexpected difficulty occurs: the saddle of the Orongorongo, which rises very gently on its own side, terminates abruptly on the east side of the range; and instead of meeting the source of the Wairongomai River it overlaps it, making a sudden drop of 900 feet, which there is no possible way of avoiding, as the side ranges are nearly perpendicular slips.

Mr. Sinclair said he had never seen this part of the range before, or he would not have put the Government to the expense of this exploration, and expressed himself quite satisfied that this route was impracticable.

The sides of the Wairogomai are very rough, and full of slips; and the distance down to the Lake from the saddle is about seven miles, and bears about N. 43° E. About two miles from the saddle, a branch comes in on the north side, up which the range is visible which separates the Pakuratahi; its bearing is about North.

We returned round by the coast from the Wairarapa; and I have no hesitation in saying that in addition to the distance by the coast road being nearly double that of the Hutt line, a railway could not be made at any reasonable cost, because of the many slips which it would be impossible to avoid, and the small streams which push forward immense shingle fans into the surf.

These two questions may now fairly be considered as being set at rest; and I feel assured that the line I have chosen over the Rimutaka is the best that will be found.

I have, &c.,  
JOHN ROCHFORD.

I append a few altitudes of Mr. Sinclair's line:—

*Altitudes taken by Aneroid along Mr. Sinclair's route.*

	Height above sea.
	Feet.
A. Summit level between Hutt and Wai-nui-omata	567
B. Mr. Sinclair's house	253
Six miles and a half up Wai-nui-omata	744
C. Summit level between Wai-nui-omata and the Orongorongo	1,495
D. Confluence of the two branches of Orongorongo	976
E. Watershed between Orongorongo and Wairongomai	1,130
Junction of first stream flowing into Wairongomai	250
Junction of second stream flowing into Wairongomai	205

To the Hon. the Minister of Public Works.

## No. 72.

Mr. ALLEN to the Hon. W. GISBORNE.

SIR,—

Waiwetu, Hutt, 15th February, 1871.

In reference to the line of road that I pointed out to you leading to the Waiwetu side of the Hutt Valley, the portion of the road midway from the beach to the Hutt Bridge is called White's Line, and is 1 chain wide, being the base line from whence the survey started. The length from Hutt Road to the junction of the Waiwetu main line, leading to the Taita, is about the same distance as from commencement of the road to the Hutt Bridge; the land is public property. The road thence to the Taita is about two and a half to three miles long, something less than a mile and a half by the present road. The above road is 1 chain wide, with a narrow metal road in the centre; clear of floods, and I believe only one small bridge or culvert in the whole distance, and the road is public property. I am not aware, and from inquiries that I have made no compensation could be claimed by the above line from the town up to the Gorge; the other portions of the line I know nothing about.

I have, &amp;c.,

The Hon. W. Gisborne, Colonial Secretary.

GEO. ALLEN.

## No. 73.

Mr. ROCHFORD to Mr. BLACKETT.

SIR,—

Hawkestone Street, Wellington, 10th April, 1871.

I have the honor to report to you, in reference to a letter addressed to the Hon. the Minister of Public Works by Mr. G. Allen, on the 15th February ultimo, relative to a deviation in the line of railway as surveyed by me at the Lower Hutt, as follows:—

The junction of White's line with the Hutt Road, about one mile on the Wellington side of the Hutt Bridge, would be about the point of deviation he proposes. From this place to the end of where the Waiwetu direct line is formed (where it touches section 47) there would be an extra distance of three-quarters of a mile.

From section 47 to the Gorge there would also be an increase of distance of another quarter of a mile against Mr. Allen's line. Much of this latter portion would have to be bought to straighten the line, &c.

Mr. Allen's proposition may be thus summarized: his line would be at least a mile longer; the Hutt River must be crossed on White's line; the railway line would also have to take the Gorge about the same place as the coach road, which has been already condemned.

I have, &amp;c.,

John Blackett, Esq.,

JOHN ROCHFORD.

Acting Engineer of Public Works, Wellington.

## No. 74.

Mr. ROCHFORD to Mr. BLACKETT.

SIR,—

Wellington, 10th April, 1871.

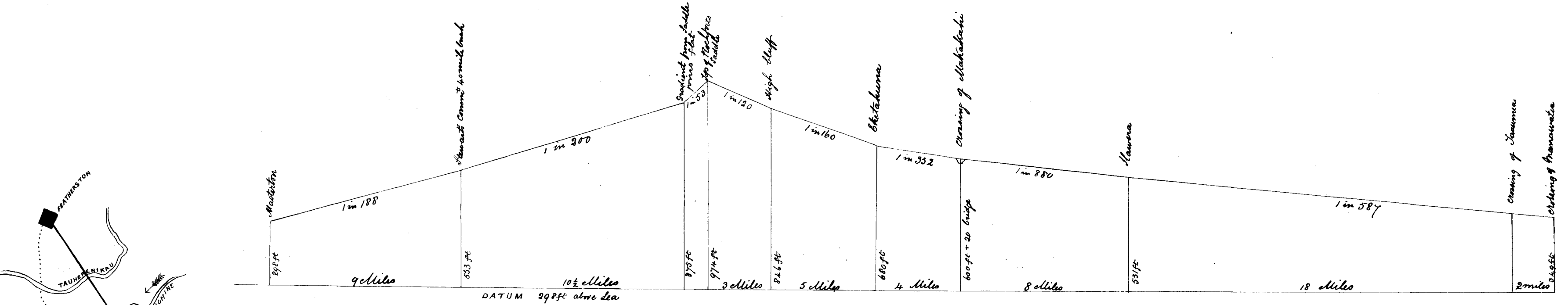
I have the honor to inform you that, agreeably with your instructions of the 16th February, I have explored the country between Masterton and Manawatu Gorge, and consider that the best line for a railway would be by the Kopuerangi and Makakahi Rivers, as shown on the accompanying sketch. Starting from Masterton, the route I have selected traverses open country for nine miles, crossing the Ruamahanga River near Mr. Dorset junior's house, on to the flank of the Terahunga Hill, where there is rock foundation on one side and favourable ground on the other.

Entering the Forty-Mile Bush at Stewart's, three miles brings us to Weston's clearing (the only sign of a European for fifty-five long miles of bush); so far the country is perfectly flat. The next five miles, as far as Mangapakihi, would be occasionally sideling and flat. The Mangapakihi is a small river coming in on the west side, where there was formerly an old Native cultivation.

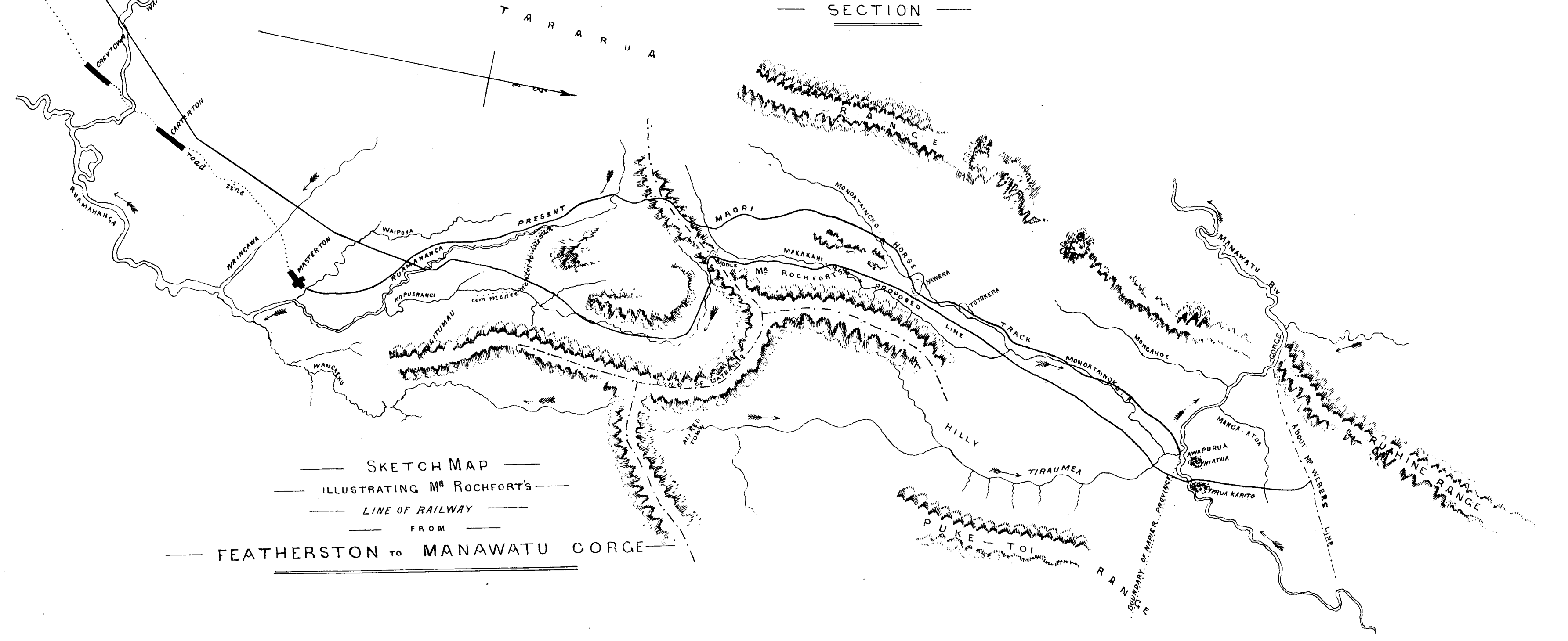
About three miles further on there is a rather broken limestone hill, abutting on the Kopuerangi, which can be avoided by keeping the line on the other side. This river is so narrow that it can be bridged easily almost anywhere; it is very sluggish, generally very deep, with a muddy bottom, and deep equal banks; from this character any bad place may be avoided by bridging. There are five miles of flat country between the limestone hill and the watershed of the Wairarapa and Manawatu. The saddle is on a branch creek, which comes in on the east side, and is of nearly equal size with the Kopuerangi. The rise to the end of the flat, immediately before ascending the saddle, is about 577 feet above and twenty-four miles from Masterton, showing a rise of 24 feet per mile, or 1 in 200. From here to the top of the saddle, which is about half a mile further, it is only 99 feet above the flat, but the line would want a gradient of 1 in 53 run back from the saddle for one mile to reach the flat. The saddle is very flat, and perhaps a mile wide, and enclosed by side hills of considerable height.

From the saddle to the River Makakahi, a tributary of the Manawatu, is a fall of 117 feet. This is a considerable river; even here, indeed, I believe, in old times, canoes have been brought within a short distance.

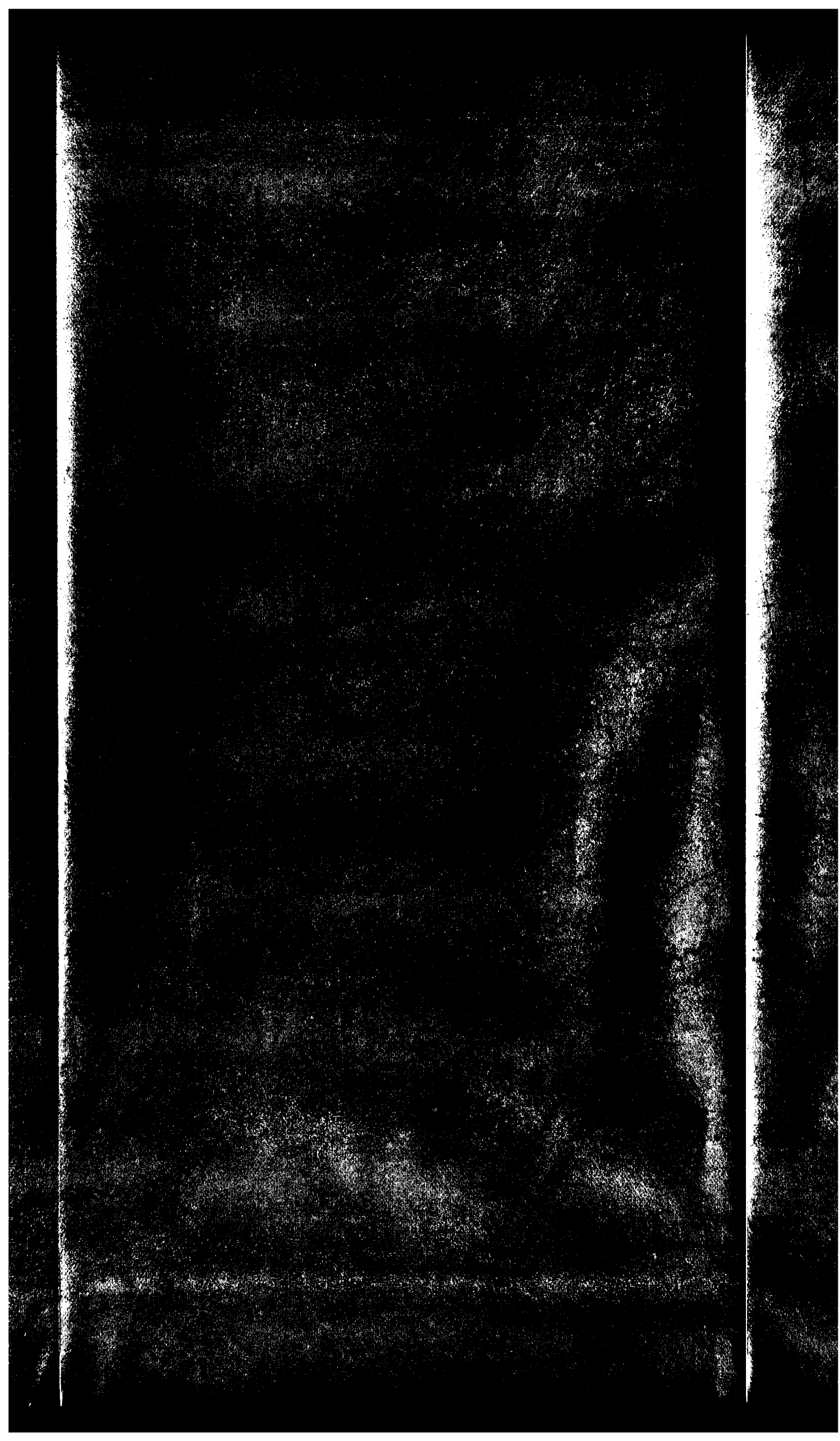
Some three miles from the saddle a bluff occurs abutting on the river, and about 100 feet high. The top of this bluff is 128 feet below the saddle. Although there are flats all along the river, I consider the best way to take the line would be to grade down very gradually from the saddle without approaching the river until this bluff is passed. The down gradient to this point from the saddle would be 1 in 120.



SECTION



SKETCH MAP  
 ILLUSTRATING MR. ROCHFORD'S  
 LINE OF RAILWAY  
 FROM  
 FEATHERSTON TO MANAWATU GORGE



From the Bluff to Eketahuna (five miles) there is a fall of 166 feet, which would work out with a grade of 1 in 160. Nearly all this portion is flat terrace.

Eketahuna (an old Native cultivation, now a thick koromiko scrub) is the end of the European purchased land. The Natives claim all the rest to the Napier Province, and caused me both delay and trouble before they would agree to this exploration.

Four miles lower down than Eketahuna my line would cross the river. I have travelled both sides, and found the east side exceedingly rough and hilly, and broken by many long deep gullies. At the crossing of the river the level is some 80 feet below Eketahuna. From this height 20 feet should be subtracted for a bridge which will give an average gradient of 1 in 352.

From this crossing to Hawera, near which the line would pass, the distance is about eight miles. At Hawera, the line would be 49 feet below the presumed height of the Makakahi Bridge, which would be falling at the rate of 6 feet per mile or nearly level. This portion is all flat terrace, but is broken by four deep gullies; three of these can be crossed on the level some 20 chains up, but the fourth must be bridged, because it runs up a great distance. This bridge would be easily made, as the distance across is short, and the banks equal in height. (Hawera is an open flat of some 600 acres, and was recently the location of a considerable Native settlement, with a European missionary, Mr. Colenso. Now, there is not a single inhabitant. Some five miles further down, on the Mongatainoko River, there is another open flat of perhaps 700 acres, called Tutakera, at which place there are about half a dozen whares with eight or ten inhabitants; these are all the residents of the Forty-Mile Bush. During the late rains, we were compelled to live on potatoes obtained from these people).

From the last point at Hawera to the Makakahi River, which has to be crossed again about six miles further down, the country is all flat bush. Soon after crossing there occurs a short swamp, but a hill skirts it, which will be convenient for siding round. Another twelve miles of flat bush brings us to the Tiraumea River, where I have chosen a crossing about a quarter of a mile above its confluence with the Mongatainoko River. From here to where I propose crossing the Manawatu (two miles more) is also flat bush. On the other side of the Manawatu another four or five miles of flat bush country intervenes before Mr. Weber's line is reached, in which distance one small river (the Manga-atua) has to be crossed. This flat would probably be the site of a large town, from its size, and from its being the junction of the three proposed lines of railway.

I found on reaching the Manawatu that it was not possible to make Mr. Stewart's bridge at the Gorge available for this line. To do so, it would be necessary to follow down the river some ten miles over very rough country, besides having another large river, the Mangahoe, to cross. I therefore searched the Manawatu northwards, and found a good place for a bridge about one mile and a half farther up than Awapurua, at a hill called Terua Karito, between which and an isolated hill called Hiatua this line would pass after crossing the river to join Weber's, with a bearing of magnetic North through the flat. Near Awapurua there is abundance of fine totara, but along the rest of the line there is only an occasional totara tree, mixed with rimu pine, hinau, and black and yellow maire—there is very little birch.

The soil of the twenty miles from Hawera to Manawatu is excellent, so also are the seven or eight miles at the end of the Forty-Mile Bush nearest Masterton; the remainder is of moderately good quality, its growth chiefly taua.

In conclusion, I may say that my party were the first Europeans who have travelled this route; also, that Wi Waka, the Native particularly recommended as having an intimate knowledge of the country, completely lost himself at the head of the Kopuerangi, and supposed we must have passed the saddle for which he was looking. After spending half a day going back to search for it, I set a course by compass in following which we found the new saddle, acknowledged by Wi Waka to be lower than the one for which he had been seeking. The latter, however, he still said he could find when we reached Eketahuna, and I accordingly went with him from that place up the range where the saddle was supposed to be; but not being able even then to discover it, I imagine it does not exist. Here the Natives left us and returned to Masterton, while we went on. On returning I brought with me from Tutakera an old Native (Mikaia) who also professed to know this saddle, but was no more successful than Wi Waka.

John Blackett, Esq., Acting Engineer of Public Works.

I have, &c.,  
JOHN ROCHFORD.

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### No. 75.

His Honor J. D. ORMOND to the Hon. W. GISBORNE.

SIR,—

Napier, 5th May, 1871.

I beg to acknowledge and thank you for your letter of 27th April, enclosing copy of Mr. Rochfort's report, with tracing of same, on the railway line from Masterton to the Manawatu River. I am glad to see the difficulties are so few, and the extent of country which the line will open.

From communication with Mr. Weber, I am led to believe that a slight alteration of Mr. Rochfort's line at the Manawatu end would improve and shorten it. I notice Mr. Rochfort speaks favourably of the block in which the junction of the lines takes place, viz., the Ahuaturanga Block. All accounts agree that this is a very valuable piece of country, both from the richness of the soil and its position. It is included in the lands negotiations for which are going on.

The Hon. the Minister for Public Works, Wellington.

I have, &c.,  
J. D. ORMOND.

## PAPERS RELATING TO THE

## No. 76.

Mr. ROCHFORD to the Hon. W. GISBORNE.

SIR,—

Wellington, 25th May, 1871.

I have the honor to inform you that I returned on Tuesday night from Manawatu, and at the same time beg to acknowledge the receipt of two telegrams from Mr. Knowles; the one, dated 27th April, stating that the expenses to Government of any preliminary survey should cease from that date; the second, dated 10th May, saying that Mr. Weber could suggest a slight alteration in my line. I have the honor to inform you that I have examined the only country where Mr. Weber could propose an alteration. The crossing of the Manawatu near the old Maori track at Taumatu, which I presume to be Mr. Weber's project, would be very wide, from a bank of some 40 feet high to a low-flooded point; the bridge would have to be of great length, and the piers very high, besides which there is a very swampy belt of country between the Manawatu River and Mr. Weber's road.

I spent a whole week on the north side of the Manawatu examining the country in question, and have come to the conclusion that the line I have adopted is the best although a little longer; it passes through finer country, and taps a large store of totara. There are two points above the confluence of the Tiraumea and Manawatu, either of which I should recommend for bridging, leaving it with Mr. Blackett to determine which should be adopted. The Manawatu is the most formidable river on the line, and below these two points it is increased to twice its size by the junction of the Tiraumea; this forms a strong reason for crossing above the latter.

I have gone carefully over the ground and have fixed on the line throughout. In the course of six weeks I hope to be able to complete the field work. The first contract is finished in the field, and also a part of the plotting.

The Natives have been rather troublesome, and still object to some eighteen miles of the line, but have agreed to let the survey go on and carry their grievances to Wellington.

The Hon. W. Gisborne, Minister for Public Works, Wellington.

I have, &amp;c.,

JOHN ROCHFORD.

## No. 77.

The Hon. W. GISBORNE to His Honor W. FITZHERBERT.

SIR,—

Colonial Secretary's Office, Wellington, 30th May, 1871.

I do myself the honor to enclose copies of the documents noted in the schedules, in order that the Provincial Government of Wellington may be informed of the steps which the Colonial Government have taken in order to carry out the provisions of the 12th section of "The Railways Act, 1870," so far as it relates to the Province of Wellington.

From these documents your Honor will learn—

(1.) That after carefully exploring the whole of the line from Wellington to the Seventy-Mile Bush, Mr. Rochfort is now engaged in making the detailed survey thereof. With reference to the part between Masterton and Manawatu, it is proposed that a tramway, ultimately to be converted into a railway, should be laid down. Half the cost of the tramway and of the survey of the line will be charged to the road vote, and the balance to the railway.

(2.) That Mr. Carrington is similarly engaged on the line from Wanganui northwards; and

(3.) That Mr. Stewart is engaged on the line from Wanganui to Manawatu Gorge.

I have, &amp;c.,

His Honor the Superintendent, Wellington.

W. GISBORNE.

## No. 78.

Mr. KNOWLES to Mr. ROCHFORD.

SIR,—

Public Works Office, Wellington, 1st June, 1871.

I have been requested by the Acting Chief Engineer to remind you that the time for the meeting of the Assembly is fast approaching, and that, as there will be much office work here for him in preparing for it, the surveys on which you are engaged should be sent in complete, with as little delay as is possibly practical.

You would oblige by telegraphing the date when you hope to be able to send your report and other documents to this office.

I have, &amp;c.,

J. Rochfort, Esq.

JOHN KNOWLES,

Under Secretary.

*Note.*—This circular letter was sent to all the Surveyors in charge of Railway Surveys.

## No. 79.

Mr. ROCHFORD to Mr. BLACKETT.

SIR,—

Wellington, 7th April, 1871.

In accordance with your instructions of 15th February ultimo, I have taken a few levels on each side of the Rimutaka, for the purpose of ascertaining whether the expense of constructing the line of railway could be diminished by making a tunnel.

The first point where a saving in distance might be effected may be presumed to be about the same level as the pass adopted in my survey. A tunnel at this point would cut 430 feet off the Rimutaka, and with a gradient of 1 in 40 would be 52 chains long.

The point C shown on section No. 1 (going towards Wellington) would be about 555 feet above

where this line would probably cross the Pakuratahi, say two miles higher up the river than the present bridge; the distance would be about four and a half miles, and a down gradient of 1 in 40. This would cause a slight dip in the line of about 70 feet to the point of deviation in Mangaroa Hill; this place is distant about four miles, and the gradient to attain it would be 1 in 300.

On the other side, from the point D to the Wairarapa Valley level (going towards Masterton), the fall is 1,013 feet, and would require nearly eight miles with a down gradient of 1 in 40 to overcome it. This line would reach the valley at the Tauherenikau River about half a mile above its exit from the hills.

The total distance saved may be estimated at eleven miles. Crossing half a mile up the Tauherenikau would be an advantage for bridging, as there are rock banks, but would make this end of the line difficult of access; the height of the railway above the town of Featherston would be 353 feet. Another objection is that the hills are rougher and more likely to slip than they are along the route I have chosen.

The following will be the estimate:—

11 miles of railroad, at say £4,000 per mile	...	...	...	£44,000
52 chains of tunnel, at say £880 per chain	...	...	...	45,760

The next point I have shown on the section (No. 2), from B to E, can now be considered. A tunnel here would cut 553 feet off the Rimutaka, and with a gradient of 1 in 40 would be one mile two chains long. The point B (going towards Wellington) would be about 458 feet above the Pakuratahi River, at one mile above the bridge where the line would probably cross. The distance would be approximately three and a half miles, and a down gradient of 1 in 40.

From the river to the point of deviation, at Mangaroa Hill, there would be a rise of 100 feet, which an up-gradient of 1 in 200 would about work out.

On the other side, from the point E to the Wairarapa Valley level (going towards Masterton), the fall is 845 feet, and would require six and a half miles with a down gradient of 1 in 40. This line would reach the level about two and a half miles beyond Featherston. The total distance saved would be about fifteen miles. The height of the railway above Featherston would be about 250 feet.

*Estimate.*

15 miles of railroad, at say £4,000 per mile	...	...	...	£60,000
82 chains of tunnel, at say £880 per chain	...	...	...	72,160

The last place I have shown on the section (No. 3) from A to F. At this elevation a tunnel would cut 708 feet off the summit of the Rimutaka, and with a gradient of 1 in 40 would be 1 mile 68 chains long. The point A would be 330 feet above the Pakuratahi River, at about half a mile above the bridge where this line would cross; the distance would be about three and a half miles, with a down gradient of 1 in 40.

From the river to the point of deviation at Mangaroa Hill there would be a rise of 125 feet and a distance of about three miles, with an up gradient of 1 in 126.

On the other side of the tunnel, from the point F to the Wairarapa Valley level, the fall is 585 feet. This line would reach the flat about Featherston, with a gradient of 1 in 40. The total distance saved would be about seventeen miles.

*Estimate.*

17 miles of railroad, at say £4,000 per mile	...	...	...	£68,000
148 chains of tunnel, at say £880 per chain	...	...	...	130,240

I have, &c.,

JOHN ROCHFORD.

John Blackett, Esq.,  
Acting Engineer of Public Works, Wellington.

No. 80.

His Honor W. FITZHERBERT to the Hon. W. GISBORNE.

SIR,—

Superintendent's Office, Wellington, 25th July, 1871.

After conference with and approval by you, Mr. O'Neill was requested by me to proceed to the Rimutaka and execute a special railway survey. I now do myself the honor to forward for your information, a copy of his report, accompanied by tracings, which have only this day been received from the Land Office, and which I lose no time in transmitting to you.

I believe, if this proposed deviation be adopted, it will materially improve the important line of railway through the southern and central portions of the North Island as at present projected.

I have, &c.,

WILLIAM FITZHERBERT,

Superintendent.

The Hon. the Colonial Secretary, Wellington.

Enclosure in No. 80.

Mr. O'NEILL to the Hon. W. FITZHERBERT.

SIR,—

Wellington, 20th July, 1871.

In obedience to your instructions of the 30th May, to survey and report on proposed Wellington and Wairarapa Railway, between Pakuratahi and Featherston, "Whether it is feasible to carry the line along the Rimutaka Valley, with a tunnel through the saddle of the hill; and, if feasible, to state distance, length of tunnel, and estimate of cost," &c.,—I have now the honor to report that I have taken a careful section of the main road between Pakuratahi and Featherston (see drawing No. 1), and a section along the main creek on both sides (see drawing No. 2).

I then measured the direct distance near the telegraph line from one of my bench marks in the creek at the foot of the spur near the roadmen's houses, to a bench mark in the creek on the

Featherston side of the range. The height of the ridge on this line I found approximately by the aneroid (see drawing No. 3).

I have also sketched on road plan the position of the creeks, and the proposed line of tunnel (see drawing No. 4).

In the third section (drawing No. 3) I found that the shortest line for a tunnel was gained, giving an easy gradient and a straight line—a most important consideration in the construction of a tunnel.

The length of the tunnel as shown is 130 chains, and the length of line along the route from the Golden Fleece Hotel, Pakuratahi, to Featherston, is eight and three-quarter miles.

The distance between the same points, along the main creeks, is nine and a half miles.

The length of road between the same points is eleven and a half miles.

The datum I have adopted is 54 feet below the level of the floor of Abbot's (Mr. Shirley's) Hotel, and the following are a few of the principal heights above datum:—

Pakuratahi Hotel	...	...	...	...	...	615·36
Summit of road	...	...	...	...	...	1723·62
Abbot's Hotel	..	...	...	...	...	54·00
Tunnel (Pakuratahi side)	...	...	...	...	...	859·50
Tunnel (Featherston side)	...	...	...	...	...	665·00

*Cost of Tunnel.*

130 chains (including brick lining), at £660 per chain ... .. £85,800

I have based my calculation of the cost of the tunnel on the following dimensions:—

Height above rails	...	...	...	...	15 feet
Breadth, 3 feet 6 inch gauge	...	...	...	...	12 feet 6 inches

and cased with brickwork on sides and roof.

The usual dimensions of a tunnel in England for a single line of railway, 4 feet 8½ inch gauge, are 20 feet above rails, and 15 feet greatest breadth.

I consider the dimensions of tunnel proposed by me as quite sufficient for the railway, and the cost is considerably lessened.

I believe the tunnel could be made without any serious difficulty. The excavation would be generally through rock from end to end. At a depth of about 1,000 feet below this ridge the rock may be found solid; although where it has been exposed to the effects of the air and rain, decomposition and disintegration have taken place, but I do not think rapidly.

In the event of the tunnel being proceeded with, and the rock turning out as solid as I anticipate, very little brickwork, except near the ends, will be necessary, thereby causing a large reduction in the cost stated by me.

*Gradients.*

Tunnel	...	...	...	...	1 in 40
Ditto to Featherston	...	...	...	...	1 in 40
Ditto towards Pakuratahi	...	...	...	...	1 in 60

The last gradient may be altered, dependent upon the level of line near Mungaroa.

In conclusion, I take the liberty of suggesting that in constructing the line from the tunnel on either side, a good portion of the work should be done on "trestle work," and as much as possible on the timber slopes of the hills; for I think it advisable, in this country, to avoid as much as possible cutting into hills where slopes are very steep.

The Hon. W. Fitzherbert, Superintendent,  
Wellington.

I have, &c.,  
CHARLES O'NEILL, C.E.

No. 81.

The Hon. W. GISBORNE to His Honor W. FITZHERBERT.

Sir,—

Colonial Secretary's Office, Wellington, 26th July, 1871.

I have the honor to acknowledge the receipt of your Honor's letter of the 25th instant, enclosing a copy of Mr. C. O'Neill's report on the Rimutaka Special Railway Survey, with tracings relating thereto, and to thank you for the same.

His Honor the Superintendent, Wellington.

I have, &c.,  
W. GISBORNE.