

Line A 3.

This line is common to line A 2 from Otira Station to the mouth of the gorge, and the summit tunnel commences at the same place as on line A, and the Bealey end of the tunnel is three or four chains further down the Bealey than the tunnel-end on line A 1, with which line it is common on the Bealey side of the range.

Characteristics of line A 3 :—

Length of west approach	...	...	...	...	7 m. 56 ch.
Length of east approach	...	...	...	...	1 m. 1·5 ch.
Total length of line	...	...	...	...	8 m. 57·5 ch.
Maximum grade, west approach	...	...	...	...	1 in 30.
Maximum grade, east approach	...	...	...	...	1 in 40.
Grade in summit tunnel	...	...	...	...	1 in 33.
Minimum radius of curve	...	...	...	...	7½ ch.
Total degrees of curvature	...	...	...	...	419 degrees.
Percentage of line curved	...	...	...	...	13.
Length of summit tunnel	...	...	...	...	9,790 yards.
Total length of tunnels outside summit tunnel	...	...	...	...	143 yards.
Total length of bridging	...	...	...	...	884 ft.
Grade-level at summit	...	...	...	...	2,440.
Estimated cost of construction	...	...	...	...	£537,000.

Line A 4.

This line is common to A 2 from Otira Station to about 74 ch., and from there it continues up the bed of the Rolleston River, keeping a sufficient distance from the foot of the shingle slides to be out of reach of slips and bounding rocks. It crosses the Rolleston on the right bank just below junction with Rose Creek, and enters summit tunnel there. The tunnel-mouth on the Bealey side is in about the same locality as that of line A 1, and the two lines are practically common on the Bealey side of range.

Characteristics of line A 4 :—

Length of west approach	...	...	...	...	7 m. 55 ch.
Length of east approach	...	...	...	...	1 m. 6·5 ch.
Total length of line	...	...	...	...	8 m. 61·5 ch.
Maximum grade, west approach	...	...	...	...	1 in 30.
Maximum grade, east approach	...	...	...	...	1 in 40.
Grade in summit tunnel	...	...	...	...	1 in 33.
Minimum radius of curve	...	...	...	...	7½ ch.
Total degrees of curvature	...	...	...	...	177 degrees.
Percentage of line curved	...	...	...	...	8.
Length of summit tunnel	...	...	...	...	9,320 yards.
Total length of tunnels outside summit tunnel	...	...	...	...	Nil.
Total length of bridging	...	...	...	...	880 ft.
Grade-level at summit	...	...	...	...	2,442.
Estimated cost of construction	...	...	...	...	£510,000.

Line A is shown on plan in red; line A 1, red dotted; line A 2, neutral tint; line A 3, blue; line A 4, yellow; line B 1, burnt sienna; line B 2, burnt sienna dotted; line B 3, green.

Grade-level at common point, Otira switch=1,255; grade-level at common point, peg 41 m. 70 ch. = 2,352.

Public Works Department, Wellington, N.Z., 13th January, 1904.

SIR,—

Midland Railway: Arthur's Pass Section.

I have the honour to acknowledge the receipt of your letter of the 31st October last, asking to be supplied with the details used in making up the estimates of cost of the various suggested routes for the above section of railway, and in reply have pleasure in enclosing you the information asked for. The estimates for tunnelling are founded on rates at Springfield end, *plus* extras for length of tunnel. The costs for grading are somewhat lower than in the Middle Island estimates for Midland Railway, which in their turn appear to be too low for the actual cost of works as now finished. This adversely affects the comparison between the B lines and the A and A 4 lines, as the B lines would have a greater first cost than shown on these sheets.

I have, &c.,

H. J. H. Blow, Under-Secretary.

Virgil G. Bogue, Esq., C.E., No. 15, William Street, New York, U.S.A.