

Line B.

This line keeps to the south side of the Otira from Otira Station, ascends Rolleston Creek, along or near the foot of the slope, to a convenient locality, where it crosses the creek and doubles back along the slope of Rolleston Spur, tunnels the spur at a suitable place, and thence follows the south slope of the Otira, which is here comparatively smooth. Just below Hodge's Creek it crosses the Otira to the north side thereof, formation-level being 70 ft. to 80 ft. above the stream, and finds entrance to proposed tunnel nearly opposite Hodge's Creek on the face of the bluff above the coach-road. Thence the line keeps substantially in the gorge and pass to its proposed east end, located on the north side of Bealey River, nearly opposite the mouth of McGrath's Creek. From this point it descends the Bealey on easy ground, but crosses the stream twice before it reaches the Bealey common point. The following are the physical characteristics of this line:—

Length of east approach	...	...	...	...	1 m. 68 ch.
Length of west approach	...	...	...	...	7 m. 76 ch.
Total length of line	...	...	...	...	9 m. 64 ch.
Maximum grade, east approach	...	...	...	...	1 in 50.
Maximum grade, west approach	...	...	...	...	1 in 32.
Grade in summit tunnel	...	...	...	...	1 in 32.
Minimum radius of curve	...	...	...	...	8 ch.
Total degrees of curvature	...	...	...	...	754.
Percentage of line curved	...	...	...	...	20.
Length of summit tunnel	...	...	...	...	20,328 ft.
Total length of tunnels outside summit tunnel	...	...	...	...	1,848 ft.
Total length of bridges	...	...	...	...	1,412 ft.
Elevation of grade at summit	...	...	...	...	2,508 ft.
Estimated cost of construction	...	...	...	...	£480,000.

Lines C and C1.

Line C keeps to the slopes along the south side of the Otira, ascending on a grade of 1 in 25 to a convenient place in the Rolleston Creek Gorge, where it doubles back and follows the slopes of the Rolleston Spur and the south side of the Otira to Park's Creek, on the west slope of which it finds entrance to the proposed summit tunnel. At a point 528 ft. west of this entrance the grade changes from 1 in 25 to 1 in 29, which grade continues through the tunnel to the summit. The east end of the tunnel is located on the Bealey River, at the junction of its smaller fork, which comes from Arthur's Pass. Thence the line descends along the north slopes of the Bealey River to the Bealey common point. The summit-tunnel line is on the south side of the pass for its entire length.

Line C1 is a mere modification of line C. Instead of keeping to the south side of the Otira, it crosses from the south to the north side a short distance above the Otira Station, thence passes by Dyer's, crosses the Otira at the entrance of the gorge, and follows the slopes of the Rolleston Spur to a suitable place, where it crosses Rolleston Creek and forms a junction with line C. It is a feasible line, but its cost would be greater than that of line C. These lines are therefore common to each other from a point west of Rolleston Creek to Bealey Station.

The following are the physical characteristics of these lines:—

			Line C.	Line C1.
Length of east approach	...	...	2 m. 57 ch.	2 m. 57 ch.
Length of west approach	...	...	7 m. 68 ch.	8 m. 11 ch.
Total length of line...	...	...	10 m. 45 ch.	10 m. 69 ch.
Maximum grade, east approach	...	...	1 in 30	1 in 30.
Maximum grade, west approach	...	...	1 in 25	1 in 25.
Grade in summit tunnel	...	...	1 in 28	1 in 28.
Minimum radius of curve	...	...	8 ch.	8 ch.
Total degrees of curvature	...	...	950	1,223.
Percentage of line curved	...	...	28	34.
Length of summit tunnel	...	...	13,662 ft.	13,662 ft.
Total length of tunnels outside summit tunnel	...	...	3,950 ft.	4,884 ft.
Total length of bridges	...	...	1,840 ft.	3,010 ft.
Elevation of grade at summit	...	...	2,754 ft.	2,754 ft.
Estimated cost of construction	...	...	£480,000	£493,000.

Lines D, D1, and D2.

Line D, like line C, keeps to the south side of the Otira, ascending from the Otira switch on a maximum grade of 1 in 28 along the southerly slopes, doubling back on Rolleston River and following the slopes of Rolleston Spur and the south side of the Otira to Park's Creek, on the east side of which it finds entrance to proposed summit tunnel. At a point 350 ft. west of Park's Creek the grade changes, and becomes 1 in 33, which is continuous through the summit tunnel to the summit. From the summit the line descends on the northerly slopes of the Bealey to the Bealey common point on maximum grades of 1 in 40.

Line D1 is similar to line C1, but crosses the Otira River not far above the station, thence going by Dyer's, crossing the entrance to the gorge, and gaining line D at the long curve on Rolleston Creek.

Line D2 keeps along the south side of the Otira near the foot of the slope, ascends the Rolleston to a suitable place, where it crosses that stream to gain distance, and, curving back, reaches the long curve of line D, thus crossing the Rolleston three times.