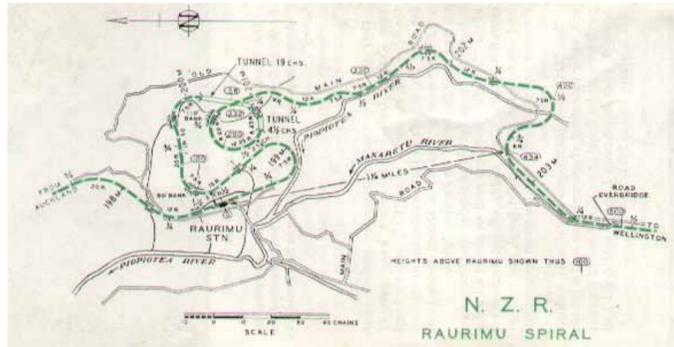




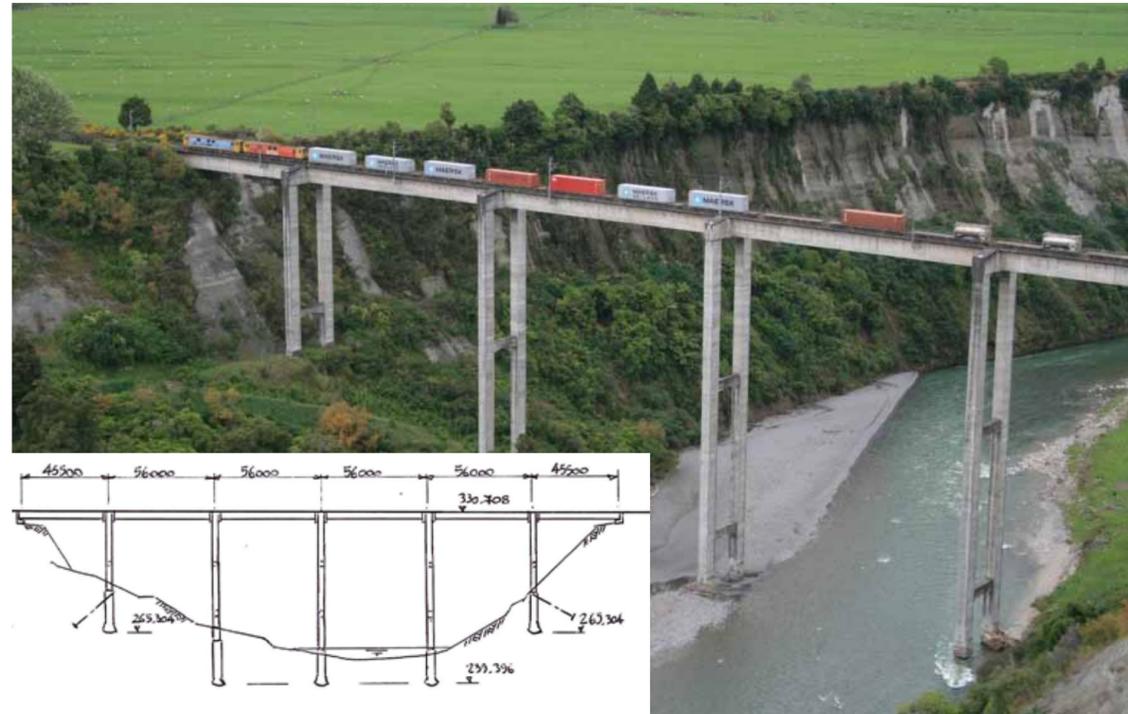
Raurimu Spiral

Title	Raurimu Spiral, NIMT
Construction Date	1908
Designer	Public Works Department
Location	Located on the North Island Main Trunk, Raurimu Spiral is located between Taumarunui and the National Park summit.
General Information	The Raurimu Spiral is a single-track railway spiral starting with a horseshoe curve and overcoming a 132 m height difference. It is a notable feat of civil engineering, having been called an 'engineering masterpiece'. The Institute of Professional Engineers (NZ) has designated the spiral as a significant Engineering heritage site. In addition, in 2005 the New Zealand Historic Places Trust gave Raurimu Spiral category one registration in recognition of its engineering design and importance.
Description	The problem of providing a maximum acceptable gradient of 1 in 52 was solved in 1898 by R. W. Holmes, Public Works Department engineer. He proposed a line that looped back upon itself and then spiralled around with the aid of tunnels and bridges. Though costly and labour intensive, the scheme was still cheaper than the previous plan by Browne and Turner which required 9 viaducts down the Piopiotea. Probably the most remarkable feature is that, even today, there is no place to view the complete line. By all accounts Holmes visualised the layout in his imagination.



South Rangitikei Viaduct

Title	Bridge 127, NIMT
Construction Date	1981
Designer	Beca Carter Hollings & Ferner Ltd
Meterage	234.410 km
Location	Located on the North island Main Trunk, Bridge 127 crosses over the Rangitikei River.
General Information	Design: The 4th highest railway viaduct in New Zealand is the 78 m high, 315 m long, South Rangitikei viaduct spanning the Rangitikei River. It is the southernmost of the 3 large viaducts on the Mangaweka Deviation. It incorporates an earthquake resistant feature that is unique in New Zealand and rare in the world. In the event of an earthquake the pier bases can lift up to 13 cm to allow energy and pressure to shift from one pier leg to the other. The rocking action is controlled by large "energy dissipaters" installed in the pier bases. Construction: Constructed by Codelfa Construction Ltd., the South Rangitikei Viaduct was opened in 1981 and is situated between Mangaweka and Taihape on the North Island Main Trunk Line. Bridge 127 is an all-concrete structure with twin-shafted vertical piers carrying a continuous prestressed hollow box superstructure of six spans.
Description	The highest point above ground level is 78m. It is 315 m in length.



North Island Main Trunk

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North Island Main Trunk

INTRODUCTION

Opened more than 100 years ago, the North Island Main Trunk remains a critical part of KiwiRail's freight network, contributing to the 'backbone' which runs from Auckland to Christchurch.

The line is used primarily for non time-sensitive, containerised freight, which moves predominantly from north to south for the domestic market.

Looking to the future, KiwiRail is focusing on reducing transit times and improving reliability on this key route, as part of its Turnaround Plan. This is likely to include the easing of curves, increased renewal of bridges, sleepers and passing loops in an effort to lift speed restrictions on the line.

Looking to the past, the NIMT holds a special place in New Zealand's engineering history. The engineering knowledge and expertise that was developed with the design and building of the NIMT more than a century ago, was used in other locations and in other industries to create transport links across the country. The feats of these early engineers have been recognised with the NIMT classified as an "International Historic Civil Engineering Landmark".

MOVING MILK BY RAIL

In the North Island, movement of bulk milk by rail began 13 years ago and since then the service has expanded from 210 litres in that first season to a recent peak of 750 million litres. From one train a day in 1997 KiwiRail now runs four during the milk season, which runs from mid-August to early May.

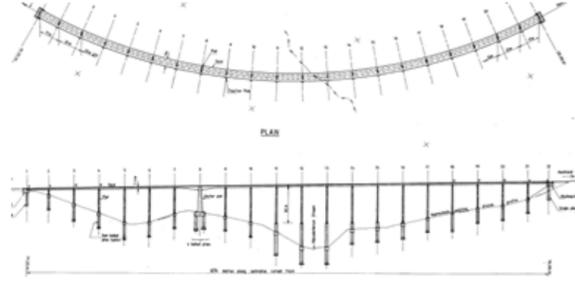
Milk moves from Oringi to Palmerston North through the Manawatu Gorge (PNGL) and from Longburn to Palmerston North (NIMT) where the two eight-wagon trains merge to form the 16 wagon train for the next three-and-a-half hour leg of the route through to Whareroa (MNPL).

During the milk season, KiwiRail moves around 3.6 million litres a day using a fleet of 64 50,000-litre insulated milk tanks, a design which is unique to New Zealand. In the off season the tanks are used to move lower volumes through to Waikato or into Canterbury.



Hapuawhenua Viaduct

Title	Bridge 170, NIMT
Construction Date	1987
Designer	Beca Carter Hollings & Ferner Ltd
Meterage	319.777 km
Location	Located on the North Island Main Trunk, Bridge 170 crosses over the Hapuawhenua Stream, approximately 2 km north of Ohakune.

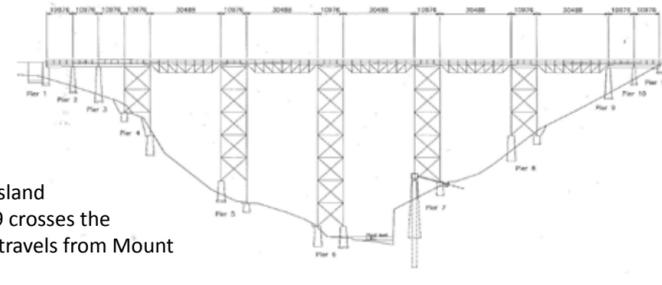


Design Information	The new structure was designed to replace the old Hapuawhenua Viaduct, built in 1907-1908 and designed by Peter Seton Hay, Superintending Engineer of the Public Works Department. The new Hapuawhenua viaduct epitomises the three aims of engineering: function, economy and (above all) grace. Completed in 1987, this 414 m long viaduct is the major structure on the 10 km Ohakune to Horopito deviation.
Construction Information	Constructed by Fletcher Construction Co., the new Hapuawhenua Viaduct was built not only to improve alignment but also to eliminate concern over the remaining fatigue life of the old curved viaduct. This viaduct is constructed from a combination of reinforced and prestressed concrete.
Description	Bridge 170 consists of 21 prestressed concrete spans on 22 reinforced concrete piers. The highest point above ground level is 51 m. It is 414 m in length.



Makatote Viaduct

Title	Bridge 179, NIMT
Construction Date	1908
Designer	Public Works Department
Meterage	335.683 km
Location	Located on the North Island Main Trunk, Bridge 179 crosses the Makatote Stream as it travels from Mount Ruapehu.



General Information	This is the third highest rail bridge in New Zealand. Christchurch firm J. & A. Anderson & Co. was awarded the contract for manufacture and erection of the bridge in 1905. As it was highly impractical to transport steel members from their base in Lyttelton, they instead built a workshop at Makatote to fabricate the steel on site. A short distance away from the viaduct is the last spike, marking the completion of the North Island Main Trunk. During the winters of 2006/2007 significant works were carried out to secure and protect support footings from scour damage at a cost of just over \$4 million.
Description	Bridge 179 consists of 10 spans on 11 piers. Spans 1, 2, 3, 9 and 10 are steel plate girders, spans 4-8 are steel Pratt trusses each 30.5m long. Piers 1, 2, 3, 9, 10 and 11 are of reinforced concrete with piers 4 to 8 being steel trestles on reinforced concrete footings. The highest point above ground level is 79 m. It is 262 m in length.

