SH1 Rolleston Transport Improvements

The path to a flyover – a summary of investigations

WAKA KOTAHI
NZ TRANSPORT AGENCY

New Zealand Upgrade Programme

Te Kāwanatanga o Aotearoa
New Zealand Government

Overview

Connecting people is key to Rolleston being a great place to live – connecting people to places of work and play, community facilities, essential services and local businesses.

Selwyn District continues to grow rapidly. Based on current travel choices – east of Hoskyns Road – SH1 through Rolleston could increase from around 24,000 to 33,000 vehicles over the next 20 years. This will make it harder for people to access Rolleston township and industrial areas, leading to rat-running, risk taking and increasing safety issues at uncontrolled intersections, and Hoskyns Road and Walkers Road level crossings.

Investing in roads, rail, walking and cycling will mean people can travel through and around Rolleston more safely. Travel times will be more reliable and having more travel choice will benefit the community, the environment and help to grow the economy. Improving the connection between town and industrial areas will make it easier to shop and support local businesses instead of driving to Christchurch.

In early 2020, the government announced the New Zealand Upgrade Programme (NZUP), a multi-billion dollar infrastructure package to improve roads, rail, hospitals and schools around the country. This includes a $8.7 billion investment across road, rail, public transport and walking and cycling infrastructure.

Among other projects, Waka Kotahi NZ Transport Agency and KiwiRail are responsible for delivering road and rail projects which includes a $300 million package of improvements for Canterbury.

The Canterbury Package is being managed as a collective with $125 million tagged for investment in upgrading highway intersections and rail through Rolleston*.

In mid-2021, Waka Kotahi shared draft plans for Rolleston with the community for feedback. These were based on past transport investigations and preliminary project analysis.

The draft proposal included safety changes to four highway intersections – as well as a new flyover designed to connect Rolleston's residential and industrial areas over the highway and rail line and provide improved walking, cycling and public transport facilities.

Included in feedback from the community were requests for better connectivity to all areas and for more information on how the flyover alignment was decided upon – including the various options that were considered and the rationale.

Since consultation, we have considered community feedback, undertaken further transport analysis and reassessed the options for Rolleston against a range of factors. An option which better suits competing community needs has emerged which is what Waka Kotahi is recommending for the next round of public consultation.

This document is a summary of the options we considered and how we arrived at a preferred alignment.

* Includes contingencies.

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Background

Rolleston began as a railway stop back in 1866. In the 1970s Prime Minister Norman Kirk heralded Rolleston as the 'Town of the Future', expecting a town of less than 1,000 to grow to a city of 80,000 people.

Rapid population growth meant more and more people crossing the highway and rail line.

In 2000, a strategic transportation study was undertaken to look at how traffic congestion to the west and south of Christchurch could be reduced over the next 10-15 years.

To support this growth, the Christchurch Rolleston and Environs Transportation Study, or CRETS was adopted in 2007. CRETS recommend the following improvements:

- Extending the Southern Motorway from Halswell Junction Road to south of Templeton
- Improving roading links between the growing townships of Rolleston, Lincoln and Prebbleton
- Improving connections to Christchurch and between Rolleston and SH1.

As part of the study, the district arterial road network was confirmed and the Weedons interchange was identified as the primary access from the north and a flyover (and other options) identified to improve township connectivity. This was based on increasing safety risks and delays at the Hoskyns Road and Rolleston Drive North traffic signals and the rail level crossing and alternative solutions being impractical or more expensive. It was becoming clear that Rolleston was outgrowing the joint traffic signals/level crossing and that upgrades were required.

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A flyover would separate local traffic (including pedestrians, cyclists and buses) from state highway traffic, making travel much safer and more reliable in all directions. Because the separation of traffic and rail removes the risk of a train/vehicle collision, the safety benefits of a flyover for people using the road and rail are substantial.

To protect land and provide for the flyover, a reference was included on all Land Information Memorandums (LIMS) in 2007/8 in the Greater Christchurch area of Selwyn to cater for long term growth. (Apart from a system glitch for a short period when some urban subdivided properties were missed). As part of its Long-Term Plan (LTP) 2015/2025 Selwyn District Council signalled major transport projects planned as part of Stage Two of the Christchurch Southern Motorway and the need to connect Rolleston Township areas across SH1 and Main Railway Lines (as identified in CRETS which was adopted in 2007).

Draft LTP consultation with the public included a skewed flyover alignment and question asking if a Rolleston SH1 flyover was supported – 70 per cent responded yes. (SDC LTP 2015-2025 pages 66-67.)

The case for investment in Rolleston

Around 2010, the establishment of the Izone Industrial Park and development of Canterbury's emerging inland port and freight hub formed the industrial side of Rolleston, while large blocks of rural land were opened up for residential subdivisions on the other side of SH1 and the Main South Line. This development was further accelerated because of people needing to resettle following the Canterbury earthquakes.

Building on the adoption of CRETS, in 2015 transport partners led by Waka Kotahi developed a business case for change to ensure the Rolleston Industrial Zone could continue to grow while ensuring safe, efficient and effective transport access, without compromising the longer-term options for the wider transport network.

The programme business case considered the steady growth in heavy vehicle traffic and access issues between Rolleston and Christchurch and Rolleston's Industrial Zone and looked to come up with solutions.

The main problems were found to be:

- The current transport improvement programme was not keeping up with the fast pace of land development in the Rolleston industrial and residential areas. This was resulting in poor travel route choices by drivers, safety and efficiency concerns and poor connection (severance issues) across the state highway and rail line as well as sub-optimal investment opportunities
- An increase in heavy vehicles to and from the industrial zone resulting in more risky turns causing crashes
- An increase in cars to and from the industrial zone resulting in delays, queues and unreliable travel time
- An increase in the number of trains resulting in more traffic hold-ups at the level crossing, causing vehicle queues, delays, and safety issues – restricting freight to an inefficient 40km/h
- Pressure points in the local road network which were causing delays, queuing, speed, rat-running and risky turns.

The benefits of investment were identified as:

- Aligned land-use and transport infrastructure investment leading to better value for money and more economic certainty
- Reduced deaths and serious injuries and social cost of crashes
- Reliable and predictable journey times to and from Rolleston IZone
- Improved freight supply chains, logistics and economic productivity: optimised rail operations, reduced travel time delays, queues and safety issues.

The programme business case then focused on where the problems were mainly located and predicted to worsen, including residential and industrial land use development, vehicle type, crash data, and locations where delays were most likely to occur.

The Programme Business Case looked at confirming a strategic case for Rolleston, developing a list of alternatives and options for infrastructure investment – a long list of possible programmes with a long-term view – which attracted NZUP investment.

At the same time residential and industrial land use continued to grow rapidly leading to Selwyn being one of the fastest growing districts in New Zealand.

Selwyn District Council has been carrying out road and intersection upgrades on its local roads in the vicinity of the Rolleston Town Centre to set up its local network to be ready for any changes. Through its future Long Term Planning processes, the Council plans to adjust programmes to cater for any other Business Case outcomes needed on its local roading network.

NZUP – investment confirmed for Rolleston

New Zealand Upgrade Programme

In January 2020, the government announced the New Zealand Upgrade Programme or NZUP, an opportunity to upgrade infrastructure in main growth areas across the country – Rolleston included.

NZUP is designed to give families around New Zealand real choices in how they travel, while making travel safer and more efficient.

As a rapid growth town, Rolleston was included in the Canterbury package as a community to benefit from transport investment through NZUP.

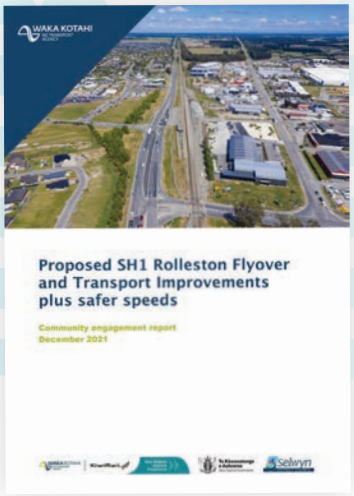
This new source of direct Crown funding meant key areas for transport investment in Rolleston could be developed to give more certainty for the future.

Public consultation 2021

In 2021, Waka Kotahi presented a first draft of what the Rolleston transport improvements could look like as a starting point for gathering feedback from the community and developing the initial design. This was the first of two planned opportunities for public consultation as part of the Rolleston Transport Improvements Project business case.

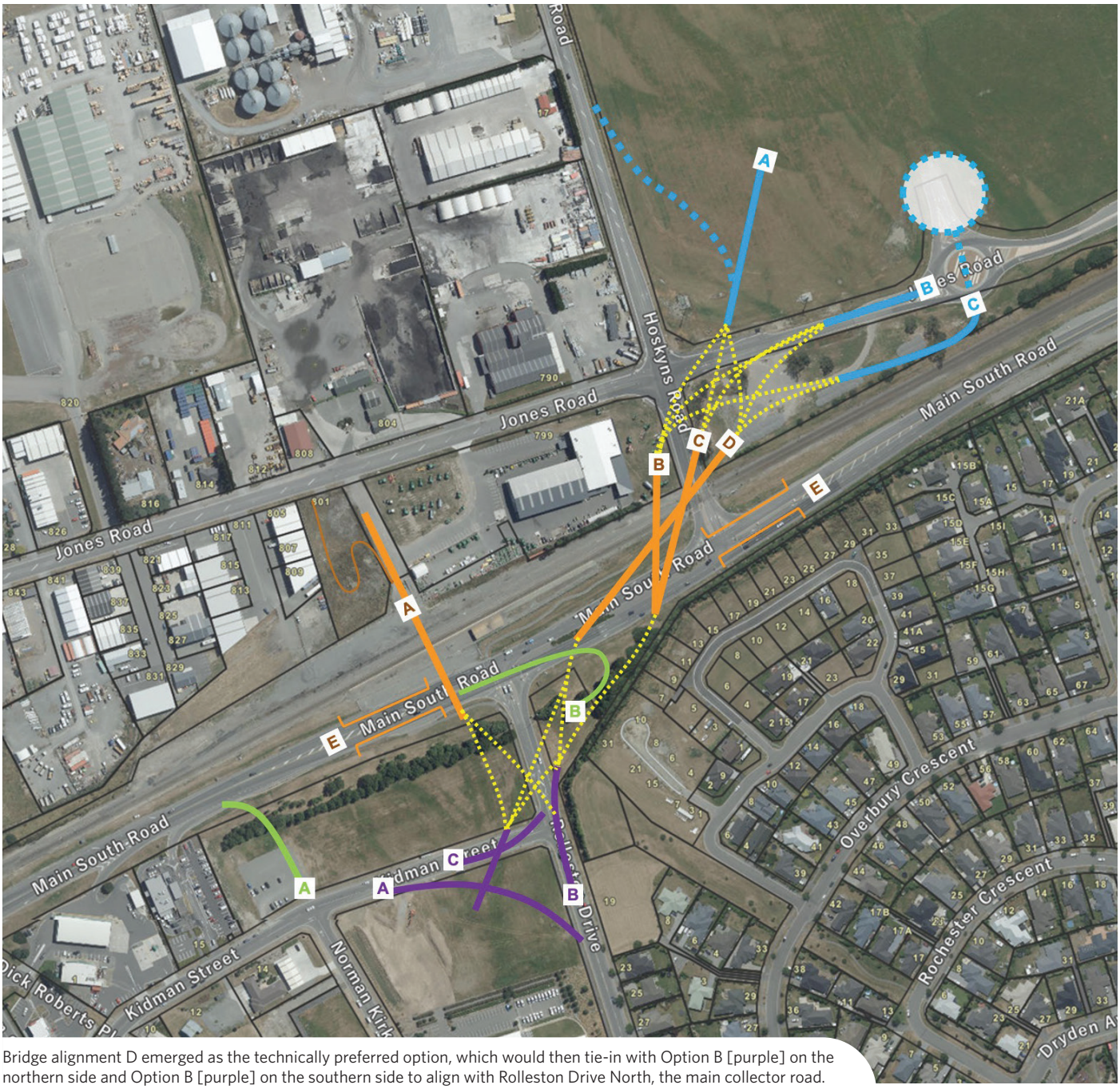
Talking with the community is an essential part of the Waka Kotahi transport project planning process. This gives everyone an opportunity to have a say on the project, identifies people's needs and helps inform the best possible solution – when there are often competing needs. It takes not only engineers and planners, but people on the ground who use our roads and rail to come up with the best solution.

As well as upgrades to highway intersections, the package we shared as part of our consultation with the public presented a 'skewed' bridge alignment connection over the highway and rail line, between the residential and industrial sides of Rolleston. This connected the town's retail hub with eastern industrial development over the highway and rail line.



The initial proposed draft alignment

A ‘skewed’ flyover option plus a package of intersection improvements was presented to the community for feedback in late 2021. This alignment emerged from a multi-criteria assessment undertaken on a range of flyover options pictured below.



Bridge alignment D emerged as the technically preferred option, which would then tie-in with Option B [purple] on the northern side and Option B [purple] on the southern side to align with Rolleston Drive North, the main collector road.

The initial proposed draft alignment cont.

The flyover would extend over the existing SH1 and the Main South Line and allow for the addition of a third rail for rail operation improvements at Rolleston. (On the basis highway access would close completely at this location.)

It was chosen because it offers a gentle gradient (less than six per cent), had minimal property access disruption, and delivered on the safety objective of zero harm at the Hoskyns Road level crossing.

The option also supported the road hierarchy and network plan to keep traffic on main roads while offering safer options for people choosing to walk or cycle.

The other options did not perform as well because of property impacts or gradient (alignment option A or B), or issues of geometry or constructability (alignment options C and E).

While people acknowledged the need to connect both sides of Rolleston, the public consultation process revealed some key community concerns about the draft proposal for Rolleston which prompted further investigation.

These concerns included:

- Reduced highway access – multiple points should remain open
- The potential for overloading Weedons Interchange
- Emergency service response times potentially affected
- Increased traffic on local roads and past schools
- Removing the Hoskyns Road level crossing required travel through multiple roundabouts
- Closure of a section of Jones Road would affect access and be detrimental to businesses, services and facilities to the southwest industrial area.

Some people commented that a bridge connecting to the east on Jones Road – and then having to backtrack to other industrial areas and businesses – was too limiting. People said they wanted access to all the industrial area and the continuity of Jones Road to remain.

Bringing community feedback onboard

With this new community feedback and ongoing analysis confirming some operational and constructability issues and given a fair amount of time had passed since the options were first explored, Waka Kotahi reassessed the options before developing the next set of draft plans.

Waka Kotahi values community input and because changes could be considered on this project that did not compromise safety (and were within scope and budget) the team was able to undertake robust analysis of the options before developing the next set of plans.

As part of the analysis the team assessed each option against the project investment objectives which were:

- Safety – working towards our Road to Zero target of reducing people being killed and seriously injured on our roads by 40 per cent by 2030
- Connectivity – supporting a more connected community resulting in more economic self-sufficiency and liveable Rolleston
- Resilience and sustainability – providing a more resilient and sustainable transport network.

Key considerations included:

- Reducing the risk of people from being killed and seriously injured on SH1 and rail crossings
- Fit with the local transport system
- Short and long-term effects on whole transport network – land use and road hierarchy
- Community impact and liveability
- Safety considerations
- Environmental impacts
- Highway access.

The team, including a panel of independent and subject matter experts, assessed more than 25 options including:

- At grade options: signals, roundabouts, left in/left out
- Under/over north/south options
- Over/under west/east options
- Over/under skewed options.

The full list was initially assessed, and seven options were identified for Multi Criteria Analysis that then determined a shortlist of three feasible options.

Safe system approach

The safe system approach to transport planning recognises that people make mistakes and are vulnerable in a crash. It reduces the price paid for a mistake, so crashes don't result in being killed or suffering life-changing serious injuries. Mistakes are inevitable – dying or being seriously injured from road crashes are not. To reach our national road safety strategy Road to Zero target of 40 per cent fewer deaths and serious injuries on our roads by 2030, Waka Kotahi has five internationally proven focus areas. These focus areas, including infrastructure and speed, vehicle safety, work-related road safety, road user choices and system management work together to create a safe transport system.

Bringing community feedback onboard cont.

Short list of three feasible options

OPTION 4

Skewed Flyover (refined consulted option)

OPTION 7

Straight flyover

OPTION 24

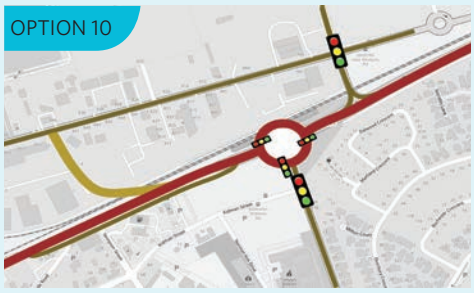
Tennyson Drive to George Holmes underpass + SH1 (east-west) flyover + Hoskyns LO

Short list options disregarded

OPTION 8

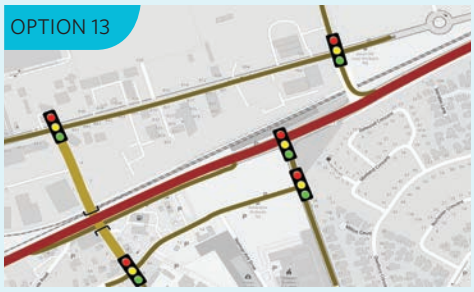
Straight flyover (plus NB on-ramp)

OPTION 10



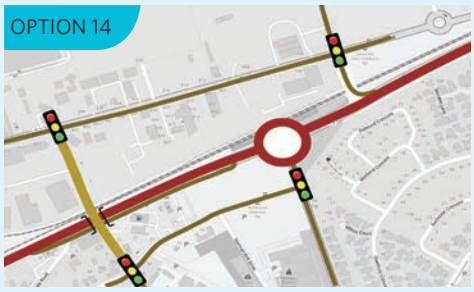
RDN roundabout (signalised) + grade-separated left out @ George Holmes Road

OPTION 13



Tennyson Drive overpass + RDN signal

OPTION 14



Tennyson Drive overpass + RDN roundabout

A revised preferred option for Rolleston

Having listened to community feedback, undertaken further transport analysis and comparing to a wide range of possible options again a range of factors, a straight flyover alignment has emerged as the best option for the Rolleston connection across SH1 and the rail corridor.

This alignment provides an extension of Rolleston Drive North through to a new T-intersection at Jones Road.

The main benefits include:

- A direct connection between Rolleston township via Rolleston Drive North to the industrial area on Jones Road and the Hoskyns Road arterial route to West Melton and also SH73
- A direct connection providing for a greater range of multi-modal journeys between the town centre and industrial areas – footpath on one side, shared path on the other
- Removal of short-stacking risk at the rail level crossing – significantly reducing the safety risk to people – 40 near-misses and collisions over the past ten years
- Some highway access is restored with a left out from Hoskyns Road and southbound off-ramp from service lane to Kidman Street and Rolleston Drive North, enabling people to 'loop' back across the flyover to the industrial area. This distributes highway access to more locations, taking pressure off Weedons Interchange and reducing Tennyson Street traffic. These additions were included in all options analysed
- Engineering and construction advantages (less complex, lower embodied carbon and visual impact)
- Retaining full east-west Jones Road connectivity
- Maximising land for future development opportunities adjacent to Kidman Street and Jones Road – including expanded Park'n'Ride facilities
- Simpler bus service integration compared with the skewed option.

A revised preferred option for Rolleston cont.

Concerns include:

- A rise similar to the Christchurch Northern Corridor Prestons Road overbridge – up to eight per cent gradient - but still acceptable
- Property acquisition is required
- Some outstanding issues to resolve in design such as bridge landing point intersection designs and understanding property and access impacts.

Overall, it is the only option that scores best against the investment objectives. It is the only option that achieves a weighted positive score in the Multi Criteria Analysis. It is also the option with the least negative effects. The flyover bridge will cater for all modes of transport and help Rolleston become a more accessible, self-sufficient township. It aligns well with the current road network and recent upgrades and links with walking and cycling paths and bus stops to give people a range of travel options. This will mean people have safer travel options other than their car and the community is better placed to undertake targeted initiatives that mitigate and adapt to climate change.

A safer transport network is more efficient

As well as reducing the risk of people being killed or seriously injured, road safety changes help to improve transport network efficiency. Crashes and other and other speed-related incidents create delays and stoppages, affecting freight timetables and the reliability of travel schedules. Businesses that rely on the roads as an efficient part of their operation will benefit from transport safety improvements. An unsafe transport network cannot be an efficient one.

Planning for the Rolleston Transport Improvements Project has factored in other transport projects in Selwyn District, which will work together to create safer and more efficient travel for people on the road. Examples include recent and planned local road upgrades (such as the Two Chain Road connection to Jones Road, and Levi Road), the local walking and cycling network, park and ride opportunities (connecting to public transport) – which are all Selwyn District Council delivered projects.

SH1 through Selwyn will be made safer and more efficient through the delivery of infrastructure improvements – flexible barriers, turn-around areas, changes to intersections and road markings including widening the centre line – planned to extend 46.1km between Selwyn River and Ashburton.

Reasons behind second and third best options

The refined skewed option

The skewed flyover alignment was initially proposed because it offered a gentle gradient, had minimal property access disruption, and delivered on a key safety objective by closing highway access and completely removing the risk for people at the Hoskyns Road level crossing.

Following public consultation and further technical analysis, the design was refined to improve access to the highway and east-west connectivity along Jones Road. However, the end result was complex and not ideal. Compared with the straight flyover option it required more convoluted routes for all forms of traffic – including people using the shared path – between the Rolleston Town Centre and industrial areas. Furthermore, the bridge structure is more complex to construct and will result in higher embodied carbon emissions due to 65m spans needing large steel girders rather than standard concrete beans.

Straight over or under the highway from Rolleston town centre (Tennyson Street)

The Tennyson-George Holmes connection offers some advantages. It separates out local north-south movements from State Highway access and provides good connection between the town centre and industrial zone. The main problem with this design is it results in increased traffic along Tennyson and Kidman Streets areas and past the primary school. Significantly increasing vehicle traffic into these areas – potentially 15,000 vehicles a day – would be detrimental to Selwyn District Council's vision for a community and retail focused Town Centre which is a pedestrian friendly, community hub. Also, this option would still require traffic signals at the Rolleston Drive North/SH1 intersection. This would not support a safe transport network or project safety investment objectives. As well, highway freight productivity would be negatively impacted if this intersection remained.

The team also investigated how people would use the various routes in each of the options.

A tunnel from Rolleston Drive North straight through to Jones Road was ruled out because of the negative effects. These include: the amount of private property required including to provide for the structured and drainage as well as CPTED considerations. (CPTED Crime Prevention Through Environmental Design is a well-researched multi-disciplinary approach to deterring criminal behaviour through environmental design). The tunnel would have up to 20,000 vehicles per day passing through and sometimes idling as they queue on the uphill incline during peak times. Even with ventilation, this would be unpleasant for people using the shared path to walk, cycle and scoot etc and could be subject to flooding during severe weather events.

This image shows a jackknifed truck at Hoskins Road level crossing. Kiwirail have reported 40 near misses at this dangerous intersection.

Reasons behind second and third best options

Proposed rail improvements

A safe reliable and resilient road and rail network is needed to support growth. More rail freight helps to reduce trucks on the road, which is safer for everyone. Using rail reduces New Zealand's carbon emissions by 488,000 tonnes a year – the equivalent of taking 87,000 cars off the road – saving millions of dollars. Rail freight has 66 per cent fewer carbon emissions than heavy road freight.

Rolleston was historically important as the site of the junction of the Midland Line and Main South Line. The Midland Line passes to the southwest of the Rolleston Industrial Zone and heads west to the West Coast and Greymouth. The Main South Line is part of the South Island's Main Trunk rail line (running north and south), connecting key economic hubs in the South Island for freight import and export. The Main South Line connects to the Midland Line approximately 700m south of the Weedons Ross Road level crossing and is critical for freight access to the inland ports supporting the South Island. Freight connections to The West Coast are critical for these communities and the economy.

There are between 20-30 rail movements a day on the Midland Line to the West Coast and 40 rail movements a day north of Rolleston (including trains to Lyttleton Port Company every day). There are eight movements south of Rolleston on the Main South Line of Rolleston. The daily TranzAlpine train can stop at Rolleston if people pre-book.

An increase in the number of trains is resulting in more traffic hold-ups at the Hoskyns Road level crossing. Because of the proximity of the rail line to the highway there are short-stacking issues which means there is not sufficient space for longer vehicles to queue safely at the level crossing barrier. This causes vehicle queues, delays, and safety issues – approximately 40 near-misses – which has resulted in KiwiRail restricting freight to an inefficient 40km/h at Rolleston.

Other issues include:

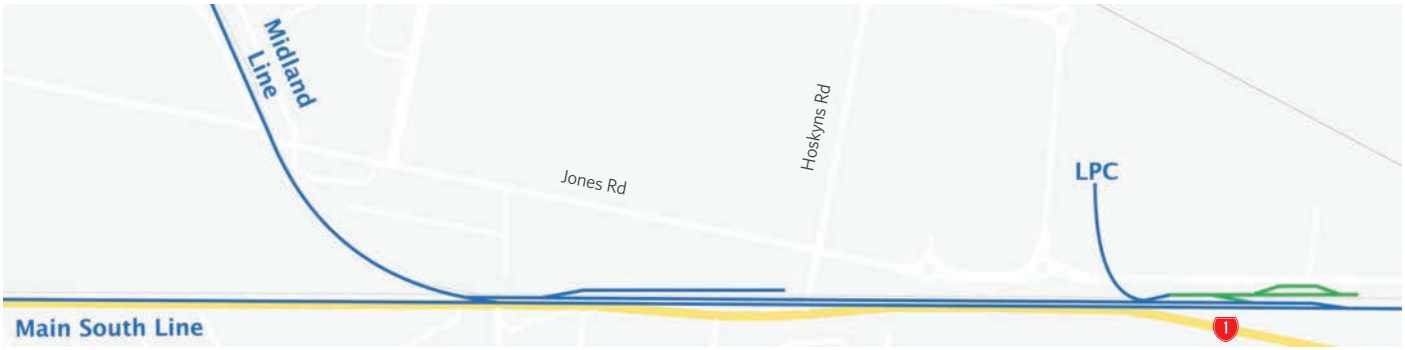
- No direct connection from the south on the Main South Line and Midland line
- No direct connection to the Lyttelton Port siding from the south
- Inefficient rail operation resulting in additional level crossing closures.

Waka Kotahi and KiwiRail explored four feasible options for improving rail in Rolleston. The recommended option gives the greatest flexibility for rail connectivity and operational improvements by:

- Focusing the run around yard east of Midland Port
- Removing the need for a third track over Hoskyns Road
- Improving safety with a two-track level crossing
- Left out access only from Hoskyns Road will remove short stacking across the rail line
- Preserving land at Hoskyns Road and Jones Road for future development opportunities including expanded Park'n'Ride facilities.

The Walkers Road rail level crossing will be upgraded as part of the proposed new roundabout project at SH1/Dunns Crossing/Walkers Roads intersection.

Reasons behind second and third best options cont.



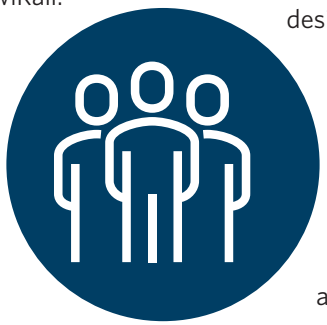
Proposed improvements indicated by green lines

Public consultation 2022

Once the straight flyover option was identified as the front-runner through the multi-criteria analysis process the team engaged with the most affected adjacent property owners.

The proposal requires some privately owned land and access to these properties will be affected. Waka Kotahi is continuing to explore ways to minimise impacts for these property owners. Most of the land required is owned by Waka Kotahi, Selwyn District Council and KiwiRail.

Waka Kotahi also tested the proposal with key stakeholders to sound out whether they thought the recommended alignment would meet their needs and provide a workable solution for the community of Rolleston.



Overall feedback was supportive of the recommend option. While the option did not suit every group's requirements exactly, people appreciated the challenges of meeting key project objectives and community desires and needs.

Feedback from emergency services on the emerging preferred alignment was supportive. Their preference was to prioritise the new roundabout at the SH1/Walkers Road/Dunns Crossing intersection. Feedback from Ia Ara Aotearoa Transporting New Zealand indicated support for the recommended straight flyover alignment.

Thank you to everyone who provided feedback on the draft design.

The project will make it easier and safer to get around Rolleston and provides people with more transport choices. It aims to improve connectivity and access between the residential and industrial sides of Rolleston, improve safety at high-risk intersections– as well as provide a more resilient and sustainable road and rail network.

Visit www.nzta.govt.nz/sh1-rolleston to view a fly-through video and public consultation brochure outlining the recommended straight flyover alignment as well as more information including answers to frequently asked questions. You can also subscribe to updates to receive the latest project information.