

Part C

Consideration of Alternatives –North Local Package

10. NOR 5 – New Crossing of SH1 at Dairy Stream

10.1 Summary

This section provides a summary of the alternatives assessment for the New Crossing of SH1 at Dairy Stream. The Project comprises an all-modes connection across State Highway 1 (SH1) at (or in the vicinity of) Dairy Stream, connecting Top Road and East Coast Road, which will improve local east-west connections and bolster network resilience. The proposed SH1 crossing allows for a 24m wide, 2-way urban arterial with active mode facilities connecting future urban areas either side of SH1.

A single option was designed for the Project, however different crossing locations were considered between the SH1 Motorway Service Centre and Ō Mahurangi Penlink, using a targeted MCA and constraints-led design process. The northern area between the floodplain and the motorway service centre was ultimately chosen as the preferred location for the crossing, due to its positioning away from significant floodplains, potential natural wetlands, and the National Grid Corridor overlay. The crossing's design was further refined, including adjustments to the connection's position and the bridge's angle to meet geometric requirements and retain access to Worsnop Road.

The preferred route for the New Crossing of SH1 at Dairy Stream is shown below in Figure 125.

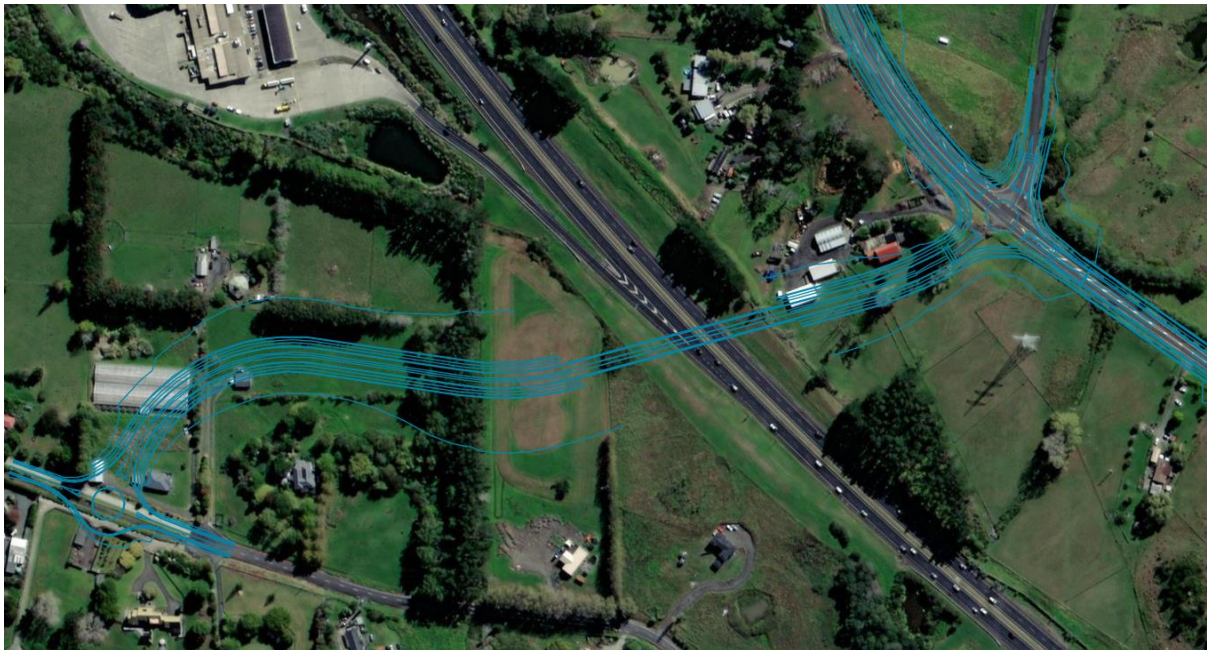


Figure 120: Preferred route for New Crossing of SH1 at Dairy Stream

10.2 IBC to DBC gap analysis

The IBC recommended option for this project was to provide an all modes connection across SH1 in the vicinity of Dairy Stream (just south of the Motorway Service Centre on SH1) – connecting the FUZ on either side of SH1 between Top Road on the west and East Coast Road on the east (refer Figure 121). The IBC notes that this project will improve east-west local connections for all modes over the Motorway.



Figure 121: Indicative Strategic Transport Network highlighting the new crossing, recommended option

East-west motorway crossings are fundamental to service connectivity between communities and access to social-economic opportunities between and on both sides of the existing SH1. Given the quantum of future growth expected in the North, the provision of east-west connections exclusive of the motorway interchanges would provide resilience to the network and avoid funnelling all east-west movements through the motorway interchanges. In combination with the motorway interchanges, particularly the Redvale (or Ō Mahurangi Penlink) interchange, the east-west motorway crossings will provide a good level of mode shift encouragement, accessibility between communities and cater for the expected travel demand.

The gap analysis concluded that an appropriate range of corridor options were considered when analysing the project and other east-west connections in the Dairy Flat area, and that the project could proceed to route refinement i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further 'corridor' assessment to be undertaken. As the DBC progressed, the project team identified the need to assess alternative areas suitable for the motorway crossing further south of the Motorway Service Centre but still retaining a reasonable distance north of the future Ō Mahurangi Penlink (Redvale) Interchange. It was also concluded that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

10.3 Corridor form and function

An assessment was undertaken for the New Crossing of SH1 at Dairy Stream following the CFAF methodology in Section 5.3. This informed the options developed and assessed below. The new crossing will provide a connection across SH1 between Top Road and East Coast Road, for all modes, connecting the FUZ on either side of SH1. The typical New Crossing of SH1 at Dairy Stream cross section is shown in Figure 122 below. The road will have an assumed 50km/hr speed limit.

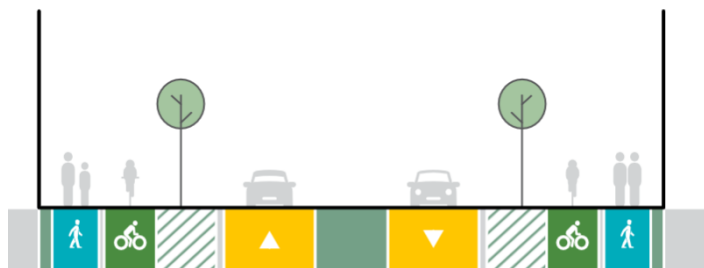


Figure 122: CFAF Outcome - New Crossing of SH1 at Dairy Stream indicative 24 m cross section

10.4 Route Refinement: Option development and assessment

The proposed SH1 crossing is a 24m wide 2-way urban arterial with active mode facilities along both sides of the road corridor, crossing SH1 via an 18m to 22m wide motorway overbridge.

A single option was designed for the project, however different crossing locations were considered using a targeted MCA and constraints-led design process. The study area for the New Crossing of SH1 at Dairy Stream was limited to an area north of the Ō Mahurangi Penlink (Redvale) Interchange and south of the Motorway Service Centre (MSC) on the western side of SH1 for the following reasons:

- a) The crossing needed to be a safe distance north of Ō Mahurangi Penlink (Redvale) Interchange – which is proposed to be upgraded post Ō Mahurangi Penlink construction as part of NoR 4 -SH1 improvements.
- b) The crossing needs to fit in south of the Motorway Service Centre – as Waka Kotahi has indicated a desire to retain this centre in future.
- c) The crossing will need to tie into the future road network. On the east side of SH1, the tie in will be into East Coast Road, which is also proposed for upgrade as part of NoR 13.

In developing options, the Project Team also considered the following known key features in the area. These are mapped in Figure 123 below and include:

- a) Flood plains and Dairy Stream culvert under SH1.
- b) Potential natural wetlands.
- c) Existing SH1 Designations and the proposed SH1 improvements project (NOR 4).
- d) Future Ō Mahurangi Penlink (Redvale) Interchange (Part of NOR 4).
- e) National grid corridor overlay.
- f) The Motorway Service Centre – assumed to be retained.



Figure 123: Map of key features and study area of the New Crossing of SH1 at Dairy Stream

Location options considered for the crossing are set out in the table below including a high level analysis of constraints in each study area.

All location options are located within the Future Urban Zone (FUZ) under the Auckland Unitary Plan (Operative in Part) (AUP(OP)), and all options cross two strategic projects, the SH1 widening and active mode projects, both located parallel to the SH1 carriageway. The Airport Approach Surface overlay also applies to each of the three study areas.

Table 54: Localised MCA and Constraints led assessment for New Crossing of SH1 at Dairy Stream

■	High/significant constraints or potential effects (avoid where practicable)
■	Moderate constraints or potential effects present (consider avoiding on balance with other issues)
■	No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Northern area between the flood plain and motorway service centre	Central area within the flood plain and wetland area	Southern area between the flood plain and Ō Mahurangi Penlink (Redvale) Interchange
1a Heritage	No known Issues	No Known issues	No known Issues
2a. Land use futures /Policy analysis	Located within FUZ	National grid corridor – Height restrictions for structures beneath and near the national grid overhead powerlines. Located within FUZ	Located within FUZ
2b. Urban design	No key issues.	No key issues.	No key issues.
2d Social cohesion; 2c. Land requirement	No key issues. Best option to reduce overall severance of SH1 as this bridge location is evenly spaced between the Redvale and Wilks interchanges	No key issues	No key issues
3b. Stormwater/flooding	Small flood prone area.	Large floodplains and flood prone areas on both sides of SH1.	Flood plains and flood prone areas on the northern side of SH1.
3c. Ecology	Small potential wetland to the north.	Large potential wetlands on both sides of SH1. Stream located within the centre of the option.	Potential wetlands nearby at stream crossing on both sides of road. Unable to avoid.
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Design to consider spanning across the service lane, active mode corridor and widening of SH1.	South of Worsnop Way, catchment > 80 ha (bridge required). SH1 will be raised at this section to achieve freeboard.	Too close to Ō Mahurangi Penlink (Redvale) Interchange – it will be a duplicate facility.

10.4.1 Recommendations



Figure 124: Preferred area for the location of Dairy Stream all modes motorway crossing

For the reasons identified above, the **northern study area** between the flood plain and motorway service centre is the preferred location for an east-west corridor and motorway crossing for all modes (refer Figure 124). Overall, the northern location is preferred as it is well spaced between the Redvale and Wilks interchanges to best reduce severance of the SH1 corridor. It is also largely located outside of the large flood plain and potential natural wetland areas and away from the National Grid Corridor overlay – an Auckland Unitary Plan (Operative in Part (AUP(OP)) overlay which places additional development restrictions within the overlay area (to protect the existing Transpower electricity transmission lines and towers). The poorest performing option is the central option as the crossing would locate within all of the aforementioned constraints. This is consistent with the recommendation made in the Indicative Business Case (IBC).

10.5 Consideration of DBC engagement

During the DBC engagement phase no specific comments were made in reference to the New Crossing. Comments were recorded suggesting the need for better and safe active mode opportunities in the wider North area. The proposed crossing includes active mode facilities along both sides of the road corridor. The new SH1 crossing will be designed in accordance with safety standards, and also promotes active modes in the area.

10.6 Design Refinement

- The preferred option of placing the Dairy Stream crossing within the northern study area was adopted during design refinement. This option is between the floodplain and motorway service centre and is largely located outside of the large floodplain, potential natural wetland areas and away from the National Grid Corridor overlay.

- The connection was also pushed further north as a result of geometric requirements and a desire to retain access to Worsnop Road.
- Angle of the bridge was also altered to achieve the required vertical grades.

10.7 Preferred Route

The preferred route for the New Crossing of SH1 at Dairy Stream is shown below in Figure 125.

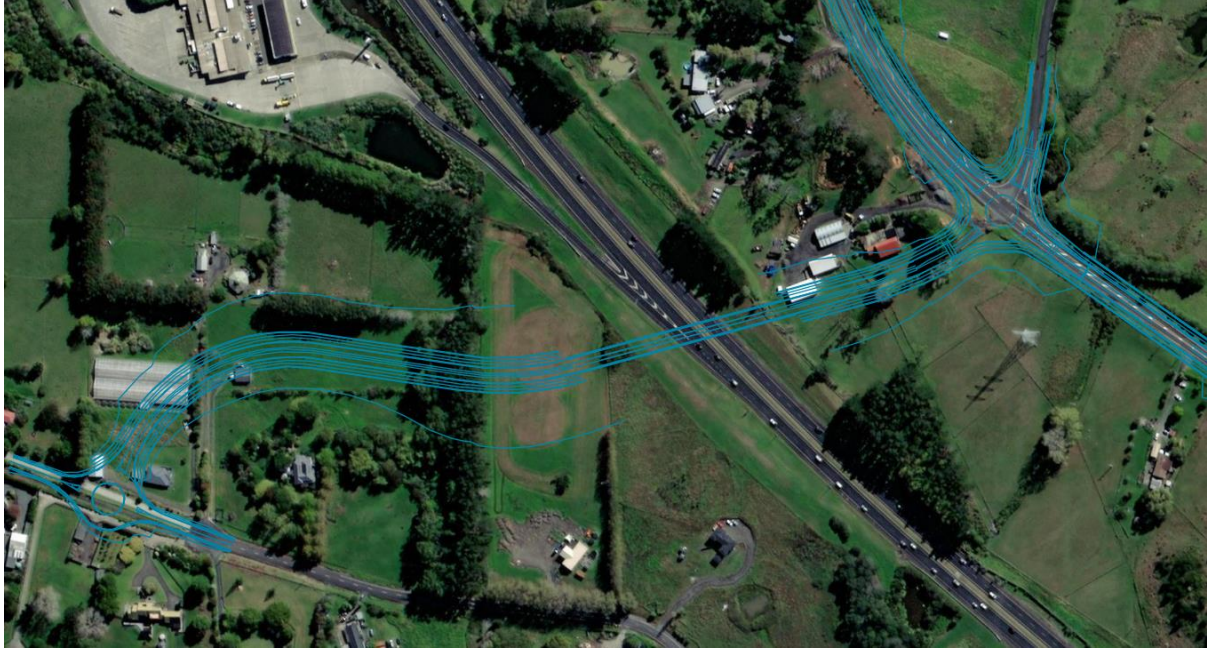


Figure 125: Preferred route for New Crossing of SH1 at Dairy Stream

11. NOR 6 – New Connection between Milldale and Grand Drive

11.1 Summary

This section describes the assessment of alternatives for the proposed New Connection between Milldale and Grand Drive in Ōrewa. The IBC recommended a new connection as part of the indicative network as it was considered an important connection for public transport.

An IBC to DBC gap analysis concluded that the IBC adequately considered indicative corridor options and recommended further consideration of new NPSs for Freshwater and Urban Development, as well as interactions with private developments. The DBC stage involved route assessment and refinement. The corridor was divided into two segments with specific cross-section designs.

The options were developed considering location of potential natural wetlands, indigenous vegetation, zoning, land instability, and other factors. After MCA assessment, Option B was identified as the preferred route due to less adverse effects; and better integration with land use, urban design, and alignment with Manawhenua preferences. Further assessment was conducted in relation to road widening options for the widening of Upper Ōrewa Road, resulting in a recommendation to widen both sides of the road while minimising impacts on adjacent constraints such as the rural urban boundary, and adjacent natural wetlands. Design refinements also accommodated necessary features such as river crossings and sight distance requirements.

The preferred route for the New Connection between Milldale and Grand Drive is shown below in **Figure 135**.

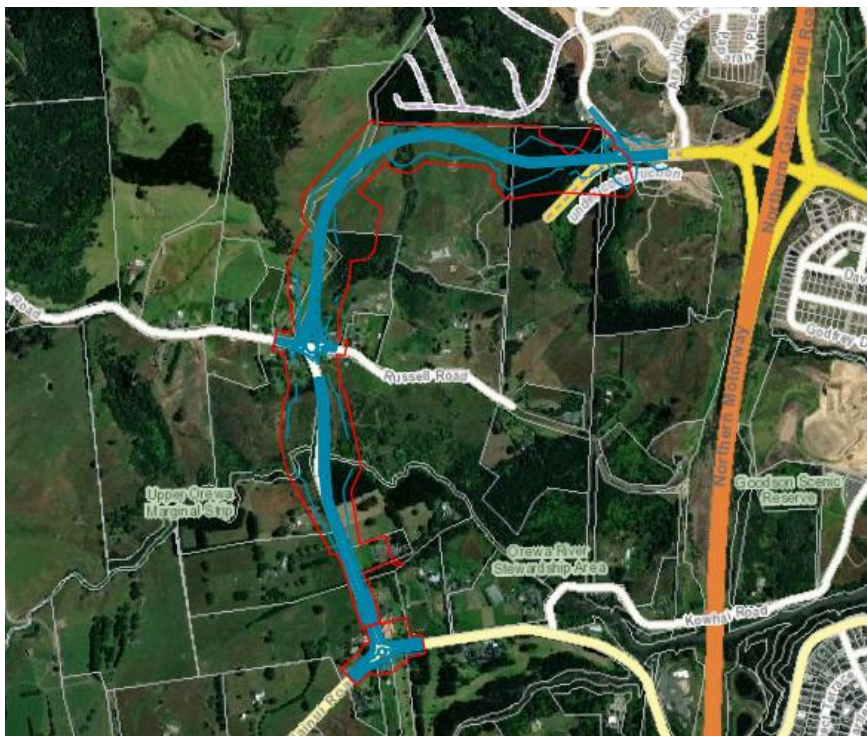


Figure 126: Preferred route for the new connection between Milldale and Grand Drive

11.2 IBC to DBC gap analysis

The IBC recommended option (R6-2) comprised a new connection between Milldale and Grand Drive in Ōrewa (number 7 in Figure 127 below). This included an upgrade to the part of Upper Ōrewa Road and a new connection across to Grand Drive interchange. The recommended option was described as a collector road (not an arterial), as IBC analysis showed this route would not be expected to cater for traffic volumes consistent with the AT road classification for an arterial (annual daily traffic of over 10,000 vehicles per day). However, since Wainui to Grand Drive is considered an important public transport connection, this connection was recommended to be included as a strategic collector type route and a new PT connection.



Figure 127: Indicative Strategic Transport Network highlighting the New Connection between Milldale and Grand Drive, recommended option

The gap analysis concluded that the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further indicative ‘corridor’ assessment to be undertaken; therefore the project could proceed to route refinement. However, the gap analysis did recommend the following be further considered in the DBC phase:

- Consider the new NPSs for Freshwater and Urban Development (as outlined in Part A)
- Better understand interactions with private developments in the area including Ara Hills approved subdivision and a potential private plan change to rezone the FUZ.

During the DBC stage, the New Connection followed the following steps for option development and assessment:

- Step 1 –Route Assessment: Development and MCA assessment of detailed route options.
- Step 2 – Route Refinement: Targeted MCA and constraints led assessment of the common Upper Ōrewa Road upgrade segment of the project – as an input to option. Note: this step was considered necessary as this section was common between the options and the MCA process did not look at which side of the road to widen on.

11.3 Corridor form and function

An assessment was undertaken for the New Connection between Milldale and Grand Drive following the CFAF methodology in Section 5.3. This informed the options developed and assessed below.

The corridor provides a north-south connection for all modes from the growth area of Milldale to Grand Drive and Ōrewa. The typical cross-section for the New Connection between the Grand Drive SH1 Interchange and the Ara Hills development town centre is shown in Figure 128 below and the typical cross section between the Ara Hills development town centre to Wainui Road is shown in Figure 129. Both will have an assumed 50km/hr speed limit.



Figure 128: CFAF Outcome - New Connection between Milldale and Grand Drive indicative 30 m cross section

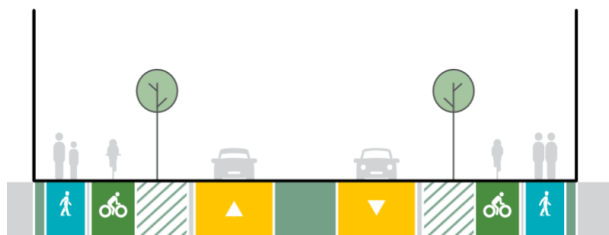


Figure 129: CFAF Outcome - New Connection between Milldale and Grand Drive indicative 24 m cross section

11.4 Route Assessment

11.4.1 Option development

For the purposes of detailed route option development, the Section was divided into two segments which matched the form and function analysis for the project (as described below):

- a) Segment 1: This corridor extends from the Grand Drive Interchange to the Ara Hills development Town Centre. The form and function proposed a generic four lane arterial corridor with a width of 30m with separated cycle lanes and footpaths on both sides for this segment.
- b) Segment 2: This corridor extends from the Ara Hills development Town Centre to Wainui Road. The form and function proposed a 24m generic two-lane corridor with separated cycle lanes and foot paths on both sides for this segment.

Options developed were limited to an area extending from the Grand Drive interchange through to Wainui Road, but with a broader study area (see Figure 130) for the new road part of the connection for the following reasons:

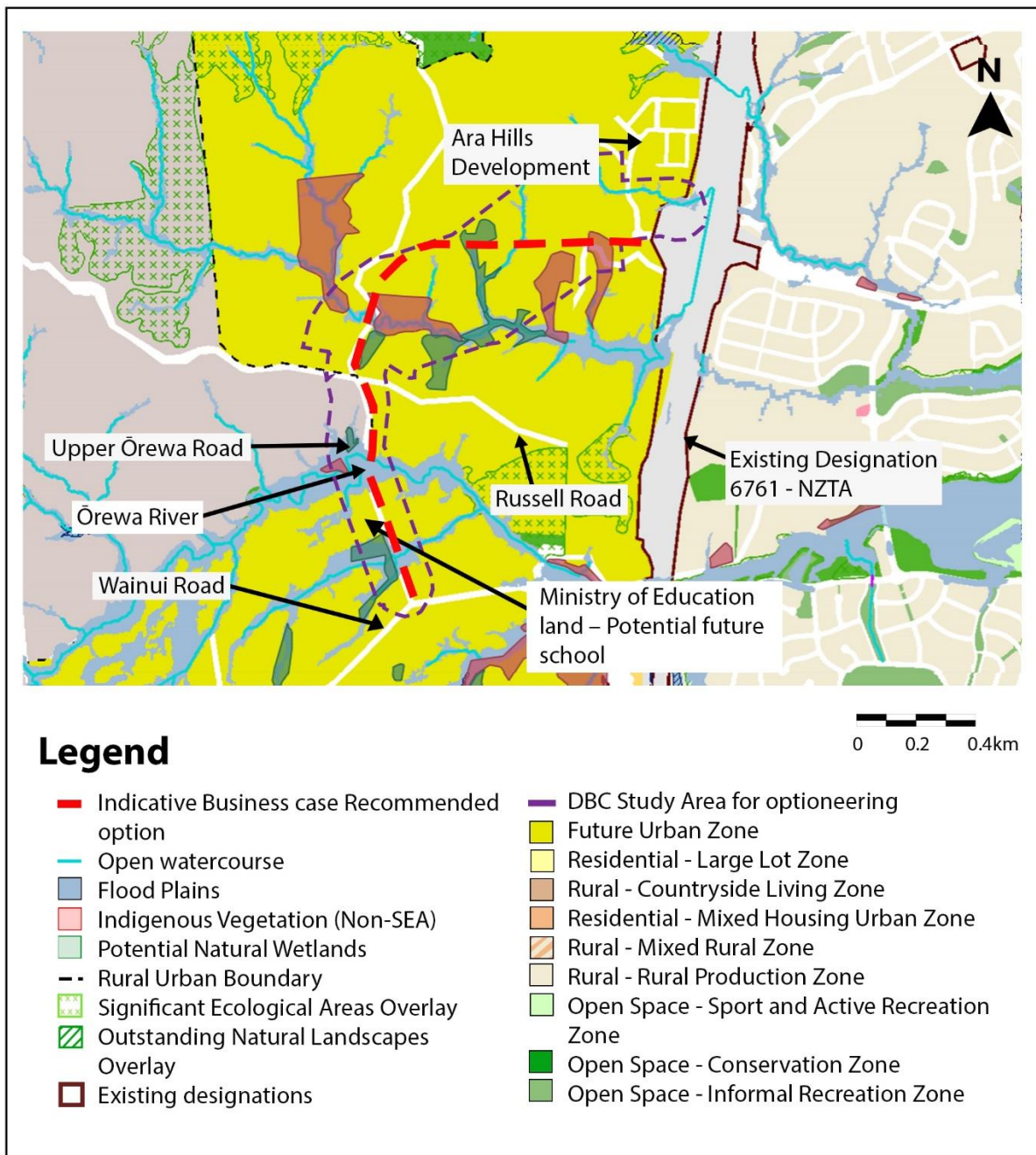


Figure 130: Map of key features and study area – New Connection between Milldale and Grand Drive

In developing options, the Project Team also considered the following known key features in the area. These are mapped in Figure 130 above and include:

- a) Areas of potential wetland and stream crossings.
- b) Areas of indigenous vegetation (non-SEA).
- c) The Rural Urban Boundary (RUB) which abuts Upper Ōrewa Road to the west.
- d) Ministry of Education land (proposed to be developed for a large school) and a childcare centre.

- e) Areas of land instability and steep topography
- f) Stormwater/flooding constraints.

In consideration of the above factors, **two detailed route options** were developed for MCA assessment, as outlined in **Table 55** and **Figure 131** below. These are discussed in the sections to follow:

Table 55: Summary of New Connection detailed route options

Option Reference	Option Name	Option description
Option A	UO-01	Option A is a new transport corridor extending in a south-west direction from the Ara Hills development towards the Russell Road/Upper Ōrewa Road intersection. The option also makes partial use of a paper road north of Russell Road. The proposal is a new road through greenfield FUZ land and was aligned to largely avoid potential areas of floodplain and wetland.
Option B	UO-02	Option B is a new transport corridor extending in a westerly direction from the new Ara Hills development, before extending southwards towards the Russell Road/Upper Ōrewa Road intersection. The option also makes partial use of a paper road north of Russell Road. The proposal is a new road through greenfield FUZ land and was aligned to largely avoid identified floodplains and areas of mapped (non-SEA) indigenous vegetation.

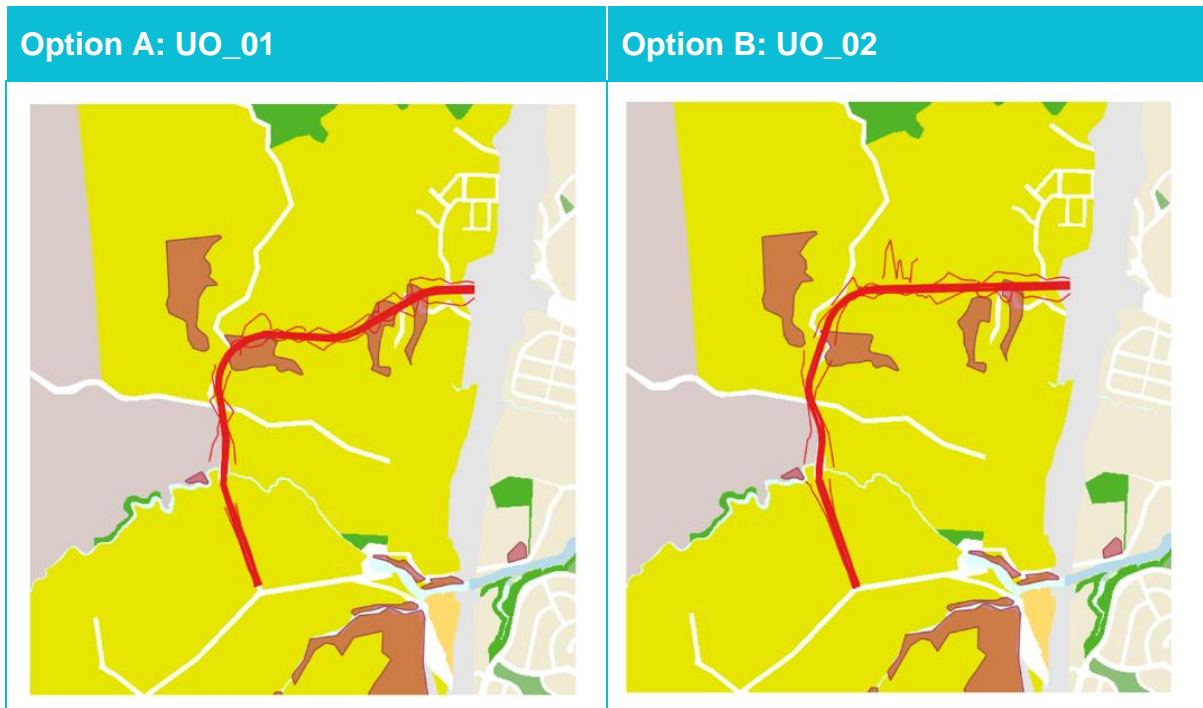


Figure 131: Detailed Route Options – New Connection Milldale to Grand Drive

Both options will provide a new north-south connection for all modes to support growth in Milldale and Ōrewa, including the new Ara Hills development (refer **Error! Reference source not found.** below). Both options include a new 30m corridor for Segment 1 (for buses, vehicles and separated walking and cycling) and a new/upgraded 24m corridor for Segment 2 (for vehicles and separated walking and cycling). As the area is quite hilly, the section of new road for Segment 2 requires some major earthworks batters.

Ara Hills consented development is occurring in Segment 1. Adjacent zoning is Future Urban Zone, with the southern half of the proposed alignment within the legal road (Upper Ōrewa Road), but with widening required to allow for the cross-sections proposed. Change to this FUZ land use is signalled through the Auckland Plan and the Auckland Unitary Plan. The future zoning/land use will likely be a mix of urban zones and uses including residential.



Figure 132: Te Ara Hills Development – Segment 1

11.4.2 Option assessment

To recap, as outlined in Section 2, route options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green). Note: The criterion for 1a Heritage was excluded from this assessment as initial constraints mapping showed there are no known heritage sites in the vicinity.

The following table identifies the outcomes from this assessment.

Table 56: Summary of MCA – New Connection Milldale to Grand Drive

MCA Criteria	Option A	Option B
Investment Objective 1 - Access: Access to economic and social opportunities in Wainui East will be limited if this connection is not provided	2	2
Investment Objective 2 - Resilience: Enable reliable and resilient people movement	2	2
Investment Objective 3 - Travel Choice: Support transformational mode share in the North by providing a high quality, safe and attractive movement of people	3	3
2a. Land use futures	0	1
2b. Urban design	-2	-1
2c. Land requirement	-1	-1
2d. Social cohesion	-2	-2
2e. Human health and wellbeing	-2	-2
3a. Landscape / visual	-3	-3
3b. Stormwater/flooding	-2	-1
3c. Ecology	-4	-3
3d. Natural hazards	-3	-2
5a. Construction impacts on utilities / infrastructure	-1	-1
5b. Construction disruption	-3	-3
6a. Construction costs / risk / value capture	-2	-2

The Project Team reviewed and compared the options identified above and noted that matters relating to land use futures, urban design, stormwater/flooding, ecology and natural hazards are the primary considerations for this segment and showing differentiation between the options.

In relation to non-scored matters:

- Manawhenua who stated a preference between the options confirmed a preference for Option B (representatives of Ngāti Maru, Ngāi Tai ki Tāmaki, Te Ākitai Waiohua, Ngāti Wānanga and Ngāti Manuhiri).
- There was no real differentiation between the options from a policy perspective.

- In relation to Value for Money – the cost differential favours Option A.

Accordingly, the Project Team identified **Option B as the preferred route option** for the following reasons:

- Option B performs best from an effects perspective. In particular, the option scored better for stormwater/flooding as there is more fill and less cuttings than Option A, meaning less need to convey stormwater through deep cuttings and greater opportunity to use fill material in low impact design for stormwater. The option also scored better for ecology as the option largely avoids areas of non-SEA indigenous vegetation where broadleaved scrub and native lizards are likely to exist. Option B also scored better for natural hazards as the option avoids a prominent large landslide observed in aerial imagery.
- Despite being more expensive, Option B provides greater opportunity for integration with development of FUZ land and has a better urban design outcome than Option A, as it is further removed from the Ōrewa River tributary/floodplain.
- Option B aligns with Manawhenua preferences.

The remaining option was discounted by the Project Team for the following reasons:

Table 57: Reasons for discounting option A

Option	Reasons for discounting option
Option A	<p>Greater impacts on areas of non-SEA indigenous vegetation where broadleaf scrub and native lizards are likely to exist. Both have similar, relatively minor effects on potential wetlands and streams.</p> <p>Will sever more land close to floodplains, making it harder to integrate with surrounding development -leaving some pockets of FUZ that are harder to develop (less accessible).</p> <p>Potentially interacts with a large landslide observed in aerial imagery.</p> <p>Option not supported by Manawhenua who have identified a preference.</p>

11.5 Route Refinement

Following selection of Option B, a targeted MCA with qualitative analysis and constraints-led assessment was completed for the section of existing Upper Ōrewa Road that is to be widened (see Figure 133).



Figure 133: Upper Ōrewa Road – Existing road upgrade section

Options considered for widening this road are set out in the table below including a high level analysis of constraints on either side of the road.

Prior to this assessment, a new National Policy Statement – the NPS: Highly Productive Land (NPS:HPL) was released. This was considered as part of the assessment, considering there is a short section of Rural Production Land to the west of the corridor (brown zone shown above in Figure 133). In relation to this NPS the following is noted:

- The objective of the NPS:HPL is: Highly productive land is protected for use in land-based primary production, both now and for future generations.
- Designations or NoRs are exempt from meeting the objectives and the NPS:HPL if the activity:
 - minimises or mitigates any actual loss or potential cumulative loss of the availability and productive capacity of highly productive land in their district; and
 - avoids if possible, or otherwise mitigates, any actual or potential reverse sensitivity effects on land-based primary production activities from the use or development.
- Existing Land Use Capability Mapping (LUC) mapping indicates there is no known highly productive soils close to the existing road within this Rural Production zone i.e., the closest LUC 1 – 3 land on the western side of the corridor is located approximately 320 m to the west.
- The NPS:HPL is not considered to have a strong bearing on the selection of the road widening option, considering the Project in this area comprises widening of a small section of existing road that is not known to have LUC 1-3 class soils, and would minimise loss of HPL (and also no reverse sensitivity effects are anticipated).

Table 58: Constraints led assessment – Upper Ōrewa Road segment of New Connection Milldale to Grand Drive)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the East SGA 24m cross sections – hold north boundary and widen to the East	Widen to the West SGA 24m cross sections – hold south boundary and widen to the West
1a Heritage	No known Issues Decommissioned bridge on western side – not archaeological or heritage listed.	No Known issues	No known Issues Decommissioned bridge on western side – not archaeological or heritage listed.
2a. Land use futures /Policy analysis	Rural Production zoned land on west of northern part of corridor – so slightly less opportunity to integrate widening / project with future urban development . NPS: Highly productive land allows designation within this zone	No key issues – FUZ land	Rural Production zoned land on west of northern part of corridor – less opportunity to integrate widening / project with future urban development. NPS: Highly productive land allows designation within this zone
2b. Urban design	Northern section topography creates potential for poor interface outcomes due to scale of earthworks. Look to minimise earthworks to create opportunity for future development to interface with the road corridor. Southern section is flatter.	As for widen both sides	As for widen both sides
2d Social cohesion; 2c. Land requirement	MoE land is located on west side of corridor – for future school – project team has engaged with MoE who are in early planning stages and supportive of the project. Small potential impact on property.	Potential full property acquisition of house close to road (Russell Road)	MoE land is located on west side of corridor – for future school.
3b. Stormwater/flooding	Treatment needed either side of flood plain - may be an issue as very flat	As for widen both sides	Treatment needed either side of flood plain - may be an issue as very flat. Potential flooding of road due to upstream catchment and low spot in road from contours.

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the East SGA 24m cross sections – hold north boundary and widen to the East	Widen to the West SGA 24m cross sections – hold south boundary and widen to the West
3c. Ecology	Weed dominated vegetation on both sides of Ōrewa River crossing. Potential wetland on west of southern half of corridor - avoid where practicable	Weed dominated vegetation on both sides of Ōrewa River crossing	Weed dominated vegetation on both sides of Ōrewa River crossing. Potential wetland on west of southern half of corridor. -avoid where practicable
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Russell Rd intersection will need to be elevated and tie-in into a new stream bridge. The existing steep grade of the road will need to be corrected and lifted higher. The same for all options.	As for widen both sides	As for widen both sides

The following recommendations were made following the assessment to inform option refinement:

- A hybrid approach (refer sections in Figure 134 below) including:
 - **Section 1 (S1) – Road widening both sides** – preference to widen both sides while minimising impacts on rural production land, at intersection with Russell Road
 - **Section 2 (S2) – Road widening both sides** -Consider driveway / garage access impacts at southern end of corridor, seek to avoid potential natural wetland on western side of corridor, and consider property acquisition at northern end of corridor. Engage with MoE around potential effects on MoE land to west.



Figure 134: Widening recommendation of Upper Ōrewa Road – Hybrid approach

11.6 Consideration of DBC engagement

During the DBC development, multiple meetings were held with the Ministry of Education (MOE). The MOE have purchased land adjoining Wainui Road and intend to develop a school on the site within a 10-year timeframe. At the time of writing, the MOE was undertaking masterplanning for the site. The MOE is interested in upgrade plans for Upper Ōrewa Road and intends to provide an access to this road in the future. The MOE was generally comfortable with the upgrade of the corridor.

During the DBC engagement phase no specific comments were made in reference to the New connection between Milldale and Grand Drive. Comments were suggested regarding public transport being a priority in these areas. The preferred option provides a new connection which can be used by all modes including buses.

11.7 Design Refinement

During design refinement, recommendations to widen Upper Ōrewa Road on both sides for Section 1 and 2 were implemented. Within Section 1, widening has been implemented while minimising impacts to rural production land. Within Section 2 widening has taken into account driveway/garage access, property acquisition at the northern end of the corridor as well as avoiding a potential natural wetland on the western side of the corridor. Other key refinements that were made include:

- Refinements to the alignment in the northern section due to sight distance requirements at the Ara Hills tie in point and to tie-in with land set aside by Ara Hills developer.
- Structure allowed for to span the Ōrewa River.
- Steepening grades of the road in the northern portion (8%) to minimise earthworks.

11.8 Preferred Route

The preferred route for the New Connection between Milldale and Grand Drive is shown below in **Figure 135**.

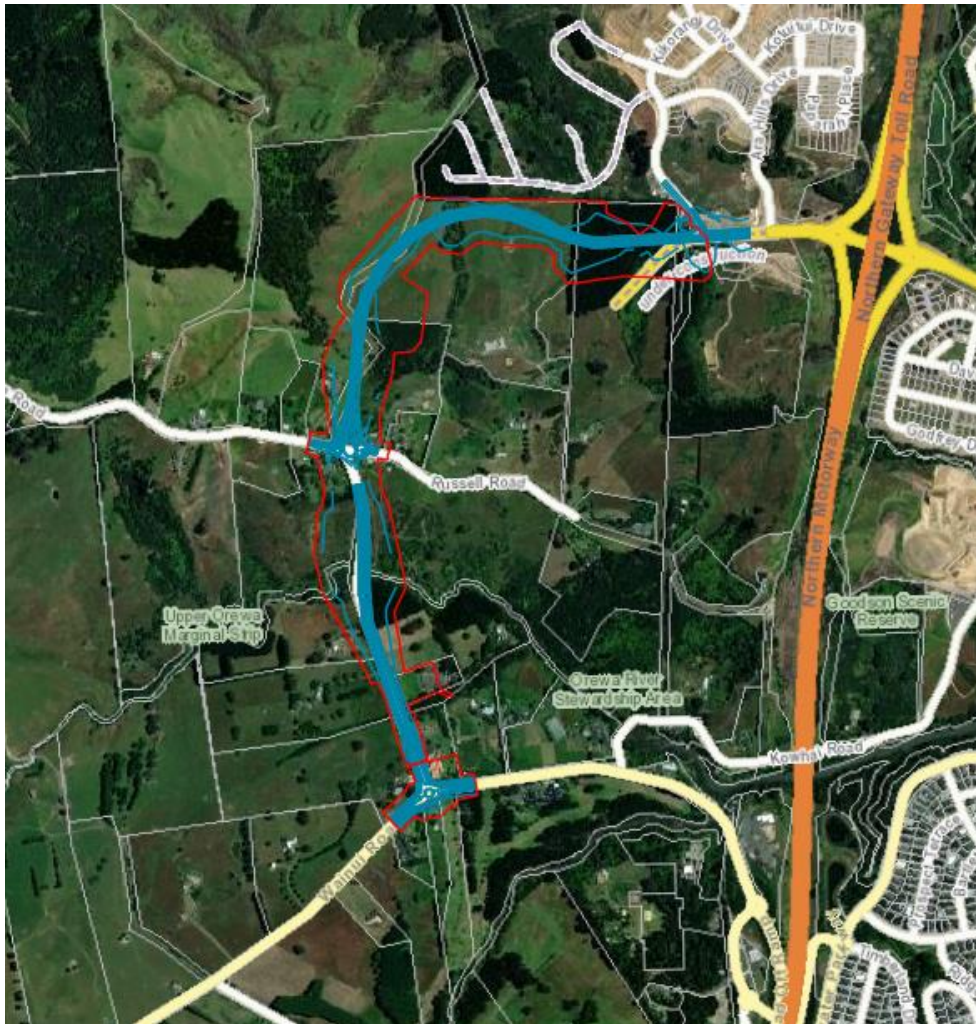


Figure 135: Preferred route for the new connection between Milldale and Grand Drive

12. NOR 7 – Upgrade to Pine Valley Road

12.1 Summary

This section describes the assessment of alternatives for the upgrade to Pine Valley Road. The IBC recommended upgrading Pine Valley Road in the Future Urban Zone (FUZ) area, with dedicated bus lanes and separated walking and cycling facilities. It aimed to improve the east-west connection between Kahikatea Flat Road and the new Argent Road connection through Milldale.

The gap analysis confirmed the adequacy of the IBC's corridor options assessment. The DBC phase considered the effects on sensitive environments, new NPSs, and constraints. The form and function process identified the need for a two-lane arterial road with walking the cycling provision. Dedicated bus lanes were not deemed necessary due to anticipated traffic flows.

The DBC used a targeted MCA and constraints-led design process to consider road widening options. Key features, such as wetlands, streams, an SEA, and archaeology, were considered. The refinement stage recommended widening the road on specific sections to avoid constraints while considering wetlands, streams, and the Wēiti Stream Esplanade Reserve. Further design refinement was undertaken considering stream/floodplain avoidance, wetlands, and minimising property impacts.

The preferred route for the Upgrade to Pine Valley Road is shown below in Figure 136.

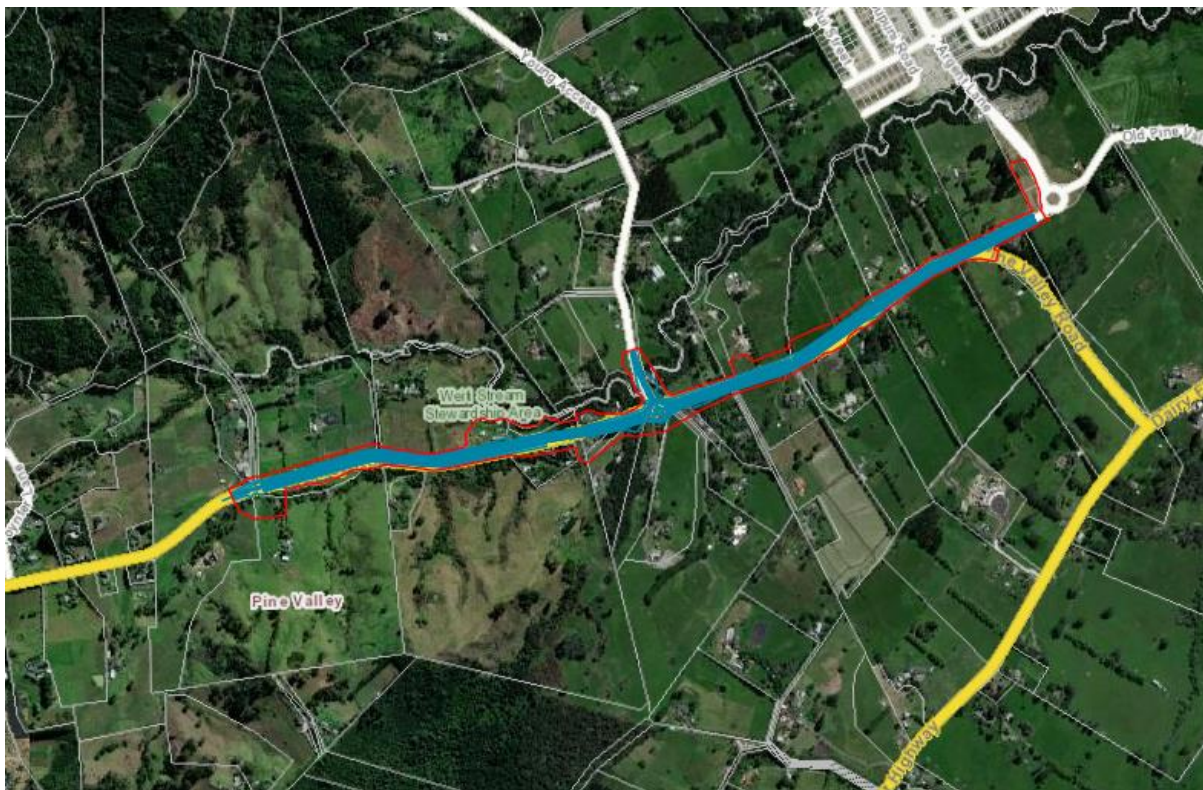


Figure 136: Preferred route for the Upgrade to Pine Valley Road.

12.2 IBC to DBC gap analysis

The IBC recommended option for this project (R10-1) comprised an upgrade of Pine Valley Road within the FUZ area, including a transitional zone at the western extent before returning to a rural road. It is expected to provide dedicated bus lanes and separated walking and cycling facilities. The IBC noted the upgrade is intended to support growth in the Silverdale West FUZ and improve the east-west connection for all modes between Kahikatea Flat Road and the new Argent Road connection through Milldale. The extent of the upgrade is shown in the IBC (refer Figure 137 below) as between the western edge of the Silverdale West FUZ and Argent Lane, where it connects to the edge of the Dairy Flat-Silverdale West Future Industrial area. The IBC determined an upgrade further west was not necessary.



Figure 137: Indicative Strategic Transport Network highlighting the Upgrade to Pine Valley Road, recommended option

Overall, the gap analysis process confirmed an appropriate range of indicative corridor options were considered including other arterial road connections in the Ōrewa/Silverdale area and the project could proceed to route refinement (i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further 'corridor' assessment to be undertaken). The gap analysis process also identified the need for the DBC optioneering and design to consider effects on sensitive receiving environments (an SEA and Wēiti stream) and avoid (where practicable) and otherwise minimise effects; as well as consideration of the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

12.3 Corridor form and function

An assessment was undertaken for the Pine Valley Road upgrade following the CFAF methodology in Section 5.3. This informed the options developed and assessed in Section 12.4 below.

The corridor forms an east-west connection for all modes between the western edge of the FUZ in Pine Valley and the new Argent Lane Connection that runs through Milldale. Further west, the corridor connects to the rural towns of Helensville and Kaukapakapa. The typical Pine Valley Road cross section is shown in Figure 138 below. This includes separated walking and cycling and a 2-lane road corridor. The road would also drop in speed to an assumed 50km/hr.



Figure 138: CFAF Outcome - Pine Valley Road indicative 24 m cross section

12.4 Route Refinement: Option development and assessment

A single Route Refinement option was developed for the Upgrade to Pine Valley Road using the targeted MCA with qualitative assessment and the constraints led design process. The option was limited to an area extending from the western edge of the FUZ through to the new Argent Lane extension (recently designated by AT) for the following reasons:

- a) The IBC recommended upgrade of this transport corridor and the IBC-DBC gap analysis confirmed this recommendation as still appropriate for the DBC as detailed above. There is an existing road corridor in this location which provides an appropriate route to meet the purpose and objectives of the project – including the fact it is relatively central to the FUZ, provides an east-west route to support growth between the edge of the FUZ and the future industrial area (and via Argent Lane to Milldale, Dairy Flat Highway, SH1 and Silverdale).
- b) More detailed constraints mapping at DBC phase confirmed that an alternative corridor (R11 in the IBC) that would remove the dog leg in the corner of the Pine Valley Road alignment would have significant constraints as it would require a new section of road with a new floodplain/wetland/stream crossing.

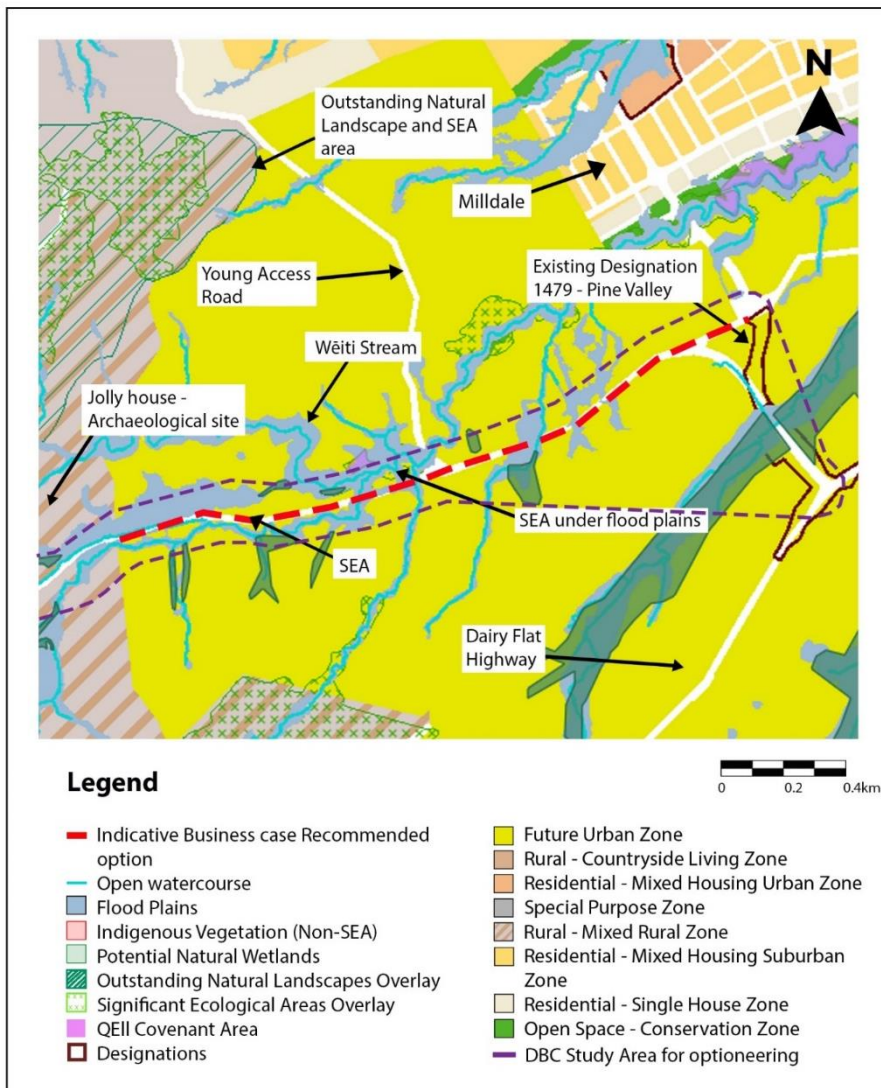


Figure 139: Map of key constraints and features – Pine Valley Road Upgrade

In developing the option, the Project Team also considered the following known key features in the area. These are mapped in Figure 139 above and include:

- Areas of potential wetland, flood-prone areas and stream crossings. The Wēiti Stream and esplanade reserve runs near to the northern side of the road and has very high cultural value.
- An SEA on the northern side of the road around the Wēiti Stream
- Pockets of indigenous forest (non-SEA)
- Archaeology – c1905 dwelling 'Jolly House'.
- NOR for Argent Lane extension/Pine Valley Road north realignment.

In consideration of the above factors, a single option was developed through route refinement using the targeted MCA and constraints-led design approach.

The option focuses on the road upgrade of Pine Valley Road within the FUZ, applying the typical two-lane 24m urban arterial cross-sections included in Part A, including the addition of separated walking and cycling and dropping of the speed limit to 50km/hr. This option was developed in order to avoid key constraints in the area. The road widening follows the existing road corridor.

The constraints-led assessment was completed for the whole length of the corridor in order to guide option development.

Which side of the road to widen on (versus both sides) and a hybrid option were considered in the context of key constraints present along the corridor. This assessment is set out in the table below including a high-level analysis of constraints on either side of the road.

Table 59: Targeted MCA and Constraints led assessment for Upgrade to Pine Valley Road

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the North (hold southern boundary and widen to North – 24m cross-section)	Widen to the South (hold northern boundary and widen to South – 24m cross-section)	Hybrid option (widen to north, then south then both sides to avoid key constraints)
1a Heritage	No known issues.	No known issues.	No known issues.	No Known issues
2a. Land use futures	FUZ both sides Will need to tie into existing designation 1479 at eastern end' where roundabouts have recently been constructed. Potential for a section of road (outside of scope) at the eastern end to be closed off in the future.	As for Widen both sides	As for Widen both sides	As for Widen both sides
2b. Urban design	No key issues.	No key issues.	No key issues.	No key issues
2d Social cohesion; 2c. Land requirement	Similar number of properties affected either side of road.	Similar number of properties affected either side of road. Wēiti Stream (Esplanade Reserve), would require Minister's consent to acquire.	Similar number of properties affected either side of road.	Similar number of properties affected either side of road
3b. Stormwater/flooding	Floodplains on both sides of road of a similar size.	Floodplains on both sides of road of a similar size.	Floodplains on both sides of road of a similar size.	Floodplains on both sides of road of a similar size.
3c. Ecology	Some areas of potential wetland. Similar on both sides of the road. SEA directly adjoins northern side of road around Wēiti Stream –avoid if practicable. Wēiti tributary parallel to southern side of road at the western end.	Some areas of potential wetland. Similar on both sides of the road. SEA directly adjoins northern side of road around Wēiti Stream –avoid if practicable. Wēiti Stream (Esplanade Reserve), would require Minister's consent to acquire.	Some areas of potential wetland. Similar on both sides of the road. Non-SEA indigenous forest is on south where Wēiti tributary crosses under the road.	Some areas of potential wetland. Similar on both sides of the road. Preferred option from ecology perspective as minimises potential effects on SEA, Wēiti and tributaries and natural wetlands

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the North (hold southern boundary and widen to North – 24m cross-section)	Widen to the South (hold northern boundary and widen to South – 24m cross-section)	Hybrid option (widen to north, then south then both sides to avoid key constraints)
	Non-SEA indigenous forest is on south where Wēiti tributary crosses under the road.	er's consent to acquire		
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Western section of the route has steep topography on the southern side and the central section, steep topography on the north. This corresponds to the stream alignment which is parallel along the route. Widening both sides will reduce the extents of the batters.	Western section of the route has steep topography on the southern side and the central section, steep topography on the north. This corresponds to the stream alignment which is parallel along the route. Impact of widening on one side may result in larger batters.	As for Widen to North	Western section of the route has steep topography on the southern side and the central section, steep topography on the north. This corresponds to the stream alignment which is parallel along the route. Widening both sides will reduce the extents of the batters.



Figure 140: Recommendation for widening – Upgrade to Pine Valley Road

Considering the above, the localised MCA and constraints-led design assessment recommended the following for further consideration in the design refinement stage to avoid key constraints (refer Figure 140):

- **Section 1** - Road widening more to the north - to avoid the stream / floodplain and wetlands running parallel to south side of road and to minimise number of properties impacted.
- **Section 2** - Road widening more to the South - to avoid SEA and Esplanade Reserve along Wēiti.
- **Section 3** - Road widening on both sides – no significant constraints but consider avoiding potential natural wetlands and streams where possible. Consider opportunity to use recently constructed roundabouts on eastern side of the alignment.

12.5 Consideration of DBC engagement

During the DBC engagement phase no specific comments were made in reference to the Upgrade to Pine Valley Road; however comments were suggested regarding public transport being a priority in these areas. In response to this, dedicated bus lanes are not considered necessary for the corridor because future expected traffic flows are not anticipated to be high enough to require them.

The preferred option for the project includes widening the road to include separated walking and cycling facilities. A Rapid Transit Corridor is also proposed through this area (refer Part A), including a new station in Pine Valley East (see NOR 3 in Part B). Pine Valley Road may be used for local bus access to this station. This will prioritise public transport and walking and cycling in this area.

One comment mentioned that the traffic counts for Pine Valley Road are not up to date and suggested that the entire length of the road should be upgraded. The traffic modelling undertaken for

the network assumes full build out of the FUZ area by 2048. This did not indicate a need to upgrade the road west of the FUZ, nor did it indicate that traffic levels would warrant adding additional traffic lanes.

12.6 Design Refinement

All the recommendations on road widening (listed above) were considered and implemented during design refinement as follows:

- Within Section 1 the road was widened more to the north to avoid the stream/floodplain and potential wetlands on the southern side of the road and to minimise the number of properties impacted.
- Within the central portion (Section 2) the design refinement looked to minimise effects to Wēiti stream and the SEA, on the northern side of Pine Valley Road, through shifting the alignment to the south where necessary and avoiding the need for stream diversions. The Young Access Roundabout (Section 2) was also shifted to the south to minimise impacts to the SEA to the north.
- Road widening on both sides within Section 3.

Other key refinements include:

- Within the eastern portion (Section 3) the design refinement looked to minimise effects on a water feature on the southern side of Pine Valley Road through shifting the alignment to the north.

12.7 Preferred Route

The preferred route for the Upgrade to Pine Valley Road is shown below in Figure 141.

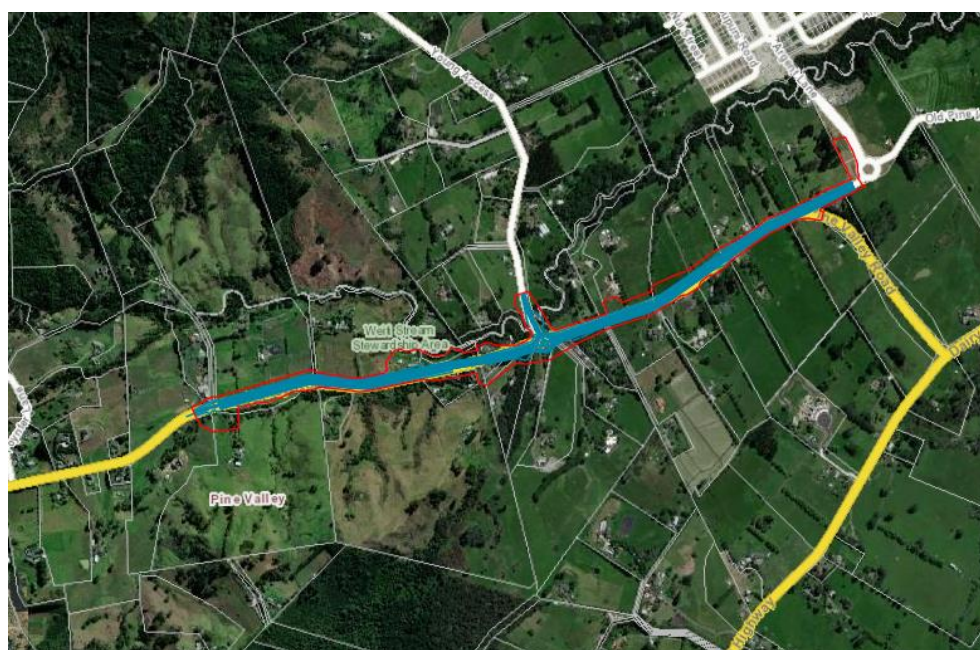


Figure 141: Preferred route for the Upgrade to Pine Valley Road.

13. NOR 8 – Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat

13.1 Summary

This section outlines the assessment of alternatives for the Upgrade of Dairy Flat Highway between Silverdale and Dairy Flat. The IBC recommended upgrading Dairy Flat Highway between Silverdale and the end of the Dairy Flat Future Urban Zone (FUZ), including dedicated bus lanes and separated walking and cycling facilities.

An IBC to DBC gap analysis confirmed the adequacy of the IBC's indicative corridor options. The DBC phase focused on avoiding or minimising effects on sensitive environments and considering the new NPSs.

The DBC assessment divided the project into four segments, each with specific cross-section designs. Key features such as wetlands, floodplains, streams, an outstanding natural landscape near Green Park, heritage sites, and community facilities were considered. A single option was developed through route refinement, following the existing road corridor and applying either urban arterial cross sections or a two lane urban/rural treatment depending on the adjacent land use.

A targeted MCA and constraints-led design assessments were conducted for each segment, recommending widening options that avoided key constraints while considering the FUZ and rural zones.

Further design refinements were made to minimise impacts on heritage sites, school facilities, floodplains, wetlands, and outstanding natural landscape areas. Adjustments were made to intersection locations, alignments, and physical works to mitigate effects and improve traffic flow. Active mode facilities and encroachments over the Rural Urban Boundary were considered to reduce impacts and accommodate existing industrial areas.

Figure 142 sets out the recommended approach to widening for the corridor.

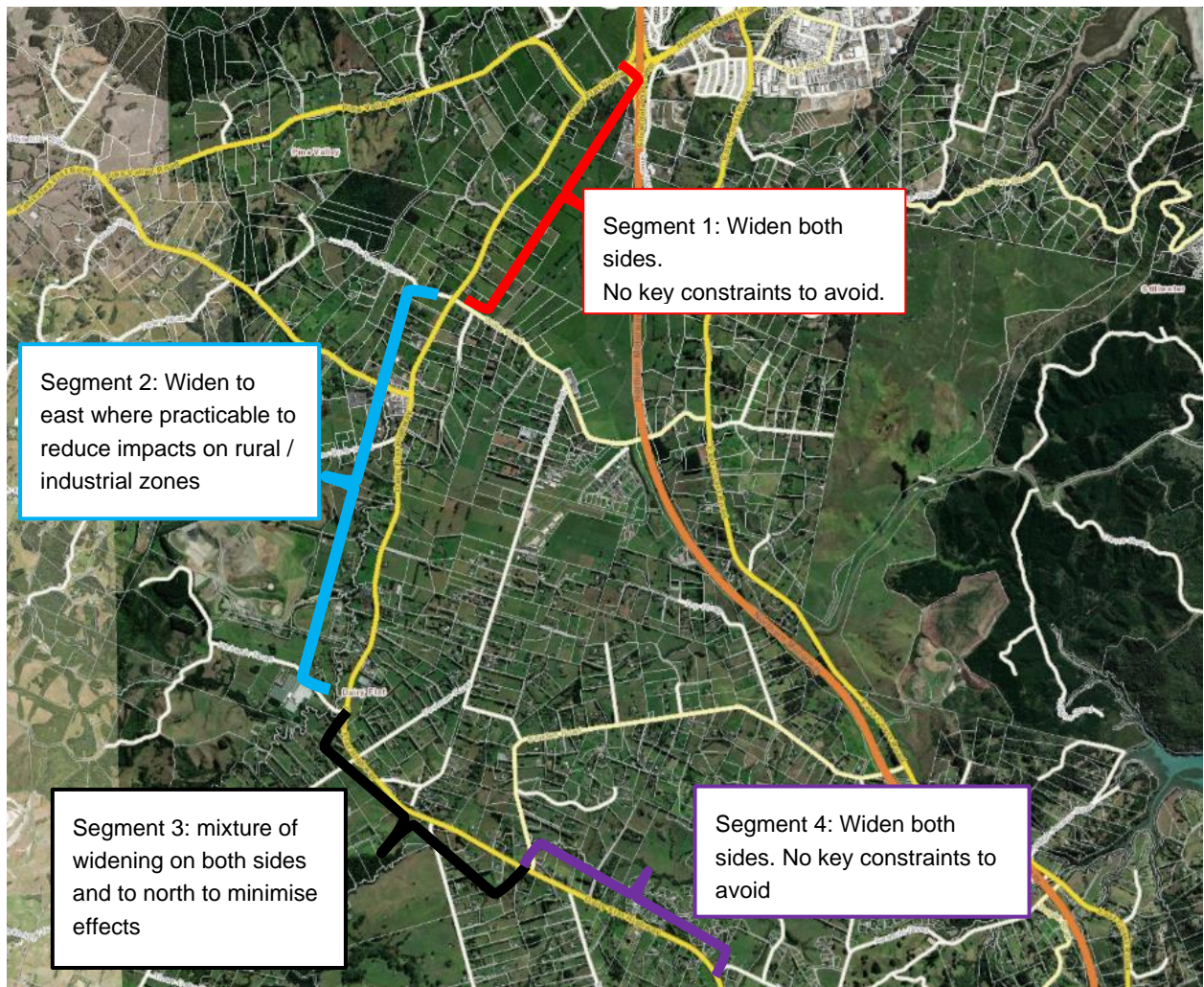


Figure 142: Preferred option and widening approach

13.2 IBC to DBC gap analysis

The IBC recommended option for this project (R24-1) comprised an upgrade of Dairy Flat Highway between Silverdale and the end of the Dairy Flat FUZ (at Potters Road) and assumed the corridor would provide dedicated bus lanes and separated walking and cycling facilities (refer Figure 143). In terms of the purpose of the connection, Dairy Flat Highway forms an important north-south connection on the North network. The corridor forms the western boundary of the Silverdale West - Dairy Flat Industrial Area. Additionally, the connection provides a good level of resilience to the rest of the network, as it can be used as an alternative to SH1 if needed.

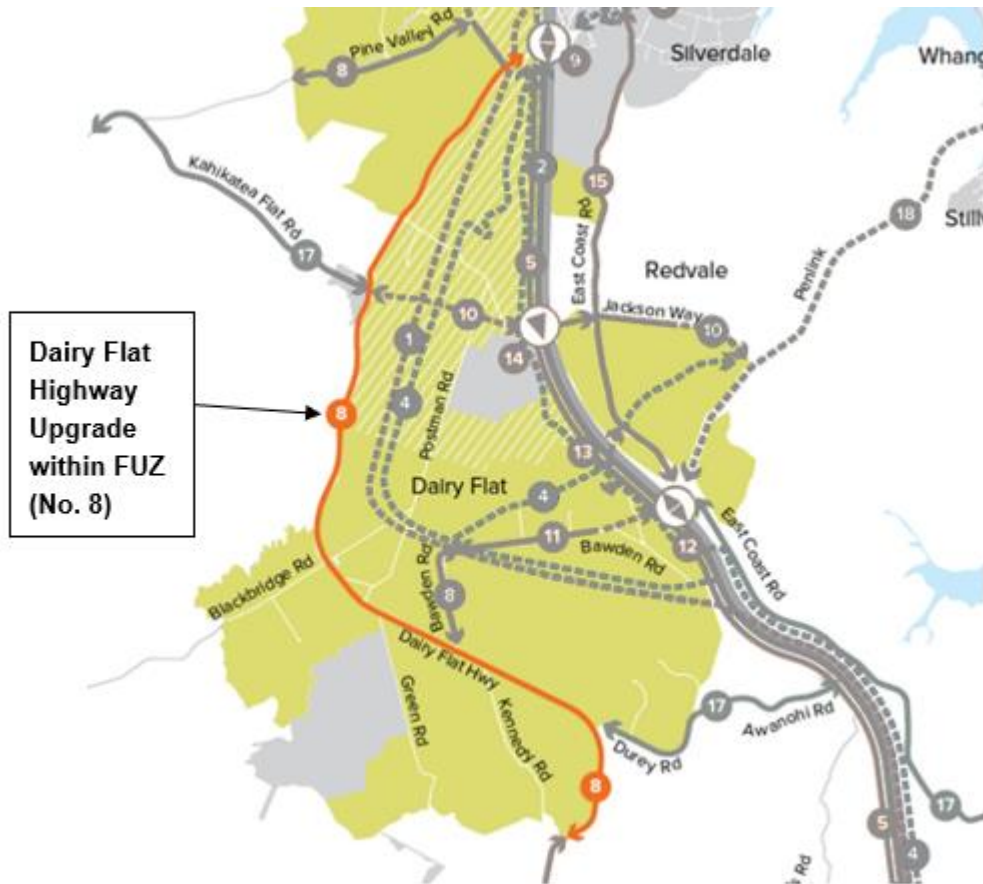


Figure 143: Indicative Strategic Transport Network highlighting the Dairy Flat Highway upgrade within FUZ, recommended option

The gap analysis concluded that the IBC considered an appropriate range of indicative corridor options, including other north-south connections, and the project could proceed to route refinement i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further 'corridor' assessment to be undertaken. The analysis also concluded that the DBC should further consider ways to minimise/avoid effects of the recommended option on sensitive receiving environments (heritage features, streams, natural wetlands and an Outstanding Natural Landscape near Green Road Park). It was also noted that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

13.3 Corridor form and function

An assessment was undertaken for the Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat following the CFAF methodology in Section 5.3. This informed the options developed and assessed below.

This corridor forms an important north-south connection on the North network. The corridor forms the boundary of the western portion of the FUZ and Silverdale West - Dairy Flat Industrial Area. Additionally, the connection provides a good level of resilience to the rest of the network, as it can be used as an alternative to SH1 if needed. The typical cross section between Silverdale and Dairy Flat where there is FUZ land on both sides of the corridor is shown in Figure 144, and Figure 145 where there is rural on one side and FUZ land on the other side.



Figure 144: CFAF Outcome - Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat indicative 30 m cross section

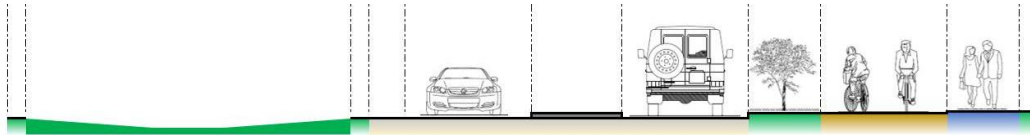


Figure 145: CFAF Outcome - Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat indicative 29 m cross section

13.4 Route Refinement: Option development and assessment

For the purposes of option development, the project was divided into four segments (as shown in Figure 146 and Figure 147 below):

- Segment 1: Silverdale Interchange to Wilks Road segment.
- Segment 2: Wilks Road to Richards Road segment.
- Segment 3: Richards Road to Bawden Road segment.
- Segment 4: Bawden Road to Durey Road segment.

The segments were identified by separating the zone changes i.e. northern FUZ section with FUZ both sides (Segment 1), central Rural Urban Boundary (RUB) section with rural zone on the west and FUZ on the east (Segment 2), central FUZ section with FUZ either side including a potential future town centre (Segment 3) and southern FUZ section (Segment 4).

The form and function of the corridor also changed with the change in segmentation/zoning - with Segments 1, 3 and 4 comprising a 4-lane urban arterial corridor with a width of 30m as shown in Figure 144; and Segment 2 comprising a 29m two-lane urban arterial corridor with walking and cycling on the FUZ side and swales on the RUB boundary (refer Figure 145).

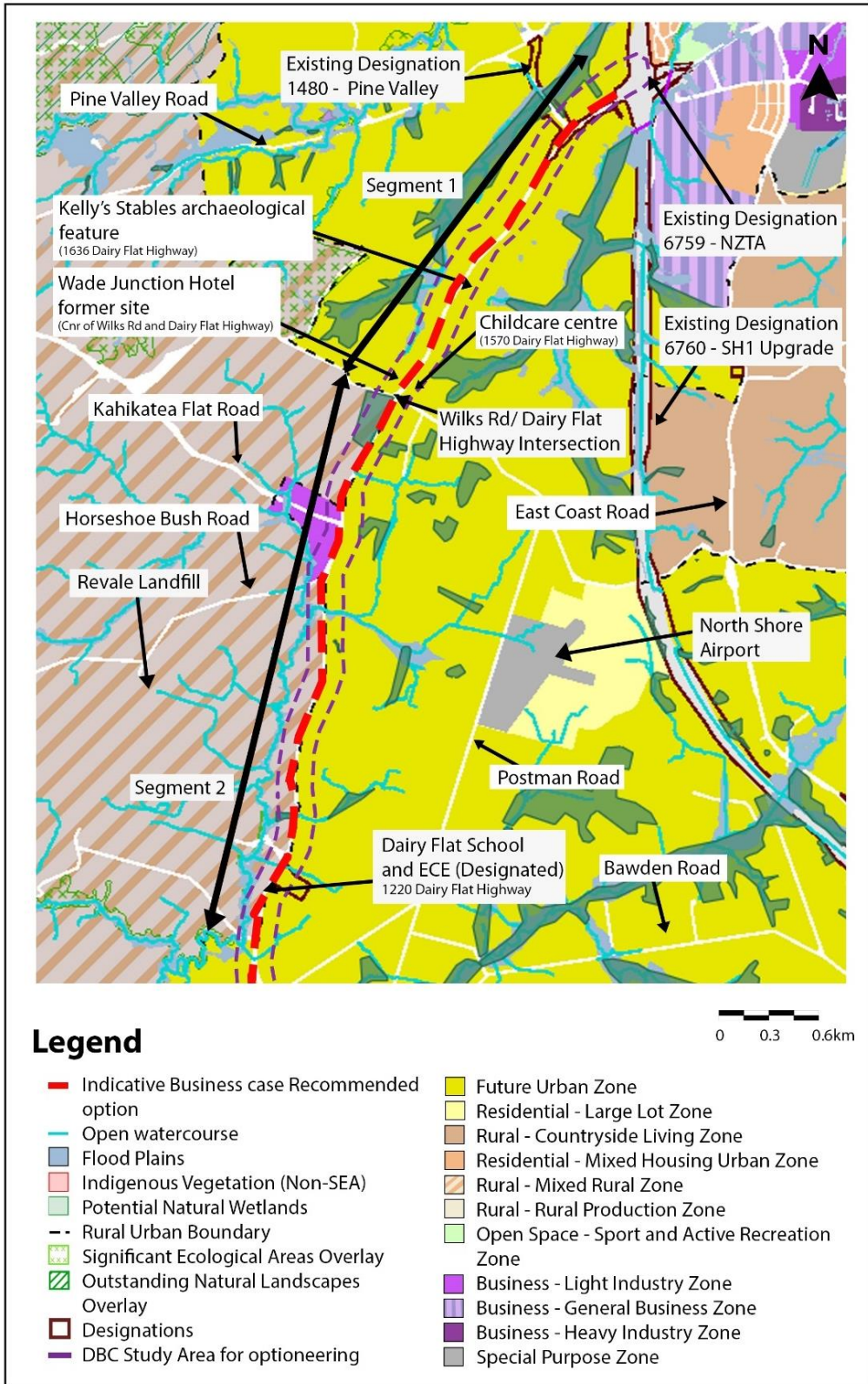


Figure 146: Map of key constraints and features – Dairy Flat Highway (Segments 1&2)

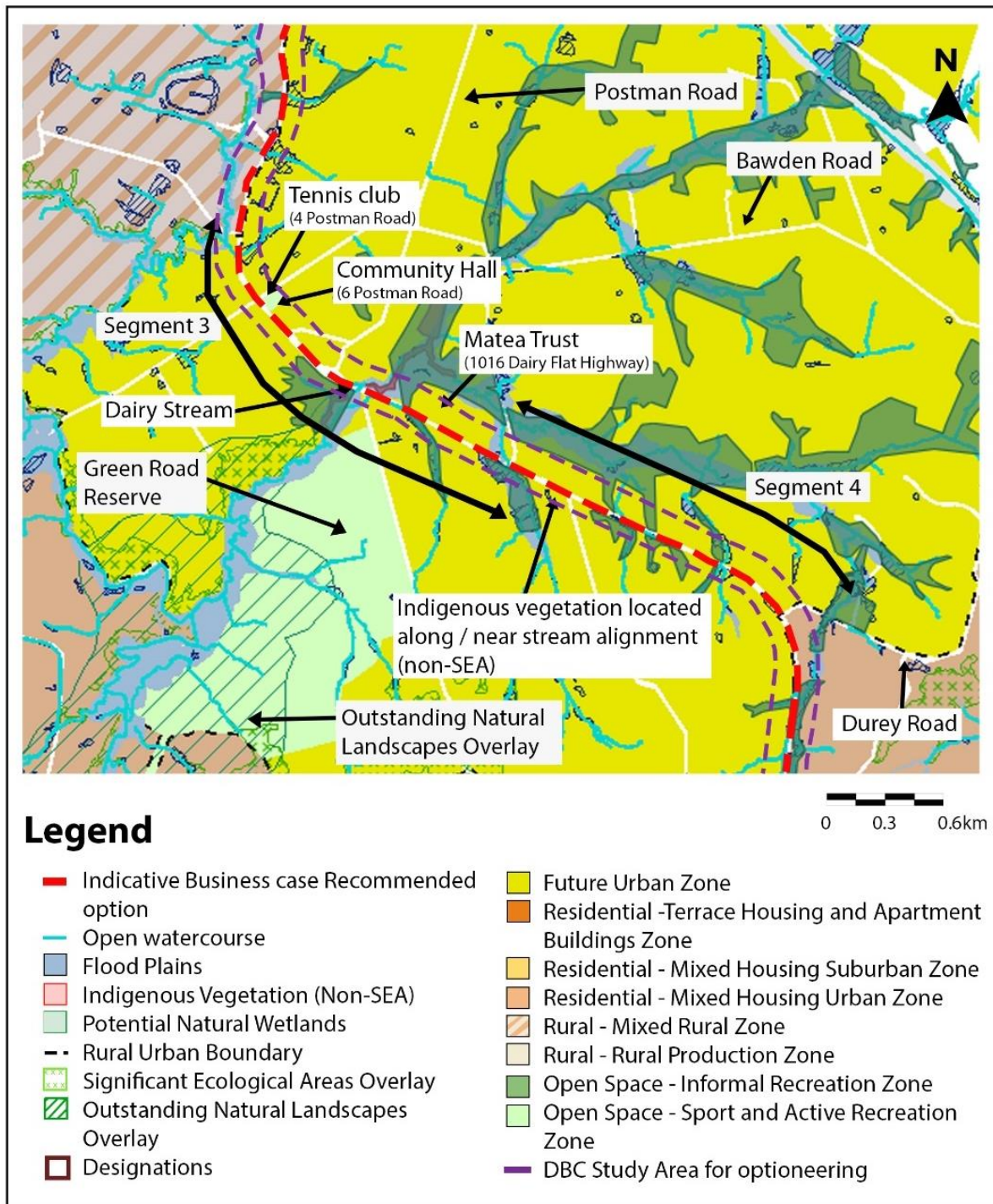


Figure 147: Map of key constraints and features – Dairy Flat Highway (Segments 3&4)

In developing options, the Project team also considered the following key features in the area. These are mapped in Figure 146 and Figure 147 that follow the project segments and include:

- a) Areas of potential wetland, flood-prone areas and stream crossings.
- b) Green Road Park – a large Council reserve which Council has aspirations to develop into a regional park and leisure facility in the long term as set out in the Green Road Park Masterplan, October 2020 (although this development is unfunded).
- c) Significant ecological area south of the road near Green Road Park.
- d) Pockets of Indigenous vegetation (non-SEA).

- e) Kelly’s stables/homestead and Wade Junction Hotel– archaeological features (segment 1).
- f) Existing community facilities including Dairy Flat Primary school (designated by the Ministry of Education and located in segment 2), a community hall and tennis club and a residential care facility (segment 3).
- g) The Rural Urban boundary in segment 2.
- h) The existing Dairy Flat business light industry zone adjacent to the Kahikatea Flat Road intersection in segment 2.

In consideration of the above factors, a single option was developed for the Upgrade to Dairy Flat Highway through route refinement using the targeted MCA and constraints-led design approach.

The option includes upgrading the existing Dairy Flat Highway within the FUZ and applies the 29m-30m urban arterial cross-section with separated footpaths and cycle lanes. This option focuses on improving the north-south connection within the North network whilst also improving network resilience by providing an alternative to SH1. The option was developed to avoid key constraints in the area. The road widening follows the existing road corridor.

The constraints-led assessment was completed for the whole length of the corridor, in order to guide option development for each segment.




Prior to this assessment, a new National Policy Statement – the NPS: Highly Productive Land (NPS:HPL) was released. This was considered as part of the assessment, considering Segment 2 has Mixed Rural zoning to the west of the corridor. In relation to this NPS the following is noted:

- The objective of the NPS:HPL is: Highly productive land is protected for use in land-based primary production, both now and for future generations.
- Designations or NoRs are exempt from meeting the objectives and the NPS:HPL if the activity:
 - minimises or mitigates any actual loss or potential cumulative loss of the availability and productive capacity of highly productive land in their district; and
 - avoids if possible, or otherwise mitigates, any actual or potential reverse sensitivity effects on land-based primary production activities from the use or development.
- Existing Land Use Capability Mapping (LUC) mapping indicates there is no known highly productive soils (LUC 1 to 3 class soils) close to the existing road within this Mixed Rural zone.
- The NPS:HPL is not considered to have a strong bearing on the selection of the road widening option, considering the Project in this area comprises widening of a section of existing road that is not known to have LUC 1-3 class soils, and would minimise loss of HPL (and also no reverse sensitivity effects are anticipated).

13.4.1 Upgrade to Dairy Flat Highway – Segment 1

Widening options considered for Dairy Flat Highway – Segment 1 are set out in the table below including a high level analysis of constraints on either side of the road.

Table 60: Constraints led assessment Upgrade to Dairy Flat Highway (Segment 1)

	High/significant constraints or potential effects (avoid where practicable)
	Moderate constraints or potential effects present (consider avoiding on balance with other issues)
	No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the West (hold southern boundary and widen to West – 30m cross-section)	Widen to the East (hold northern boundary and widen to East – 30m cross-section)
1a Heritage	Kellys stables and former site of the Wade Junction Hotel on east – increased potential for undiscovered archaeological features around these locations.	Lower likelihood of encountering archaeological features associated with Kellys stables and former site of the Wade Junction Hotel as these are mapped on the eastern side of the highway	Kellys stables and former site of the Wade Junction Hotel – increased potential for undiscovered archaeological features around these locations.
2a. Land use futures	FUZ land Existing Pine Valley South designation could be used to widen; however the width would be limited to the designation extent which in some instances is narrower than the 30 m cross section required (designation is 25 m wide at its narrowest).	As for Widen both sides	As for Widen both sides
2b. Urban design	No key issues – need to consider tie into Segment 2 and how crossing the road will be facilitated for active modes as treatment transitions from cycle lane on each side to only on urban side.	As for Widen both sides	As for Widen both sides
2d Social cohesion; 2c. Land requirement	High number of driveways accessing the road on both sides.	As for Widen both sides	As for Widen both sides
3b. Stormwater/flooding	No key issues	No key issues	No key issues
3c. Ecology	No key issues	No key issues	No key issues
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Alignment will tie-into the Argent Ln-Pine Valley Rd Upgrade project by Fulton Hogan south of DFH / Pine Valley Rd intersection	As for Widen both sides	As for Widen both sides

13.4.2 Upgrade to Dairy Flat Highway – Segment 2

Widening options considered for Dairy Flat Highway – Segment 2 are set out in the table below including a high level analysis of constraints on either side of the road.

Table 61: Constraints led assessment DFH (Segment 2)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 29m cross-section)	Widen to the West (hold southern boundary and widen to West – 29m cross-section)	Widen to the East (hold northern boundary and widen to East – 29m cross-section)
1a Heritage	No known issues	No known issues	No known issues
2a. Land use futures /Policy analysis	Dairy Flat School on east (designated and may be expanded in future) Mixed Rural and industrial zones on west; FUZ on east. Some widening into Rural zone -which has potential to put pressure on the Rural Urban Boundary (RUB). NPS: Highly Productive Land may apply to Mixed Rural Zone but allows designation within this zone	Mixed Rural and industrial zones on west (widens into live zones that are unlikely to change in future). Widens into Rural zone – which has potential to put pressure on the RUB. NPS: Highly Productive Land may apply to Mixed Rural Zone but allows designation within this zone	FUZ on east. Dairy Flat School (designated and may be expanded in future). Widens into FUZ –which is generally preferred but not into school which is a designated site
2b. Urban design	Interface/access with Kahikatea Flat Rd commercial land use. Need to consider tie into Segment 3 and how crossing the road will be facilitated for active modes as treatment transitions from active modes only on urban side to being on each side.	As for Widen both sides	Need to consider tie into Segment 3 and how crossing the road will be facilitated for active modes as treatment transitions from active modes only on urban side to being on each side.
2d Social cohesion ;	Dairy Flat School (key social facility) and ECE centre – land purchase may be required. Approx. 27 properties fronting road on eastern side.	Approx. 15 properties fronting DFH on western side. Existing industrial area on west (unlikely to change) and potential contaminated land issues.	Dairy Flat School (key community facility) and ECE centre – land purchase may be required. Approx. 27 properties fronting DFH on eastern side.

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 29m cross-section)	Widen to the West (hold southern boundary and widen to West – 29m cross-section)	Widen to the East (hold northern boundary and widen to East – 29m cross-section)
2c. Land requirement	Approx. 15 fronting road on western side. Existing industrial area on west (unlikely to change and potential contaminated land issues).	No other key issues.	
3b. Stormwater/flooding	Low points in the road near stream crossings – susceptible to flooding	Low points in the road near stream crossings – susceptible to flooding.	Low points in the road near stream crossings – susceptible to flooding.
3c. Ecology	Potential wetland areas on west side of road – May be able to avoid.	Potential wetland areas on west side of road. Unlikely to be able to avoid	No key issues
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Side roads intersections on the west will need to be realigned to improve approach/vertical grade to DFH. Impact on side roads likely to be moderate.	Side roads intersections on the west will need to be realigned to improve approach vertical grade to DFH. Impact on this side roads likely to be significant.	Side roads intersections on the west will need to be realigned to improve approach vertical grade to DFH. Impact on side roads likely to be moderate

13.4.3 Upgrade to Dairy Flat Highway – Segment 3

Widening options considered for Dairy Flat Highway– Segment 3 are set out in the table below including a high level analysis of constraints on either side of the road and a hybrid option developed after considering the constraints.

Table 62: Constraints led assessment DFH (Segment 3)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the North (hold southern boundary and widen to North – 24m cross-section)	Widen to the South (hold northern boundary and widen to South – 24m cross-section)	Hybrid Option (widening both sides, then to north, then both sides -24m cross-section)
1a Heritage	No known issues	No known issues	No known issues	No known issues
2a. Land use futures /Policy analysis	<p>FUZ land either side.</p> <p>Various planning restrictions around Huruheru (Dairy Stream) crossing – particularly on the southern side.</p> <p>Outstanding natural landscape *overlay adjoining southern road corridor boundary. AUP policy supports avoidance</p>	<p>FUZ land either side.</p> <p>Various planning restrictions around Huruheru (Dairy Stream) crossing – particularly on the southern side.</p> <p>Outstanding natural landscape overlay adjoining southern road corridor boundary. AUP policy supports avoidance.</p>	<p>FUZ land either side.</p> <p>Various planning restrictions around Huruheru (Dairy Stream) crossing – less restrictive on the northern side.</p>	<p>FUZ land either side.</p> <p>Various planning restrictions around Huruheru (Dairy Stream) crossing – less restrictive on the northern side.</p>
2b. Urban design	Potential town centre location, consideration of interface, access and crossing in this location.	As for Widen both sides	As for Widen both sides	As for Widen both sides
2d Social cohesion; 2c. Land requirement	Land purchase from community facilities could be required (Tennis Club, community hall and the Matea Trust). Otherwise no difference between the options on general property impacts.	No key issues	Land purchase from community facilities likely required (Tennis Club, community hall and the Matea Trust). Some impact on tennis courts considered likely.	No key issues
3b. Stormwater/flooding	<p>Large floodplain area around Huruheru (Dairy Stream) – will require extra consideration in design.</p> <p>Large floodplain on southern side of DFH opposite Bawden Road intersection.</p>	As for Widen both sides	<p>Large floodplain area around Huruheru (Dairy Stream) – will require extra consideration in design.</p> <p>Moderately sized floodplain on northern side of DFH adjacent to Bawden Road intersection.</p>	<p>Large floodplain area around Huruheru (Dairy Stream) – will require extra consideration in design.</p> <p>Moderately sized floodplain on northern side of DFH adjacent to Bawden Road intersection.</p>
3c. Ecology	Numerous wetland areas on both sides – more on southern side and around Huruheru (Dairy Stream).	Numerous wetland areas on both sides Indigenous Kahikatea around riparian corridor approx. 30 m south	Large wetland area on southern side of Huruheru (Dairy Stream) crossing which encroaches into road reserve.	Numerous wetland areas on both sides

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the North (hold southern boundary and widen to North – 24m cross-section)	Widen to the South (hold northern boundary and widen to South – 24m cross-section)	Hybrid Option (widening both sides, then to north, then both sides -24m cross-section)
	Wetland area encroaches into road reserve on southern side. Indigenous Kahikatea around riparian corridor on both sides of Huruhuru (Dairy Stream). (non-SEA). Nearest on northern side.	of road reserve. Nearest on northern side Least preferred option.		Indigenous Kahikatea (non-SEA) around riparian corridor, very close to northern side of DFH.
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Design to consider stream bridge crossings and to fit in dual roundabouts plus realignment of side road to improve approach. The same for all options.	As for Widen both sides	As for Widen both sides	As for widen both sides

13.4.4 Upgrade to Dairy Flat Highway – Segment 4

Widening options considered for Dairy Flat Highway Segment 4 are set out in the table below including a high level analysis of constraints on either side of the road.

Table 63: Constraints led assessment DFH (Segment 4)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the South (hold southern boundary and widen to South – 30m cross-section)	Widen to the North (hold northern boundary and widen to North – 30m cross-section)
1a Heritage	No known issues.	No known issues.	No known issues
2a. Land use futures	FUZ either side. No key issues.	FUZ either side. No key issues.	FUZ either side. No key issues.
2b. Urban design	No key issues.	No key issues.	No key issues.
2d Social cohesion; 2c. Land requirement	No key issues/differentiation.	No key issues/differentiation.	No key issues/differentiation.
3b. Stormwater/flooding	Some upgrading of stream crossings may be required.	As for widen both sides	As for widen both sides
3c. Ecology	Some areas of potential wetland. Similar on both sides of road	As for widen both sides	As for widen both sides
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Design to consider stream bridge crossings and to fit in dual roundabouts plus realignment of side road to improve approach. The same for all options	As for widen both sides	As for widen both sides

13.4.5 Recommendation

Considering the above, the targeted MCA and constraints-led design assessment recommended the following for further consideration in the design refinement stage to avoid key constraints (refer Figure 148):

- **Segment 1 – Silverdale to Wilks: Widen both sides.** And widen to west where practicable around archaeological sites to reduce risk of disturbing unknown artefacts. (Although interaction with RT corridor crossing here should also be considered)

- **Segment 2 – Wilks to Richards Road: Widen to east** where practicable to locate new infrastructure within the FUZ and not within rural/industrial zones and avoid key constraints (potential natural wetland near Wilks) but widen to the west where practicable around Dairy Flat School and early childhood education centre.
- **Segment 3 – Richards Road to Bawden Road:** a hybrid widening approach was recommended to avoid key constraints (refer to Figure 148), as follows:
 - Section 1 - **Widening both sides** considering the area is FUZ with no key constraints to avoid, but consider if impacts on tennis club can be avoided.
 - Section 2 - **Widen to the north** where practicable to avoid potential wetland and outstanding natural landscape area.
 - Section 3 - **Widen both sides** but widen slightly to north where practicable near Bawden Road intersection to avoid large flood plain and potential wetland.
- **Segment 4 – Bawden Road to Durey Road: Widen both sides** is the preferable option as there are no key constraints to avoid in this segment.



Figure 148: Recommendation for segment 3 of DFH

Note: The location of the Bawden Road-Dairy Flat Highway intersection was considered further as part of route refinement for NOR 12 – Upgrade and Extension to Bawden Road. This assessment recommended a shift in this intersection further to the west of the existing location.

13.5 Consideration of DBC engagement

During the DBC engagement phase no specific comments were made in reference to the Upgrade to Dairy Flat Highway, between Silverdale and Dairy Flat. However, suggestions to improve public transport in the wider North Shore area were encouraged by the public. The preferred option would enable room for buses within the road corridor, as well as providing an alternative to SH1.

One comment suggested that a roundabout should be considered at the intersection between Dairy Flat Highway and Postman Road. The proposed upgrade includes a new roundabout at this intersection.

13.6 Design Refinement

All recommendations listed above were implemented during the design refinement stage. Key design refinements included:

- Wilks Road / Dairy Flat Highway intersection was pushed further to the south-west to minimise impacts on a heritage site (Wade Junction Hotel Archaeological site) (Segment 1).
- Widening around the Dairy Flat School was shifted to the west to minimise impacts on the school carpark (Segment 2).
- Bridge placed at stream crossing just south of Horseshoe Bush Road (Segment 2).
- Consideration was given to the location of the Dairy Flat Highway / Postman Road intersection due to impacts on the Tennis Club. Due to constraints in this location, the existing intersection location was maintained (Segment 3).
- Adjustments to the horizontal and vertical alignment and proposed physical works (bridges and retaining walls) were undertaken to minimise effects on floodplains and streams in the vicinity of the Bawden Road and Green Road intersections (Segment 3).
- Adjustments to physical works to avoid permanent impacts on the ONL area south of Dairy Flat Highway (Segment 3).
- Bawden Road to Durey Road was widened on both sides (Segment 4).
- Retaining wall placed at Postman Road/Dairy Flat roundabout (Segment 3) to minimise natural wetland effects to the south.
- Some additional encroachment over the Rural Urban Boundary to reduce impacts on dwellings on the east where western property impacts were low.
- Active mode facilities through existing industrial area included on both sides of road.
- An existing consent was raised during consultation at the intersection of Dairy Flat Highway and Landfill Access Road. The proposed designation was adjusted in this location to avoid impacts on any buildings proposed under this consent.

During consultation with affected landowners, a query was received around the assessment of alternatives at the Dairy Flat Highway / Wilks Road intersection. In this location, the intersection form and function process identified the need for a roundabout to provide a safe and efficient intersection in the future.

Several constraints (see Figure 149) were identified in close proximity to the intersection including:

- The historic former Wade junction hotel site to the north east.
- A potential natural wetland to the southwest of the intersection; and a Mixed Rural zoning (i.e. the Rural urban boundary).
- The RTC corridor passes under Dairy Flat Highway (i.e. the highway would be on a bridge to the north of the intersection).
- Private property would be affected on all sides.

The preferred route includes a roundabout with a slight skew to the south to best balance effects on the above constraints. Realignment of the roundabout further east or west was not preferred as:

- Moving the roundabout westwards would likely increase impacts on the Natural wetland and the Rural Urban Boundary.
- Moving the roundabout further eastwards would likely increase impacts on the archaeological site, albeit the heritage report states the risk of encountering remains is low given the site has been developed.
- Moving the roundabout further east or west would increase the encroachment of Dairy Flat onto private land.
- If moved east or west, less of the existing road corridor and pavement structure would be able to be reused, increasing the cost of the Project.

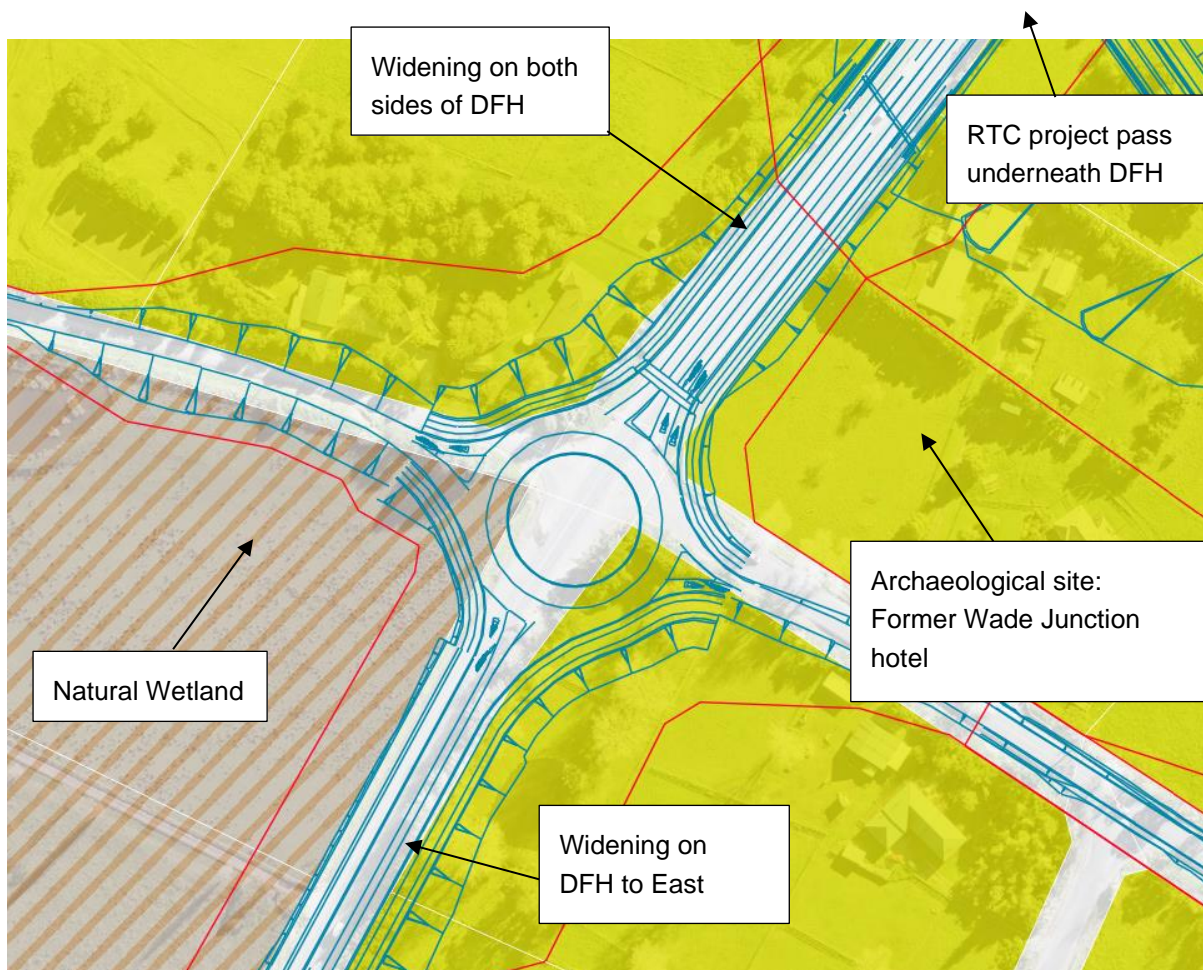


Figure 149: Constraints around the Dairy Flat Highway / Wilks Road intersection

Regardless of the recent development of the site at 9 Wilks Road (former site of the Wade Junction hotel) the preferred option is considered to remain as per **Figure 149**. Maintaining the existing alignment of Dairy Flat Highway is considered to represent the best practical options from a cost and effects perspective.

13.7 Preferred Route

The preferred route for the Upgrade to Dairy Flat Highway (between Silverdale and Dairy Flat) is shown below in **Figure 150**.

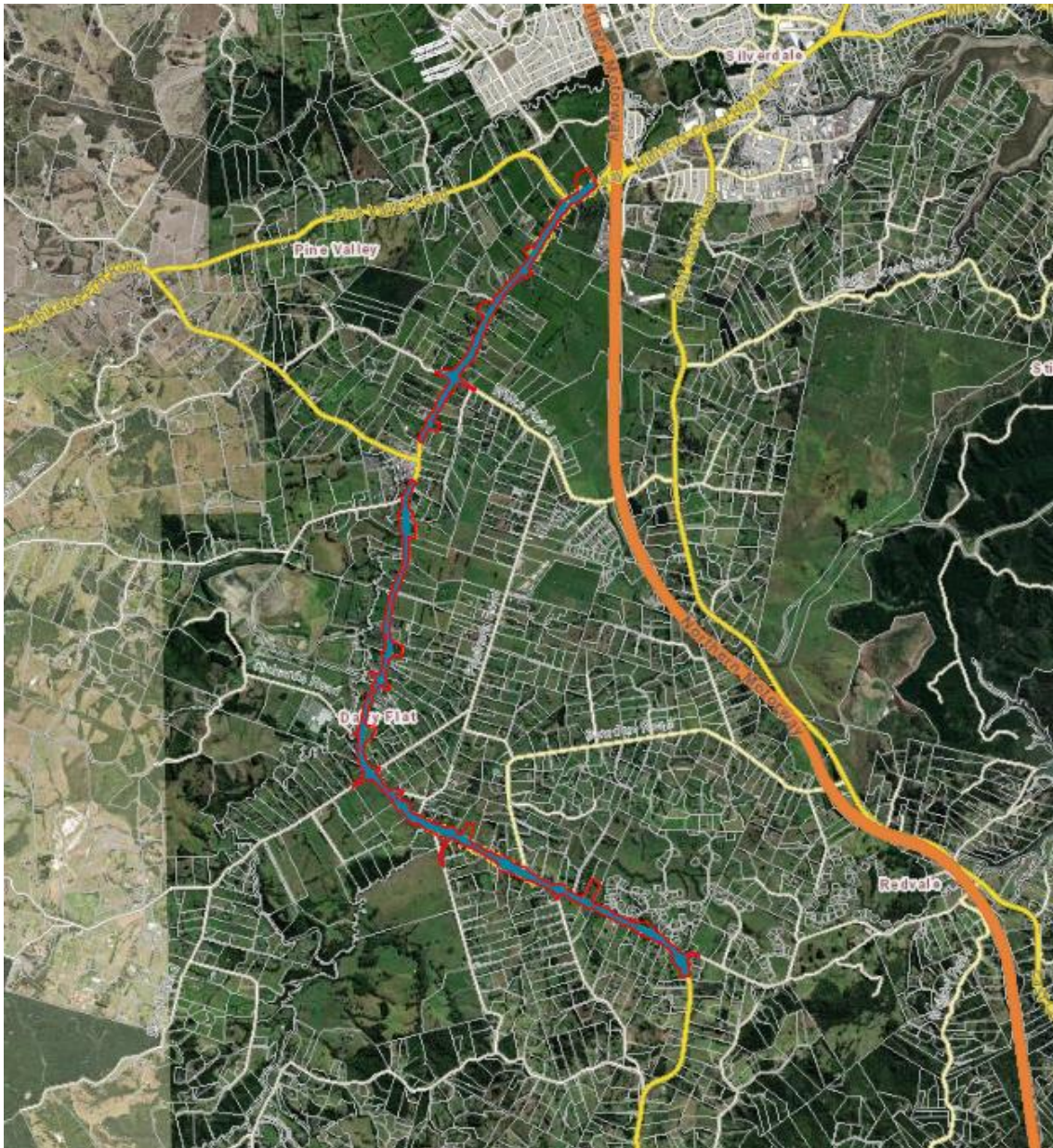


Figure 150: Preferred route for upgrade to Dairy Flat Highway between Silverdale and Dairy Flat

14. NOR 9 – Upgrade to Dairy Flat Highway (Durey Road to Albany Village)

14.1 Summary

This section outlines the assessment of alternatives for the Upgrade to Dairy Flat Highway between Durey Road to Albany Village.

The IBC recommended the upgrade of Dairy Flat Highway between the Dairy Flat FUZ and Albany Village to improve capacity and safety. However, several issues required further attention in the DBC phase, including avoiding/minimising effects on SEAs, potential impacts on cultural and social wellbeing, the form of the upgrade, and geometric and construction challenges along the route.

The form and function process identified the need to provide walking and cycling improvements and safety improvements but recommended no addition of traffic capacity to the route due to constraints along the corridor and on the transport network in Albany.

The DBC considered options through an MCA process, before a more detailed constraints-led assessment was conducted for the whole length of the corridor. Key features and constraints, including SEAs, changes in land use (FUZ and Countryside Living), notable trees, archaeological sites, stormwater/flooding constraints, and steep topography, were considered in the option development and assessment.

Four options were developed for MCA analysis through route refinement. The options included a constrained rural two-lane arterial cross-section with variations to accommodate significant constraints along the corridor. Option D was selected, which involved a cycling path on the west and then the eastern side (heading north to south) with safety improvements. This option was selected due to significant constraints on the western side south of Coatesville Riverhead Highway, including high-value SEAs, notable trees, mature kauri, natural hazards, and social features.

A detailed constraints-led assessment was conducted for the whole length of the corridor, provided recommendations on where widening should be considered and how to avoid or mitigate constraints. The recommendations took into account the complexity of constraints along the corridor, such as ecological considerations and the preference to avoid mature kauri where possible.

During the option development phase, key refinements included changes to access roads, adjustment of the project extent at the Albany end, and the provision of retaining walls to minimise earthworks and associated impacts.

The recommended option is set out in **Figure 151** and **Figure 152**.

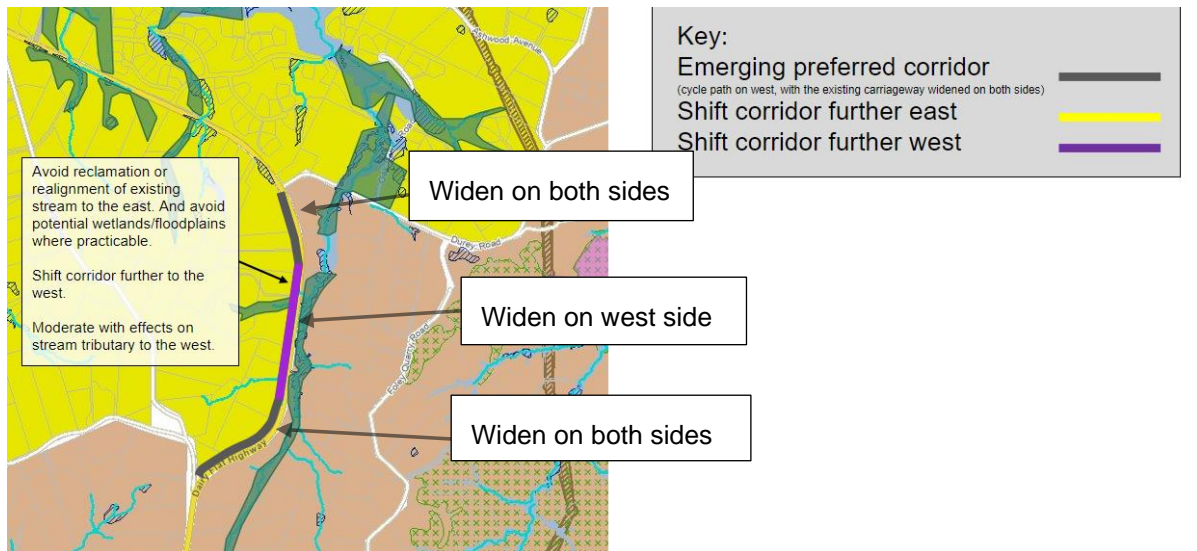


Figure 151: Segment 1 widening recommendation

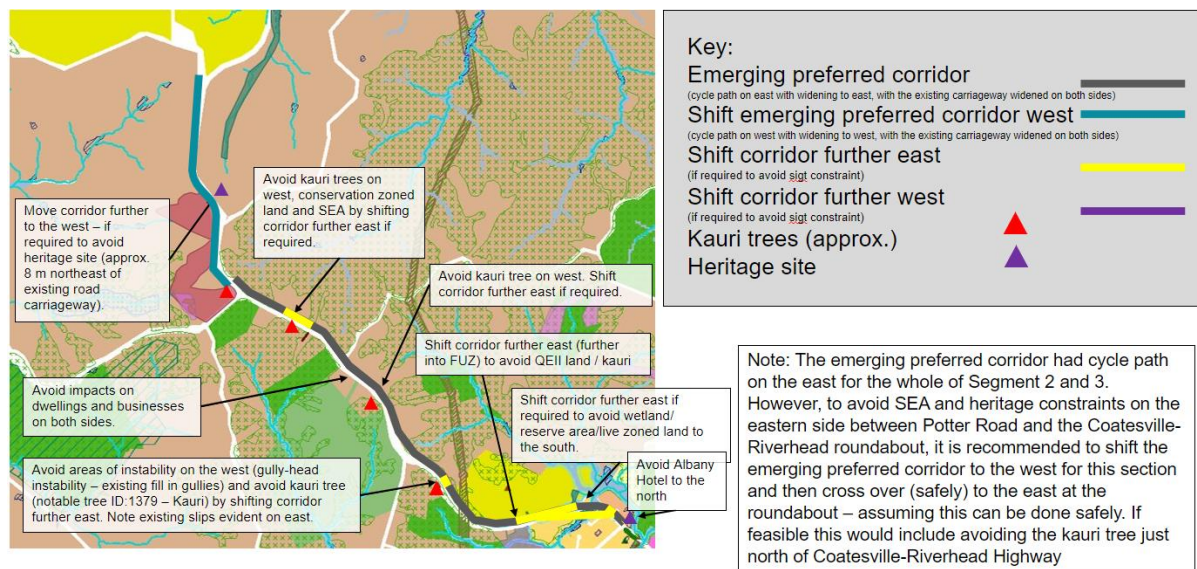


Figure 152: Segment 2&3 widening recommendation

14.2 IBC to DBC gap analysis

The IBC recommended option for this project (SR11-1) comprised an upgrade of Dairy Flat Highway between the Dairy Flat FUZ and Albany Village to improve capacity and safety (with the form yet to be determined) (refer Figure 153).



Figure 153: Indicative Strategic Transport Network highlighting Dairy Flat Highway (Rural section), recommended option

The IBC noted that this project comprises an important north-south strategic connection to provide access and resilience to SH1; however a number of issues required further focus in the DBC, including:

- potential impacts on cultural and social wellbeing and ecology.
- the form of the upgrade.
- geometric and construction challenges along the route.

The gap analysis completed at the start of the DBC confirmed that the above issues required further analysis in the DBC, along with consideration of the following issues:

- the NPS-UD and NPS-FW as described in Part A.
- whether adverse effects on SEA areas can be avoided, minimised or mitigated through the options assessment and design process e.g. considering a narrower corridor than the typical cross-section applied for road upgrades.

The gap analysis confirmed that a sufficient range of indicative corridor options was considered at IBC stage and the project could proceed to route refinement i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further 'corridor' assessment to be undertaken.

The gap analysis also identified an error in the IBC reporting whereby the option description in the main IBC and the IBC Options Report does not match the mapped extent (i.e. the description describes the project extent as Albany to Silverdale SH1 interchange, but the mapped extent is shown as Albany Village to Potter Road at the southern extent of the FUZ). The project team confirmed that the mapped extent is correct (i.e. Potter Road to Albany Village) and that is what was scored in the MCA assessment.

During the DBC stage, the Upgrade to Dairy Flat Highway (Durey Road to Albany Village) followed the following steps for option development and assessment:

- Step 1 – Route Assessment: Development and assessment of route options for MCA analysis.

- Step 2 – Route Refinement: Targeted MCA and constraints-led assessment of the selected route alignment – as an input to option refinement. Note: this was considered necessary as the corridor has numerous and complex constraints, which require a ‘tread the needle’ approach to manage effects and costs of the project.

14.3 Corridor form and function

An assessment was undertaken for the Upgrade to Dairy Flat Highway (Durey Road to Albany Village) following the CFAF methodology in Section 5.3. This informed the options developed and assessed below. The corridor forms an important north-south connection on the North network. The upgrade seeks to improve safety and provide separating walking and cycling facilities. The selected form and function did not propose a capacity improvement as was signalled in the IBC recommended option. This is because traffic modelling indicated that this section of road did not warrant a 4-lane urban arterial (i.e. it did not warrant an increase in lanes).

The corridor will provide an important north south connection for active modes traveling between future centres (less than 5km). The typical cross section is shown in Figure 154 below. Where there are constrained sections of corridor, a narrower cross section was proposed and this is illustrated in Figure 155 below. The road would also drop in speed to an assumed 60km/hr.

As this corridor is very constrained, the typical cross-sections were tested through the options assessment process as explained further below.

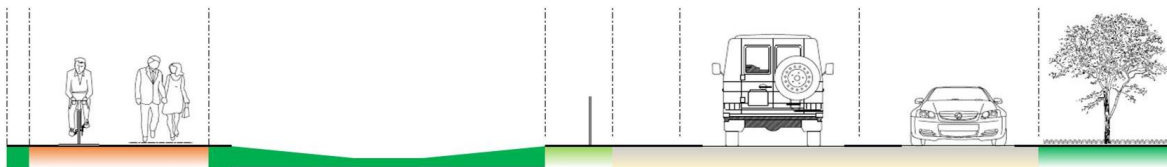


Figure 154: CFAF Outcome - Upgrade to Dairy Flat Highway (Durey Road to Albany Village) indicative 25 m cross section

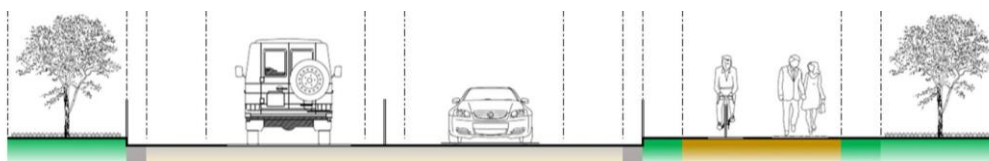


Figure 155: CFAF Outcome - Upgrade to Dairy Flat Highway (Durey Road to Albany Village) indicative 19.1 m cross section

14.4 Route Assessment

14.4.1 Option development

The study area for route option development (refer Figure 156) was expanded further north than what was assumed at IBC stage i.e. to include the section of Dairy Flat Highway between Potter Road and Durey Road. For this section, the zoning is FUZ on the west and Rural Countryside Living on the east. This change from the IBC was made as traffic modelling indicated that this section of road did not

warrant a 4-lane urban arterial (i.e. it did not warrant an increase in lanes) like the remainder of the Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat.

The study area was also limited to the area extending along Dairy Flat Highway between Durey Road and The Avenue adjacent to Albany Village for the following reasons:

- a) The IBC recommended upgrade of this transport corridor and this decision was reconfirmed through the IBC to DBC gap analysis. There is an existing road corridor in this location which provides an appropriate route to meet the purpose and objectives of the project and new corridors would likely have significant adverse effects based on identification of constraints.

Constraints and opportunities were analysed for the project to inform option development and are summarised in **Figure 156**.

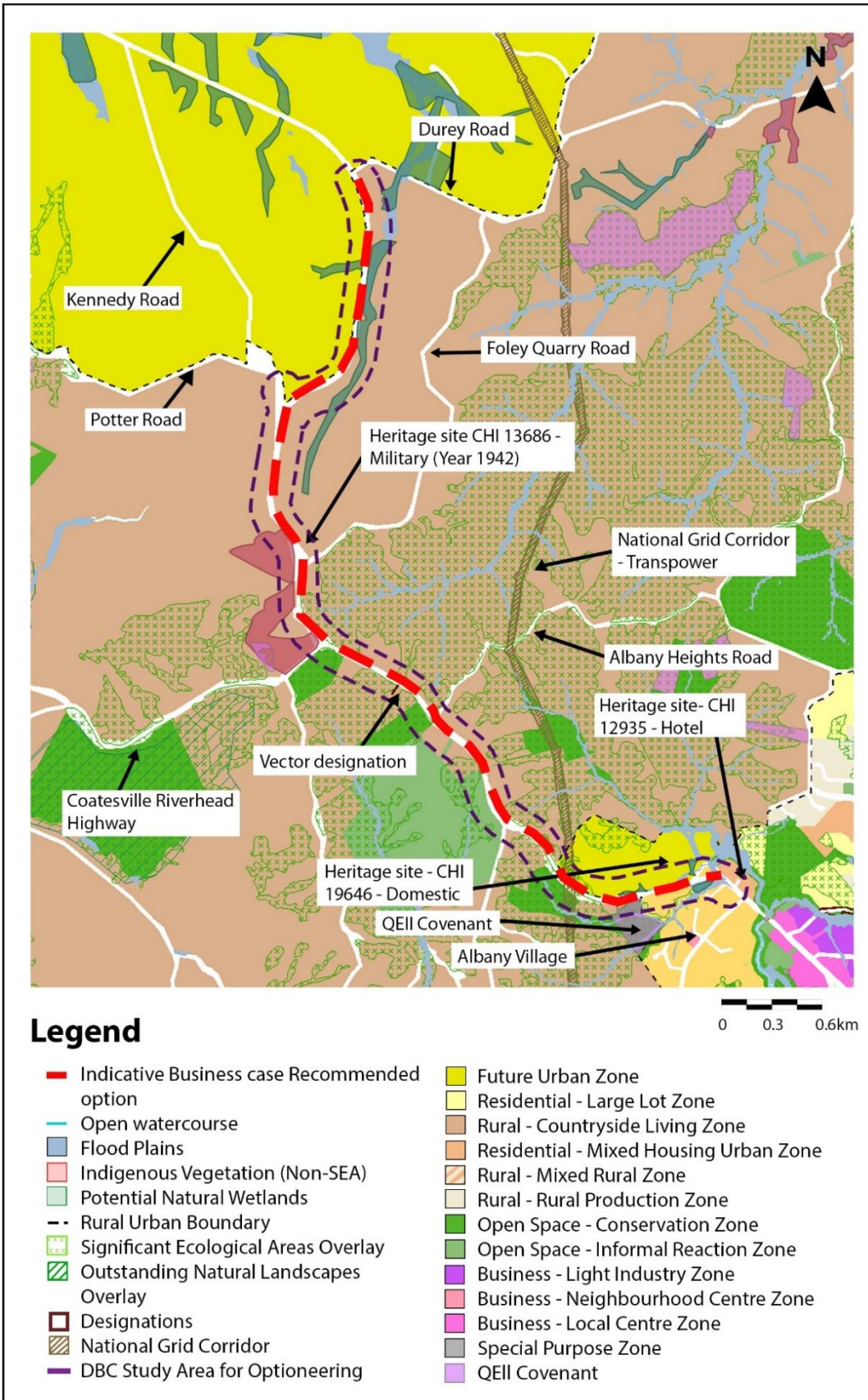


Figure 156: Map of key features and study area – Dairy Flat Highway (Durey Road to Albany Village)

In developing options, the Project Team also considered the following known key features in the area. These are mapped in Figure 156 above and include:

- a) Indigenous habitat and SEA areas on both sides of the road.
- b) Archaeological sites near the road.
- c) Stormwater/Flooding constraints.
- d) Transpower National Grid corridor.
- e) Steep topography and areas of geotechnical instability.
- f) Reserve areas, mainly on the southern side of the road.
- g) Mature Kauri including notable trees close to the road.
- h) FUZ areas at the northern end (western side only) and southern end (northern side only) – which provide the opportunity to widen the corridor into the FUZ to integrate with future development.
- i) An opportunity to tie into (retain) a recently constructed roundabout at the Coatesville Riverhead Highway intersection.

The form and function of the project changed through the option development and assessment phase – as the project team investigated ways to avoid and mitigate effects and costs of the significant constraints along the corridor (i.e. by testing ways to narrow the corridor, minimise earthworks and avoid significant adverse effects). The proposed upgrade will improve safety and provide separated walking and cycling facilities, which will provide an important north-south connection for active modes travelling between centres.

In consideration of the above factors, four options were developed for MCA analysis through route refinement as outlined in **Table 64** and **Figure 157** below. These are discussed in the sections to follow:

Table 64: Summary of Upgrade to Dairy Flat Highway Options –Durey Road to Albany Village

Option Reference	Option Name	Option Description
Option A	DH-01	Option A is the active mode upgrade of the rural section of Dairy Flat Highway between Durey Road in the north and Albany Village in the south - with a new cycling path on the western side of the highway.
Option B	DH-02	Option B is the active mode upgrade of the rural section of Dairy Flat Highway between Durey Road in the north and Albany Village in the south - with a new cycling path on the eastern side of the highway south of Potter Road. Section from Durey Road to Potter Road has shared path on the west.
Option C	DH-03	Option C is the active mode and safety improvements upgrade of the rural section of Dairy Flat Highway between Durey Road in the north and Albany Village in the south - with a new cycling path on the western side of the highway.
Option D	DH-04	Option D is the active mode and safety improvements upgrade of the Rural section of Dairy Flat Highway between Durey Road in the north and Albany Village in the south - with a new cycling path on eastern side of the highway south of Potter Road. Section from Durey Road to Potter Road has shared path on the west.



Figure 157: Upgrade to Dairy Flat Highway Options- Durey Road to Albany Village

For all options, the project team varied (narrowed) the cross-section from typical cross-sections applied for Te Tupu Ngātahi Projects, considering the significant constraints along the corridor.

The typical cross-sections for all options comprised:

- Constrained rural two-lane arterial.
- 19.1m wide on constrained sections with 4m cycle path on one side.
- 25m wide for unconstrained sections with swale included for stormwater treatment north of Potter Road.

For Options C and D only, the typical cross-sections also comprised:

- Median wire rope barrier between traffic lanes and a solid barrier between active modes and vehicles.

14.4.2 Option assessment

To recap, as outlined in Section 2, options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

The following table identifies the outcomes from this assessment.

Table 65: Summary of Upgrade to Dairy Flat Highway (Durey Road to Albany Village) MCA assessment

MCA Criteria	Option A (Cycling path on west)	Option B (Cycling path on west then east)	Option C (Cycling path on west with safety)	Option D (Cycling path on west then east with safety)
Investment Objective 1 - Access/integration: Improve access to economic and social opportunities through direct and attractive active mode facilities	2	1	2	1
Investment Objective 2 - Travel Choice: Provide a high quality, low carbon strategic active mode facility within the catchment	3	3	3	3
Investment Objective 3 - Safety: A safe facility which separates vulnerable users from conflict with vehicles	2	1	3	2
1a. Heritage	-1	-2	-1	-2
2a. Land use futures	1	0	1	1
2b. Urban design	3	3	3	3
2c. Land requirement	-1	-1	-1	-1
2d. Social cohesion	-1	0	-1	0
2e. Human health and wellbeing	1	1	1	1
3a. Landscape / visual	-3	-3	-3	-3
3b. Stormwater/flooding	-1	-1	-1	-1
3c. Ecology	-4	-4	-4	-4
3d. Natural hazards	-3	-2	-3	-2
5a. Construction impacts on utilities / infrastructure	-2	-2	-2	-2
5b. Construction disruption	-1	-1	-1	-1
6a. Construction costs / risk / value capture	-2	-2	-2	-2

The Project Team reviewed and compared the options identified above and noted that matters relating to the Investment Objectives (transport outcomes), heritage, land use futures, social cohesion

and natural hazards are the primary considerations for this segment showing differentiation between the options.

In relation to non-scored criteria:

- Those Manawhenua that indicated a preference, noted a strong preference to avoid mature Kauri on the western wide of the corridor and also to maintain their wellbeing with an exclusion zone where feasible. Manawhenua also acknowledged that a safe and intuitive connection is important.
- No clear preference was noted from a policy perspective as all options impact areas of high value SEA and potentially areas of potential natural wetland, for which there is a strong policy direction to avoid.
- No differentiation from a value for money perspective.

During the course of option refinement, the form and function of the corridor was confirmed to require safety improvements in the form of a wire rope barrier between traffic lanes. For this reason, Options A and B were dismissed from further consideration and a decision was sought between Options C and D.

In relation to the investment objectives, the MCA process indicated an overall preference for Option C (Cycling path on west with safety improvements) over Option D because:

- a) Option C scored better in relation to the access/integration investment objective as it provides a more direct and attractive active mode access via a facility on one side of the road (with no requirement for a crossing)
- b) Option C scored better in relation to the safety investment objective because it provides a safe continuous corridor on one side of the road.
- c) Option C integrates better with the Coatesville Riverhead Highway roundabout, which was recently reconstructed.

However, the effects scoring and Manawhenua feedback indicated a preference for Option D (Cycling path on west then east with safety improvements) due to significant constraints on the west, including ecology (high value SEAs and mature kauri), a QEII covenanted area, natural hazards (Geotech instability) and social features (reserves). In relation to ecology, although all options scored -4, the Ecology Specialist noted a preference for widening to the east because mature Kauri are present on the western side and habitat to the east appears more fragmented/weedy (although a stream/potential wetland running parallel to the road on the east near Stevenson Crescent should be avoided where possible).

The assessment also confirmed that for the safety improvements part of the project, holding the centreline is preferred, with widening both sides, as this avoids the significant costs of reworking the full road corridor.

Accordingly, the project team identified **Option D (Cycling path on west then east with safety improvements)** as the preferred route option for the following reasons:

- Significant constraints are present on the west, including ecology (SEAs and mature Kauri), a QEII covenanted area, natural hazards and social features (reserves).

Table 66: Reasons for discounting options

Option	Reasons for discounting option
Option A	Dismissed from further consideration as the form and function required safety improvements
Option B	As above
Option C	Discounted in favour of option D as Significant constraints are present on the west, including ecology (SEAs and mature Kauri), a QEII covenanted area, natural hazards and social features (reserves)

14.5 Route refinement

Following selection of Option D, a detailed constraints-led assessment was completed for the whole length of the corridor (see Figure 158, Figure 159 and Figure 160), in order to guide option development. This was considered necessary considering the significant constraints present on both sides of the corridor, and a recommendation from the ecology specialist and Manawhenua that mature kauri be avoided where practicable. This was broken into 3 segments:

- Segment 1 – Durey Road to Potter Road.
- Segment 2 – Potter Road to the edge of the FUZ at Albany Village.
- Segment 3 – Edge of the FUZ to The Avenue in Albany Village.

Key constraints and opportunities in each segment are detailed in the figures below

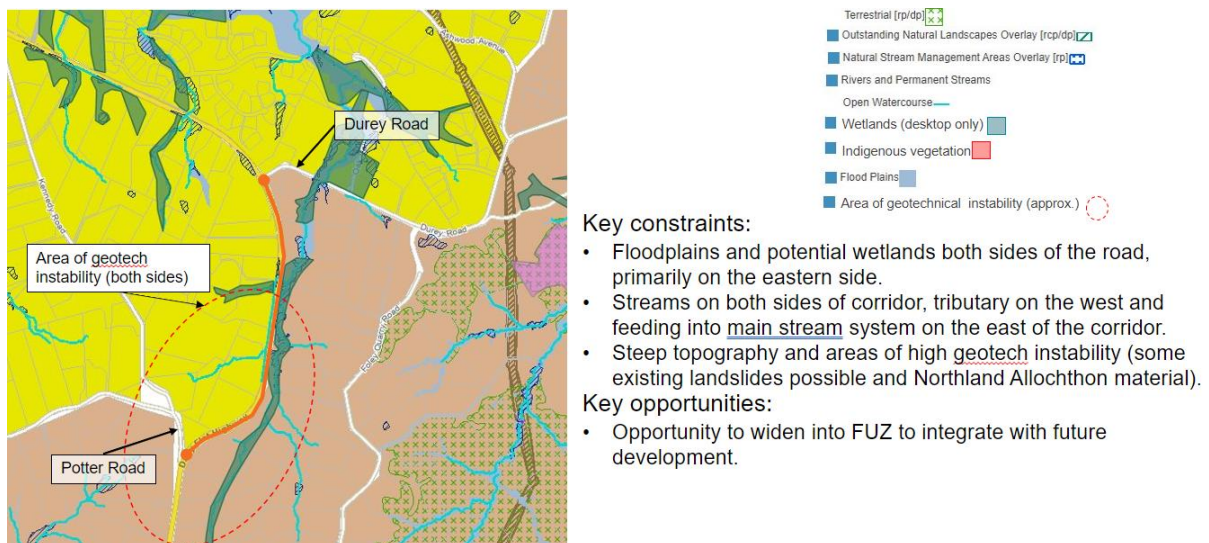
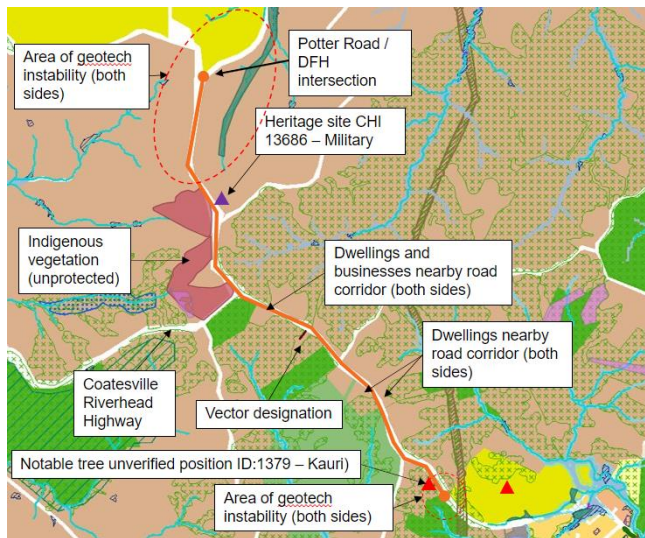


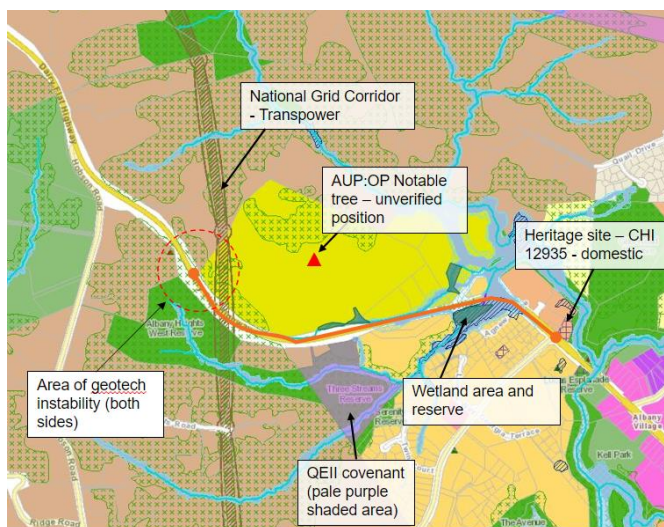
Figure 158: Upgrade to Dairy Flat Highway– Segment 1



Key constraints:

- Steep topography and areas of high geotech instability (some existing landslides possible and Northland Allochthon material).
- Reserve areas on western side of road.
- Telecommunications Hut (Vector) AUP designation.
- WWII medium machine gun post / pillbox. Standard Northern Military District design. CHI 13686 – military
- SEAs both sides
- Mature Kauri on west (see next slide)

Figure 159: Upgrade to Dairy Flat Highway – Segment 2



Key constraints:

- Floodplains and potential wetlands both sides of the road.
- Steep topography and areas of high geotech instability (some existing landslides possible and Northland Allochthon material).
- SEAs.
- Unverified positions of notable tree.
- QEII covenant (Three Streams Reserve).
- National Grid Corridor – Transpower.
- Heritage site (hotel).

Key opportunities:

- Opportunity to widen into FUZ (north) to integrate with future development.

Figure 160: Upgrade to Dairy Flat Highway – Segment 3

The project team considered the above constraints and made the following recommendations to inform option development (refer Figure 158, Figure 159 and Figure 160). Note: As a full MCA assessment was completed for this project in the route assessment step, and because the constraints are complex and vary along the route, the Project team took a slightly different approach to this assessment. This involved more detailed mapping of constraints and recommendations as to where widening should be considered in the design refinement stage.

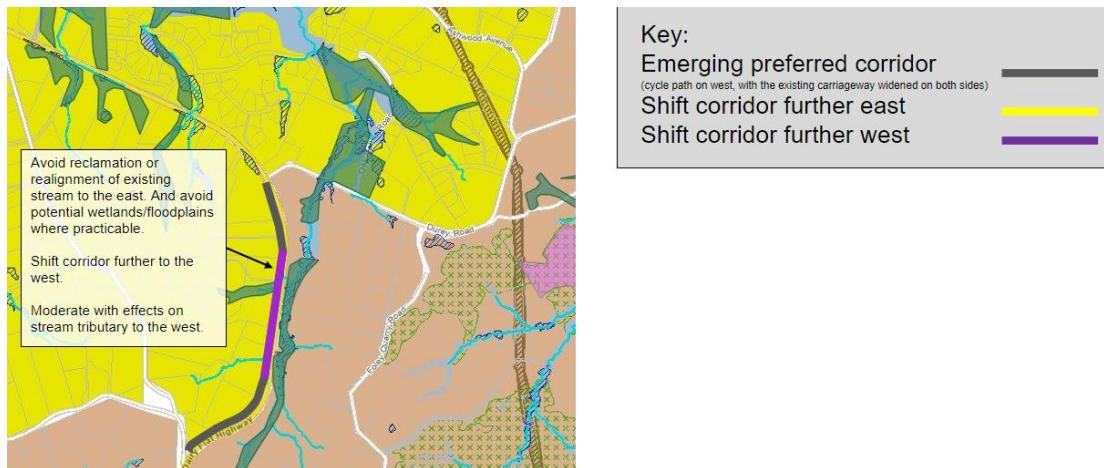


Figure 161: Widening recommendation for Upgrade to Dairy Flat Highway – segment 1

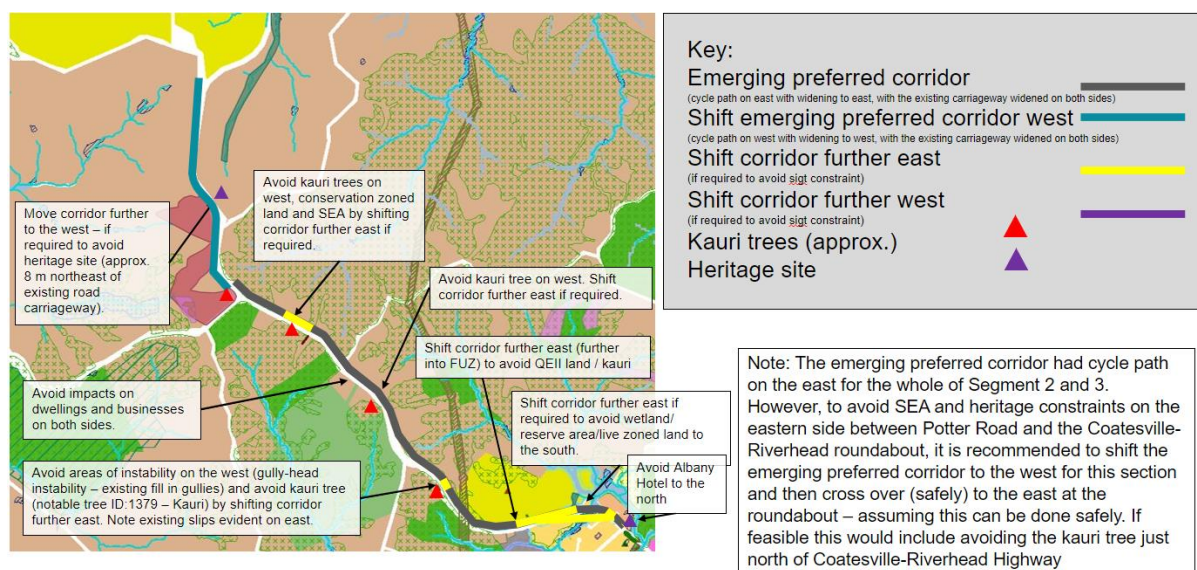


Figure 162: Widening recommendation for Upgrade to Dairy Flat Highway – segments 2 & 3

14.6 Consideration of DBC engagement

During the DBC engagement phase no specific comments were made in reference to the upgrade to Dairy Flat Highway between Durey Road and Albany Village. Comments were recorded suggesting better public transport in the wider North area. The indicative design assumes a drop in speed to 60km/hr as well as separated walking and cycling. The route can be used by buses.

14.7 Design Refinement

During the design refinement stage the recommendations listed above were generally implemented, except for the recommendation to avoid the notable tree (kauri, ID: 1379) and surrounding SEA in the southern section of the corridor. Although the main widening for the cycleway is on the northern side, some widening is also required on the southern side based on the current design – to allow room for a safety median barrier. While this tree and an area of this SEA are affected by the current design footprint, there are options to reduce effects in future detailed design which can be considered closer to construction.

Other key refinements that were made include:

- Foley Quarry Access Road and Hobson Road changed to be left in left out due to topographical constraints and presence of a barrier.
- Project extent at Albany end adjusted to end at Stevensons Crescent to tie in with an existing AT project.
- Shortening of passing lane to avoid impacts on a SEA / QEII parcel of land.
- Retaining provided at various locations to reduce extents of earthworks and associated impacts on SEAs, property and surrounding environment.
- Several properties have compromised access south of Durey Road. The design was amended to include a consolidated access within the proposed designation to maintain access into the effected properties.

14.8 Preferred Route

The preferred route for the Upgrade to Dairy Flat Highway (Durey Road to Albany Village) is shown below in Figure 163.

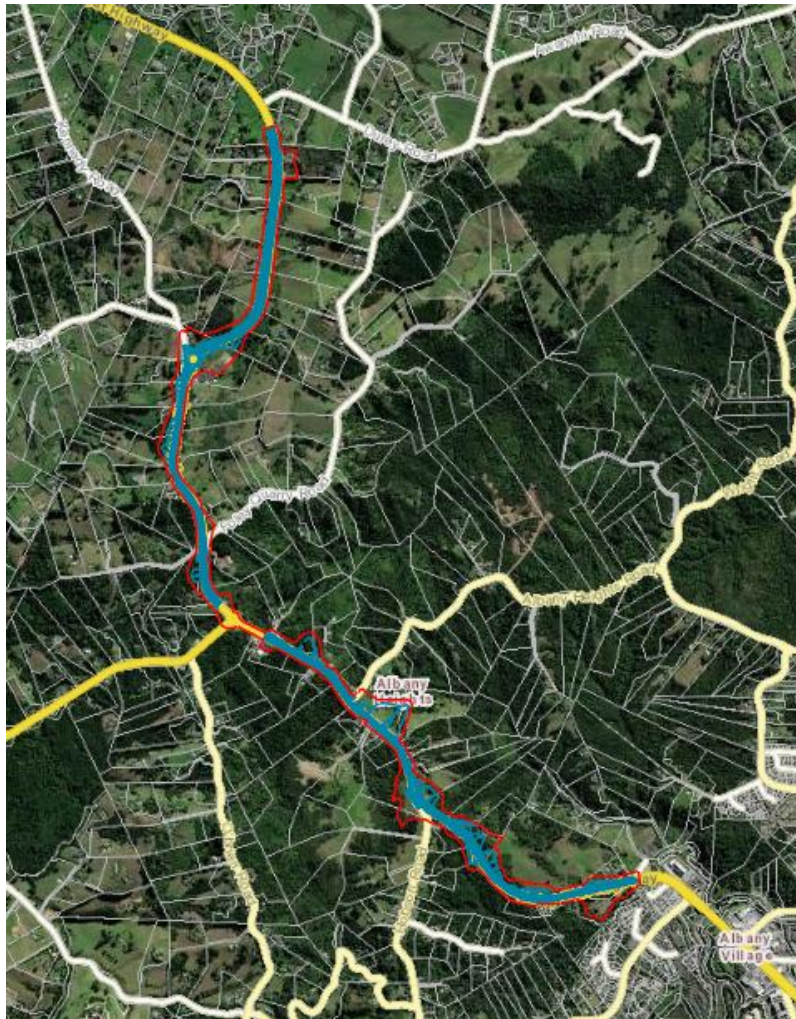


Figure 163: Preferred route for Dairy Flat Highway (Durey Road to Albany Village)

15. NOR10 – Upgrade to Wainui Road

15.1 Summary

This section outlines the consideration of alternatives for the upgrade of Wainui Road. The corridor serves as an important east-west connection for all modes of transportation, providing connectivity in Wainui North and between Wainui Road, Grand Drive, and Milldale. The IBC recommended option for the upgrade of Wainui Road within the Future Urban Zone (FUZ) was to widen the road, including dedicated bus lanes and separated walking and cycling facilities.

The DBC form and function process identified the need for a two lane arterial road corridor. The scope of the upgrade was reduced to between Wainui interchange and Lysnar Road due to the infrastructure funding agreement in place with Fulton Hogan on the western portion of the land.

The gap analysis conducted during the DBC stage confirmed that the IBC had considered an appropriate range of options, and the project could proceed to route refinement without requiring further corridor assessment.

The DBC stage of the Upgrade to Wainui Road followed the steps of route assessment and route refinement. The route assessment involved the development and evaluation of route options using full MCA analysis. The route refinement included a targeted MCA and constraints-led assessment of specific parts of the selected route alignment that were not previously assessed.

Key features and constraints in the area, such as the Ōrewa River, SEA areas, wetland areas, indigenous vegetation, stormwater/flooding constraints, and the proposed MoE school site, were considered during option development. After a thorough evaluation, Option A (widen both sides) was identified as the preferred route refinement option due to its better performance in terms of effects, particularly in ecology and landscape/visual aspects. Option A was also supported by Manawhenua preferences.

Further MCA and constraints-led design assessments were conducted for Segments 1 and 3 of the corridor to guide option development. The recommendation was to widen both sides of the road, avoiding impacts on the Early Childhood Education centre and Meraki Montessori Primary School land where possible.

In the design refinement stage, recommendations to avoid impacting the Early Childhood Education centre and Meraki Montessori Primary School land were implemented. Other refinements included the lengthening and raising of the structure over the Ōrewa River to improve flood resilience and minimise earthworks on adjacent areas.

The preferred route for the Upgrade to Wainui Road is shown below in **Figure 170**.

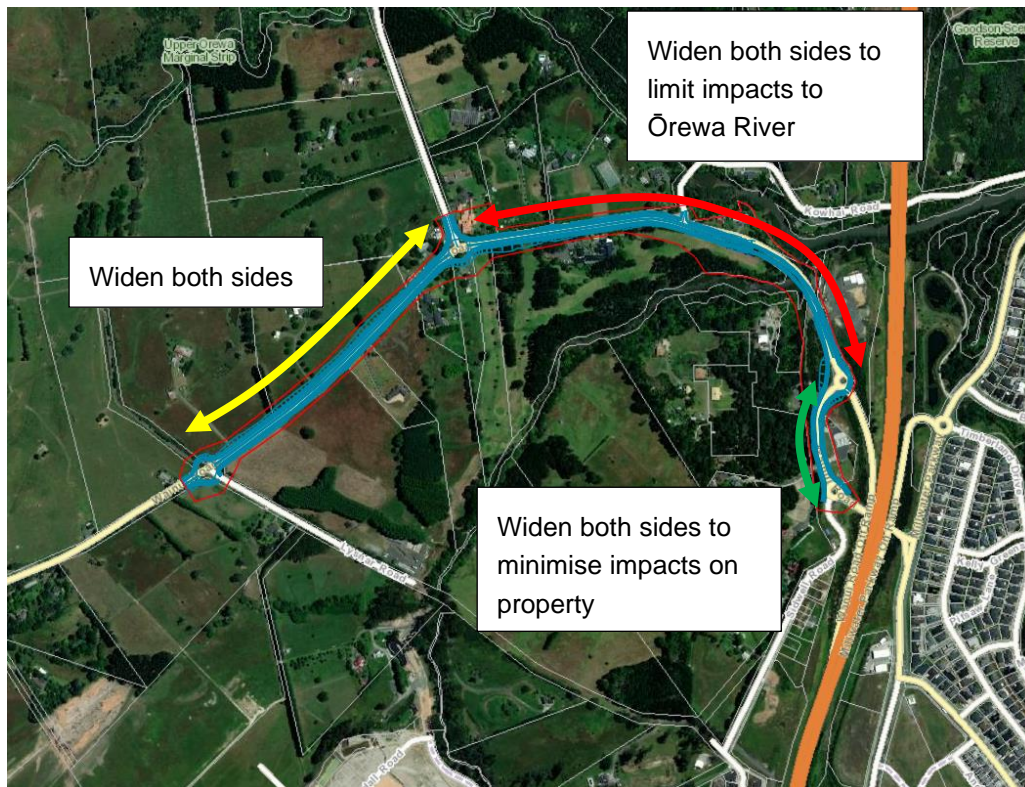


Figure 164: Preferred route for the Upgrade to Wainui Road

15.2 IBC to DBC gap analysis

The IBC recommended option for this project (R8-1) was to upgrade and widen Wainui Road within the FUZ area (including a transitional zone before returning to a rural road) – Number 8 in Figure 165. The connection was assumed to include dedicated bus lanes and separated walking and cycling facilities.

The connection seeks to improve connectivity in Wainui North and/or between Wainui Road, Grand Drive and Milldale, providing resilience to the network. This corridor forms an important east west connection for all modes on the edge of the proposed Milldale town centre. Additionally, the corridor connects up with SH1 and the major growth areas of Millwater.

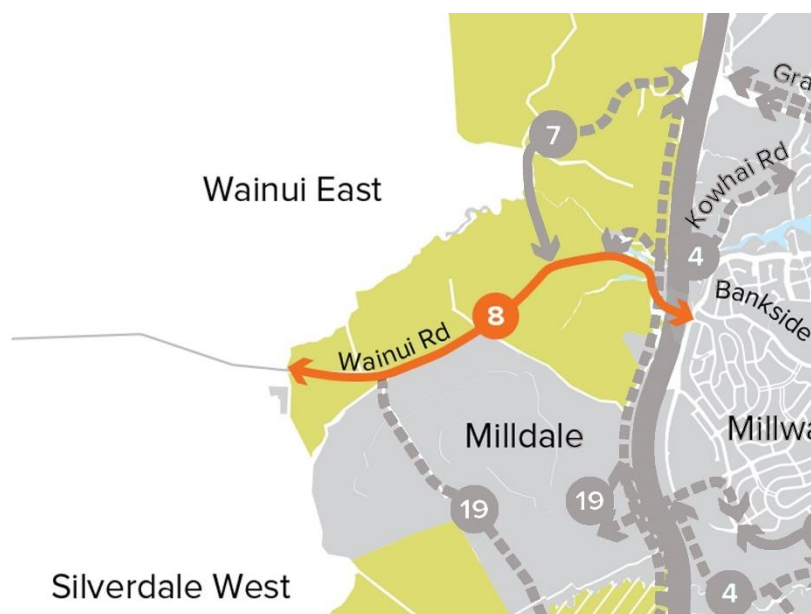


Figure 165: Indicative Strategic Transport Network highlighting the Wainui Road, recommended option

The gap analysis at the start of the DBC concluded that an appropriate range of options was considered at IBC stage and the project could proceed to route refinement i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further ‘corridor’ assessment to be undertaken. The gap analysis also recommended the route assessment further considered the following:

- The new NPSs for Freshwater and Urban Development.
- Effects on sensitive receiving environments (SEAs and tributaries of the Ōrewa River), including options that avoid (where practicable) or minimise effects on the SEA and river.

As the Milldale developer has set aside land to upgrade Wainui Road adjacent to Milldale and west towards the edge of the FUZ, the DBC scope for route protection was reduced from the IBC corridor shown above to exclude that part of the road upgrade next to Milldale. This is explained in section 15.4.1 below.

During the DBC stage, the Upgrade to Wainui Road followed the following steps for option development and assessment:

- Step 1 – Route Assessment : Development and assessment of route options for full MCA analysis.
- Step 2 – Route Refinement: Targeted MCA and constraints led assessment of those parts of the selected route alignment that were not the subject of the above MCA– as an input to option refinement. Note: this was considered necessary as the MCA process did not look at which side of the road to widen on between Lysnar Road and Upper Ōrewa Road, or between the two roundabouts next to the SH1 interchange (refer Figure 166).

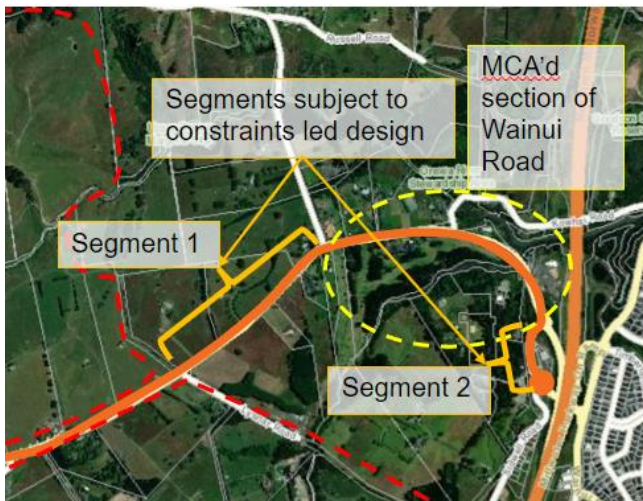


Figure 166: Segments subject to full MCA versus localised MCA and constraints led design assessment

15.3 Corridor form and function

An assessment was undertaken for the Upgrade to Wainui Road following the CFAF methodology in Section 5.3. This informed the options developed and assessed below. The corridor forms an important east-west connection for all modes on the edge of the proposed Milldale town centre. Additionally, the corridor connects to SH1 and the growth area of Millwater. The typical Upgrade to Wainui Road cross section is shown in Figure 167 below. The road would also drop in speed to an assumed 50km/hr.

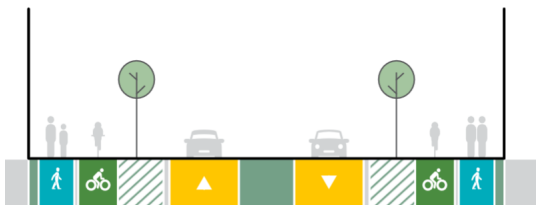


Figure 167: CFAF Outcome - Upgrade to Wainui Road indicative 24 m cross section

15.4 Route Assessment

15.4.1 Option development

The form and function analysis for the project is to upgrade the existing Wainui Road to include a generic 2 lane arterial with separated cycle lanes and footpaths on both sides of the corridor, with a width of 24m. Additionally, the corridor connects to SH1 and the growth area of Millwater.

Options for the initial route assessment were initially limited to an area extending along Wainui Road from Argent Lane to the Wainui Road bridge for the following reasons:

- a) The IBC recommended upgrade of this transport corridor and this decision was reconfirmed through the IBC to DBC gap analysis. There is an existing road corridor in this location which

provides an appropriate route to meet the purpose and objectives of the project, and makes best use of existing infrastructure in alignment with policy direction in the AUP.

- b) Although the FUZ extends further west of Argent Lane, route protection for an upgrade past this point was not considered necessary because the developer had set aside land for the upgrade.
- c) The connection was assumed to connect into the Wainui interchange active mode crossing project at the eastern end – and at the time a bridge over SH1 was assumed just past the Wainui Road bridge.

As the optioneering progressed, the extent of the proposed NoR was amended to extend from Lysnar Road to the northern end of Sidwell Road for the following reasons:

- a) The part of the upgrade west of Lysnar Road does not require route protection as the developer has set aside land for it in an agreement with AT
- b) Analysis of the best location for the Wainui interchange active mode crossing upgrade confirmed the best location is further south than anticipated (near the most southern roundabout near Sidwell Road – as described in Part B, Section 9.9 for NOR 4: SH1 improvements). This required extension of the Wainui Road upgrade further south to connect to this crossing.

In developing options, the Project Team also considered the following known key features in the area. These are mapped in Figure 168 below and include:

- a) Ōrewa River and an associated area of SEA (high cultural and ecological importance).
- b) Potential wetland areas.
- c) Areas of unprotected indigenous vegetation.
- d) Existing Waterloo Creek.
- e) Existing bridge over Ōrewa River.
- f) Stormwater/Flooding constraints.
- g) Ministry of Education (MoE) land near the Upper Ōrewa Road intersection, which is proposed to be developed for a large school.

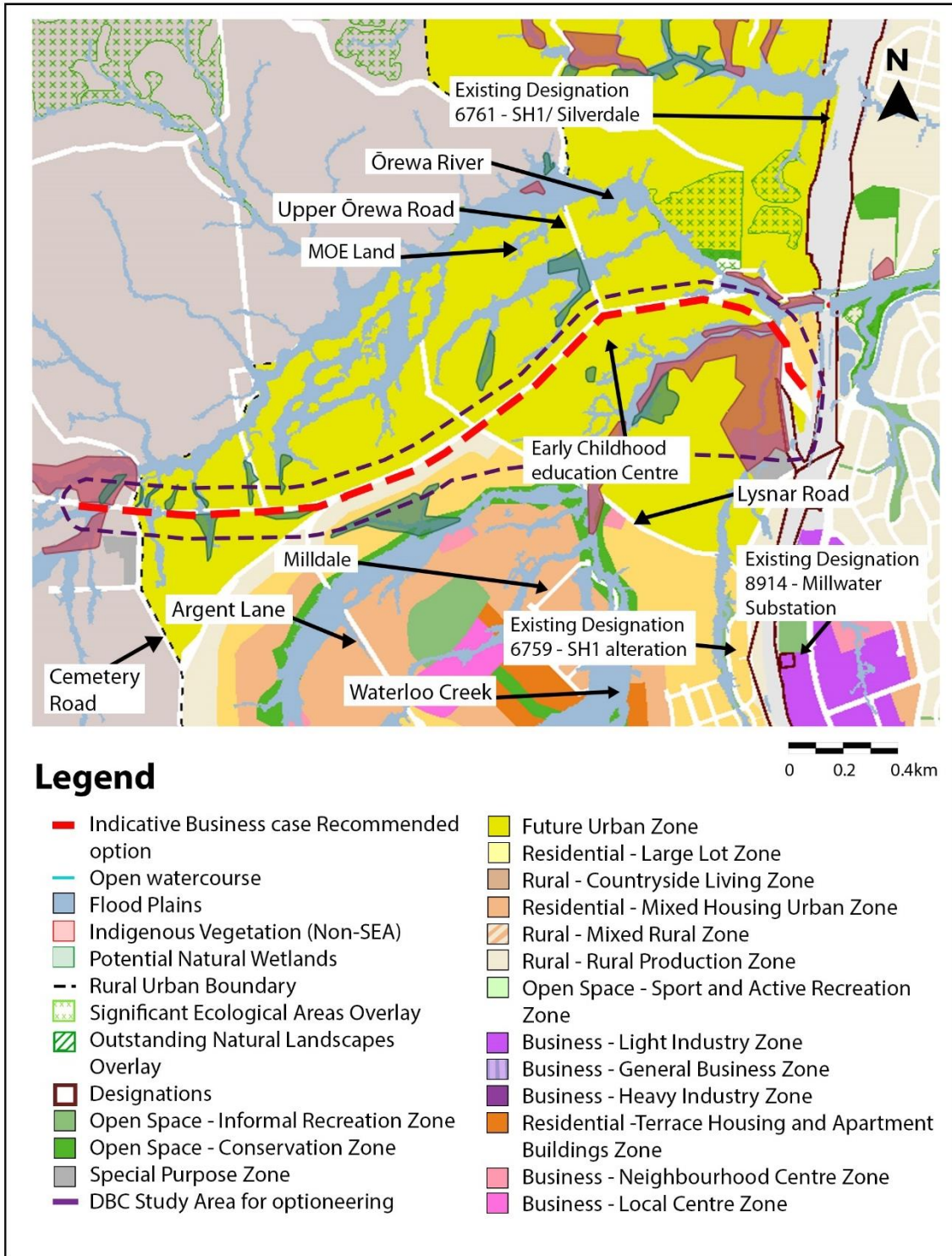


Figure 168: Map of key features and study area – on Wainui Road

In consideration of the above factors, two options were developed for route assessment as outlined in Table 67 and Figure 169 below. These are discussed in the sections to follow:

Table 67: Summary of Wainui Road Options for MCA

Option Reference	Option Name	Option description
Option A	WR-01	Option A retains the existing centre line, while widening both sides the corridor between Upper Ōrewa Road and the roundabout at the top of the SH1 southbound off-ramp.
Option B	WR-02	Option B holds the southern boundary and widens to the north between Upper Ōrewa Road and Kowhai Road. Between Kowhai Road and the roundabout at the top of the SH1 south bound off-ramp, this option widens to the south.

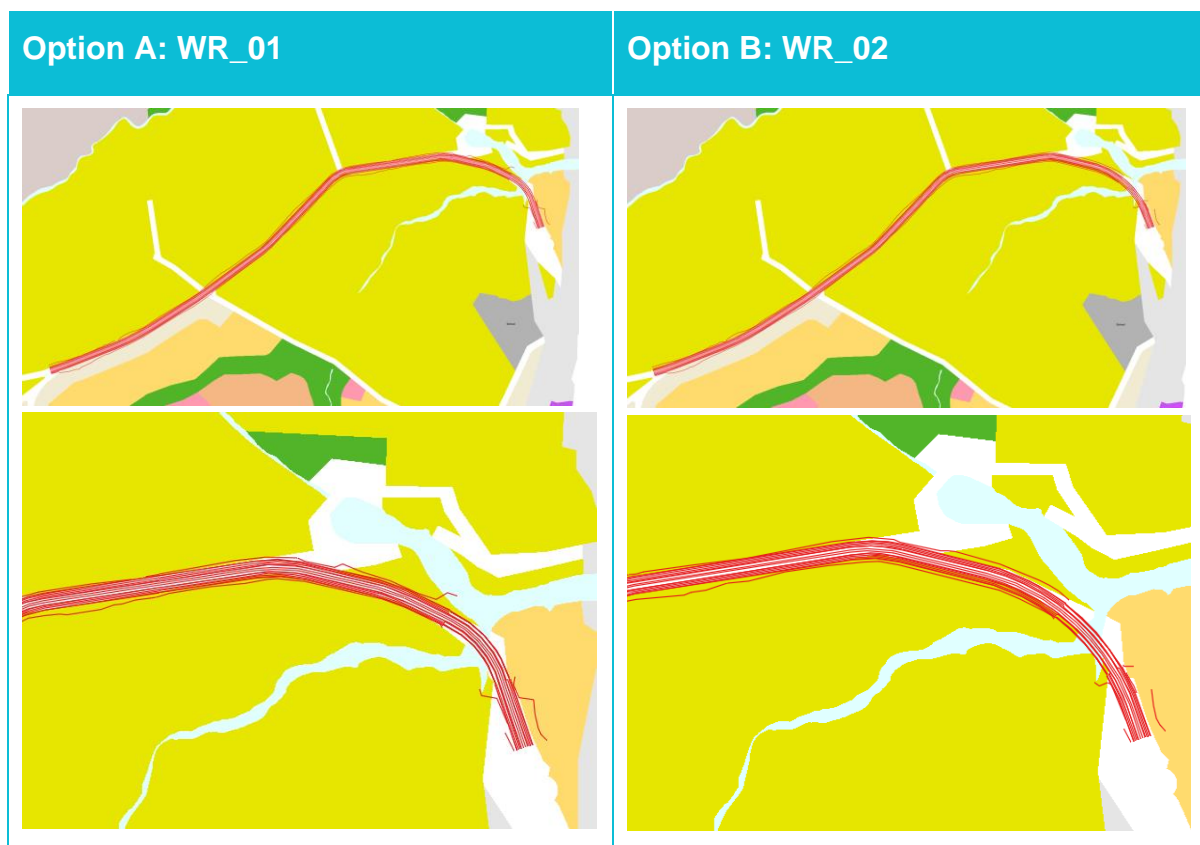


Figure 169: Map of Wainui Road Upgrade –Options

Both options follow the same route and share the same alignment west of Upper Ōrewa Road where widening was assumed either side of the road.

15.4.2 Option assessment

To recap, as outlined in Section 2, options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in a full day MCA workshop to undertake an assessment, scoring each option on a gradual scale from ‘Very High Adverse Effect’ (red) to ‘Very High Positive Impact’ (green).

The following table identifies the outcomes from this assessment.

Table 68: Summary of Wainui Road MCA analysis

MCA Criteria	Option A	Option B
Investment Objective 1 - Access: Improve access to economic and social opportunities by providing an integrated multi-modal corridor along Wainui Road	3	3
Investment Objective 2 - Integration: Provide corridor protection to support planned growth and flexibly enable future land use and transport integration	3	3
Investment Objective 3 - Travel Choice: Enable transformational mode share in the North by providing a high quality, low carbon transport network	3	3
2a. Land use futures	2	3
2b. Urban design	2	2
2c. Land requirement	-1	-1
2d. Social cohesion	-1	-2
2e. Human health and wellbeing	1	1
3a. Landscape / visual	-2	-3
3b. Stormwater	-1	-1
3c. Ecology	-2	-3
3d. Natural hazards	-2	-1
5a. Construction impacts on utilities / infrastructure	-2	-2
5b. Construction disruption	-2	-2
6a. Construction costs / risk / value capture	-2	-2

The Project Team reviewed and compared the options identified above and noted that matters relating to land use futures, social cohesion, landscape/visual, ecology and natural hazards are the primary considerations for this segment showing differentiation between the options.

In regard to non-scored criteria:

- Manawhenua who stated a preference, noted a preference for Option A.
- There was no real differentiation between options from a policy perspective or a Value for Money perspective.

Accordingly, the Project Team identified **Option A -Widening both sides** as the preferred route refinement option for the following reasons:

- Option A performs best from an effects-based perspective. In particular the option scores better for ecology and landscape/visual (natural character) as it minimises disturbance of riparian vegetation within the Ōrewa River/Waterloo Creek crossing. The option also has less impact on existing businesses including a private lodge and golf course.
- Option A was supported by Manawhenua who had stated a preference.

Option B was discounted by the Project Team for the following reasons:

Table 69: Reasons for discounting option B

Option	Reasons for discounting option
Option B	<ul style="list-style-type: none"> Greater disturbance of Waterloo Creek / Ōrewa River and therefore greater ecology and natural character effects. Not a stated preference of Manawhenua.




15.5 Route Refinement

Following selection of Option B, the Project team completed a targeted MCA and constraints led design assessment for Segments 1 and 3 of the corridor length – as an input to option development (to consider constraints and which side of the road to widen on).

15.5.1 Wainui Road – Segment 1 (Lysnar Road to Upper Ōrewa Road)

Options considered for widening Wainui Road – Segment 1 are set out in the table below including a high level analysis of constraints on either side of the road.

Table 70: Constraints led assessment for Wainui Road (Segment 1)

	High/significant constraints or potential effects (avoid where practicable)
	Moderate constraints or potential effects present (consider avoiding on balance with other issues)
	No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the South SGA 24m cross sections – hold north boundary and widen to the south	Widen to the North SGA 24m cross sections – hold south boundary and widen to the north
1a Heritage	No known Issues	No Known issues	No known Issues
2a. Land use futures	No key issues – FUZ land	No key issues – FUZ land	No key issues – FUZ land
2b. Urban design	No differentiators	No differentiators	No differentiators
2d Social cohesion; 2c. Land requirement	Similar number of properties likely affected either side of road – FUZ land and likely to be redeveloped. Minor widening into ECE centre to south (also in FUZ).	Similar number of properties affected either side of road – FUZ land and likely to be redeveloped. Widening into ECE centre to south – potential to impact ECE buildings.	Similar number of properties affected either side of road – FUZ land and likely to be redeveloped
3b. Stormwater/flooding	No key issues.	No key issues.	No key issues.

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the South SGA 24m cross sections – hold north boundary and widen to the south	Widen to the North SGA 24m cross sections – hold south boundary and widen to the north
3c. Ecology	No key issues. Mature vegetation primarily on south side of road near intersection with Upper Ōrewa Road, one large tree on north – none of which are protected.	No key issues. Mature vegetation on south side of road near intersection with Upper Ōrewa Road – none of which are protected.	No key issues. One large tree on north – not protected.
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	No differentiators – topography along the road is generally flat.	No differentiators – topography along the road is generally flat.	No differentiators – topography along the road is generally flat.

15.5.2 Wainui Road – Segment 2 (between roundabouts next to SH1)

Options considered for widening Wainui Road – Segment 2 are set out in the table below including a high-level analysis of constraints on either side of the road.

Table 71: Constraints led assessment for Wainui Road (Segment 2)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides Existing centreline – with walking and cycling paths on both sides.	Widen to the east Hold western boundary, shift carriageway east and locate walking and cycling on both sides of shifted carriageway	Widen to the west Hold eastern boundary, shift carriageway west and locate walking and cycling on both sides of shifted carriageway
1a Heritage	No known Issues	No Known issues	No known Issues
2a. Land use futures	FUZ located on both sides + small pocket of live zoned residential land to the north east. Could likely avoid widening into live zoned land.	FUZ located on both sides + small pocket of live zoned residential land to the north east. Avoid widening into live zoned residential land. Least preferred option.	FUZ on both sides + Special purpose school zone on west. No buildings located near road reserve boundary, however preference to avoid widening into special purpose zone land.
2b. Urban design	No differentiators	No differentiators	No differentiators

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides Existing centreline – with walking and cycling paths on both sides.	Widen to the east Hold western boundary, shift carriageway east and locate walking and cycling on both sides of shifted carriageway	Widen to the west Hold eastern boundary, shift carriageway west and locate walking and cycling on both sides of shifted carriageway
2d Social cohesion; 2c. Land requirement	Unlikely to affect properties outside of road reserve.	Unlikely to affect properties outside of road reserve.	May affect Primary School property. Least preferred.
3b. Stormwater/flooding	No key issues.	No key issues.	No key issues.
3c. Ecology	No key issues. Mature indigenous vegetation located on west side. Not protected – minimal impacts anticipated.	No key issues.	No key issues. Mature indigenous vegetation located on west side. Not protected. Least preferred option.
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	No key issues.	Would require reworking of the carriageway and significantly more earthworks than widening both sides.	Would require reworking of the carriageway and significantly more earthworks than widening both sides.

15.5.3 Recommendations

The following was recommended as a guide to option development:

- Both segments – widen both sides. Preference to avoid impacting Early Childhood Education centre and Meraki Montessori Primary School land where practicable. Otherwise, no key constraints to avoid.

15.6 Consideration of DBC Engagement

During the DBC engagement phase no specific comments were made in reference to the Upgrade to Wainui Road. Comments were made around making the North project area safer and to prioritise public transport in the wider North Shore area. The upgraded corridor will allow for all modes, including buses and separated walking and cycling. The corridor is also proposed to be reduced to a 50km/hr speed.

15.7 Design Refinement

During design refinement stage, recommendations to avoid the Early Childhood Education centre and Meraki Montessori Primary School land were implemented. Other key refinements included:

- Lengthening and raising of structure over Ōrewa River to improve flood resilience and minimise earthworks on adjacent areas.

15.8 Preferred Route

The preferred route for the Upgrade to Wainui Road is shown below in **Figure 170**.

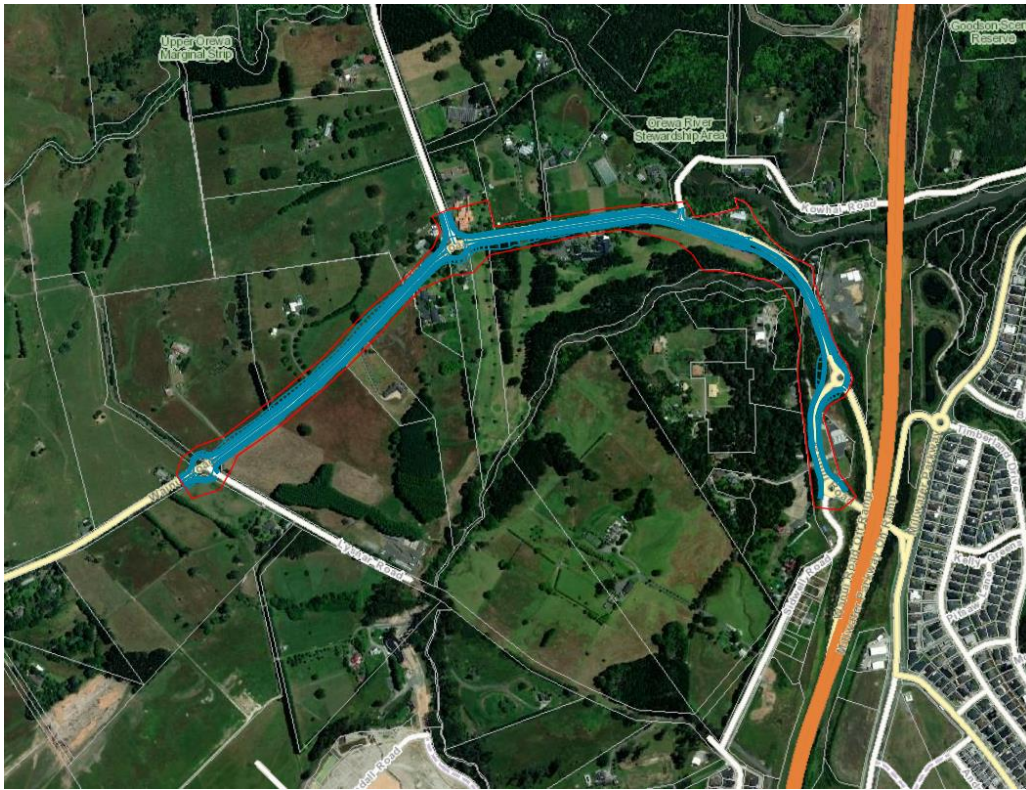


Figure 170: Preferred route for the Upgrade to Wainui Road

16. NOR 11 – New Connection from Dairy Flat Highway to Wilks Road

16.1 Summary

The following sections set out the assessment of alternatives for the New Connection from Dairy Flat Highway to Wilks Road. The IBC recommended a new east-west arterial connection through the Silverdale West - Dairy Flat Industrial Structure Plan Area, linking Dairy Flat Highway/Kahikatea Flat Road intersection to Wilks Road.

The IBC-DBC gap analysis confirmed the sufficiency of the IBC's assessment of indicative corridor options, considering the limited constraints in the area. The DBC stage focused on option refinement and assessment.

The form and function process identified the need for a four lane arterial road between Postman Road and the interchange; reduced to a two lane arterial west of Wilks Road to avoid overprovision of road space.

A single option was developed, taking into account the absence of significant constraints and aligning with the industrial structure plan. Constraints-led assessments guided the design, including slight alignment adjustments and widening to avoid key constraints and minimise impacts. The project team considered potential natural wetlands, stream crossings, and the presence of the North Shore airport and adjacent residential precincts.

Design refinements were made to minimise impacts on natural wetlands and consider existing businesses near the Kahikatea Flat Road/Dairy Flat Highway intersection. The preferred route was adjusted accordingly, taking into account key constraints and recommendations.

The preferred route for the New Connection is shown below in **Figure 171**.

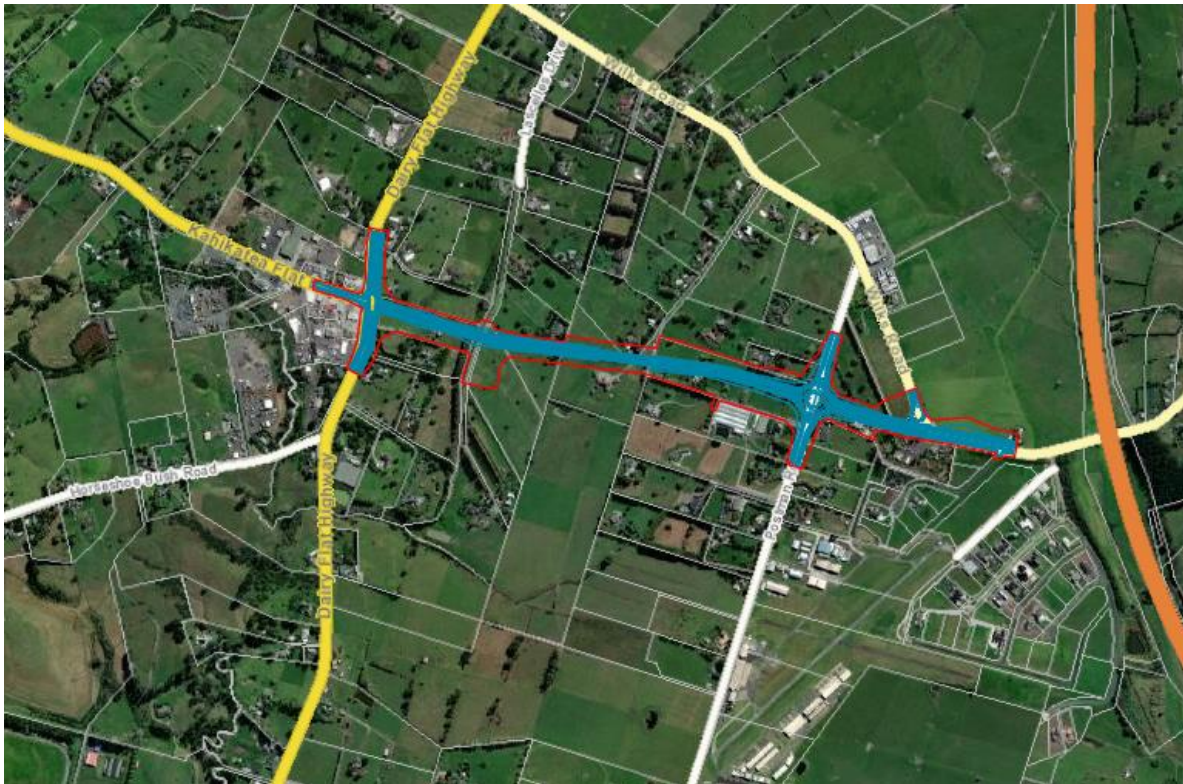


Figure 171: Preferred route for New Connection from Dairy Flat Highway to Wilks Road

16.2 IBC to DBC gap analysis

The IBC recommended option for this project (R13-1) proposed a new east-west arterial connection through the centre of the proposed Silverdale West - Dairy Flat Industrial Structure Plan Area from the Dairy Flat Highway/Kahikatea Flat Road intersection to Wilks Road (refer Figure 172). The connection was assumed to include four vehicle lanes and separated walking and cycling facilities. Additionally, the corridor forms an important link between the proposed Industrial Area and the strategic transport network (SH1). This connection is expected to help improve road connections providing access and resilience to the strategic network. The extent of this project is between the Kahikatea Flat Road intersection with Dairy Flat Highway and the proposed Wilks Road interchange at SH1 (which is part of the SH1 improvements NoR#4). The IBC noted that this connection is interdependent with the selected Wilks Road interchange location.

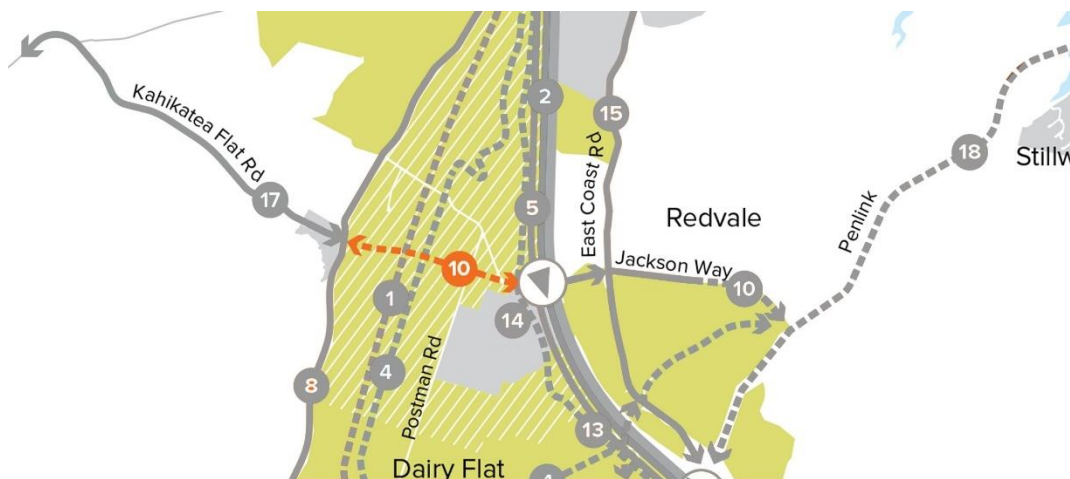


Figure 172: Indicative Strategic Transport Network highlighting New Link Road (Connecting Kahikatea to Wilks Road) recommended option

The gap analysis concluded that an appropriate range of indicative corridor options were considered at IBC phase for the North network as a whole, including a variety of east-west arterial options i.e., the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further ‘corridor’ assessment to be undertaken. Although only one of the IBC options comprised an east-west arterial through the industrial structure plan area, this was considered an appropriate corridor level of assessment, considering the lack of significant constraints present and the need to connect two points and align with the connection assumed in the industrial structure plan (see further discussion below). It was also noted that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

16.3 Corridor form and function

An assessment was undertaken for the New Connection from Dairy Flat Highway to Wilks Road following the CFAF methodology in Section 5.3. This informed the options developed and assessed below.

The corridor will provide an east-west connection through the centre of the Silverdale West - Dairy Flat Industrial Area. Additionally, the corridor forms an important link between the Industrial Area and SH1. The typical New Connection from Dairy Flat Highway to Wilks Road cross section between Postman Road and Kahikatea Flat Road is shown in Figure 173 below and the typical cross section between Postman Road and Wilks Road Interchange is shown in Figure 174. Both will have an assumed 50km/hr speed limit.

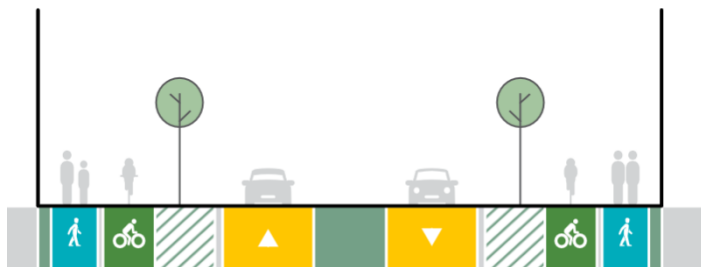


Figure 173: CFAF Outcome - New Connection from Dairy Flat Highway to Wilks Road indicative 24 m cross section



Figure 174: CFAF Outcome - New Connection from Dairy Flat Highway to Wilks Road indicative 30 m cross section

16.4 Route Refinement: Option development and assessment

A single Route Refinement option was developed for the new connection using the targeted MCA and constraints-led design process.

The option was limited to an area extending from Kahikatea Flat Road to connect to the proposed new Wilks State Highway 1 interchange (at the site of the existing Wilks Road SH1 overbridge) for the following reasons:

- a) The IBC recommended connecting these two defined points.
- b) The gap analysis and more detailed constraints analysis at DBC phase confirmed that there are few key constraints between these two connection points, other than the North Shore Airport and associated residential precinct to the south at the SH1 end (which was recommended to be avoided where practicable), and some areas of potential wetland east of the Kahikatea Flat Road intersection – which likely cannot be avoided as the intersection location is fixed.
- c) An alignment between these two points would be consistent with the Silverdale West - Dairy Flat Industrial Structure Plan.
- d) The DBC options assessment for the Wilks interchange confirmed an option at the location of the existing Wilks Road crossing of SH1 (refer Section 9.9). The new connection would play a strategic freight role to support growth in the industrial area and connect to SH1 at Wilks Interchange.

For the purposed of the option development, the project was divided into two segments:

- Segment 1: Kahikatea Flat Road to Postman Road Segment.
- Segment 2: Postman Road to SH1 Wilks interchange.

The segments for the section were identified based on the varying form and function of the segments. Segment 1 comprises the generic 2 lane arterial cross-section with a width of 24m, including separated walking and cycling either side. This part of the corridor is expected to have lower volumes in future (11,000-9,000), but more buses than segment 2. Segment 2 includes a generic 4 lane arterial with a width of 30m, including separated walking and cycling either side. The wider road corridor reflects the greater traffic volumes expected (36,000).

In developing the option, the project team also considered the following key features in the area. These are mapped in **Figure 175** and include:

- a) Potential natural wetlands.
- b) Stream crossings.
- c) North Shore airport and the adjacent Dairy Flat residential precinct.

In consideration of the key constraints above, a single option was developed for this new connection through route refinement using the localised MCA and constraints led design approach.



Figure 175: Map of key constraints and features – New Connection between Dairy Flat Highway and Wilks Road

The option comprises a new urban arterial connection through the FUZ (proposed industrial area) connecting the Kahikatea Flat Road/Dairy Flat Highway intersection with Wilks Road just west of the proposed Wilks SH1 Interchange. The connection includes separated walking and cycling along the new corridor. This option was developed in order to avoid key constraints in the area where feasible/practicable.

A constraints-led assessment was completed for the whole length of the corridor, in order to guide option development.

16.4.1 New Connection – Segment 1

DBC alignment options considered for the New Connection – Segment 1 are set out in the table below.

Table 72: Constraints led design for New Connection (Segment 1)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the North (hold southern boundary and widen to North – 24m cross-section)	Widen to the South (hold northern boundary and widen to South – 24m cross-section)
1a Heritage	No known Issues	No known Issues	No known Issues
2a. Land use futures /Policy analysis	No key Issues – FUZ land	No key Issues – FUZ land	No key Issues – FUZ land
2b. Urban design	No key Issues	No key Issues	No key Issues
2d Social cohesion; 2c. Land requirement	No key Issues	No key Issues	Commercial greenhouse near southern edge. FUZ so unlikely to remain in future.
3b. Stormwater/flooding	Minor flood plains, otherwise no key issues	As for widen both sides	As for widen both sides
3c. Ecology	Potential wetlands located adjacent and within indicated route	Potential wetlands located within indicated route.	Potential wetlands located adjacent and within indicated route (likely less impact for this option)
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Design to incorporate side road intersection as priority controlled intersection (some realignment required). Generally no issues.	As for widen both sides	As for widen both sides

16.4.2 New Connection – Segment 2

DBC alignment options considered for the New Connection – Segment 2 are set out in the table below.

Table 73: Constraints led assessment – New Connection (Segment 2)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the North (hold southern boundary and widen to North – 30m cross-section)	Widen to the South (hold northern boundary and widen to South – 30m cross-section)
1a Heritage	No known Issues	No known Issues	No known Issues
2a. Land use futures	Dairy Flat and North Shore Airport precincts – Special purpose zone and large lot zone on south (which is unlikely to change in future). Can likely be avoided if widening both sides. FUZ on north and to the west	No key Issues – FUZ land	Dairy Flat and North Shore Airport precincts – Special purpose zone and large lot zone (which is unlikely to change in future). FUZ to the west.
2b. Urban design	Need to manage interface on portions of this section along the ridgeline.	Need to manage interface on portions of this section along the ridgeline.	Need to manage interface on portions of this section along the ridgeline.
2d Social cohesion; 2c. Land requirement	North Shore Airport and residential precinct. Can likely be avoided if widening both sides	No issues	North Shore Airport and residential precinct. Airport is a key property constraint that should be avoided where practicable
3b. Stormwater/flooding	No key issues	No key issues	No key issues
3c. Ecology	No key issues	No key issues	No key issues
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Design to incorporate side road intersection as priority controlled intersection (some realignment required). Generally no issues.	As for widen both sides	As for widen both sides

16.4.3 Recommendation for New Connection

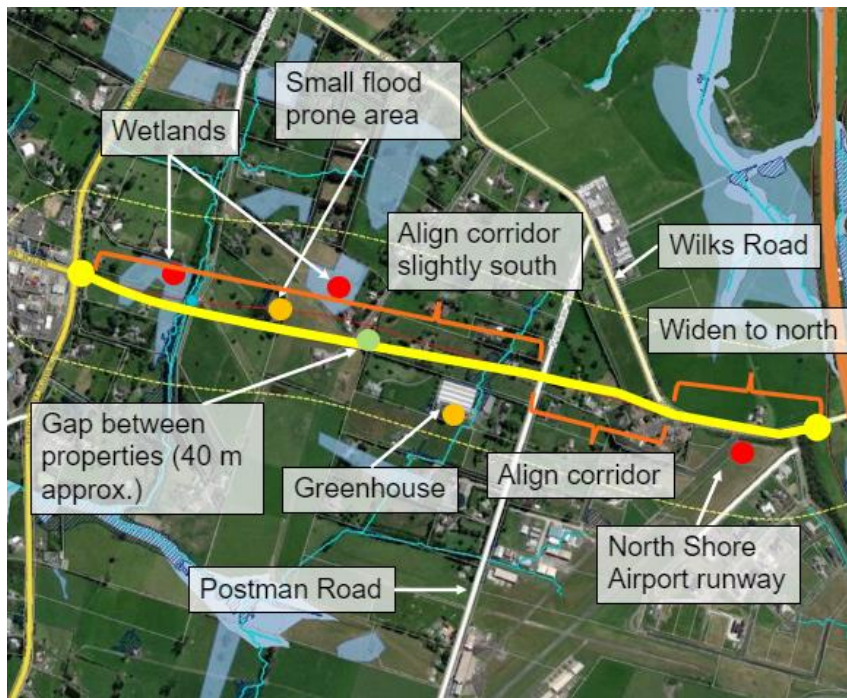


Figure 176: Recommendation for New Connection

Considering the above, the constraints-led design assessment recommended the following for further consideration in the design refinement stage to avoid key constraints:

- Segment 1 – Align corridor slightly to South to avoid or minimise potential effects on key constraints where possible.
- Segment 2 – Align corridor as shown between Postman Road and Wilks Road (as no key constraints) and widen to North along Wilks Road section to avoid impacts on the North Shore airport / runway and residential precinct.

16.5 Consideration of DBC engagement

During the DBC engagement phase no specific comments were made in reference to the New Connection. However, comments were suggested regarding public transport being a priority in these areas. The preferred option provides a new east-west arterial connection, which can be used by all modes including buses.

One comment suggested upgrading Kahikatea Flat Road as it approaches Dairy Flat Highway. The proposed upgrade includes an upgrade to the intersection in this area.

16.6 Design Refinement

During the design refinement stage, the recommendations listed above were implemented. Other key refinements included:

- Refinements to alignment at western end to minimise effects on potential natural wetlands (Segment 1).

- Design refinements around the Kahikatea Flat Road / Dairy Flat Highway intersection, considering existing businesses located on the west of the intersection (e.g. removal of swales to minimise widening) (Segment 1).

16.7 Preferred Route

The preferred route for the New Connection is shown below in **Figure 177**.

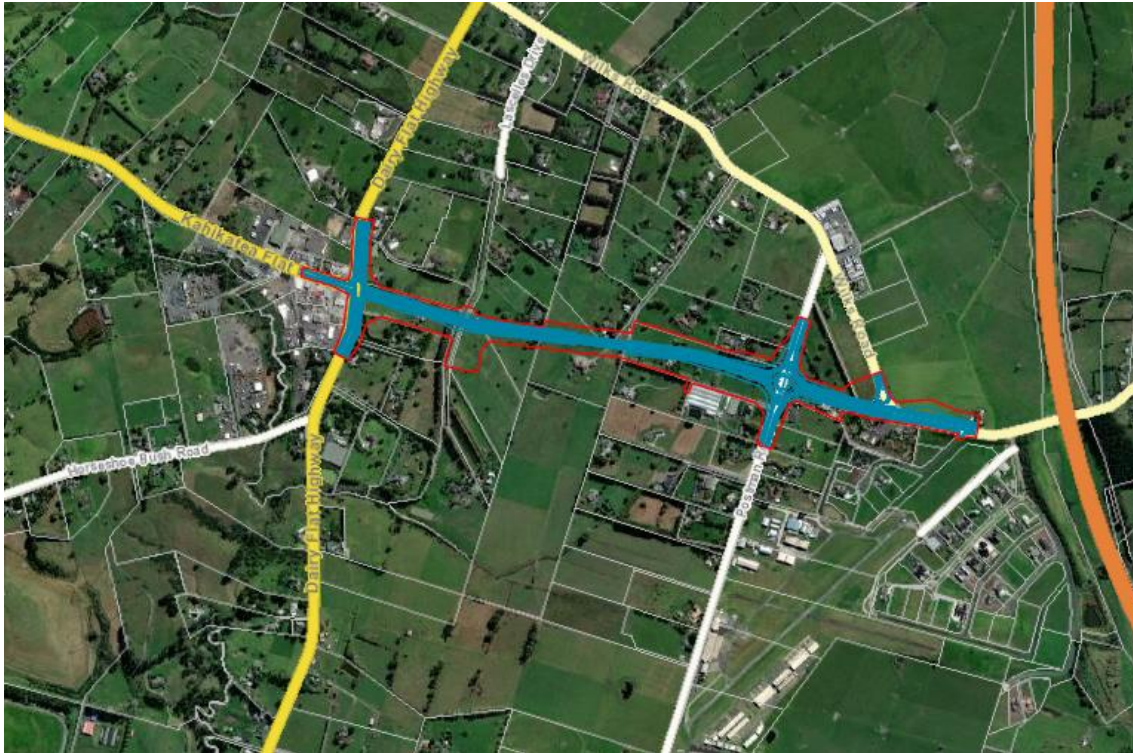


Figure 177: Preferred route for New Connection from Dairy Flat Highway to Wilks Road.

17. NOR 12 – Upgrade and Extension to Bawden Road

17.1 Summary

This section outlines the assessment of alternatives for the upgrade and extension of Bawden Road. The corridor aims to provide an east-west connection between the strategic transport network (including SH1) and a future Dairy Flat town centre, residential area, and Rapid Transit station.

The gap analysis confirmed that the IBC phase adequately considered indicative corridor options for the project. However given uncertainty around the town centre location, the study area for DBC alternatives was expanded to encompass a broader scope.

The form and function process identified the need for a four-lane urban arterial cross section. The DBC phase followed a two-step process of detailed corridor assessment and route refinement.

Key features in the area included the proposed Ō Mahurangi Penlink alignment and interchange, potential natural wetlands, stream crossings, floodplain areas, the North Shore airport, and the future town centre. Consideration was given to connecting other North Projects, such as the Upgrade to Dairy Flat Highway and the SH1 improvements (Ō Mahurangi Penlink (Redvale) Interchange Upgrade).

Three options were developed for detailed corridor assessment. The option that most closely followed the existing Bawden Road was preferred. Further route refinement was undertaken including a targeted MCA and qualitative assessment of which side of the road to widen on, considering key constraints. Hybrid options were selected to avoid or minimise impacts on wetlands, streams, and other constraints.

Option development led to further alignment adjustments and intersection improvements to address specialist issues raised such as avoidance of floodplains.

Figure 178 sets out the preferred option for Bawden Road.

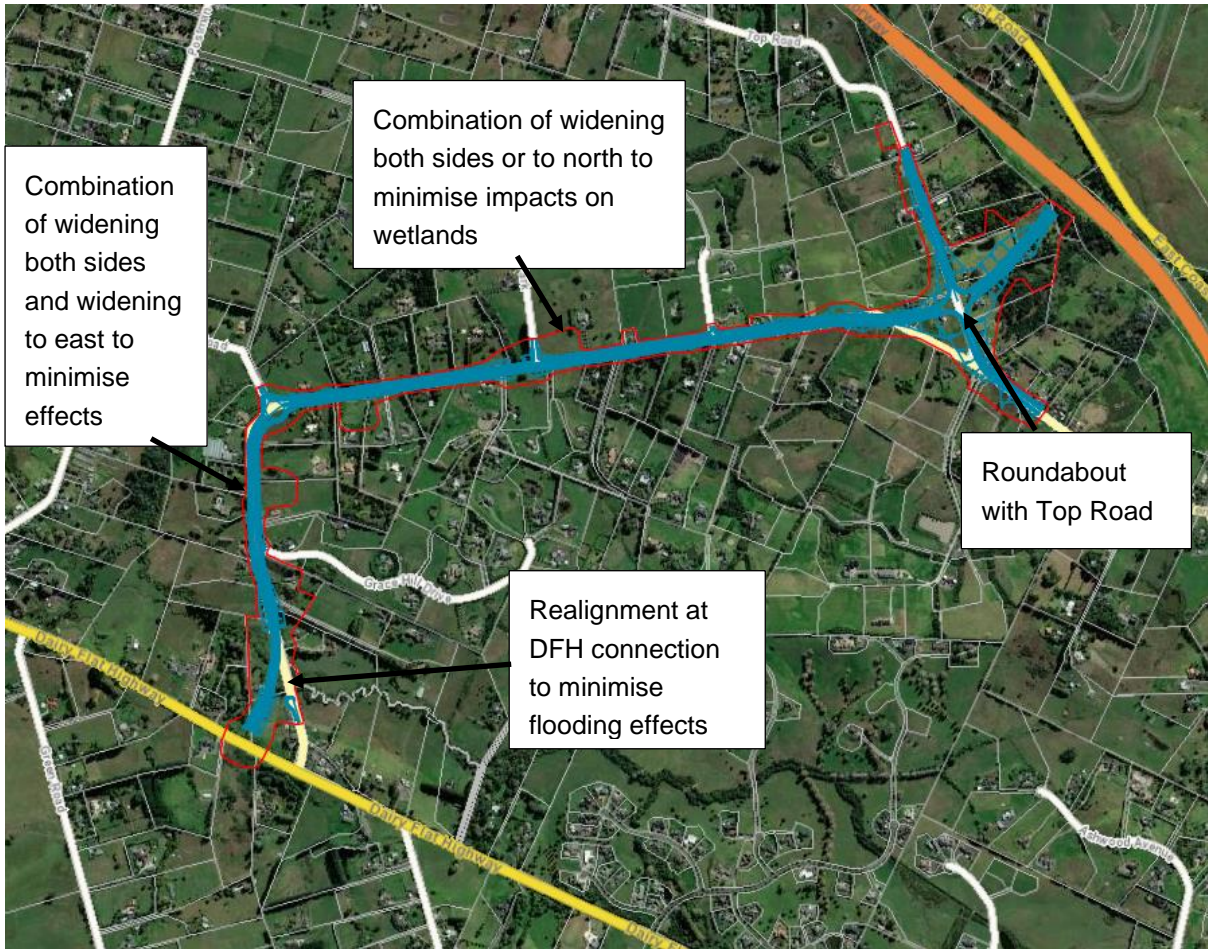


Figure 178: Preferred option for Bawden Road upgrade and extension

17.2 IBC to DBC gap analysis

The gap analysis concluded that an appropriate range of indicative corridor options were considered at IBC phase i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of impacts and was not subject to any new information which required further 'corridor' assessment to be undertaken. However, it was concluded that more detailed corridor options at DBC phase should consider the likely location of a future town centre and the selected RTC alignment. Uncertainty around the town centre location was also highlighted. Also the new NPSs on Urban Development and Freshwater should be considered in the assessment of route options. Hence a broader study area was recommended for the DBC alternatives assessment than the IBC corridor shown in **Figure 179**.

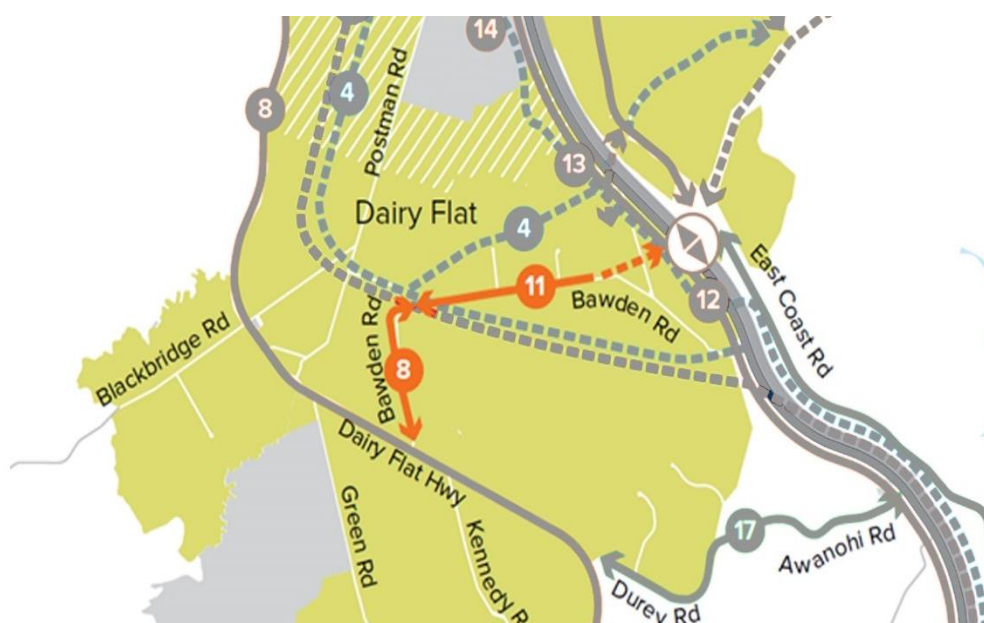


Figure 179: Indicative Strategic Transport Network highlighting the Bawden Road Upgrade and extension, recommended option

During the DBC phase, the Upgrade and Extension to Bawden Road followed the following steps for option development and assessment:

- **Step 1 –Detailed Corridor Assessment** – development and full MCA assessment of detailed corridor options.
- **Step 2 – Route Refinement** - Targeted MCA with qualitative analysis and constraints led assessment of the selected corridor– as an input to option refinement. Note: this was considered necessary as the majority of the selected corridor alignment from Step 1 comprised an upgrade to Bawden Road, but the MCA process did not look at which side of the road to widen on and did not look in detail at the alignment of the new section connecting into Ō Mahurangi Penlink interchange.

17.3 Corridor form and function

An assessment was undertaken for the Upgrade and Extension to Bawden Road following the CFAF methodology in Section 5.3. This informed the options developed and assessed below.

This corridor will provide an east-west connection between the strategic transport network and a future Dairy Flat town centre, the future Dairy Flat urban residential area and a likely future Rapid

Transit station. The typical Upgrade and Extension to Bawden Road cross section is shown in Figure 180.



Figure 180: CFAF Outcome - Upgrade and Extension to Bawden Road indicative 30 m cross section

17.4 Detailed Corridor Assessment

17.4.1 Option development

Detailed corridor options were limited to a study area between the proposed Ō Mahurangi Penlink interchange at SH1, connecting to the existing Bawden Road alignment to the west, and then connecting southwards to Dairy Flat Highway between the Huruhuru (Dairy Stream) floodplain and Kennedy Road (refer Figure 181) for the following reasons:

- All options need to tie into the proposed Ō Mahurangi Penlink interchange location at SH1, which is fixed (as the Ō Mahurangi Penlink project has confirmed the location of this interchange).
- Auckland Council (at the time of option development) had identified a location of a future town centre in Dairy Flat either south-east of the Bawden Road/Dairy Stream Road intersection or further south just east of Green Road (or somewhere in-between). Part of the purpose of this connection is to connect to this future town centre, and hence the options were limited to an area that would facilitate this.
- More detailed constraints mapping at DBC phase confirmed that the Huruhuru (Dairy Stream) floodplain and associated wetlands should be avoided where feasible so this set the western boundary.
- These options make use of the existing Bawden Road corridor where appropriate, as per the indicative corridor recommended in the IBC.

In developing options, the Project Team also considered the following known key features and opportunities in the area. These are mapped in **Figure 181** and include:

- The proposed Ō Mahurangi Penlink alignment and interchange at SH1.
- Areas of potential wetland, and non-SEA indigenous vegetation (kahikatea forest).
- Large floodplain areas and stream crossings.
- Flat areas to the south of study area subject to settlement (Tauranga Group Alluvium).
- Green Park Reserve and an Outstanding Natural Landscape area and SEA southwest of Dairy Flat Highway.
- A likely future town centre for Dairy Flat. As well as a desire to connect to this town centre, there was also a desire not to sever the town centre with this corridor which required testing in the MCA process. The assumptions around the location of this town centre evolved through the course of the assessment as explained below.

- g) The need to connect to other North Projects – the Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat (NOR 8); and Upgrade to Ō Mahurangi Penlink (Redvale) Interchange (part of NOR 4) – as well as the Ō Mahurangi Penlink Project.

The proposed RTC (NOR 1) also crosses the Upgrade and Extension to Bawden Road in the centre of Dairy Flat. The assumption was made that the RTC would be grade-separated over the road.

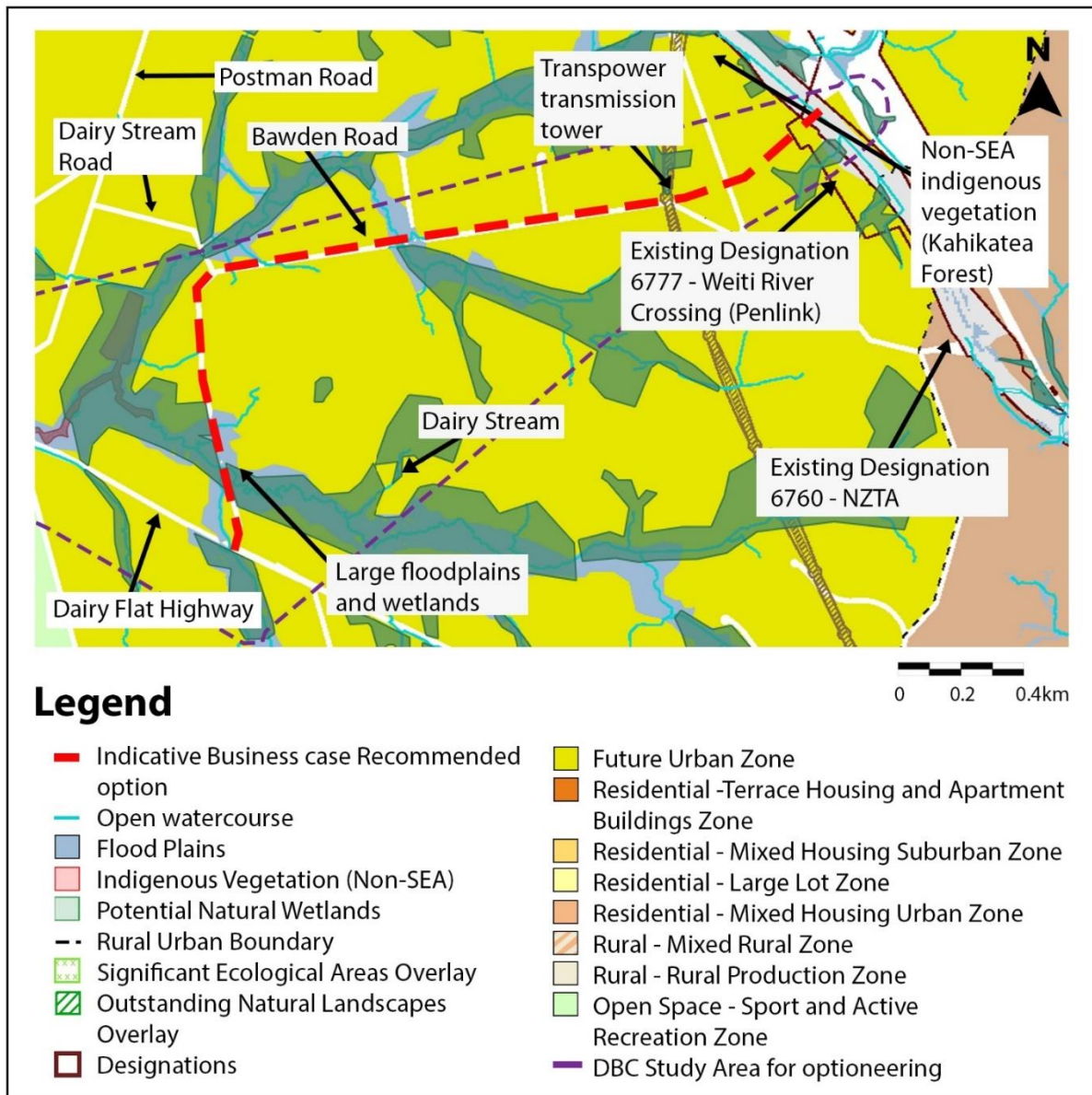


Figure 181: Map of key constraints and features – Upgrade and Extension to Bawden Road

In consideration of the above factors, three options were developed for detailed corridor assessment as outlined in **Table 74** and **Figure 182** below. These are discussed in the sections to follow:

Table 74: Summary of Upgrade and Extension to Bawden Road Options

Option Reference	Option Name	Option description
Option A	BW-01	Widen existing Bawden Road along its full length
Option B	BW-02	Widen existing Bawden Road at eastern end, connecting to new road following the eastern side of the Huruhuru (Dairy Stream), intersecting with Dairy Flat Highway just east of Green Road
Option C	BW-03	Widen existing Bawden Road at eastern end, connecting to new road that extends south towards Kennedy Road (including realignment of Kennedy Road to form a 4-legged intersection with Bawden Road and Dairy Flat Highway).

Note: All options include an extension of Bawden Road at the eastern end to connect to the proposed Ō Mahurangi Penlink interchange at SH1.

Each of the options focus on extending and upgrading the existing Bawden Road to create a strong connection between the strategic transport network (SH1 at the Ō Mahurangi Penlink interchange) and the future Dairy Flat town centre, Dairy Flat FUZ residential area and future Rapid Transit station. Each of the alignment options provide a 4-lane arterial (using the 30m generic 4-lane arterial cross-section), as well as separated cycle lanes and footpaths on both sides of the corridor. At the time of scoring, the Dairy Flat town centre was assumed to be a central town centre, a Green Road town centre or somewhere in-between as shown in Figure 182.

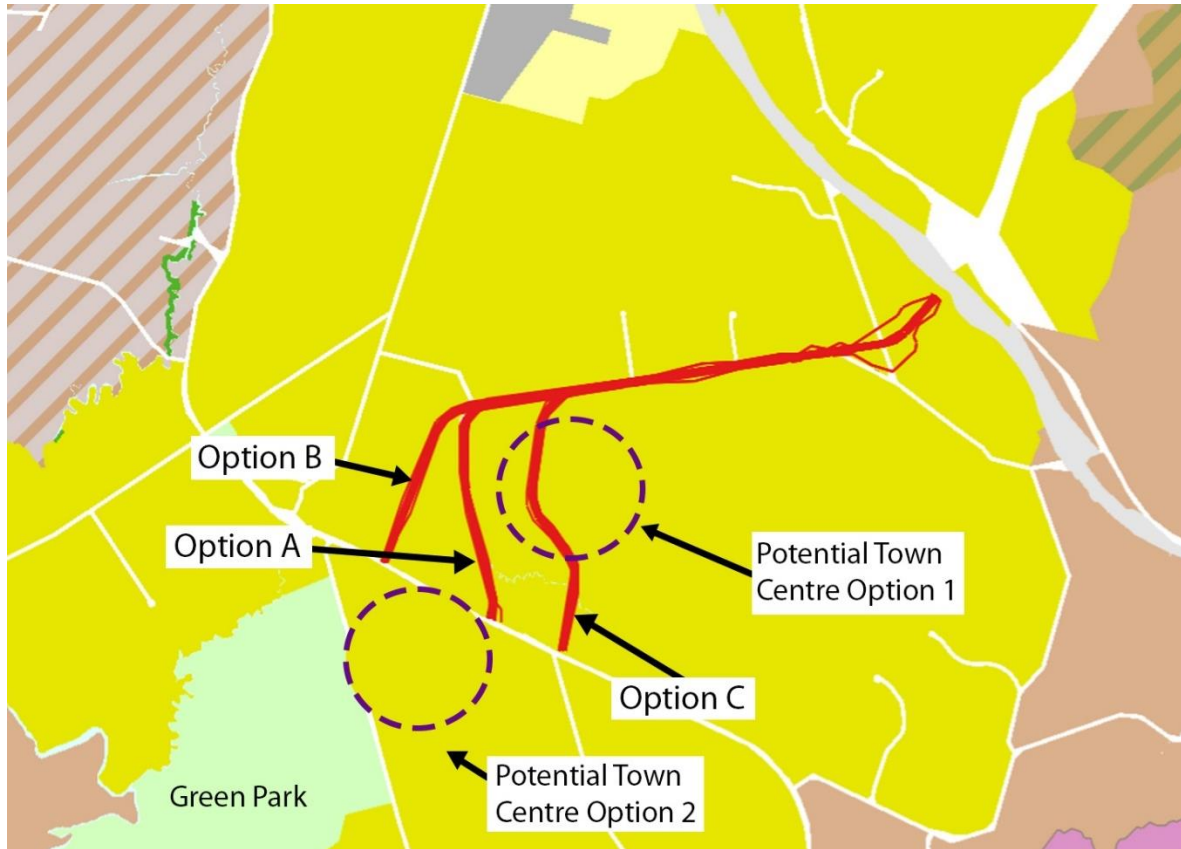


Figure 182: Options developed for Upgrade and Extension to Bawden Road

17.4.2 Options assessment

To recap, as outlined in Section 2, options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from ‘Very High Adverse Effect’ (red) to ‘Very High Positive Impact’ (green). Note: The criterion for 1a Heritage was excluded from this assessment as initial constraints mapping showed there are no known heritage sites in the vicinity.

The following table identifies the outcomes from this assessment.

Table 75: Summary of MCA -Upgrade and Extension to Bawden Road

MCA Criteria	Option A	Option B	Option C
Investment Objective 1: Access: Improve access to economic and social opportunities by providing an integrated multi-modal corridor along Bawden Road	3	2	1
Investment Objective 2: Resilience: Enable reliable people and freight movement.	3	3	3
Investment Objective 3: Integration: Provide corridor protection to support planned growth and flexibly enable future land use and transport integration	3	3	1

MCA Criteria	Option A	Option B	Option C
Investment Objective 4: Travel Choice: Support transformational mode share in the North by providing a high quality, safe and attractive movement of people along future urban corridors.	3	3	1
2a. Land use futures	2	1	0
2b. Urban design	2	2	1
2c. Land requirement	-1	-1	-2
2d. Social cohesion	-1	-2	-3
2e. Human health and wellbeing	-1	-2	-3
3a. Landscape / visual	-3	-3	-3
3b. Stormwater/flooding	-2	-3	-1
3c. Ecology	-2	-3	-3
3d. Natural hazards	-1	-1	-2
5a. Construction impacts on utilities / infrastructure	-2	-1	-1
5b. Construction disruption	-2	-2	-3
6a. Construction costs / risk	-2	-3	-3

The Project Team reviewed and compared the options identified above and noted that matters relating to the investment objectives (transport outcomes), and all of the effects criteria (other than landscape/visual) are the primary considerations for this project showing differentiation between options.

Note: The scoring assumed selection of the Option D (RT-04) alignment for the RTC and an associated station and future town centre in the vicinity. In October 2022, when Council confirmed they proposed a town centre next to the RTC (i.e. as per the 'Central Town Centre' shown on Figure 34), the project team tested the scoring and confirmed there was no change.

As part of the assessment, the Project Team also considered how the future (unplanned) transport network (i.e. Public transport, road and active mode networks) might work in the vicinity of the Bawden Road alignment (including all modes), with input from transport and urban design specialists and engagement with AT subject matter experts. The key conclusions of this assessment were that:

- The existing Bawden Road (potentially with a small diversion off to the RTC station) is the best corridor for public transport (frequent transport network) access to a future RTC station.
- It is undesirable for a four-lane arterial to run through the future town centre.
- It is desirable to separate movement and place functions¹² where possible.

In relation to non-scored criteria:

- Manawhenua who stated a preference, noted their overall preference for Option A.
- From a policy perspective, Option A is preferred as it minimises impacts on potential natural wetlands and avoids new stream crossings.

¹² The movement function of a road focuses on facilitating the transportation of people and goods between different locations, emphasizing efficiency and connectivity, while the place function of a road emphasizes the creation of a sense of community and interaction within the immediate surroundings, such as supporting local businesses and providing space for social activities.

- There was no real difference between the options in relation to value for money.

Accordingly, the Project Team identified **Option A- Widen existing Bawden Road along its full length (plus a new extension through to Ō Mahurangi Penlink (Redvale) Interchange)** as the preferred detailed corridor option for the following reasons:

- a) Scores best overall against the investment objectives, land use futures and urban design
- b) Aligns with Manawhenua preferences.
- c) Best scoring option against environmental and social criteria as it follows the existing road corridor.
- d) Provides access to a future RTC station for bus services from both the north and south.
- e) Assuming the future town centre is located next to the RTC (as Council have confirmed via their revised Spatial Land use Plan -TBC), the road can travel around and not sever the town centre and there is potential for a PT (FTN) route to divert off Bawden Road through the town centre – which can be looked at the future Structure Plan phase.
- f) Preferred option from an ecology perspective as avoids large wetlands on both sides of the road and avoids new stream crossings.
- g) Slightly preferred from construction cost/risk perspective
- h) Less property acquisition required.

The remaining options were discounted by the Project Team for the following reasons:

Table 76: Discounted options for Upgrade and Extension to Bawden Road

Option	Reasons for discounting option
Option B	<ul style="list-style-type: none"> • More ecological constraints than option A – earthworks likely to extend into potential wetland areas around Huruuru (Dairy Stream) and includes new crossing of tributary. • Less preferred from an investment objectives (Access) perspective than Option A as the road does not as closely connect to the likely future town centre. • Less preferred from stormwater/flooding perspective as crosses 2 main streams with large catchments and floodplains. • Less preferred from social cohesion perspective (existing community) as will create some severance issues and have direct impacts on existing rural properties on section of new road. • Likely longer construction period and higher risk due to the larger earthworks scope in greenfield section. • Not a stated preference of Manawhenua.
Option C	<ul style="list-style-type: none"> • Least preferred option from an investment objectives perspective as doesn't connect as directly to likely future town centre or RT station location. • More ecological constraints than option A. • Least preferred from a social cohesion perspective (existing community) as will have the most severance effects and direct impacts on the most rural properties. • Least preferred from a natural hazards perspective as climbs a Northland Allochton slope - greater risk of instability requires realignment of Kennedy Road to tie in the intersection resulting in greater construction risks. • Not a stated preference of Manawhenua.

17.5 Route refinement: Option development and assessment

Following selected of detailed corridor Option A, a route refinement process was completed for the whole length of the corridor, including a targeted MCA with qualitative assessment of which side of the road to widen on, and a constraints-led design process. This was broken into 3 segments (refer Figure 183):

- Segment 1 – Existing Bawden Road upgrade southern section.
- Segment 2 – Existing Bawden Road upgrade eastern section.
- Segment 3 – Bawden Road extension to SH1.

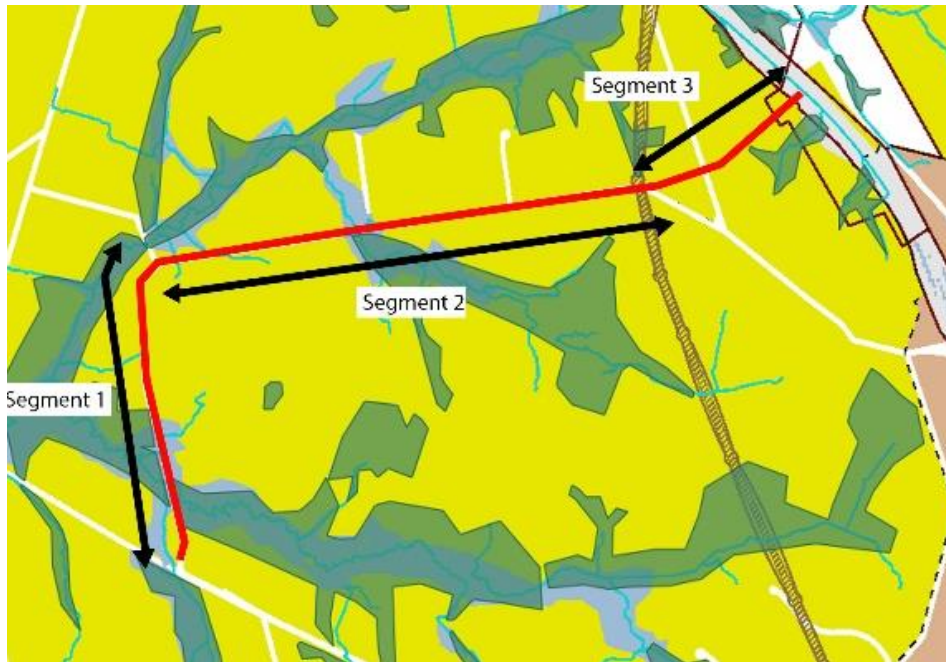


Figure 183: Bawden Road Upgrade and Extension segments

During route refinement, corridor widening options were assessed which allowed for scored criteria to differ from the original option assessment scores. For example, some corridor widening options could result in more significant effects that were not originally captured in option assessment scores.

17.5.1 Bawden Road – Segment 1

Which side of the road to widen on (versus both sides) and a hybrid option were considered in the context of key constraints present along the Segment 1 corridor. This assessment is set out in the table below including a high level analysis of constraints on either side of the road.

Table 77: Constraints led assessment for Bawden Road (Segment 1)

■	High/significant constraints or potential effects (avoid where practicable)
■	Moderate constraints or potential effects present (consider avoiding on balance with other issues)
■	No key constraints present or potentially low adverse/positive effects




MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the East (hold southern boundary and widen to East – 30m cross-section)	Widen to the West (hold northern boundary and widen to West – 30m cross-section)	Hybrid Option (mix of widening both sides and widen to east/west to avoid key constraints -30m cross-section)
1a Heritage	No known issues	No known issues	No known issues	No known issues
2a. Land use futures /Policy analysis	FUZ with likely future town centre to east and floodplain to west	FUZ with likely future town centre to east	FUZ with likely future town centre to east and floodplain to west	FUZ with likely future town centre to east and floodplain to west
2b. Urban design	Look to minimise level change between road and adjacent land to create opportunity for anticipated future town centre / high density development to interface with the road corridor.	As for widen both sides	As for widen both sides	As for widen both sides
2d Social cohesion; 2c. Land requirement	No key issues	No key issues	Equestrian centre – Southstar Equestrian on west side of road	No key issues
3b. Stormwater/flooding	Large flood plains on either side of the road	Large flood plains on either side of the road	Large flood plains on either side of the road	Option seeks to avoid key floodplains
3c. Ecology	Large potential wetlands either side near the middle of the alignment; larger on the west at the southern end of the alignment.	As for widen both sides	As for widen both sides	Option seeks to avoid key wetland areas

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the East (hold southern boundary and widen to East – 30m cross-section)	Widen to the West (hold northern boundary and widen to West – 30m cross-section)	Hybrid Option (mix of widening both sides and widen to east/west to avoid key constraints -30m cross-section)
<p>3d Natural hazards</p> <p>5a Construction impacts on utilities/infrastructure</p> <p>6a Construction cost/risk</p>	<p>The stream bridge immediately north-west of the existing DFH / Bawden Rd intersection will be located in the middle of the future roundabout or signalised intersection if the existing Bawden Rd alignment is retained. Need to locate the future DFH / Bawden Rd intersection further west</p>	<p>As for widen both sides</p>	<p>As for widen both sides</p>	<p>As for widen to both sides</p>

17.5.2 Bawden Road – Segment 2

Which side of the road to widen on (versus both sides) and a hybrid option were considered in the context of key constraints present along the Segment 2 corridor. This assessment is set out in the table below including a high-level analysis of constraints on either side of the road.

Table 78: Constraints led assessment Bawden Road (Segment 2)

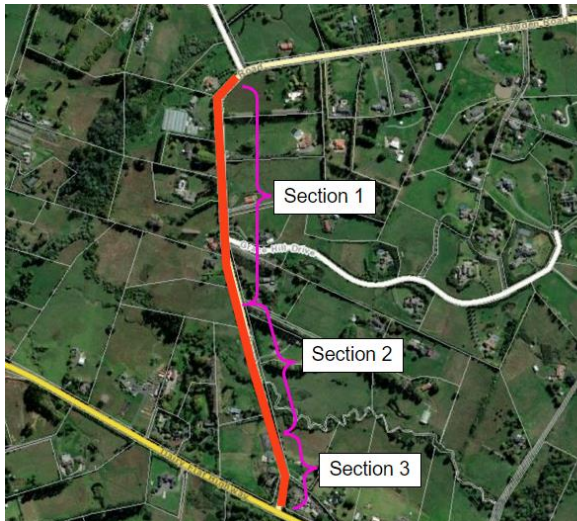
-  High/significant constraints or potential effects (avoid where practicable)
-  Moderate constraints or potential effects present (consider avoiding on balance with other issues)
-  No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Direct alignment (30m cross-section)	Shift alignment to north (30m cross-section)	Shift alignment to south (30m cross section)	Hybrid Option (hybrid option to avoid key constraints)
1a Heritage	No known issues	No known issues	No known issues	No known issues
2a. Land use futures	FUZ; however challenging topography for future land use integration	As for direct alignment option	As for direct alignment option	As for direct alignment option
2b. Urban design	Look to minimise level change between road and adjacent land to create opportunity for active interface with anticipated residential development	As for direct alignment option	As for direct alignment option	As for direct alignment option
2d Social cohesion; 2c. Land requirement	Alignment likely to impact four dwellings	Alignment likely to impact two - four dwellings	Alignment likely to impact four dwellings	Alignment likely to impact four dwellings
3b. Stormwater/flooding	No key issues	No key issues	No key issues	No key issues
3c. Ecology	Earthworks batters are likely to impact potential wetland.	Earthworks batters may impact potential wetland.	Route will locate within potential wetland	Option seeks to avoid wetlands, but earthworks batters may still impact
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	New road – design to allow for clearances to Transpower pylon and overhead lines. Design to include local road intersection.	New road – design to allow for clearances to Transpower pylon and overhead lines. Design to include local road intersection.	New road – design to allow for clearances to Transpower pylon and overhead lines. Design to include local road intersection.	New road – design to allow for clearances to Transpower pylon and overhead lines. Design to include local road intersection.

17.5.3 Recommendations

The following route refinement recommendations were made following the assessment:

- **Bawden Road Segment 1 - Hybrid option for segment 1 to avoid key constraints** (refer to Figure 184).



Hybrid option for the whole section to avoid key constraints

Section 1 – Widen both sides – No major constraints in this area

Section 2 – Widen to east side – To avoid a large section of wetland to the west

Section 3 – Consider location of wetlands. Avoid floodplain to the east.

Figure 184: Recommendation for Bawden Road Segment 1

Bawden Road Segment 2 – hybrid option to avoid key constraints (refer to Figure 185)



Hybrid option for the whole corridor to avoid key constraints

S1 - Road Widening to Both sides – to avoid wetlands and stream realignment. Widen to south where corridor turns south (at the very western end of alignment)

S2 - Road Widening to the North – to avoid wetlands, and flood-prone areas

S3 - Road Widening to both sides – avoid wetland and Transpower transmission tower to the north (at the very eastern end of alignment). Widen to the south next to transmission tower.

Figure 185: Recommendations for Bawden Road Segment 2

Bawden Road Segment 3 - Hybrid option to avoid potential wetland to east (refer to Figure 186)



Figure 186: Recommendations for Bawden Road Segment 3

17.6 Consideration of DBC Engagement

The DBC engagement in July-August 2022 included the Upgrade and Extension of Bawden Road. Feedback from the community during DBC engagement suggested that Bawden Road needs to be widened and realigned to increase safety. The preferred option for this project includes widening of the road to a 4-lane urban arterial. The upgrade will be designed in accordance with safety standards, and the road speed limit is proposed to be dropped to 50 km/hr in accordance with the future urban environment. Comments were also made to consider noise mitigation along Bawden Road due to the increase in traffic numbers, which will be considered through the Assessment of Environmental Effects phase.

17.7 Design Refinement

All key recommendations listed above were implemented design refinement for Segments 1, 2 and 3. Other key refinements included:

- Realignment of western tie-in to Dairy Flat Highway to minimise impacts on streams / floodplains and potential natural wetlands (Segment 1) -see below.
- Maximised grades on Bawden Road to reduce earthworks at eastern end. Connection to Top Road maintained requiring work to Top Road to tie in.
- Intersection between Bawden Road and Dairy Stream Road has been amended to allow for a roundabout.

17.7.1 Connection with Dairy Flat Highway

Further work was done with engineering, ecology, flooding/stormwater and planning specialists on Section 3 of this segment. This confirmed a recommendation to realign this part of Bawden Road further west (see red line on Figure 187 below) for the following reasons:

- to shift the Bawden/Dairy Flat Highway intersection out of a stream and to the modelled edge of a large floodplain (which would otherwise require a large bridge structure and an elevated roundabout).
- to align the approach to Dairy Flat Highway at a more appropriate angle.
- realigning to the east is not feasible because the angle of approach would be at such an acute angle there would be sight distance and turning movement issues.
- the realignment would affect less existing dwellings than upgrading the existing alignment.
- the realignment would have less effect on streams/freshwater values.

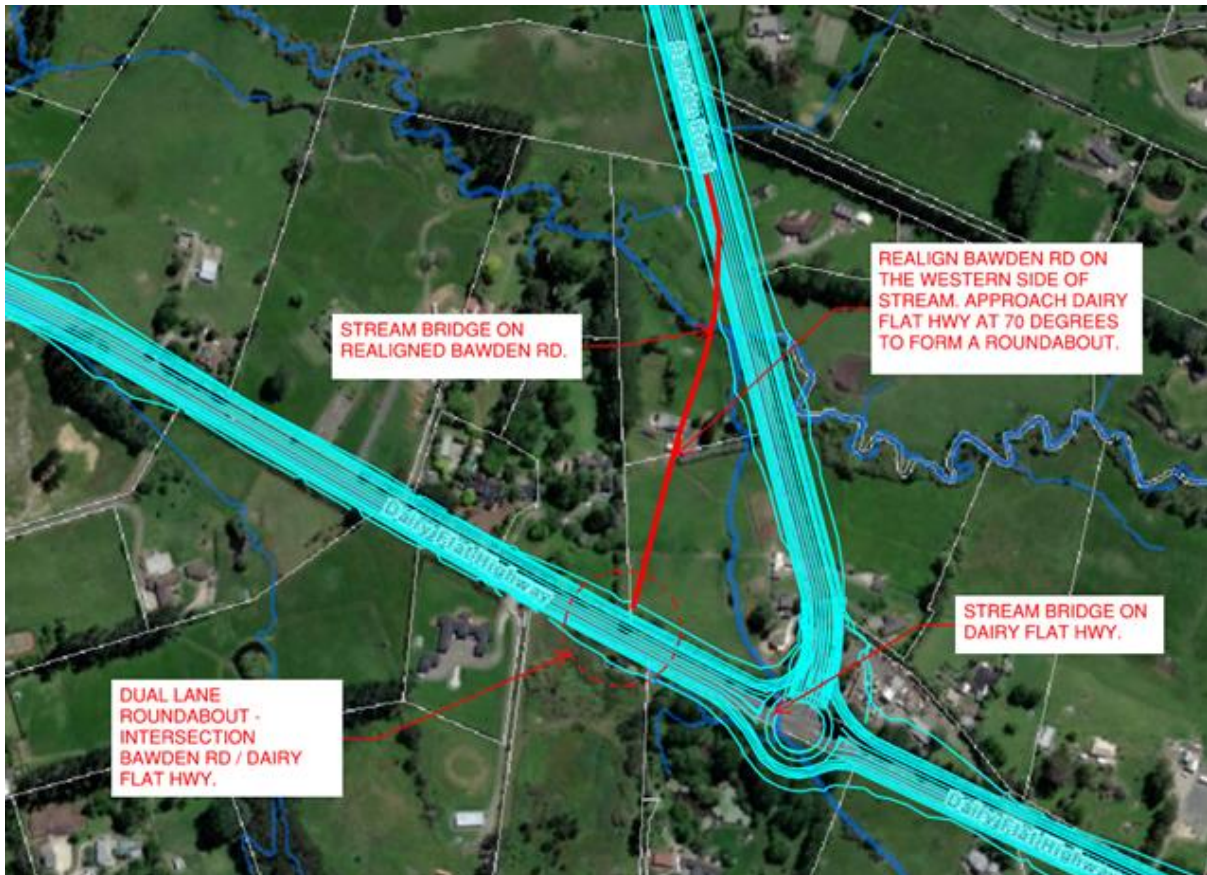


Figure 187: Recommendation to realign most southern section of Bawden Road (see red line)

17.8 Preferred Route

The preferred route for the Upgrade and Extension to Bawden Road is shown below in **Figure 188**.

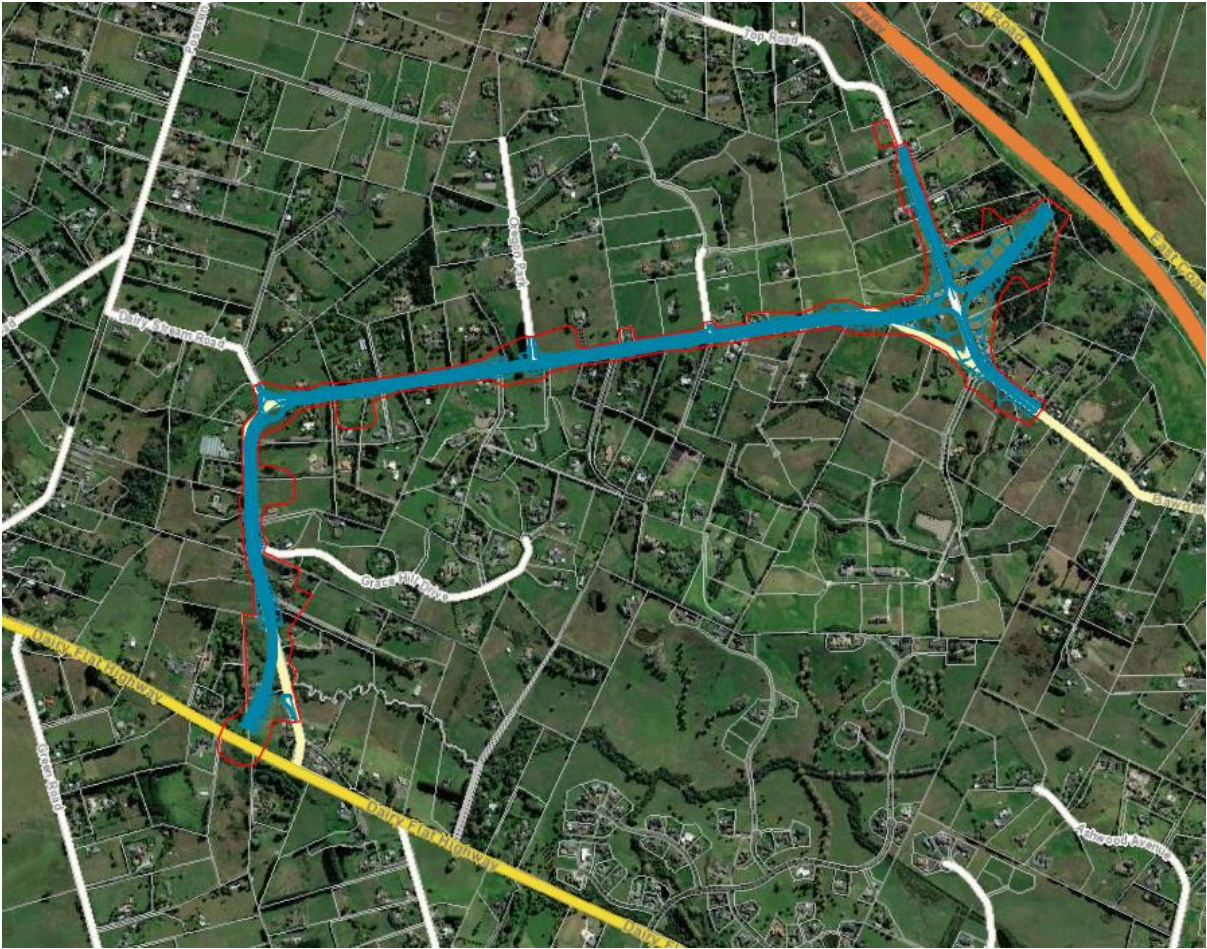


Figure 188: Preferred route for Upgrade and Extension to Bawden Road

18. NOR 13 – Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink (Redvale) Interchange

18.1 Summary

This section outlines the assessment of alternatives for the upgrade to East Coast Road. The upgrade includes the addition of separated walking and cycling paths to accommodate growth areas and provide strategic connections for various forms of transport. The IBC-DBC gap analysis confirmed that no further 'corridor' assessment was required, and the project could proceed to route refinement. The DBC considered ways to minimise earthworks and effects, taking into account the implications of Ō Mahurangi Penlink being brought forward.

The form and function assessment identified the need for different cross sections to be applied in the urban and rural portions of the corridor. The project team also considered known key features in the area during route option development, including natural wetland areas, slope instability risks, a cemetery, a site of cultural value, a substation, land urbanisation, an entertainment zone, and the proposed Ō Mahurangi Penlink interchange.

The DBC considered options in two phases. Initially an MCA assessment was undertaken. Two route options were developed and assessed to test whether the transport corridor should be upgraded along the full length or just within the FUZ and existing urban sections. Upgrade along the full East Coast Road corridor was preferred.

A detailed analysis was then carried out to determine which side of the road to widen in each of the three segments. During this stage, the cross section within the rural section was narrowed to minimise earthworks and impact on property, as well as avoiding environmental and geotechnical constraints.

The preferred route for the Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink is shown below in **Figure 189**.

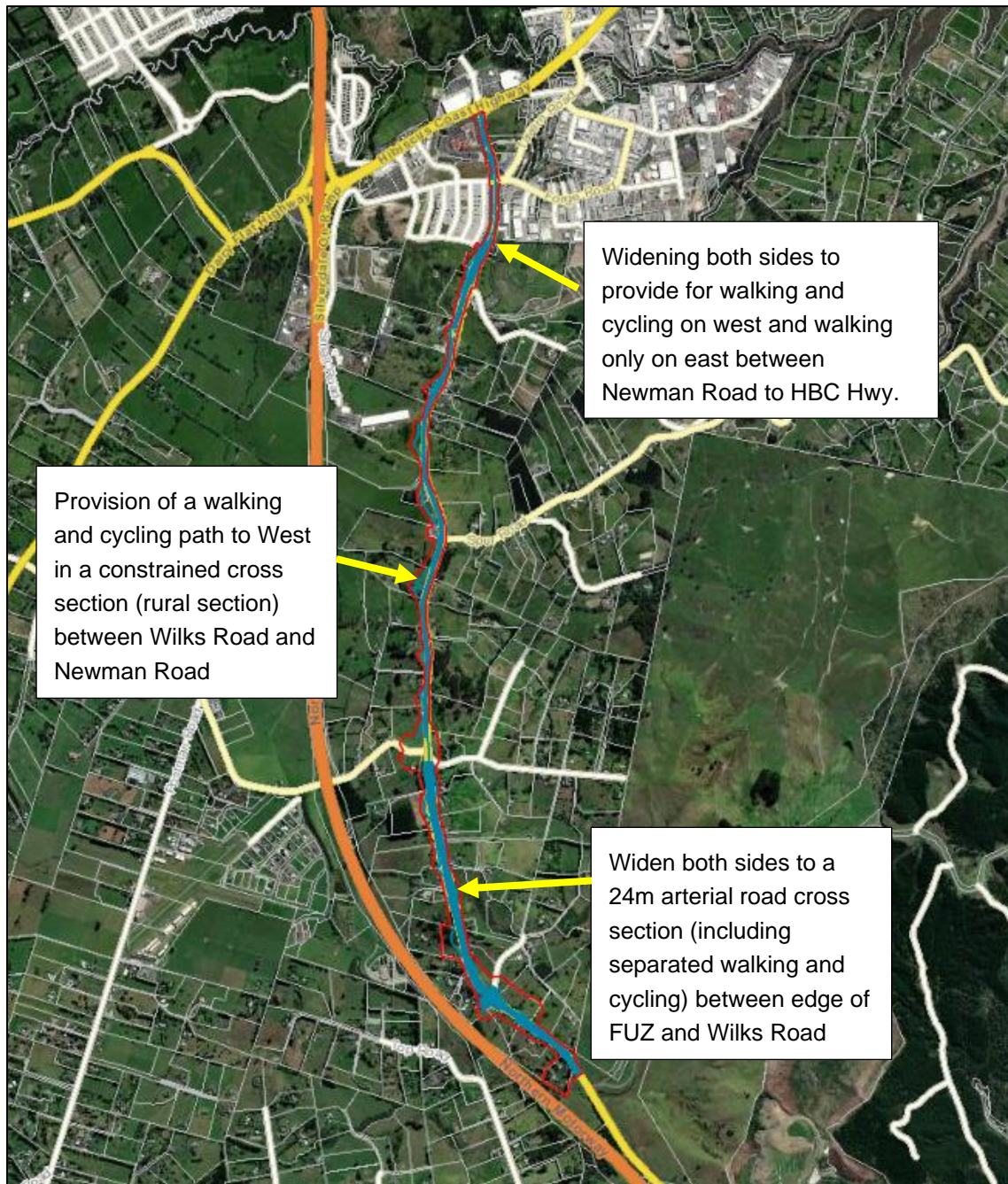


Figure 189: Preferred route for Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink

18.2 IBC to DBC gap analysis

The IBC recommended option for this project (R-26-1) proposed an upgrade to the existing East Coast Road between Hibiscus Coast Highway and the end of the FUZ area around Ō Mahurangi Penlink (Number 15 in Figure 190). The upgrade was assumed to include dedicated bus lanes and separated walking and cycling. This upgraded connection is intended to provide a strategic bus connection to the Hibiscus Coast bus station and an alternate north-south connection between major growth areas, including a high quality and safe direct active mode connection between the growth areas of Silverdale and Redvale.

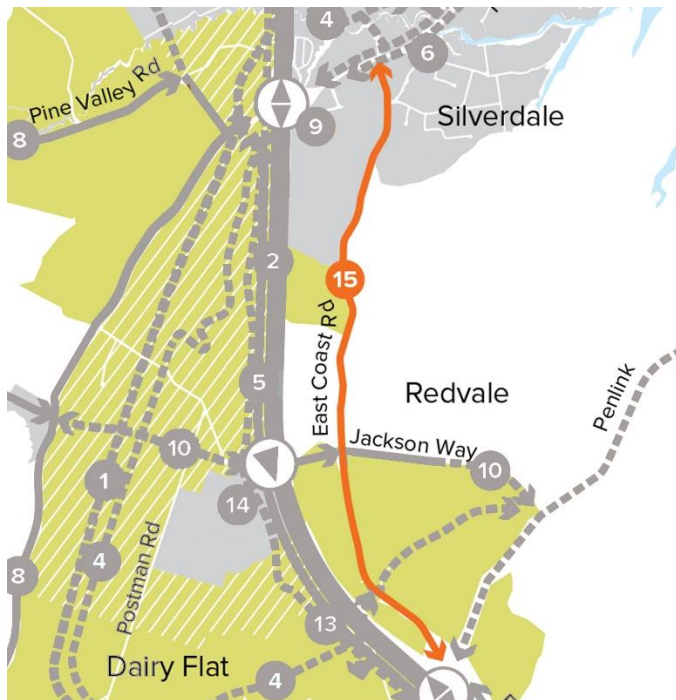


Figure 190: Indicative Strategic Transport Network highlighting the East Coast Road Upgrade , recommended option

The gap analysis at the start of the DBC phase concluded that an appropriate range of indicative corridor alternatives was considered and that the project could proceed to route refinement i.e. the IBC was sufficient in considering indicative corridor options proportionate to the scale of likely impacts and was not subject to any new information which required further ‘corridor’ assessment to be undertaken. The analysis also recommended that the following issues were considered further at DBC stage:

- a) Consider ways to minimise earthworks considering location of the road on a ridgeline.
- b) Consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).
- c) Implications of Ō Mahurangi Penlink being brought forward – whether this means the project is required earlier.

During the DBC stage, the Upgrade to East Coast Road followed the following steps for option development and assessment:

- Step 1 –Route Assessment: Development and full MCA assessment of detailed route options.
- Step 2 – Route Refinement Assessment (Part A): Targeted MCA and constraints led. assessment of the selected corridor – as an input to option refinement. Note: this was considered necessary as the MCA process did not look at which side of the road to widen on.
- Step 3 – Route Refinement Assessment (Part B): Reconsideration of the widening options for the corridor through the rural section- recognising earthworks and property effects of the road upgrade based on the initial form and function/option selection.

18.3 Corridor form and function

An assessment was undertaken for the Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink following the CFAF methodology in Section 5.3. This informed the options developed and assessed below.

The corridor provides an important north-south connection for all modes between the growth areas of Silverdale and Redvale. In addition, the corridor provides an alternative connection between these two growth areas without the need to travel via SH1. The typical cross section is shown in Figure 191 below. The road would also drop in speed to an assumed 50km/hr. The typical cross section between Newman Road and Jackson Way is shown in Figure 192 and this section of road will drop to an assumed 60km/hr speed limit. These typical cross-sections were tested further as the options assessment progressed – this is explained in the following sections.



Figure 191: CFAF Outcome - Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink indicative 24 m cross section



Figure 192: CFAF Outcome - Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink indicative 29 m cross section

18.4 Route Assessment

18.4.1 Option development

For the purposes of option development, the project was divided into three segments which aligned with the form and function analysis and changes in AUP zoning:

- Segment 1: this segment of East Coast Road extends from Hibiscus Coast Highway to Newman Road (predominantly General business zone /Light industry zone).

- Segment 2: this segment of East Coast Road extends from Newman Road to Jackson Way (predominantly Rural Countryside living zone).
- Segment 3: this segment extends from Jackson Way to the Ō Mahurangi Penlink interchange (predominantly FUZ).

At the time of route option development, the recommended form and function included separated cycle lanes and footpaths on both sides of the corridor in Segments 1 and 3 with a width of 24m (live zoned and FUZ sections), and a separated cycle lane and footpath on one side of the corridor in Segment 2 with a width of 29m (the rural section). This form and function for Segment 2 was amended in Step 3 of the options process as explained in Section 18.6 below.

The corridor options were limited to a study area along East Coast Road (refer Figure 193) extending from Hibiscus Coast Highway through to just past the Ō Mahurangi Penlink interchange for the following reasons.

- a) The IBC recommended upgrade of this transport corridor and the IBC-DBC gap analysis confirmed this recommendation as still appropriate for the DBC as detailed above.
- b) The road upgrade needs to connect two points – the Hibiscus Coast Highway intersection with East Coast Road and the end of the FUZ just past Ō Mahurangi Penlink to support future urban growth along this corridor and provide north-south resilience.

In developing route options, the Project Team also considered the following known key features in the area. These are mapped in Figure 193 below and include:

- a) Several wetland and flood prone areas.
- b) High risk of slope instability in some areas of steep slopes.
- c) Cemetery near the northern extent of study area in Silverdale (Auckland memorial park and cemetery).
- d) A puke (site of cultural value) near the intersection with Wilks Road (location confidential).
- e) Vector Substation – designated under the AUP.
- f) Urbanising land at the northern end.
- g) An entertainment zone in segment 2 (including Snowplanet and a luge).
- h) The rural urban boundary within Segment 2 – where an isolated pocket of Countryside Living zoned land exists, which is not expected to change in future.
- i) Ō Mahurangi Penlink and the proposed Ō Mahurangi Penlink interchange at the southern end.

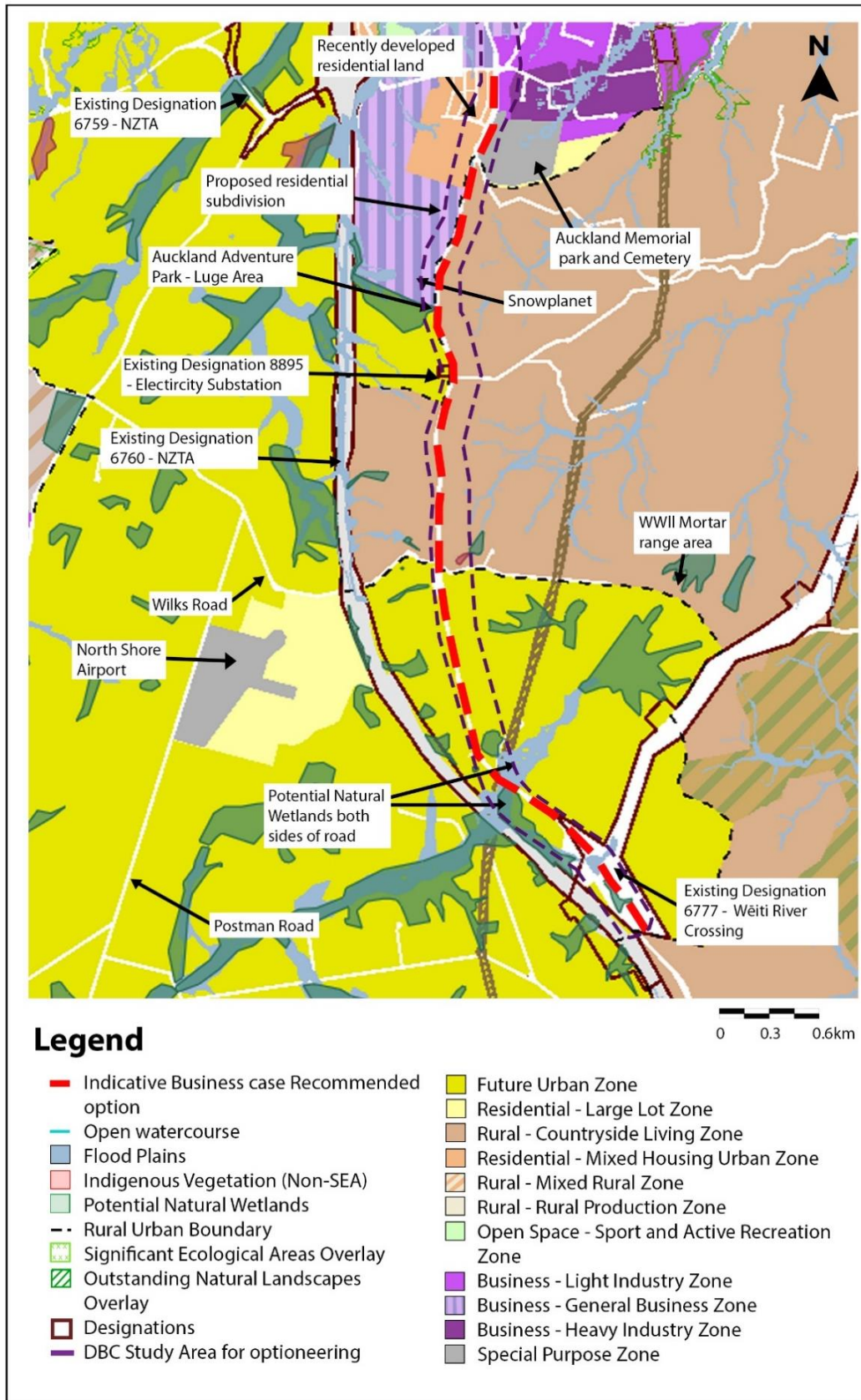


Figure 193: Map of key features and study area – Upgrade to East Coast Road

In consideration of the above factors, two route options were developed for MCA analysis as outlined in **Table 79** and **Figure 194** below. These are discussed in the sections to follow:

Table 79: Summary of route options considered for East Coast Road

Option Reference	Option Name	Option description
Option A	EC-01	Option A provides a shared path on one side of the road in segment 2. This option provides a dedicated shared path along the entire corridor, providing connectivity between the FUZ land east of the SH1 corridor and the Silverdale area.
Option B	EC-02	Option B does not include an upgrade of segment 2 but does include an east-west active mode connection across to the proposed strategic active mode corridor along SH1 (i.e. this option has a gap in the connection through the rural zoned section where deviation is required onto the strategic SH1 cycleway to the west).

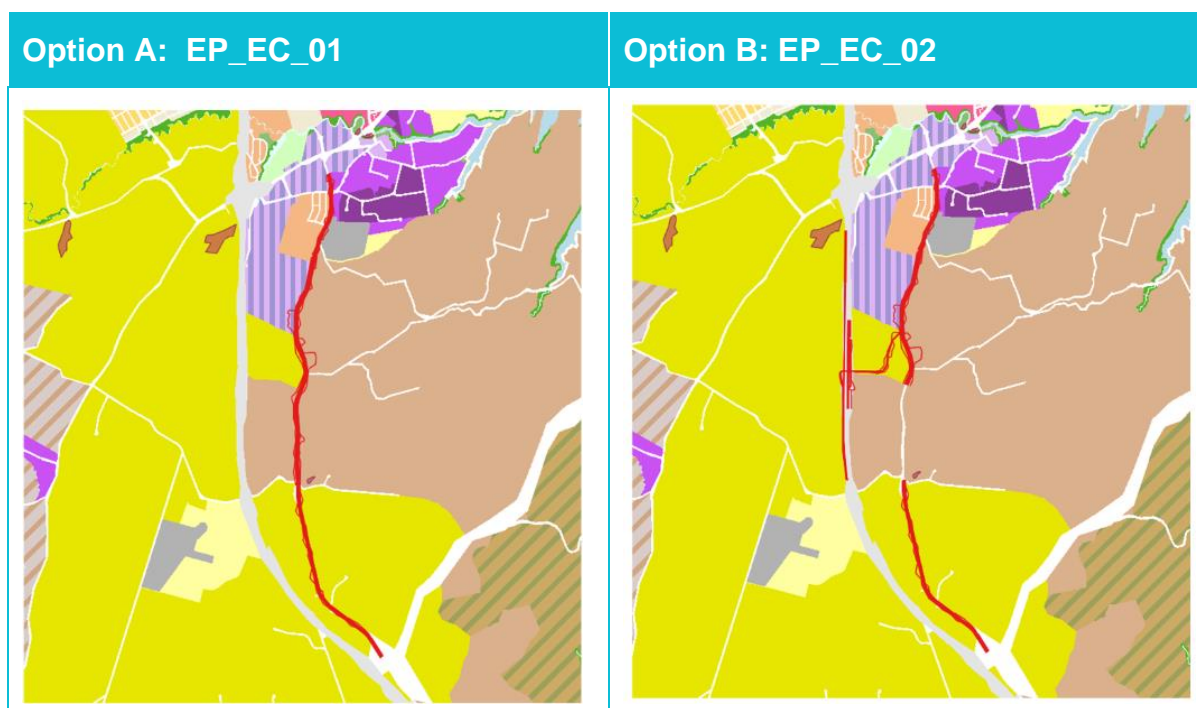


Figure 194: Route Options for MCA - Upgrade to East Coast Road

These options were designed to test whether the transport corridor should be upgraded along the full length or just the FUZ and existing urban sections (considering there is a segment in the middle which is zoned rural and is not proposed to change).

Both options focused on upgrading the existing road to deliver a high quality, safe, and direct active mode connection between the growth areas of Silverdale and Redvale. Both options provide widening for separated cycles lanes and footpaths on both sides within segments 1 and 3 (24m corridor). The options will support planned development by enabling safe active mode access for current and future communities along East Coast Road and between Silverdale town centre and Redvale/Ō Mahurangi Penlink.

18.4.2 Option assessment

To recap, as outlined in Section 2, two options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

The following table identifies the outcomes from this assessment.

Table 80: Summary of Upgrade to East Coast Road - MCA assessment

MCA Criteria	Option A	Option B
Investment Objective 1 - Access: Access/integration: Improve access to economic and social opportunities through direct and attractive active mode facilities	3	2
Investment Objective 2 - Travel Choice: Provide a high quality, low carbon strategic active mode facility within the catchment	3	2
Investment Objective 3 - Safety: A safe facility which separates vulnerable users from conflict with vehicles	3	3
1a. Heritage	-1	-1
2a. Land use futures	2	1
2b. Urban design	3	1
2c. Land requirement	-1	-1
2d. Social cohesion	-2	-2
2e. Human health and wellbeing	2	2
3a. Landscape / visual	-3	-3
3b. Stormwater	-1	-1
3c. Ecology	-2	-3
3d. Natural hazards	-2	-3
5a. Construction impacts on utilities / infrastructure	-2	-2
5b. Construction disruption	-1	-2
6a. Construction costs / risk / value capture	-3	-3

The Project Team reviewed and compared the options identified above and noted that matters relating to the investment objectives (access and travel choice), land use futures, urban design, ecology, natural hazards and construction disruption are the primary considerations for this project showing differentiation between the options.

In relation to non-scored criteria:

- Option A was the stated preference of those Manawhenua that stated a preference.
- Option A was slightly preferred from a policy perspective as it affects less potential natural wetlands.
- Option A was preferred from a value for money perspective as it has better benefits and similar costs.

Accordingly, the Project Team identified **Option A- Dedicated shared path along the entire corridor** as the preferred route option for the following reasons:

- a) Scores better for Access and travel choice investment objectives (as it has a more direct N-S connection without interruption).
- b) Supported by Manawhenua who have stated a preference.
- c) Less future land use segregation (as it avoids connection across FUZ to SH1).
- d) Less impact on ecology (potential wetlands, flood prone areas and streams).
- e) Less geotechnical instability risk.

Option B was discounted by the Project Team for the following reasons:

Table 81: Reasons for discounting option B

Option	Reasons for discounting option
Option B	<p>Did not score as well against the investment objectives</p> <p>Has greater impacts on low value wetlands and streams which are anticipated to be culverted</p> <p>Will cause some severance of FUZ area to the west of the road corridor</p> <p>Requires more construction disruption and cost associated with connection to SH1 facility</p> <p>The connection across to SH1 is located in areas of high geotech risk (Northland Allochthon) - swampy/organics, landslides, a pond to avoid and ephemeral streams to cross.</p> <p>Will sever more land which is close to flood plains</p> <p>This option is not supported by Manawhenua who have stated a preference</p>

18.5 Route Refinement (Part A)

Following selection of Option A, a targeted MCA and constraints-led assessment was completed for the whole length of the corridor, in order to guide route refinement. This was considered necessary as the route assessment did not consider which side of the road to widen on. This assessment was broken into segments as per the form and function analysis and **Figure 195**.

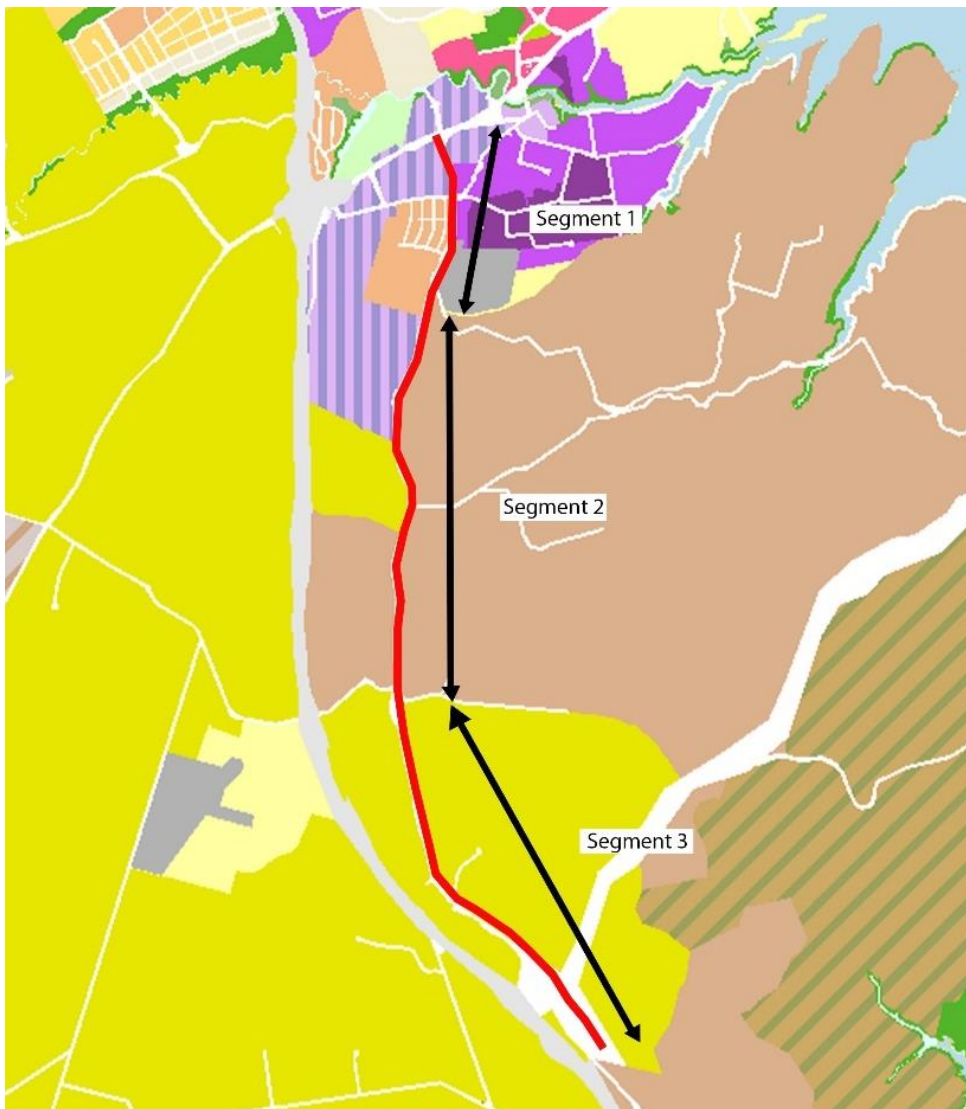


Figure 195: East Coast Road segments

18.5.1 ECR – Segment 1 – Hibiscus Coast Highway to Newman Road

Widening options considered for widening East Coast Road - Segment 1 are set out in the table below including a high level analysis of constraints on either side of the road.

Table 82: Constraints led assessment East Coast Road (Segment 1)

■	High/significant constraints or potential effects (avoid where practicable)
■	Moderate constraints or potential effects present (consider avoiding on balance with other issues)
■	No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the West (hold Eastern boundary and widen to west – 24m cross-section)	Widen to the East (hold western boundary and widen to east – 24m cross-section)
1a Heritage	No key issues	No key issues	No issues
2a. Land use futures	Opportunity to work with developer of residentially zoned land parcels on western side of road.	Opportunity to work with developer of residentially zoned land parcel on western side of road	No Key issues
2b. Urban design	No key issues Need to consider interface with residential development – likely to be rear fence from development.	Need to consider interface with residential development – likely to be rear fence from development.	Need to consider interface with "Vantage Point" shopping centre
2d Social cohesion; 2c. Land requirement	Cemetery on eastern side of road. Burials area may be avoided if widening both sides Newly developing urban land around northern end of road – developer seeking bulk earthworks resource consent (as at March 2023) within parts of the road reserve on western side of corridor.	Newly developing urban land around northern end of road – developer seeking bulk earthworks resource consent (as at March 2023) within parts of the road reserve on western side of corridor.	Some impact on cemetery may be unavoidable. Newly developed urban land around northern end of road. Parking at Vantage Point shopping centre could be impacted.
3b. Stormwater/flooding	No key issues – Swales and some ponds anticipated.	As for widen both sides	As for widen both sides
3c. Ecology	No key issues	No key issues	No issues
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Cemetery on eastern side of road. Burials area may be avoided if widening both sides Newly developing urban land around northern end of road	Newly developing urban land around northern end of road. Widening one side would require reconstruction / reprofiling of the carriageway and come at significant cost and disruption.	Newly developed urban land around northern end of road. Parking at Vantage Point shopping centre could be impacted. Widening one side would require reconstruction / reprofiling of the carriageway and come at

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the West (hold Eastern boundary and widen to west – 24m cross-section)	Widen to the East (hold western boundary and widen to east – 24m cross-section)
			significant cost and disruption.

18.5.2 ECR – Segment 2 – Newman Road to Jackson Way

Options considered for widening East Coast Road - Segment 2 are set out in the table below including a high-level analysis of constraints on either side of the road.

Table 83: Constraints led assessment East Coast Road (Segment 2)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the West (hold Eastern boundary and widen to west – 24m cross-section)	Widen to the East (hold western boundary and widen to east – 24m cross-section)
1a Heritage	No key issues	No key issues	No key issues
2a. Land use futures	Electricity substation on west (8895 Designated site) Business zone on west (occupied by entertainment land uses and a childcare centre). Small area of FUZ (yellow) land on west. Rest is Rural land that is not proposed to change.	As for widen both sides	Rural land on east that is not proposed to change.
2b. Urban design	No key issues	No key issues	No key issues

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 24m cross-section)	Widen to the West (hold Eastern boundary and widen to west – 24m cross-section)	Widen to the East (hold western boundary and widen to east – 24m cross-section)
2d Social cohesion; 2c. Land requirement	Business land (Snowplanet, adventure park and childcare centre) on west; Rural properties on east (outside of FUZ). Snowplanet has consent to extend facilities closer to road	As for widen both sides	Rural properties on east (outside of FUZ)
3b. Stormwater/flooding	No key issues – Swales anticipated. Ponds anticipated within FUZ areas.	As for widen both sides	As for widen both sides
3c. Ecology	Potential wetland on western side, south of Snowplanet.	As for widen both sides	No key issues
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Opportunity to utilise the berm along eastern side of ECR for swale.	The swale will require deconstructing the existing road corridor.	Opportunity to utilise the berm along eastern side of ECR for swale.

18.5.3 ECR – Segment 3 – Jacksons Way to Ō Mahurangi Penlink

Options considered for widening East Coast Road - Segment 3 are set out in the table below including a high level analysis of constraints on either side of the road.

Table 84: Constraints led assessment East Coast Road (Segment 3)

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the North (hold southern boundary and widen to North – 30m cross-section)	Widen to the South (hold northern boundary and widen to South – 30m cross-section)	Hybrid option (mix of widen both sides and widen to north to avoid key constraints)
1a Heritage	No known issues	No known issues	No known issues	No known issues
2a. Land use futures /Policy analysis	<p>FUZ</p> <p>Transpower transmission tower</p> <p>Within national grid corridor overlay at very eastern end of segment</p>	As for widen both sides	<p>FUZ</p> <p>Within national grid corridor overlay at very eastern end but likely clear of transmission tower</p>	As for widen to south
2b. Urban design	Look to minimise level change between road and adjacent land to create opportunity for anticipated future high density development to actively interface with the road corridor	As for widen both sides	As for widen both sides	As for widen to both sides
2d Social cohesion; 2c. Land requirement	A large number of private properties exist either side of the road	As for widen both sides	As for widen both sides	As for widen both sides
3b. Stormwater/flooding	Large flood plains on either side of the road (more to the south)	Avoids key floodplain areas to south	As for widen both sides	Avoids key floodplain areas to south
3c. Ecology	Stream on both sides of the road Large potential wetlands on both sides of the road	As for widen both sides	As for widen both sides	Slightly preferred option as seeks to avoid key areas of wetland and stream realignment

MCA criteria (targeted to those criteria that may differentiate)	Widen both sides (existing centreline – 30m cross-section)	Widen to the North (hold southern boundary and widen to North – 30m cross-section)	Widen to the South (hold northern boundary and widen to South – 30m cross-section)	Hybrid option (mix of widen both sides and widen to north to avoid key constraints)
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	No key issues - Local road intersections will need to be allowed for in the design.	As for widen both sides	As for widen both sides	As for widen both sides

18.5.4 Recommendations

The following recommendations were made to inform option refinement:

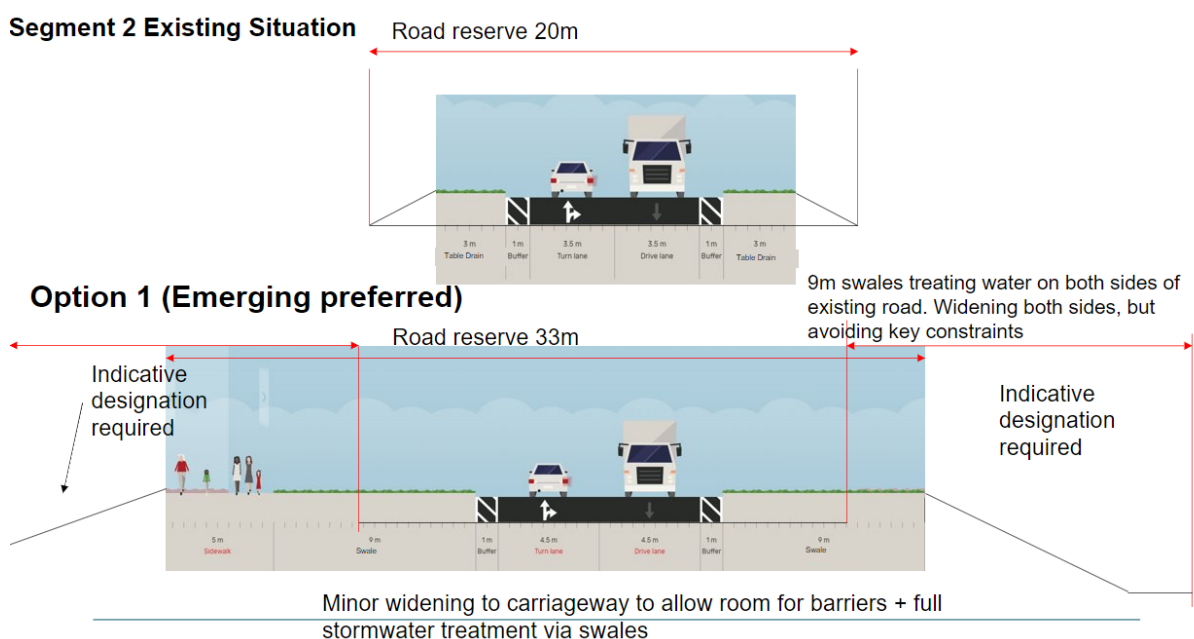
- **ECR Segment 1 - Widening to both sides** where possible. Avoid the cemetery and make use of grassed road corridor adjacent to the recently developed residential land on the west, in consultation with landowner. This option is also likely to avoid recently developed land parcels.
- **ECR Segment 2 - Widening to both sides** will likely avoid/minimise impacts and the partial land acquisition of Snow Planet/ adventure park (where possible) and avoid/minimise impacts on rural dwellings to east. Avoid substation constraint by widening to the east around this area.
- **ECR Segment 3 - Widen both sides** as there are no key constraints that aren't on both sides of the road. Consider need for bridge over permanent stream at low spot in road, considering large catchment size. Minimise cuts near Puke at northern end of segment.

18.6 Route Refinement (Part B – rural segment 2)

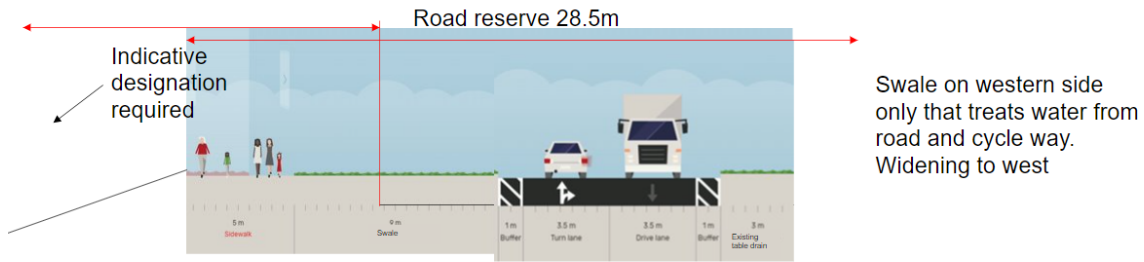
Following the initial route refinement assessment, the project team considered updating the form and function for the rural section of the project (Segment 2) to reflect programme-wide cross-section guidance regarding a rural two-lane arterial. This guidance recommended a wider 33m corridor including swales for stormwater treatment from the road.

Initial designs assuming this cross-section (Option 1 below) showed very large earthworks and significant property effects in the Countryside Living Zone. As a consequence, the project team tested two other cross-section (form and function) options for this segment.

The options are summarised below in **Figure 196**.



Option 2 – Swale on one side/ shared path on side (west side)



Option 3- No swale, Shared path on west



Figure 196: Revised widening options for rural segment 2

A targeted MCA and constraints-led assessment was prepared for these options, as summarised in Table 85.

Table 85: Constraints-led assessment for additional options in Segment 2

- High/significant constraints or potential effects (avoid where practicable)
- Moderate constraints or potential effects present (consider avoiding on balance with other issues)
- No key constraints present or potentially low adverse/positive effects

MCA criteria (targeted to those criteria that may differentiate)	Option 1 - Emerging preferred option	Option 2 - Swale on one side/shared path on west	Option 3 - No swale, shared path on west
1a Heritage	No known issues	No known issues	No known issues
2a. Land use futures /Policy analysis	Electricity substation (Vector) (designated site) Business zone (occupied by entertainment land uses and a childcare centre). FUZ land on west. Rural land on that is not proposed to change.	As for Option 1	As for emerging preferred option Likely less effect on these uses
2b. Urban design	No key issues. Need to provide for high quality crossing facility	No key issues, although need to provide for high	No key issues; although need to provide for

MCA criteria (targeted to those criteria that may differentiate)	Option 1 - Emerging preferred option 33m cross section with minor widening of carriageway to provide room for barriers Swales treating water on both sides of road Widens both sides	Option 2 - Swale on one side/shared path on west Reduced cross section (28.5m) with swale/shared path on one side only Widen to west side	Option 3 - No swale, shared path on west Reduced cross-section (20m) Keep current carriageway and drainage and add on shared path on west Widen to west side No swales
	for active modes if connecting to cycleway on both sides of road in urban area north and south. Large batters on eastern side	quality crossing facility for active modes if connecting to cycleway on both sides of road in urban area north and south. Potential opportunity to reduce batters on eastern side without swale	high quality crossing facility for active modes if connecting to cycleway on both sides of road in urban area north and south. Potential opportunity to reduce batters without swales
2d Social cohesion; 2c. Land requirement	Business land on west that may be affected (Snowplanet, adventure park and childcare centre) – unclear if Snowplanet consented extension can be avoided FUZ on west likely affected Rural properties on east likely affected	Business land on west that may be affected (Snowplanet, adventure park and childcare centre)- unclear if Snowplanet extension can be avoided FUZ on west likely affected	Business land on west that may be affected (Snowplanet, adventure park and childcare centre)- likely less effect than other options FUZ on west likely affected
3b. Stormwater/flooding	No key issues - most flexible option for future stormwater design options	Single swale on western side may not be sufficient to treat the whole road surface, depending on existing road cross fall and proposed road improvement extent	The future road traffic will qualify the road as High Use Road per AUP and trigger water quality treatment requirements.
3c. Ecology	Potential natural wetland on western side of the road (south of Snowplanet) and on eastern side of the road (across and south of Snowplanet). Possible wetland on eastern side of road –across the road from 2036 East Coast Road	Potential natural wetland on western side of the road (south of Snowplanet)	Potential natural wetland on western side of the road (south of Snowplanet) – smaller risk to wetland as road width will be narrower than Option 1 and 2
3d Natural hazards 5a Construction impacts on utilities/infrastructure 6a Construction cost/risk	Requires widening beyond the crest of the existing roadway which generates quite large fill and cut earthworks along the alignment. Corridor at its widest has widths in excess of 200m	This option expected to eliminate all earthworks on the eastern side which is the side which tends to contain most of the large fill slopes	This option will also reduce earthworks extents on western side

The project team prefer **Option 3** for the following reasons:

- Topography – Option 1 creates very large earthworks batters and significant property and land use effects on both sides. Recommendation is that scope of the project should change to active mode only upgrade on one side, without upgrading the road corridor. Therefore Option 1 was not preferred.
- When comparing Options 2 and 3, overall earthworks/effects from widening to the west are likely quite a lot greater for Option 2 (for a relatively minor stormwater benefit). Option 2 would only provide stormwater treatment for half the road surface (to west).
- Option 3 meets project objectives and there would still be opportunity to treat stormwater through a piping system in place of an open channel drain in the future if this was desired.

18.7 Consideration of DBC engagement

During the DBC engagement phase, general comments were recorded suggesting a need for better and safer public transport in the wider North area. The upgraded East Coast Road corridor can be used by all modes, including buses and separated walking and cycling. The upgrade will be designed in accordance with safety standards, and the road speed limit is proposed to be dropped to 50 km/hr in accordance with the future urban environment.

One comment questioned whether walking and cycling paths were needed on both sides of East Coast Road and thought that providing these facilities on one side would be sufficient due to the proposed dedicated cycleway along SH1. In response, both facilities are considered necessary considering the scale of the proposed growth in the North and the desire to achieve a significant mode shift towards walking and cycling for future communities. The SH1 facility also has a different, more strategic function than the East Coast Road facility, plus there is quite a level change between SH1 and East Coast Road.

18.8 Design Refinement

The recommendations listed above were implemented during the design refinement stage. Other key refinements that were made include:

- Revision to the assumed cross section to reduce earthworks in Segment 2.
- Provision of retaining walls in some locations to reduce impacts.
- Southern extent of the upgrade was included in the SH1 Improvements (NoR 4) due to interdependence with Ō Mahurangi Penlink (Redvale) Interchange upgrade.
- Intersection with Huruhuru (Dairy Stream) SH1 crossing included (single lane roundabout)

During consultation with affected landowners, a meeting with Snowplanet highlighted an existing consent on the site. The indicative design included a mixture of batter slope and retaining solution along the Snowplanet frontage. Following the meeting, a minor design refinement was made to extend the retaining solution along the full Snowplanet frontage to reduce the impact on the existing consented activity.

18.9 Preferred Route

The preferred route for the Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink is shown below in **Figure 197**.

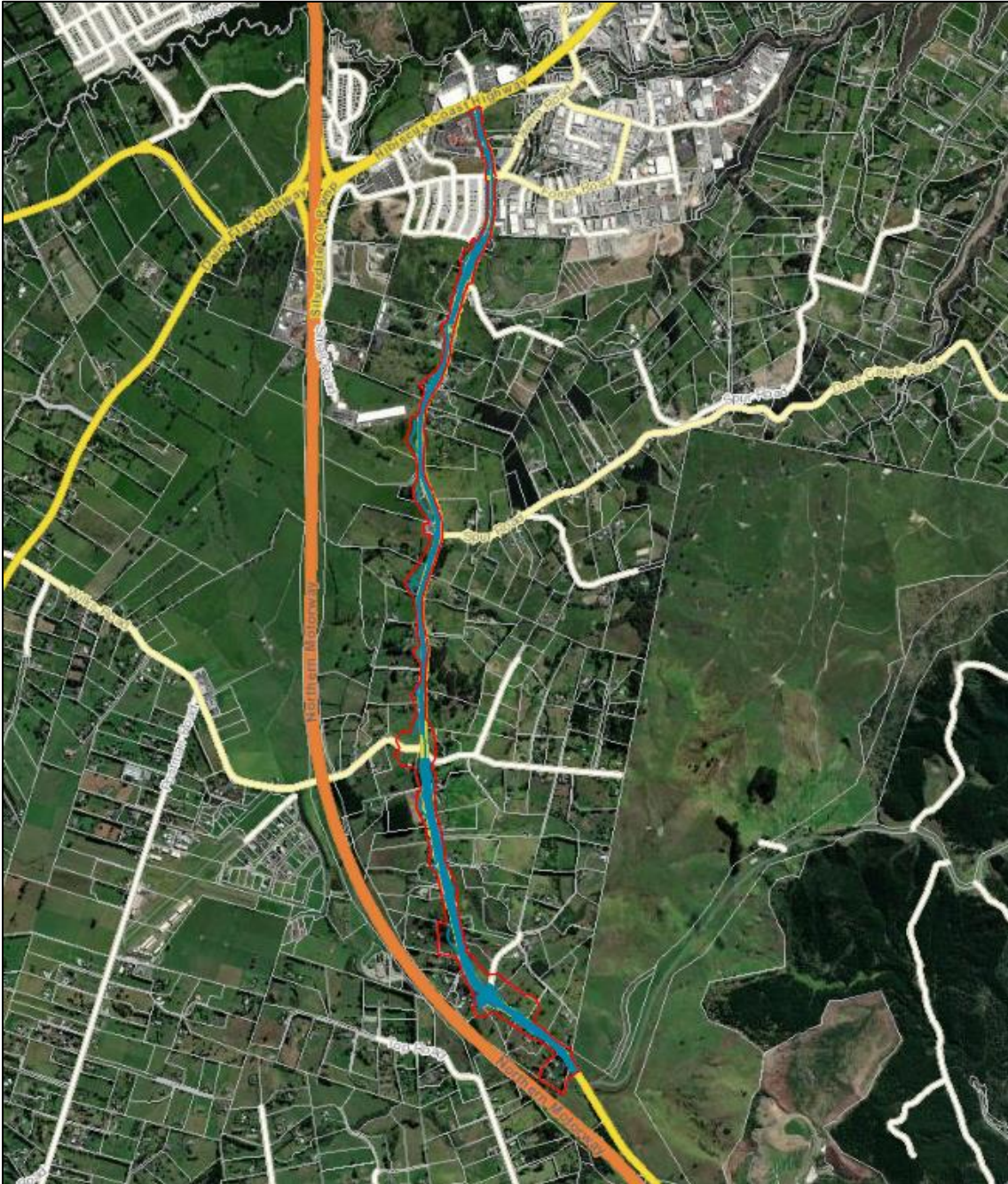


Figure 197: Preferred route for Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink

19. Updated and New Information

Following the selection of the preferred options in late 2022 (following DBC engagement), the National Policy Statement for Indigenous Biodiversity (NPS:IB) was issued in July 2023. The Draft NPS:IB was released in mid-2021 and was considered during the consideration of alternatives but given limited weight due to its draft nature and that it was subject to change. The project team considered that many of the key provisions in the Draft NPS:IB were consistent with the biodiversity provisions in the AUP.

The project team has considered the relevant provisions of the NPS:IB and whether the substance of those provisions have already been assessed and addressed in the consideration of alternatives undertaken until this point, or whether a new assessment is required. This process included an assessment of whether the NPS:IB was materially different from the draft NPS:IB and/or the existing biodiversity provisions in the AUP or if a different approach should be taken to assessing effects on biodiversity. The purpose of this task was to identify if the NPS:IB contained any materially new information or policy direction and whether the selected routes and sites could meet relevant tests in the NPS:IB. A final assessment was undertaken as to whether a different decision would have been made in light of the NPS:IB.

The NPS:IB is particularly relevant for routes that are adjacent or directly impact on SEAs identified in the AUP. This is NOR1 (Rapid Transit Corridor), NOR4 (State highway 1 improvements), NOR 7 (Upgrade to Pine Valley Road), NOR 9 Upgrade to Dairy Flat Highway (Durey Road to Albany Village) and NOR 10 (Upgrade to Wainui Road). The most relevant provisions of the NPS:IB include:

- The protection of significant natural areas (SNAs) by avoiding or managing adverse effects from new subdivision, use and development (Policy 7)
- Specific recognition that specified infrastructure cannot avoid all effects on significant natural areas if there is a functional or operational need and no practicable alternative and the effects are managed in accordance with the effects management hierarchy (Clause 3.11)
- Management of significant adverse effects on biodiversity outside of significant natural areas (Policy 8 and clause 3.16).

The consideration of alternatives and the MCA included a specific criterion relating to ecology and effects on biodiversity. This included effects on SEAs (the Auckland equivalent of SNAs) and on indigenous biodiversity outside of SEAs. The effects of different options were assessed by expert ecologists and then considered alongside other relevant factors. As a result, the primary policy theme of the NPS:IB, being avoidance or management of effects on biodiversity, was fully considered during the options process. The projects comprise specified infrastructure within the terms of the NPS-IB definition, as they provide significant regional benefit.

The AUP was considered in detail as part of the policy assessment for different options. The AUP contains a comprehensive set of provisions relating to the protection of biodiversity and the management of effects. The AUP already contains the following aspects:

- Identification of SEAs, which are the Auckland equivalent of significant natural areas in the NPS:IB (Chapter D9)
- Protection of SEAs and avoidance of certain effects as the first step in the effects management hierarchy (Chapter D9)

- Specific recognition that infrastructure cannot always avoid locating in SEAs when there is no practicable alternative (Chapter D9 and E26)
- Management of effects in accordance with the effects management hierarchy
- Management of effects on biodiversity outside of SEAs (Chapter E15).

There is a strong alignment and consistency between the NPS:IB, the previous draft NPS:IB and the biodiversity provisions in the AUP. Given that these matters were already considered as part of the policy assessment against the AUP, the NPS:IB does not add any materially different information, policy direction or policy tests.

In relation to the specific NORs that are adjacent or directly affect SEAs, we note:

- There is a functional need for NOR4 to be located along State Highway 1 because it involves widening of the motorway which can only occur adjacent to the existing state highway. In the part of NOR4 between Ōteha Valley Road and Awanohi Road there are areas of SEA on the western side of the existing motorway and areas of non-SEA but high value biodiversity on the eastern side. For this reason there was no option that could avoid impacts on SEA or high value biodiversity.
- There is a functional need for NOR1 to be located adjacent to State Highway 1 until the route travels westward to the Dairy Flat FUZ and potential future town centre in order to efficiently provide a connection between Albany and Dairy Flat. Locating the RTC within the same corridor as the existing state highway in this location will have the least effects, including on biodiversity. North of Ōteha Valley Road, the RTC has a functional need to be in this location to provide a connection with the Albany centre. A route on the western side of state highway 1 was assessed to have less overall adverse effects than an option on the eastern side. North of Awanohi Road, locating the RTC on the western side of State highway 1 between Awanohi Road and Bawden Road was assessed to have lesser ecological and other effects than other alternatives.
- There is functional need for NOR9 to be in its location due to the existing road. It is not practical to avoid impacting on SEAs which are immediately adjacent to the existing road because road widening can only occur adjacent to the road. In many parts of the route there are SEAs on both sides of the road and so there is no alternative but to impact on an SEA. In other locations the steep topography means it is impractical to widen on one side of the route and so no other option but to impact on an SEA. For this reason there was no option that could avoid impacts on SEA or high value biodiversity.

In summary, the assessment of alternatives considered the AUP provisions and NPS:IB in its draft form. The finalised NPS:IB would not alter any of the preferences identified as is not considered to introduce any materially different approach or information regarding the management of ecological effects arising from new and upgraded infrastructure.

PART D

Consideration of Alternative methods

20. Consideration of Alternative Methods

In accordance with Section 171(1)(b) of the RMA, an evaluation of alternative methods was undertaken as part of the business case and alternatives assessment preparation for the North Projects. As part of the consideration of alternatives, the options for statutory approval that enable route protection and future implementation were considered in light of a number of contextual elements including project strategic importance, project urgency/timing and project complexity risk profile.

A range of options were considered including:

- a) Designations;
- b) Resource consents;
- c) Landowner/developer negotiations;
- d) Plan changes (initiated or submitted on);
- e) Structure plans; and
- f) Traditional property acquisition.

In the IBC phase, designations (new or alteration to existing) were identified as the recommended route protection method by the requiring authorities for the North Projects. This was on the basis that the principal task of Te Tupu Ngātahi Supporting Growth is to protect a preferred network to support future growth in Auckland over the next 30 years. Designations were considered to be the most logical and effective method to protect a route in an evolving environment for the following reasons:

- A designation provides certainty to all parties including the community and affected landowners;
- It is a well-recognised and understood tool for route protection which also enables land acquisition processes through the link to the Public Works Act;
- Maximises flexibility for future implementation;
- Negates the need for additional land use consents to implement works authorised under the district plan (s9(3) of the RMA); and
- Will continually provide for future operation and maintenance requirements.

This decision was reconfirmed through the NOR/DBC phase for the majority of the North Network projects. As outlined in Part A (section 4), some corridors recommended in the IBC did not proceed to route protection, as they are already route protected or will be route protected through other means outside of the Te Tupu Ngātahi Programme. This is explained in section 4, with the following exceptions:

- NoR 6: New Connection between Milldale and Ōrewa – the new section of road between the SH1 interchange at Grand Drive and the edge of the Ara Hills development, is to be delivered via the developer.
- NoR 10: Upgrade to Wainui Road – the section of road upgrade between Lysnar Road and the western edge of the FUZ is proposed to be protected through a developer agreement with AT, as the land is owned by a single developer.

The remainder of the North Projects are proposed to comprise new designations, as well as an alteration to the existing SH1 Motorway designations 6761, 6760, 6759, 6751 for the SH1 Improvements projects.

20.1 Alternative Statutory Methods

This section provides an overview of the statutory methods considered to deliver the North Projects.

The principal objective is to identify, and route protect the strategic transport network for the North Projects. These projects will support Auckland’s projected growth over the next three decades and beyond. To achieve this a number of statutory methods have been considered (see Figure 198), to enable route protection and implementation in light of each project’s strategic importance, delivery urgency / timing, complexity and risk profile.



Figure 198: Route Protection Methods considered

Table 86 below summarises the strengths, weaknesses and suitability of each method for route protecting the North Projects. The planning context, key risks and considerations which may influence the preferred route protection method were reviewed and evaluated taking into account the planning environment and identified risks and considerations.

An overall assessment of the method is provided for all North Projects, and where applicable, further commentary is provided on a Project route’s unique characteristics.

Table 86: Summary of route protection methods considered

Methods	Summary of strengths and weaknesses within local context
Auckland Unitary Plan ‘Corridor Overlay’	AUP:OP overlays can provide certainty to the community by publicly identifying the network, however they do not protect the land necessary for the works. Any overlays would require a plan change, and this approach may not be accepted by Council as the AUP:OP overlays

Methods	Summary of strengths and weaknesses within local context
	<p>are generally focused on RMA Section 6 and 5 matters (e.g., heritage, SEAs) rather than transport.</p> <p>There are existing infrastructure overlays in the AUP:OP for noise (e.g., Airport Noise Overlay, City Centre Port Noise Overlay) as well as the National Grid Corridor Overlay, which is most reflective of how an overlay could appear for transport. However, it is noted that the National Grid implements the National Policy Statement on Electricity Transmission which sets out key protections from adverse impacts of third-party development. There is currently no National Policy Statement which would provide the required protection for key transport corridors.</p> <p>Progressing a 'Transport Corridor Overlay' within the AUP:OP is therefore not considered a viable route protection method for the North Projects.</p> <p>A similar method would be to rezone the proposed corridors as Strategic Transport Zone. However, this would not provide sufficient protection for the network or control as landowners could apply for a resource consents to development their land or their own plan change to rezone the land. This would be a novel approach that has not been implemented before by Waka Kotahi or Auckland Transport and so is unproven.</p>
Resource consents	<p>A resource consent grants approval to use resources such as the land, water, air and coastal environment. A resource consent, if granted, is not shown publicly in a district plan and does not protect land or provide rights of exclusion that would hinder incompatible land use. Therefore resource consents are not considered an appropriate route protection method for these Projects.</p> <p>It can be advantageous to seek resource consents (particularly for construction activities) under the RMA alongside route protection methods in instances where projects will proceed to construction once the route is secured. None of the North Projects have funding for short term construction and delivery, therefore resource consents are not being sought.</p>
Landowner/ developer negotiation	<p>Landowner or developer negotiations can include private parties purchasing land and vesting roads that support development, or development agreements whereby a developer agrees to "set aside land for future transport corridor" and / or construction at a future point.</p> <p>Infrastructure Funding Agreements (IFA) are the preferred form of landowner / developer agreement to enable delivery of transport infrastructure. IFAs provide route protection where a developer agrees to design and implement a project.</p> <p>For landowner agreements to be efficient, the aspirations and timing of each party must be aligned. Where multiple independent properties and developers are involved, the final solution is likely to be delivered piecemeal due to the impracticalities and timeframes required to negotiate complex agreements with numerous landowners for each corridor, noting that there are generally a high number of property owners along the North Project corridors. Landowner agreements do not grant landuse approval in the same way that resource consents or designations do.</p> <p>IFAs with a large number of parties are generally impractical to implement and unlikely to protect the corridors within a reasonable time period. Additionally, it is not compulsory for landowners to enter into agreements. For linear corridors requiring a consistent network, agreement must be secured along the length of the route. A piecemeal approach significantly reduces the utility of this method for route protection purposes.</p> <p>Whilst this method of route protection is not generally suitable for the North Projects, two corridors are to be part-delivered by developers. These are the western section of Wainui Road (adjacent NoR 10) where there is an existing agreement with AT; and the eastern section of the new connection between Milldale and Grand Drive (adjacent NoR 6), which is</p>

Methods	Summary of strengths and weaknesses within local context
	<p>being delivered by the developer. In both cases, developers are the sole landholder and are active in the area so able to deliver the corridor in conjunction with urban development of the area, aligning with the desired timing for each of these corridors.</p>
<p>Traditional property acquisition</p>	<p>Traditional property acquisition to acquire the necessary land for each route was also considered. Land is typically purchased a few years before projects go to construction and delivery, based on detailed design plans.</p> <p>Purchasing property at this stage ahead of detailed design may result in more or less land being acquired than is required to deliver the projects. It also may not enable construction areas to be protected which are required temporarily to construct the corridors. It may not enable mitigation areas to be protected. Like developer negotiations, traditional property purchase would not provide route protection until acquisition. Where multiple owners are present this is unlikely to be achieved in a timely or consistent manner. As none of the North Projects have funding for construction and delivery and have likely commencement timeframes of up to 30 years, this option risks 'build out' of the corridors in the meantime, especially as the urban development envisaged in FUZ areas occurs.</p>
<p>Designation</p>	<p>A NOR to designate land for a public work under the RMA provides a strong level of route protection from incompatible development particularly where development pressure is anticipated along the corridor. Once confirmed it also provides authorisation to undertake and maintain the works. A NOR has interim route protection effect as soon as the notice is lodged with Council which ensures the corridors will be protected from incompatible development from that date, enabling a cohesive interim protection for linear networks like roads and Rapid Transit. This effectively manages risk of development within the corridor that may otherwise hinder the proposed works. Whilst most of the North is not currently structure planned or subject to operative plan changes, proposed plan changes are currently being prepared by Council and private developers for the northern part of the future industrial area. There is also potential for 'out of sequence' plan changes to be lodged in the short term, highlighting the need for a route protection method which provides immediate and ongoing route protection. A designation, if confirmed, is included in the relevant district plan as a publicly visible layer. This provides visibility to the public about the intended land use and project extent, and it also provides certainty to other infrastructure providers and developers about the future network location, enabling integrated development planning.</p> <p>A designation enables faster construction and delivery of a corridor following detailed design, by consenting the project requirements under the district plan and allowing regional consents and Outline Plan of Works to be sought at a later date.</p> <p>Lapse periods of up to 30 years will likely be sought for the North Projects to protect future transport corridors allowing flexible and efficient infrastructure. The longer lapse periods will provide long term protection for longer implementation periods.</p>
<p>Alteration to existing designations</p>	<p>Lodging a NOR for the alteration of an existing designation has the same strengths and potential risks as identified for a new designation. To facilitate the SH1 Improvements projects (NoR 4), an alteration to existing designations is required to existing SH1 designations 6761, 6760, 6759, and 6751. This method also provides for an efficient use of an existing corridor, reducing private property impacts.</p>

20.2 Preferred Methods

Designations (new or alteration to existing) are the preferred method. Designations provide certainty to the public by identifying the long-term transport network, enabling it to be implemented in stages as aligned with government funding and pace of growth, and enabling effective investment. The method protects the required area by restricting activities or use that may prevent or hinder the Project and allows detailed design to be undertaken prior to project delivery. Designations provide an efficient and effective route protection method for projects in a changing environment. **Table 87** sets out the preferred method for each Project. There are also two instances where part-delivery of the corridor by developer is appropriate. In both instances, the developer is the sole adjoining landholder, and has development and timing aspirations which are compatible with the adjoining NoR's anticipated delivery timeframe.

Table 87: North Projects Preferred method

Ref	Project	Preferred Method
SH1 Improvements		
NOR 4	New walking and cycling along SH1	Alteration to Existing SH1 Designation (Designations 6761, 6760, 6759, 6751)
	SH1 improvements (SH1 widening (Albany to Silverdale), Ō Mahurangi Penlink interchange upgrade, New Wilks interchange, Silverdale interchange upgrade)	Alteration to Existing Designation (Designations 6761, 6760, 6759, 6751)
	Silverdale to Highgate Active mode connection	Alteration to Existing SH1 Designation (Designation 6759)
	Wainui Road active mode motorway crossing	Alteration to Existing SH1 Designation (Designation 6759 and 6761)
Rapid Transit		
NOR 1	Rapid transit corridor – Albany to Milldale	Notice of Requirement
NOR 2	Rapid transit station – Milldale	Notice of Requirement
NOR 3	Rapid transit station – Pine Valley East	Notice of Requirement
Roading Upgrades		
NOR 5	New SH1 Crossing at Dairy Stream	Notice of Requirement

Ref	Project	Preferred Method
NOR 6	New Connection between Milldale and Grand Drive	Notice of Requirement (part delivered by developer)
NOR 7	Pine Valley Road upgrade	Notice of Requirement
NOR 8	Dairy Flat Highway (Silverdale to Dairy Flat)	Notice of Requirement
NOR 9	Dairy Flat Highway Upgrade (Durey Road to Albany village)	Notice of Requirement
NOR 10	Wainui Road Upgrade	Notice of Requirement (part delivered by developer)
NOR 11	New Connection from Dairy Flat Highway to Wilks Road	Notice of Requirement
NOR 12	Upgrade and Extension to Bawden Road	Notice of Requirement
NOR 13	East Coast Road Upgrade	Notice of Requirement

20.3 Summary

A variety of route protection methods were considered with designations being confirmed as the recommended method for the North Projects at both the IBC and DBC phases.

The North Projects will either be route protected via new designations or, in the case of NOR 4 only, via alterations to existing designations.

Designations were selected because they

- Provide certainty to the public by identifying the long-term transport network, enabling projects to be implemented in stages as aligned with government funding and pace of growth, and enabling effective investment.
- Protect the required area by restricting activities or use that may prevent or hinder the Project and allows detailed design to be undertaken prior to project delivery.
- Provide an efficient and effective route protection method for projects in a changing environment.

Overall, it is considered the assessment of alternatives undertaken meets the statutory requirements set out in section 171(1)(b) of the RMA.

Appendix A

Options Guide – IBC to route protection

September 2023

Version 1.0

1 Appendix A: Options Guide – IBC to route protection

Table 88: NoR1 RTC

Refer Figure 1 below for IBC and DBC segments. Figure 2 illustrates the short list options.

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
Albany to Silverdale	<p><u>MT1a</u> RT along the existing SH1 corridor</p> <p><u>MT2a (progressed to short list)</u> RT through the Dairy Flat/Silverdale West FUZ</p>	Southern section – Albany to south of Bawden Road (refer Figure 1 below)	<p><u>MTS-1 (progressed to DBC)</u> The route involves an RT alignment on the eastern side of the motorway. Crosses over the SH, from east to west just north of Awanohi Road.</p> <p><u>MTS-2</u> The route involves an RT alignment on the eastern side of the motorway. Continues along the east as it travels north.</p> <p><u>MTS-3</u> The route involves an RT alignment on the western side of the motorway, which is shifted and widened to the east. RT alignment stays on the west of the motorway.</p> <p><u>MTS-4</u> The route involves an RT alignment on the</p>	Albany to Awanohi (refer Figure 1 below) (refer Alternatives assessment RTC section for DBC option maps)	<p><u>Option A (SH-01A)</u> SH1 widening both sides along the outside of the carriageway, north of Lonely Track Road Bridge to south of Awanohi Road Underpass; and RT with cycleway alignment east of SH1 widening. Assumed RT tie into Northern Busway on east.</p> <p><u>Option B (SH-03A)</u> SH1 widening to the east by retaining the northbound carriageway from Lonely Track Road Bridge to south of Awanohi Road Underpass; and RT with cycleway alignment east of SH1 widening. Assumed RT tie into Northern Busway on east.</p> <p><u>Option C (EP SH11)</u> RT and cycleway on east (from just south of Ōteha Valley Road to approx. 1km south of Awanohi Road). SH1 widening to east.</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
			western side of the motorway (assumes widening to the west).		<p>Assumed RT tie into Northern Busway on east.</p> <p><u>Option D (SH-12) (progressed to route protection)</u></p> <p>RT on west, cycleway on east (from just south of Ōteha Valley Road to approx. 1km south of Awanohi Road). SH1 widening to east as RT uses the northbound carriageway and motorway lanes are shifted over to east to minimise SEA impacts to west. Assumed RT tie into Albany bus station on west.</p>
				<p>Awanohi to Bawden (SH1 crossover area) (refer Figure 1 below) (refer Alternatives assessment RTC section for</p>	<p><u>Option A (SH-01A)</u> SH1 widening both sides along the outside of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option B (SH-01B)</u> SH1 widening both sides along the outside of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option C (SH-02A)</u> SH1 widening to the west by retaining the southbound carriageway, south of Awanohi Rd Underpass to south</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
				DBC option maps)	<p>of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option D (SH-02B)</u> SH1 widening to the west by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option E (SH-03A)</u> SH1 widening to the east by retaining the northbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option F (SH-03B)</u> SH1 widening to the east by retaining the northbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option G (SH-04)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
					<p>Underpass to south of Bawden Rd bridge; and RT that crosses to the west of SH1 approximately 1km south of Awanohi Rd Underpass. The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN.</p> <p><u>Option H (SH-05A)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge. RT Cross-over above Awanohi Rd Underpass. The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN. Option includes some realignment of East Coast Road.</p> <p><u>Option I (SH-06A)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge. RT Cross-over approx. 400m south of Awanohi Rd Underpass. Active mode corridor continues along the eastern side of</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
					<p>SH1 and crosses over SH1 to join the RT corridor further north, before the existing Bawden Rd bridge. Option includes the realignment of Wright Rd.</p> <p><u>Option J (SH-12) (progressed to route protection)</u></p> <p>RT on western side of SH1 on northbound berm with no SH1 crossover. Cycleway on eastern side of SH1 with cycleway crossover just south of Bawden Road. SH1 widening on both sides to minimise impacts on East Coast Road - with motorway lanes shifted over to east.</p>
		<p>Middle section – South of Bawden Road to south of Silverdale SH1 interchange (refer Figure 1 below)</p>	<p><u>MT1-1</u> RT follows the SH1 alignment on the west with a deviation into the Dairy Flat FUZ area. High speed corridor with grade separation at interchange locations. (State Highway RT)</p> <p><u>MT1-2</u> RT follows the SH1 alignment on the east. High speed corridor with grade separation at interchange locations. (State Highway RT)</p>	<p>Dairy Flat FUZ (refer Figure 1 below) (refer Alternatives assessment RTC section for DBC option maps)</p>	<p><u>Option A (RT-01)</u> RT with cycleway alignment joining SH1 cross-over south of Awanohi Road underpass, then passing through the Dairy Flat FUZ adjacent to Dairy Flat Highway.</p> <p><u>Option B (RT-02)</u> RT with cycleway alignment joining the SH1 cross-over south of Awanohi Road Underpass. The alignment then cuts across the FUZ towards the ridgeline, which is centrally located within the FUZ.</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
			<p><u>MT1-3</u> Two components:</p> <ol style="list-style-type: none"> 1. RT along Motorway corridor - High speed corridor with grade separation at interchange locations. (State Highway RT). 2. Local Urban FUZ route - Urban Rapid Transit route shared with arterial roads. Crosses SH1 from the west across the Silverdale interchange. Operates as an additional service to complement the RT along the SH. <p><u>MT1-4</u> Two components:</p> <ol style="list-style-type: none"> 1. RT along Motorway corridor - High speed corridor with grade separation at interchange locations. (State Highway RT) 2. Local Urban FUZ route - Urban Rapid Transit route shared with arterial roads. Crosses SH1 from the west via a new separate crossing. Operates as an additional service to complement the RT along the SH. 		<p><u>Option C (RT-03)</u> RT with cycleway alignment joining the SH1 cross-over south of Bawden Road Bridge, then crossing the Dairy Flat FUZ towards Dairy Flat Highway, crossing the local road corridor and continuing adjacent to Dairy Flat Highway, on the southern side.</p> <p><u>Option D (RT-04) (progressed to route protection)</u> RT with cycleway alignment joining the SH1 cross-over south of Bawden Road Bridge, then following the ridgeline through the centre of the Dairy Flat FUZ.</p> <p><u>Option E (RT-05)</u> Variant of RT-03 to avoid Outstanding Natural Landscape and Dairy Flat school. RT with cycleway alignment joining the SH1 cross-over south of Bawden Road Bridge, then crossing the Dairy Flat FUZ towards Dairy Flat Highway, crossing the local road corridor and continuing adjacent to Dairy Flat Highway, on the southern side – crossing back over Dairy Flat Highway at the Green Road intersection (cross-sections are same as RT-03).</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
			<p><u>MT1-5</u> Urban FUZ corridor shared with arterial roads. (Urban Rapid Transit Arterial)</p> <p><u>MT2-1</u> High speed RT through the FUZ area with grade separated crossings with arterial and collector roads. The route would integrate with a town centre in the northern portion of the Dairy Flat FUZ.</p> <p><u>MT2-2 (progressed to DBC)</u> High Speed RT through the FUZ area with grade separated crossings with arterial and collector roads. The route would integrate with a town centre in the middle portion of the Dairy Flat FUZ.</p> <p><u>MT2-3</u> High Speed RT through the FUZ area with grade separated crossings with arterial and collector roads. The route would integrate with a town centre in the more southern portion of the Dairy Flat FUZ.</p>		<p><u>Option F (RT-06)</u> Blend of Options RT-02 and RT-05. RT with cycleway alignment joining the SH1 cross-over south of Awanohi Road Underpass. The alignment then cuts across the FUZ towards the ridgeline, then turns towards the Dairy Flat FUZ towards Dairy Flat Highway, crossing the local road corridor and continuing adjacent to Dairy Flat Highway, on the southern side. The alignment then continues north to the edge of the industrial Structure Plan area.</p> <p><u>Option G (RT-04A)</u> RT with cycleway alignment entering the Dairy Flat FUZ in the area just south of Bawden Road Bridge, then following slightly north of the ridgeline through the centre of the Dairy Flat FUZ.</p>
				<p>Postman Road Future Industrial Area (refer Figure 1 below)</p>	<p><u>Option A (RT-01)</u> RT with cycleway alignment adjacent to the eastern side of Dairy Flat Highway (through an area identified in the Structure Plan as light industrial).</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
				(refer Alternatives assessment RTC section for DBC option maps)	<p><u>Option B (RT-04) (progressed to route protection)</u> RT with cycleway alignment through the centre of the Industrial Area (through an area identified in the Structure Plan as heavy industrial).</p> <p><u>Option C (RT-06)</u> RT with cycleway alignment through the centre of the Industrial Area (through an area identified in the Structure Plan as heavy industrial). Very similar to RT-04.</p>
		Northern section – South of Silverdale SH1 interchange to Milldale station (refer Figure 1 below)	<p><u>MTN-1 (progressed to DBC)</u> Ties in with a RT (middle) alignment through the FUZ. RT alignment remains on western side of SH with Hibiscus Coast Station relocated to a Pine Valley Road location. New Milldale station north of the Wēiti River crossing in the south-east of Milldale.</p> <p><u>MTN-2</u> Ties in with a RT (middle) alignment through the FUZ. The RT alignment crosses over the SH into the Hibiscus Coast Station via a separate bridge. The alignment continues north, crossing Hibiscus Coast Highway (grade</p>	Silverdale West (refer Figure 1 below) (refer Alternatives assessment RTC section for DBC option maps)	<p><u>Option A (RT-01, 1 station)</u> RT with cycleway alignment adjacent to the eastern side of Dairy Flat Highway (through an area identified in the Structure Plan as light industrial).</p> <p><u>Option B (RT-04, 1 station)</u> RT with cycleway alignment through the centre of the Industrial Area (through an area identified in the Structure Plan as light industrial).</p> <p><u>Option C (RT-06, 1 station)</u> RT with cycleway alignment traverses towards Dairy Flat Highway. At this point the</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
			<p>separated), along the eastern side of the SH. Existing Hibiscus Coast Station will require upgrading.</p> <p><u>MTN-3</u> Ties in with option MT1-2 only. RT alignment on the east of the SH connecting directly into the Hibiscus Coast station. The alignment continues north, crossing Hibiscus Coast Highway (grade separated), along the eastern side of the SH. Existing Hibiscus Coast Station will require upgrading.</p> <p><u>MTN-4</u> Ties in with option MT1-1 only on the west of the SH. Crosses over the SH via a separated crossing and into the Hibiscus Coast Station which will require upgrading. Service ends here.</p> <p><u>MTN-5</u> Ties in with option MT1-2 only. RT alignment on the east of the SH connecting directly into the Hibiscus Coast station which will require upgrading. Service ends here.</p> <p><u>MTN-6</u> Ties in with an RT (middle) alignment through the FUZ. RT alignment remains on the west of</p>		<p>RT passes west (underneath) Dairy Flat Highway, before passing underneath Pine Valley Road. Cycleway splits from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.</p> <p><u>Option D (RT-07, 1 station)</u> RT alignment crosses under Wilks Road and heads north-west towards Dairy Flat Hwy. An RT underpass is proposed at Dairy Flat Hwy before the alignment crosses the flood plain and then under Pine Valley Road.</p> <p>Cycleway splits from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.</p> <p><u>Option E (RT-08, 1 station)</u> RT alignment crosses under Dairy Flat Hwy / Wilks Road intersection. The RT alignment then shifts to the northern side of the flood plain before passing under Pine Valley Road. Cycleway splits from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
			<p>the SH with station relocated to a Pine Valley Road location. Hibiscus Coast Station is no longer used. Alignment crosses the Wēiti River separate from and to the west of the Argent Lane crossing, avoiding the QEII covenant, up to a new Milldale station.</p> <p><u>MTN-7</u> Ties in with an RT (middle) alignment through the FUZ. RT alignment remains on the west of the SH with station relocated to a Pine Valley Road location. Alignment crosses the Wēiti River to the west of the Argent Lane bridge via a separate crossing. Route terminates at a new station to the west of Argent lane adjacent to the Milldale Town Centre. Existing Hibiscus Coast Station is no longer used.</p> <p><u>MTN-8</u> Ties in with a RT (middle) alignment through the FUZ. RT alignment remains on the west of the SH with station relocated to a Pine Valley Road location. Existing Hibiscus Coast Station is no longer used. Option follows the Argent Road alignment across the Wēiti River before heading east to connect to the Milldale station alongside SH1.</p>	<p>Milldale (refer Figure 1 below) (refer Alternatives assessment)</p>	<p><u>Option F (RT-09B, 1 station) (progressed to route protection)</u> RT alignment crosses under Dairy Flat Hwy / Wilks Road intersection. The RT alignment then passes between the flood plain and the historic cemetery site before passing over Pine Valley Road. Cycleway splits from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.</p> <p><u>Option G (RT-01 but with two stations)</u> As per RT-01 but assumed two stations.</p> <p><u>Option H (RT-07 but with two stations)</u> As per RT-07 but assumed two stations.</p> <p><u>Option I (RT-09 but with two stations)</u> As per RT-09 but assumed two stations.</p> <p>Single option progressed to route protection Preferred option from IBC short list developed through constraints led design process to DBC design level. RT on western side of SH1 between Old Pine Valley Road and the proposed</p>

IBC long list segment	IBC long list options progressed to short list	IBC short list segment	IBC short list options	DBC segment	DBC options (RT options combined with SH1 Upgrade, and New Walking and Cycle Path on SH1)
				RTC section for DBC option maps)	terminating RTC station at Milldale. Assumes strategic cycleway on eastern side of SH1.
Silverdale to Grand Drive	<u>MT1b-c (progressed to short list)</u> RTC along SH1 to Grand Drive SH1 interchange	Grand Drive Extension	<u>MTG-1</u> RTC extends on the western side of the SH terminating at Grand Drive. Assume an underpass at Wainui. <u>MTG-2</u> RTC extends on the eastern side of the SH terminating at Grand Drive. Assume an underpass at Wainui. <u>MTG-3 (progressed to DBC)</u> Milldale station is the terminus of the RTC. Connectivity is provided via local bus services.	-	No segments or options developed for RTC. Milldale is the terminus with no additional RTC length proposed.

Note: RT station options were not considered at IBC phase and hence are not covered in this Appendix. DBC options are explained in the main Alternatives Assessment Report

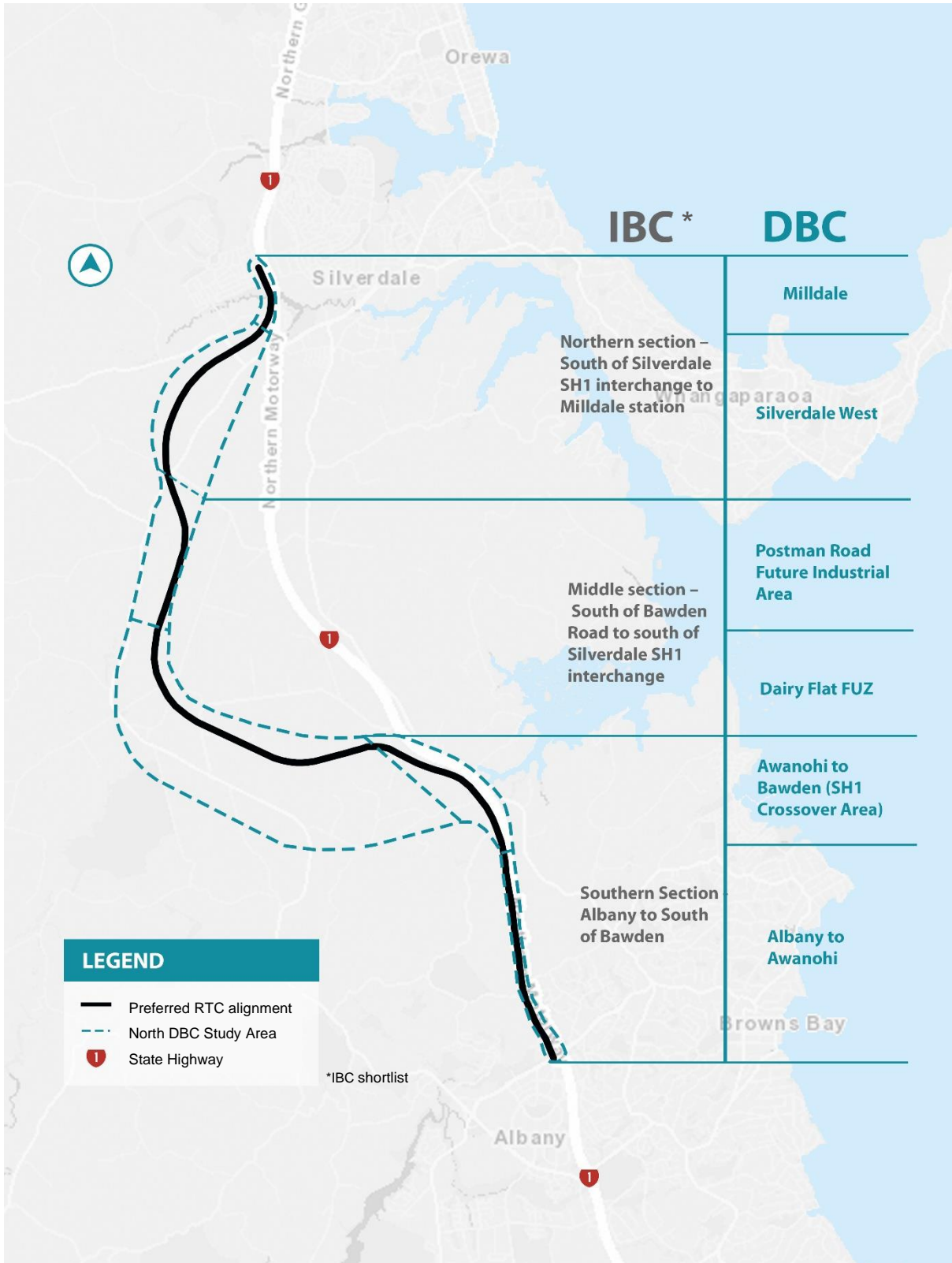


Figure 199: Indicative Business Case / Detailed Business Case segments - Rapid Transit Corridor

Southern section – Albany to south of Bawden Road (refer Figure 1 above)

Middle section – South of Bawden Road to south of Silverdale SH1 interchange (refer Figure 1 above)

Northern section – South of Silverdale SH1 interchange to Milldale station (refer Figure 1 below)

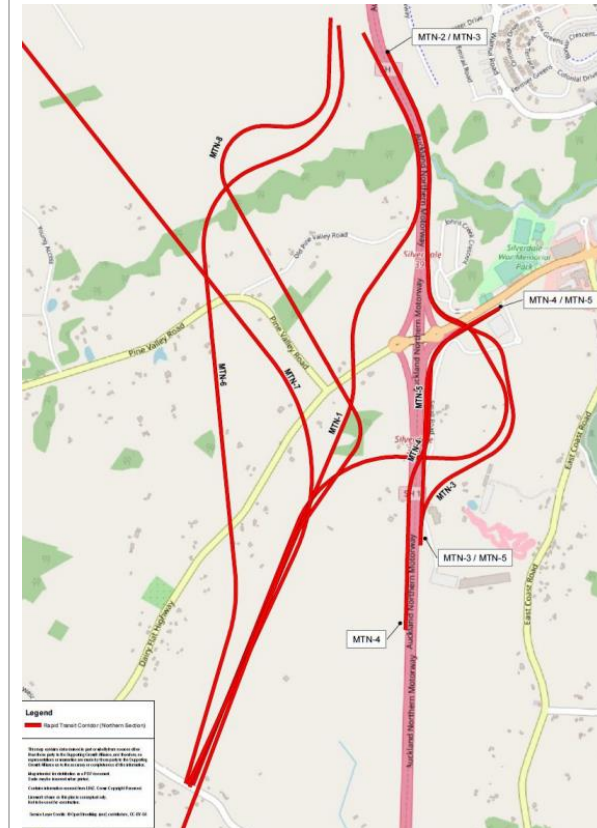
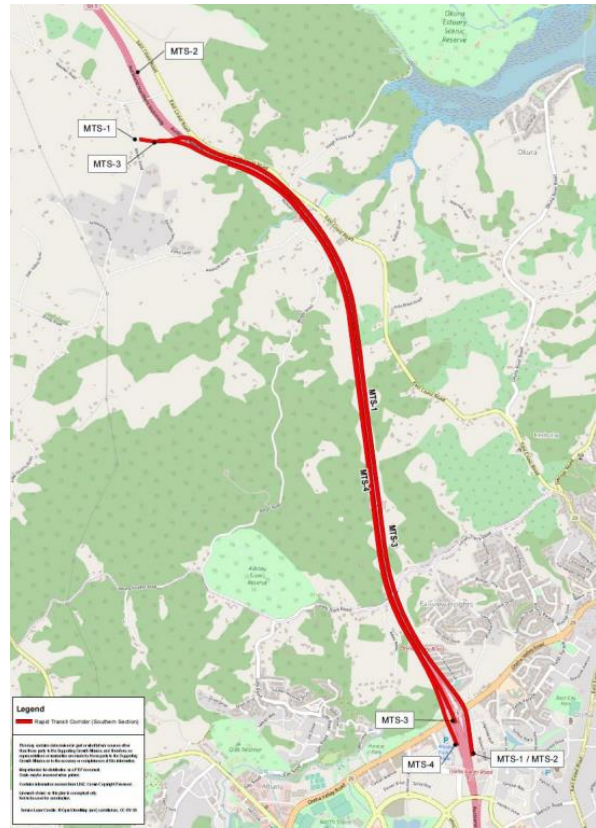


Figure 200: Short list options - Rapid Transit Corridor

Table 89: NoR4 SH1 Improvements Projects

Refer Figure 201 and Figure 202 below for long list and short list options. Figure 203 below illustrates the Upgrades to SH1 between Albany and Silverdale Detailed Business Case segment extents. Figure 204 below illustrates the New Walking and Cycling Path along SH1 Detailed Business Case segment extents.

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
Upgrades to SH1 (3-laning)			
<p><u>SR1 - SR4</u> Bus shoulder lanes on SH1 Albany to Grand Drive</p> <p><u>SR6</u> Providing additional capacity SH1 Albany to Penlink SH1 interchange</p> <p><u>SR6a</u> Additional managed lane SH1 Albany to Penlink SH1 interchange</p> <p><u>SR7</u> Providing additional capacity SH1 Albany to Silverdale SH1 interchange</p> <p><u>SR7a</u> Additional managed lane</p>	<p><u>SR1-1</u> Provide bus shoulder lanes along SH1 from Albany to Penlink interchange</p> <p><u>SR2-1 (progressed to DBC)</u> Provide bus shoulder lanes along SH1 from Albany to Silverdale interchange</p> <p><u>SR3-1</u> Provide bus shoulder lanes along SH1 from Albany to Wainui Road interchange</p> <p><u>SR4-1</u> Provide bus shoulder lanes along SH1 from Albany to Grand Drive interchange</p> <p><u>SR6-1</u> Provide additional capacity on</p>	Albany to Awanohi (refer Figure 5 below)	<p>Options combined with RTC and Walking and Cycling path along SH1 in this segment as they share a corridor</p> <p><u>Option A (SH-01A)</u> SH1 widening both sides along the outside of the carriageway, north of Lonely Track Road Bridge to south of Awanohi Road Underpass; and RT with cycleway alignment east of SH1 widening. Assumed RT tie into Northern Busway on east.</p> <p><u>Option B (SH-03A)</u> SH1 widening to the east by retaining the northbound carriageway from Lonely Track Road Bridge to south of Awanohi Road Underpass; and RT with cycleway alignment east of SH1 widening. Assumed RT tie into Northern Busway on east.</p> <p><u>Option C (EP_SH11)</u> RT and cycleway on east (from just south of Ōteha Valley Road to approx. 1km south of Awanohi Road). SH1 widening to east. Assumed RT tie into Northern Busway on east.</p> <p><u>Option D (SH-12) (progressed to route protection)</u> RT on west, cycleway on east (from just south of Ōteha Valley Road to approx. 1km south of Awanohi Road). SH1 widening to</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
<p>SH1 Albany to Silverdale SH1 interchange</p> <p><u>SR8a</u> Additional managed lane SH1 Albany to Wainui Road interchange</p> <p><u>SR9a</u> Additional managed lane SH1 Albany to Grand Drive SH1 interchange</p> <p><u>SR13</u> SH1 safety upgrades only</p>	<p>SH1 from Albany to Penlink interchange</p> <p><u>SR7-1 (progressed to DBC)</u> Provide additional capacity on SH1 from Albany to Silverdale Interchange</p> <p><u>SR8-1</u> Provide additional capacity on SH1 from Albany to Wainui Road interchange</p> <p><u>SR9-1</u> Provide additional capacity on SH1 from Albany to Grand Drive interchange</p>	<p></p> <p>Awanohi to Bawden (refer Figure 5 below)</p>	<p>east as RT uses the northbound carriageway and motorway lanes are shifted over to east to minimise SEA impacts to west. Assumed RT tie into Albany bus station on west.</p> <p>Options combined with RTC and Walking and Cycling path along SH1 in this segment as they share a corridor</p> <p><u>Option A (SH-01A)</u> SH1 widening both sides along the outside of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option B (SH-01B)</u> SH1 widening both sides along the outside of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option C (SH-02A)</u> SH1 widening to the west by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option D (SH-02B)</u> SH1 widening to the west by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
			<p><u>Option E (SH-03A)</u> SH1 widening to the east by retaining the northbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option F (SH-03B)</u> SH1 widening to the east by retaining the northbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option G (SH-04)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge; and RT that crosses to the west of SH1 approximately 1km south of Awanohi Rd Underpass. The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN.</p> <p><u>Option H (SH-05A)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge. RT Cross-over above Awanohi Rd Underpass. The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN. Option includes some realignment of East Coast Road.</p> <p><u>Option I (SH-06A)</u> SH1 widening to the west of the carriageway, south of Awanohi</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
			<p>Rd Underpass to south of Bawden Rd bridge. RT Cross-over approx. 400m south of Awanohi Rd Underpass. Active mode corridor continues along the eastern side of SH1 and crosses over SH1 to join the RT corridor further north, before the existing Bawden Rd bridge. Option includes the realignment of Wright Rd.</p> <p><u>Option J (SH-12) (progressed to route protection)</u> RT on western side of SH1 on northbound berm with no SH1 crossover. Cycleway on eastern side of SH1 with cycleway crossover just south of Bawden Road. SH1 widening on both sides to minimise impacts on East Coast Road</p>
		Bawden to Silverdale Interchange (refer Figure 5 below)	<p><u>Single option progressed to route protection (Option A – SH-01)</u> SH1 widening both sides.</p>
SH1 Interchanges			
<p><u>IC3</u> Wilks Road full interchange (N +S ramps)</p>	<p><u>IC3-1</u> Wilks Road full interchange</p>	New Wilks Road Interchange	<p><u>Option A (SH-04)</u> Wilks Road interchange – South (at location of existing Wilks Road bridge)</p>
<p><u>IC4</u> Wilks Road south-facing ramps SH1 interchange</p>	<p><u>IC3-2</u> Spur Road full interchange</p> <p><u>IC4-1 (progressed to DBC)</u> Wilks Road South facing only</p>		<p><u>Option B (SH-05)</u> Wilks Road interchange – North (assumes removal of existing Wilks Road overbridge)</p> <p><u>Option C (SH-12)</u> Wilks Road interchange – South with loop onramp and realigned connection with East Coast Road.</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
			<p><u>Option D (SH-04B) (progressed to route protection)</u> Variant of Option A: but with max gradients on Wilks to East Coast Road connection plus addition of a roundabout at East Coast Road and a minor realignment of Jackson Way. Allows for lower bridge over SH1 and less earthworks.</p> <p><u>Option E (SH-04C)</u> Variant of Option A: but with more southern connection to East Coast Road. Allows for lower bridge over SH1 and less earthworks around interchange. East Coast Road connection seeks to avoid a culturally significant site on East Coast Road and allow maximum grades to be applied to minimise overall earthworks.</p>
<p><u>IC5b</u> Penlink north-facing ramps SH1 interchange – Wilks Road interchange moved north</p>	<p><u>IC5-1 (progressed to DBC)</u> Redvale (Penlink) full interchange</p> <p><u>IC5-2</u> Spur Road south facing + Redvale (Penlink) full</p>	<p>Upgrade to Ō Mahurangi Penlink (Redvale) Interchange</p>	<p><u>Single option progressed to route protection</u></p>
<p><u>IC7</u> Upgrade to existing Silverdale interchange – increase in capacity</p>	<p><u>IC7-1 (progressed to DBC)</u> Silverdale interchange capacity upgrade</p>	<p>Upgrade to Silverdale Interchange</p>	<p><u>Single option progressed to route protection</u></p>
<p>Walking and Cycling Paths</p>			
<p><u>AT1</u> Shared path along SH1</p>		<p>Albany to Awano</p>	<p>Options combined with RTC and Upgrades to SH1 along SH1 in this segment as they share a corridor</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
between Albany and Grand Drive interchange	AT1-1 (progressed to DBC) Shared path along SH1 (Albany to Grand Drive interchange)		<p><u>Option A (SH-01A)</u> SH1 widening both sides along the outside of the carriageway, north of Lonely Track Road Bridge to south of Awanohi Road Underpass; and RT with cycleway alignment east of SH1 widening.</p> <p><u>Option B (SH-03A)</u> SH1 widening to the east by retaining the northbound carriageway from Lonely Track Road Bridge to south of Awanohi Road Underpass; and RT with cycleway alignment east of SH1 widening.</p> <p><u>Option C (EP_SH11)</u> RT and cycleway on east (from just south of Ōteha Valley Road to approx. 1km south of Awanohi Road). SH1 widening to east by retaining the northbound carriageway from Lonely Track Road Bridge to south of Awanohi Road Underpass. Option assumes Lonely Track motorway bridge replacement.</p> <p><u>Option D (SH-12) (progressed to route protection)</u> RT on west with cycleway on east and SH1 widening to east with motorway lanes shifted over. In this option, the New Walking and Cycling Path along SH1 locates on the eastern side of the SH1 carriageway, separate from the RTC.</p>
		Awanohi to Bawden	<p>Options combined with RTC and Upgrades to SH1 along SH1 in this segment as they share a corridor</p> <p><u>Option A (SH-01A)</u> SH1 widening both sides along the outside of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge;</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
			<p>and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option B (SH-01B)</u> SH1 widening both sides along the outside of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option C (SH-02A)</u> SH1 widening to the west by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option D (SH-02B)</u> SH1 widening to the west by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option E (SH-03A)</u> SH1 widening to the east by retaining the northbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Awanohi Rd Underpass.</p> <p><u>Option F (SH-03B)</u> SH1 widening to the east by retaining the northbound</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
			<p>carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; and RT with cycleway alignment east of SH1 including cross-over of SH1, south of Bawden Rd Bridge.</p> <p><u>Option G (SH-04)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge; and RT that crosses to the west of SH1 approximately 1km south of Awanohi Rd Underpass. The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN.</p> <p><u>Option H (SH-05A)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge. RT Cross-over above Awanohi Rd Underpass. The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN. Option includes some realignment of East Coast Road.</p> <p><u>Option I (SH-06A)</u> SH1 widening to the west of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge. RT Cross-over approx. 400m south of Awanohi Rd Underpass. Active mode corridor continues along the eastern side of SH1 and crosses over SH1 to join the RT corridor further north, before the existing Bawden Rd bridge. Option includes the realignment of Wright Rd.</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
			<p><u>Option J (SH-12) (progressed to route protection)</u> RT on west with no crossover; cycleway on east; SH1 widening both sides. In this option, the New Walking and Cycling path along SH1 locates on the eastern side of the SH1 carriageway, separate from the RTC and then crosses SH1 via a bridge near Bawden Road. At this point the path splits into two, with one path following on alongside the RTC, and the other joining segment 3 (Bawden to Silverdale Interchange).</p>
		Bawden to Silverdale Interchange	<p><u>Option A (SH-04 West) (progressed to route protection)</u> Strategic cycleway on the western side of the proposed SH1 widening.</p> <p><u>Option B (SH-04 East)</u> Strategic cycleway on the eastern side of the proposed SH1 widening.</p>
		Silverdale Interchange to Wainui Road	<p><u>Option A (SH-04 West)</u> Strategic cycleway on the western side of the existing SH1.</p> <p><u>Option B (SH-04 East) (progressed to route protection)</u> Strategic cycleway on the eastern side of the existing SH1.</p>
		Wainui to Grand Drive	<p><u>Option A (SH-04 West)</u> Strategic cycleway on the western side of the existing SH1.</p> <p><u>Option B (SH-04 East) (progressed to route protection)</u> Strategic cycleway on the eastern side of the existing SH1.</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
<p><u>EW3</u> Wainui active modes</p>	<p><u>EW3-1 (progressed to DBC)</u> Wainui active mode only crossing</p>	<p>Wainui Interchange Active Modes Upgrade</p>	<p><u>Option A</u> Active mode connection (new bridge) from SH1 strategic corridor over the south bound on-ramp.</p> <p><u>Option B</u> Active mode facility (new bridge) against the northern side of the existing Wainui Ramp + link to north-south facility from Millwater Parkway.</p> <p><u>Option C (progressed to route protection)</u> Active mode facility (new bridge) against the southern side of existing Wainui Ramp + link to north-south facility from Millwater Parkway.</p>
<p><u>R16</u> Curley Avenue extension to Milldale / Highgate motorway crossing</p>	<p><u>R16-2</u> Curley Avenue extension to Milldale / Highgate motorway crossing</p> <p><u>R16-3 (progressed to DBC)</u> Use existing roads, with active mode only connection to Curley Avenue and bridge to Brian Smith Drive.</p> <p><u>R16-4</u> Curley Avenue arterial road extension (Links to SH1 crossing at Highgate)</p>	<p>Silverdale to Highgate Active Mode Connection</p>	<p><u>Option A (CA-01A)</u> Active mode link utilising the existing road corridor from Highgate Parkway to Hibiscus-Coast Highway via Waterloo Road, Wainui Road and Silverdale Street. Separated facilities along both sides of Waterloo Road and Wainui Road.</p> <p><u>Option B (CA-01B)</u> Active mode link utilising the existing road corridor from Highgate Parkway to Hibiscus-Coast Highway via Waterloo Road, Wainui Road and Silverdale Street. Separated facility where there is available berm space along the southern side of Waterloo Road and Wainui Road.</p> <p><u>Option C (CA-02A)</u> Active mode link from Highgate Parkway to Hibiscus Coast Highway through greenfield land. The route diverges into two</p>

IBC long list options progressed to short list	IBC short list options	DBC segment	DBC options
	<p><u>R16-5</u> Curley Avenue arterial road extension and new Brian Smith Drive bridge.</p>		<p>pathways at the top of Waiokahukura (Lucas Creek) towards Curley Avenue and Brian Smith Drive.</p> <p><u>Option D (CA-02B)</u> Active mode link from Highgate Parkway to Hibiscus Coast Highway through the greenfield land via Brian Smith Drive.</p> <p><u>Option E (CA-02C)</u> Active mode link from Highgate Parkway to Hibiscus Coast Highway through the greenfield land. The route diverges into two pathways at the top of Wēiti Stream towards Curley Avenue and round the back of the Memorial grounds / rugby fields</p> <p><u>Option F (CA-04)</u> Follows the SH1 motorway as a separate facility from Highgate Parkway to Hibiscus-Coast Highway via the south-bound motorway off-ramp.</p> <p><u>Option G (CA-04B) (progressed to route protection)</u> Follows the SH1 motorway as a separate facility from Highgate Parkway to Hibiscus-Coast Highway via the south-bound motorway off-ramp with a more direct route through Highgate Parkway</p>

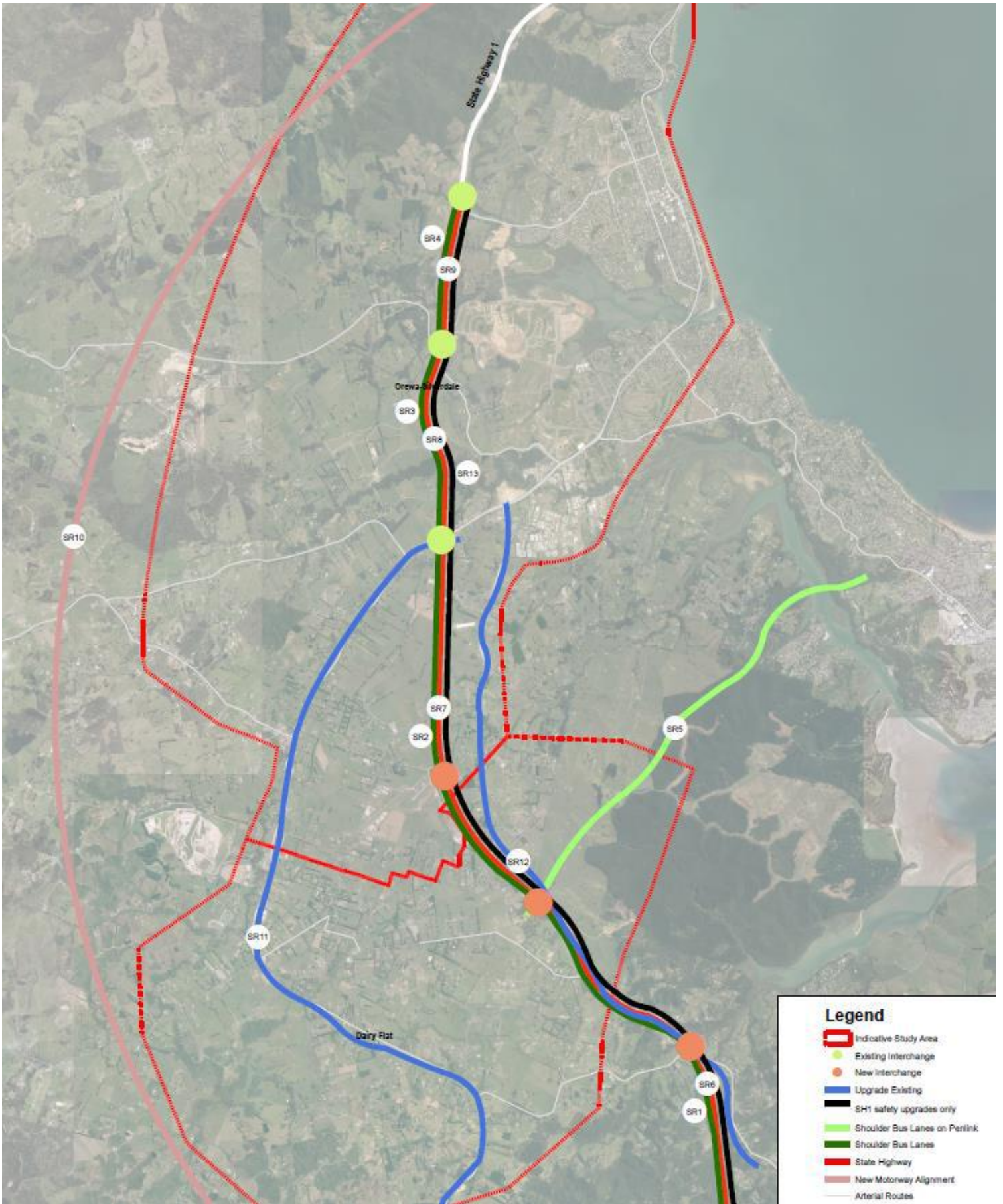


Figure 201: Long list Option Grouping Sketch - Strategic Road Connections (Upgrades to SH1)

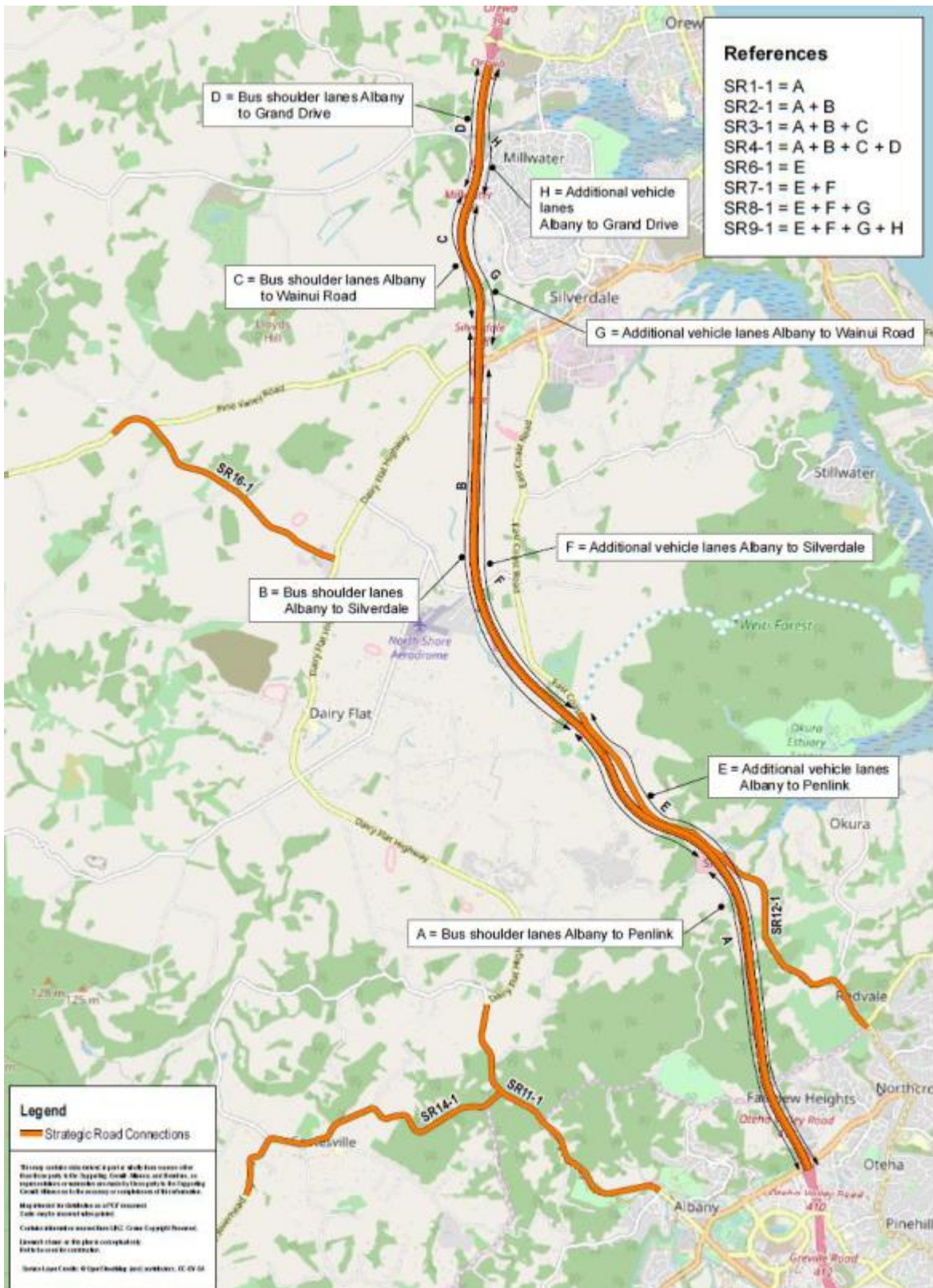


Figure 202: Short list Options - Strategic Road Connections (Upgrades to SH1)

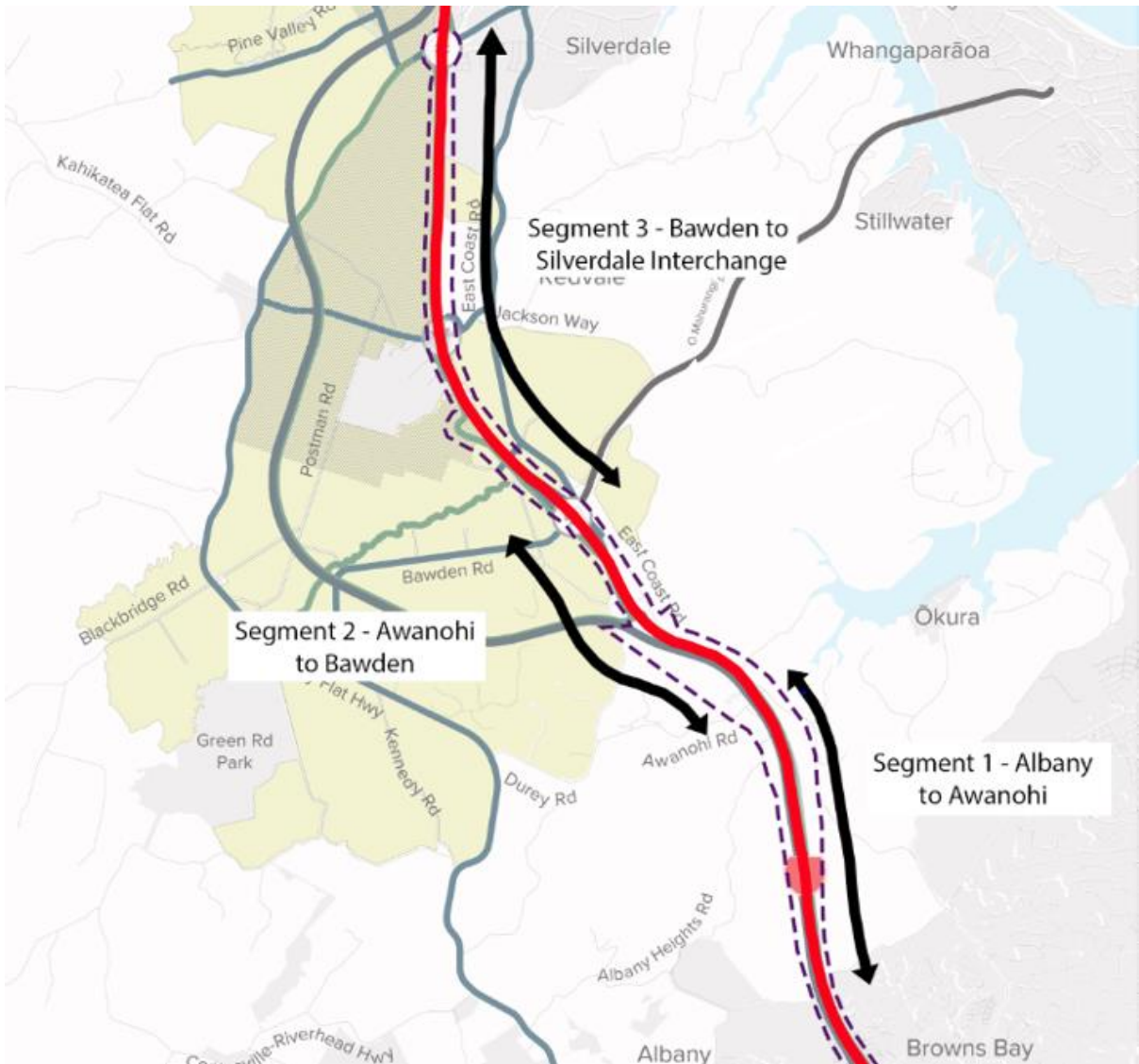


Figure 203: Detailed Business Case segments - Upgrades to SH1

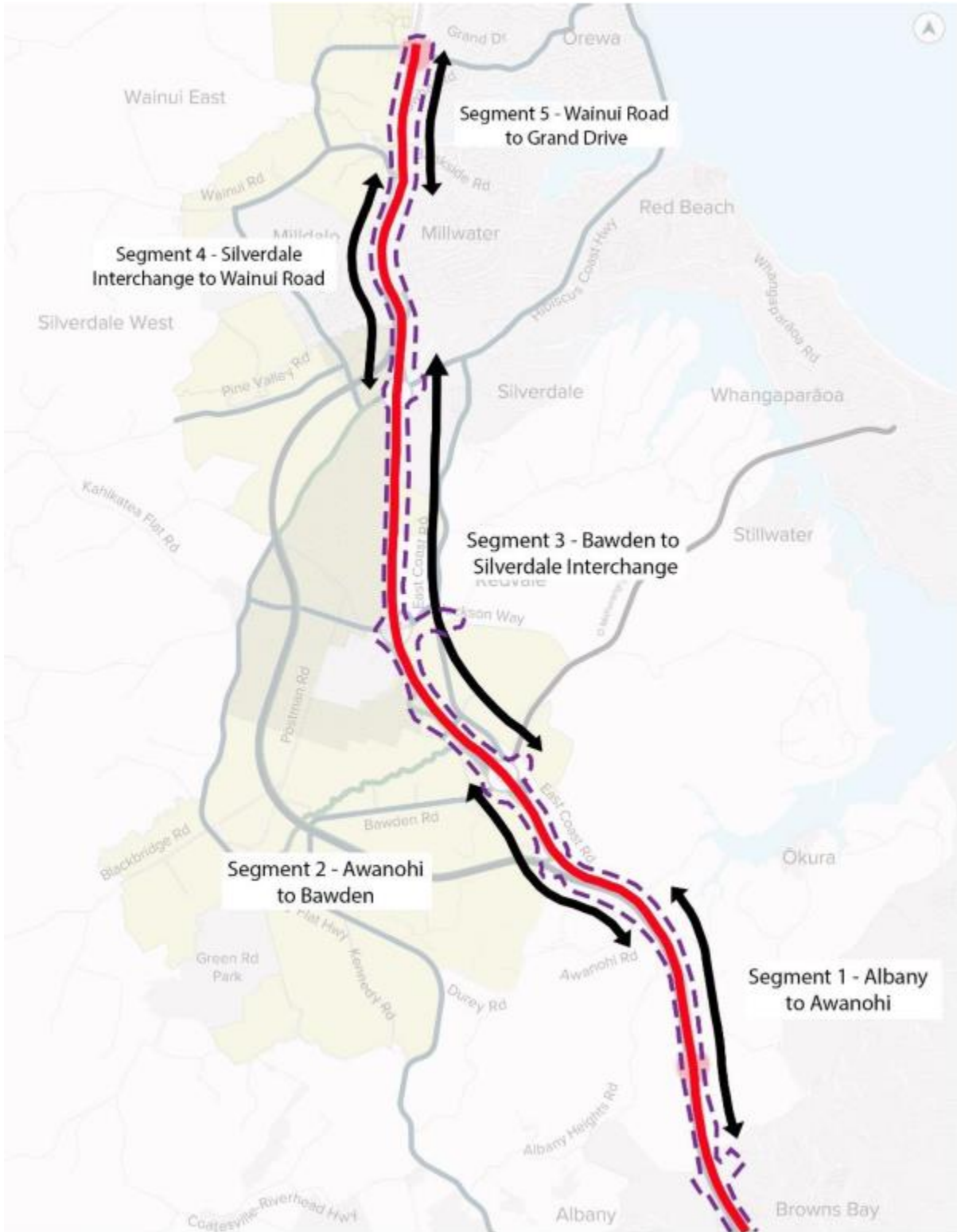


Figure 204: Detailed Business Case Segments - New Walking and Cycling Path along SH1

Table 90: NOR 5 – New Crossing of SH1 at Dairy Stream

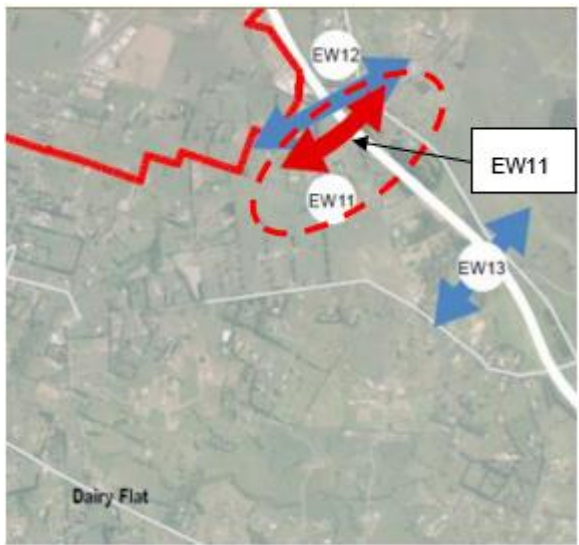

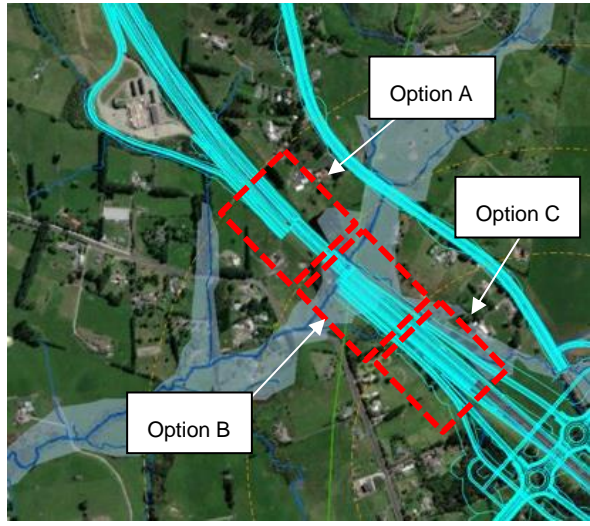
IBC long list options progressed to short list	IBC short list options	DBC options
<p><u>EW11 (progressed to short list)</u> Dairy Stream crossing all modes</p>	<p><u>EW11-1 (progressed to DBC)</u> Provide a two-lane corridor, plus active mode facilities to connect FUZ on either side of the SH at or near Dairy Stream.</p>	<p><u>Location Option A (progressed to route protection)</u> Northern area between the flood plain and motorway service centre.</p> <p><u>Location Option B</u> Central area within the flood plain and wetland area.</p> <p><u>Location Option C</u> Southern area between the flood plain and Ō Mahurangi Penlink (Redvale) Interchange.</p>
<p>IBC long list options</p>	<p>IBC short list options</p>	<p>DBC options</p>
		

Table 91: NOR 6 – New Connection between Milldale and Grand Drive

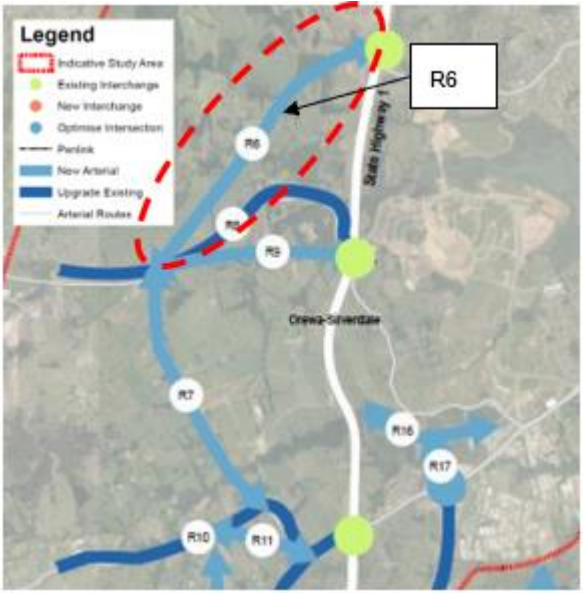
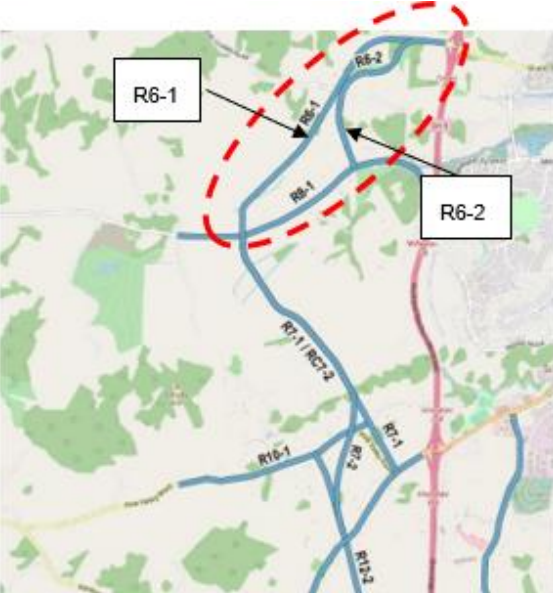
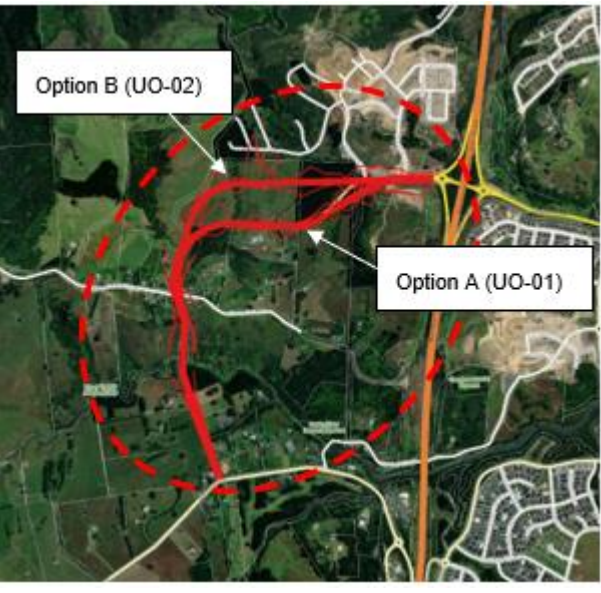
IBC long list options progressed to short list	IBC short list options	DBC options
<p>R6 (progressed to short list) New arterial - Wainui Road to Grand Drive Interchange</p>	<p>R6-1 New arterial - North-South Milldale to Grand Drive.</p> <p>R6-2 (progressed to DBC) New arterial - North-South Milldale to Grand Drive short version.</p>	<p>Option A (UO-01) South-west direction from Ara Hills development towards Upper Ōrewa Road / Russell Road. Includes upgrade to Upper Ōrewa Road.</p> <p>Option B (UO-02) (progressed to route protection) Westerly direction from Ara Hills development before heading south towards Upper Ōrewa Road / Russell Road. Includes upgrade to Upper Ōrewa Road.</p>
IBC long list options	IBC short list options	DBC options
		

Table 92: NOR 7 – Upgrade to Pine Valley Road

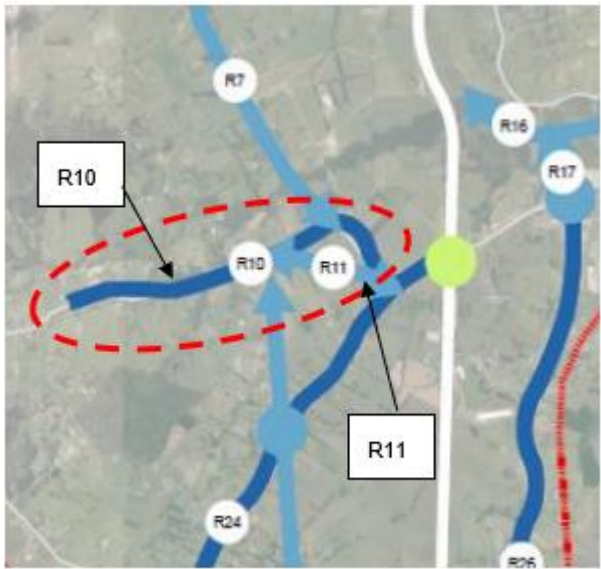


IBC long list options progressed to short list	IBC short list options	DBC options
<p><u>R10 (progressed to short list)</u> Widening Pine Valley Road within FUZ area from the intersection with Dairy Flat Highway</p> <p><u>R11</u> New arterial - Dairy Flat Highway / Pine Valley Road intersection to Pine Valley Road</p>	<p><u>R10-1 (progressed to DBC)</u> Upgrade of Pine Valley Road within the FUZ area. Includes a transitional zone before returning to a rural road.</p>	<p><u>Single option progressed to route protection</u> Preferred option from IBC short list developed through constraints led design process to DBC design level. Confirmed 2 lane urban arterial with widening for active modes. Considered widening to north, south or both sides.</p>
IBC long list options	IBC short list options	DBC options
		

Table 93: NOR 8 – Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat

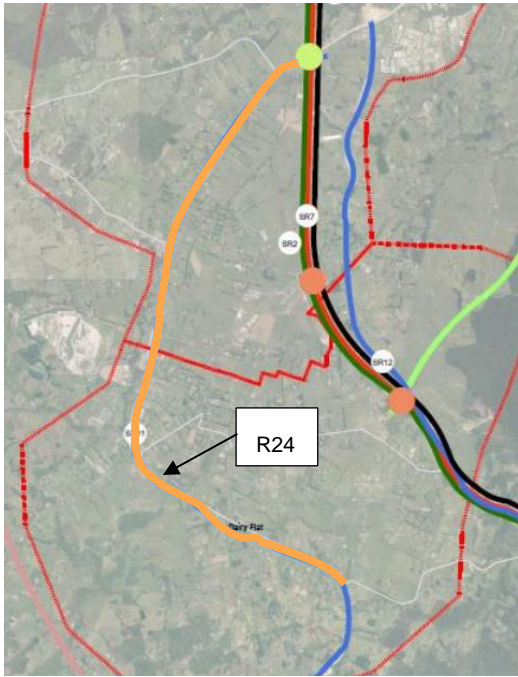
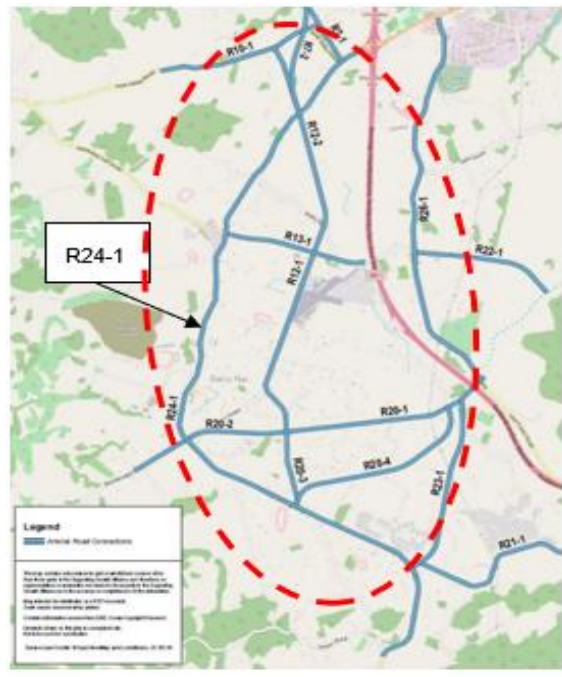

IBC long list options progressed to short list	IBC short list options	DBC options
<p><u>R24 (progressed to short list)</u> Widening Dairy Flat Highway between Silverdale and the end of FUZ area.</p>	<p><u>R24-1 (progressed to DBC)</u> Widening Dairy Flat Highway from Silverdale to the end of FUZ.</p>	<p><u>Single option progressed to route protection</u> Preferred option from IBC short list developed through constraints led design process to DBC design level. Broken into segments to match proposed form and function. Considered widening to west, east or both sides.</p>
<p>IBC long list options</p>	<p>IBC short list options</p>	<p>DBC options</p>
		

Table 94: NOR 9 – Upgrade to Dairy Flat Highway (Durey Road to Albany Village)

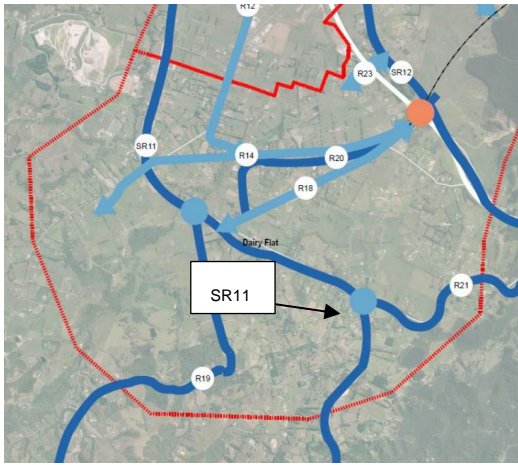

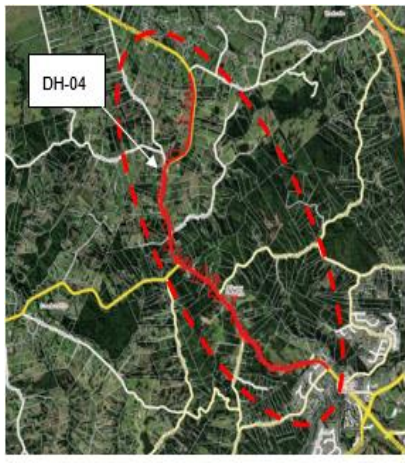
IBC long list options progressed to short list	IBC short list options	DBC options
<p>SR11 (progressed to short list) Upgrade Dairy Flat Highway – Improved capacity between Albany and Dairy Flat</p>	<p>SR11-1 (progressed to DBC) Upgrade Dairy Flat Highway from Albany to Dairy Flat to arterial to improve capacity and safety.</p>	<p>Form and function confirmed no need to upgrade for capacity in this section – active mode upgrade only. Safety improvements in the form of a median barrier (and associated widening) were included in Options C and D.</p> <p><u>Option A (DH-01)</u> Active mode upgrade with a new cycling path on the western side of the highway.</p> <p><u>Option B (DH-02)</u> Active mode upgrade with a new cycling path on the eastern side of the highway south of Potter Road, and a shared path on the west from Durey Road to Potter Road.</p> <p><u>Option C (DH-03)</u> Active mode and safety improvements upgrade with a new cycling path on the western side of the highway.</p> <p>Option D (DH-04) (progressed to route protection) Active mode and safety improvements upgrade with a new cycling path on the eastern side of the highway south of Potter Road, and a shared path on the west from Durey Road to Potter Road.</p>
IBC long list options	IBC short list options	DBC options
		

Table 95: NOR 10 – Upgrade to Wainui Road

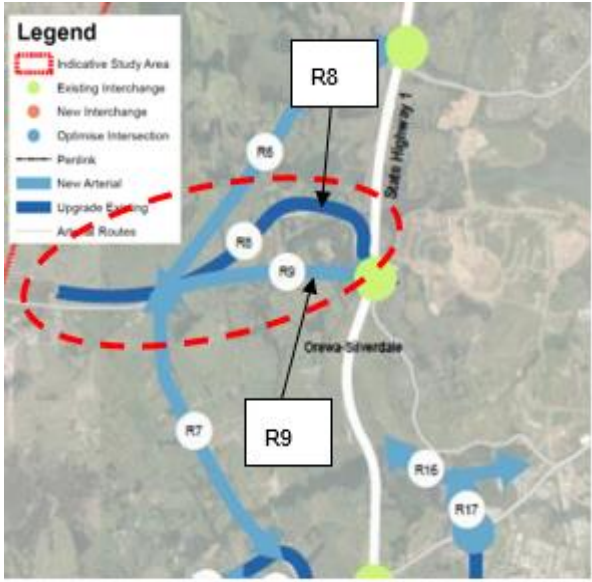


IBC long list options progressed to short list	IBC short list options	DBC options
<p>R8 (progressed to short list) Upgrade Wainui Road within FUZ area</p> <p>R9 New arterial – Wainui Interchange to Wainui Road to intersection with Argent Lane</p>	<p>R8-1 (progressed to DBC) Upgrade and widening of Wainui Road within the FUZ area. Includes a transitional zone before returning to a rural road.</p>	<p>Confirmed 2 lane urban arterial with widening for active modes.</p> <p>Option A (WR-01) (progressed to route protection) Widens both sides of the corridor between Upper Ōrewa Road and the roundabout at the top of the SH1 southbound off-ramp.</p> <p>Option B (WR-02) Widens to the north between Upper Ōrewa Road and Kowhai Road, and widens to the south between Kowhai Road and the roundabout at the top of the SH1 south bound off-ramp.</p> <p>Note: upgrade west of Lysnar Road was removed from scope of route protection as land has been set side by developer.</p>
IBC long list options	IBC short list options	DBC options
		

Table 96: NOR 11 – New Connection from Dairy Flat Highway to Wilks Road

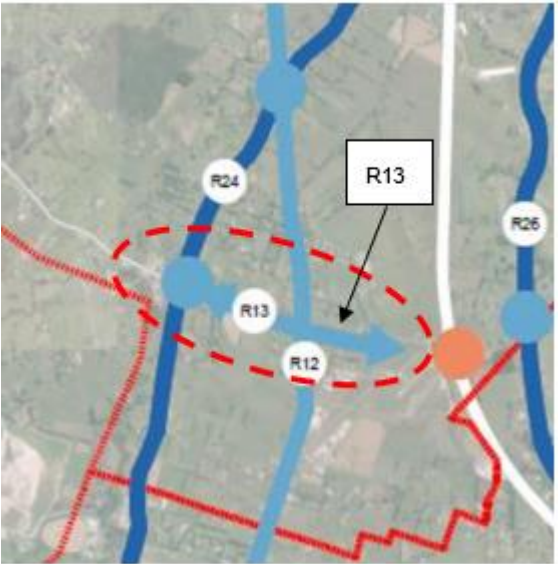


IBC long list options progressed to short list	IBC short list options	DBC options
<p><u>R13 (progressed to short list)</u> New arterial – Dairy Flat Highway / Kahikatea Road intersection to Wilks Road</p>	<p><u>R13-1 (progressed to DBC)</u> New arterial – East-West through industrial area. Dairy Flat Highway / Kahikatea Road intersection to Wilks Road.</p>	<p><u>Single option progressed to route protection</u> Preferred option from IBC short list developed through constraints led design process to DBC design level. Considered alignments slightly to north, south or central.</p>
IBC long list options	IBC short list options	DBC options
		

Table 97: NOR 12 – Upgrade and Extension to Bawden Road

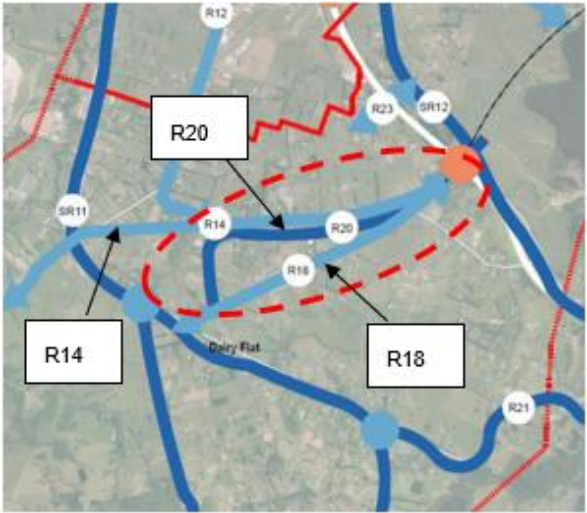
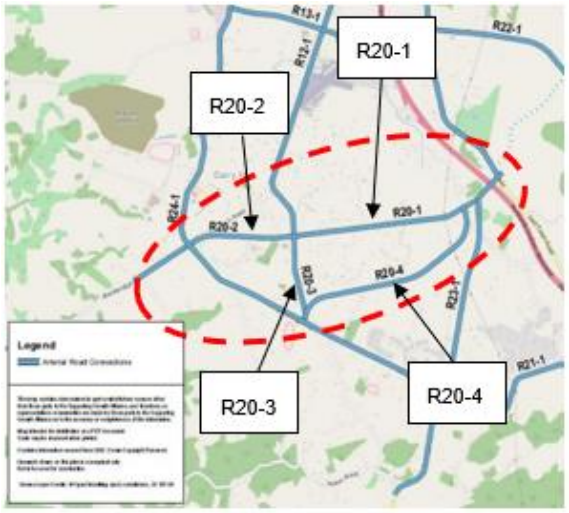
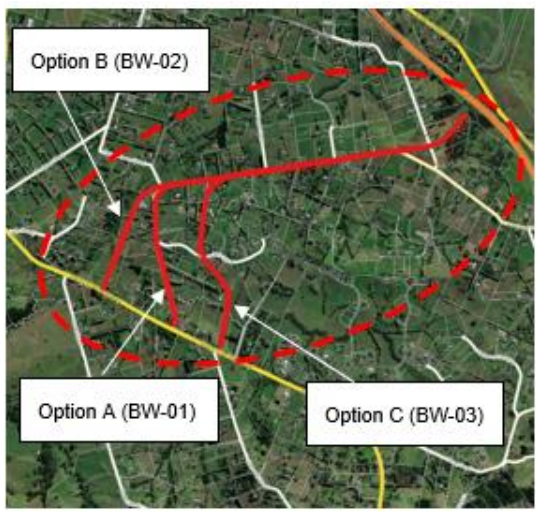
IBC long list options progressed to short list	IBC short list options	DBC options
<p>R14, R18, R20 Three different alignments of options to provide an east-west arterial route through Dairy Flat connecting the western part of the business case area across SH1 to East Coast Road to the east.</p> <p><u>R20 (progressed to short list)</u></p>	<p><u>R20-1 (progressed to DBC)</u> Bawden Road new arterial.</p> <p><u>R20-2</u> Bawden Road extension.</p> <p><u>R20-3 (progressed to DBC)</u> Bawden Road to Dairy Flat Highway.</p> <p><u>R20-4</u> New east-west arterial south of Bawden Road.</p>	<p><u>Option A (BW-01) (progressed to route protection)</u> Widen existing Bawden Road along its full length.</p> <p><u>Option B (BW-02)</u> Widen existing Bawden Road at eastern end, connecting to new road following the eastern side of the Dairy Stream, intersecting with Dairy Flat Highway just east of Green Road.</p> <p><u>Option C (BW-03)</u> Widen existing Bawden Road at eastern end, connecting to new road that extends south towards Kennedy Road.</p> <p>All options assumed extension at eastern end through to Ō Mahurangi Penlink (Redvale) Interchange. Road widening options also considered for selected option – widening to north, south or both sides.</p>
<p>IBC long list options</p>	<p>IBC short list options</p>	<p>DBC options</p>
 <p>A map of the Dairy Flat area showing several road options. Options R14, R18, and R20 are highlighted with blue lines and labeled with white boxes. A red dashed line indicates a boundary or specific route. The map includes labels for Dairy Flat, SH1, and other roads like SR11, SR12, R21, R22, and R23.</p>	 <p>A map showing four specific road options: R20-1, R20-2, R20-3, and R20-4. Each option is labeled with a white box and an arrow pointing to its location on the map. A legend in the bottom left corner explains the symbols used, such as 'Arterial Road Corridor' and 'Proposed Arterial Road'. The map shows the roads in relation to Dairy Flat and surrounding areas.</p>	 <p>A map showing three Design Build Contract (DBC) options: Option A (BW-01), Option B (BW-02), and Option C (BW-03). Each option is labeled with a white box and an arrow pointing to its location on the map. The map shows the roads in relation to Dairy Flat and surrounding areas, with Option A being a widening of Bawden Road, Option B being a widening at the eastern end with a new road, and Option C being a widening at the eastern end with a new road extending south.</p>

Table 98: NOR 13 – Upgrade to East Coast Road between Silverdale and Penlink

IBC long list options progressed to short list	IBC short list options	DBC options
<p><u>R26 (progressed to short list)</u> Widening East Coast Road - Hibiscus Coast Highway to end of FUZ area</p>	<p><u>R26-1 (progressed to DBC)</u> Upgrade and widen East Coast Road to an arterial between Hibiscus Coast Highway and the southern end of the study area.</p>	<p><u>Option A (EC-01) (progressed to route protection)</u> Shared path on one side of the road in segment 2 (rural segment) and a dedicated shared path along the entire corridor.</p> <p><u>Option B (EC-02)</u> Does not include an upgrade of segment 2 (rural segment), but includes an east-west active mode connection across to the proposed strategic active mode corridor along SH1. This option has a gap in the connection through the rural zoned section where deviation is required onto the strategic SH1 cycleway to the west.</p> <p>Considered road widening and form and function options for selected option- widening to west, east or both sides.</p>
<p>IBC long list options</p>	<p>IBC short list options</p>	<p>DBC options</p>
