3 AGREED SOLUTION SUMMARY

Section 3 discusses the proposed solution for this corridor and addresses the design scope included (and also deferred), planning, C&E, procurement, cost estimate and constructability considerations.

3.1 Design Solution

This section outlines the guidelines and standards Manu Tāiko has adopted for the completion of the detailed design of this Project.

The design is based on the following standards:

- NZ Transport Agency State Highway Geometric Design Manual (Draft)
- Austroads Guide to Road Design (AGRD)
- Road to Zero Speed and Infrastructure Programme Design Framework – 1 July 2021 (Draft)
- Austroads. 2017. "Guide to Pavement Technology – Part 2: Pavement Structural Design". 2017)
- NZTA. 2018a. "New Zealand Guide to Pavement Structural Design." 12 April 2018
- NZTA. 2018b. "New Zealand Guide to Pavement Evaluation and Treatment Design." 21 August 2018
- Other relevant Austroads and NZ Transport Agency guidelines and specifications.
- Guide to Road Design Part 6: Roadside Design, Safety and Barriers
- Specification and guidelines for road safety hardware and devices NZTA M23:2022
- M23 Appendix A: permanent road safety hardware & devices, NZTA M23:2022.

Where there have been no changes to the existing horizontal and vertical alignment the geometry has been maintained, and where shoulder or carriageway widening is required, existing cross falls have been matched.

The Design Philosophy Statement is included as Appendix T.

3.1.1 Geometrics

3.1.1.1 General Geometrics Approach

The existing geometric layout of the corridor is not altered in the proposed design in order to limit major earthworks resulting from major cutting or filling. Similarly, the pavement widening works are proposed to be carried out within the existing sealed or berm areas directly adjacent to the road as much as possible. The main reason not to widen the existing cross-

sectional width along the corridor as much as possible is to avoid heavy earthworks and retaining structures.

Where a wide centreline is proposed, the existing crown of the road is to be located within the proposed wide centreline markings to minimise the need for pavement works. No superelevation on the horizontal curves is altered as part of the proposed design.

3.1.1.2 Setout

The design has been undertaken based on Mobile Lidar Survey which has a reasonable level of accuracy on the corridor, suitable for widening projects. Any widening of the corridor should be undertaken as extension of existing crossfall rather than utilisation of 3D model set out. This will account for minor inaccuracies on site to be adjusted slightly. It is important to note that Mobile Lidar survey beyond the edge of the carriageway is less accurate and some on-site adjustments to earthwork tie in locations will be required with the site engineer. This can be determined once the areas of earthworks have been exposed/cleared.

Appropriate programme allowances should be made by the Contractor to allow this setout to be checked and adjusted, proactively with the site engineer.

3.1.1.3 Sight Distance

No changes to existing sight distance have been made within the design nor have further checks been undertaken. Increasing sight distances on the corridor will typically require extensive cutting of batters resulting in a high cost.

3.1.1.4 Courtesy Bays

It was agreed with the client to use an MGSD assessment rather than SISD, and to allow for dynamic obstruction only for a small part of a lane, which meant most options were assessed as infeasible. Out of the 12 Courtesy Bays proposed in the original GHD assessment, two of them were investigated further as part of this project.

The Courtesy Bay design was presented to Waka Kotahi for feedback and comments. During the design process, the design team met Waka Kotahi SME (Richard Langdon-Lane) and Local Safety Engineer (Errol Riston) along with Waka Kotahi PM (David Cross). The main outcome of the meeting is tabulated below.

Courtesy Bay	Location Reference	Decision
Courtesy Bay 1	931/4250 (Inc)	Not feasible for courtesy bay. Leave is as it is stopping bay. Marking to be considered around existing driveways.
Courtesy Bay 2	931/3550 (Inc)	Not feasible for courtesy bay. Leave is as Stopping Bay. Keep the diagonal marking as it is.

Courtesy Bay 3	931/2250 (Dec)	Not feasible for courtesy bay. Remove Stopping Bay sign. Widen the lane or centreline, depending on tracking. Leave hatch marking.
Courtesy Bay 4	931/1550 (Inc)	Not feasible for courtesy bay. Leave as it is.
Courtesy Bay 5	931/950 (Dec)	Provide signs and marking for Courtesy Bay. Leave diagonal marking or add additional diagonal marking to move merge location before the curve. Remark the diagonal marking and extend to towards the shoulder.
Courtesy Bay 6	931/760 (Inc)	Not feasible for courtesy bay. Remove the sign for stopping bay. Leave the marking as it is.
Courtesy Bay 7	921/9450 (Dec)	Not feasible for courtesy bay. No sign to be installed.
Courtesy Bay 8	921/8700 (Inc)	Not feasible for courtesy bay. Leave it as it is.
Courtesy Bay 9	921/8150 (Inc)	Not feasible for courtesy bay. Leave it as it is. Keep the roadmarking. Don't install NSAAT line as shown on both sides.
Courtesy Bay 10	921/5350 (Dec)	Not feasible for courtesy bay. Merge area is unsafe around bank face. Leave as it is.
Courtesy Bay 11	921/4300 (Inc)	Not feasible for courtesy bay. Leave as it is. It is considered that a barrier upgrade will provide better safety outcome.
Courtesy Bay 12	921/4200 (Dec)	Courtesy Bay. Provide signs and markings as required.

As mentioned in the table above, only two of the courtesy bays from the GHD assessment are progressed to Detailed Design and signs and markings are proposed accordingly.

During the design process, the Local Safety Engineer requested (agreed by Waka Kotahi PM and documented in the project decision tracking register in Appendix R) to convert the existing passing lanes into Courtesy Bays. This is for route consistency as the passing lanes do not meet the minimum required length. The design team have explored the existing passing lanes and proposed signs and marking to convert the existing passing lanes into the courtesy bays.

The agreed courtesy bays are listed in the table below.

Courtesy Bay	Location Reference	Decision
Courtesy Bay 1	931/4050 (Dec)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 2	931/3475 (Dec)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 3	931/1750 (Dec)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 4	931/950 (Dec)	Provide signs and marking for Courtesy Bay. Leave diagonal marking or add additional diagonal marking to move

		merge location before the curve. Remark the diagonal marking and extend to towards the shoulder.
Courtesy Bay 5	921/9350 (Inc)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 6	921/5550 (Inc)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 7	921/4200 (Dec)	Courtesy Bay. Provide signs and markings as required.
Courtesy Bay 8		Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 9	931/4050 (Dec)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 10	931/3475 (Dec)	Passing lane conversion to a courtesy bay. Signs and markings updated.
Courtesy Bay 11	931/3250 (Inc)	Passing lane conversion to a courtesy bay. Signs and markings updated.

As part of the design, there are sets of gated advisory signs provided on either side of the Remutaka Hill. The signs are proposed for people to be courteous while driving through the hill and let others pass if it is safe to do so. The locations of the advisory signs are RS/RP 931/5943 (Decreasing) and 921/1077 (Increasing).

Although these Courtesy Bay's will be implemented as part of phase 1 works, they have been assessed as a Low-Cost Low Risk project and therefore the detailed design and implementation is now a separate project.

3.1.1.5 Right Turn Bays

This right turn bay feasibility assessment is for two low volume intersections, Gilbert Road and Waterworks Road. They are 130m apart, so the designs are inter-dependent. The intersections are located in Section 4 of the Safe Network Programme: SH2 Remutaka Hills Remutaka project, and therefore relate to the median barrier assessments being undertaken in parallel. Initially, three options for right-turn bays were identified. Four options were presented to Waka Kotahi at a mini feasibility workshop on 07 December 2022. All the four options for right turn bays are summarised below:

- Option 1 terminates median barriers at the start of the right turn bay tapers and is based on retaining the location of roadside barriers on the south side while cutting into the bank on the northern side.

- Option 2 continues a consistent 1.5 m wide centreline through the intersections allowing for provision of median barrier up to the intersections with a minimum break to enable right turning at the intersections.

- Option 3 assumes no median barrier is desired to be installed on this section of State Highway and is based on the philosophy of developing the minimum footprint for a right turn bay facility.

- Option 4 proposed minor seal widening opposite each intersection to better accommodate any right turn movements. This is similar to a 'Diagram E' treatment as per Waka Kotahi's Planning Policy Manual. All options have been designed with widths and tapers consistent with a 100 km/h speed limit. This offers a factor of safety, given that without enforcement vehicle speeds are likely to often exceed the proposed 80 km/h limit.

As a result of the discussions held during the mini-feasibility workshop, the Option 4 was requested to be further explored. The design memo and design drawings are attached in the Appendices P & Q respectively. Right-turn bays were not progressed into the detailed design stage.

3.1.1.6 Corner Widening

The objective of the design is to widen corners enough to allow for two-way traffic of heavy vehicles. The extent of seal widening required was assessed for each corner for a net cut option (e.g. netting or crib wall). Topographical data has not been obtained nor is available hence historical data of a similar project was used as the basis for the assessment.

Corner 1 could have available space for partial fill widening for less significant cut earthworks. Corner 2 has limited fill opportunities due to a steep drop off right next to the existing road width.

A short memo with high level cost estimate were prepared. Refer to Appendix P for details. The design for corner widening was not progressed into the detailed design stage.

3.1.2 Road Safety Barriers

3.1.2.1 Edge Barriers Design

The road safety edge barrier design is based on the Waka Kotahi Specifications and Notes for Road Barrier Systems (NZTA M23), State Highway Geometric Design Manual and Austroads guidelines. Road safety barriers are present for approximately 19km (on both sides) of the

total length of the corridor and mostly on the northern side of the carriageway where there are steep drop-offs requiring protection.

During the design process, the proposed barrier design has been updated to cater to feedback from stakeholders and Safe System Audit (SSA) recommendations. The design team has reassessed the barrier locations and proposed new barriers as per the stakeholder and SSA recommendations. The design drawings include these new barriers.

Where there are existing barriers, the opportunity to extend barrier lengths to fully shield hazards have been explored as part of the design process.

There are several locations along the corridor where the barriers are attached to bridges, retaining walls, and installed on ground beams. Barriers requiring upgrade before installing motorcycle underrun barriers in those areas have been discussed with Waka Kotahi SME with possible options for retrofitting the barrier system. However, bridge widening and assessing the existing retaining wall or ground beams has not been considered as part of this Project.

3.1.2.2 End terminals

There are some areas in the corridor where the existing end terminals are obsolete as per the current NZTA M23 specifications. Those end terminals are assessed along with the barriers, and recommendations made for how terminals could be retrofitted to meet current compliant specifications.

Full end terminal widening has not always been provided given the narrow corridor width. The whole corridor has topographical constraints so that we cannot achieve the clear area of 22.0m x 6.0m as per Waka Kotahi M23 Grading Plan without significant earthworks and retaining structures. During the early design stages of this project, Manu Taiko design team has met with Waka Kotahi Barrier SMEs and agreed on providing the primary width behind the barrier which is 0.6m. The secondary clear area is not fully available due to the topographical constraints, with an agreed best effort being achieved.

Where the end terminals are replaced with a new MASH TL3 compliant system, the length of need of the existing barrier has been assessed. The barriers have been extended as required to meet current length of need requirements.

3.1.2.3 Curved Barrier Treatments

Curve barrier clear zones behind barriers cannot be achieved due to topographical constraints. The whole corridor has topographical constraints so that the clear area cannot be fully achieved (22.0m x 6.0m as per Waka Kotahi M23 RSB-2) and 2A Curved rail Terminals without significant earthworks and retaining structures. During the early design stages of this

project, Manu Taiko design team has met with Waka Kotahi Barrier SMEs and agreed on a best effort approach to the provision of the gating clear area, and that the clear area is not practically achievable for this corridor due to the topographical constraints.

3.1.2.4 Motorcycle underrun barriers (or rub-rails)

Rub-rails are proposed in the high-risk areas for motorcyclists. The barriers not compliant with the standard guidelines in these areas are replaced to allow rub-rails to be attached under them. To install motorcycle protection underneath the existing barrier, a gap of approximately 500mm between the bottom rail and the existing ground is required. The motorcycle underrun barriers are proposed on the outside of the curves along the route where the risk of a motorcyclist hitting the barrier is highest.

No rub-rails are proposed in straight sections or the inside of the curves and where there is existing kerb and channels.

As per the stakeholder, Local Safety Engineer and the SSA recommendations, the whole corridor has been reviewed to ensure rub-rails are proposed on the outside of all curves.

To avoid maintenance issues under the motorcycle protection rail, grass removal and chip sealing is proposed under the barrier in locations where it can be achieved.

3.1.3 Wide centreline

There are no wide centrelines on the corridor at present. Wide centrelines reduce the likelihood of head-on type crashes by providing additional separation / buffer between the opposing traffic lanes. As per the TCD rule (clause 7.2A(1) and (2)) a wide centreline consists of two parallel lines a minimum of 0.5m apart and maximum of 1.5m apart.

The recently released Road to Zero Speed and Infrastructure Programme Design Standards and Guidance however states that the minimum wide centreline width should be 0.6m. The standard also states that other Waka Kotahi guidance is superseded by this document and therefore, for this Project, a 0.6m to 1.0m wide centreline will be adopted.

Where there is not enough cross-sectional width, all the traffic lane widths are considered to be a minimum of 3.5m and then 0.6m to 1.0m wide centreline are proposed. In some areas minor pavement widening beyond the existing edge of seal are proposed to allow space for wide centreline.

A minimum sealed shoulder of 0.75m will be provided where a wide centreline is applied. If there are new or existing edge barriers on both sides of the carriageway, the total cross section will need to increase to 10.1m and minimum 1.25m width shoulders provided.

Typically, the wide centreline will be positioned equally over the corridor crown, unless noted otherwise.

3.1.4 Pavement and Surfacing Design

3.1.4.1 Pavement Design

The pavement design has been undertaken in consultation with Eric Rohde, Greg Major from WTA and Project Manager (David Cross). Decisions were reached to increase the pavement construction to minimise risks during construction and meet the minimum requirements for the corridor cross section.

The design has been undertaken based on an extensive review of existing pavement data for the corridor and options have been developed based on different scenarios that could be encountered. The pavement design developed and priced is a conservative assessment, since there was no test pit information available during the detailed design phase to base the design upon. The potential exists for a reduction in pavement construction work, contingent upon the pavement testing results confirming the adequacy of materials beneath the shoulder or if a new construction methodology mandates a narrower working width for stabilising the basecourse materials.

For further information refer to the Pavement Design Memo dated 8 June 2023 and included in **Appendix D.**

3.1.4.2 Surfacing Design

Resealing is recommended under the following conditions:

- Removing Ghost Linemarkings: To eliminate ghost linemarkings, the proposal suggests resealing the area where the existing edge line marking is relocated.
- Sealing of Existing Carriageways: The following conditions outline the circumstances under which resealing is propsoed for existing carriageways.
    - Where the existing accessway is gravel and requires a sealed surface.

When the sealing surface of the existing carriageway is deteriorated, reseal after required repairs have been made.

Based on the historical records of pavement surfacing, it is evident that chipseal surfacing has been predominantly used in recent times. Therefore, it is deemed appropriate to adopt chipseal surfacing for the pavement. It is recommended the first coat seal be a Grade 3/5 (either two coat or racked-in). The second coat seal be placed in the following season but not longer than 12 months after application of the first coat seal. A single coat seal Grade 4 or 5 is recommended for the second coat seal.

Refer to Pavement Design memo attached in Appendix D for pavement options and surfacing details.

3.1.4.3 Pavement and Surfacing Risk for Future Consideration by Waka Kotahi

Pavement risk remains high across SIP projects, specifically relating to existing pavement condition, the season in which the pavement is constructed, location of the pavement joint and temporary trafficking. The following risk elements (not exhaustive) should be considered by Waka Kotahi when moving into the construction phase.

- Pavement Joint – currently located at the centreline. During construction, this joint is often temporarily trafficked and can show signs of damage that needs to be repaired prior to final surfacing. Clear definition of responsibility should be made in Contract documents either through ownership of risk by Contractor so they can build into their price, or ownership by Waka Kotahi through identifying budget to fund repairs.

- Season for construction – if Programme is critical, there is often a desire to construct in Winter. Options should be considered and agreed with Waka Kotahi SMEs for adoption if construction and surfacing outside the optimal seasons is desired.

- Existing Pavement Condition – agreement should be reached prior to construction regarding existing pavement condition and best outcomes for the project through coordinated reseal efforts. Providing a good quality homogeneous impervious surface will benefit any new widening

- Ensuring the protection of pavements against water-induced damage is a crucial consideration in pavement design. To effectively mitigate the detrimental effects of moisture on pavement layers, it is imperative to ensure the proficient drainage of excess water from the subgrade.

- As per New Zealand guide to pavement structural design, modified aggregate basecourse has a low risk considering the traffic volume of the corridor. However, the

use of modified aggregate basecourse is deemed non-ideal for this project due to several reasons:

  - It poses construction challenges in achieving integration with the existing pavement for widening sections.
  - It introduces drainage issues.
  - The advantages of a modified aggregate base are anticipated to be more short-term compared to foamed bitumen stabilization.

- An unbound granular pavement design is medium risk but when used in a widening the risk increases to high risk due to the difficulties in achieving a homogenous basecourse. If trafficked then an unbound widening is likely to develop distress within a year.

3.1.5 Stormwater Design

The stormwater generally runs off the paved surfaces to the adjacent kerb and channel in most of Section 4 and to the adjacent grassed berms and slopes in most of Sections 1 & 2. No changes are proposed to the drainage along corridor including no culvert extensions.

Minimal drainage works are required, with these being limited to providing subsoil drains during pavement construction.

3.1.6 Services Considerations

During the feasibility stage, the undergrounding of powerlines is proposed from RS/RP 931/5380 to 931/5950 (Increasing). However, in early detailed design stage, the scope for undergrounding the powerline has been extended. The agreed updated extent of undergrounding the powerline and removing the existing powerpoles is from RS/RP 931/5080 to 931/5950 (Increasing). The major power supplier in the vicinity of the projects is Welectricity. The design team have liaised with Welectricity for undergrounding the powerlines. Manu Taiko Design team and Waka Kotahi Project Manager (David Cross) met with Welectricity team on 23 May 2023 and agreed on the scope. Welectricity highlighted that the project of this scale could take three years of making for them. The actual physical works during the undergrounding process will be carried out by Weletricity themselves and Waka Kotahi to liaise with them.

Welectricity has provided the design and cost estimate for the undergrounding works along with the general specification. As per the Welectricity design, the underground powerline

runs on the decreasing side of SH2 along the existing berm and/or shoulder. Waka Kotahi is responsible for liaising with Welectricity prior to start of the actual project physical works (this project) so that the undergrounding works could be planned accordingly.

It is recommended that the powerline undergrounding works to be carried out as an enabling works for this project so that there are no delays delivering the main project. Waka Kotahi is responsible for ensuring this is scheduled in a time frame that allows the project to meet timeframes.

The design documents for undergrounding powerlines are attached in Appendix K.

Some services such as fibre optic cables may conflict with the pavement widening areas. There is also a possibility of fibre optic cable clashing with the barrier from RS/RP 921/1500 to 921/1600 (Decreasing) in Section 1. The contractor is to check the depth and location of any underground services in the vicinity of pavement and barrier works and relocate and/or protect as required.

3.1.7 Access Requirements

As discussed with the Local Safety Engineer, it has been agreed to reseal the accessways to private properties along the corridor. The extent of the resealing of driveways will be either 10m into the driveway or up to the property boundary, whichever is shorter.

This will reduce loose debris and chip tracking out onto the state highway, potentially causing safety concerns to slow and turning traffic.

The existing layout of the accessway (size, extents, turning radii and the like) will not be modified.

3.1.8 Walking and Cycling Consideration

SH2 over the project area is a rural section of State Highway. There are no existing cycle facilities on the corridor and only a short section of footpath at the Upper Hutt end of the route alongside the residential properties. The existing footpath is not impacted by the Project.

Maintaining a minimum 750mm shoulder across the full Project aligns with SIP principles for minimum treatments for cyclists.

3.1.9 Property Requirements

The proposed work is within the existing road reserve boundaries. No land acquisition is required.

3.1.10 Traffic Modelling

No traffic modelling has been performed during the feasibility and detailed design stages, as the proposed interventions do not involve removal or reallocation of existing traffic lanes.

3.1.11 Heavy Haulage Considerations

The project corridor is an "Over Dimension" (O-D) route. The agreed envelope on an undivided two-lane two-way corridor is 10.0m wide by 6.0m. This clearance envelope is achieved along the corridor. No median barriers are proposed as part of this design.

3.1.12 Additional Safety Improvements

3.1.12.1 Audio tactile profile markings (ATP)

There are existing ATP markings along the corridor on Sections 1, 2 & 4. The ATP markings are installed on both centreline and edgelines. As pavement widening and resealing works are proposed, it is proposed to reinstate the existing ATP markings once the resealing works have been carried out. Prior to the start of the physical works on this project, the Wellington Transport Alliance (WTA) forward works programme should be checked to ensure that no double works are proposed in the same area of the corridor.

No new ATP markings have been proposed along the corridor.

3.1.12.2 High performance structure markings (HPS)

There are currently no HPS markings on the edgeline of the corridor and there is an over representation of crashes related to wet conditions. Therefore, it is proposed to apply HPS markings on all edgelines on the corridor to make it more visible at night and in wet weather conditions.

3.1.12.3 New and relocated signs

All new and relocated signage are in accordance with the Waka Kotahi Traffic control devices manual (TCD manual). The corridor is located in high wind areas and therefore all signs are proposed on two posts.

New and/or relocated signs are proposed to be installed behind new or existing barriers.

3.1.12.4 Curve warning signs review

During the detailed design stage, the design team carried out a site drive over with a side thrust gauge. The data from the drive over has been processed and all curves on the corridor have been reviewed to ensure alignment with MoTSAM Appendix A3. The posted speed advisory has been updated where considered to be appropriate.

3.1.12.5 No-overtaking markings

No-overtaking lines exist and are marked along the corridor. There are opportunities to improve the existing markings to ensure they are more effective. As per recommendations by the Local Safety Engineer and SSA, the existing curves are assessed for installing the no-overtaking lanes. However, the curves assessed did not meet the MoTSAM requirements for installation of the no-overtaking markings.

3.1.12.6 Street lighting

Existing streetlights are maintained in their respective locations. No additional lighting is proposed as part of this design.

3.2 Scope Deferred

3.2.1 Median Barrier and associated Turnarounds

An additional Feasibility design task has been carried out for a median barrier and associated turn around facilities in Section 4, refer to Appendix P SH2 Remutaka Median Barrier Feasibility Memo FINAL & Appendix Q WRSB Plans Option 1 & 2 as requested by Waka Kotahi. The assessment was for the corridor between RS/RP 931/5700 and 931/13000.

Two options were presented to Waka Kotahi who selected their preferred option (Option 2) which was then developed to allow for a cost estimate to be made. It was found, however, that due to extensive earthworks, pavement widening and barrier and kerb & channel relocation, the overall cost was too high and that the median barriers were to be excluded from detailed design.

Opportunities for future proofing for potential median barrier was explored through the corridor except for Section 3 during the initial feasibility design but the cost associated with the additional works required to provide a wide centreline that could allow the installation of median barrier was found to not meet the SSI funding criteria. Therefore, the design of the wide centreline proposed does not allow for future installation of median barrier.

3.2.2 Right Turn Bays

As a part of the previous Feasibility Phase closeout, additional analysis to determine whether right turn bays can be provided at the intersections with Waterworks Road and Gilbert Road.

Four options were considered; Options 1, 2 and 3 proposed right turn bays with and without median barriers, whereas Option 4 was the do minimum option and proposed widening opposite Waterworks Road to enable vehicles to wait on the shoulder before making the right turn manoeuvre.

During the mini-workshop 7 December 2022, Options 1 & 2 were discarded and agreed to progress Options 3 and 4 for further investigation.

Feasibility plans and Cost estimates are prepared for both Option 3 and Option 4. Based on the cost estimates and scale of works to be carried out constructing a right turn bay, the Option 3 is not progressed into a detailed design and not included in this SIP project. Option 4 is also deferred and not included in this SIP project because the estimate falls within the funding criteria for Low Cost Low Risk (LCLR) project.

Manu Taiko design team also explored implementing an option similar to **Diagram E** Waka Kotahi's Planning Policy Manual, Appendix 5B – Accessway standards and guidelines. However, the layout didn't meet the width requirement for shoulders as specified in the guidelines. Therefore, all the options for providing right turn bays including do minimum task (Option 4 or Diagram E) is deferred and not included this SIP project.

3.2.3 Corner Widening

Manu Taiko design team assessed the whole corridor, but due to the limitations of a LCLR project only two corners were concentrated on. These were identified by Wellington Transport Alliance (WTA, the Maintenance and Operations team): Corner 1 (Ref RS/RP 921/6630) and Corner 2 (Ref RS/RP 921/6120).

The estimated costs for widening the two corners assessed were within the $2M budget threshold of LCLR project. However, it was decided the project will be deferred and not included in this SIP project.

3.3 Safety In Design

A Safety in Design (SID) workshop was held 12 October 2023 with representatives of Waka Kotahi, Wellington Transport Alliance (WTA) and Manu Tāiko. The register is included