Technical Note

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Date:	22 April 2022
Subject:	Cycleway Delivery Scope and Design Standards

Purpose

To achieve Council and AT goals for cycle and micromobility (CAM) mode share and infrastructure, this technical note recommends an approach to departures from current design standards to enable accelerated, lower cost delivery of the programme identified in the CAM-Programme Business Case (PBC). Overall, this approach enables accelerated delivery of more kilometres of safe, connected and protected network and is therefore seen as the best approach towards achieving Auckland's mode shift goals in a short time period.

The focus of the memo is on design and delivery scope only. Recommendations are applicable to roadspace reallocation projects delivered through the Ongoing Cycling Programme and are intended to avoid the need to shift kerbs.

This new design approach is critical to the delivery on the CAM-PBC investment objectives and any safe cycling infrastructure targets that might arise from the CAM-PBC, for example, in future SOIs.

Context

Clarification of the design and delivery scope is just one element required to accelerate delivery of the CAM network. Further support is required from;

- a clear vision and strategic communications approach to bring communities along with us on the delivery journey;
- policy changes related to road space reallocation (including updates to the parking strategy) across AT and our partners;
- bundling of procurement across routes/projects to support delivery;
- Using Single-Stage Business Case Lites to accelerate funding approvals and advocate for changes more broadly to funding conditions.

This document responds to AT's 'Cycling Reset' action to 'clarify and communicate standards' related to safe cycle facilities. This action recognises the need to reduce costs and accelerate delivery of the Cycle and Micromobility (CAM) network to achieve greater mode shift.

The CAM-PBC has identified high priority connections that can be delivered primarily through road space reallocation within the existing carriageway. These projects are unlikely to fully meet the requirements of the cycling standards set in the Transport Design Manual (TDM) without departures from these standards. Consequently, this document recommends an approach to departures from current standards and policies to enable accelerated, lower cost delivery of the programme identified in the CAM-PBC.

A note on safety: In this memo references to 'safety' relate to the strategic and Safe System Principles outlined in the Vision Zero for Tāmaki Makaurau and Road to Zero strategies. This is consistent with our broader strategic aims for road safety. Perceptive safety relates to incidents or occurrences that are within safe system conditions but often create barriers to uptake of travel choices through creating an environment that feels unsafe to the user or that may result in minor injuries.

In addition, driving greater mode shift through accelerated delivery should enable AT to achieve 'safety in numbers' and 'mode shift to less harmful modes' benefits more quickly at a system level, supporting wider safety outcomes.

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The recommendations in this document will be presented to the Board for endorsement of the direction alongside the CAM-PBC in May 2022. The specifics of a programme-level departure will be approved through existing functions under the Chief Engineer and AT's Design Centre of Excellence. The CAM Programme Control Group and the Design Review Panel will be accountable for ensuring the recommendations in this memo are actioned and monitoring the effectiveness of the changes.

The detail of this technical note was consulted on with key external stakeholders. This included Bike Auckland and the wider CAM-PBC Technical Reference Group (Automobile Association, Greater Auckland, Ministry of Transport, Public Health Specialists (Auckland DHB, University of Auckland). External Stakeholders were supportive in principle of the direction and considered that trading off comfort and speed to improve the rate and extent of delivery was appropriate. They were clear that high safety standards should be maintained as proposed. Changes to the detail of the proposals have been actioned following this engagement. The Technical Reference Group reinforced the importance of communicating to the public our new delivery approach.

The technical note was peer reviewed by MR Cagney from a vision zero and active mode user experience and operational perspective. The peer review supported the departures and found no critical issues.

The remainder of this memo is presented in the following sections:

- Strategic – revising our design user
- Design requirements for separated cycle facilities
- Scope and design requirements for infrastructure and other modes in the vicinity of cycle facilities
- Next steps

Strategic - revising our design user

Recommendation: The 'design users' for CAM PBC investment are the 'interested but concerned' group. Facilities are optimised for users on standard sized bicycles, generally travelling at low-mid speeds.

All Ages and Abilities

There are a range of user abilities, ages, confidence levels, dimensions and trip purposes on our CAM network. Since 2017 AT has been designing for All Ages and Abilities (AAA), this means the CAM network should be attractive and comfortable for all users to cycle on, including providing for users who:

- are less experienced or confident, and
- may use larger forms of wheeled devices, such as cargo bikes, bikes with trailers and mobility devices.

AAA is interpreted within the Transport Design Manual (TDM) to mean a cycle facility must be wide enough to allow fast users to safely overtake slower users within the facility. It also allows users to ride side by side, which can only be achieved where cycle facilities are greater than 2.0m wide.

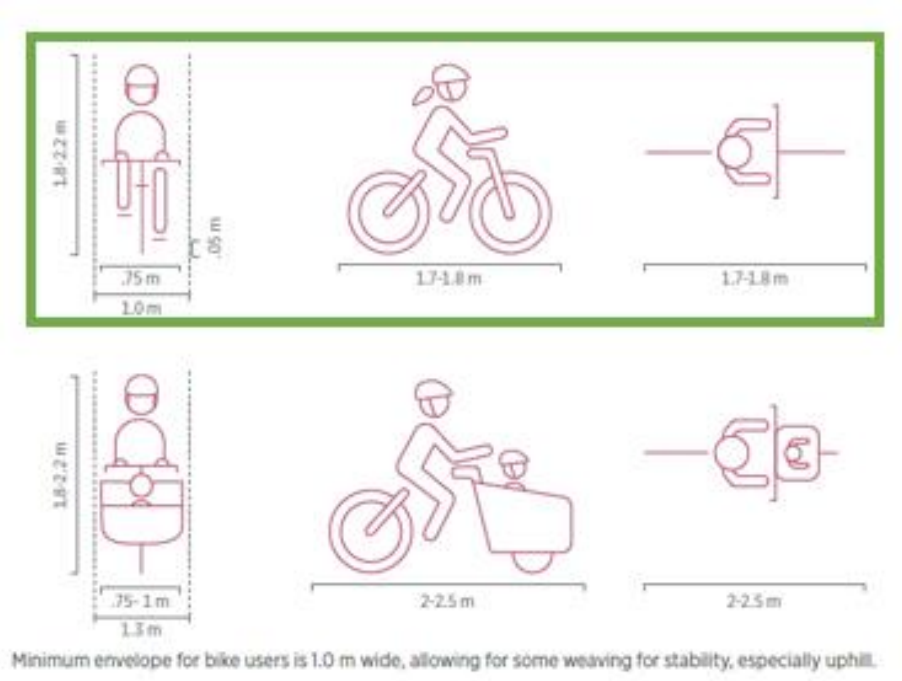


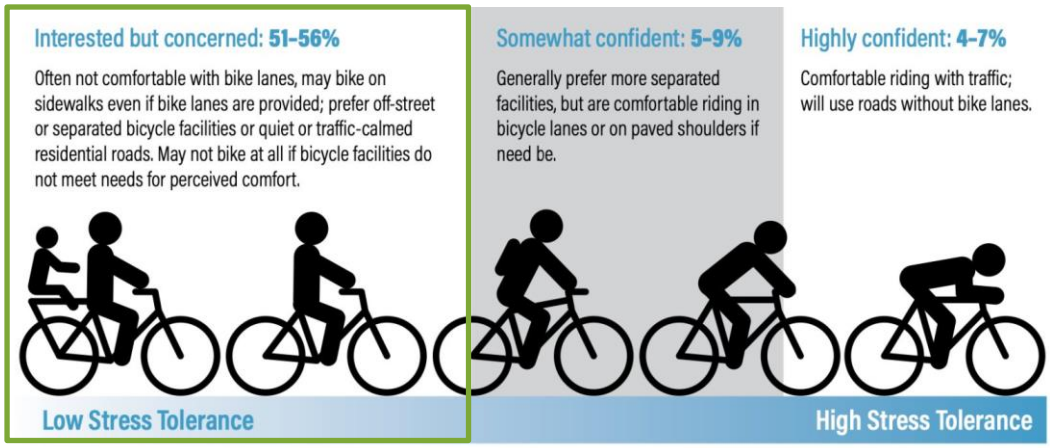
Figure 1 Design user dimensions and speed

Optimising for Mode Shift

Local and international research show that the 'interested but concerned' user group are where the potential for greatest mode shift exists. 'Interested but concerned' users represent those who could cycle for everyday journeys but are dissuaded by feeling unsafe, often due to the lack of protected cycle facilities.

The CAM-PBC acknowledges that it is not always possible and/or affordable to design cycle facilities that comply with the TDM standards aimed at AAA users within existing kerbs. As such, AT proposes to target the highest potential mode shift through delivering facilities that are optimised and designed for 'interested but concerned' users on standard sized bicycles that fit the 1.0mx1.8m envelope, generally travelling at the 10-20km/h as set out in Figure 1. A definition of 'interested but concerned' users is provided in Figure 2[1].

The larger TDM bicycle envelope (see Figure 1) must physically fit within all facilities, however pinch points and lower levels of service are accepted for these users.



Note: The percentages of total population above reflect only adults who have stated an interest in bicycling.
Source: ***Bikeway Selection Guide***, Federal Highway Administration (February 2019).

Figure 2 User confidence levels and mode shift potential

Trade-offs and risks

Optimising our new facilities for less confident users is anticipated to result in the greatest uptake for active modes, particularly once we establish greater network connectivity across the region. However, there are trade-offs associated with this approach including:

- Users may not be able to ride side by side (e.g. parent and child) and faster users may not be able to overtake.
- Safety remains the same for confident and faster users who opt to continue to use the road *(Karangahape Rd is an existing example)*. This can be improved through providing regular opportunities for users to re-enter the protected lane if they choose to travel on road for a segment of the route.
- There may be more pinch points for cargo bikes or bikes with trailers, which require very low speeds to navigate some sections. Impacts increased if uptake of larger cycles accelerates e.g. cargo bikes as a freight alternative.
- Potential for more driver aggression towards users on-road rather than in the cycle facility who are perceived to be holding up traffic.

[1] Note that this is based on international research. Auckland research shows 66% of Aucklanders self report as 'not confident' or 'neutral confidence' about riding a bike in Auckland. 50% of Aucklanders report feeling unsafe because of how people drive and 29% report not enough cycleways or separated routes as being barriers to cycling. (TRA Active Modes Survey 2021)

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Design requirements for separated cycle facilities

Recommendation: The proposed minimum standards for separated cycle facilities are endorsed for use to inform a programme-level departure from TDM standards applicable to designing for road space reallocation in the Ongoing Cycle Programme.

The reallocation of roadspace at intersections is endorsed in principle to ensure the safety of users at key conflict points but will also need to consider and align with Future Connect modal priorities.

The CAM-PBC prioritises road space reallocation opportunities. Proposed facilities are intended as permanent, however through the approach in this memo it must be accepted that investment may be required in future to further optimise the facilities. This may be required for example where increased demand requires a wider facility, or minimum standards are not observed to work well in a particular location. Note this further investment is not accounted for within the CAM-PBC funding allocation.

For the majority of routes, it will not be possible or affordable to meet full TDM standards within the existing carriageway space and departures from standards will be required. The proposed minimum requirements for separated cycle facilities in this memo are recommended to inform a programme wide departure for CAM-PBC investment.

These minimum standards are not proposed to apply to new roads or major projects where kerb realignment is necessary. The Design Review Panel has a responsibility to ensure these minimum standards are used appropriately.

A programme wide departure is recommended to cover the following elements, further detail is provided in Appendix A:

- Cycle facility and separator width
- Separator material
- Cycle facility surface
- Safety treatments on side roads
- Lighting

The effectiveness of these recommendations will be monitored through delivery and after implementation. Changes required to the approach should be incorporated on an ongoing basis and will be the responsibility of the CAM Programme Director. Note that in some locations it will be necessary to compromise on the provision for other modes to ensure these minimums can be met e.g. reduced traffic lane widths.

Wayfinding and cycle counters are also included as a mandatory element within cycleway delivery scopes, this increases delivery cost but is necessary to support uptake and monitoring of benefits.

Intersections

Endorsement in principle is also sought to reallocate roadspace, specifically general traffic capacity, at intersections. This is necessary to ensure safety for users at these key conflict points. Roadspace may be reallocated through for example combining through and left turns on approaches to signalised intersections, reducing the number of through lanes where there are multiple, or banning movements.

It is proposed that high level impact analysis (traffic modelling if appropriate) and a Roads and Streets Framework assessment, including consideration of impacts on other modal strategic networks, are undertaken to understand impacts and confirm the strategic alignment of the proposed change. Detailed modelling should not be required to justify these changes. Assessments will be used to identify the best design approach to mitigate strategic impacts

and communicate with stakeholders. It is not envisaged that the impacts assessment will impede the ability to proceed with a roadspace reallocation approach where the proposal is strategically aligned.

Note that the CAM-PBC has generally prioritised links where there are minimal, if any, conflicts with the strategic public transport network in Future Connect. It is therefore anticipated that the strategic alignment of cycleway provision will be high.

Trade offs and risks

The above departures are aimed at enabling more network to be built with the available funds, while creating facilities that are attractive to 'interested but concerned' users. However, a number of trade-offs and risks are anticipated including:

- Mode shift: The proposed approach offers a significant improvement in enabling a shift from no facility to a protected cycleway. However departures from standards may mean facilities are not attractive to all users, due to size and speed constraints and minor and perceptive safety concerns.
- Costs are passed on to other programmes e.g. lighting and renewals. This may include higher maintenance costs in some locations.
- Interim materials may necessitate further future cycle programme investment and construction disruption to upgrade facilities.
- Impacts on other modes e.g. buses/freight/general traffic at intersections, loss of 'right turn pockets' in medians where this space is reallocated to provide the cycleway, and narrower traffic lanes to create space for the cycleway.
- Significant parking loss along the full length of corridors due to the need to reallocate space to cycle facilities
- Useability of facility impacted if high CAM user volumes eventuate

Proposed minimum standards for separated cycleways can be found in Appendix A, along with Indicative cross sections for typical carriageway widths using the above design minimums are provided in Appendix B.

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Scope and design requirements for infrastructure and other modes in the vicinity of cycle facilities

Recommendation: Projects implemented through the CAM PBC are generally not required to invest in betterment of other modes, or repairs, where it is not required to enable a successful CAM facility.

Analysis of recent cycleway projects shows a large proportion of the budget is often attributed to non-cycleway costs. To support the accelerated delivery of a connected CAM network, within the available funding, it is recommended that AT accepts that the CAM programme will generally not invest in non-CAM outcomes from its budget. This is a departure from current AT policy.

Other programmes will still be required to invest in cycle and micromobility outcomes as per AT policy. This is considered a fair and equitable approach due to the immature nature of the current cycle network and the significant level of investment required to achieve a well-connected network, similar to what is available to other modes. Other programmes will be provided the opportunity to provide funding in order to achieve non-cycling improvements. Very minor changes such as missing line marking for bus stops may be able to be accommodated.

The prioritised links within the CAM PBC predominantly avoid the public transport strategic network and primary strategic networks for other modes, which further reduces the potential impacts on other modes through the proposed programme.

This is proposed to be applied to the design scope through:

- No requirement to fund upgrades for other modes or road safety more generally out of project budgets, where it is not required for the functioning of the cycle facility. Note that functionality for other modes will be maintained and facilities replaced like for like if they are impacted by the design (with the exception of reallocated road space).
- No requirement to fund repairs or upgrades out of project budgets where it does not improve the functioning of the cycle facility. This extends to exclusion of stormwater upgrades and road resurfacing.
- No requirement to improve streetscape out of project budgets, including in areas of high place value.

Further detail on proposed changes is provided in Appendix C..

Trade offs and risks

The recommended change to AT policy for CAM project scopes will enable cycleway delivery to be accelerated within the available funding. However, a number of trade-offs and risks are anticipated including:

- Risk of negative community and stakeholder feedback related to lack of ‘dig once’ approach if non -cycling upgrade is pushed out to the future
- Additional maintenance costs where repairs are not included in project budgets
- Opportunities to make improvements for other modes (including pedestrians) and streetscape forgone to enable budget to be targeted at maximising cycle network
- Reduction in co-benefits to cycling for example not upgrading stormwater may mean the cycleway is flooded during some events.

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Next Steps & Commitments

The following next steps are required to complete this workstream:

1) Presentation of memo recommendations to Capital Projects Accessibility Group
2) Test design scope and cost assumptions on selection of prioritised corridors in the CAM-PBC
3) Development of 'acceptable' surface parameters for cycleways and seek endorsement from Waka Kotahi that asphalt is an appropriate surface treatment for roads with cycleways independent of traffic volumes
4) Agree waste management operational approach with Council to ensure safe operation of cycleways

The following commitments are required to be complete to ensure the successful roll out of this workstream:

1) Development of programme-wide departure for CAM-PBC delivery, led by Cycle Programme Director and Design and Standards Manager
2) Develop and cascade communications strategy to set expectations with stakeholders on delivery approach and why this is being undertaken
3) Ongoing monitoring and refinement of programme-wide departure and associated delivery costs

Endorsement

The design standards and scope outlined in this document is endorsed by the following parties. Endorsement of this memo does not negate the need for good design decision-making on an individual project basis. The CAM Programme Control Group and the Design Review Panel will be accountable for ensuring the recommendations in this memo are actioned, appropriate project decision-making, and monitoring the effectiveness of the changes.

	Name	*Signature*	*Date*
Grow Active Modes Investment Portfolio	Jenny Chetwynd **Exec GM Integrated Networks**		
Cycle and Micromobility Programme	Mark Lambert **Exec GM Integrated Networks**	DocuSigned by: Mark Lambert 8BBC89628CFC452...	27 April 2022
Network Operations	Andrew Allen **Exec GM Service Delivery**	DocuSigned by: 7918D0411C0A4F2...	02 May 2022
Design and Standards	Murray Burt **Chief Engineer**	DocuSigned by: Murray Burt E8F8F833D8914E2...	02 May 2022
Active Modes Investment and Planning	Hamish Bunn **GM Policy, Planning and Investment**	DocuSigned by: 9304A57E16E44E9...	22 April 2022

Appendix A: Proposed minimum standards for separated cycle facilities

Item	Current standard	Proposed minimum standards for cycle facilities	Trade offs / Risks
Cycle facility and separator width	**Separation/ buffer:** 0.8m on existing roads, 0.6m on collector roads with no vehicle crossings, bin collection, parking present (pending change to TDM) **Uni-directional cycleway:** 2.0m **Bi-directional cycleway:** 3.0m	Reduction to below TDM standards allowed up to the following when traffic lane widths are at minimum standards. **Separation/buffer**: 0.5m. **Uni-directional cycleway:** Usable width 1.5m, local reduction to 1.3m for a distance of less than 6 metres allowable at pinch points. **Bi-directional cycleway**: Usable width 2.6m. local reduction to 2.3m for a distance of less than 6 metres allowable at pinch points. A local reduction of 1.3m creating a 'one lane bridge' can be considered only where necessitated by existing structures and appropriate intervisibility exists. **Error! Not a valid bookmark self-reference.** demonstrates possible arrangements for typical carriageway widths. Medians and parking reallocated to create space for protected cycle facilities prioritised through the PBC. NB useable width generally excludes the channel.	• Lesser separation reduces comfort and perceptive safety for users of facility, since greater separation from traffic preferred. • On residential streets with many driveways, reduced traffic lane width and manoeuvring requirements mean the separation may only achieve 30-40% of the total length. That will have an impact on the attractiveness and safety of the facility. • Users will not be able to ride side by side within the facility or overtake slower users. Minimums may be inappropriate on higher CAM volume routes. • Pinch points for cargo and larger bikes or bikes with trailers, which may require slower speeds to navigate. • Local width reduction on bi-directional facility creates a 'one-lane bridge' scenario where oncoming users must give way. • Maintenance, if hand sweeping required will increase costs. • Rubbish bin collection difficult over a bi-directional cycle facility. Collection vehicles may straddle cycleway, introducing risk particularly for younger users. Potential to work with AC Waste Management and consider how timing of collection can mitigate this in key locations. • Removing medians will impact right turning vehicles, which

			may impede the flow of vehicle traffic. • Significant parking loss along the full length of corridors due to the need to reallocate space to cycle facilities

Separator material	Concrete kerbing or pre-cast concrete islands.
	Standard details available for 800mm, 600mm and 400mm precast separators (to fit within allocated buffer).
		Interim materials accepted. Durable materials preferred e.g. precast concrete islands of 3-5m long (NB precast concrete may not be appropriate where reseal or renewals anticipated on corridor). Alternative materials will be considered on a case-by-case basis and innovation is encouraged, a minimum 10-year design life for materials is required. Where very narrow separators are necessary the addition of vertical elements should be considered.
		Mountable rubber humps appropriate across some driveways (e.g. commercial driveways or at driveways on bi-directional cycle routes).
		Regular opportunities for users to enter the cycleway from the roadway must be provided between separators.
			• Semi-permanent materials will have a shorter life span resulting in increased maintenance and renewal costs.
			• Risk of negative community and stakeholder feedback related to:
			  ○ Lack of ‘dig once’ approach if permanent solution not delivered immediately.
			  ○ Interim materials considered to be less attractive / appealing than permanent, more expensive, options.
			• User perceptions of different separator types and widths in different contexts are currently unknown. further user testing is required to understand how to best improve comfort for users.

Uni-directional vs bi-directional cycle facilities	Uni-directional cycleways are preferred. Bi-directional can be considered when this would lead to a better quality outcome.	Bi-directional cycle facilities on one side of the road require less space on the carriageway and can be more cost-effective. Bi-directional facilities also provide more space for manoeuvring and overtaking within the cycle facility, catering to a wider range of users. Bi-directional facilities may better accommodate rubbish bin collection as they only impact one side of the road, and may	• The risk of an incident at vehicle crossings is double for bi-directional cycleways compared to uni-directional. This can be mitigated through good visibility, appropriate markings and treatments to reduce speeds at conflict points.

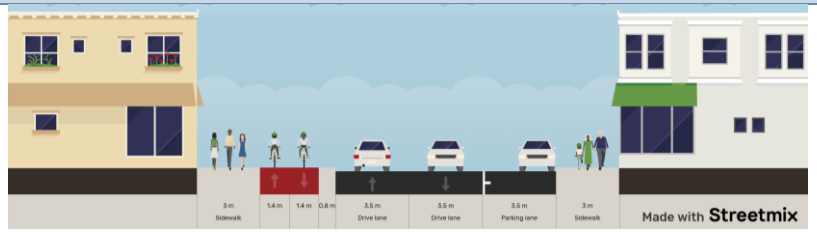
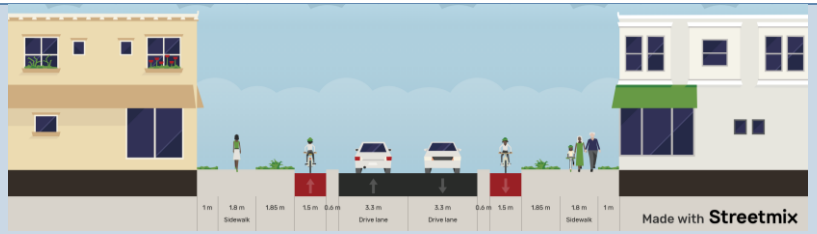
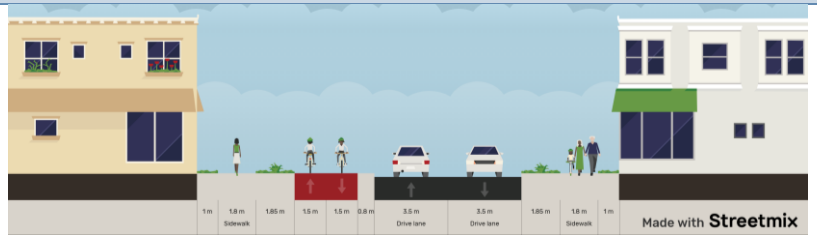
		enable wider buffers.	
Cycle facility surface	Asphalt surfacing for all new cycle facilities Crossfall of 3% or less.	If the existing road surface is in acceptable condition, it will be not be resurfaced as part of the cycle facility install. This includes on chipseal roads, where the existing surface will be accepted as part of cycleway delivery. Where resurfacing is required either as part of cycleway delivery or future maintenance asphalt surfacing is required. Crossfall of 3% or less do not need to be altered in road space reallocation scenarios. Crossfalls of greater than 3% require approval.	• Chipseal is less comfortable and attractive for users, particularly for micromobility users who may opt to continue using the footpath. • Chipseal holds more debris creating further useability issues for users. • Bolting separators to chip seal can create maintenance issues as vehicle strike can damage chip seal and pavement. • Shifts cost of asphalt surfacing to future maintenance activities, including having to remove and reinstall separation. • AT currently does not have a definition of an acceptable chipseal surface for cycling, further work required to develop a standard. • Waka Kotahi may not accept renewals costs to upgrade a street to asphalt due to the presence of a cycleway where traffic volumes are low.
Lighting	Minimum lighting level Px/Mx for cycleways	Street lighting upgrades are excluded from scope. Localised lighting upgrades will only be considered where the cycleway crosses a collector road or above, to improve safety OR if new pedestrian/cycle crossings are added. Reflectivity to be used in key locations to ensure separator and vertical deflection visibility.	• Personal security and minor safety concerns may deter some users from using facility outside of daylight hours. This should be monitored as part of CAM Programme and requirements changed if necessary. • In poorly lit areas, it may be difficult for drivers to see users who are not using bike lights. DSI risk mitigated through low design speed at conflict points. Project teams must work with lighting team to confirm the need for lighting upgrades or changes.
Intersections -		Protected intersections required to align with	• Impact on capacity for other modes (freight/ public transport/ general traffic). This is mitigated through CAM PBC generally

signalised		vision zero. General traffic lanes reduced where necessary to ensure safety for users at these key conflict points. This may be through: combining left turn with through lanes, reducing the number of through lanes, banning right turn movements, or considering limit line setbacks to create additional space for PT and cycleways. No modelling required to enable this reallocation of space and phasing, however a Roads and Streets Framework Assessment and high level assessment / sense check of impacts to traffic flow required to enable impacts to be communicated. Signal phasing must ensure conflicts between traffic and CAM users are avoided, as well as between CAM users and people walking. Shared paths at intersections will only be considered where space reallocation options above are not available AND significant impacts on public transport reliability anticipated AND there is no other space for a separated cycle facility to be delivered within the carriageway. Shared paths at intersections should be considered as a very last resort (and will not be included in the programme level departure). Intersection upgrades for other modes or purposes will not be funded by the CAM PBC	prioritising routes for roadspace reallocation that do not conflict with other strategic modal priorities. Impacts of anticipated policy change, particularly related to emissions reduction, may offset many of these trade-offs. • Potential for more driver aggression towards users on-road rather than in the cycle facility who are perceived to be holding up traffic. • Shared paths at intersections decrease perception of safety and useability for footpath users, such as bus customers and people with visual, mobility and cognitive impairments. Potential to decrease walking mode share where this solution is implemented and further restrict inclusive access to opportunities. • Risk of negative community and stakeholder feedback related to lack of ‘dig once’ approach if final intersection solution not delivered. Delivery timing may be impacted if dependent on co-funding from other programmes where intersection needs to be upgraded for other purposes.

		but may be delivered in parallel.	
Intersections – unsignalised side roads		Separator position used to decrease effective kerb radii/design speed (30km/h or below) at side roads in lieu of vertical deflection. This mitigates DSI risk. In future the safety programme may choose to provide raised platforms across side roads. Standard separator spacings to be developed to enable approval without detailed tracking. Modal filters and turn restrictions considered for safety and efficiency.	• Risk of negative community and stakeholder feedback related to lack of 'dig once' approach if final intersection solution not delivered and due to restricting traffic movements. • Maintenance cost implications if separators often struck by vehicles making tight turns. • Perception of safety concerns may deter some users from using facility where they would prefer a raised platform. User perceptions to be monitored following implementation to understand impacts.
Intersections - other		A protected option for CAM users must be provided through all intersections where the cycleway does not have priority. This may include the need to raise approaches and consider signalisation of crossings e.g. at dual lane roundabouts	•
Cycle facility markings	Cycle symbol markings used to legalise cycle lanes/cycle paths. Green surfacing used where cycling is in priority (e.g. across a side road). Green continuity line marking used at signal controlled intersections.	Green lane marking and cycle symbols as per TDM standards except on chipseal surfaces where greening is only required across collector and above roads.	• Greening and cycle symbol markings on chip seal will wear quickly leading to higher maintenance costs.

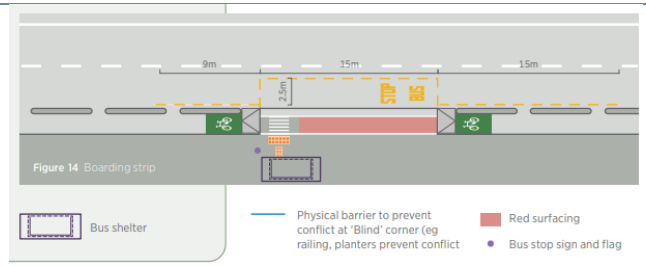
Wayfinding	Wayfinding technical details in TDM wayfinding chapter, not mandated as part of project scope.	Wayfinding required for all cycleways. This should be appropriately scoped up and costed as per the CAM Wayfinding Strategy, currently under development.	• Increases cost of delivery, necessary to maximise uptake. Current cost estimates for wayfinding to be tested through applications to understand highest value components.
Cycle counters	N/A	Capturing of count data is a requirement for all projects before and after installation. Permanent cycle counters must be installed on routes specified on the Cycle Counter Network Plan (under development through the Active Modes Monitoring and Evaluation Framework). If the project does not overlap with a count site identified through the Cycle Counter Network Plan, then temporary / periodic monitoring is acceptable.	• Increases cost of delivery, necessary to track and communicate benefits.

Appendix B: Indicative cross sections of typical corridors with cycle facilities within existing roadway

	Cross section	Configuration and dimensioning
20.12m corridor 14m roadway Uni-directional		• 2 traffic lanes, 1 parking lane • 1.7m uni-directional cycleway with 0.8m buffer • 1.3m cycleway left with 1.2m blockage, resilient
20.12m corridor 14m roadway Bi-directional		• 2 traffic lanes, 1 parking lane • 2.8m uni-directional cycleway with 0.8m buffer • 2.4m cycleway left with 1.2m blockage: resilient
20.12m corridor 10.8m roadway Uni-directional		• 2 traffic lanes • 1.5m uni-directional cycleway with 0.6m buffer • Reduced traffic lanes • 0.9m cycleway left with 1.2m blockage, not resilient
20.12m corridor 10.8m roadway Bi-directional		• 2 traffic lanes • 3.0m bi-directional cycleway with 0.8m buffer • 2.6m cycleway left with 1.2m blockage, resilient

Appendix C: Scope and design requirements for infrastructure and other modes impacted by cycle facilities

Item	Current scope/standard	Proposed minimum inclusions for cycle projects	Trade off / Risk
Resurfacing (roadway)	Expectation is that the entire carriageway is resurfaced if any line making changes are undertaken, to prevent ghosting. Black cold applied plastic (CAP) not accepted as long-term solution, as it wears off over time especially in wheel paths. Line marking is unable to be removed, (water blasted), from chip seal surfacing	Resurfacing not required if centre line does not move and if markings are in un-trafficked areas (e.g. parking ticks). Black CAP appropriate for un-trafficked marking removal, including where marking falls in the new cycleway. Resurfacing not required in trafficked areas or for realigned centreline if mean speed ≤30km/hr. Lower speeds minimise the safety impacts of any 'ghost markings'. Resurfacing required where the centre line moves or line marking changes in trafficked areas AND mean speeds are >30km/hr.	• Skid resistance of black CAP for CAM users to be managed through ensuring appropriate CAP product. • Risk of negative community and stakeholder feedback related to driver perception of safety due to by 'ghost markings' on low speed roads. • Maintenance costs may increase due to black CAP wear in trafficked areas.
Bus stop relocation and upgrades	Bus boarder between the cycleway and the traffic lane. Minimum cycleway width 1.3m (2.3m two-way), minimum bus boarding 1.2m	No bus stop shelter upgrade funded from CAM budget. May be delivered in parallel if investigated and funded by AT Metro. Indented bus stops are expected to be changed to in-lane stops (with no kerb changes). Cycle facility design past bus stop to meet minimum design standard as shown in Figure 14 below of the TDM engineering design code for cycling infrastructure version 1. Testing of lesser design for lower frequency bus routes to be explored.	• Opportunity for improved bus stop amenity forgone. • Obsolete space from indented bays left unfilled may attract illegal vehicle parking (e.g. on Project WAVE) • Stormwater effects to be assessed. New catch pits or kerb drain are likely required and may be costly. • New bus boarders may not be classed as accessible for mobility impaired users due to changes in level.

			
Streetscape upgrades	Generally not included in general Auckland Transport projects, but may be added to projects if requested by Auckland Council or Panuku.	Should streetscaping (e.g. tree planting, seating, footpath upgrades) be desirable in certain locations of high place value this should be explored and funded by third parties (e.g. Auckland Council, Eke Panuku).	• Risk of negative community and stakeholder feedback related to look and feel expectations. • Reduced opportunity to enhance walking environment co-benefits.
Catchpits and other stormwater infrastructure upgrades	Upgrade existing catchpit/cesspit grates to cycle friendly, (now also lockable). No changes to existing stormwater infrastructure unless project increases impervious surface area, or existing lids and assets need to be relocated off the cycleway	Catch pit grates upgraded to be cycle friendly. No changes to existing stormwater infrastructure required. Stormwater effects and consequences not assessed. If stormwater upgrade required this should be investigated and funded through other programmes. Existing service lids and assets approved coatings to be safe from slips where necessary to ensure safe and comfortable cycleway operation.	• Stormwater effects and consequences will not be assessed and therefore there is a risk of flooding on cycle facility during extreme rain events. • Additional maintenance/cleaning may be necessary if cycle facilities flood regularly. • Risk of negative community and stakeholder feedback related to lack of 'dig once' approach if major stormwater upgrade is pushed out to the future. • Excluding stormwater upgrades does not enable projects to consider incorporating evolving innovations in this space that may provide a better cycle facility.
Utility	No changes to existing utilities infrastructure unless	Full road lighting and utility upgrades are excluded from scope as road space reallocation is not	• Risks can be appropriately mitigated through

upgrades	existing lids and assets need to be relocated off the cycleway, (ie No changes to existing stormwater infrastructure unless project increases impervious surface area, or existing lids and assets need to be relocated off the cycleway, (i.e. power poles)	expected to affect utilities. If the service cover is within the cycle facility, these will need approved coatings to be safe from slips. See **Error! Reference source not found.** for lighting requirements for cycleways.	minimum standards specified.
Midblock crossings	Current scope and standards are on a case-by-case basis and based on road hierarchy, traffic/cycle/pedestrian counts, location and proximity to 'other' features.	Existing crossings will not be upgraded as part of the project. However, if the pedestrian refuge island is removed as part of project, the project will provide a safe pedestrian crossing. No new crossings will be added unless required to support the functioning of the CAM facility.	• Risk of negative community and stakeholder feedback related to lack of 'dig once' approach if existing crossings are upgraded in the future. • Missed opportunities to enhance pedestrian LOS.
Addressing existing issues	Existing issues are identified, and attempts are made to include repairs in scope of works with negotiation with Asset Management team(s). However sometimes outcomes are not favourable to project.	Where there are existing infrastructure issues that do not affect cycleway functionality these will not be upgraded as part of this budget e.g. traffic lane surface, (or markings), kerbs, footpaths, pedestrian crossings, pavement condition, drainage improvements. Project teams will, however, engage with other programme owners to identify whether there are opportunities to fund improvements from other programmes in line with a 'dig once' approach.	• Maintenance (or other teams within AT) would need to cover these costs from ongoing budgets.