Draft

Integrated Transport Assessment Guidelines

Auckland Transport

2025

Disclaimer

This document is intended for information only and is designed to support the preparation of Integrated Transport Assessments (ITAs) within the Auckland Region. It does not supersede or replace any existing legislation, statutory requirements, or regulatory frameworks.

The guidance provided herein is offered without prejudice and does not limit the authority of Auckland Transport (AT) or Auckland Council to request additional information or assessments as deemed necessary to evaluate any development or land use change proposal.

Preface

This guide replaces the previous Integrated Transport Assessment (ITA) guidelines prepared by Auckland Transport (AT) in 2015. The guide is aimed at all transport professionals involved in preparing or reviewing ITAs in Auckland. The guide provides advice on preparing ITAs in support of environmental approvals for development or land use change proposals as well as structure plans and plan changes. The guide incorporates current transport planning and engineering best practices with general transport assessment requirements and relevant legislation, including Auckland Council strategic direction (expressed through documents such as the Auckland Unitary Plan (AUP)). The AUP became operative in part in November 2016, after AT's previous ITA guidelines were published.

These guidelines are designed to ensure ITAs deliver better integration between development or land use change proposals, the transport systems, and funding decisions. This integration will result in a proactive assessment of potential or anticipated transport effects which will streamline the review process and help ensure development positively contributes to the growth and wellbeing of Auckland.

The guide provides the starting point for preparing an ITA in terms of the general structure and content, which will vary based on the scale, context, and complexity of the proposal.

AT welcomes feedback on the guidelines and on how they are working in practice. The guidelines will be updated on an ongoing basis to reflect best practice and changes in legislation.

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Purpose and Outcomes

This guidance is for transport and planning professionals preparing or reviewing Integrated Transport Assessments and provides guidance on how to prepare an ITA in the Auckland Region. It offers a framework to assess the effects of land use changes, and development (including subdivision) on the transport network. The aim is to ensure that Auckland Council and Auckland Transport have confidence in the outcomes of development or land use change proposals according to current legislation and policy.

Assessing the proposed land use as well as the transport network is a critical aspect of an integrated transport assessment. Assessing how proposed land uses affect the transport network may lead to recommending changes to either the land use and/or the transport network to improve integration. Land use decisions directly influence travel patterns and demand on the transport network. An ITA can consider land uses that integrate with the existing or future transport which could avoid adverse effects in the first instance before seeking to remedy or mitigate these effects. For example, locating activities of appropriate scale at appropriate locations to the existing transport network i.e., integration, could reduce the need to travel which avoids additional vehicular trips on the network.

Integrated transport assessments play a vital role in evaluating significant development or land use change proposals. These Assessments require a multidisciplinary approach to identify and assess potential effects on the existing and future transport network.

Specific outcomes of an ITA include:

- Assessment of the transport effects of a development or land use change proposal across all modes, including walking, cycling, public transport, freight, and general traffic and ensuring that effects and impacts are managed.
- Integrated land use and transport planning by aligning development proposals with the existing and planned transport network and land use planning.
- Informing decision-making by identifying potential adverse effects and recommending appropriate mitigation, staging, or design responses.
- Where appropriate, enabling and supporting travel choice and accessibility by evaluating how developments can support travel by public transport and active modes.
- Ensure consistency with strategic plans and policies, the AUP) and Auckland Transport's plans (such as Future Connect and the Network Operating Plan).

Statutory and Policy Framework

The relationship between transport and land use regulation involves multiple factors. ITAs are responsible for evaluating a proposal to determine its consistency and interface with relevant transport and land use regulation, strategies, policies, and plans. ITA's should identify direction and outcomes from relevant strategies, policies, plans and guidelines prepared by Auckland Council, Auckland Transport, and/or central government. The most relevant planning legislation in this regard includes the Resource Management Act 1991 (RMA) and the Fast Track Approvals Act 2024 (FTAA).

The RMA governs the use, development, and protection of natural and physical resources in New Zealand. Under section 52(2) of the RMA The National Policy Statement on Urban Development 2020 (NPS-UD) provides a framework for integrated land use and infrastructure planning, which local authorities must give effect to through regional, and district plans which in Auckland's case includes the Future Development Strategy (FDS) and Auckland Unitary Plan (AUP).

The FDS aims to promote integrated, long-term strategic planning to help the Council set a high-level vision for urban growth, achieve well-functioning urban environments, ensure sufficient development capacity, and integrate planning with infrastructure planning and funding.

Within the AUP, the Regional Policy Statement (RPS) sets the overall strategic direction and overarching policies for integrated environmental and resource management. Regional and district plan provisions, along with their rules, are designed to "give effect" to the RPS, meaning they implement the broader objectives and policies established at the RPS level to manage growth, land use, subdivision, and resource issues.

The Auckland Unitary Plan has three key roles:

1. it describes how the people and communities of the Auckland region will manage Auckland's natural and physical resources while enabling growth and development and protecting the things people and communities value,
2. it provides the regulatory framework to help make Auckland a quality place to live, attractive to people and businesses and a place where environmental standards are respected and upheld, and
3. it is a principal statutory planning document for Auckland. Other relevant planning and transport documents include both Central and Local Government strategies, polices and plans (refer to AT website for more information).

The Fast-track Approvals Act 2024 streamlines approvals for infrastructure, housing, and development projects that deliver significant regional or national benefits. Projects may be listed

in the Act or referred by the Minister for Infrastructure. An ITA accompanying a substantive application should be prepared in accordance with these guidelines.

Where it is identified that a development or proposed land-use change is not consistent with these documents, this should be highlighted in the ITA. This is especially important where the proposal is not consistent with the Auckland Council Future Development Strategy (or the timing within this strategy) or the Auckland Transport Network Operating Plan.

When is an ITA Required

Development or land use change proposals that are likely to require an ITA include:

- A Plan Change to support the evaluation report under s32 of the RMA,
- A Notice of Requirement or Outline Plan of Works,
- Major development proposals that have an overall activity status of Discretionary or Non-Complying,
- Proposals that trigger the AUP trip generation threshold or where the AUP states that an ITA is required, such as precinct provisions or designation conditions, or any new activity or change to an existing activity, which is not specifically provided for in the activity tables in the applicable zone or is a non-complying land use activity, and which will generate 100 vehicles or more (any hour)
- Applications under the FTAA where there may be impacts on the transport network,
- Other non-statutory planning processes, where there may be effects on the transport network.

Scoping an ITA

ITAs will vary based on the proposal, complexity, location, and effects. As such, it is not expected that each ITA will follow the same format, content, or depth of assessment. Scoping the ITA is a crucial step in its preparation and can help better define the extent and limitations of an ITA.

The scope of analysis will also depend on the type of proposal an ITA is prepared for as summarised below.

Type of proposal	Typical Considerations
Structure plan	• Final planned land use activities and yields, • Required arterial and collector routes, • Strategic active modes, passenger transport, and freight connectivity and networks required over time, • Potential output: structure plan content.
Plan change	• Demands associated with forecast land use. Identifying the required networks and connectivity required at full build out of the area, and staging of any upgrades, including those required beyond the plan change area, • Demonstrating feasibility of proposed networks to support demands and connectivity between all modes, • Potential output: Precinct plan maps and provisions (includes road classification, function design dimensions,) AUP zones
Notices of Requirement	• Assessment of potential transport effects and mitigation measures for all modes, • Consideration of alternative sites, routes or methods, • Potential output: land designation plan / drawings (level of detail may vary depending on Outline Plan of Works requirements) and designation conditions.
Resource consent	• Analysis of transport effects and measures required to mitigate effects based on AUP provisions (including precinct provisions where relevant), • Matters assessed may include trip generation by mode, access arrangements and operational impacts on existing and future network, • Potential output: specific measures/designs for upgrades and conditions of consent.

The following process is recommended when scoping an ITA:

- Refer to the relevant AUP provisions if relevant to the site or surrounding area. For instance, regional policy statement, overlays, Auckland-wide rules, precinct provisions, designations, etc,
- Determine the scale and extent of the ITA based on the proposal, its location, and the content of the guidelines,
- Determine when and what stakeholder engagement may be required, specifically with stakeholders such as AT, Council or NZTA.,
- Determine what work has already been undertaken in the location. For example, Council has introduced development contributions based on a 30-year horizon in some areas which are underpinned by analysis on the forecast land use and, transport upgrades required over time.

The level of detail and substance of assessment in relation to the following ITA guidance will need to be appropriate and relevant to the type of proposal. This includes how transport elements such as access, parking, staging, trip generation, etc are addressed in line with the above scope considerations.

Early Engagement

Early engagement with Council and relevant stakeholders, such as AT, NZTA Waka Kotahi, KiwiRail, etc., is recommended. This engagement will help to determine the scope, the required level of assessment of the ITA, and highlight potential implementation issues and any fundamental differences of opinion or expectation between an applicant and government stakeholders.

Additional benefits of early engagement include:

- A well-planned approach is enabled through early discussions, ensuring that all stakeholders, including local authorities, road controlling authorities, transport providers, and applicants, are aligned. This collaborative approach can assist with a joint understanding of policy alignment, highlighting any inconsistencies and areas that may require further assessment or alterations, as well as to assist the applicant understand the scope of the ITA.
- Agreeing on the scope of an ITA with stakeholders, especially AT will provide more certainty prior to the full ITA assessment.

- Socialising any proposed mitigation principles and measures with the relevant stakeholders to gauge their effectiveness and the receptiveness of stakeholders to accept these measures. For instance, early discussion with AT regarding any new proposed road infrastructure will indicate AT's acceptance or opposition to the proposal at an early stage.
- Highlighting constraints early in the process that the applicant might not be aware of, which could result in costly delays later in the development process,
- Consistent data source usage will be improved through early engagement. Use of data agreed upon between an applicant and AT will streamline the ITA review process and could avoid the requirement for ITA amendments through further requests for information, including RMA s92 and FTAA s67 requests.
- Early engagement provides opportunities to integrate with other transport investments planned in the vicinity of a proposal.
- Any land requirements to enable mitigation can also be discussed early in the process.
- Iterative development of the transport considerations with the proposed land use and feedback on the appropriateness of the type, location or scale of land use proposed so that amendments can be made to the land use proposal prior to any other assessment being completed which would avoid or minimise re-work. This may be particularly relevant for plan change proposals.

Discussing key underlying ITA assumptions with AT or other stakeholders early in the process could avoid processing delays and requests for information. For instance, trip generation assumptions can be discussed with AT before developing the ITA to assess whether AT can support the assumptions. The recommended channel for engaging with AT for ITA-related feedback for a resource consent is through Council-organised pre-application meeting(s). For Plan Changes or Notices of Requirement, an early scoping exercise with Auckland Transport is recommended, alternatively, AT can be invited to attend pre-lodgement meetings between the applicant and Council.

Preparing an ITA

The level of detail related to the land use mix and density proposed will be different for different processes. An ITA supporting a master planning, structure planning or plan change process may be more coarse and high level, as the process is likely to be focusing on broad concepts and land use zones (residential, commercial, open space etc) without specifying exact types of buildings or businesses within each area. The road hierarchy, public transport routes pedestrian and cycle networks and key infrastructure locations would need to be broadly identified . The ITA would acknowledge physical and environmental constraints and identify key connections and linkages between different parts of the development area and the surrounding context. This may result in modelling and mitigation which is less well defined and high level. An ITA supporting a plan change would need to sufficient detail in order to consider precinct provisions and triggers for infrastructure, further detail may still be expected to be developed to support a resource consent stage.

The ITA should outline the vision and objectives for the development related to transport, connectivity and accessibility, these outcomes should align with the strategic policy and plans for Auckland and may require an iterative process of testing plausible land use scenarios to ensure that the transport outcomes and any mitigation align with those outcomes.

There will be occasions where resource consent applications are received for sites for which an ITA has already been prepared as part of a plan change. In these situations, the ITA for the resource consent should focus on aspects that have since changed (for example scale of development and land use mix, site access, road layout etc) and it's likely that such an ITA will be more succinct. In these situations, early discussions are strongly encouraged to discuss the level of detail expected for the ITA.

It is recommended that an ITA's structure is based on and includes at least the following key sections which are then further elaborated on in the following sections of this guidance:

1. Introduction
2. A section on the transport and land use environment
3. Description of the proposal
4. Transport Assessment
5. Mitigation
6. Conclusion

1. Introduction

An introduction and/or executive summary of the proposal that highlights specific purpose(s) of the ITA should be provided. This section can also include information regarding the initial scoping process of the ITA and indicate what stakeholder consultation has occurred. Additionally, a background section can be included to provide the reader with the site's history and other relevant factors that will be useful for the reader to know.

An introduction section can also provide a high-level overview of the proposal or proposed land use change. This should also refer to the relevant district plan overlays, controls, zones, or precincts for the readers' ease of reference. The intention is to make the reader more familiar with the overall proposal, including transport matters, before reading the rest of the ITA. The degree of detail required will depend on the context and its relevance to decision making.

2. Transport and Land Use Environment

A section describing the site location and including a locality plan provides context for the description of the proposal in section 3. This section should describe the existing and future receiving transport environment in the vicinity of the site and the extent of its potential effects. The "future receiving environment" refers to the expected environment at the time when planned networks and land uses are fully in place.

This should include where relevant a description of the site frontage, road alignments and gradients, speed limits, surrounding land uses, District Plan zoning, any adjacent features such as intersections, footpaths, and crossing facilities, and the presence of other transport infrastructure such as public transport and cycling facilities. This could also include planned and funded future infrastructure projects and the degree of commitment to provide them. The transport environment should be described from the perspective of users of different modes of transport, including:

- Walking,
- Cycling,
- Public Transport,
- Freight and,
- General Vehicles.

As relevant and up-to-date information that reflect the transport environment across various time periods, seasons, and the commuter peak times must be used. Please refer to AT ITA Guidelines website for sources that can be used to inform the existing and future transport environment.

2.1 Land Use Environment

Depending on the type and scale of the proposal, it will be appropriate to include a section on the existing and future surrounding land use environment and how this influences transport considerations. This can include information on relevant existing and likely future activities, destinations, or other land uses for example, schools, hospitals, or shopping centres that could influence users' travel choices or network outcomes.

This section can also include information on existing zoning and land uses, site-specific constraints like topography or wetlands, anticipated growth or known development areas, or relevant title restrictions, such as easements or consent notices.

3. Description of the Proposal

Where applicable provide a detailed description of the development or land use change proposal, ensuring that the reader has all the

information they need to fully understand what is proposed. This should include at least the following main headings:

I. General elements of the proposal,

II. Access and accessibility,

III. Parking,

IV. Staging and sequencing,

V. Construction methodology,

VI. Estimated Trip Generation.

These six points are further discussed individually below.

3.1 General Elements of the Proposal

Provide general information on the proposal, such as:

- Number of dwellings and residents for residential activities,
- Gross Floor Area (GFA) and staff numbers for commercial activities,
- Parking and loading provision, including on-street and off-street parking,
- Hours of operation,
- Details on proposed new zoning(s) for plan change related proposals,
- The AUP reason for resource consent, if applicable,
- Relevant images and figures such as masterplans, area plans, precinct plans etc.

3.2 Design

The Auckland Transport Design Manual (TDM) is a comprehensive set of guides, codes and specifications created for the Auckland region. The TDM provides the design guidance and engineering requirements for the development and delivery of well-designed transport projects and their operation. Design principles are detailed in the TDM and therefore not repeated in the ITA guidelines. To determine if an ITA aligns with the Integrated Transport Assessment Guidelines applicable at the time of application, the design element will be evaluated for compliance with the most current version of the TDM.

Design and construction of transport infrastructure that is to be vested as public road or other Auckland Transport assets is to comply with the Auckland Code of Practice for Land Development and Subdivision – Chapter 1: General Requirements and Chapter 3: Transport.

The purpose of Chapter 3 Transport is to provide minimum standards for developers for the design and construction of new public road assets and of new assets which are to be vested in Auckland Council ownership. In the event that these minimum standards are not achievable, developers shall discuss alternative approaches to development and ownership with Auckland Council. Auckland Council requires that any vested assets are safe to maintain, operate and decommission.

The TDM has three sections:

- **Design Principles** - outlining user-focused outcomes and strategic design intent.
- **Engineering Standards** – detailing technical requirements for infrastructure design.
- **Specifications** - providing construction standards to ensure consistent delivery.

Together, these three sections allow end user outcomes, engineering design and construction requirements to be clearly identified and designed. The manual has been created to be a cascaded principle-based approach that ensures consistency from strategic planning through to detailed design and construction of the outcomes.

The entire manual sets out:

- The design principles and approaches to designing user outcomes.
- How to apply safe design and safe speed requirements to achieve Vision Zero outcomes.
- Design guidance and identification of key transport catchment areas for designing liveable, connected neighbourhoods and town centres, particularly in Greenfields.
- How to build a street from basic elements and how intersections should be designed to support this.

- The detailed engineering requirements to design and construct the facilities necessary for the users identified by the Design Guides.
- The construction specifications required to achieve consistent construction outcomes, including the opportunities to utilise recycled, synthetic and manmade products.

The TDM is a living document that is continually updated to reflect best practice and ensure it remains fit for purpose.

3.2.3 Access Design

The ITA should outline an access strategy that promotes safe, convenient, and efficient access for all transport modes. This strategy should demonstrate how the proposal integrates with the surrounding transport network and supports multi-modal connectivity.

Key considerations include:

- Improving connectivity between the site, surrounding transport networks, and adjacent land uses by designing block patterns and subdivisions that promote active mode connectivity reducing travel distances, specifically for active modes.
- Providing multi-modal access points that support walking, cycling, public transport, and vehicles.
- Demonstrating that each access point will function safely and efficiently, avoiding dangerous or arterial road access where alternatives exist.
- Avoiding significant adverse effects on the adjacent transport network.
- Considering how access points will operate in the future, accounting for anticipated development and associated transport demand.
- Ensuring sufficient land to enable the safe and efficient function of all modes of transport. For example, providing land that can allow for all modes of transport and tracking requirements of larger vehicles.
- Aligning a roading network which can connect to adjacent sites to be developed in future.

3.3 Accessibility

An ITA should include an assessment of inclusive and equitable access to ensure that the transport system works for everyone, regardless of age or ability. This aligns with universal design principles. The following should be considered:

- Ensuring that anyone can travel safely, conveniently, and with dignity, without barriers or unnecessary inconvenience.
- Removing barriers that make the transport system and environment inaccessible for users with temporary or permanent impairments.
- Providing step-free routes, tactile paving, accessible crossings, and appropriate gradients.
- Considering wayfinding, lighting, and safety for people with visual or cognitive impairments.
- Integrating accessible connections to public transport, including stops and shelters.

3.3 Parking

The supply and management of parking can directly impact transport and land use decisions as it affects public transport viability, travel behaviour, mode choice, and subsequently traffic generation. Where relevant an ITA should include information on how parking demand will be managed on or around the development area and identify any likely adverse effects on the road network arising from queuing and offsite parking within nearby roads. This might include proposals to prioritise parking for shared modes like carshare, pricing or time-restricting parking, investment in non-car travel options to reduce parking demand. The ITA should indicate how these management measures, including any within vested roads will be provided and enforced.

The ITA should identify the parking needs of the development or land use change proposal and ensure that this provision is met onsite in order to avoid adverse effects related to spillover parking on public roads.

Any proposed parking provision should be illustrated in a scaled plan in an ITA for a specific development. The location of accessible parking, loading, and electric vehicle charging should be provided in this plan. Parking spaces should be designed so that vehicles can safely manoeuvre within a site. Vehicle tracking diagrams should also be provided to demonstrate manoeuvring works for constrained parking spaces or where reverse manoeuvring is considered dangerous .

An ITA should also include information on the location and design of other parking provisions such as visitor or long-stay bicycle parking spaces, disabled parking provisions, loading spaces, and electric vehicle charging. This is required to ensure that these spaces are fit for purpose.

3.4 Staging and Sequencing

If relevant an ITA must include a section on staging and sequencing to ensure that proposed infrastructure upgrades and other measures that are required to mitigate transport effects are implemented before these effects occur. Staging can also help with infrastructure coordination, financial feasibility and alignment, risk management, and managing transport effects.

The RLTP, NLTP, and LTP can provide insights on the indicative timing of funding for proposed transport projects within the next ten years. They include projects that are Government funded, co-funded between Government and Council or solely Council funded. In some areas further information is available on the indicative timing for proposals and associated funding based on either a 30-year horizon or full build scenario.

The following can also be considered with regard to the staging and sequencing of a development:

- The relevant, effects-based triggers or thresholds for when the required transport mitigation is to be provided should be identified for each defined stage of a proposal. The intention is to ensure that the measures are in place when required,
- The staging of new road connections that enable these connections to be extended into adjoining land/developments if required,
- Whether there is a need for any interim works within the road reserve to ensure the network is safe and connected ahead of the full network and development being in place,
- How the proposal will affect the transport network over time/per phase,
- Whether monitoring is required to confirm underpinning assumptions and forecasts.

The results of the above analysis could be reflected in Precinct plan rules, plan changes, or conditions of consent or funding agreements.

3.5 Construction Traffic and Disruption Management

The ITA should ensure that any potential adverse effects related to construction, earthworks, events, or any disruption from road closures, detours, diversions or temporary changes to the transport network is assessed and effects managed. Particularly where the duration of the works exceeds the permitted duration in the AUP. A draft Construction or Temporary Traffic Management Plan (CTMP/ TMP) should accompany or be included as part of the ITA and should not be regarded as an isolated future process. The level of detail should align with the duration

and adverse effects generated by the proposal. A generic CTMP/TMP condition is not appropriate where significant effects are anticipated.

The following should be considered:

- The scale and duration of any potential disruption which includes detours and displace any existing trips. Transport modelling may be required to allocate and understand detour route and performance of the network and intersections. Diversion routes may not be appropriate for some volumes of traffic such as freight or public transport.
- Possible road pavement damage resulting from proposed high numbers of heavy vehicle movements, such as earthwork or construction vehicles, especially on roads not built to withstand heavy vehicles.
- Public transport routes, or where a public transport route is being diverted. This could increase the costs to operate public transport and reduce reliability and accessibility of public transport.
- Arterial roads, or where arterial roads are being fully or partially closed or diverted, particularly during peak commute hours,
- Where construction or earthwork related heavy vehicles need to reverse manoeuvre in or out of a subject site.
- Whether there are sensitive land uses such as schools or town/city centres that could be affected.
- On freight routes, over-dimensional routes or where these are being diverted, especially if the diversion includes routes that aren't built to cater for higher level of heavy vehicle movements or contain vulnerable land uses such as schools.
- Closures full or in part of any collector or arterial roads or intersections.

3.6 Estimating Trip Generation

3.6.1 Overview and Principles

Accurately forecasting the trip generation of a proposed development is central to evaluating the transport effects of the development on the transport network and for identifying any changes needed to mitigate these effects. The number of trips expected to be generated by the development and the ability of the planned network to accommodate them will also determine the scale of the ITA and the level of analysis required.

Trip generation refers to person-trips, including freight movement, and needs to be established before considering how people travel (mode share) or where (distribution) or when they are travelling. The volume of trips generated by a development is based on a number of factors including the scale and type of land use activity (or activities) included in the development, as well as accessibility and the type of available destinations.

It is highly recommended that the applicant undertake pre-application consultation with Auckland Transport for advice on the trip generation methodology, including rate assumptions and the potential need for transport modelling.

Trip generation and the associated mode-share for a proposed development is an evidence-based estimate. The chosen approach to estimating trip generation and associated mode share will vary on the proposed land use, where it is located, the supporting transport network, the development scale, and the data available. For example, a small residential development, adopting industry standard trip generation rates may be sufficient to form an estimate, whereas for a large-scale development or Plan Change, a first principles approach to trip generation may be more suitable. In all cases, professional judgement must be exercised depending on the nature of the activity and site and the assumptions and methodology used to establish the trip rate and associate mode share used must be documented in the ITA.

For a plan change, the reasonably expected development within the proposed zoning areas should be used to arrive at the estimated trip generation assumption. This should be based on a scenario that assumes all zoned land is fully developed as per the development or land use change proposal. There also needs to be clear information included on the methodology and assumptions used.

The intention is to ensure that the resulting trip generation used for further detailed transport analysis is context-specific and that it is considered as a subset of the overall demand for travel and not in isolation. As such, potential improvements to all modes of transport should be considered within the ITA, including those that would be expected to lower the mode share of private vehicles and resulting vehicular trip generation.

Trip generation rates need to consider that some future planned infrastructure and services (by NZTA or AT) may not be available for some time or may never happen. For example, In the case of passenger transport services, the absence of such assumed service improvements may require assessment of a scenario with increased vehicle trip rates. Where sensitivity testing of scenarios is not provided only planned and funded projects that are likely to happen should be included in the future networks that are assumed to be in place. These need to be agreed prior to undertaking an assessment with the relevant parties.

Trip generation rates also need to consider the future growth and development of that specific proposal and how its surrounding land use development can change over time. For example, early stages of a development might not account for the land use of infrastructural requirements of those stages resulting in a higher trip generation rate until supporting infrastructure and land uses are provided.

For larger land use developments and Plan Changes, or in instances where the receiving transport network is sensitive to change, the impacts of different trip generation estimates should be sensitivity tested.

These matters are elaborated on further in Appendix 1, and it is recommended the full description of trip generation considerations is appraised to guide the assessment.

Key considerations for establishing trip generation

The matters outlined below should be considered with regard to the application of trip generation for a specific development or land use change proposal. These matters are elaborated on further in Appendix 1.

i. Transparency and Relevance of Trip Generation Assumptions

Transparency in trip generation estimation is crucial for robust analysis and future replicability. Transport assessments should clearly document the site context, methodology, time periods, data sources, and assumptions. This includes justification for mode shares, survey site relevance, freight and servicing trips, any adjustment factors, and alignment with strategic policies and place-based objectives.

ii. Trip Timing

Trip generation estimates should include person trips and use local data to reflect all travel modes. Forecasting must cover both the development's peak activity times and the surrounding network's peak traffic periods, with justification for selected timeframes. Seasonal and weekly variations, as well as arrival/departure profiles, can help assess impacts on network performance and inform mitigation needs.

iii. Sources of Trip Generation

Trip generation forecasting relies on various data sources, with the methodology tailored to the development's type, scale and transport network / land use context. Auckland Transport (and if relevant NZTA, or Council) should be consulted during ITA scoping to confirm the appropriate approach and data sources for estimating person and freight trips, especially for significant developments or in instances where an ITA attempts to apply non-standard discounts from trip generation rates. Relevant data sources (and assumptions) must be used. This will help reduce

subsequent requests for additional modelling using alternative scenarios/assumption to those presented.

iv. Adjustments to Trip Estimates

Adjustments to trip estimates may be necessary to reflect factors like travel demand management, internal trips, or evolving travel trends. These adjustments must be supported by robust evidence and should not be applied if relevant factors are already reflected in the assumed "base" trip rates. Older trip rates, especially pre-2020, (or between 2020 and 2022 which might be influenced by Covid 19 travel patterns) should be reviewed for relevance, as assumptions like reduced travel from remote work which may not always result in lower trip generation. Different types of trips must also be considered, for example, linked trips or internalised trips. Acceptance of any adjustments to trip generation estimates will be evaluated on case by case basis.

v. Mode Share and Trip Distribution

Once person-trip generation is forecast for a development, mode share should be assessed based on travel patterns, land use, transport networks, and planned improvements to ensure accurate multimodal trip estimates. This involves using relevant data sources, considering site-specific factors like parking and accessibility, and conducting sensitivity testing for larger developments or where transport networks are sensitive to change. Steps to undertake mode share and trip distribution assessment are provided in Appendix 1.

vi. Land use Characteristics

When assessing a proposed land use, consider whether it serves a local or wider catchment, whether it attracts single or multi-purpose trips, and if nearby activities are within walking distance. Also evaluate the extent to which the land use depends on car travel versus the practicality of using public or active transport modes.

vii. Public Transport Accessibility

When forecasting public transport trips for a development, consider the availability and suitability of nearby Rapid or Frequent services, and whether proposed infrastructure upgrades will improve access and usage. Benchmarking against current built up areas with equivalent passenger transport services can be used to sense check forecasts of patronage. The RLTP can also be referred to for the possibility of future transport services provided by AT. Mode share predictions should account for walking conditions to stops, service capacity, and alignment with Auckland's Regional Public Transport Plan, with adjustments made where public transport access is notably better or worse than average.

viii. Walking and Cycling Accessibility

When estimating walking and cycling mode share, consider the destinations within a feasible walking or cycling distance, the quality and completeness of surrounding infrastructure, and any proposed upgrades or on-site facilities that support active travel. Also factor in the expected user demographics, as different land uses may have varying potential for walking and cycling based on age, mobility, and trip purpose.

ix. Freight and Heavy Vehicle Trips

If a proposed land use is expected to generate significant freight or service vehicle trips, these should be estimated separately using standard industry trip rates and clearly reported in the ITA. Auckland Transport and NZTA should be consulted during scoping to confirm the appropriate freight trip rates to use.

x. Trip Assignment

Once trip numbers by mode and destination have been forecast for peak periods, the next step is trip assignment determining which parts of the transport network those trips will use. This involves matching trip origins and destinations with the most efficient or attractive routes, using tools like the MSM model for large developments, or local data (e.g., traffic counts, public transport access, active mode infrastructure) for smaller ones. Sensitivity testing is recommended for larger developments or where the network is particularly sensitive to change.

4. Transport Assessment

AT supports an assessment hierarchy that directs development and land use change proposals to identify and subsequently manage adverse effects. This approach is also used by AT in its network planning function and response to development and growth. The assessment section of an ITA considers the effects that the proposal is expected to have on the existing and planned transport network. The section should also provide the proposed future transport environment, which includes the proposed measures to manage adverse effects through avoiding, remedying, or mitigating these effects. This could include the vesting of new roads, roading infrastructure, funding agreements, precinct provisions, conditions of consent, consent notices, etc. The assessment section can be based on, but not necessarily limited to, the following considerations:

- Operational Effects on the Transport Network,
- Traffic and Transport Modelling,
- Road User Safety,
- Policy Alignment,
- Climate Effects.

4.1 Operational Effects on the Transport Network

Operational effects on the transport network refer to the impacts that can occur due to a specific development or proposed land use change. These effects are generally caused by an increase in trips or movements generated by a development proposal, as these influence traffic flow, congestion, safety, and the overall efficiency of the transport network. It is important to consider these influences in accordance with the Auckland Transport's Network Plan (Future Connect) and the Auckland Network Operating Plan (ANOP):

Future Connect

- Future Connect acts as the network plan for Auckland's transport system. The Plan identifies the most important parts of the transport network and the most critical issues and opportunities. Future Connect is a consideration that informs the Regional Land Transport Plan, Auckland's 10-year transport investment programme. Please refer to Future Connect on AT's website for more information.

Auckland Network Operating Plan

- The ANOP ensures that Auckland's transport network operates safely and efficiently, and that different transport modes are integrated and appropriately prioritised to move people, goods, and services. The ANOP uses the Future Connect Strategic Network and the Roads and Streets Framework to ensure consistent application of strategic intent across all roads and streets in Auckland. Please refer to the Auckland Network Operating Plan on AT's website for more information.

Any new developments or land use change proposals requiring an ITA should have regard to both these plans and seek to ensure that the outcome of the proposal is consistent with their intent. In line with these plans and in accordance with the RMA, the ITA should identify potential operational effects of the proposal on each individual mode of transport. The ITA must then recommend any measures required to ensure the proposal does not significantly adversely affect the current of planned operation of the strategic transport network or impede AT's ability to deliver key objectives of the network through managing effects.

To assess operational effects, it is recommended that the ITA provide detailed traffic and transport modelling as well as an assessment in accordance with ANOP, AT's ANOP tool is recommended in this regard. AT's recommended modelling requirements and ANOP tool assessment are further discussed in sections 4.1.2 and 4.1.3 below.

4.2 Traffic and Transport Modelling

Detailed modelling of generated travel is likely to be a key component of an ITA to evaluate the potential traffic effects of a proposal. This is particularly the case given the scale of development anticipated by the ITA triggers in the Unitary Plan. The extent of any modelling required will depend on the potential network level of service effects of a proposal. This is discussed further in the next section. In some cases, it may be limited to intersection modelling to confirm the basic form of a new intersection or whether upgrades are required to any existing intersections.

Consideration of the transport effects of the proposal should include construction and the interim years while development is occurring, as well as the final full build-out of the proposed development or land use change as well as the planned development in the area. There may be critical stages during the development where local transport improvements or future planned improvements beyond the applicant's control are required to support ongoing development. These matters should be investigated with appropriate traffic modelling to ensure suitable staging provisions are identified, or to demonstrate that the development is not reliant on these improvements.

The assessment of traffic effects may be an iterative process that tests the effectiveness of infrastructure improvements or changes to the form or scale of the proposed development in response to adverse traffic effects identified in the initial assessment. The results reported in the ITA will summarise the final proposal that has been developed during that process, including the final set of assumptions and the magnitude of effects.

For more complex proposals, it is recommended that the applicant undertake a pre-application with Auckland Transport for advice on the modelling methodology, type of modelling required, etc., and whether modelling would be required. This would be more of a scoping exercise for plan changes. There are instances where the potential effects of a proposal/proposed changes to the network because of trip generation, result in significant safety effects - this is where modelling may not be the next step in the process.

To assist in the review of any modelling work it is important to provide all model input data to confirm how the inputs to any modelling exercises have been derived and used.

4.2.1 Transport Level of Service Assessments

Public transport, walking, cycling LOS

An ITA for a large development should include an assessment of the LOS for public transport, walking, cycling or other modes. A full multi-modal LOS assessment may not be required for some contexts, such as in rural locations with consistent land use zoning, however, the ITA should still address multi-modal LOS internal to the site where relevant.

Some examples of aspects to be included for public transport, walking and cycling LOS assessments include:

- The LOS for public transport services within walking distance of the site. The effects of the proposed development on any public transport LOS (e.g., delays to public transport or increased patronage which may make more services financially viable), including services that are beyond the above walking distance of the site but are within the scope of any traffic network LOS assessment. For greenfield proposals, this should also consider how the network could efficiently and effectively accommodate future bus services,
- The effect of the proposal on the LOS for active modes on relevant roads and major routes to key destinations near the site should be assessed.
- Safety and practicality of designated public transport stops (e.g., bus stops) on the site or the adjacent road reserve,

- Safe walking routes to/from off-site public transport stops or stations,
- Potential diversions of public bus services through the site and how that could improve or detract from the public transport network,
- What key destinations can be reached on public transport services that can be accessed within a 400 m to 1.2 km walk (depending on public transport LOS). The LOS for pedestrians on all adjoining routes to the site, including roads, paths, and at intersections,
- Consider crossing facilities on all adjoining roads and footpaths of suitable width and design. The local speed environment and impact of traffic generated by the proposed development on pedestrian LOS should be assessed at all locations where traffic is being assessed,
- Consideration of the need for any infrastructure provision for micromobility devices, including through movements, crossings, and parking,
- Cumulative effects of other nearby enabled or planned, development (for example, approved plan changes or resource consents that are yet to be developed or that are provided for within approved structure plans or land use zones).

4.2.1.1 General Traffic Network LOS

The modelling requirements for a development or land use change proposal will vary depending on the circumstances involved. Any such traffic modelling should be discussed with AT and, if applicable, NZTA, including the purpose of the modelling and the geographic extent of the model, such that the appropriate modelling tool(s) are used to assess traffic effects.

Depending on the scale and location of a proposal there may be a need to obtain inputs from the Auckland Forecasting Centre's (AFC) transport models, or collaboration with the AFC to run development scenarios transport models.

To understand the implications on the road network, detailed traffic modelling will usually be required. This could include wider traffic network modelling, micro-simulation modelling of a road corridor or localised area of the road network or isolated intersection modelling, in software packages such as SATURN, AIMSUN, PARAMICS, SIDRA Network, or other similarly accepted tools. Any such detailed modelling should be consistent with the regional MSM forecasts, where appropriate, in terms of predicted changes in demands on the wider network and general assumptions.

The appropriate modelling package will depend on the scale of the development and the size and complexity of the road network likely to be used by development traffic. The scale of the area to

be modelled should be agreed with AT and, where appropriate, NZTA. As a general guide, where a development is forecast to increase the traffic demand on a road or intersection by more than 5% on an arterial or a rapid/frequent transit or freight route, or 10% on a collector road, it should be included in the model. Another factor will be the degree to which traffic demand differs from those assumed in any prior modelling exercises.

The assessment of the effects of generated traffic on the surrounding network should consider:

- Cumulative effects of other nearby enabled or planned development (for example, approved plan changes or resource consents that are yet to be developed.
- Safety, capacity, and performance of intersections, and lane capacity at midblock locations. This should reflect the context of the environment. For example, in a dense urban area, vehicle delays at intersections are likely to be more acceptable, provided that this does not have a negative effect on safety, or the walking, cycling, and public transport LOS. In contrast, vehicle LOS in a rural area is likely to be more important, where excessive delays at intersections can lead to negative safety outcomes,
- The assessment should cover the development's forecast peak trip generation times, as well as the traffic network's peak times,
- Any upgrades to the network required to address the effects from a proposal. The need to evaluate road network LOS may not automatically result in a need to upgrade a road network to address poor vehicular LOS, since in brownfields areas in particular this may not be practical.
- Whether excessive queue lengths may present a safety related effect.

4.2.1.2 Freight Network LOS

For developments that could adversely affect freight routes as identified in Future Connect, the ITA should include an assessment of the LOS freight traffic. To assess the impacts of the development on the freight network, consider:

- The guidance covered by the general traffic LOS assessment above,
- The freight classification on the surrounding streets,
- Any key freight hubs nearby, and the method of distribution of freight from these hubs (including linkages to ports or rail freight lines),
- The effects of the proposal on the freight network, including consideration of freight peak hours, long-distance freight movements and local service delivery,

- Developments generating large numbers of freight trips should preferably be well connected to the Strategic Freight Network,
- High freight movements may need to be factored into any general traffic modelling that is undertaken.

4.2.3 Auckland Network Operating Plan Assessment Tool

AT have developed an easy-to-use tool to enable assessments to be made of developments, plans or any other permanent or temporary changes that impact on road users (all modes), to determine whether the impacts align with Auckland Transport's Network Operating Plan (ANOP) and ensure the optimal operation of the network based on the strategic modal significance of the network by location. The ANOP tool can be downloaded from the Auckland Transport website, which includes more comprehensive guidance on how to use it.

The assessment is intended to help identify key issues for the strategic transport network that may require further scrutiny and to ensure that appropriate mitigation options have been considered.

The tool is recommended to be used and provided in ITAs where a development or land use proposal affects or is likely to affect the LOS of one or more modes of transport. The tool includes the following objectives and benefits:

- The tool can help align proposed mitigation with AT's strategic framework for the operation of the network in the ANOP,
- The tool can help assess the impact of multiple interventions across different modes, assisting in finding the most appropriate solution,
- The tool also helps to indicate to what extent a development contributes to increasing or reducing existing or future operational deficiencies or gaps,
- The tool can also illustrate the expected benefits or effects of projects, interventions, or changes to the road corridor. ANOP Assessments that result in positive or moderate alignment with the ANOP give an indication that the project largely aligns with the strategic modal priorities in Future Connect and the Roads and Streets Framework.

AT collects and analyses data on how Aucklanders use our city's road network. This includes existing general traffic LOS information, which is based on average vehicle speed data, this data can be used in the ANOP tool to determine the existing LOS for general vehicles, freight and public transport (if public transport uses the general vehicle lanes). Data on active modes across

Auckland is fragmented and it is recommended that the applicant assess and review the site, its surrounding, and any barriers to walking or cycling on routes to key destinations in order to obtain the existing LOS for walking and cycling.

AT's average speed data can be acquired from AT through early engagement that includes consent pre-application meetings/requests for comments or requested directly. Contact details for requests for data will be provided on the ITA section of the AT website. A request for this data should include the name(s), relevant sections of roads, time of day (AM, PM, Mid-day) and the date range for the data sought.

For potential data sources please refer to section 2.

4.3 Road User Safety

The Auckland Plan and the AUP acknowledge the importance of road safety as a key consideration in regional planning and note the need to manage transport-related effects. AT's recommended method of delivering the safety requirements of the Auckland Plan and AUP is the Safe System Approach. This approach is a holistic way of assessing road safety that considers exposure, likelihood, and severity with a greater focus on system changes. The approach also aims to design roads and associated infrastructure that recognises that humans are vulnerable and make mistakes. To reduce the likelihood of those mistakes leading to death or serious injury, it is recommended that road design be undertaken in accordance with AT's design guidelines.

The AT Urban Street and Road Design Guide, chapter 1, provides guidance on safe systems assessments and designs. ITAs should use this material as a reference to assess a proposal's potential impact on the current and future transport environment from a safety perspective.

The Road Safety section of the ITA should include, but not be limited to, the following assessments elaborated on below.

4.3.1 Sight Distance

A sight distance assessment evaluating visibility should be undertaken for all new or altered vehicle accesses, intersections, pedestrian crossings, or roads with significant horizontal or vertical curves. The assessment must ensure that drivers have a clear view of the road ahead, appropriate to the operating speeds, allowing them to react safely to any obstacles or changes in driving conditions or provide. This assessment should be undertaken in accordance with the Austroads Guide to Road Design Part 4A, as the guide considers multiple variables that are omitted in other guidelines, such as NZTA Waka Kotahi 's 1992 Guidance for visibility at driveways (RTS-6) .

- For intersection visibility, various measures of sight distance from Austroads (sections 2 and 3) are recommended. This would include Approach Sight Distance (ASD), Safe Intersection Sight Distance (SISD), and Minimum Gap Sight Distance (MGSD),
- For visibility to pedestrian crossing points or crossing facilities, both Approach Sight Distance and Crossing Sight Distance standards from Austroads (section 3) are recommended,
- For visibility to cycling facilities at intersections, appropriate intervisibility is recommended. Refer to Practice Note 4: Policy template for details.

For locations where the operating speeds of the sections of road relevant to the sight line assessment are unknown and AT does not have this information, the applicant can provide speed surveys to support their sight distance assessment(s). The methodology for the speed surveys should be agreed upon with AT before surveys are undertaken. It is also important to confirm and factor in any likely changes to current speed limits.

Site visits are recommended when assessing sight distances and incorporating these visits with site photos could help the person reviewing the ITA.

4.3.2 Active Modes Safety

The Safe Systems approach is vital for people travelling outside of vehicles, i.e. walking, cycling or micro-mobility users. These users are especially vulnerable to death and serious injury incidents, especially when vehicle speeds exceed 30km/h. The safety of these road users should be ensured by reviewing the existing active mode network and assessing whether there are any existing or potential future active mode safety concerns because of the proposal. The following matters can help guide this assessment:

- Whether there is opportunity to reduce vehicle access across cycle lanes. any bi-directional cycling lanes or shared path proposals.
- Appropriate intervisibility between vehicles exiting the site and pedestrians crossing the site frontage making use of appropriately sized pedestrian visibility splays. This is applicable to private roads or access lots as well.
- Adequacy of pedestrian crossing facilities. Whether existing facilities are appropriate to cater for increased pedestrian demand or increased traffic, or whether new facilities might be required.
- The security of any routes assessed using a crime prevention through environmental design approach.

4.3.3 Crash History

A review and assessment of the existing crash history in proximity to the site based on the NZTA Waka Kotahi Crash Analysis System for the latest five years must be undertaken within all ITA's and individually for each altered intersections or vehicle accesses. The review and assessment must be done through a safe systems approach by taking a risk-based assessment as opposed to simply assessing the existing individual crashes. The focus of this assessment is to understand why the system failed (if there are crashes identified) and how the system can be made more forgiving to avoid death or serious injuries. This approach should consider the CAS risk maps for an overall view as well as identify if less severe crashes might be more likely to be more severe if the same type of crash occurs in the future, if the development will include changes to the environment and/ or higher trip generation. The conclusion should indicate the overall risk factor, as well as whether there is an existing crash pattern that could be exacerbated by the proposal.

A crash history assessment does not replace the need for a safety assessment for any proposal that increases trip generation or that introduces new or more turning manoeuvres in or out of a site. In this regard, please refer to section 4.3.4 below.

4.3.4 Safety Effects Related to an Increase in Vehicle Trips

Trip generation is a useful tool in establishing potential safety effects of a development or land use change proposal based on the frequency of anticipated vehicle movements.

If a proposal increases the number of trips and is considered to result in a potential adverse safety effect on the transport network, the effects of this increase on user and road safety should be assessed. This assessment could include:

- How additional trips might exacerbate existing safety issues,
- How additional trips impact pedestrian safety at access points,
- Effects of additional turning movements, especially more risky movements, such as right turns, or turns across multiple lanes,
- Whether additional trips can lead to levels of congestion that can increase driver frustration leading to more aggressive driving behaviour.

4.3.5 Safe Systems Audit

A Safe System Audit (SSA) is a technical assessment of transport safety risks associated with transport infrastructure and renewal projects; it includes a Safe System Assessment (SSA) Framework designed to help methodically consider safety system objectives.

It is recommended that any ITA that proposes new road infrastructure investigate whether it is required to provide an SSA for infrastructure that will be vested to AT. In this regard, early engagement with AT can confirm what infrastructure will require an audit, and what may be exempt from requiring an audit, based on the risk profile of the proposed infrastructure.

The SSA should be carried out by an independent, qualified transport specialist engaged by the client (the developer in the instance of an ITA) and provided as part of an ITA. For ITAs, a stage 1 or 2 SSA is generally required to determine that the type of intervention is appropriate and that the design is acceptable. Therefore, a stage 1 or 2 audit can be required during the consent or plan change review process to ensure adequate land is provided for the intervention. The four stages of the SSA are provided below:

Stage 1	Concept Design
Stage 2	Preliminary Design
Stage 3	Detailed Design
Stage 4	Pre-opening or post-construction

For more information on the Safe Systems Approach and Audits (including the audit guidelines), visit the NZTA website. The road safety section of AT's website also provides useful information.

4.4 Transport Network Alignment

It is important that the ITA describe the extent to which the proposal integrates with the existing and future strategic transport networks as well as to planned infrastructure projects in the road corridor. Specific focus should be placed on projects that are planned and funded. In this section, the following should be considered:

- Level of accessibility by all modes, in alignment with Future Connect or other identified strategic priorities and any new strategic and supporting links identified by the proposal.

- Is any proposed mitigation consistent with the strategic function and the expected Levels of Service.
- The effects of any proposed vehicular access points on the road including whether the access could affect the function of AT's strategic network.
- Will the proposal align with Auckland Transport's intentions for delivering planned strategic networks in the future.
- Any deficiencies or gaps previously identified in the strategic networks, and whether upgrades are included within the proposed works, e.g., completion of a missing link in the cycling network.
- Whether the proposal provides the upgrades, connections and roads outlined within any structure or precinct plan, or alternative solutions and the implications of any departures from these plans.
- For plan changes or instances where new collector roads, arterial roads, or other key connections are required a high-level assessment of the feasibility of any proposed route or key connection is required, particularly where they are expected to cross several separately owned properties or the alignment includes constraints.

While the RLTP provides information on some transport projects, information will also be obtainable from NZTA/Waka Kotahi, KiwiRail, AT or Council depending on the project. There may also be situations where the mitigation of transport effects and the operation of a land use development are dependent on a strategic corridor upgrade or significant transport investment, e.g., multi-modal arterial road upgrade. In these instances, there may be an opportunity for the transport agency or provider to work in partnership with the developer to determine and agree on their contribution towards a particular transport project to ensure the mitigation is in place when it is needed. This could involve statutory planning mechanisms (e.g., AUP Precinct Provisions, resource consent conditions, or notices) and/or non-statutory planning mechanisms (e.g., Infrastructure Funding Agreement, Relationship Agreement).

The Future Development Strategy (FDS) provides Auckland-wide direction and integration of the Council group's approach to growth and development, guiding subsequent strategies, operational plans, programmes of work and investment decisions. New capital projects and any growth-related investments will be fully aligned with guiding strategies, such as the Future Development Strategy.

4.5 Climate Adaptation Effects

ITAs should consider climate adaptation in the assessment where relevant to ensure the transport network and road infrastructure remain safe, reliable, functional and resilient under future conditions.

Objective 8 and policy 1(f) of the NPS-UD notes that the New Zealand Urban Environment should be resilient to the current and future effects of climate change. With policy 6(c) noting that planning decisions that affect urban environments should consider the current and future effects of climate change.

In the context of an ITA, this could include understanding the relative level of risk of climate change related hazards impacting on key transport infrastructure and land use proposals e.g. road network resilience to more frequent and intense flood events. The level of risk will inform the need to consider avoidance or mitigation responses particularly where there is dependency on the transport network to service increased transport demands associated with a proposal.

AT recognises that changing climatic conditions will significantly impact the Auckland transport network including AT controlled operations, services, and assets. For developments that include new assets to vest, such as new streets or roads and upgrades to existing transport infrastructure and services, the ITA should evaluate and consider adaptation to the physical impacts of the changing climate as forecast over the life of the asset and reduce the risk and vulnerability of assets exposed to climate change, so that services can continue if disruption occurs.

5. Mitigation Measures

5.1 Principles of Mitigation

The RMA requires adverse effects, to be avoided, remedied or mitigated and the degree to which effects are managed is assessed through the plan change and consent processes. Having assessed the anticipated transport effects of the development through an iterative process, the ITA should identify how effects have been avoided or remediated, and where necessary, what mitigation measures are required to address any impacts on the transport network. Mitigation measures may be needed both within a development area or site, and in the transport, network surrounding the development site or area.

A development in itself may have positive effects such as increasing the mode share and/ or number of trips made by public transport, walking and cycling. Any mitigation measure must be related to the effects of the development and appropriate for the proposed function of the network.

With regard to mitigation AT expects that ITAs will clearly outline:

- What mitigation is proposed. What problem does it solve. What options have been considered, including non-infrastructure options.
- The estimated cost of such mitigation, how it will be funded and constructed.
- When such mitigation is needed, e.g., before construction begins, at a certain level of development/occupation or only with full development, and
- Details regarding mechanics to ensure the delivery of mitigation measures. For example, conditions of consent, designation conditions or precinct provisions.

This will allow the ITA and the planning application to focus on the appropriate triggers, rules, conditions, and assessment criteria that would be included in any decision, but it will also provide information that informs AT future investment.

Where mitigation is identified there should be reasonable certainty around the delivery of the mitigation measures. Limited consideration will generally be given to recommended measures that are not committed to by an applicant, or which rely on uncertain delivery or funding by third parties. Such measures also need to be effective and efficient and reflect the priorities of providers. For example, AT is unlikely to be in a position to fund frequent bus services to serve proposed growth in remote rural settlements.

Measures such as travel demand management measures and passenger transport services may also need to be provided on an ongoing basis for an indefinite duration.

Applicants should refer to the RLTP to determine the transport works planned by AT and the NZTA in any given period. This document is prepared and reviewed every 3 years. Projects listed in the RLTP may be funded by the Council, by NZTA or a mix of funding from both sources, and have a priority for funding, for when that is likely to be available.

A proportionate contribution towards the provision of new networks within greenfield areas will be required to support a development land use change proposal to address direct and cumulative effects relating to connectivity, safety and levels of service across all modes. For example, this could entail upgrading existing urban roads to the required urban standard or providing new intersections and constructing arterial roads, or where relevant at least a collector standard (with AT responsible for any additional width or lanes). This is regardless of whether AT has designated a route to protect the ability to provide it.

If the mitigation measures identified by an ITA are not a listed project in the LTP, it is unlikely that AT will have any funding which can be applied to the project.

In situations where a required project/improvement is not included in the RTLP/LTP, there will generally be three options available where the project is directly required to mitigate the effects of development:

- A direct payment by the applicant to the relevant Transport Agency or Auckland Council amounting to the value of the proposed works (i.e. total project cost including investigation, design, property acquisition and construction costs).
- Construction of the physical works by the applicant, subject to all works being to the satisfaction of the relevant transport agency (AC/AT/ NZTA/ KiwiRail).

This will allow the ITA and the planning application to focus on the appropriate triggers, rules, conditions, and assessment criteria that would be included in any decision, but it will also provide information that informs AT future work budget.

Discussions as to who will be responsible for building and funding infrastructure should be advanced separately with Auckland Transport/Auckland Council. Early engagement on these issues is strongly encouraged, given the lead-in times necessary to change funding priorities and to design and construct transport projects. Applicants should also not assume that development contributions collected will be used to directly fund the mitigation of their proposal. Development contributions are collected by the Council and are based on the Council's (including AT) total spending proposals (net of assumed mitigation works to be undertaken by developers) over the next 10-year period as set out in the LTP, or in some cases a 30-year period. Development contributions only fund a certain portion of the Council's costs over that period. The remainder of

the money must be sourced from rates, loans, and other funders such as NZTA. Accordingly, there is a limit to the extent of new development that can be accommodated under current revenue sources.

If there are stages during the development where specific improvements are required, then these should be identified. Staging development could be a form of mitigation itself; staging could align a development with the network's capacity and development can then subsequently occur when there is capacity. In addition, there may be the option of interim upgrades which deal with the immediate effects. Similarly, if the full development proposal is reliant on future planned infrastructure beyond the control of the applicant, then this should also be identified, along with appropriate staging provisions. Please refer to section 3.4 for more staging and sequencing considerations.

Out of Sequence Development

If development is proposed ahead of and out of sequence with growth outlined in the Auckland Future Development Strategy, there is very likely to be an infrastructure funding gap, with no funding mechanisms in place in the LTP or RLTP. There is a risk of development proceeding without the required suite of supporting infrastructure or that there is a substantial risk that providing infrastructure for development would displace planned investment in other areas where funding is already in place. If the development is out of sequence with the FDS then the applicant should assess the effects and provide an explanation as to how any funding gap is proposed to be addressed by the applicant. This relates mostly capital expenditure costs but may also involve operational expenditure funding for things such as passenger transport services or approaches to manage transport demands supporting the uptake of travel choices. This may require staging of the application or additional funding and financing solutions being put in place by the applicant or an agreement for the applicant to cover all of the necessary capital expenditure and operational expenses until the planned development timeframe. Council may also decline to accept assets proposed to be vested and to provide services.

In summary, considering limitations, mitigation measures that reduce vehicle trip generation through modifying the land use proposal, travel demand management, mode shift, or improving infrastructure for public transport or active modes will be preferable to providing additional capacity beyond that planned for private vehicles on the local road network

Refer to Appendix 3 for additional guidance on what to consider with regard to mitigation measures.

5.2 Presenting Information on Mitigation Measures

The ITA should clearly record the mitigation measures that have been identified and relied upon in the ITA. The associated planning material and assessments need to indicate how these measures have been incorporated into the proposal, resource consent conditions, funding agreements or Plan Change Provisions /NOR conditions

The ITA should include clear conceptual drawings for each physical mitigation measure required to ensure that the feasibility of the measures can be assessed prior to subsequent detailed design stages. This will also assist in identifying the extent of land required for certain measures, as this could be outside the control of the applicant.

The ITA should include an clear and actionable implementation plan. The plan should include, but not be limited to:

- A description of the recommended mitigation measure,
- A specific trigger/timeframe or trigger point for the required mitigation measure,
- The entity which is assumed to be responsible for funding and delivery,
- A description of infrastructure and upgrades to be provided as part of the development.

Precinct plans to rezone land will typically need to define:

- A plan indicating the required network and key connections for each mode,
- The different proposed road types and associated width, elements or functionality (usually contained within a Road Function and required design element table),
- Any standards or requirements around what transport upgrades are required at different stages of development,
- Any supporting monitoring or special information requirements,
- Design information should support key interaction provisions to inform the assessment of subsequent stages of the proposal,
- Any limits on access or requirements relating to travel demand management measures.

Previous ITAs applicable to a site should be considered depending on the degree that the previous ITA is relevant and the new proposal aligns with it.

6. Conclusion

The ITA should include a conclusion section that summarises the key points and findings of the ITA and confirms to what extent the proposal avoids, remedies or mitigates adverse transport-related effects. The following can be considered when drafting a conclusion section.

- Whether the proposal is consistent with national and Auckland Council's strategic direction by aligning with the intent of key planning and transport-related frameworks and policies,
- Whether the proposal aligns with AT documents and standards such as Future Connect and the Network Operating Plan across all modes of transport and promotes an integrated transport network that is less dependent on private vehicle use,
- Identification of any significant departures from the above,
- Whether adverse transport effects are sufficiently avoided, remedied or mitigated, promoting a safe, sustainable and accessible transport network,
- A summary of the recommended measures that are required to mitigate effects,
- Whether the proposal promotes an integrated response between transport and land use that ensures high-quality and sustainable outcomes.

Appendix 1 – Trip Generation

Trip Generation Definitions

- **Trip generation:** the first step in the conventional four-step transport planning and modelling process. Trips are defined as one-way movements of people or goods from one point (origin) to another (destination) by any mode of transport.
- **Person trip:** a one-way movement by one person by any mode of transport. Person trip generation refers to the number of movements of people (person trips) to and from a site.
- **Vehicle trip:** a one-way movement by a single vehicle, such as a car, van, truck, motorcycle etc. Vehicle trip generation refers to the number of vehicle movements to and from a site.
- **Linked trip/multi-leg:** a trip where there are multiple destinations from the origin to the ultimate destination.
- **Unlinked trip:** a direct journey from an origin to a destination with no intermediate stops. For example, a trip from home to work at an office development with no stops.
- **New trip:** a trip that is generated by the development, which would not have been made without the new development.
- **Transferred trip:** a trip already present, accessing comparable sites close to a proposed development, which would now transfer its destination to the new development.
- **Diverted drop-in trip:** a linked trip from an origin to a destination that has made a significant diversion to use the new development.
- **Undiverted drop-in/Pass-by trip:** a linked trip from an origin to a destination that previously passed the development site. These trips are common for sites such as service stations.
- **Internal trip:** one that occurs wholly within the development site, i.e. does not use the external transport network.
- **External trip:** one that occurs outside the development, so utilises and impacts the external transport network.

Transparency of Trip Generation

Transparency of trip generation estimation methodologies is essential to ensure robustness of the analysis and future replicability. The following should be documented when estimating trip generation rates as part of any transport assessment:

- Provide findings from detailed site context analysis, including the key factors influencing travel behaviour.
- A clear methodology for calculating estimates for trip generation rates with justification.
- The chosen time periods for the transport assessment and trip generation estimation are justified with evidence.
- Provide all relevant data and assumptions that have influenced the trip generation estimate, justified with evidence, and highlighting the key factors considered.
- Trip generation data used.
    - Characteristics of survey sites considered and how they relate to the proposed site and activity.
    - Anticipated mode shares, including justification for each mode share, (e.g., walking, cycling, public transport, private vehicles) and vehicle occupancy by mode (e.g., buses, private vehicles).
    - Freight and servicing trips.
    - If applicable, justified trip adjustment factors applied, including any TDM strategies proposed and anticipated impacts.
    - If applicable, alignment of assumptions with strategic policies and place-based visions and objectives.

Trip Timing

Much of the literature and resources commonly used to estimate trip generation focus on vehicle trips and not 'person' trips. We encourage the use of relevant local data where possible to include details around vehicle occupancy, public transport use, cycling, and walking trips in estimates of total trip generation.

For all developments, trip generation should be forecast for the peak trip generating hours of the land use, and the peak traffic hours of the surrounding network. In the context of trip generation, peak periods are defined as the time of the day and /or part of the week when demand for travel

to, from, or around a development is at its highest. Typically, trip generation rates are estimated for the following periods:

- The **peak activity times of the transport network** – traffic volume and public transport patronage data can be used to determine peak transport network use, typically in the morning peak "AM" and evening peak "PM" periods. These peak periods are used to assess the development's impact on the transport system when it is at its busiest, and, where applicable, inform any mitigation required to accommodate new trips on the system.
- The **peak activity time of the proposed development** – this is particularly relevant for developments that will generate the peak number of trips outside of the network peaks, including at weekends.

Appropriate assessment periods should be justified in the context of the proposed development. For example, a proposed retail centre would consider assessing both the weekday AM and PM peak period and the weekend peak period, while a development with mixed or multiple uses may consider several time periods.

Assessment should also identify peak periods during the week and over the year as appropriate. For example, an office might expect higher attendance mid-week due to flexible working policies and lower in-office attendance on Mondays and Fridays. Similarly, a tourist destination may experience the greatest seasonal demand during summer and holiday periods.

The expected arrival and departure profile of a new development is useful in understanding how travel will impact on transport network performance throughout the day. Analysis of the profile may assist with the identification of the peak activity time for the proposed development and assist with the estimation of trip generation. For example, arrivals to schools are typically spread out over an hour at the start of the day, while departures are consolidated over a shorter period at the end of the school day.

Sources of Trip Generation

There are several sources of information to help forecast the trip generation of a development. The appropriate methodology will depend on the type and scale of the proposed development.

Auckland Transport (and NZTA if development traffic is likely to directly affect a State Highway) should be consulted on the proposed method for forecasting trip rates to be used, as part of scoping your ITA.

Typical sources of information to forecast person and freight trips include :

- NZ Trips Database Bureau (TDB),
- Transport for New South Wales (TfNSW) Guide to Transport Impact Assessment, Chapter 5,
- USA Institute of Transportation Engineers (ITE) Trip Generation Manuals,
- Travel to work surveys as recorded during the census (Statistics New Zealand),
- The New Zealand Household Travel Survey (Ministry of Transport),
- NZ Transport Agency research report 453 – trips and parking related to land use,
- United Kingdom National Travel Survey (UK Department of Transport),
- Benchmarking method by actual survey data from similar land uses with similar transport characteristics.

The use of international sources of trip generation must be treated with caution, as travel patterns can be very different in other countries. If relying on international sources, justification of their applicability to the proposed development is required.

Adjustments to Trip Estimates

Depending on the development and location, adjustments to trip generation rates, trip distribution, and mode share may be made to account for a range of factors that may affect trip generation. This includes the effect of proposed Travel Demand Management interventions, reductions to reflect existing, linked, or internal trips, or changing travel trends.

When using older trip generation rates, especially those pre-2020, consider whether the rates remain appropriate for their land use, as more recent changes to travel (such as working from home, home shopping, industrial automation) may impact current and future trip generation.

Any reductions (or increases) and their implications must be reasonable, genuine, and supported by a robust evidence base. For example, hybrid working arrangements may suggest that trip generation rates may be lowered, but in many cases, evidence suggests that the effect of people working from home may not be lower trip generation every day of the week, and there is substantial evidence of hybrid working plus hotdesking resulting in more employees being accommodated per m2 of office space. Simply assuming that working from home will automatically reduce the transport impacts of a development will not be supported without

evidence.

Types of Trips

For many land uses, there may be different trip generations for different trip purposes. For example, a retail development will attract trips by both staff and customers, who will travel at different times, by different modes and to/from different places. These different trip types should be assessed separately and then combined.

Travel Demand Management

Travel demand management can alter people's trip-making behaviour, affecting mode choice, travel time, travel route, or even removing the trip altogether (e.g., working from home). Any proposed adjustments to the trip characteristics must be genuine and based on robust evidence, including consideration of catchment and assessment of any existing and proposed transport infrastructure.

Existing Trips

Where a proposed development will replace an existing land use, the existing trips should be assessed and removed from the network where applicable. Existing trips should be sourced from surveys of the existing development, rather than applying trip generation rates. If surveys cannot be completed, the use of trip generation rates should be adequately justified.

Where a proposed development will be co-located with the same land use, the existing trips may need to be revised to reflect a relationship between competing activities.

Peak Spreading

Where the transport network external to the site is congested, peak spreading may occur. Care should, however, be taken as sources of trip generation rates may already account for such effects. Congested networks can also result in changes in mode share, without affecting the person-trip rate.

Linked Trips

Linked trips are trips that already exist on the network without the development, and adjustments may be made to account for these trips in the assessment. The likely proportion of linked trips can be estimated based on studies of similar land uses. If surveyed data is used to establish trip generation, it is important to understand whether linked trips have already been accounted for.

At a local level, all trips will need to be considered in the operation of the immediate transport network. At a network level, undiverted trips may be discounted for assessment, while new trips

are added to the network flows. Transferred and diverted trips may increase travel demand closer to the development, while reducing trips in other areas of the transport network. This may be accounted for by amending background travel demands where relevant and justified.

Internal Trips

In larger developments, mixed-use developments, or subdivisions, internal trips occur without leaving the site. The internal trip rate should be assessed considering the size, mix, and type of land use proposed, the surrounding land uses, proximity to competing destinations, the expected trip purposes, and existing travel patterns from other similar developments.

The analysis should consider whether the trip generation rates used already account for internal trips, e.g., surveys of large developments may not capture internal trips. Where there are many internal trips forecast, the ITA should assess whether the internal transport network is adequate to support the number of internal trips.

Monitoring may be required where the assessment of internal trips or the level of travel by actives mode relies on assumptions around the future provision of other land uses such as schools, employment, retail, or other service activities.

Mode Share and Trip Distribution

Once the number of person-trips generated by a proposed development is forecast, the share of these trips expected to be made by each transport mode ("mode share") should then be assessed, considering where people are likely to travel from (and to), the land use and transport networks in the area, including any future planned improvements and any improvements proposed as part of the development.

The purpose of mode share forecasting is to ensure that the resulting vehicle, public transport, and active mode trip generation is robust and appropriate to the site and development type so that the ITA can identify any improvement or mitigation needed to enable these trips to be made.

Mode share and trip distribution are closely linked, as the location of each trip origin/destination pair will play a large part in assessing which mode(s) of transport are available, viable and attractive for that trip.

Mode share and trip distribution assessment can be undertaken using the following steps:

- Reference to the industry sources as listed in Section 2,
- Census data (Statistics New Zealand) can show where trips to work and education are

currently occurring, which may be relevant where a similar land use activity is proposed within that census zone. Other census zones that are more reflective of the site's land use characteristics may be able to give an indication of what might occur, provided that transport accessibility is similar,

- If the proposed development has an identified occupant, such as a relocation or the expansion of an existing business, surveys of the existing site can provide information on modes used and where trips come from and go to,
- Determine the expected trip distribution and mode share for the proposed land use type based on existing surveyed data of similar (land use and location) sites,
- Trip distribution is very aligned to land use – for example, the catchment of a new outlet of a fast-food restaurant chain that has multiple stores across Auckland will be determined by the locations of surrounding outlets, while an employment use is likely to attract trips from across the region,
- If no multi-modal surveys are available, surveys of a similar land use or uses, in a similarly accessible location, should be undertaken. Intercept surveys, where people entering or leaving a development are surveyed on their trip origin or destination, mode(s) of travel and trip purpose, are recommended to best identify travel demands,
- Consider if mode share data from other sites is appropriate for the proposed site. Where the provision of public transport, cycling and pedestrian infrastructure around your site is significantly better or worse, it may be necessary to suggest different rates,
- Use the expected mode share to calculate the expected multimodal trip generation for the proposed land use(s),
- Consider if there may be different mode shares at different times of the day, or days of the week.

Auckland Forecasting Centre's Macro Strategic Model (MSM) can provide an indication of mode share for vehicle users and public transport trips and could be used for large-scale developments. If your site has especially good (or poor) public transport or walking and cycling connections, manual adjustments to the MSM forecasts should be made to reflect anticipated higher (or lower) public transport or active mode shares than the standard MSM assumption.

The expected number of private vehicle trips also needs to consider the level of parking proposed to be provided within the development area or site, and the availability of on-street parking in the area, as this will often influence the number of vehicle trips generated. Where car parking is identified as a constraint to private vehicle travel, an assessment of how these trips will be made

by other modes and any further improvements required to support this should be undertaken.

Forecasts of resulting vehicle movements should include the consideration of the number of people in each vehicle, which should be informed by appropriate research applicable to the development type and location.

For larger land use developments and Plan Changes, or in instances where the receiving transport network is sensitive to change, the impacts of different trip mode share and trip distribution assumptions should be subject to sensitivity testing.

Land Use Characteristics

The following should be considered regarding the proposed land use:

- Will the land use be serving a local catchment, or will it draw people from a wider area,
- Will the land use attract single or multi-purpose trips. Will people be undertaking other activities in the vicinity. Will these be within walking distance of the development,
- Are the land uses proposed 'dependent' on car use (for example, bulky goods), or can a significant proportion practicably travel by public transport or active modes.

Public Transport

In terms of trips predicted to use public transport, the following should be considered:

- Is the site served by nearby Rapid or Frequent all-day services. How well do the services provided match with expected travel demands,
- Is the development proposing measures that would increase public transport use further. For example, are new services or upgrades to existing infrastructure proposed. The public transport mode share will be sensitive to walking distances (and the walking environment, e.g., gradients, perceived safety) to public transport stops, the locations served by public transport routes, and frequencies. Proposed changes to these will directly impact the predicted trips,
- Are the current or planned services capable of accommodating the predicted demand. This may result in the need to reach an understanding with AT regarding the feasibility of increased services,
- Refer to Auckland's Regional Public Transport Plan for information on existing and proposed services near your development and maps in Future Connect.

Walking and Cycling

In estimating walking and cycling mode share, the following should be considered:

- Where would people walk or cycle to and from. What other land uses can be accessed within a feasible walking or cycling catchment. The likelihood of people choosing to walk and cycle reduces with their distance from the site, but, depending upon the attractiveness of the development and the safety and convenience of infrastructure provided, the distance can be longer than traditional limits (e.g., 15 minutes) might suggest. The ITA should provide commentary on accessible destinations such as schools, shops, employment opportunities, and medical facilities,
- Are footpath access and appropriate crossing facilities available to support these walking and cycling trips. How safe and convenient are the footpath and cycling network around the site. Is the network complete or are there gaps. Consider the speed environment on roads surrounding the site and its effect on the comfort and safety of walking and cycling. Look at the strategic walking and cycling network maps on Future Connect to see where the development would connect in with the broader network.
- Are any of these measures proposed within the development area, or are upgrades proposed on the perimeter of the development area,
- Are facilities proposed to be provided on site to encourage the use of active modes, e.g., secure cycle parking, lockers, showers,
- What demographic is expected to live/work/study etc. at the development. Some land use activities, such as retirement villages and primary schools, have very different potential for active mode trips due to their differing user demographics, and or may need different infrastructure (e.g., signal-controlled crossings).

Freight and Heavy Vehicle Trips

Where a proposed land use is likely to have a high proportion of freight/service trips, freight/service vehicle trips should be estimated separately using standard industry trip rates and reported in the ITA. Some land uses (e.g., warehousing or quarrying) will have unique heavy vehicle trip generation.

Auckland Transport and NZTA should be consulted on the freight trip rates that are proposed to be used as part of the scoping exercise.

Look at the strategic freight network maps in Future Connect, to see how the development could connect into the broader network.

Trip Assignment

At this stage, the number of trips predicted to travel to or from the development by each travel mode, and where they are travelling from, or to, for the appropriate peak periods, will have been established.

The next task is to determine which parts of the transport network the trips will use, known as trip assignment. The key consideration in assigning trips is combining where these trips are likely to originate from, or are destined for, with the roads or public transport services that are the quickest or most attractive for that trip.

The MSM model can be used to help identify the trip assignment for large-scale developments.

For smaller developments, the following information can assist in forecasting where generated trips are likely to travel.

- Traffic counts on the adjacent road network can help identify the main traffic routes, which can help indicate the most likely roads to be used by generated traffic,
- Public transport trips can be assumed to use the nearest bus stop or station, but if a further stop or station offers more frequent services or better connections, this should be considered,
- Walking and cycling trips should be assigned to the network considering their origin/destination, and the quality of the active mode infrastructure,
- The likely routes to be undertaken by heavy traffic/freight movements should also be assessed

For larger land use developments and Plan Changes, or in instances where the receiving transport network is sensitive to change, the impacts of different trip assignments should be sensitivity tested.

Appendix 2 – Potential Network Performance Data sources

- Auckland Transport Data sources that include cycling and public transport usage data.
- Auckland Transport Open GIS includes AT infrastructure projects and traffic counts.
- Auckland Council Open Data, which includes Auckland growth scenarios, speed data, and other planning-related data.
- Contacting the AT developmentplanning@at.govt.nz inbox to request abridged information regarding AT speed data and relating road corridor LOS data.
- Governmental data sources, which include Auckland Transport data such as road closures, AT projects, traffic counts, speed limits, etc.
- Surveys of existing sites with similar land use/development proposals.
- Site observations.
- Pre-application meetings or requests for comments with AT.

Appendix 3 - Mitigation Measures – What to Consider

The below provides guidance on what can be considered with regard to providing mitigation measures (as relevant):

- Changes that have been made to the location, use, design, and intensity or mix of land use, so that the site or development area is more aligned with the existing or planned transport networks in the area,
- Are new bus services required to support the proposal and does this align with existing services or possible future services as per the RPTP,
- Does parking provision, design, and time restrictions align with the needs of the proposal, the area and AT's parking strategy,
- Wider and/or new footpaths or upgraded crossing points for pedestrians and cyclists at key points proposed both within and external to the development area,
- End-of-trip cycle facilities for both visitors and staff proposed, which are secure, weather sheltered and include facilities such as lockers and changing rooms. If offered as mitigation, these should exceed the rates specified in the AUP,
- Are dedicated cycle facilities or shared path facilities required to support the proposal,
- Are bus priority measures, bus lanes or High Occupancy Vehicle or Transit lanes required,
- Will public transport stop and infrastructure (e.g., real-time signage) be upgraded,
- Are there provisions for shared or remote parking and car-pooling,
- Do existing intersections need to be upgraded to ensure adequate capacity (ensuring that provision is made for all travel modes),
- Do existing public roads surrounding the development area need to be upgraded to provide satisfactory LOS for pedestrians, cyclists, and general traffic,
- Will the development create impacts and greater operation and maintenance costs on existing transport assets in the vicinity, and should the applicant provide mitigation for such impacts.

Mitigation measures provided should not preclude future mitigation or upgrades. For examples, intersection upgrades should be designed to future proof proposed upgrades such as a planned cycle-lane. Mitigation measures are also expected to be free standing, for example if a developer builds a road that requires land from an adjacent future development the road should be able to function on its own in the interim, which will include a design to AT's standard.