

Entered by Board Secretary

Road Assessment and Maintenance Management Extension and Asset Management Roadmap

For decision: For noting:

Reason for inclusion in closed board meeting session	
1. Please state why this report is being considered in the closed board meeting as opposed to the open board meeting. Please refer to the 'reasons for confidentiality' and provide a direct reference to one of these reasons.	Commercially sensitive content
2. Please provide an estimated date for release of this report.	Not for release

Ngā tūhonga / Recommendations

That the Design and Delivery Committee (committee):

- a) Recommends that the Auckland Transport (AT) Board (board) approve a five-year extension to the Road Assessment and Maintenance Management (RAMM) technology solution contract with Thinkproject at a cost of \$2.5 million.
- b) Note the updated roadmap for Asset Management.
- c) Recommends that the board delegate authority to the Chief Executive to sign the final contract variation documentation.

Te whakarāpopototanga matua / Executive summary

1. Previously AT went to market to replace the RAMM software. The basis of that was to investigate the market for a replacement, given the risk of proprietary nature associated and single private owner with the then ownership of RAMM. It was also to deliver a holistic single system for AT asset management. The project did not deliver an alternative. In the meantime, RAMM software was sold to Thinkproject, a large asset software company based in Europe, and has been reinvigorated with lifecycle management and future roadmaps to develop the RAMM software.
2. AT is using RAMM software to support the Asset Management functions for roading assets and for other assets within the road space, i.e., Passenger Information Display signs.

Entered by Board Secretary

3. RAMM is extensively used by Road Controlling Authorities within New Zealand, including all Local Government Councils, Waka Kotahi New Zealand Transport Agency (Waka Kotahi) and all road maintenance suppliers. Worldwide, over 120 Local Governments in New Zealand and Australia, as well as the Fiji Roads Authority in Fiji, use RAMM to support asset management.
4. The AT RAMM software maintenance contract is due to expire on 30 June 2023. Given the term and value, board approval is required to extend this contract under AT's delegations manual. AT is renegotiating the terms of the current agreement and seeking approval for a new term of five years at a cost to AT of \$2.5 million.
5. The RAMM software was acquired by Thinkproject, a German construction and engineering software provider in April 2020. Thinkproject have commenced producing a product roadmap to continue developing the RAMM software while also being able to leverage Thinkproject's suite of associated software solutions to meet the needs of AT and its existing customers.
6. There is a good understanding of the respective obligations of both AT and Thinkproject under the existing contract, however AT is seeking to build on this to secure additional benefits and functionality for AT by agreeing the prioritisation of that functionality within RAMM to cover other asset classes not currently included on Thinkproject's technology roadmap, and seeking to secure dedicated Thinkproject resourcing to support this product development.
7. Continuation of the RAMM software aligns partners such as with Waka Kotahi and means that third party providers to both organisations will use the same software.
8. The Chief Engineer, Asset Management, and Business Technology teams have been working together to establish an Asset Management Technology, Data and Standards (AMTDS) roadmap for AT.
9. The AMTDS initiative is in alignment with the board's adoption of a revised Asset Management Policy (September 2022) which includes all key elements of ISO55001 as part of its asset management practice standards, and calls for AT to establish, implement, maintain, and continually improve its Asset Management System (AMS) capabilities.

Ngā tuhinga ō mua / Previous deliberations

10. There have been no previous deliberations by the board for a renewal of the RAMM software.

Te horopaki me te tīaroaro rautaki / Context and strategic alignment

11. The current contract with Thinkproject for RAMM support and maintenance expires on 30 June 2023.
12. The RAMM software is New Zealand's primary Asset Management Information System (AMIS). It is used by all of New Zealand's Local and Regional Councils and Rooding Authorities, including Waka Kotahi. RAMM forms the basis for Waka Kotahi's assessing and allocating funding. RAMM is also used extensively across the wider asset management and operations ecosystem and community in New Zealand

Entered by Board Secretary

including engineering consulting companies and maintenance contractors. The scope of assets currently managed in RAMM are extensive, spanning Transport Network and Road Corridor Assets and Structures including at a high-level the following classes below. This amounts to 80% of AT's assets.

- a. Transport Network and Corridor:
 - Road Network and Carriageway Topology
 - Pavement and Surface Assets
 - Stormwater (Drainage)
 - Road Barriers and Fencing
 - Footpaths and Cycleways
 - Street Lighting
 - Traffic Systems, Signals, and Surveillance Devices
 - Road Signs
 - Road Markings
 - Amenities and Street Furniture
 - On-Street AT Grade Car Parks
- b. Transport Structures:
 - Bridges
 - Major Culverts
 - Minor Structures
 - Retaining Walls and Sea Walls
 - Tunnels and Underpasses

13. The remaining 20% of AT's assets are managed via other software. These assets include Public Transport Facilities assets (such as bus and rail stations, depots, bus fleet and rail rolling stock) and Intelligent Transport Systems (ITS) assets (such as closed-circuit television (CCTV) cameras and dynamic lanes). Work is currently underway to understand if the latest version of the RAMM software can manage these assets, which aligns with the aspirations of the Enterprise Asset Management (EAM) project to have one system to manage all of AT's assets.

14. The AMTDS is also aligned to AT's strategic context including the diversity of its asset portfolio, operations, and services, as well as initiatives being driven nationally by Waka Kotahi, and ongoing consideration for Architecture, Construction, and Engineering (ACE) industry innovation both locally and internationally. This includes, for example, the adoption of digital engineering practices, standards, and technology.

15. The purpose of the AMTDS is to facilitate a cross-departmental partnership, and provides:

- a. A working document outlining AT's strategic and operational asset management context and scope, including a summary of key definitions, principles, priorities, and supporting reference models as input into governing the AMTDS' roadmap over the next 5 years

Entered by Board Secretary

- and beyond, as part of creating a common understanding of AT's asset management eco-system and related challenges and considerations as part of ongoing decision making.
- b. A framework that provides a consolidated view of inflight and future asset management related milestones, challenges, opportunities, and initiatives across AT. Also included is the development of an 'industry-aligned' framework of AMS capabilities to support current state assessment of priorities and forms the basis for framing any future AMS related requirements.
 - c. A delivery roadmap moving forwards for the next 5 years and beyond that leverages, improves, and advances current AT technology capabilities, while at the same time addresses opportunities through innovation and emerging technologies. This part of the roadmap is still being formed.

Ngā matapakinga me ngā tātaritanga / Discussion and analysis

16. The work carried out for AT by Thinkproject is exclusively for New Zealand.
17. The AMTDS work completed to date has already provided several benefits including:
 - a. Facilitated teams across Asset Management, Operations, and Technology to work more closely together. This has also included significant contributions from various team members as part of documenting AT's asset management related intellectual property to create a common understanding of AT's asset management eco-system, as well as identifying important principles and considerations as part of future decision making and prioritisation of asset management related requirements and capabilities.
 - b. Creating greater awareness and visibility across the teams of various interrelated activities and tasks currently underway, as well as future opportunities and / or issues that need to be addressed.
 - c. Creating visibility of several important 'macro' initiatives driven by other agencies that impact AT and will require planning and preparation for. For example:
 - o Resource management reform: the Spatial Planning Act
 - o Three Waters Transition: Auckland and Northern (AT Urban and Rural Drainage / Stormwater Asset Management)
 - o Waka Kotahi Asset Management Data Standards (AMDS) Adoption and Rollout for Auckland Region Roading Assets and the rest of New Zealand
 - o Waka Kotahi Multi-Mode Network Model (MNM) Development and Rollout – Roading, Cycleways, Public Transport
 - o Waka Kotahi Common Data Contracts Rollout
18. In summary, the AMTDS roadmap recognises that RAMM forms a core and important role as AT's primary asset management platform moving forwards. AT has seen significant changes over the last 24 months in terms of positive improvements to RAMM's ongoing roadmap since the change of ownership to Thinkproject. Furthermore, Waka Kotahi, as one of AT's significant funding sources, continues to work closely with RAMM as part of the rollout of the national AMDS for New Zealand. AT is scheduled for adoption during 2024.

Entered by Board Secretary

19. With the renewal of the RAMM software, the immediate current and planned high level areas of focus that this will enable are:
- a. Waka Kotahi Asset Management Data Standards (AMDS) Adoption and Rollout for AT preparation and pilots have already commenced.
 - b. Improvements being worked though functionally and in terms of data in the area of the Transport Network Structures portfolio i.e., Bridges, Major Culverts, Retaining Walls etc.
 - c. Focus on data quality improvements across roading network.
 - d. Potentially accommodating Facilities Assets in RAMM.

Ngā tūraru matua / Key risks and mitigations

Key risk	Mitigation
There is a risk that the planned developments in the Thinkproject roadmap do not come to fruition.	To mitigate this risk, AT will include contract reporting against product roadmap features. AT also intends on seeking agreement (non-binding) as to what items from AT's priority list are expected to be delivered and when. AT has also been represented on Thinkproject's customer advisory board.

Ngā ritenga-ā-pūtea me ngā rauemi / Financial and resource impacts

20. The RAMM software costs are budgeted for in the 2023/2024 fiscal year, in the Auckland Long Term Plan, and the Regional Land Transport Plan. Budgets for subsequent years will be agreed as part of the annual budgeting process.

Ngā whaiwhakaaro ō te taiao me te panonitanga o te āhuarangi / Environment and climate change considerations

21. There are no direct environmental or climate change impacts.

Entered by Board Secretary

Ngā whakaaweawe me ngā whakaaro / Impacts and perspectives

Mana whenua

22. There are no direct mana whenua impacts related to the contract extension request.

Ngā mema pōti / Elected members

23. There are no direct, elected member impacts related to the contract extension request.

Ngā rōpū kei raro i te Kaunihera / Council Controlled Organisations

24. There are no direct Council Controlled Organisation impacts related to the contract extension request.

25. Discussions will be required with group shared services to see if AT's asset management can be extended to cover the wider council assets in due course.

Ngā kiritaki / Customers

26. There are no direct customer or community impacts related to the contract extension request.

Ngā whaiwhakaaro haumarū me ngā whaiwhakaaro hauora / Health, safety and wellbeing considerations

27. There are no direct health, safety and wellbeing impacts.

Ā muri ake nei / Next steps

28. The next steps are for AT to provide notice to Thinkproject of its decision to extend the contract, and to execute the relevant contract variation documentation.

Te whakapiringa / Attachment

Attachment number	Description
1	Asset Management Technology, Data & Standards (AMTDS) Roadmap

Entered by Board Secretary

Te pou whenua tuhinga / Document ownership

Submitted by	Chris Creighton Group Manager Digital and Technology Delivery
Submitted by	Myles Lind Group Manager Chief Engineer and Asset Management (Acting)
Submitted by	Andy Richards Group Manager Procurement
Recommended by	Roger Jones Executive General Manager Business Technology
Approved for submission	Dean Kimpton Chief Executive



Auckland Transport

Asset Management Technology, Data & Standards (AMTDS) Roadmap

The following provides a summary of Auckland Transport's **Asset Management Technology, Data & Standards (AMTDS)** Roadmap. Its purpose is to facilitate a cross department partnership providing a working document outlining AT's strategic and operational asset management context and scope, including a summary of key definitions, principles, priorities and supporting reference models as input into governing the AMTDS roadmap.

- 1 Introduction & Approach
- 2 Key Definitions & Scope
- 3 Key Priorities & Timelines
- 4 Reference Models: Asset Data & AT AMIS Landscape
- 5 AMTDS Roadmap



Sponsors : Myles Lind
Chris Crieghton

Date: 23/02/2023



SECTION 1

AT AMTDS Roadmap Summary

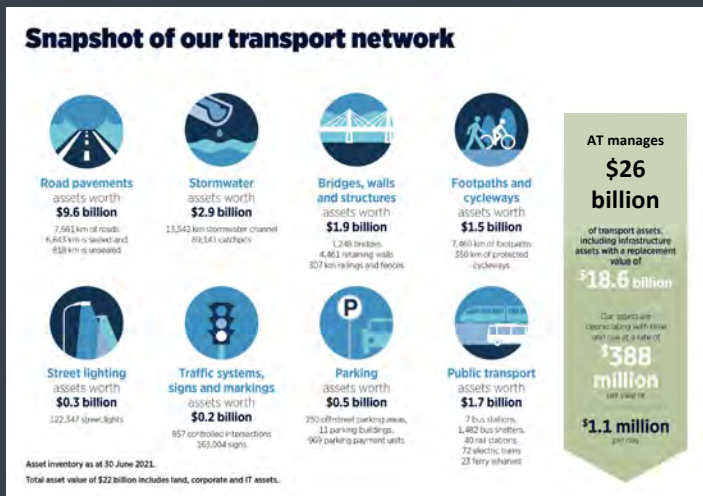
The following section provides a summary report of the Auckland Transport **Asset Management Technology, Data & Standards** (AMTDS) roadmap that has been completed. This includes providing a summary of the scope and approach taken, an overview of key business reference models developed, and a summary of key observations, findings, considerations and recommendations.



Introduction AMTDS Roadmap



STRATEGIC CONTEXT



Auckland Transport (AT) is responsible for the planning, delivery, operation, and management of the Auckland Region’s publicly owned Transport Assets spanning Roding Infrastructure and Facilities worth **\$26 billion**. Roding maintenance spend is in excess of \$1 million per day for example.

BACKGROUND

Asset Management (AM) is the coordinated activities of an organisation to realise value from assets. It translates an organisation’s objectives into asset related decisions, plans and activities, using a risk-based approach. (ISO55000:2014)

Subsequently AT follows national and international best practice as part of its continuing investment in transport asset management activities to ensure the ongoing optimized delivery, operation, maintenance and renewal of assets to achieve a level of service that aligns with the outcomes the community requires.

On this basis AT’s current Asset Management Plan (AMP 2021) is focused on addressing the following **4 key challenges**:



AMTDS PURPOSE

Integrated asset management technology, systems, and data related capabilities underpinned by aligned standards form a key enabler towards achieving robust evidence-based optimized Enterprise Asset Management & Operations.

In line with AT’s strategic, operational and regulatory AM mandate, the **Asset Management Technology, Data & Standards (AMTDS) Roadmap & Programme** is focused on the planning and delivery of initiatives that enable the continuous enhancement of AT’s AM activities and practices as part of progressively maturing the management and operation of its Facility and Roding Infrastructure assets as required by AT’s AM Policy and the International Standard ISO 55001 – Asset Management.

DEFINITION & SCOPE

Asset Management System (AMS) - the overall interrelated and interacting set of organizational elements and capabilities that includes

- **AM Policy, Strategy and Plans;**
- **People, Processes and Practices;**
- **Technology (systems and tools), Information, and Standards**

that enable an organisation to achieve its goals and objectives toward effectively optimizing, managing and operating the end-to-end lifecycle of its Assets and their performance.

See Defining AMS and AMIS further on.



APPROACH:

AMTDS PROGRAMME



This document outlines the 3-to-5-year roadmap for AT's AMTDS Programme within the context of leveraging, improving and extending its current portfolio of AM Systems, Tools and Datasets. This includes defining the scope, principles and supporting reference models required to provide context to the AMTDS roadmap and programme.

The objective of the roadmap is threefold:

1. Identify the aspects of AT asset management business needs that relate to the AMTDS programme scope (demand).
2. Outline the high-level AMTDS items that the programme is required to deliver progressively over the duration of the roadmap (supply).
3. Inform alignment and traceability between AT business needs and AMTDS programme delivery (alignment).

AMTDS ROADMAP STRUCTURE & APPROACH



DOMAINS & CAPABILITIES

- **AD01 - Asset Strategy & Policy**
- **AD02 - Asset Requirements & Lifecycle**
(Capacity & Demand, Criticality, Risk & Resilience, Performance & Condition, Deterioration)
- **AD03 - Asset Investment Planning**
(Capital & Renewal Forecast Modeling, RFWP, MFWP)
- **AD04 - Asset Financial Planning**
(Asset Life-cycle Cost, Valuation, Depreciation & Replacement Cost, Long-term Financial Forecast, AMP)
- **AD05 - Asset Creation, Replacement & Disposal**
- **AD06 - Asset Acquisition & Handover**
- **AD07 - Asset Operations & Maintenance**
- **AD08 - Asset Monitoring**
- **AD09 - AM Technology, Data, & Standards (AMTDS)**

CURRENT CORE SYSTEMS

ROADING	RAMM	3rd Party Systems
	dTims	
	Street Light Vision	
	TCP; CAS; Other	
FACILITIES	FM Fix-it	
	SPM Assets	
	Maximo (External)	
CORPORATE	GIS	
	EDW	
	Fulcrum+	
	Edison 365	
	SAP Financials	
	CRM	

See Reference Model: AT AMS Landscape

ASSET SCOPE

- **ROAD CORRIDOR INFRASTRUCTURE:**
 - Road Network
 - Road Pavement & Surface
 - Stormwater (Drainage)
 - Bridges, Walls, Structures
 - Footpaths & Cycleways
 - Street Lighting
 - Traffic Systems, Signs and Markings
 - Amenities & Street Furniture
- **PUBLIC TRANSPORT (PT) FACILITIES:**
 - Bus, Rail, Marine, Air
 - Parking & Other
- **INTELLIGENT TRANSPORT SYSTEMS (ITS)**



ASSET INFORMATION SCOPE

- Asset Inventory & Classification
- Asset Component Data
- Asset Network, Location & Spatial Data
- Asset Function & Use Data
- Asset Performance & Condition Data
- Asset Maintenance Data
- Asset Modeling, Analysis & Forward Planning
- 2D/3D Drawings, BIM Models, Documents & Files

See Reference Model: Asset Data Scope

INTER-PROGRAMME DEPENDENCIES

- **CCDC** - Led by Waka Kotahi (NZTA), our co-funder, from 2024 the new regional consistent condition data contract (CCDC) commences. This will significantly increase the quantity and quality of roading condition data needed to be entered and stored in the roading AMS
- **AMDS** - The asset management data standard is a Waka Kotahi (NZTA) led project to have all roading authorities in Aotearoa using a common data standard for roading asset management functions. The standard is a requirement of future funding to AT under the Land Transport management Act. AT is programmed for implementation between July and December 2025, however considerable prep work is required prior to this date.

KEY SOURCES

- Waka Kotahi set requirements of AT in relation to infrastructure management and co-funder confidence.
- AT Enterprise Asset Management Processes and Systems Project Business Case
- AT 2021 Asset Management Plan (AMP)

OTHER INPUTS

- Annual Waka Kotahi Technical Audits (May)
- Annual REG Asset Management Data Quality Reports (Sept)
- Annual Asset Management Maturity Assessments (April)
- Annual Programme Completion Reports (Sept)
- Internal AT Audit Recommendations
- Land transport peers



ASSET MANAGEMENT SYSTEM (AMS):

KEY DEFINITIONS & SCOPE

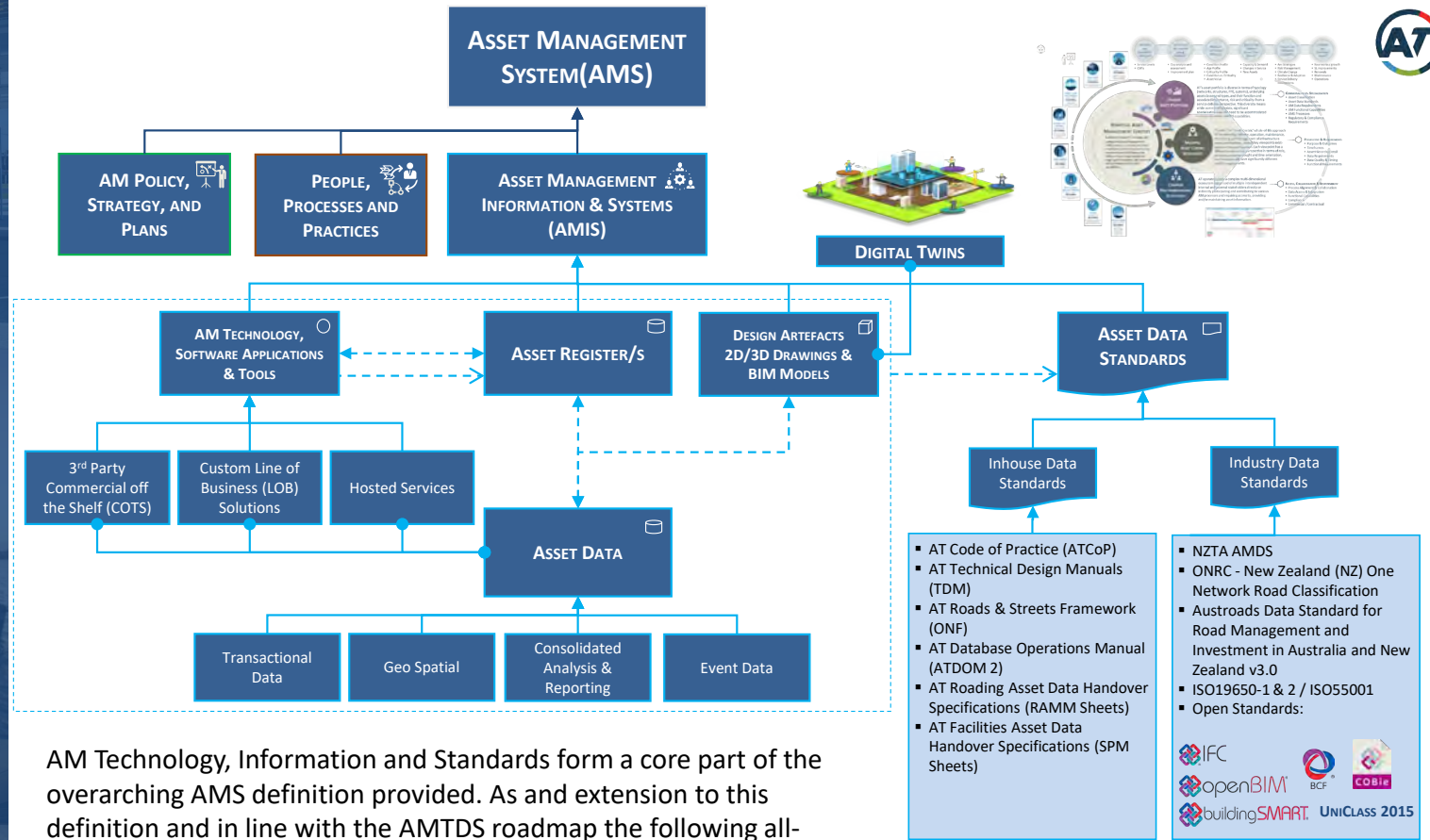
It is common in the Civil Infrastructure, Plant and Facilities Asset Management domains to use terms such as Asset Management System (AMS) and/or Asset Management Information System (AMIS) interchangeably. However, depending on organizational viewpoint there are potentially several different definitions and interpretations of what these terms mean as far as scope and operational implementation is concerned.

For the purposes of the AMTDS Roadmap:

Asset Management System (AMS) - the overall interrelated and interacting set of organizational elements and capabilities that includes:

- AM Policy, Strategy and Plans;
- People, Processes and Practices;
- Technology (systems and tools), Information, and Standards

that enable an organisation to achieve its goals and objectives toward effectively optimizing, managing and operating the end-to-end lifecycle of its Assets and their performance.



AM Technology, Information and Standards form a core part of the overarching AMS definition provided. As an extension to this definition and in line with the AMTDS roadmap the following all-encompassing definition applies:

Asset Management Information & Systems (AMIS) – the overall portfolio of ‘integrated’ Asset Management (AM) technology capabilities including software applications, tools and systems; structured and unstructured information and data; and associated standards, specifications, processes and practices that support and enable organisations to strategically plan, design, build/acquire, operate, maintain and improve their assets as part of the end-to-end asset lifecycle.

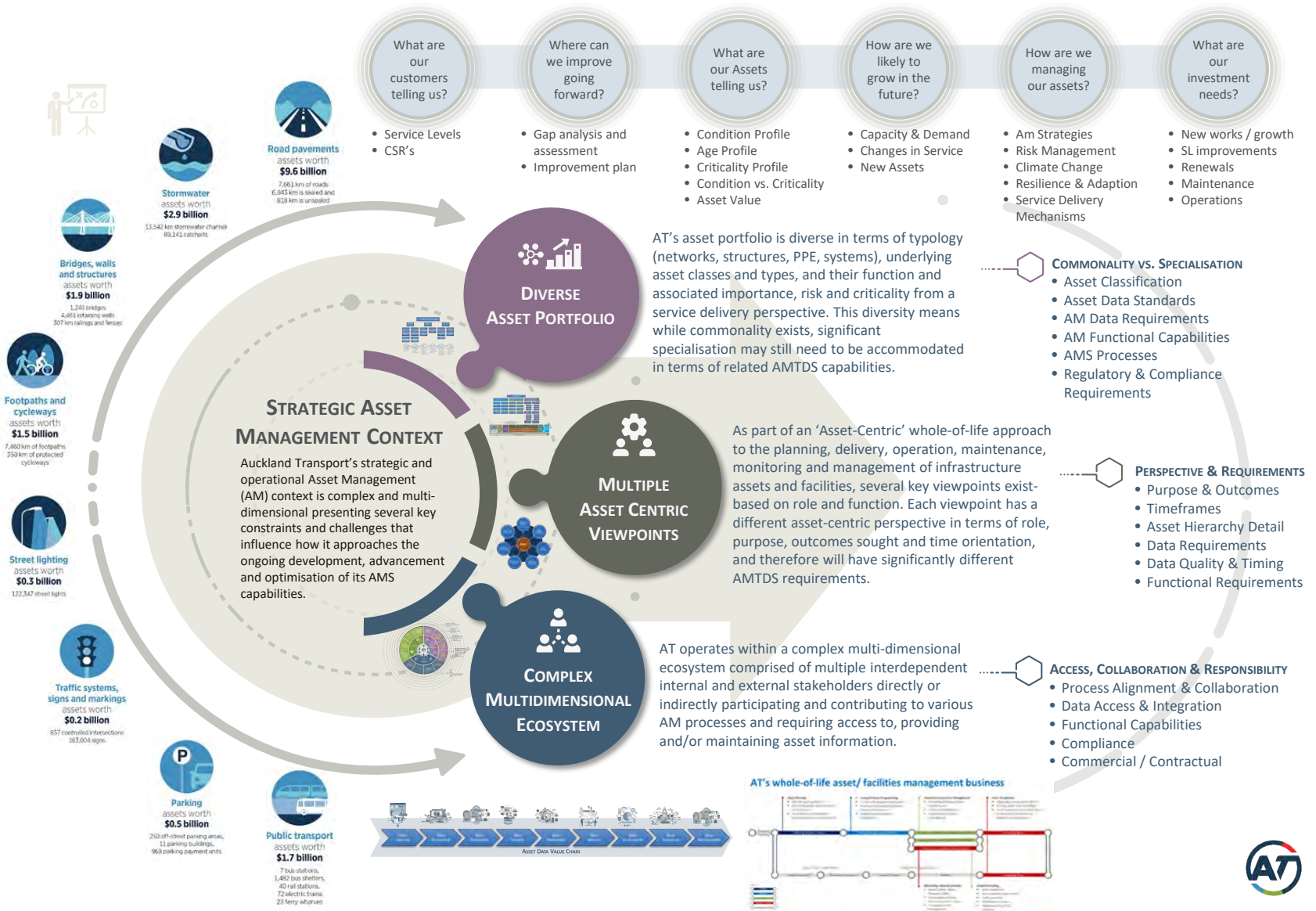
A **key principle** follows that AMIS as part of an organization’s overarching AMS and is comprised of an integrated portfolio of technology and information capabilities underpinned and governed by data standards as opposed to being any one single system. The above conceptual framework provides an outline of AT’s AMIS scope within the broader AMS context.

SUMMARY:

KEY THEMES

The following slide provides a summary of a several key themes that have emerged and are referenced in more detail throughout the slides that follow. AT's strategic asset management context underpinned by these key themes present several key constraints and challenges as part of solutioning and prioritizing AMTDS roadmap requirements and deliverables. Key considerations include:

- AMTDS prioritization based on the importance, risk and criticality of various asset classes across the 3 Asset Portfolios.
- Asset class specific characteristics and requirements means 'specialization' of common AMS and associated AMTDS capabilities will need to be accommodated.
- Decisions on where certain 'common' AMS /AMTDS capabilities are implemented and realized may vary between asset classes based on their unique characteristics and specializations.





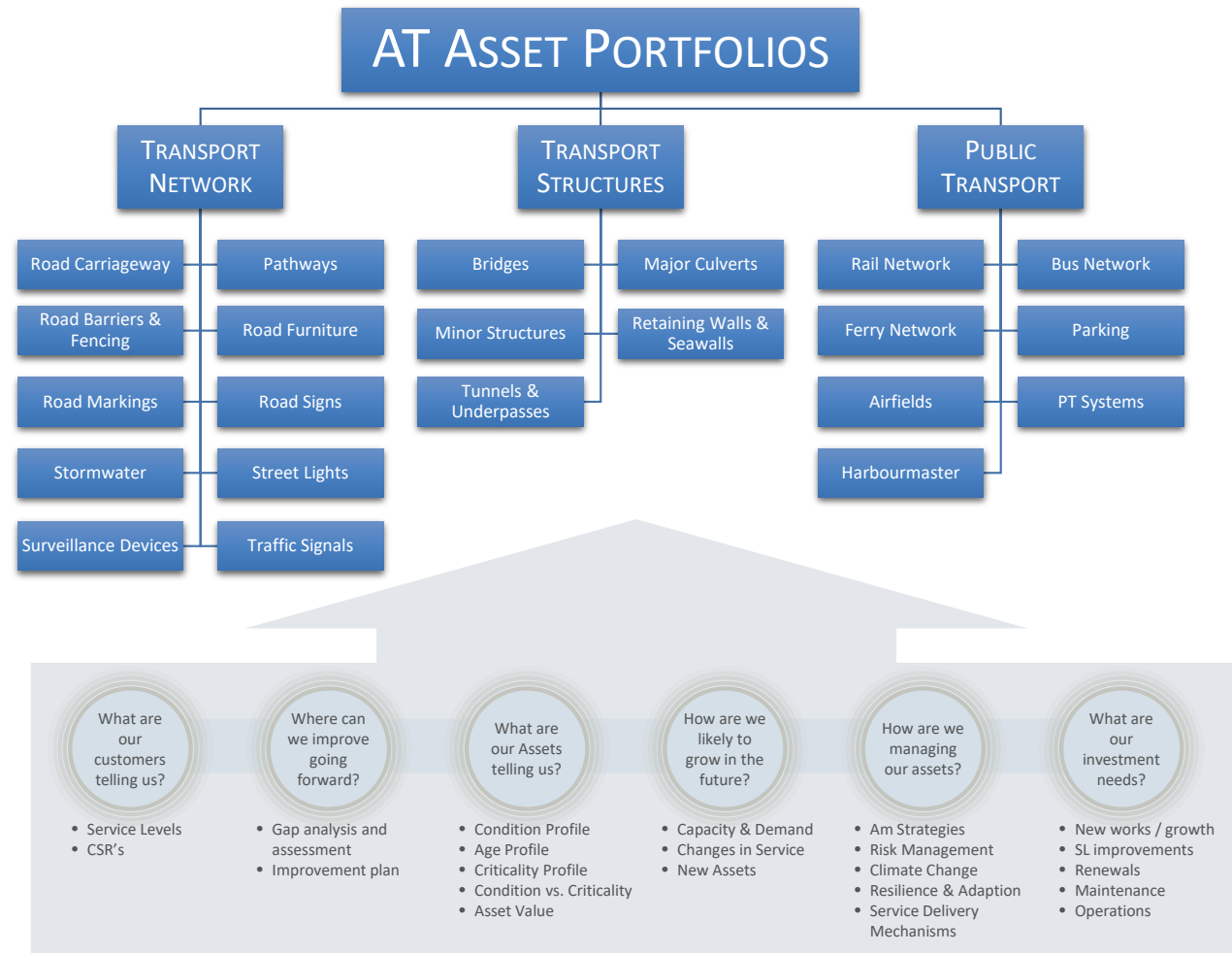
ASSET MANAGEMENT: ASSET PORTFOLIOS



The Auckland Transport 2024 Strategic Asset Management Plan (AMP) is structured into 3 Asset Portfolios:

1. Transport Network
2. Transport Structures
3. Public Transport (PT)

Each portfolio is comprised of several Asset Classes that are formally managed as part of fulfilling AT's Asset Planning, Policy, and Operational obligations in line with meeting the Local Government Act 2002 requirements.



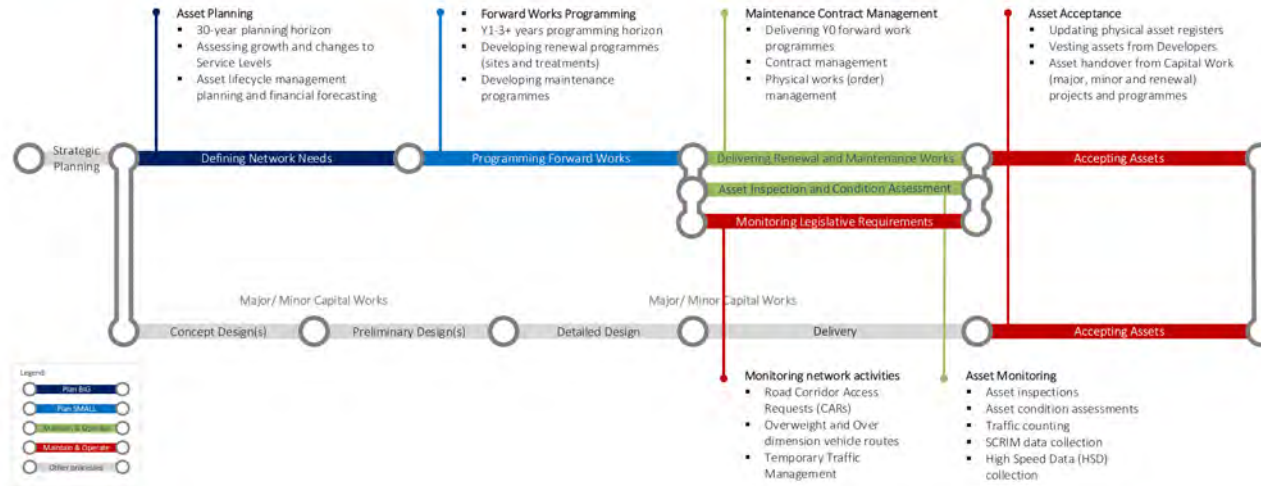
ASSET MANAGEMENT: TEAM & FUNCTIONS



As part of AT's ISO Maturity Assessment & Improvement Roadmap, the following slide outlines AT's whole-of-life Asset and Facilities management model and associated AM functions and process owners.



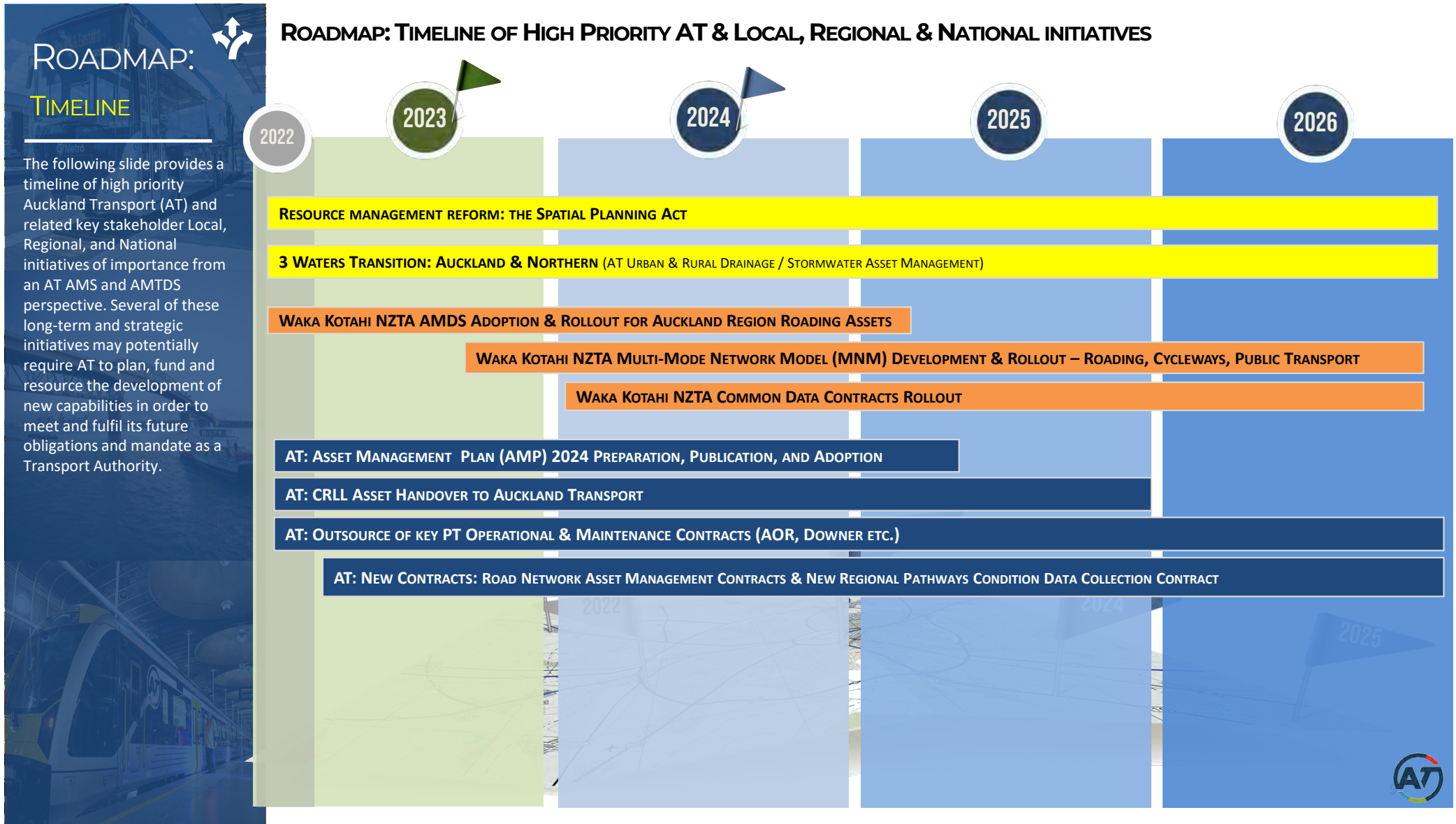
AT's whole-of-life asset/ facilities management business



AT's Asset Management Functions – Process Owners

High-level AM functions	Defining Network Needs – Asset Planning	Programming Forward Works – Forward Works Programming	Monitoring Existing Assets – Asset Inspection and Condition Assessment	Maintenance Contract Management – Delivering Renewal and Maintenance Works	Monitoring Legislative Requirements – Monitoring Network Activities	Accepting Assets – Asset Acceptance
Key processes	<ul style="list-style-type: none"> 30-year planning horizon Assessing growth and changes to Service Levels Asset lifecycle management planning and financial forecasting 	<ul style="list-style-type: none"> Y1-3+ years programming horizon Developing renewal programmes (sites and treatments) Developing maintenance programmes 	<ul style="list-style-type: none"> Asset inspections Asset condition assessments Traffic counting SCRIM data collection High Speed Data (HSD) collection 	<ul style="list-style-type: none"> Delivering Y0 forward work programmes Contract management Physical works (order) management 	<ul style="list-style-type: none"> Road Corridor Access Requests (CARs) Overweight and Over dimension vehicle routes Temporary Traffic Management 	<ul style="list-style-type: none"> Updating physical asset registers Vesting assets from Developers Asset handover from Capital Work (major, minor and renewal) projects and programmes
Asset Portfolio – Asset Class						
Public Transport – Airfields, Bus Network, Ferry Network, Harbourmaster, Parking, PT/ ITS Systems, Rail Network	Process Owner: Brett Elston	Process Owner: Matiul Khan	Process Owner: Matiul Khan	Process Owners: Bus and Ferry networks: Josh Hyland, Parking and Airfields Facilities: Richard La Ville, Harbourmaster: Andrew Hayton, PT Facilities: Anne Ussher	Not applicable	Process Owner: Delia Sahinovic
Transport Structures – Bridges, Major Culverts, Minor Structures, Retaining Walls and Seawalls, Tunnels and Underpasses	Process Owner: Brett Elston	Process Owner: Cam Gordon	Process Owner: Cam Gordon	Process Owner: Alan Wallace	Not applicable	Process Owner: Delia Sahinovic
Transport Network – Carriageway, Stormwater, Pathway, Streetlighting, Road barrier and fence, Road Furniture, Traffic signals, Surveillance Device, Road Sign, Road Marking	Process Owner: Brett Elston	Process Owner: Peter Scott	Process Owner: Peter Scott – Traffic counting: Delia Sahinovic	Process Owner: Alan Wallace – Streetlighting: David Dick	Process Owner: Tracey Berkahn	Process Owner: Delia Sahinovic





KEY PRIORITIES:

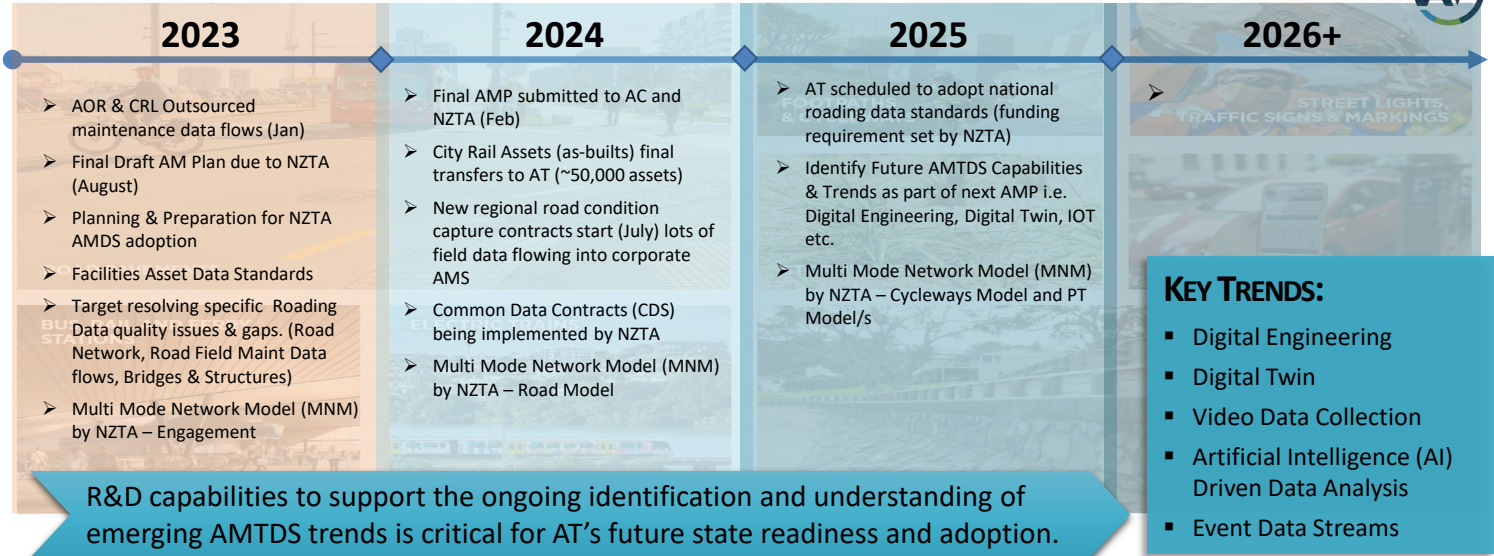
OPERATIONAL CONTEXT



Several **key challenges and constraints** unique to AT's strategic and operational environment and context provide a critical basis for identifying and prioritizing its ongoing long-term AMTDS roadmap and programme and include:

- AT operates within a complex multi-dimensional AM Ecosystem comprised of multiple interdependent internal and external stakeholders and 3rd Parties requiring access to a common portfolio of AM system and data capabilities.
- Growing gaps in AT's Asset Data Quality including its accuracy, completeness, timeliness, and compliance is creating uncertainty and eroding credibility and confidence in the quality of AT's investment decisions thus impacting and undermining evidence-based AM practices and risking funding levels moving forwards.
- Waka Kotahi (NZTA) is driving National AM Data Standards (AMDS) adoption across whole of NZ as part of future funding compliance requirements. Noted too is their Digital Engineering initiative by end of 2027 with view of being extended to local authorities as it will be system agnostic
- CRL is driving a shared Asset model between multiple stakeholders including AT, Kiwi Rail and Auckland Council among several others. This will require greater levels of AMS integration and standardization that before.
- AT is behind the industry in preparing for and adopting Digital Engineering Standards and Technologies as part of elevating and optimizing its future AM capabilities.

TIMELINE OF KEY PRIORITIES & MILESTONES FOR AT AND ASSET MANAGEMENT



KEY THEMES:

- ❖ Growing gaps in **data quality** undermines evidence based decision making creating uncertainty and eroding confidence and credibility.
- ❖ The need for greater levels of process alignment and collaboration underpinned by data integration and access among both internal and external stakeholders, and across the ecosystem as a whole, is rapidly expanding.
- ❖ Significant pressure is mounting for the adoption of common industry data standards.

KEY PRINCIPLES:

- ✓ Whole of Life Asset Lifecycle Management
- ✓ Asset Data Standards Driven
- ✓ Digital Engineering driven Process Integration, Alignment and Optimisation

SUMMARY OF KEY PRIORITIES

- Asset Data Standards:
 - NZTA AMDS adoption for Roading
 - AT Facilities Asset Standards
 - Digital Engineering
- Data Quality:
 - Road Network Topology
 - Pavement & Surface Maintenance
 - Stormwater (Drainage)
 - Facilities Asset Register
- Asset Acceptance & Handover (AAH):
 - CRL Assets
 - AAH Digitisation & Optimisation

EXECUTIVE SUMMARY:

CRL HANDOVERS & TIMELINE

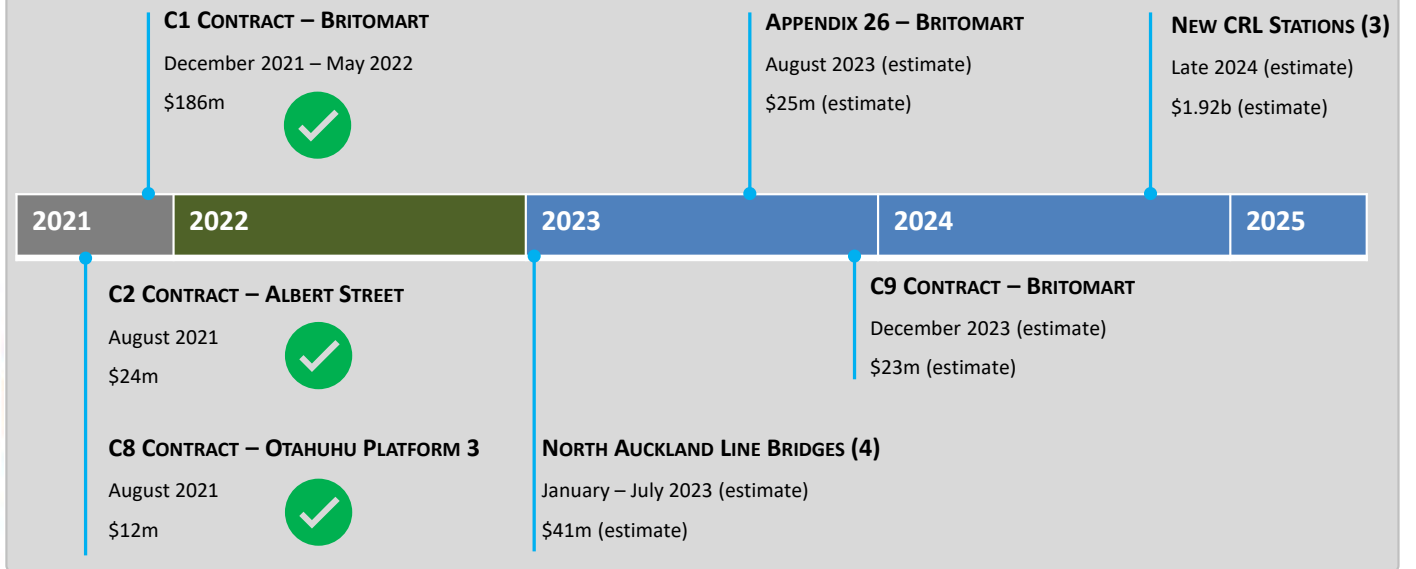


BACKGROUND

The City Rail Link (CRL) is a rail project currently under construction and involving the building of a 3.45 km long tunnel underneath Auckland's City Centre, between Britomart and Mt Eden stations. Also included as part of the project are upgrades to existing Stations as well as the construction of new Stations.

Overall construction and final handover of CRL Facilities to Auckland Transport is scheduled to be completed in late 2024. Ownership of Tunnels and Line assets will be with Kiwi Rail.

CURRENT HANDOVER TIMELINE



KEY UPDATES

- To date the handover of Assets from 3 CRL Contracts has been successfully completed. (C1, C2, C8)
- Ongoing preparation continues for the **progressive handover** of the assets constructed through the remaining CRL Contracts.
- AT's CRL and CE&AM Teams are working towards establishing a shared 'common data environment' (CDE). Additional resources and funding may be required to accommodate for the increased volume of work anticipated.



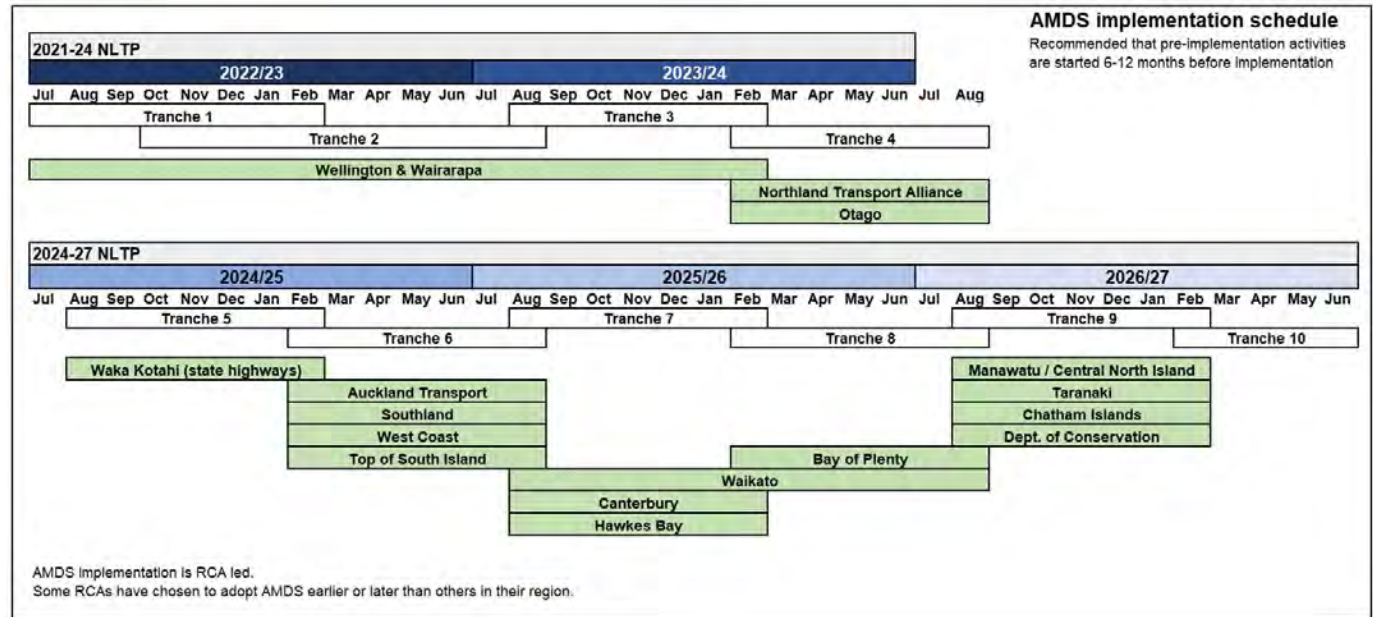
NZTA AMDS IMPLEMENTATION SCHEDULE

<https://www.nzta.govt.nz/roads-and-rail/asset-management-data-standard/>

The Asset Management Data Standard (AMDS) is a data standard that informs activity management decisions for transport so we can plan and implement activities which deliver services as expected for the cost expected. It is a common language that describes the service, impact, and asset lifecycle across the transport system.

The standard will create a structure that will ensure the consistency of collection of data. This will enable Road Controlling Authorities (RCAs), Waka Kotahi NZ Transport Agency and the transport sector to collect better quality data, helping them meet asset management goals.

Development of the standard and implementation approach is a joint collaboration between Waka Kotahi, RCAs, maintenance contractors and service consultants.



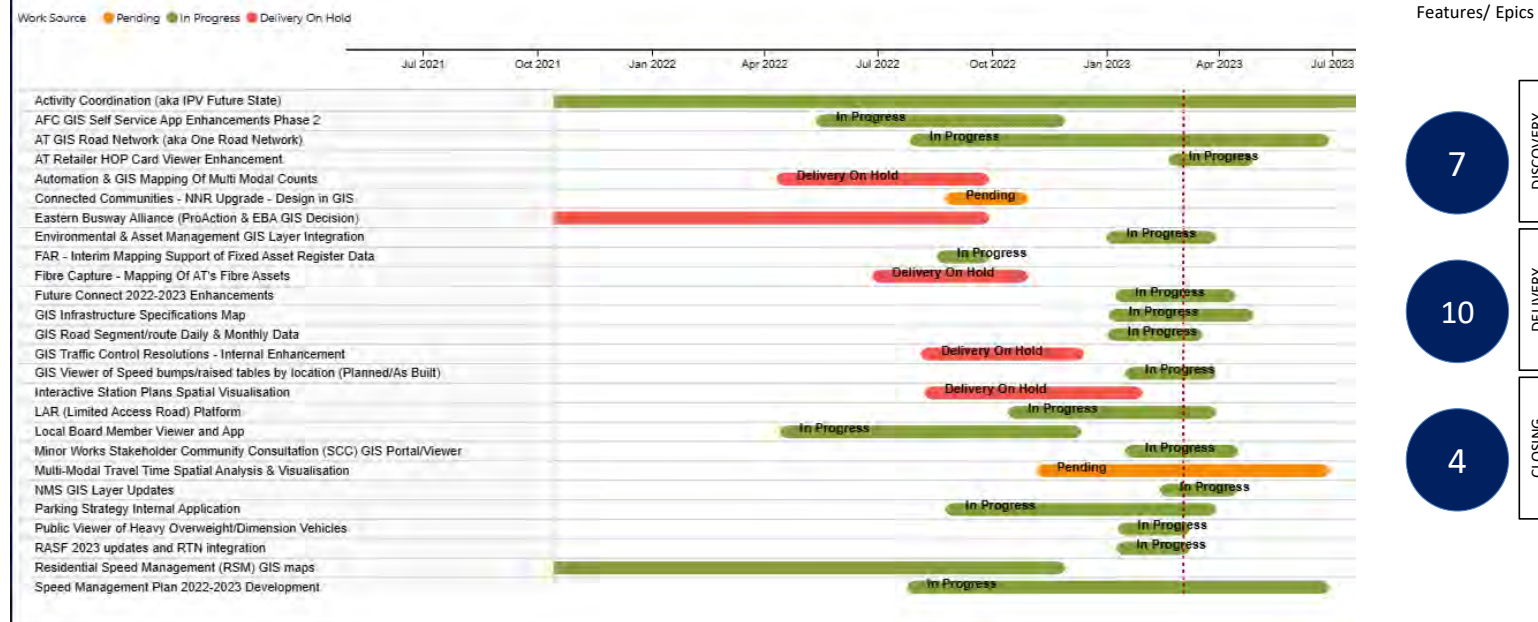
<https://www.nzta.govt.nz/assets/Roads-and-Rail/amds/data-standard/AMDS-implementation-schedule-by-region.JPG>



GIS FY23: PROJECT STATUS



Overall	Budget	Schedule	Risk	Quality	Resources	Benefits
Green	Amber ↓	Green ↑	Green ↑	Green	Green	Green



Highlights:

- Budgets – GIS Core Budget drawdown – the Re-Auth Business Case has been submitted to draw down the remaining funds for the financial year.
- Resources – We have had new starters recently and reshuffled our squads a little based on work loads and capacity. We have now 4 new starters as well as our GIS Team Lead who have settled in well. We are also spreading knowledge in FME, Custom Apps and Speed Management programme of work.
- Closing Projects – we are still having some difficulties closing off projects and are committed to getting as many completed prior to end of this month.
- Our key focus this period is how we transition from Discovery to Delivery and how we can speed up the Delivery phase of our projects.

ASSET MANAGEMENT SYSTEM (AMS):

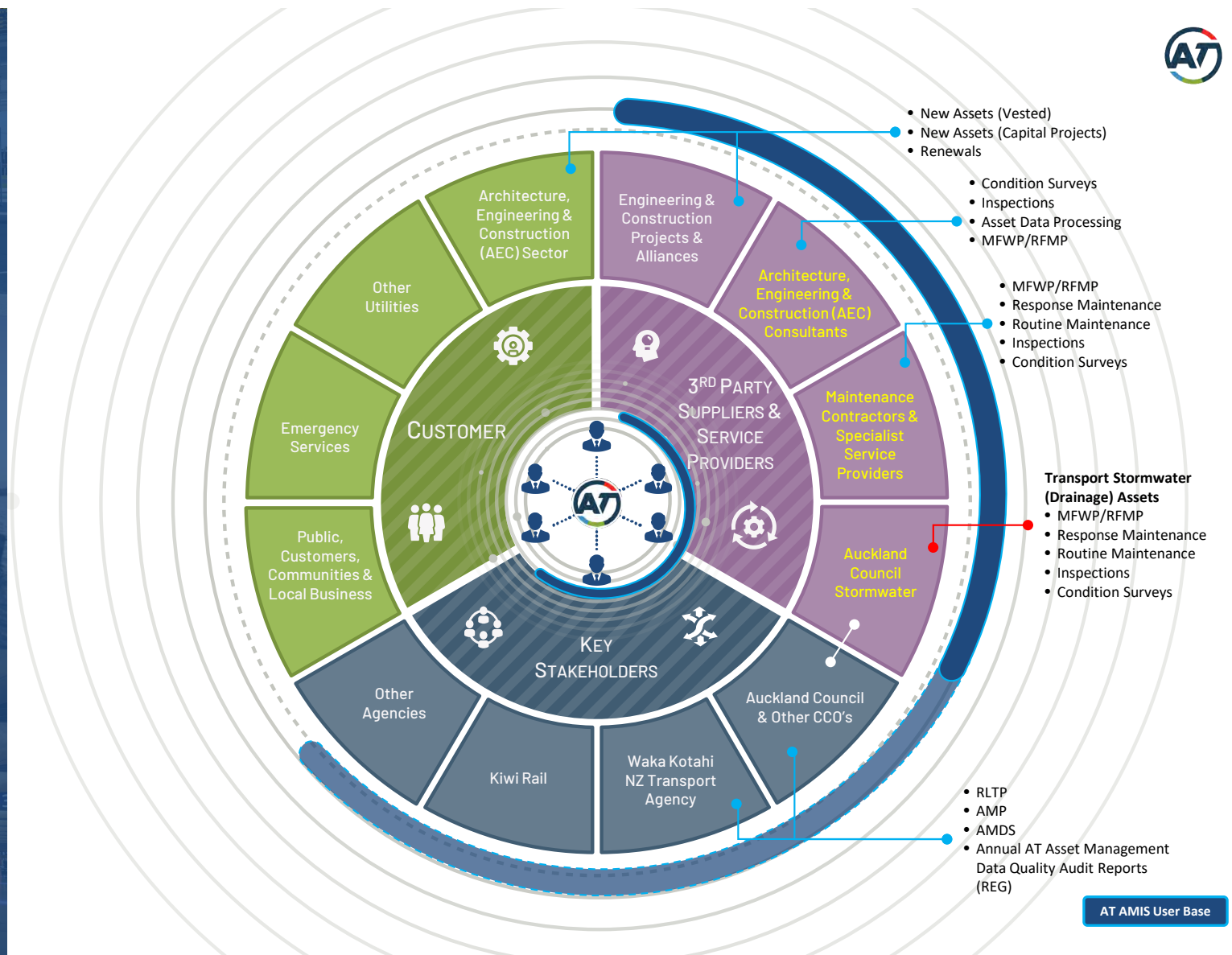
A COMPLEX ECOSYSTEM



From an Asset Management perspective, AT operates within a complex multi-dimensional ecosystem comprised of multiple interdependent internal and external stakeholders spanning various Customer Groups, 3rd Party Suppliers & Service Providers and Key Stakeholders.

A number of these stakeholders and parties either directly or indirectly participate in various AM processes and are required access, provide and/or maintain asset information and data as well as access any associated AMIS functional capabilities.

Furthermore, clarity and alignment across stakeholders has become a key priority in terms of asset ownership vs. operations and associated roles and responsibilities for critical and shared assets from an AMIS perspective. For example Road Drainage (Stormwater) Assets are maintained and managed by the AC Healthy Waters (Stormwater) team as part of the Auckland Region's wider Stormwater network and asset base.



KEY STAKEHOLDER

CONSIDERATIONS :



ASSET-CENTRIC ASSET MANAGEMENT VIEWPOINTS

Seven key viewpoints need to be considered when understanding management and operation of infrastructure assets and the delivery of associated services and facilities.

The viewpoints are closely aligned to the 'asset lifecycle' and 'functions' associated with delivering, operating and maintaining assets and associated services. However, for the purposes of this Roadmap they intend to provide a meaningful context for identifying, understanding and qualifying business requirements pertaining asset management information, systems and tools from different perspectives.

It is important to note that other 'viewpoints' exist pertaining to for example the 'customer' and 'corporate' perspectives. These are not represented here however are important considerations.

The '**Asset Planning**' viewpoint is focused on planning the on-going delivery, renewal and maintenance of assets and related services. In other words, 'asset management planning is to ensure that present and future customer service requirements are met while managing assets in the most cost-effective manner.'

Timeframe: 0 – 35 years+

The '**Asset Technical Services**' viewpoint is focused on the broader strategic framework and context within which the 'asset management function' exists and interfaces with internal and externally. This includes providing advisory services around consenting as well as consent monitoring.

Timeframe: 0 – 25 years+

The '**Asset Financials**' viewpoint is focused on funding capital and renewal projects, asset acquisition, and asset maintenance programmes; and the capital value and depreciation of assets.

Timeframe: 0 – 15 years+

The '**Asset Projects**' viewpoint is focused on the delivery of capital and renewal asset programmes and projects.

- Timeframe: Daily – 3 years+

The '**Asset Management**' viewpoint is focused on the long-term life-cycle management of assets over time from 'cradle' to the 'grave'. This includes understanding the 'remaining economic life' of assets. Importantly asset manager provide a supporting and facilitators role across the other viewpoints presented.

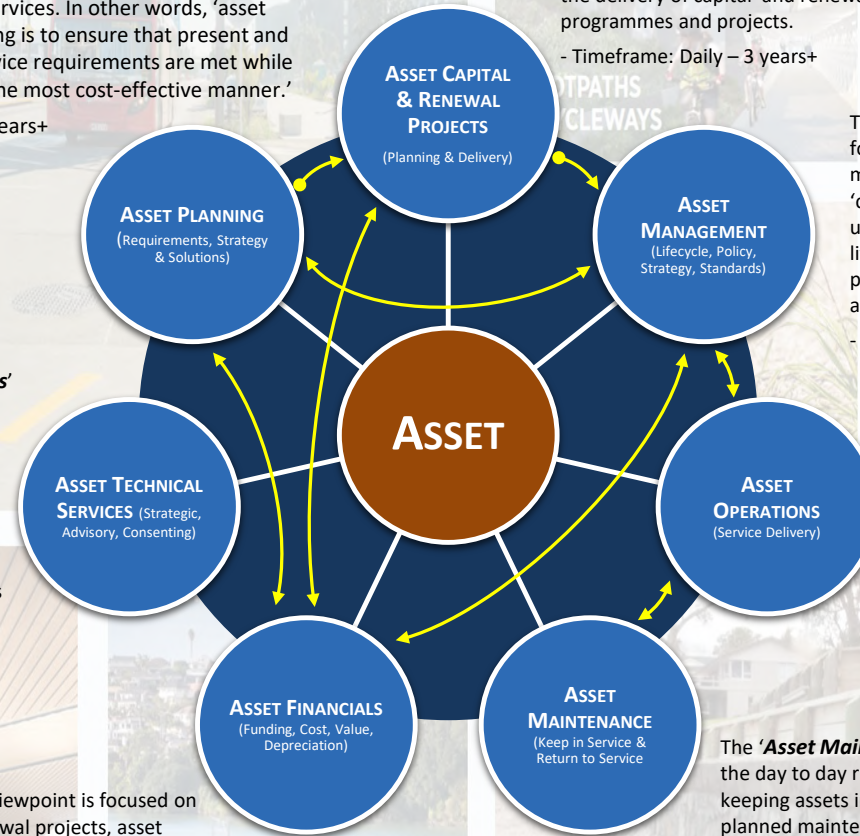
- Timeframe: 0 – 100 years +

The '**Asset Operations**' viewpoint is focused on managing and operating (running) assets from a service delivery perspective.

- Timeframe: Daily – 3 years+

The '**Asset Maintenance**' viewpoint is focused on the day to day running of assets in terms of keeping assets in service (preventive / scheduled / planned maintenance) or returning assets to service (response / unplanned maintenance).

- Timeframe: Daily – 1 year+



REFERENCE MODEL:

AT ASSET DATA SCOPE

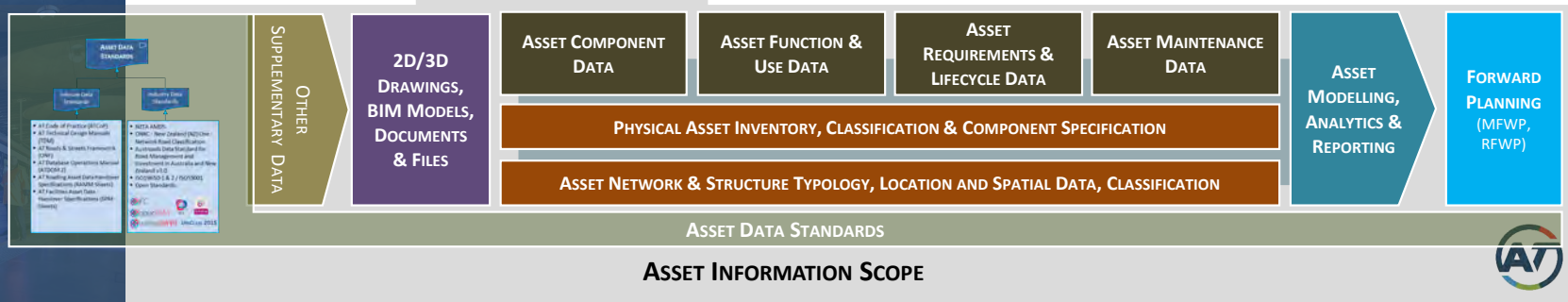
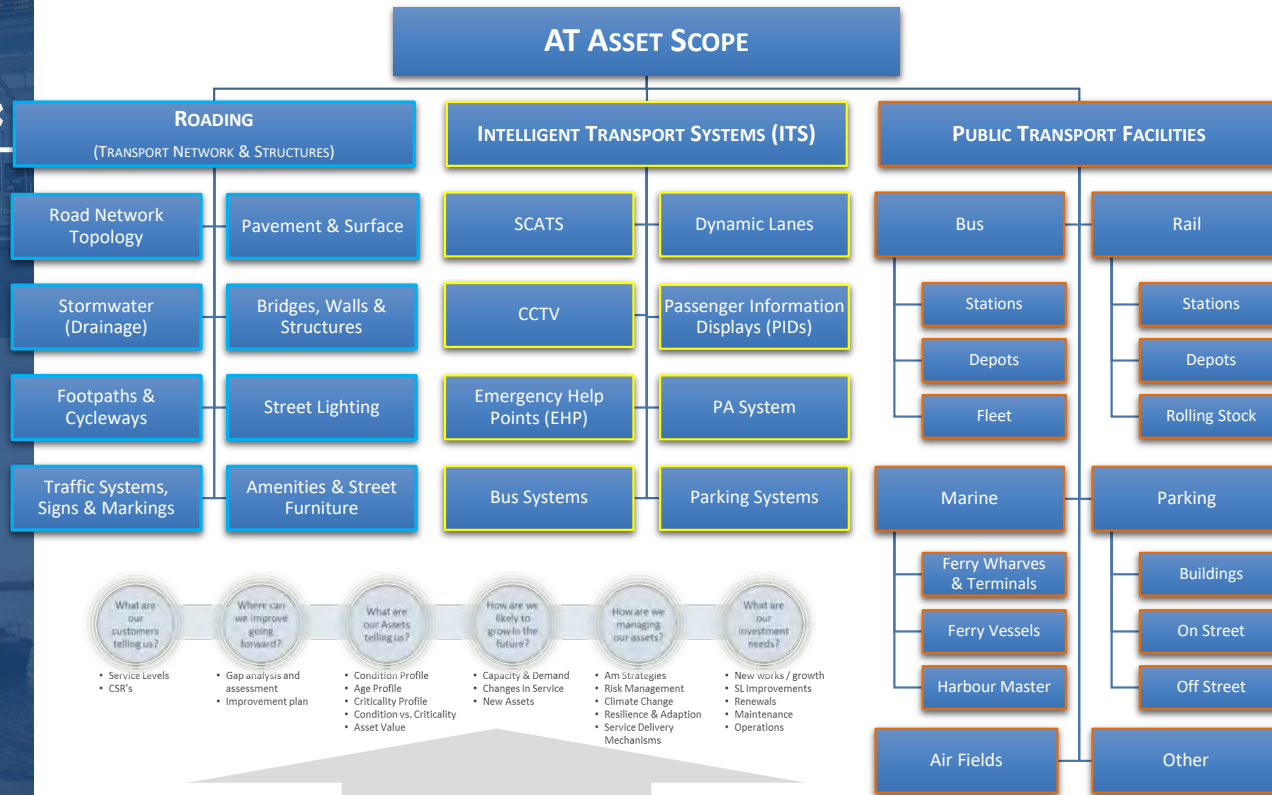
The following reference model provides a high-level view AT's current asset scope spanning three core areas:

1. Road Corridor Infrastructure
2. Public Transport Assets & Facilities
3. Intelligent Transport Systems (ITS)

It should be noted that ITS assets can span both Rooding & Facilities and are also unique in that they may also be represented in underlying 'control' systems.

The underpinning Asset Information Scope model identifies the broad range of 'static' and 'time-based' asset data that is collected and maintained to enable evidence-based asset management practices and decision making for the various asset areas. This includes the implementation of asset data standards.

A **key principle** follows that the AMS operational and associated AMTDS requirements both across and within these 3 asset areas can vary significantly. Therefore, while common ground and standardization should be sought in terms of the broader AMTDS strategy and implementation, the unique domain specific characteristics and requirements of each Asset Class should be recognized and specialized accordingly.



REFERENCE MODEL: CORE AMS CAPABILITIES



The following reference model provides a high-level overview of AT's core AMS capabilities loosely based around the NAMMS framework among other sources. These span the following core capability areas:

- CG01: Asset Management Planning
- CG02: Asset Capital & Renewal Delivery
- CG03: Asset Operations & Maintenance
- CG04: Asset Management Technology, Data & Standards (AMTDS)

CG00: Road Network and Pavement & Surface (P&S) Management has been identified as a capability category given its significance and complexity and specialization over other asset 'investment classes'.

It should be noted that AT's capability maturity and priorities across these capabilities varies between the 3 Asset Portfolios and associated Asset Classes. Furthermore, it should be recognized how and where these are implemented could vary across the asset classed and any associated requirements vary significantly based on asset class specialization.

CG00: ROAD NETWORK AND PAVEMENT & SURFACE (P&S) MANAGEMENT

CG00.01: Road Network Management

- CG00.01.01: Road Network Typology Management
- CG00.01.02: Intersection Management
- CG00.01.03: Centreline Management
- CG00.01.04: Crash Data Management
- CG00.01.05: Traffic Count Estimation
- CG00.01.06: One Network Road Classification (ONRC) Management
- CG00.01.07: One Network Framework (ONF)

CG00.02: Pavement & Surface Management

- CG00.02.01: Surface Structure & Data Configuration Management
- CG00.02.02: Surface Life & Achieve Surface Life Assessment
- CG00.02.03: Surface Depth Assessment
- CG00.02.04: Pavement Layer Structure & Data Configuration Management
- CG00.02.05: Pavement Strength (SNP) Assessment
- CG00.02.06: Pavement Data Validation (Test Pit)
- CG00.02.07: Sealed Road Rating Assessment
- CG00.02.09: Falling Weight Deflectometer (FWP) Assessment
- CG00.02.10: High Speed Data (HSD) Data Management
- CG00.02.08: Skid Resistance (SCRIM) Data Summarisation

CG00.03: Treatment Management

- CG00.03.01: Treatment Length (TL) Dynamic Segmentation
- CG00.03.02: Treatment Length (TL) Management
- CG00.03.03: Treatment Length (TL) Data Summarisation
- CG00.03.04: Treatment Selection Algorithm (TSA)

CG00.04: Pavement & Surface RFWP

CG01: ASSET MANAGEMENT PLANNING

CG01.01: Asset Requirements & Lifecycle Management

- CG01.01.01: Levels of Service (LOS) Framework
- CG01.01.02: Capacity & Demand Assessment and Forecasting
- CG01.01.03: Condition Analysis & Assessment
- CG01.01.04: Performance Monitoring & Assessment
- CG01.01.05: Deterioration Modelling
- CG01.01.06: Asset Criticality, Risk & Resilience Assessment

CG01.02: Asset Investment Planning (Capital & Operational)

- CG01.02.01: Capital Projects Planning & Prioritisation
- CG01.02.02: Renewal Forecast Modelling (Class/Region 30 years+)
- CG01.02.04: Maintenance Forward Works Programming (MFWP)
- CG01.02.03: Renewals Forward Works Programming (RFWP)

CG01.03: Asset Financial Planning

- CG01.03.01: Asset Lifecycle Cost Analysis & Modelling
- CG01.03.02: Asset Valuation & Revaluation
- CG01.03.03: Asset Depreciation & Replacement Cost Modelling
- CG01.03.04: Long-term Asset Financial Forecasting
- CG01.03.05: Asset Management Plans

CG02: ASSET CAPITAL & RENEWAL DELIVERY

CG02.01: Major/Minor Capital & Renewal Works Delivery

- CG02.01.01: Engineering & Design Management
- CG02.01.02: Virtual Design & Construction (VDC)
- CG02.01.03: Consent Management
- CG02.01.04: Corridor Access & Traffic Management
- CG02.01.05: Traffic Resolutions

CG02.02: Asset Handover, Vesting & Acceptance

- CG02.02.01: As-Built Submissions
- CG02.02.02: As-Built Submissions Acceptance
- CG02.02.03: As-Built Submissions Final Inspections & Validations
- CG02.02.04: As-Built Processing, QA and Closeout

CG03: ASSET OPERATIONS & MAINTENANCE

CG03.01: Work Management (Inspections, Renewals, Maintenance)

- CG03.01.01: Request for Service (RFS) Management
- CG03.01.02: Unplanned (Response) Maintenance Management
- CG03.01.03: Planned (Routine/Preventive) Maintenance Management
- CG03.01.04: Routine Maintenance Schedules
- CG03.01.05: Work Order Management
- CG03.01.06: Claims Management
- CG03.01.07: Contract Management

CG03.03: Network & Facility Restrictions, Access and Safety

- CG03.03.01: Corridor Access Management
- CG03.03.02: Facility & Site Access Request Management
- CG03.03.03: Resource Consent Management
- CG03.03.04: Asset Warrantees Management
- CG03.03.05: Permit Management
- CG03.03.06: Bylaws & Restrictions Management
- CG03.03.07: Site and Facility Hazards & Risks Register

CG03.02: Network, Facility & Asset Monitoring

- CG03.02.01: Asset Inspections Management
- CG03.02.02: Asset Condition Surveys & Assessment
- CG03.02.03: Traffic Count Management

CG04.01: Typology & Spatial

- CG04.01.01: Typology - Structural
- CG04.01.02: Typology - Network
- CG04.01.03: Location & Spatial
- CG04.01.05: BIM & Digital Twin
- CG04.01.04: Linear Referencing

CG04.03: Asset Register

- CG04.03.01: Asset Inventory
- CG04.03.02: Asset Specification
- CG04.03.03: Asset Component Data
- CG04.03.04: Asset Restrictions & Access

CG04.04: Reporting & Analytics

CG04.05: Key Data Exchange & Integration Interfaces

CG04.02: Asset Data Standards & Classification

CG04.06: Asset Data Collection & Management

CG04: ASSET MANAGEMENT TECHNOLOGY, DATA & STANDARDS (AMTDS)

REFERENCE MODEL:

DATA QUALITY

Data Quality has emerged as a significant AMS issue and challenge.

Growing gaps in AT's Asset Data Quality including its accuracy, completeness, timeliness, and compliance is creating uncertainty and eroding credibility and confidence in the quality of AT's investment decisions thus impacting and undermining evidence-based AM practices and risking funding levels moving forwards.

Under Waka Kotahi NZ Transport Agency (NZTA) the Road Efficiency Group (REG) complete annual data quality audits of the roading data of all agencies and local authorities across NZ, including AT. Three dimensions are assessed and reported – Accuracy, Completeness and Timeliness.

However as outlined by this slide there are several other dimensions to be considered when assessing data quality. While it's not suggested all these dimensions be used by AT, they form a useful framework and set of definitions for guiding Data Quality related initiatives and interventions including measuring their effectiveness and supporting ongoing Data Quality monitoring.

#	Dimension	Description
1	ACCURACY	A measurement of the veracity, precision and correctness of data as a true reflection of what it represents in the real-world.
2	COMPLETENESS	A measure of the availability and existence (presence) of the required data within the population of data records. In other words is the dataset comprehensive enough to be of value for its intended use?
3	CONFORMITY	A measure of how well the data aligns and conforms to internal and external industry-wide standards. May also be known as 'Validity'.
4	CONSISTENCY	A measure of compliance of the data with required formats, values and definitions within and across datasets. In other words are data records and their attributes consistent with each other within a dataset?
5	COVERAGE	A measure of the availability, breadth and depth of required data that exists but is missing from a given dataset.
6	TIMELINESS	A measurement of the degree to which data is both representative of current conditions (currency of data) and its availability for use.
7	UNIQUENESS	A measure of the 'singularity' of data records and attributes being existent within as well as across datasets. i.e. Data duplicated within a dataset and/or split across datasets.
8	CREDIBILITY	The degree to which the data is true, plausible and believable by data consumers and meets expectations. In other words is the data and its source reliable and trusted?
9	VARIABILITY	A measure of the volatility / stability of data within a dataset.
10	INTEGRITY	A measure of the reliability and the degree to which the data is free from data loss, corruption and error.
11	RELEVANCE	A measure of the appropriateness of the data captured based on the requirement and its intended use. In other words do we have the right data for what we need?
12	CLARITY	Measures the degree and ease to which the data can be understood and its meaning consistently interpreted without ambiguity by end-users and consumers of the data. This is often dependent on well defined meta-data.
13	COHERENCE	Measures the degree to which datasets can be combined and/or related to each other.
14	COMPLIANCE	Measures the degree to which data is compliant with laws, regulations and standards, as well as internal policies and requirements.

REFERENCE MODEL: DATA VALUE CHAIN

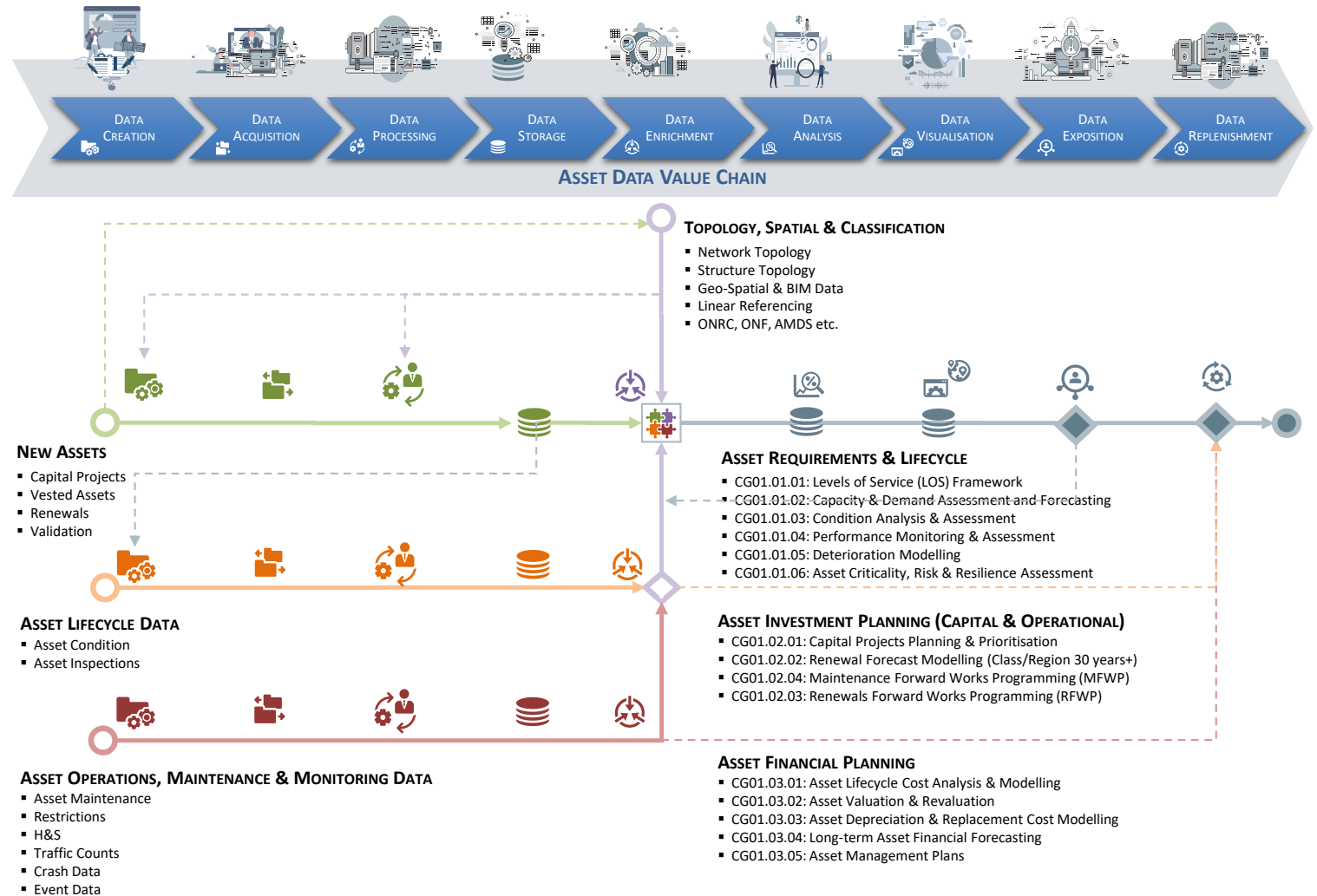
As previously outlined, AT operates within a **complex multi-dimensional ecosystem** comprised of numerous interdependent internal and external stakeholders who either directly or indirectly participate in various AM processes and are required access, provide and/or maintain asset information and data across several internal and external systems.

Furthermore, a key principle that's been highlighted is that **AMIS is comprised of an integrated portfolio of technology and information capabilities underpinned and governed by data standards as opposed to being any one single system.**

The following reference model outlines a conceptual **Asset Data Value Chain** across several streams and types of asset information that form the basis of 'integrated' and 'enriched' asset datasets. As depicted further on as part of AT's AMIS Landscape, these datasets are in turn streamed into secondary datasets to support data analysis, visualization, as well as inputs into other business process capabilities as part of Data Exposition.

In summary this reference model puts into context the importance of 'Data Quality' and its impact on downstream utilisation, as well as the associated AM Capabilities previously described and where these for example fit within the value chain. These interdependencies for a key part of prioritizing the AMTDS roadmap.

The **data value chain** describes the full pragmatic data lifecycle from collection to analysis and usage. In other words, it categorizes all of the various steps required to transform raw data into useful insights including awareness of how datasets may be integrated, aggregated and enriched, transforming low-value inputs into high-value outputs. This is particularly applicable to Asset Management.

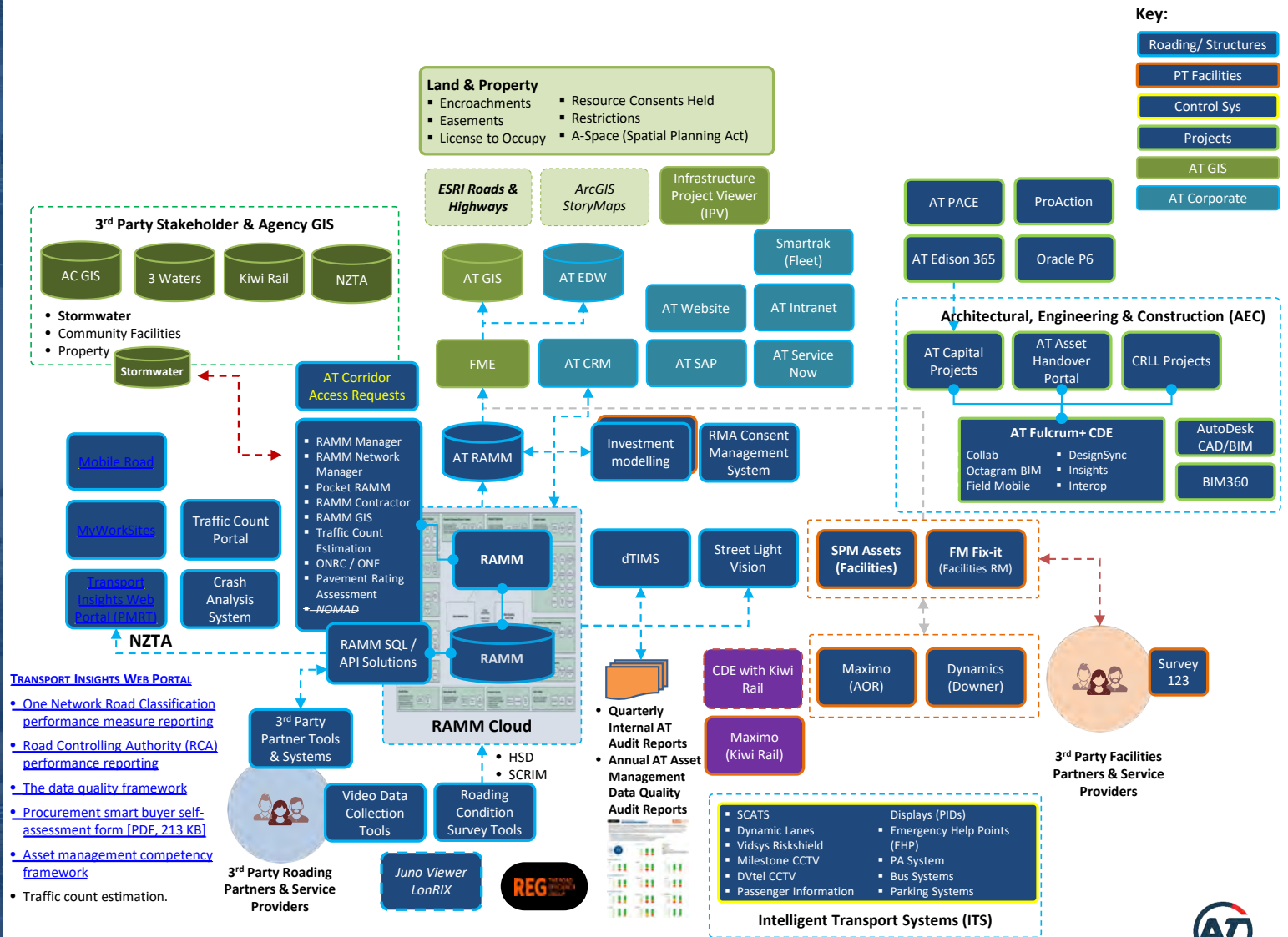


REFERENCE MODEL:

CURRENT AT AMIS LANDSCAPE

The following reference model provides a high-level view of AT's current Asset Management Systems (AMS) landscape. In summary this spans 6 core areas:

1. Road Corridor AMS
2. PT Facilities AMS
3. Intelligent Transport Systems (ITS)
4. Capital & Renewal Projects
5. AT GIS and Supporting Corporate Systems
6. 3rd Party Systems, Tools and Datasets

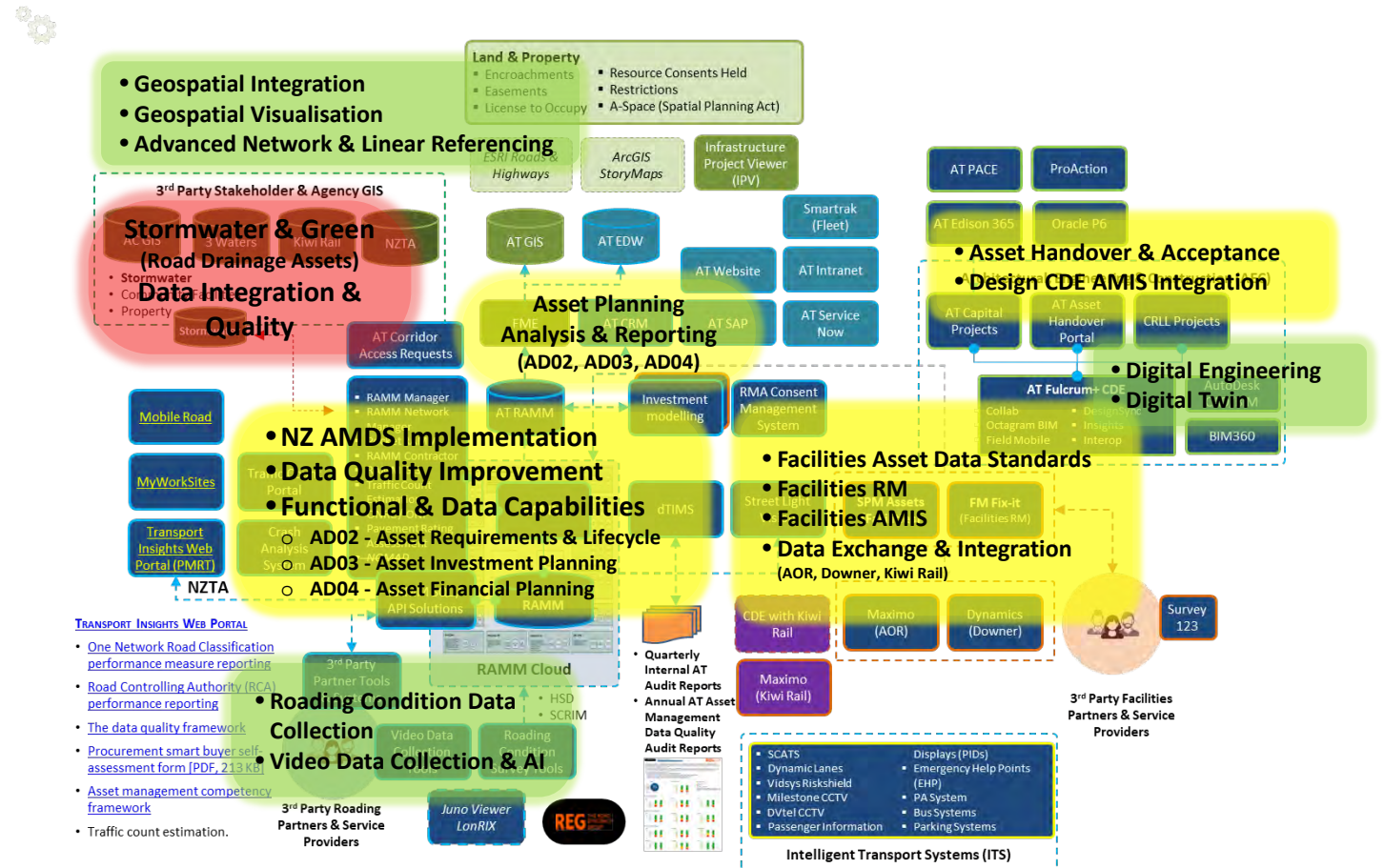


REFERENCE MODEL:

AT AMTDS PRIORITIES

Following on from AT's current AMIS landscape and eco-system, the following reference model provides a high-level visualization of the key AMTDS priorities that have been identified. These span the following core themes:

1. Asset Data Standards Adoption & Implementation both in Rooding & PT Facilities
2. Transport Network & Structures Data Quality Improvements
3. Advancing Transport Network & Structures Lifecycle and Investment & Financial functional and data capabilities
4. Rooding Data Collection & Emerging Tech Opportunities in VDC & AI
5. Advancing PT Facilities AMIS Capabilities
6. Advancing AEC Collaboration & Integration capabilities as part of ISO19650 adoption and Digital Engineering implementation across critical AMS Process.
7. AM Data Integration with 3rd Party Stakeholders and Service Providers including AC Stormwater, Kiwi Rail, AOR, Downer etc.
8. Advancing current Geospatial Capabilities



The following provides a summary of the key AM Domains & Capabilities from the wider set being referenced in this slide:

- **AD02 - Asset Requirements & Lifecycle**
(Capacity & Demand, Criticality, Risk & Resilience, Performance & Condition, Deterioration)
- **AD03 - Asset Investment Planning**
(Capital & Renewal Forecast Modeling, RFWP, MFWP)
- **AD04 - Asset Financial Planning**
(Asset Life-cycle Cost, Valuation, Depreciation & Replacement Cost, Long-term Financial Forecast, AMP)



KEY DEFINITIONS

- **Accounting Standards** – A set of rules that govern the way in which financial statements are prepared to ensure that these statements are comparable through time for an entity and across similar entities. Refers to the accounting standards of Australia and New Zealand.
- **Asset** - An item, thing or entity that has potential or actual value to an organization. (ISO19650)
- **Asset Class** – A group of assets having a similar nature or function in the operations of an entity. Relates to level 1 of the asset classification structure within this guideline. Asset Class is broken down into Asset Sub-Class groups, level 2 of the asset classification structure, for the purposes of disclosure within notes to financial statements.
- **Asset Classification Structure** – Hierarchy describing how assets are consistently broken down into components and how assets are rolled up for reporting. The asset classification structure in this guideline consists of Asset Class (level 1), Asset Sub-Class (level 2), Asset Type (level 3), Asset Sub-Type (level 4), Asset Component (level 5) and Asset Sub-Component (level 6). Refer to Appendix B for details.
- **Asset Component** – specific parts of an asset having independent physical or functional identity and having attributes such as different life expectancy, maintenance regimes, risk or criticality. Relates to level 5 of the asset classification structure within this guideline. Asset Component may be broken down into Asset Sub-Component, level 6 of the asset classification structure, for the purposes of identifying engineering detail required for maintenance and renewal regimes.
- **Asset Information** - is the combined set of data (graphical and non-graphical) and documents (drawings, manuals, plans, certificates) required to support the management of assets over the assets life cycle. (Austroads)
- **Asset Information Requirements (AIR)** - Information requirements in relation to the **operation** of an asset. (ISO19650)
- **Asset Information Model (AIM)**
- **Asset Management (AM)** - Asset management
 - A systematic process of effectively maintaining, upgrading and operating assets, combining engineering principles with sound business practice and economic rationale, and providing the tools to facilitate a more organised and flexible approach to making decisions necessary to deliver optimal community benefits. (Austroads)
 - is the systematic process of coordinating a company's financial, risk, operational, and other asset-related entities to increase the value of its assets. Assets are considered as anything that has potential value to an organisation. These include physical assets (equipment, machinery, and buildings) and non-physical assets (financial assets, intellectual property, and human capital). (ISO55001)
- **Asset Management Information & Systems (AMIS)** - an all-encompassing term used here to describe the overall portfolio of 'integrated' Asset Management (AM) technology capabilities including software applications, tools and systems; structured and unstructured information and data; and associated standards, specifications, processes and practices that support and enable organisations to strategically plan, design, build/acquire, operate, maintain and improve their assets as part of the end-to-end asset lifecycle.
- **Asset Management System (AMS)** – the overall interrelated and interacting set of organizational elements and capabilities that include AM Policy, Strategy and Plans; People, Processes and Practices; Technology (Systems and Tools), Information and Standards that enable an organisation to achieve its goals and objectives in effectively managing and operating the end-to-end lifecycle of its Assets.
- **Asset Management Technology, Data & Standards (AMTDS)** see AMS
- **Asset Register** - contains the definition and description of each asset in the asset portfolio. The asset register includes all the data required to ensure unique identification of the asset. (Austroads)
- **Asset Type** – a group of assets having similar nature or function in the operations of an entity. Relates to level 3 of the asset classification structure within this guideline. Asset Type may be broken down into Asset Sub-Type groups, level 4 of the asset classification structure, for the purposes of identifying asset groups that can be valued using similar data attributes.
- **Building Information Modelling (BIM)** - use of a shared digital representation of a built asset to facilitate design, construction and operation processes to form a reliable basis for decisions. (ISO19650)
- **Common Data Environment (CDE)** - agreed source of information for any given project or asset, for collecting, managing and disseminating each information container through a managed process. (ISO19650)
- **Complex Asset** – an individual asset that is disaggregated into Components for the purposes of recognising value. This Item definition approach is applied at the Asset Type (or Asset Sub-Type) level of the asset classification structure.
- **Data** - information collected and stored but not yet interpreted or analysed (graphical and non-graphical). (Austroads)
- **Data Harmonisation** - is to combine data definition and format from heterogeneous sources into integrated, consistent and unambiguous data specification to create unified understanding and to facilitate data sharing between organisations. (Austroads)
- **Data Standardisation** - is to specify data definition and data format. (Austroads)
- **Data Quality** – is a collective term used to assess the 'fitness for use' of data with data quality assessment focused on the overall 'condition' of data across several key dimensions that may include for example: accuracy, consistency, completeness, timeliness, reliability, conformance, validity, integrity, and compliance.
- **Digital Engineering** - Digital Engineering is a collaborative way of working, using digital processes, integrated datasets and technology to enable more productive methods of planning, designing, constructing, operating and maintaining our assets.
- **Exchange Information Requirements (EIR)** - Information requirements in relation to an *appointment* i.e. "agreed instruction for the provision of information concerning works, goods or services." (ISO19650)
- **Industry Foundation Classes (IFC)** - IFC is a standardized, digital description of the built asset industry. It is an open, international standard (ISO 16739-1:2018) for BIM and promotes vendor-neutral, or agnostic, and usable capabilities across a wide range of hardware devices, software platforms, and interfaces for many different use cases. (buildingSMART)
- **Information Container** - named persistent set of information retrievable from within a file, system or application storage hierarchy. (ISO19650)
- **Information Requirement** - specification for what, when, how and for whom information is to be produced. (ISO19650)
- **Life cycle** - stages for an asset from conception through to disposal and any residual risks or liability period. (Austroads)
- **Metadata** - is data that provides information about other data. Two types of metadata exist: structural metadata and descriptive metadata. Structural metadata is data about the containers of data. Descriptive metadata uses individual instances of application data or the data content. (Austroads)
- **Project Information** - information produced for, or utilized in, a particular project. (ISO19650)
- **Project Information Requirements (PIR)** - Information requirements in relation to the **delivery** of an asset. (ISO19650)
- **Project Information Model (PIM)**
- **Simple Asset** – an individual asset that is not disaggregated into Components for the purposes of recognising value. This Item definition approach is applied at the Asset Type (or Asset Sub-Type) level of the asset classification structure.

