NSW Infrastructure Data Management Framework (IDMF)
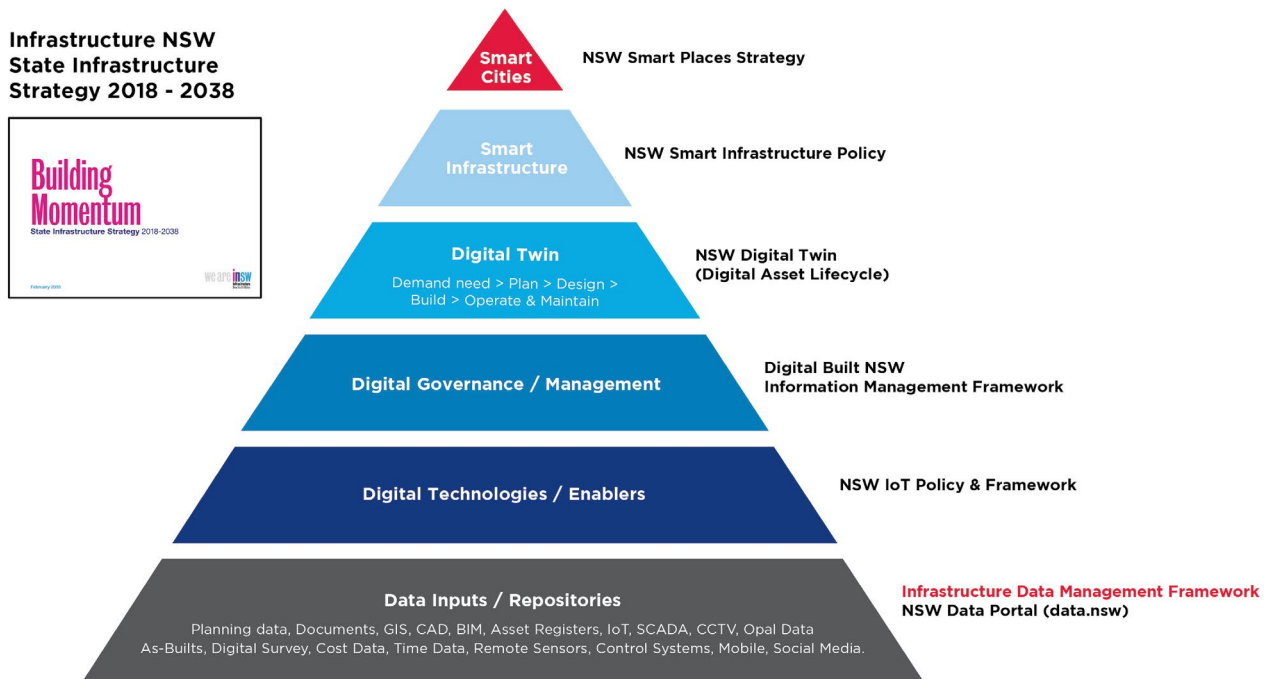
Executive Summary

Overview

The NSW Government builds, owns and manages a significant portfolio of major infrastructure assets which benefit and improve the lives of NSW communities and citizens. Increasingly valuable data is created and used during the planning, design, construction and operation of infrastructure. The State Infrastructure Strategy 2018-2038 (SIS) identified data as a key asset for the NSW Government that needs to be effectively managed across the asset lifecycle as it is critical to support decision making about infrastructure assets.

The **Infrastructure Data Management Framework (IDMF)** provides a set of guidelines, procedures and standard approaches to support consistent management of infrastructure data across the NSW Government from building information models to internet of things sensor data. The IDMF provides links to relevant NSW Government data policies, strategies and frameworks, and tailors the content and approach to the infrastructure and asset management sector.

The IDMF is not a mandatory framework – it describes best practice and will assist agencies and others in meeting mandatory requirements of other NSW Government policies and initiatives.

It supports NSW Government initiatives recommended by the SIS that are changing the way agencies view infrastructure data:

NSW Infrastructure Smart and Digital Initiatives

Objectives

The objectives of the IDMF are to:

- improve collaboration, access to and sharing of NSW Government infrastructure data and information across the asset lifecycle
- improve service and whole of life infrastructure investment decisions
- support the creation and management of digital twins for infrastructure assets to enable smart infrastructure and smart places
- improve the ability of agencies to meet and document statutory and legislative compliance requirements
- capture lessons learnt and best practice from NSW Government agencies and service providers on infrastructure data management.

Audience

The primary audience is NSW Government agencies that own and manage infrastructure assets. All NSW Government agencies, State-Owned corporations, public financial corporations and local governments are encouraged to apply the IDMF to data and information associated with both existing and new infrastructure assets.

Senior executives can use the IDMF to understand the opportunities of applying good data management practices to support infrastructure planning, projects and operation. Project managers and practitioners can use the Framework as a guide to best practice and to design approaches to managing data across the lifecycle of projects.
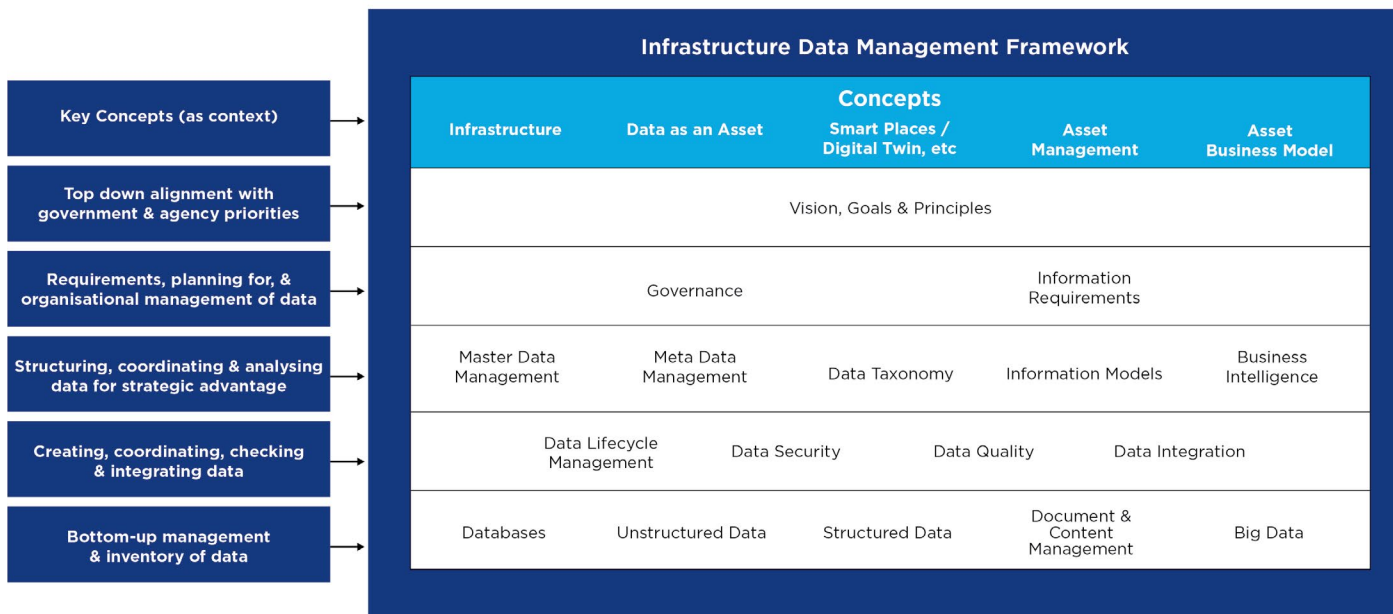
Infrastructure data management principles

The following principles have been used to guide the development and support the application of the IDMF:

Objective	Public Good	Infrastructure data should deliver public good
	Value	Infrastructure data should provide ongoing value and insights to inform planning, development, operation and maintenance of infrastructure across the asset lifecycle
Function and Form	Quality	Infrastructure data should be reliable, consistent and known quality
	Adaptability	Infrastructure data should be flexible and scalable to allow adaptation to new technology and societal needs
	Openness	Infrastructure data should be as openly available, transparent, authoritative, accessible and discoverable as possible to maximise value and reuse
Governance and Accountability	Security & Privacy	Infrastructure data should be governed by processes that ensure privacy by design, and facilitate security and privacy-preserving role-based access
	Curation	Infrastructure data should be curated by processes that allocate responsibilities, ownership, monitoring and management
	Standards	Infrastructure data should meet agreed standards (open where feasible) to enable interoperability
	Federation	Infrastructure data should be able to be federated to enable an interconnected eco-system of data environments supported by custodians

These principles help guide agencies to identify their Organisational Information Requirements (OIR) to support strategic outcomes and implement and adapt the IDMF to suit the needs of their customers and stakeholders.

Structure of the Framework

The IDMF is structured to align good data management practice with government and agency priorities and is designed to be systematically applied to infrastructure during any phase of the asset lifecycle.

	Infrastructure Data Management Framework				
Key Concepts (as context)	**Concepts**				
	Infrastructure	**Data as an Asset**	**Smart Places / Digital Twin, etc**	**Asset Management**	**Asset Business Model**
Top down alignment with government & agency priorities	Vision, Goals & Principles				
Requirements, planning for, & organisational management of data	Governance			Information Requirements	
Structuring, coordinating & analysing data for strategic advantage	Master Data Management	Meta Data Management	Data Taxonomy	Information Models	Business Intelligence
Creating, coordinating, checking & integrating data	Data Lifecycle Management	Data Security	Data Quality	Data Integration	
Bottom-up management & inventory of data	Databases	Unstructured Data	Structured Data	Document & Content Management	Big Data

IDMF Structure

Benefits

Adopting the concepts, principles and approaches outlined in the IDMF will assist infrastructure stakeholders, including government and non-government partners, to:
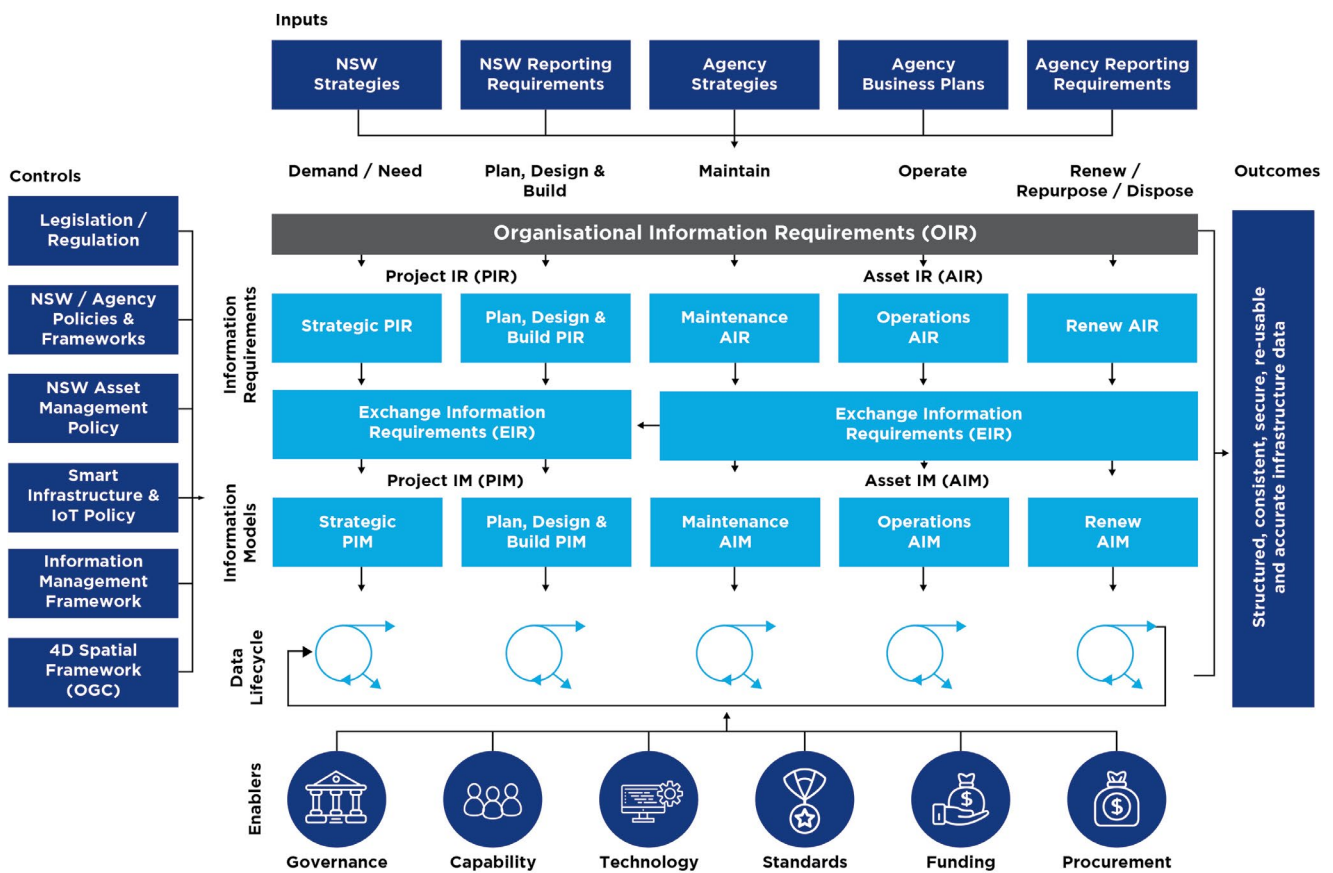
- Identify appropriate information requirements across the asset lifecycle
- Agree appropriate data management activities for each stage of the asset lifecycle
- Define the information models to be created and managed for each stage of the asset lifecycle
- Agree the data exchange requirements, including timings, standards and formats the exchanges should comply with
- Agree on how the data collected about infrastructure assets satisfy the reporting and decision-making requirements at all organisational levels.

Adopting the IDMF will enable agencies to identify data requirements needed to meet requirements other policies and embed appropriate infrastructure data lifecycle management practices to better support data driven decision making. The IDMF supports the Infrastructure Investor Assurance Framework (IIAF), the ICT Assurance Framework, and Infrastructure Australia's Assessment Framework (for Federally funded programs).

Implementation

The IDMF provides guidance on implementation of good data management practice and identifies supporting framework elements, including:

- **Governance** - The NSW Data Governance Toolkit is a valuable resource designed to assist NSW Government agencies to develop their own data governance capability, and should be applied to the development of data governance arrangements in an infrastructure data program context.

- **Technology** - Appropriate technology will support storage and interchange of infrastructure data. The NSW Government is supporting publication and sharing of agency data through Data.NSW and the NSW Digital Twin, however individual technology platforms will need to become more open for stakeholders to participate in a connected data ecosystem.

- **Standards** - From an infrastructure data perspective, the ability of software platforms to support relevant open data standards will become more important over time. Standardised, interconnected data ecosystems eliminate the cost of complex data transformations between different technology platforms. The key information concepts in the IDMF align with ISO and Australian standards.

- **Procurement** - Procurement plays a central role in the successful delivery of infrastructure projects, and it is critical to clearly address data requirements in contracts with service providers. Contracts need to address data handling, data ownership and rights, data retention and destruction obligations and data privacy and security.

- **Information requirements and models** - Agencies should derive their infrastructure data by understanding what the organisational information requirements are to support strategic objectives. A set of information models based on these requirements should be supported by an eco-system of inter-operable Common Data Environments (CDE) across different phases of the asset lifecycle, including sharing and connecting information between agency and industry partners.

IDMF Context: Inputs, Controls, Process and Enablers

Infrastructure data that is well defined, controlled and organised is more likely to be used by all infrastructure stakeholders able to access data stored across a variety of information systems that provide decision support across all lifecycle phases. Applying structure to infrastructure data through master data management, effective management of metadata, use of an appropriate data taxonomy and information models enables the interoperability and enduring value of infrastructure data.

Active application of good data management principles and practices is essential for the effective and efficient use of infrastructure data across the asset lifecycle. The IDMF incorporates the key principles of the Information Management Framework and provides guidance to agencies on better practices across the data management lifecycle.

Maintaining the Framework

Infrastructure data is rapidly evolving, and associated policies should be flexible and adaptable to accommodate change. To maintain its usefulness, this Framework will be regularly updated as technologies change, opportunities and risks are better understood, associated and appropriate standards are developed, and the NSW Government's infrastructure data maturity grows. The Smart Places Coordination Group will oversee further development.

The IDMF is available as a website at www.data.nsw.gov.au.

Please e-mail any feedback to datansw@customerservice.nsw.gov.au.