ISO55000x Asset Management

TANGIBLE OPPORTUNITIES TO ALIGN WITH ISO STANDARDS IN A DIGITAL ASSET MANAGEMENT WORLD

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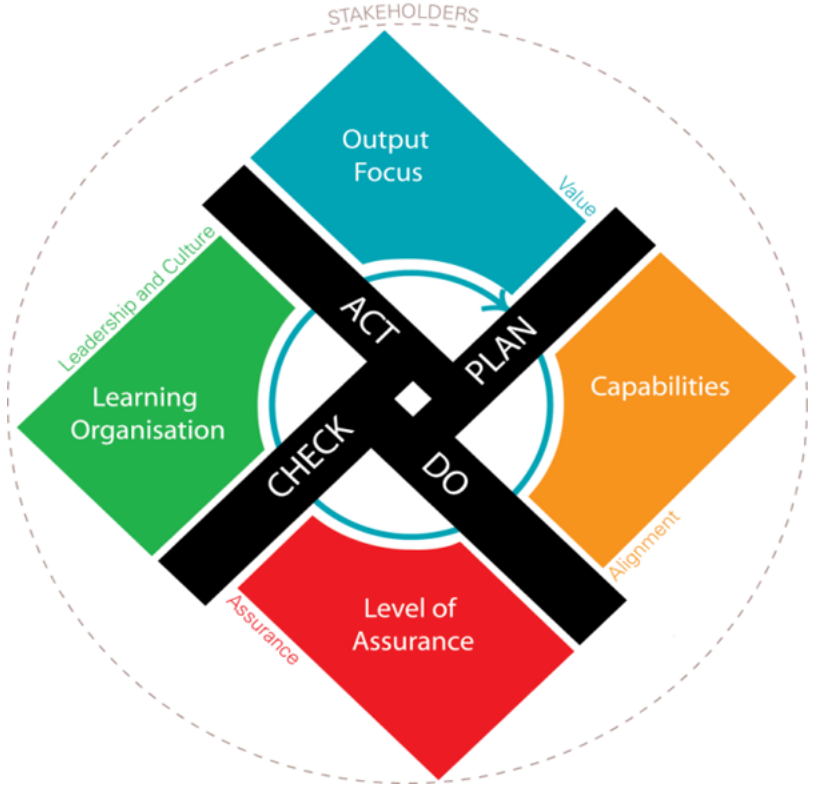
Intro - A Strategic Approach: Asset Management

- Presumptions:
  - All asset types are highly interdependent, and the optimal management of physical assets also involves:
    - *Managing people (**SAP – HR Module**),*
    - *Information (**SAP – Plant Maintenance Module**),*
    - *Finances (**SAP – Finance Module**)*
  - Removal of 'silos', and the consideration of assets in a system of systems context, along with the cross-functional optimization of their life cycles, are core principles of good asset management
- Structured around the familiar Plan-Do-Check-Act cycle of continual improvement.



Asset Management

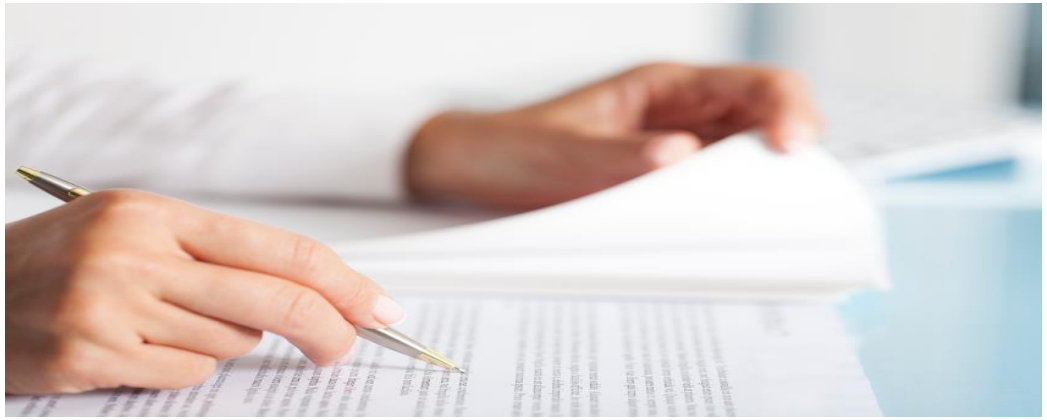
ISO55000 determines Asset Management in a broad scope:

- Not just physical assets, although these are significant elements - “coordinated activity of an organization to realise value from assets”.
- Based on a life cycle management approach to realise this value.

Core message from the Standard is that assets must be managed **within an *integrated* framework – the Asset Management System.**

- Organisational structure, governance, management, leadership & culture (tie value creation & profit generation to physical assets).

Standards provide some stability, consistency and a core direction for the way forward to improve organisational performance!



International Standards ISO55000x Asset Management

- International standards developed for Asset Management first Australian published 2014.
- Australian Mirror Committee MB19 and ISO Technical Committee TC251 Asset Management.
- Focus on value creation through assets and ensuring asset management is driven by top management.
- A strategic perspective to rethink the way physical assets facilitate the delivery of services.
- Assets – not always tangible – intangible.
- May also be financial and non-financial .

ISO 55000x supported by a Technical Committee (TC251) – global reach

Game Changers

Contemporary asset management reflects general movement to shift away from asset maintenance to focus on the bigger picture of life cycle asset assessment integrated across organisational functions including:

- Strategy,
- Risk management & measurement,
- Safety,
- Environment & sustainability,
- Human factors.

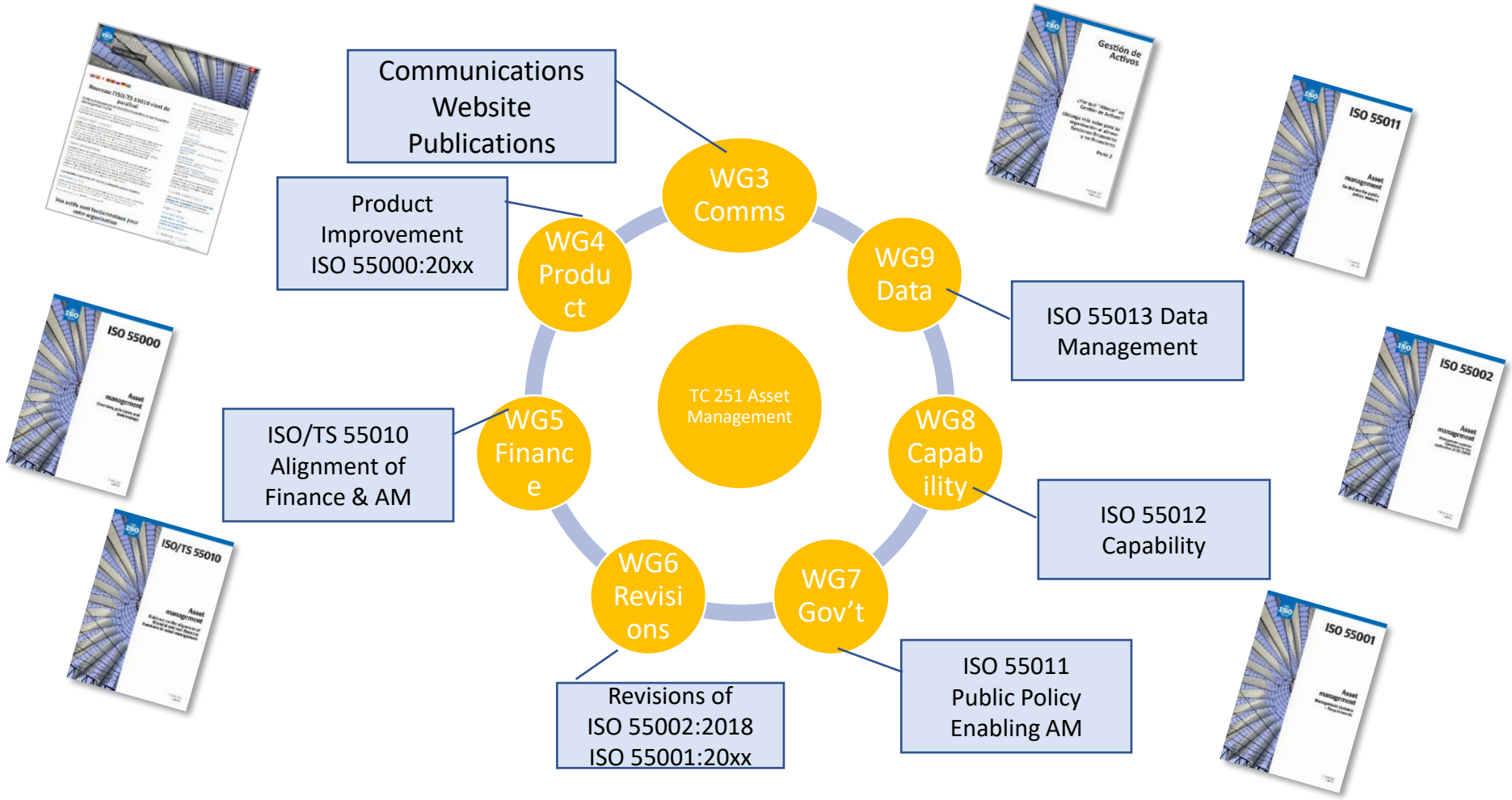
Increased awareness that infrastructure assets are the means to deliver services to fulfil citizens/ community needs and requirements.

Advance of ‘Digital Twin’ and BIM
‘Asset as a service’

Shift: AM projects led by CIO to Asset Managers – career paths

Broad view of cost/benefit e.g. UK Manchester Light Rail - benefits to health not just transport

Technical Committee TC251 Structure



ISO 55000x Asset Management Series

- Existing Body of Work

- **ISO55000** Overview, principles, terminology
- **ISO 55001** Management systems, Requirements
- **ISO 55002** – Guidance document to give detailed explanation and practical support to implement the ISO 55000 requirements
- Like ISO9000 – it is a management standard.
- Based on a 'continual improvement' model

- Current Work

- ISO 55001/2 – update specific and practical assistance.
- ISO 55010 - *Guidance on the alignment of financial and non-financial functions* in asset management.
- ISO 55011 Government Policy initiated by US – specific to public sector –
- ISO5512 – People Management
- ISO55013 Data Management

Key element is a Strategic Asset Management Plan (SAMP)

- *"information that specifies how **organisational objectives** are to be converted into **asset management objectives**, the approach for developing **AMPs**, and the role of the **asset management system** in supporting achievement of the **asset management objectives**"*
- *(ISO 55001:2014).*

Benefits: adopting/aligning to ISO standards

- Enables an organisation to achieve its objectives through ‘effective and efficient management of assets’
- Applying principles of an Asset Management System provides assurance those objectives can be achieved consistently and sustainably over time
- Allows benchmarking to a global community of practice - best practice exemplars

Benefits of Integration & Alignment

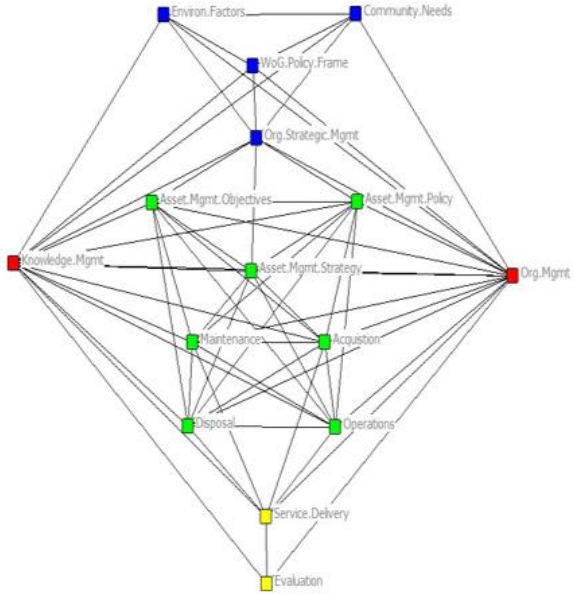
The processes of the ISAM framework are presented here as a network map

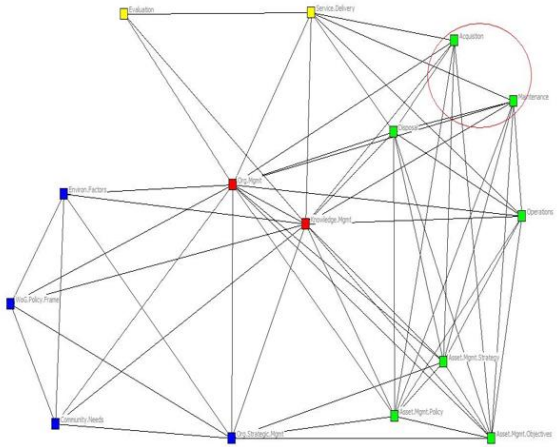
Each node represents a coordinator
for each of the functions of asset management

The ties between the nodes are the relationships
that must exist for efficient service delivery

The network map provides a blueprint
for an 'ideal' model for organisations to use
in strategic asset management

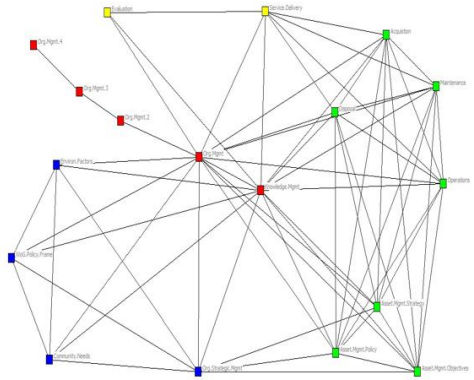
The aim is to structure organisational charts
and processes in the most efficient manner
possible for service delivery



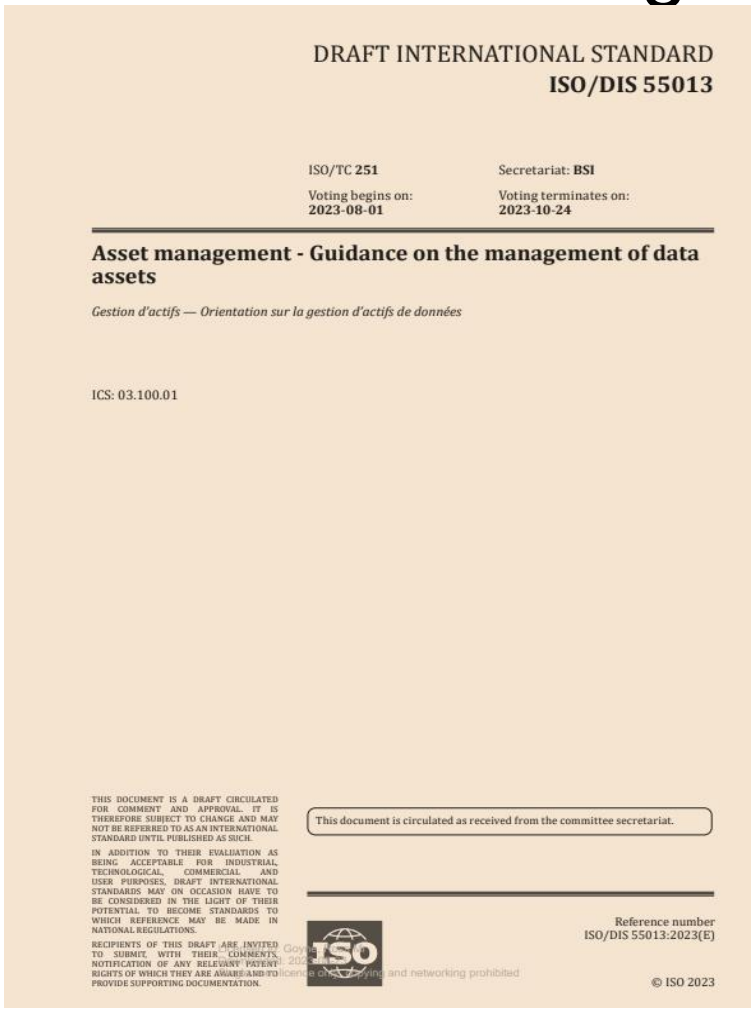


When an organisation's
business model is NOT
aligned…

Fully aligned
business model



ISO55013: Asset Management – Guidance on the management of data assets



DRAFT INTERNATIONAL STANDARD
ISO/DIS 55013

ISO/TC **251** Secretariat: **BSI**

Voting begins on: **2023-08-01** Voting terminates on: **2023-10-24**

Asset management - Guidance on the management of data assets

Gestion d'actifs — Orientation sur la gestion d'actifs de données

ICS: 03.100.01

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This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 55013:2023(E)

- Built on assumption - asset management involves decision making with decisions being reliant on data, especially for larger, more complex contexts.

- ISO 55013 incorporates management of data for:
  - a) supporting asset management and
  - b) handling the data as an asset.

- Change = Data- from a resource supporting management activities to a non-physical asset from which value is generated by being managed systematically, like any other tangible or intangible asset

Tangible opportunities

Alignment ISO55000x	Asset Management	SAP - Plant Maintenance	
		Action	Transaction
Leadership	**Leadership**: occurs at all levels of an organisation, but mandatorily starts at the top! Communicating requirements: Asset Information Strategies; Asset Information Standards; Data and Information Management, Outputs and Cleansing.	Monitor	IW38
		Direct	IW69
		Support	PM01
Planning	**Planning**: Delivering grass root understandings and alignment of strategy and outputs. Identify risks and opportunities: Risk Management; Asset Health Monitoring; Management Reviews; Asset Costing, Depreciation and Valuations.	Asset Data Structuring	IH01
		Notifications	IW28
		Work Orders	IW38
		Condition	IK17
		Review Fault Codes	IW69
Support	**Support**: Resources / Competency / Communication / Employer Information Requirements / Records. Resource and competency requirements: Organisational Structures of Competencies; Work Flows and Resource Management.	Notifications	IW28
		Work Orders	IW38
		Task Lists	IA10
Operation	**Operations**: Health Checks / Management of Change / Risk Management / Work Flows. Implementation of processes: Capital Planning Decision Making; Resourcing Strategies; Outage Strategies; OPEX and Capital Planning Cycles.	Notifications	IW28
		Work Orders	IW38
		Task Lists	IA10
Performance	**Performance**: Identification and evaluation of asset rich data. Monitor; Audit & Review: Configuration Management; Stakeholder Engagement; Contingency Planning.	Measurement Documents	IK17
		Asset Data	IH01
		Work Orders	IW39
		ALM	IH06, IH08
Improvement	**Improvement**: Responding; Searching and analytical evaluation driving improvements. Non-conformity; Corrective & Preventative: Systems Engineering; Risk Mitigation; Management Reviews.	Notification	IW28
		Work Orders	IW38
		Fault and Cause Codes	IW69
		Activity Codes	IW65

EAMS Top 10 changes to our business

1. New business rules e.g. **'no work can be done without a work order, and each work order must be against an asset'**
2. Introduction of **four Work Order types** – Immediate, Corrective, Preventative and Project
3. More structured **asset planning and scheduling activities**
4. **New** and **additional information to be recorded** against each asset at each location i.e. SAP and GIS Master Data
5. Asset **stock levels and materials will be delivered and managed at each depot**
6. More detailed **information will be available on work done on every asset**
7. Field workers entering **important information on assets through PCs and/or mobile devices**
8. Managers have more detailed information on **asset performance** and all maintenance work, including a record of the cost of maintaining assets
9. Managers more responsible for setting **asset maintenance budgets** and making **decisions about critical work**
10. New **information to be used to prioritise and manage maintenance activities** (i.e. notifications)

Notification Types

Network	Notification Type	Description
SEQ	S1	Work Request
SEQ	S2	Preventive
Regional	T1	Work Request
Regional	T2	Preventive

Notification Type	Description
G1	Service Request Weld Management Activity Recording
X1	Surveillance Management
G2	Data Change Asset Information
G3	Root Cause Analysis
G4	Temporary Speed Restrictions
G5	Business Group Referral
G7	Linear Survey Condition

Notification Category and Priority

- Work request (S1/T1) Notification type is used as initial record of the fault or defect which requires corrective maintenance work. This work request must have essential information about the
- defect against the asset,
- defect categorisation and
- priority of the defect
- Defects must be reviewed and prioritised based on their potential to lead to a functional failure (Category). Priority of the repair based on the probability of a functional failure occurring within the nominated timeframe.
- Note:
- Work Request Notification type is not an automatic authorization to perform maintenance work activities.

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Definition:
Safety – A defect or failure of an asset which could cause a risk
of serious/major injuries being sustained by
Employee/Contractor/Customer/Member of the Public.

Environmental – An event or defect that has the risk of a
negative environmental impact requiring some clean-up or
restorative works.

Example:
Broken rail, track buckle, track washout, extreme track gauge
variation, large ineffective sleeper cluster, broken boom gate
arm, overhead line trip, power line issue, signalling system has
not worked to design, unauthorised corridor access,
Spillage of oil / fuel, landside, wildfire, noxious weeds
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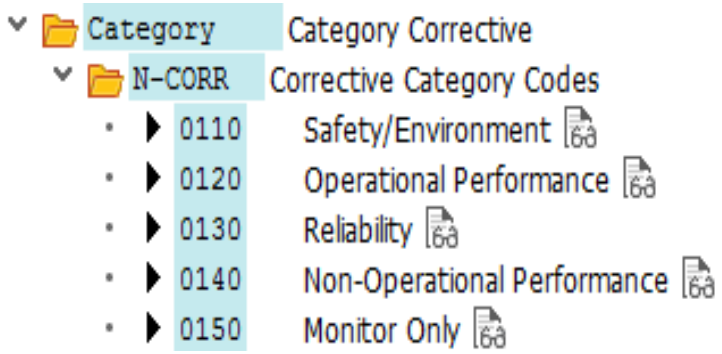
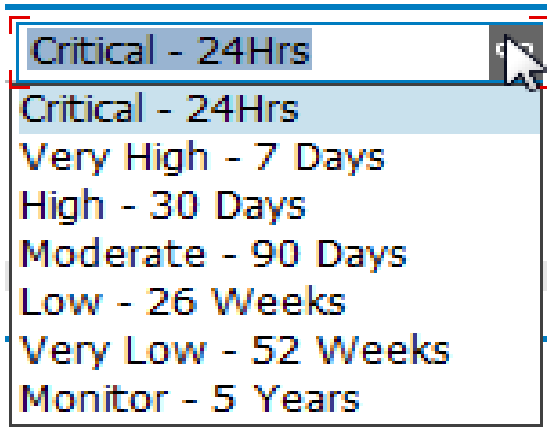




Case Study QR: What we have achieved

- Enterprise Asset Management System – Single source of asset and maintenance information

End-to-end visibility of the asset

Age ✓

Location ✓

Condition ✓

PM schedule ✓

Cost of asset ✓

Cost of maintenance ✓

Asset replacement date ✓

End of life date ✓

- EAMS Governance Process
- Asset Data Process
- Work Management Processes
- Asset Lifecycle Management (ALM)
- Integration with GIS, Primavera, InPlan
- Work Manager and MRS
- Asbestos, TSR, Workbench, Notifications

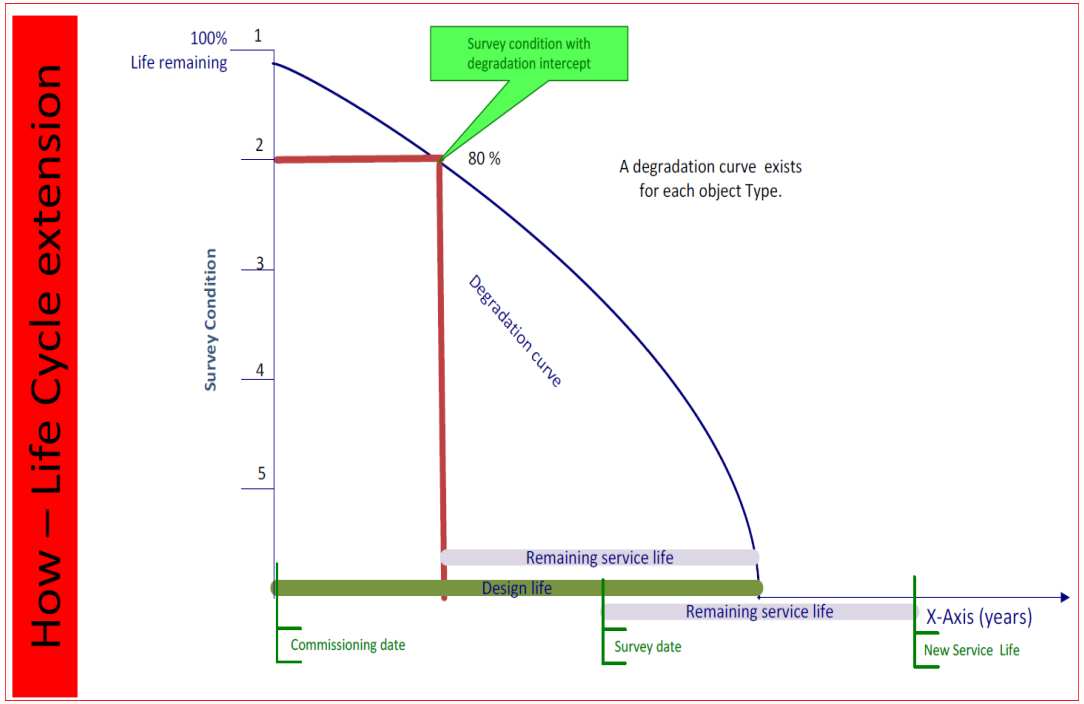
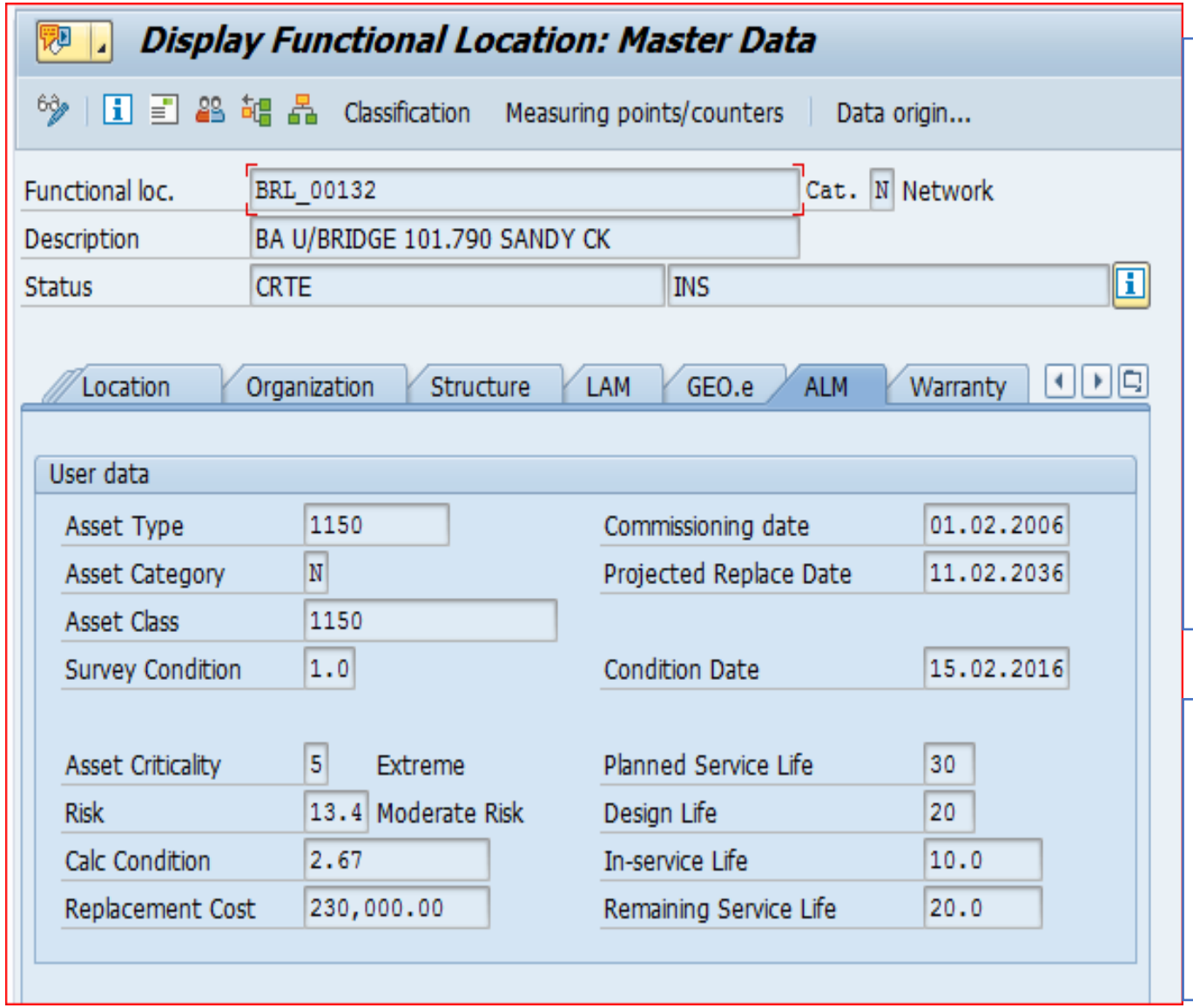


Table 1 Generic condition rating guidelines

	1	2	3	4	5
	Very good	Good	Average	Poor	Very Poor
Generic Condition Rating Scale	Very good condition	Good condition – minor defects only	Fair or moderate condition – maintenance required to return to acceptable level of service	Poor condition – consider renewal	Very poor condition – approaching unserviceable

How – ALM Tab (2015)



Risk Score

- **Risk is calculated from two factors:**
- **Risk Value = (Asset Criticality * Calculated Condition)**
- **e.g. Risk = (4 X 1.85) = 7.4**
- **If Risk Value > 20 = Extreme Risk**
- **If Risk Value 15 to 20 = High Risk**
- **If Risk Value 10 to 15 = Moderate Risk**
- **If Risk Value 5 to 10 = Low Risk**
- **If Risk Value < 5 = No Risk**

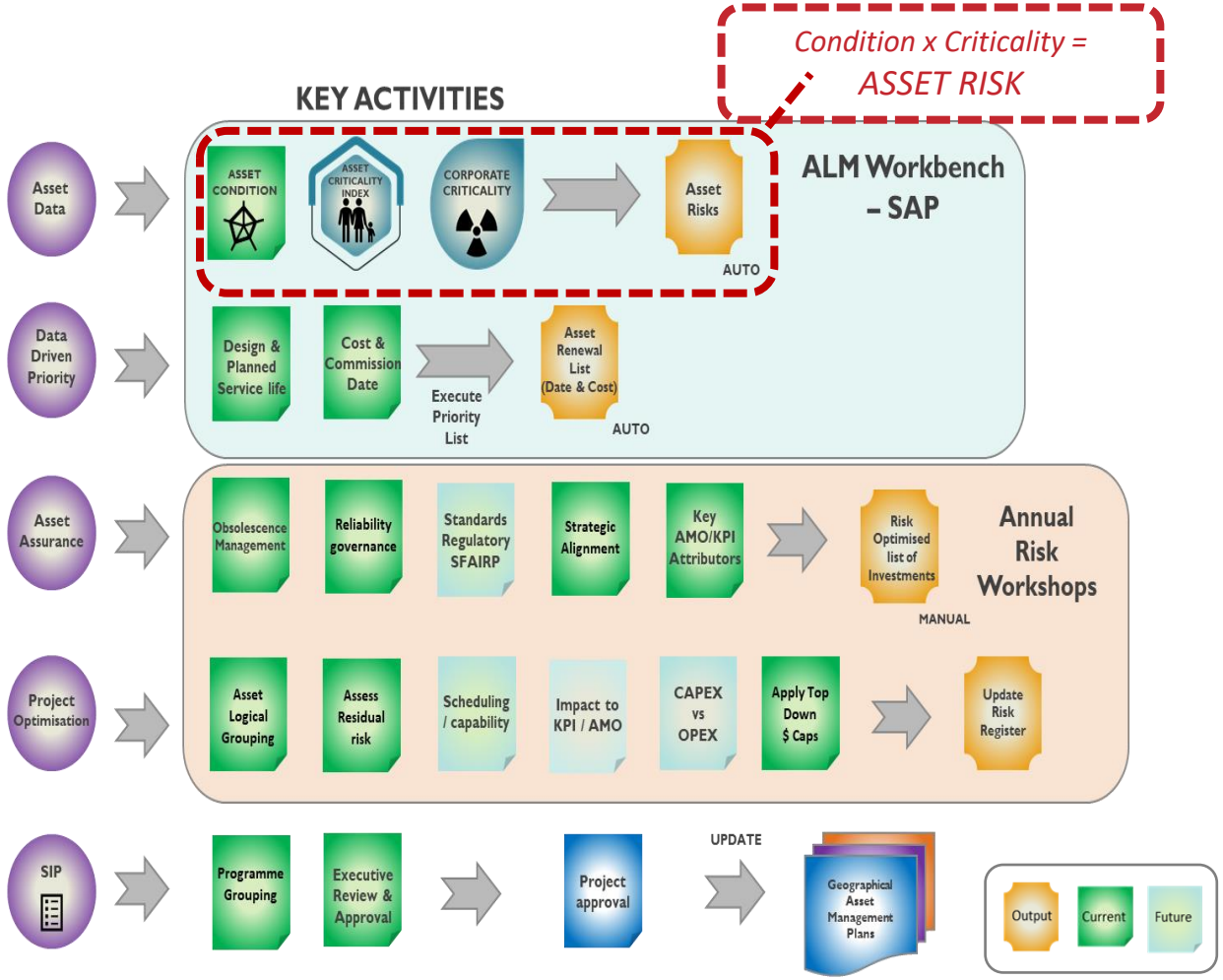
Calculated Condition

- **Condition coming from a measuring document and measuring point**
- **= (1+((In-service life X asset criticality) / Planned Service Life))**

Case Study QR: What we have Implemented

- Risk Based Decision Framework

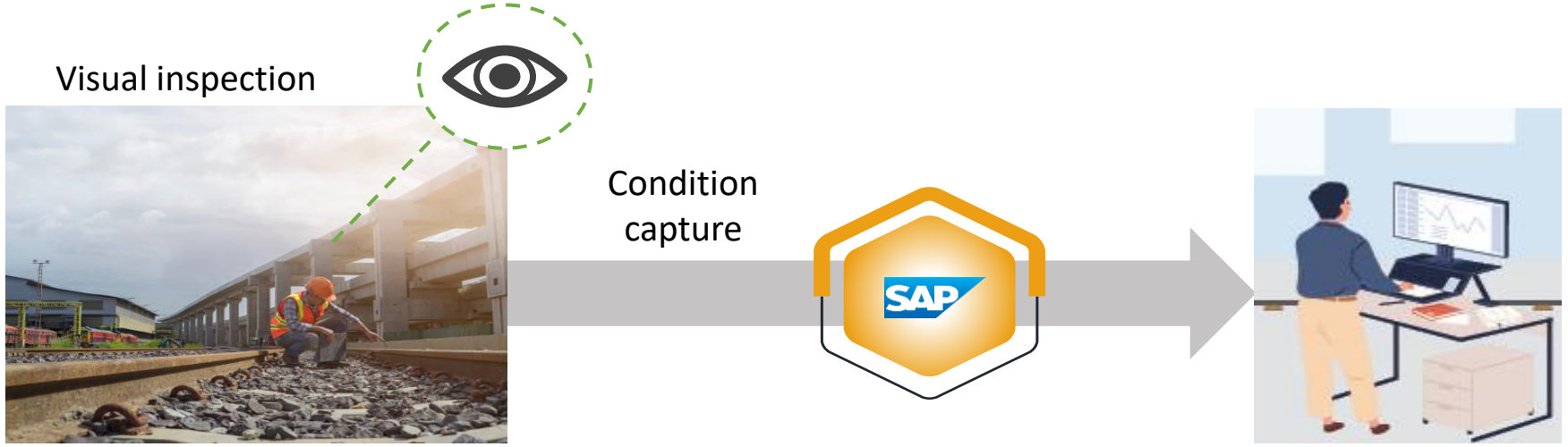
- The investment decision framework provides a new methodology for consistent risk-based, data-driven asset investment planning and decision-making. It gives consideration to asset management objectives, KPIs, cost, ability to deliver and customer outcomes.



Condition capture workflows (AHI)

Asset Health Index (AHI)

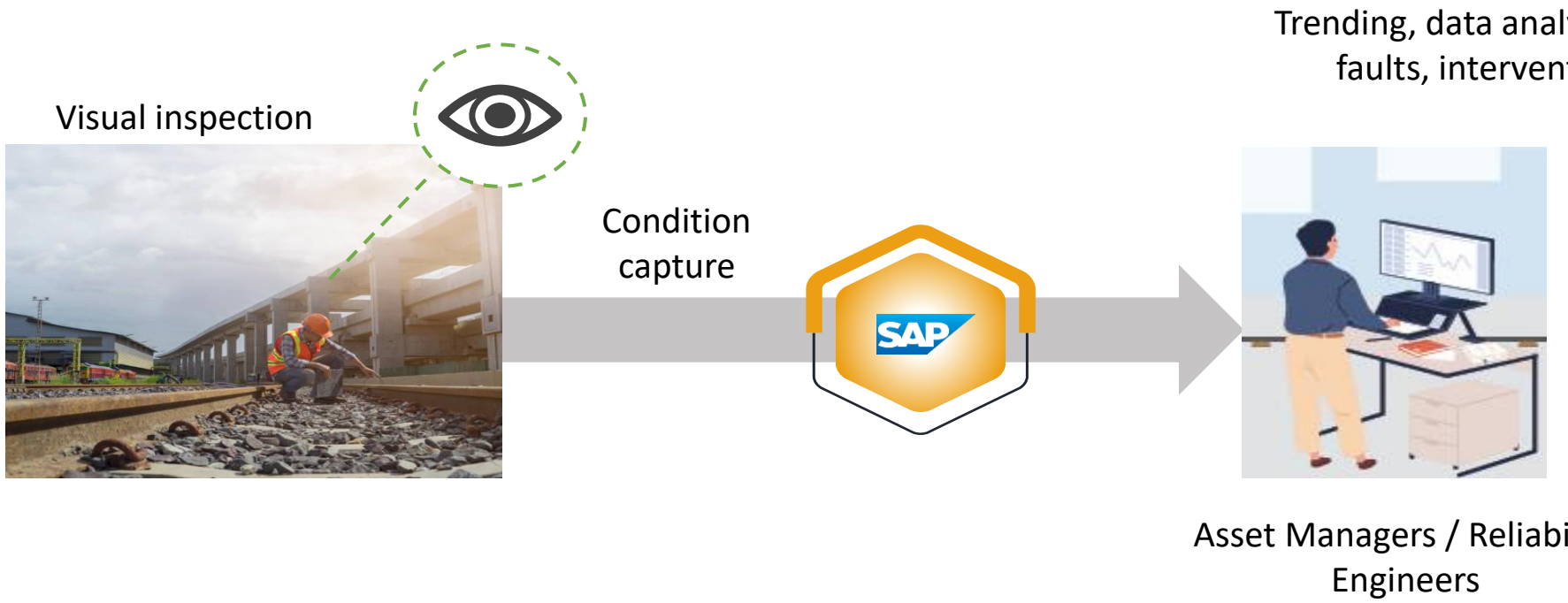
- The score given as a result of a **physical inspection** by a field inspector, based on a published table of relative scores.
- Suitable for assets such as signal mast/ladder, cable troughing/pits, buildings, carparks, stairs/ramps - assets where a visual inspection is sufficient and there is no benefit in establishing measurement points.



Condition capture workflows (UCI)

Universal Condition Index (UCI)

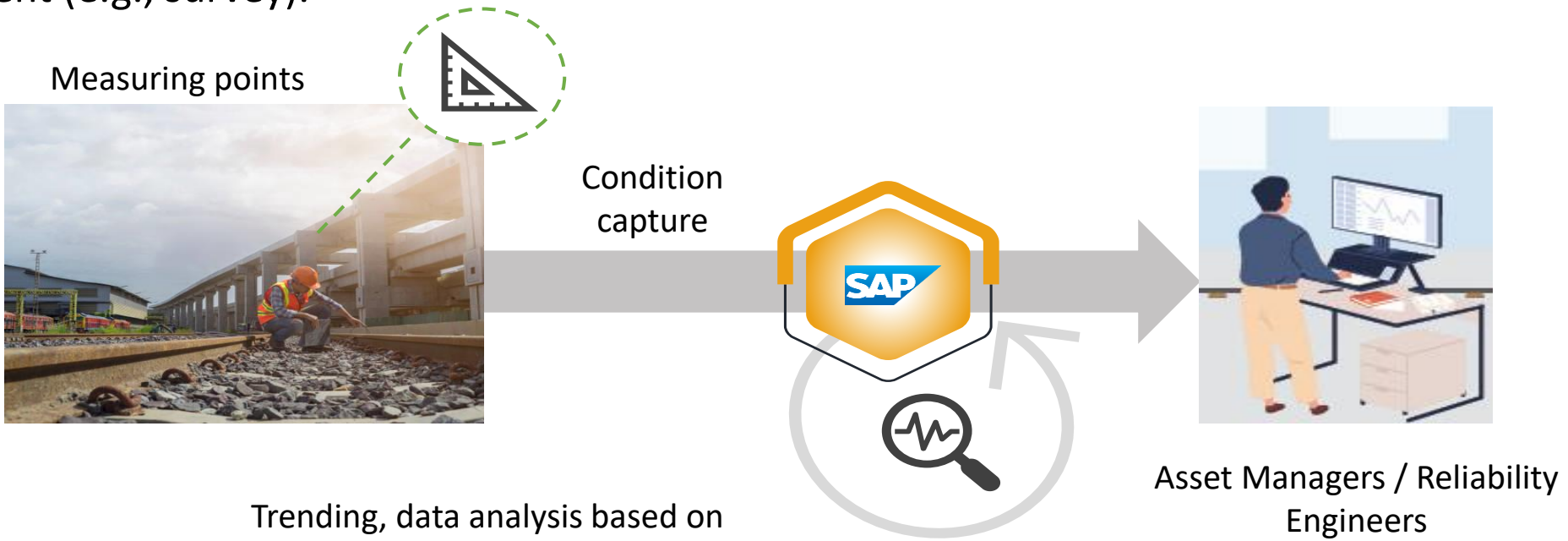
- Calculated likelihood of failure indicator based on **trend analysis** of work order history and severity data (SAP defect notifications).
- Suitable for fix on fail (FOF) assets or to support scores derived through other methods of assessment (including AHI).



Condition capture workflows (DCI)

Deterministic Condition Index (DCI) – manual measurements

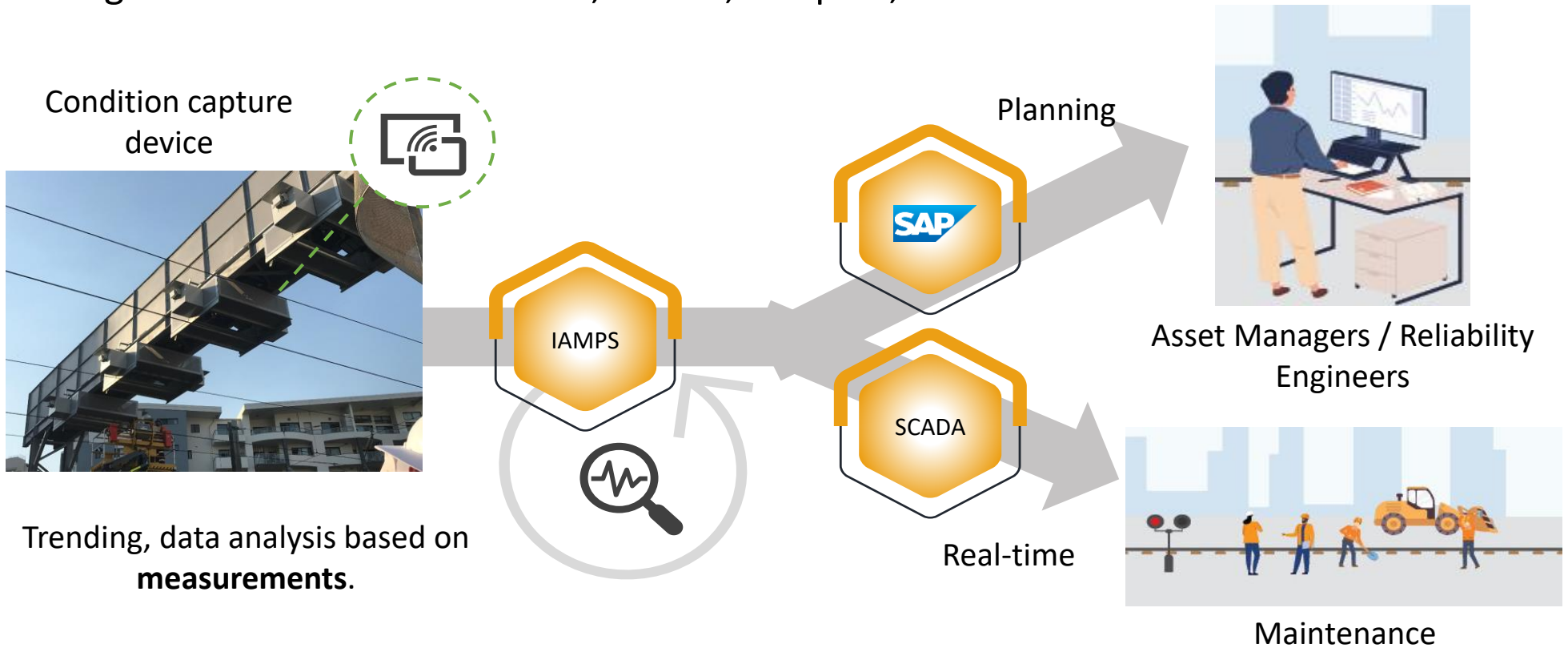
- Condition measured using **physical measurements** such as voltage, material loss, size of gaps or cracks etc.
- Suitable for assets where a measurement point can be monitored either by an inspector or monitoring equipment (e.g., survey).



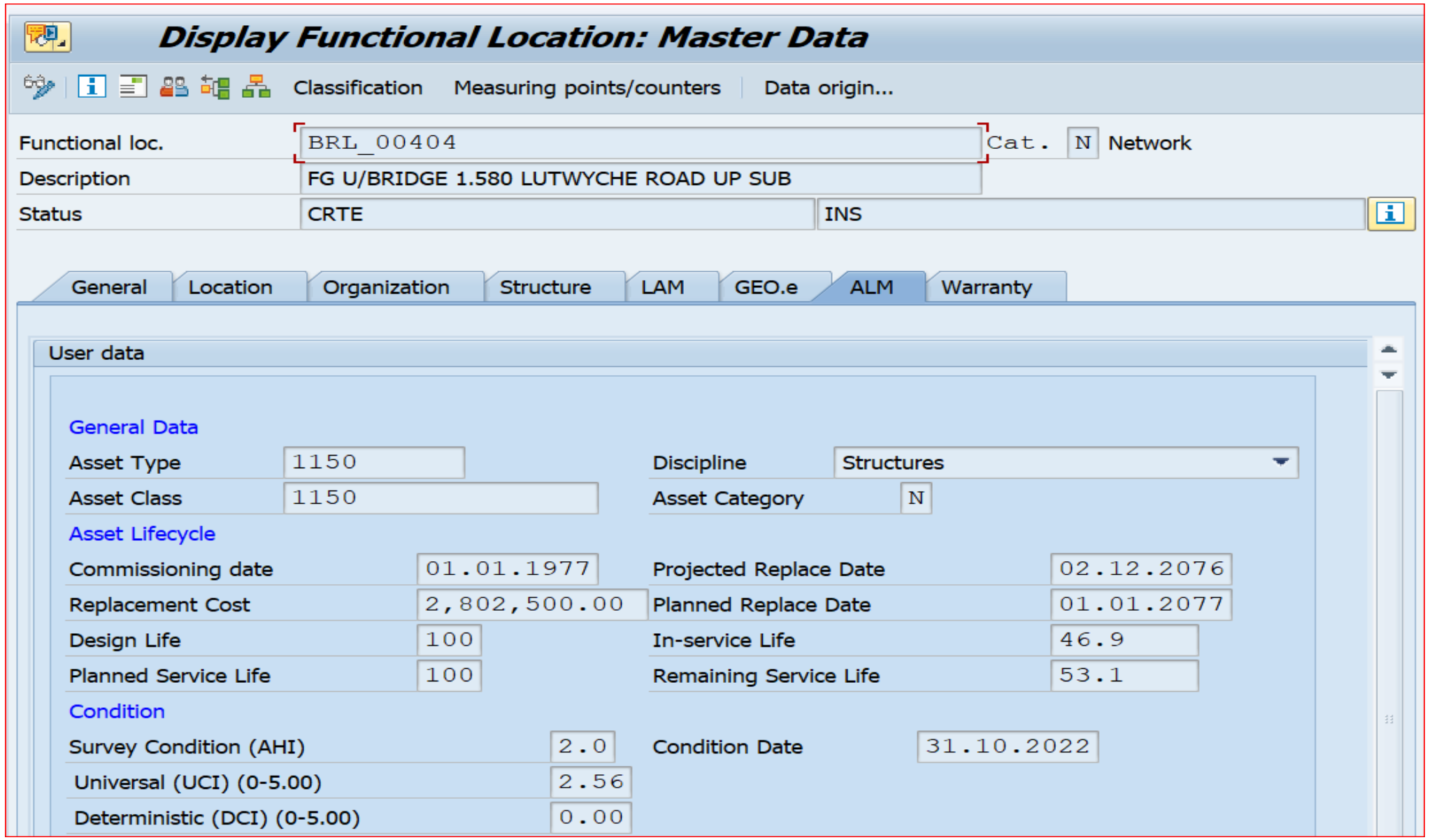
.. plus condition monitoring

Deterministic Condition Index (DCI) – with condition monitoring

- Machine-measured condition using automated **measuring devices**
- Suitable for high-critical assets such as rail, ballast, sleepers, overhead contact wire



How – ALM Tab (2021)



How – ALM Tab (2021)

Criticality

Asset Criticality	3.38	Corporate Criticality	0
Tonnage (0-100)	75	Safety (0-5)	0
Operational Impacts (0-100)	20	Regulatory/Liability (0-5)	0
Redundancy (0-100)	80	Asset, Operation & Services (0-5)	0
Maintain. (Spares) (0-50)	50	Heritage, Envi. & Indigenous (0-5)	0
Maintain. (Access) (0-50)	50	Customer, Brand & Reputation (0-5)	0
Usage (0-100)	60	Financial (0-5)	0

Risk

Asset Risk (AHI)	6.76	Corp Risk (AHI)	0.00
Asset Risk (UCI)	8.65	Corp Risk (UCI)	0.00
Asset Risk (DCI)	0.00	Corp Risk (DCI)	0.00

Obsolescence

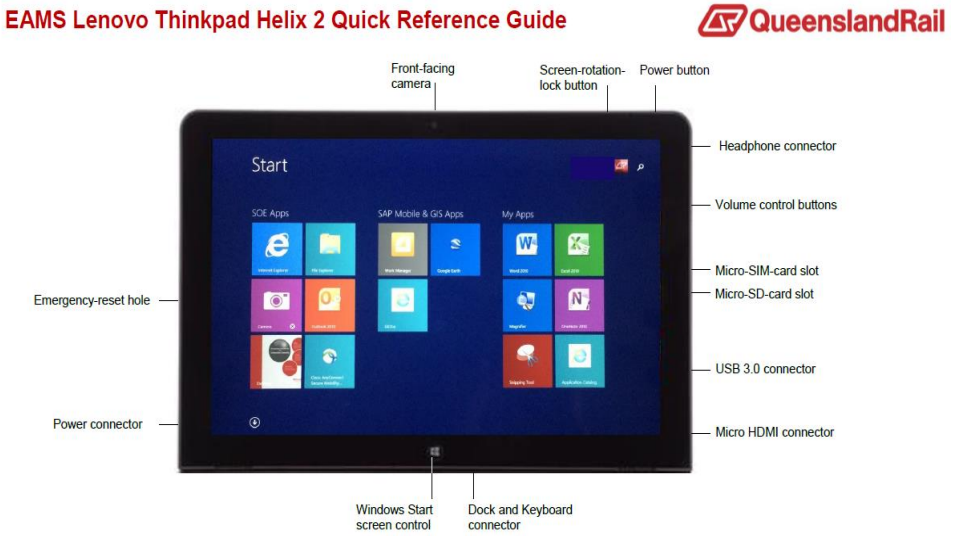
☐ Obsolete

Date of Obsolescence

Obsolescence Details

Mobility

- Works Management using SAP Work Manager.
- Time confirmation, response time and location details are captured on Tablet.
- Only one discipline users using PDA pre-EAMS.
- Post EAMS more than half of field users using tablets (Approximately 1000+)



Home Gallery Map Scene Groups Sign In

web maps

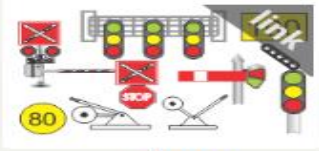
**my.assist

*my.assets (EAMS)

*my.explore

my.belowrailassets

web links



route maps

line section codes

aims 3d viewer

level crossings

xsite drawings

information and ownership

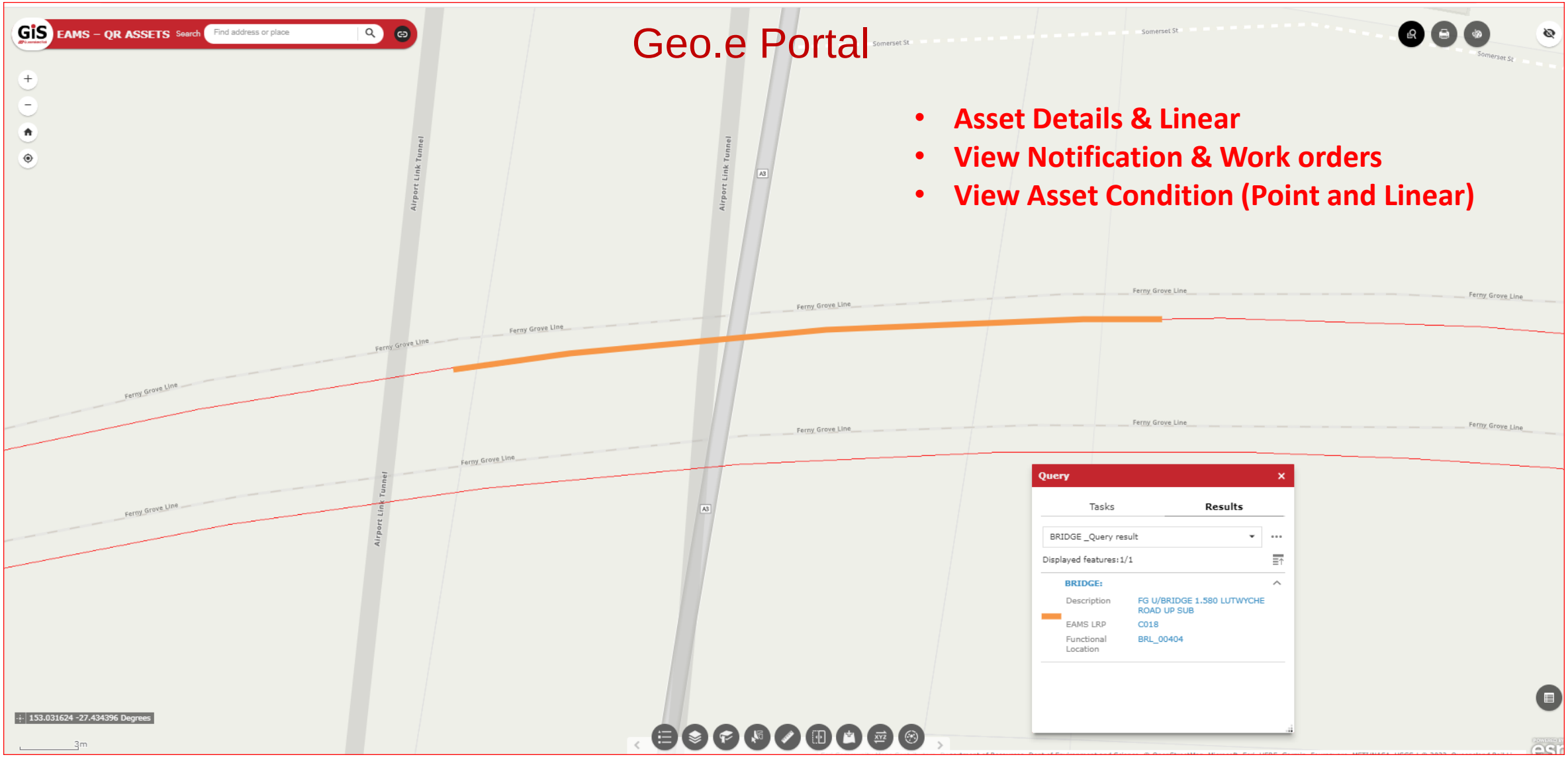
sap corridors


current issues

floodmon

Geo.e Portal

- Asset Details & Linear
- View Notification & Work orders
- View Asset Condition (Point and Linear)



Case Study QR: What we have learned

- Assets in the field and what is recorded in the system is always a challenge
- Asset Data Design – Classification, categorisation, recording and use of it
- Asset Data Standards – consistent data specifications
- Tools to capture the data in the field and from projects
- Purpose of data – Data Driven Decisions – what this means?
- Need to understand management of data

Case Study QR: What we have learned cont..

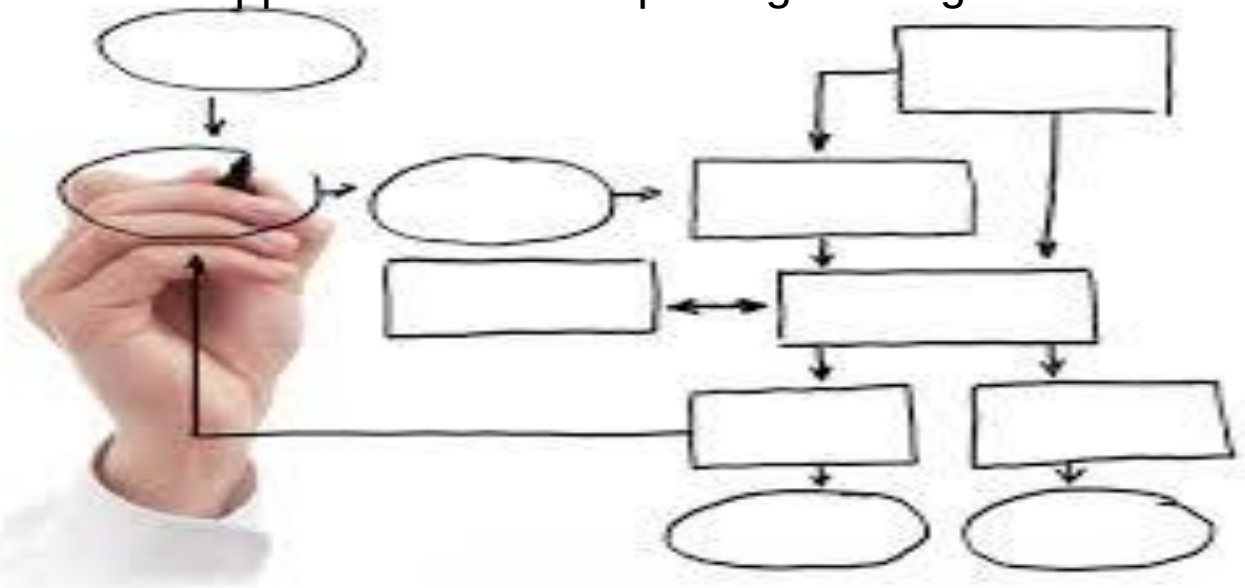
- Assets, Data, Systems and Processes Ownership
- Aligning to Strategic Asset Management Priorities
- Assets with and without maintenance (fix on fail)
- Review asset failure data and reliability analysis
- Accountability and Responsibility of data and continuous improvement
- Decision making criteria – asset management

Case Study QR: What we could do better

- MORE FOR LESS – Data, Systems, Processes, Integration and technology solutions
- Understand the orgasniational expectations and maturity
- Change and support management framework
- Simplifying the asset management
- Continuous improvement plan – understand benchmarking and aligning with National standards
- Aligning the asset management leadership with organsiational, strategic direction and priorities
- Communication, Collaboration, Integration, Digital Technology implementations
- Understand the value and the importance of data – for Data Driven Decisions

Conclusion

- Novel and innovative approaches required for Strategic Asset Management - long life infrastructure, new asset requirements with complex technologies
- Global community of practice - ISO standards and International benchmarking - ISO Standard Asset Management introduced end 2014
- Shift to service-centric approach and underpinning framing of assets delivering value



- Case study QR – Managing data

How to Connect with Us

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