

Road Hierarchy, Data Collection & Data Management

UKNiAF RD0011 Workshop 2
20th October 2021

Presented by:

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Agenda

- Road Hierarchy
- Resilient network
- Data
- Data Collection
- Data Management & Systems



What is a classified road hierarchy?

All UK roads are classified within the six categories listed below, from the highest class at the top (motorways) to the lowest class at the bottom (unclassified):

- Motorways – Strategic High Speed links
- Trunk roads – Cross country roads intended to provide large-scale transport links
- A roads – Large-scale transport links within or between major cities
- B roads - Connect smaller towns and feed traffic between A roads and smaller roads on the network.
- C roads – Connect unclassified roads with A and B roads, often linking a village to the rest of the network.
- Unclassified roads - Local roads intended for local traffic.

They are often historic and don't reflect changes in the network or demographics



What is a classified road hierarchy?

Nigeria has a similar network

- Motorways – Strategic High Speed links
- Roads that provide large-scale transport links within or between major cities
- Roads that connect smaller towns and feed traffic between A roads and smaller roads on the network.
- Roads that connect the previous, often linking a village to the rest of the network.
- Local roads intended for local traffic.

And again these may be historic and not reflect changes in the network or demographics



What is a road maintenance hierarchy?

- A road maintenance hierarchy is the foundation of a coherent, consistent, well managed and auditable infrastructure maintenance strategy.
- It is crucial to asset management planning as it enables
 - different levels of service to be associated with different maintenance categories
 - a range of maintenance strategies
- It ensures maintenance is appropriate to the use and importance of the road hierarchy

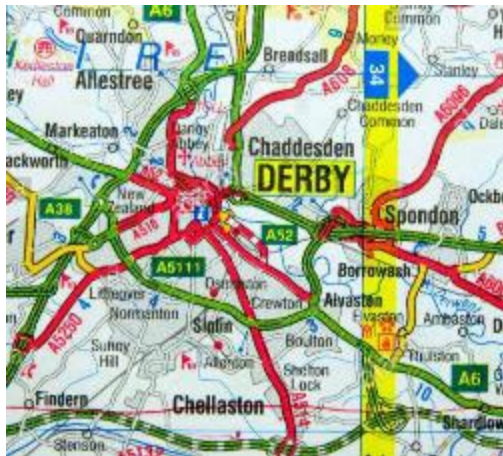


Its based on use and importance of the road in transporting people and goods

What's the difference?

A maintenance hierarchy

- recognises roads by their use and importance
- is an assessment based on data
- is consistent and repeatable



A new hierarchy to support maintenance

UK Motorways and Trunk Roads managed by the government dept

The rest regionally by local councils

- A maintenance hierarchy offering greater granularity
 - 4 classified descriptors become 8 maintenance hierarchy descriptors
 - Meaning more treatment options service levels appropriate to the importance and use

Maintenance Hierarchy	Type of Road	Description
M101	Strategic Roads	Major national cross-country roads between places of traffic importance across the UK, with the aim of providing easily identifiable routes to access the whole of the country i.e. motorway network. Typically, major dual carriageways and major single A roads.
M102	Main Distributors	Primary roads within the city providing quick access to urban areas, linking to major industrial/ retail areas and main centres of employment. These roads will typically be inner and outer ring roads.
M103	Secondary Distributors	Roads connecting urban areas to the inner and outer ring road. Typically, major bus routes and roads serving smaller retail i.e. District Centres, business and leisure facilities. Also including roads serving the city centre from the inner ring roads.
M104	Tertiary Distributors	Roads providing alternative but less direct links between urban areas and the inner and outer ring roads. They typically are the main routes through residential and industrial areas and will have less traffic than secondary roads.
M105	Collector Roads	Roads providing links within residential areas, often bus routes, small shopping frontages <4 shops. Typically, the spine road through an urban estate, collecting traffic from access and minor residential roads.
M106	Access Roads	Roads serving to distribute users from major residential roads to minor residential roads, often with on street parking serving >30 properties including long cul-de-sacs and minor industrial estate roads
M107	Minor Residential Roads	Urban residential roads including those with a shared road space. Typically, cul-de-sacs with <30 properties, including paved service roads i.e. rear of residential properties/shops
M108	Back/service Roads	Unpaved/gravel roads

Hierarchy and maintenance

- Lifecycle and costs are appropriate to usage
- Lifecycle plan for each hierarchy
- Provides an opportunity to prioritise works by hierarchy knowing this will reflect importance and use

M102

Lifecycle:		Life until next intervention (years)
Treatment 1	Tar and Chippings	8
Treatment 2	SD or Micro	8
Treatment 3	Tar and Chippings	14
	Lifecycle	30



M104

Lifecycle:		Life until next intervention (years)
Treatment 1	Patch	10
Treatment 2	Patch	10
Treatment 3	Patch	10
Treatment 4	Tar and Chippings	30
	Lifecycle	60



M106

Lifecycle:		Life until next intervention (years)
Treatment 1	Scrape and compact	4
Treatment 2	Scrape and compact	4
Treatment 3	Resurface	10
	Lifecycle	18



Hierarchy and inspections

- Inspection frequencies can be based on the maintenance hierarchy and relate to importance of road and volumes of traffic
 - risk = likelihood x consequence
- Allows differing strategies for approaching risk, response and defect rectification
 - Can deliver a risk based service
 - Can save money if used well



Colour Code on Map	Maintenance Hierarchy	Type of Road	Inspection Frequencies
Red	M101	Strategic Roads	MONTHLY
Blue	M102	Main Distributors	
Green	M103	Secondary Distributors	3 MONTHLY
Yellow	M104	Tertiary Distributors	
Purple	M105	Collector Roads	6 MONTHLY
Pink	M106	Access Roads	
Light Blue	M107	Minor Residential Roads	12 MONTHLY
Yellow	M108	Back/service Roads	

Creating a road hierarchy

Workshop - Use experience and local knowledge to determine roads that should be included in the top four hierarchies, M101, M102, M103 & M104.

GIS - Road hierarchies determined transferred to GIS

Traffic Flow Verification - Digital plans produced in Step 2 sense checked against available traffic flow data. In the course of scrutinising the traffic data some clear bandings of AADT (Annual Average Daily Traffic) should emerge to provide differentiation between hierarchies M101, M102 & M103. Roads identified as M104 also checked against the definition 'main routes within and through residential and industrial areas'.



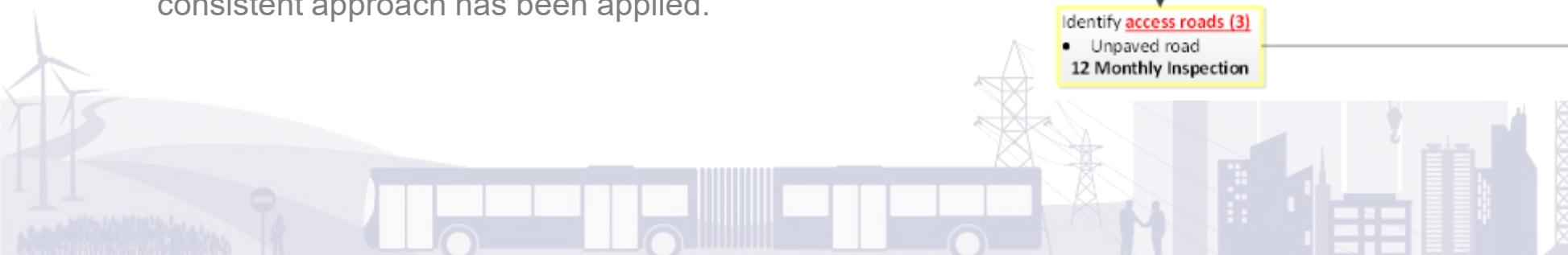
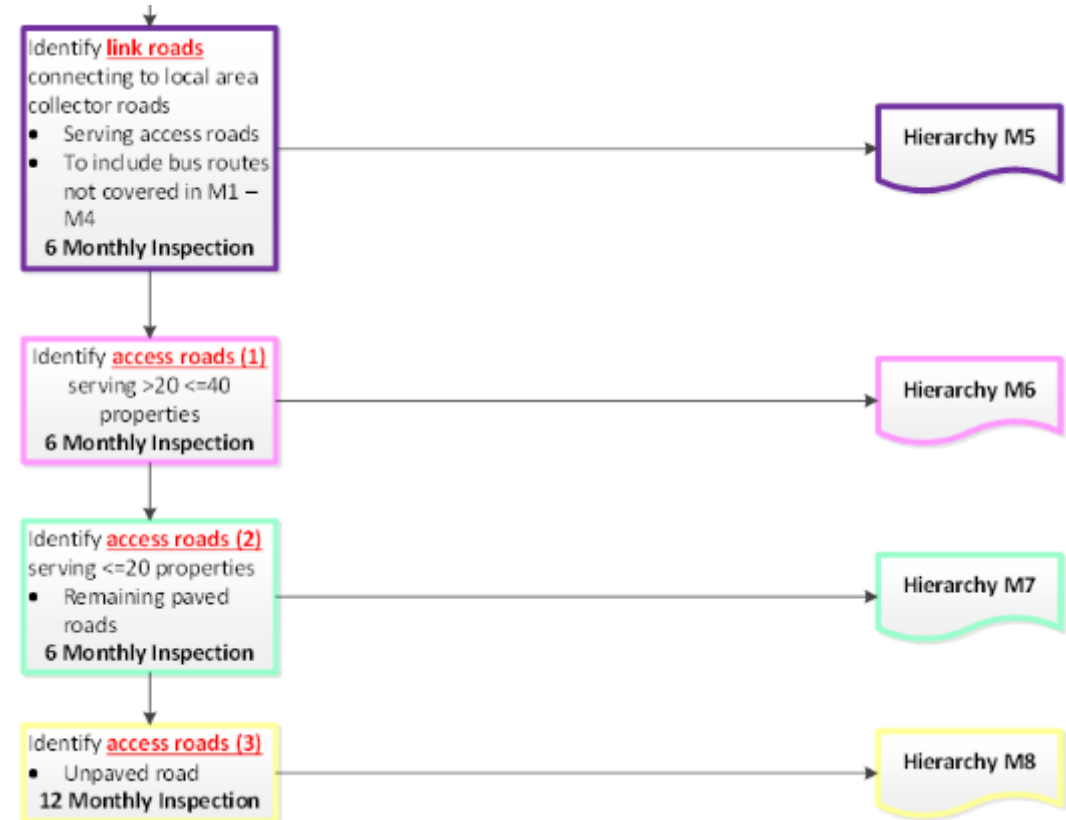
Creating a road hierarchy

Public Transport - Add bus routes to the digitised map. Any bus / public transport routes that were not covered by M101, M102 M103 and M104 should be assigned M105.

Bottom-up approach - The lowest level was agreed to be unsurfaced roads M108. (This will need to be reviewed for Nigeria). M107 (small cul-de-sacs serving less than 30 properties). M106 (roads collecting traffic from the small cul-de-sacs to feed into hierarchies M104 and M105)

Hierarchies M106, M107 and M108 were then added to the digitised layer.

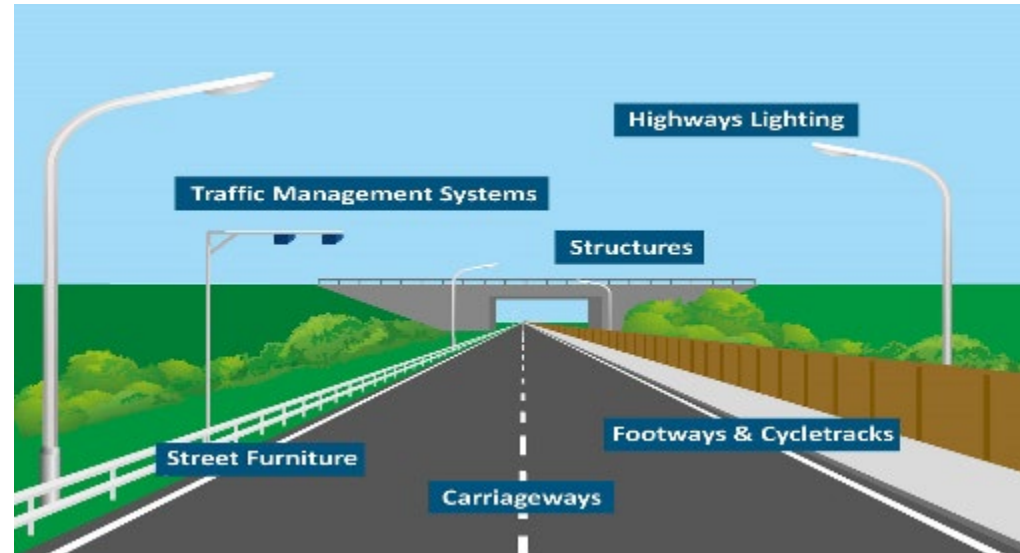
Finalise - Review and sense check to ensure that a consistent approach has been applied.



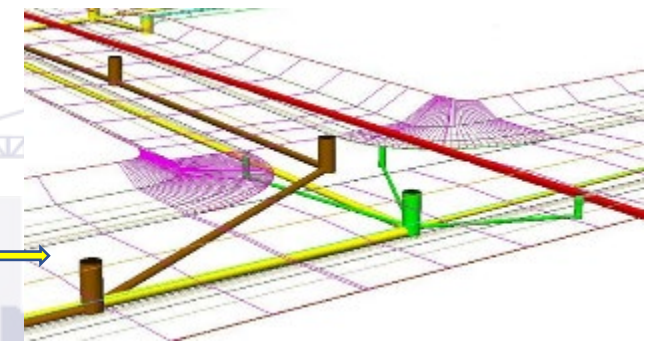
Do all assets have the same hierarchy?

- Most infrastructure assets will relate to the carriageway hierarchy and be predicated by vehicle flow.
- Those that will need a separate hierarchy will be subject to a different user group
 - Footways – predicated by pedestrian flow
 - Drainage – independent of carriageway layout
 - Cycleways – specific user and often independent of carriageway layout

Structures may have significant assets providing sole crossing points

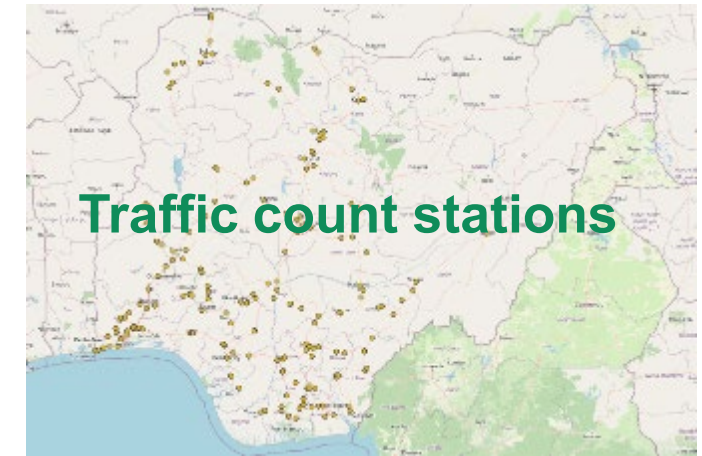
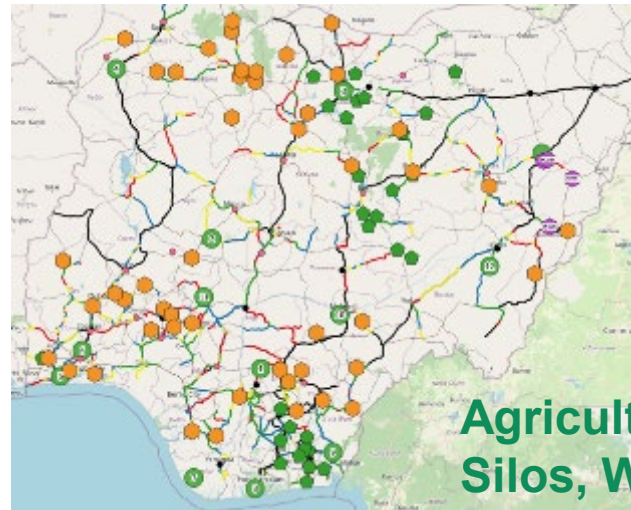


Series	Asset Group
M100	Carriageways
M200	Footways
M300	Street Lighting
M400	Cycle Routes
M500	Bridges & Structures
M600	Drainage
M700	Traffic Signals
M800	Street Scene



Nigeria - Key Route Network

- FERMA Covid-19 Response
- FMWH Agricultural Routes
- FMWH Economic Routes



Exercise: Hierarchies on the FRN

- Is the FERMA definition of priority roads on the FRN a good proxy for hierarchy?
- Are there different treatments that are applied to different priority roads?
- ...



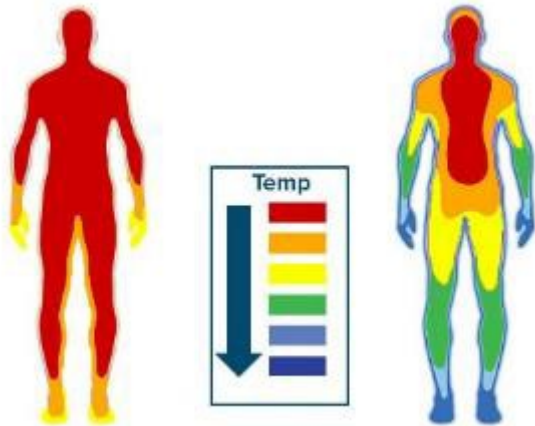
What is a resilient network?

- The Resilient Network is used to maintain economic activity, access to key services and to enable the citizens, businesses and visitors to go about their daily business in times of extreme weather or other significant events
- It's a network that can be maintained open for use 365 days a year

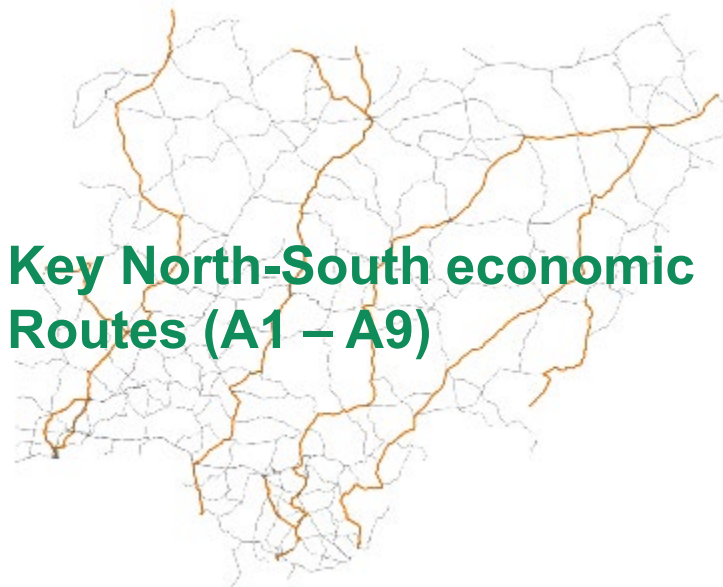


What does it look like, and why?

- It's the core network, essential to ensure the economy and the well being of citizens in times of extreme weather or other significant events



Key North-South economic Routes (A1 – A9)



Creating a resilient network

- Identify routes that can fulfil the more specific role of the a core resilient network for a range of issues beyond normal use
- The resilient network is the bare minimum to maintain when resources are scarce to maintain all roads
 - *UK snowfall*
 - Torrential rain / Flooding / Heatwaves
 - Strong winds / Sandstorms
 - Civil unrest

What might the main drivers be to the creation of a Resilient Network in Nigeria



What's the difference between a maintenance hierarchy and a resilient network

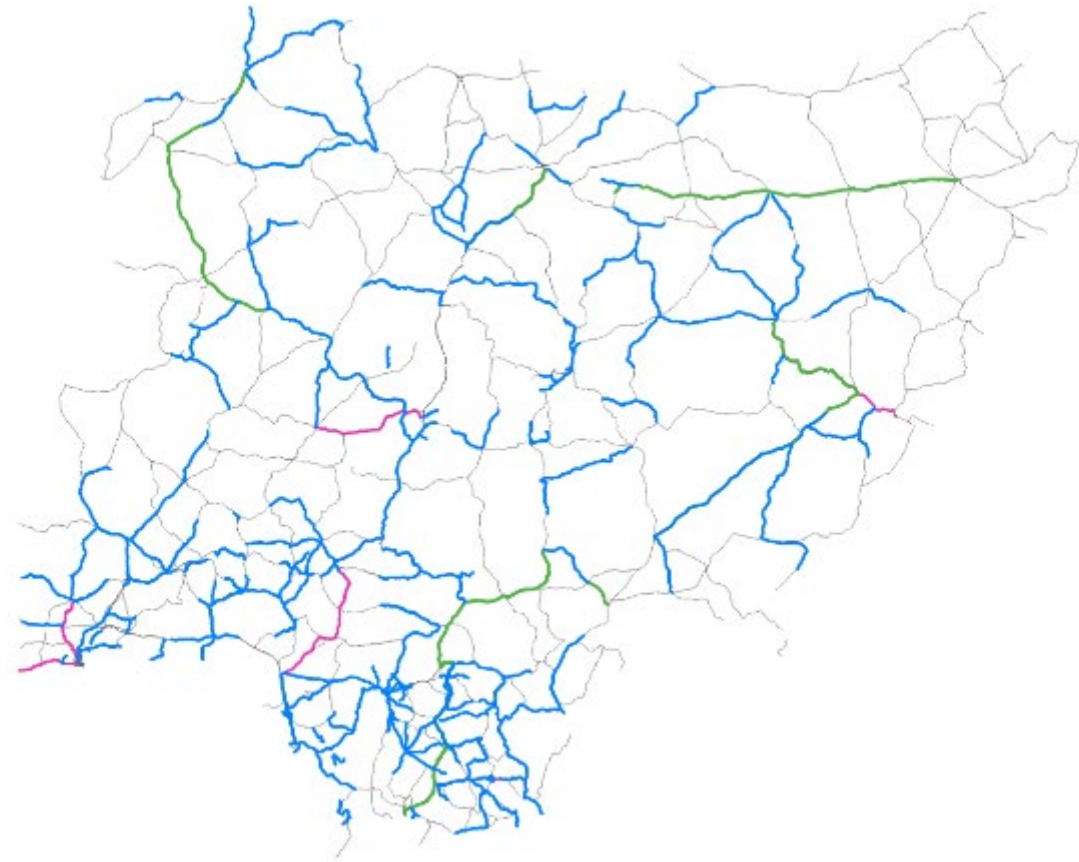
- The resilient network may comprise upper and lower levels of the maintenance hierarchy, depending on what purpose or access to locations they serve
 - e.g. access to a Power Station may not be an upper tier road in the maintenance hierarchy but it is essential to maintain access at all times for the benefit of the economy and well being of the citizens
- Hence the resilient network should be considered as essential to maintain over and above the maintenance hierarchy, as it needs to be available 24/7



Nigeria – Resilient Network ??

- FERMA Covid-19 Response
- FMWH Agricultural Routes
- FMWH Economic Routes

Are these routes part of the hierarchy,
perhaps the high level hierarchy
.. and are they part of a resilient
network



What could you consider when creating a resilient network?

Key installations

- Ministry of Defence
- Centres of food production
- Food depots and deliveries
- Police stations
- Ambulance stations
- Fire stations
- Hospitals with Accident and Emergency
- Bus Stations
- Railway Stations
- Primary Bus route

- Critical infrastructure identified in FERMA's emergency plan
- Petrol Stations
- Power Distribution Points
- Communications i.e. essential fibre optic cables etc.

Key locations of Economic value

- Main Business parks
- Main Industrial estates
- Main employment centre
- Agriculture

Where appropriate it may also be necessary to consider;

- Care Homes with Nursing Care facilities
- Educational Facilities (weekdays)
- Large Medical Clinics/ non A and E hospitals
- Utility facilities in need of access (gas, electricity, water, comms)
- Town and District Centres
- Large Retail/ Business Parks
- Secondary bus routes and school routes

Who might it affect - who will affect it?

- **Who should you consult with?**

- Neighbouring Country / Region Highway Authorities
- Fire and Rescue
- Ambulance Service
- Police
- Rail operators
- Bus Operators
- Ministry of Defence
- Emergency Planning department
- Utility Operators
- Stakeholders
 - Highways Maintenance
 - Traffic and Safety
 - Street lighting
 - Structures
 - Drainage

Everyone who provides an essential service critical to preserving life

Maintenance and the resilient network

- Maintenance hierarchy provides a means to prioritise cyclic, planned & reactive maintenance by understanding the importance and usage of the network
- The resilient network is essential to maintain economic activity, access to key services and to enable the citizens, businesses and visitors to go about their daily business in times of extreme weather or other significant events

As a consequence maintaining the resilient network is a priority



A lot of the early work has been done on the hierarchy and resilient network



UKNIAF ROADS COVID-19 Response *August 2020*

Presented by:

- UKNIAF



Road Data Sets (Basemap)

- Geo-referenced Basemap of FRN developed during NIAF2
- Approx. **31,000 km** mapped (out of total 35,000 km for FRN)
- Reliable geo-referenced trace data still required for some sections
 - TBC under UKNiAF
- All major routes mapped
- Whole network is divided into **2,843** individual section lengths for analysis
 - All sections included in analyses



Road Data Set 1 (FERMA Covid-19 Response)

- 215 identified routes
- 207 have been mapped
- Issues for 8 sections not mapped
 - Some duplicates
 - Some unable to locate
 - Limited overlap with Federal network

Highlights need for some clarification works with FMWH to finalize FRN Basemap?



Road Data Set 2 (FMWH: agricultural routes)

Agricultural Routes (identified by FMWH)

Federal Roads identified by FMWH as passing through agricultural production areas

Context

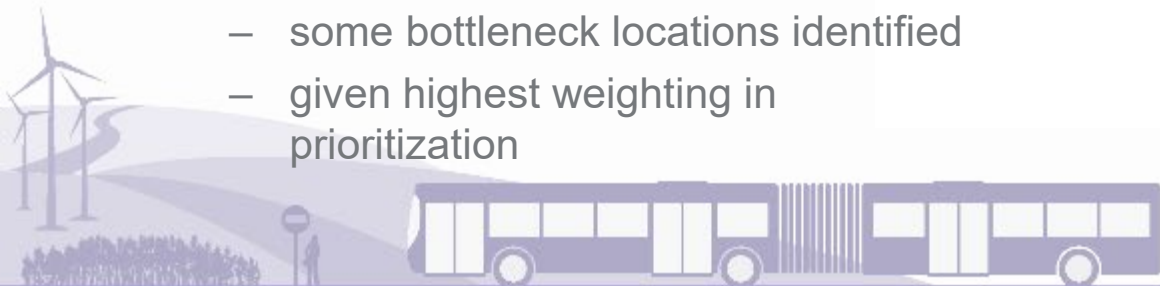
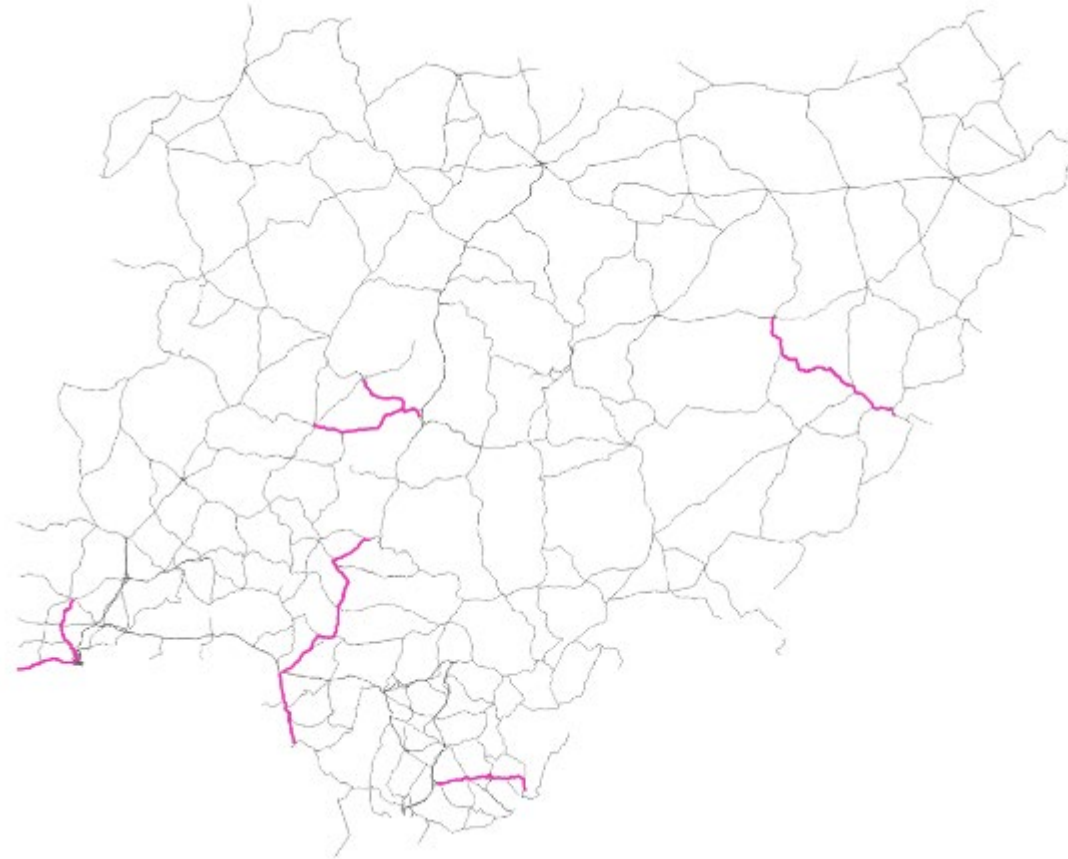
- These are key agricultural routes that FMWH has worked on in recent years
- FMWH are not saying they are the *only* key agricultural routes



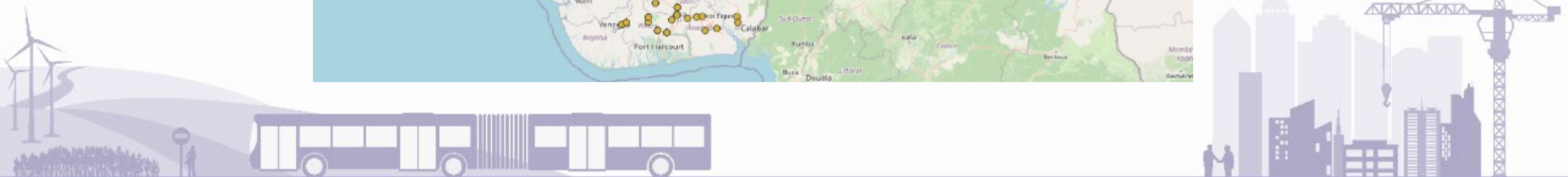
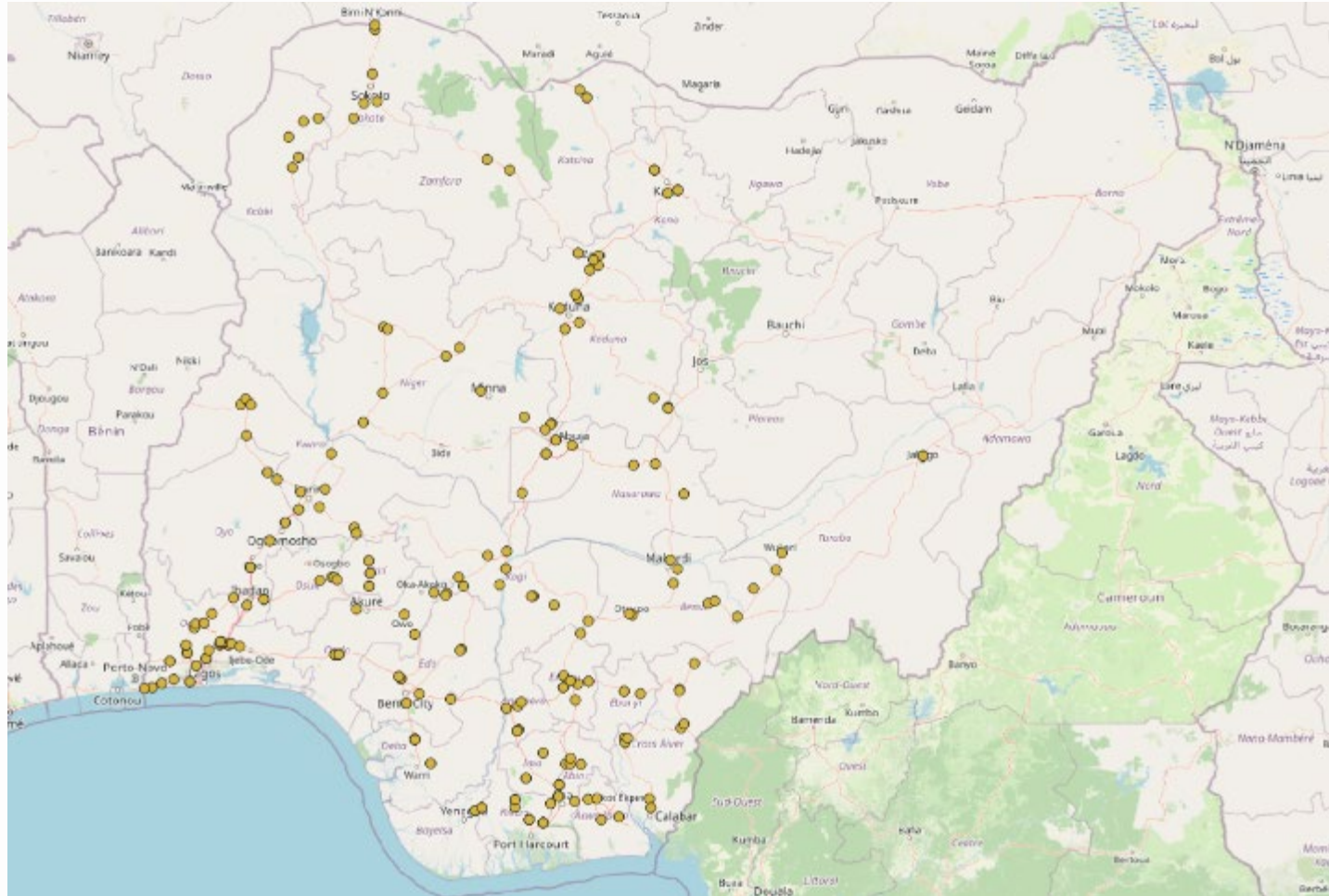
Road Data Set 3 (FMWH: key economic routes subject to gridlock in rainy season)

FMWH Report identified certain routes known to have bottlenecks in rainy season

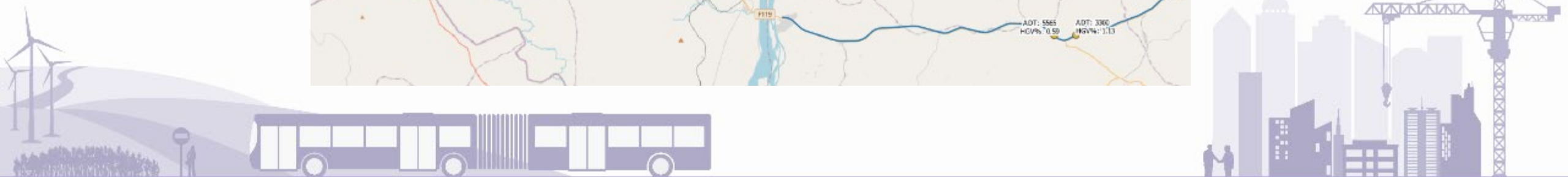
- Eight route sections, identified for economic importance/transport of
 - Agri products
 - Fuel
 - Industrial products
- Heavily trafficked
- Bottlenecks develop on some sections during rainy season
 - some bottleneck locations identified
 - given highest weighting in prioritization



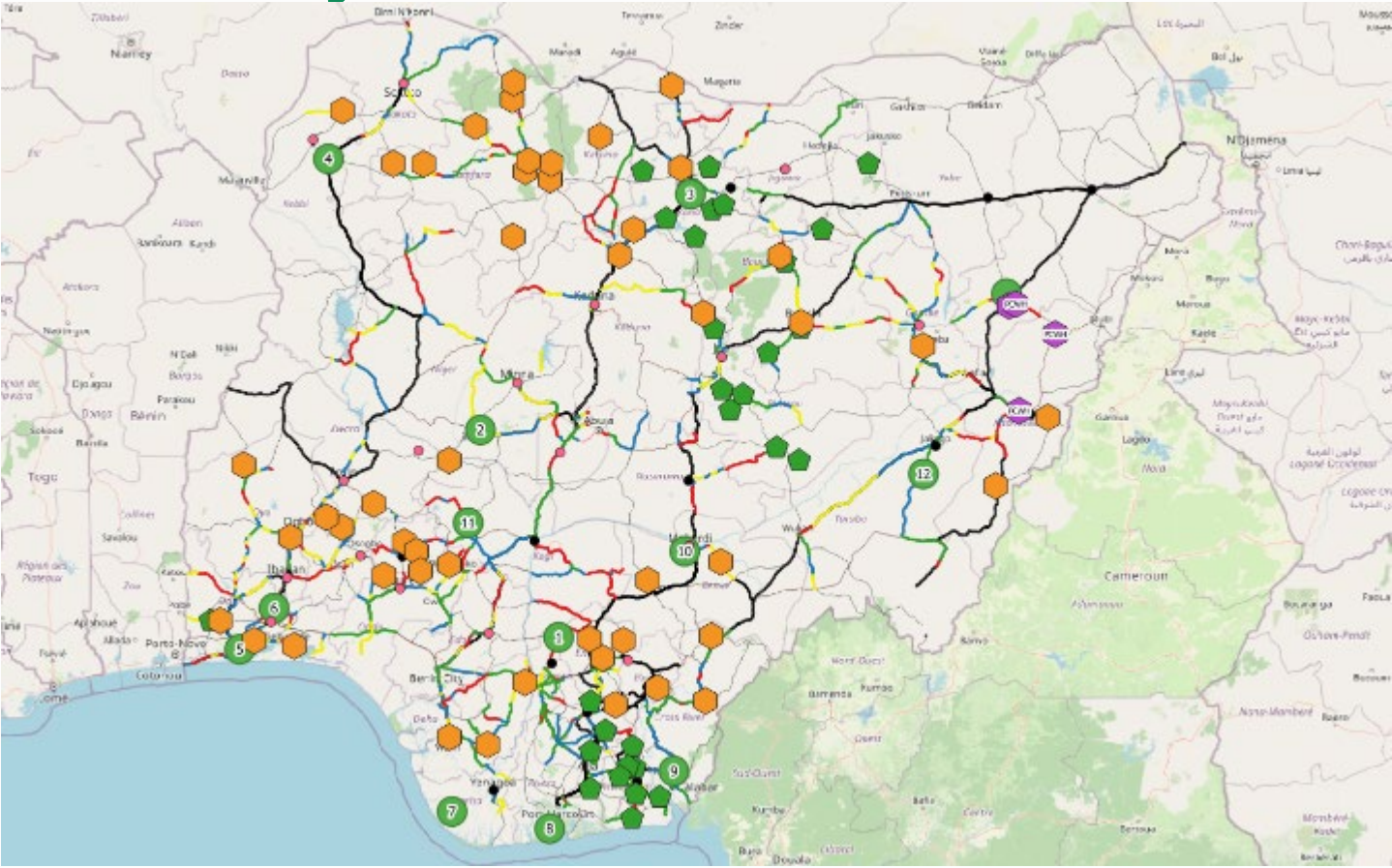
Traffic count stations...



...with AADT and HGV %



Agriculture SCPZs, Hubs, Silos, Warehouses and selected key routes



Prioritise network sections - criteria

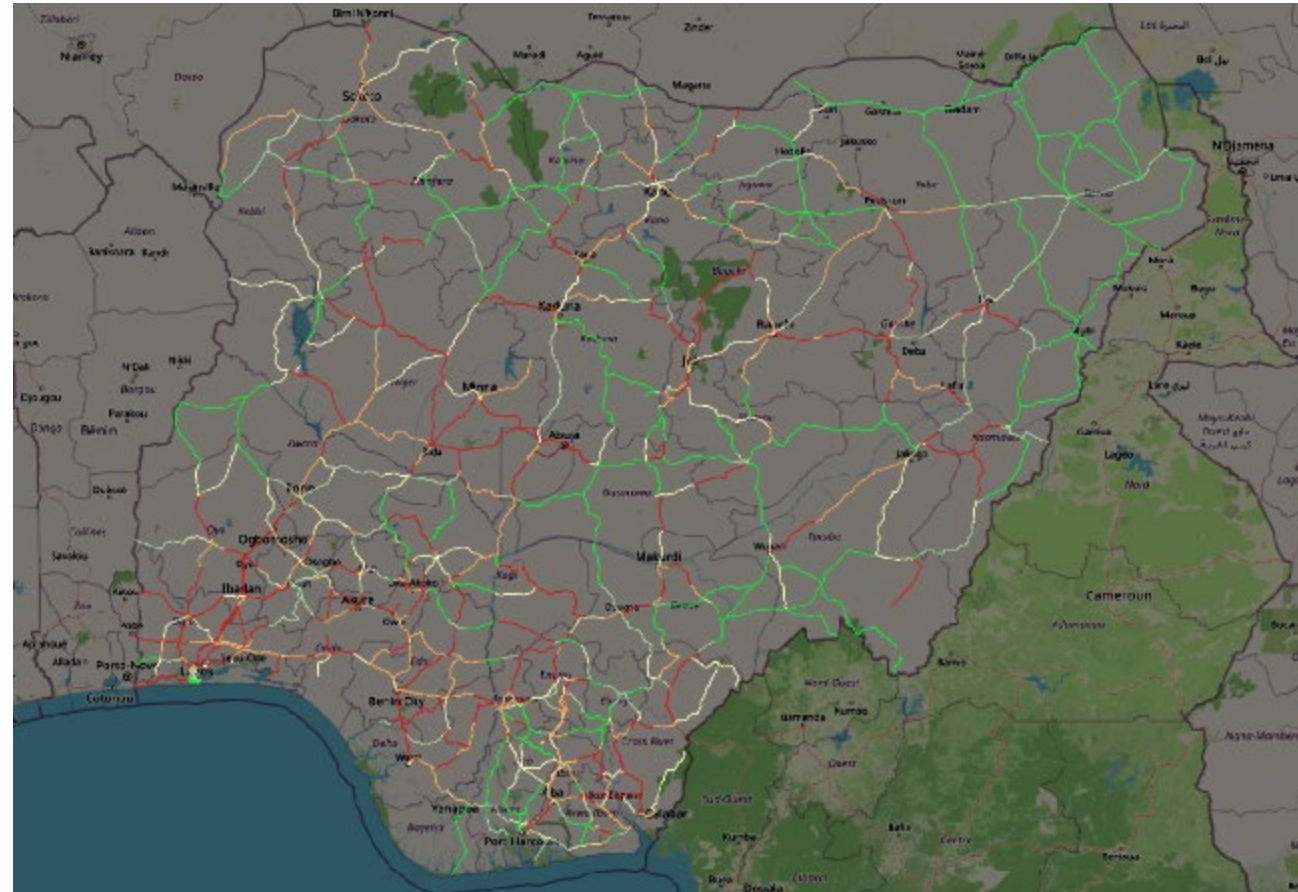
Produce list of scoring criteria. For example:

- Is it on a key economic route?
- Is it on a key agriculture route?
- Already identified as potential bottleneck site?
- ~~*What was existing visual condition?*~~
- Proximity to agricultural hubs / warehouses
- Proximity to SCPZs
- Proximity to Silos
- Traffic level



Prioritisation results – impact of weightings

Category	Weightings
FERMA Priority North-South Route	1
FERMA COVID-19 Routes	3
Visual Condition (All)	4
Visual Condition (Bad only)	8
Key Economic Route (FMWH)	1
Previous Palliative Measure Identified (FMWH)	10
Key Agricultural Route	0
Key Agricultural Route Name	3
At least 1 SCPZ within 25km	0
SCPZs within 50km	4
SCPZs within 100km	1
At least 1 Silo within 25km	0
Silos within 50km	5
Silos within 100km	2
At least 1 Hub/Warehouse within 15km	0
Hubs/Warehouses within 15km	5
Hubs/Warehouses within 25km	2
HGV% threshold	5



Site Priority

- High
- Med
- Low

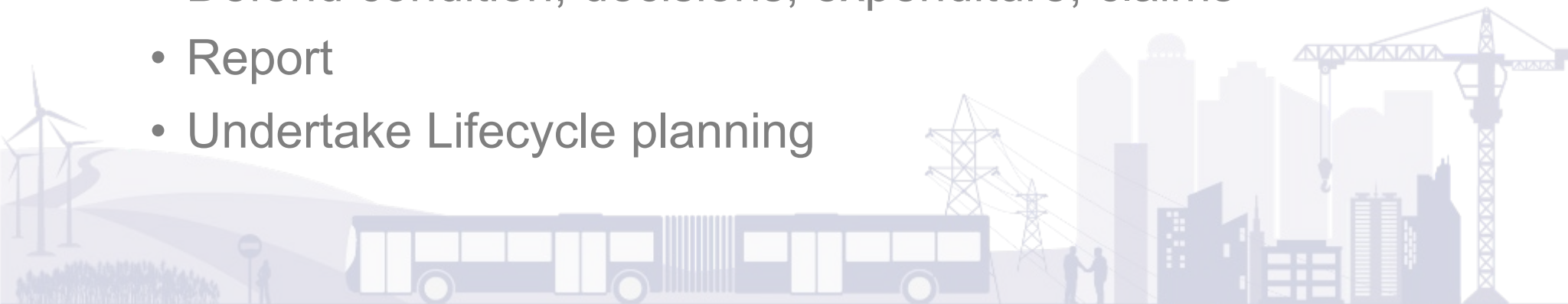


Data



Why collect data?

- Understand and describe the asset, what we have done and the risks
- Inform decision making
- Performance and accountability
- Plan future works
- Support ongoing improvement
- Understand Finance / Identify future Budget requirements
- Defend condition, decisions, expenditure, claims
- Report
- Undertake Lifecycle planning



Describe the asset

Inventory

- Where is it?
- What is it?
- Why is it there?
- How many are there?
- When did we put it there?
- Who is responsible?



Highway Gully
Ref DCC RG 11013
Cleansed 20.03.2019
Cleansed 17.11.2018
Blocked 14.11.2018

Understand what we have done

- How up to date is the inventory and all supporting data
- Do we capture and record
 - New works
 - Cyclic, Planned and Reactive
 - Maintenance
 - Improvements
 - Costs



Understand the Risk and Risks

What is the risk

- Risk of service failure
 - Asset
 - Network
 - Network Availability

What are the risks

- Getting it wrong



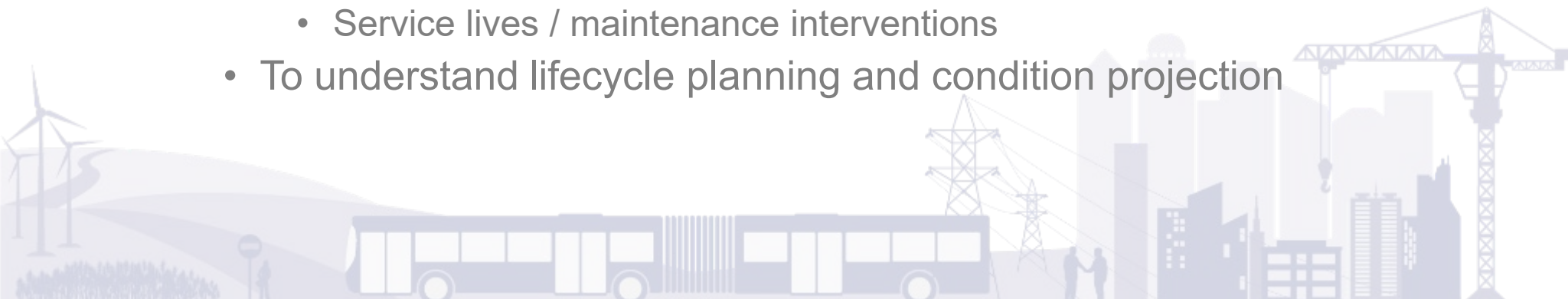
Informed decision making

Decisions on;

- Annual Service Plan / Management of Reactive works / Forward plans and Budgets

For which we need - Inventory plus ..

- Condition
- Dates of installation/ maintenance / replacement
- Age or condition proxied age
- Service lives / maintenance interventions
- To understand lifecycle planning and condition projection



Lifecycle Planning - Treatment and Replacement Options

Do we know our

- Service lives
- Maintenance interventions
- Replacements
- Maintenance only



Can we undertake lifecycle planning and produce

- Forward plan; Year 1, 2, 3-5, 6-15
 - so as to understand
 - Future works
 - Future Budget requirements
 - Long term asset need



Improving and monitoring

- Carriageways & Structures
 - Safety
 - Performance
 - Resilience
 - Longevity
- LEDs
 - Energy
- Reducing
 - Accidents
 - Flooding

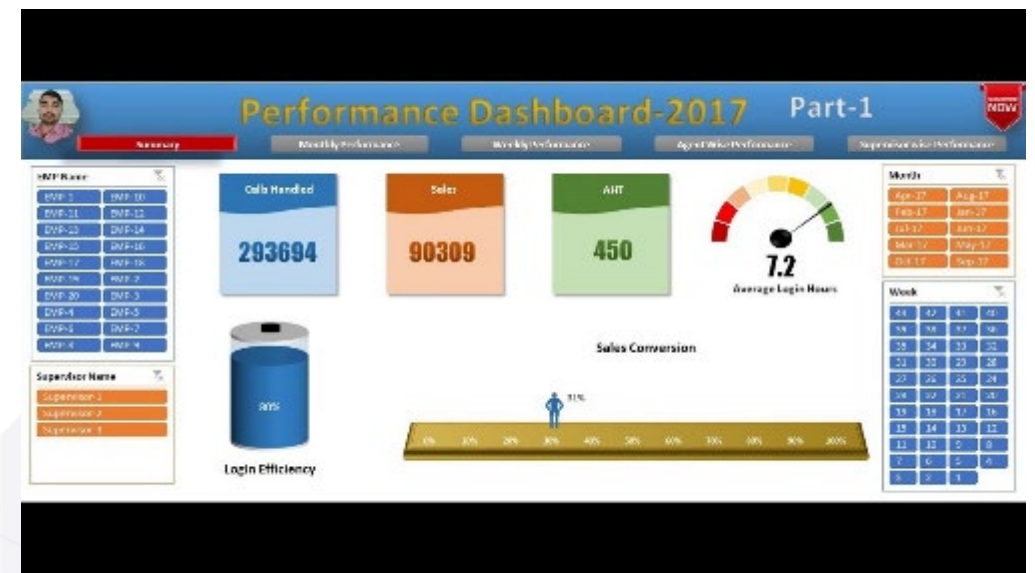


... all data based decisions



Performance and accountability

- Service Levels
- Condition
- Effectiveness
 - Asset
 - Repairs
 - Design
 - Delivery
- Performance Indicators
- Performance Management
- Monitor & improve



Defending

- Claims
- Condition
- Signing (speeds and mandatory signs)
- Skid Resistance
- Asset Failure
- Flooding
- Congestion
- Noise / Air Quality
- Carbon usage & generation



Reporting

Publicity

- Performance
- Effectiveness
- Initiatives / Innovation



Budgets

- What about the money
 - Where is the funding
- Zero Budgeting Approach
 - Your case sets out the funding you need to maintain your asset
 - Where's the catch??
 - Evidence and there may be greater priorities



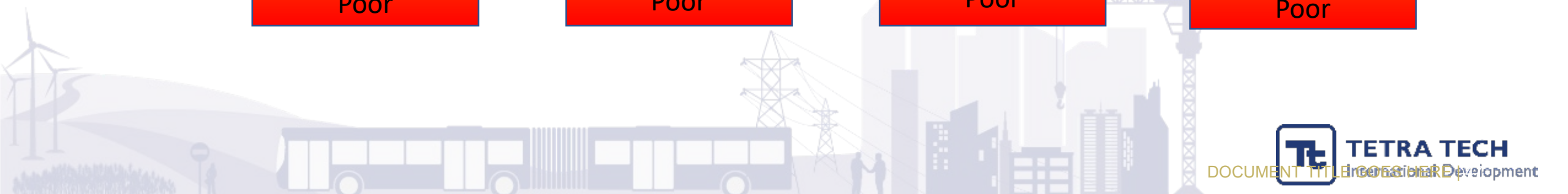
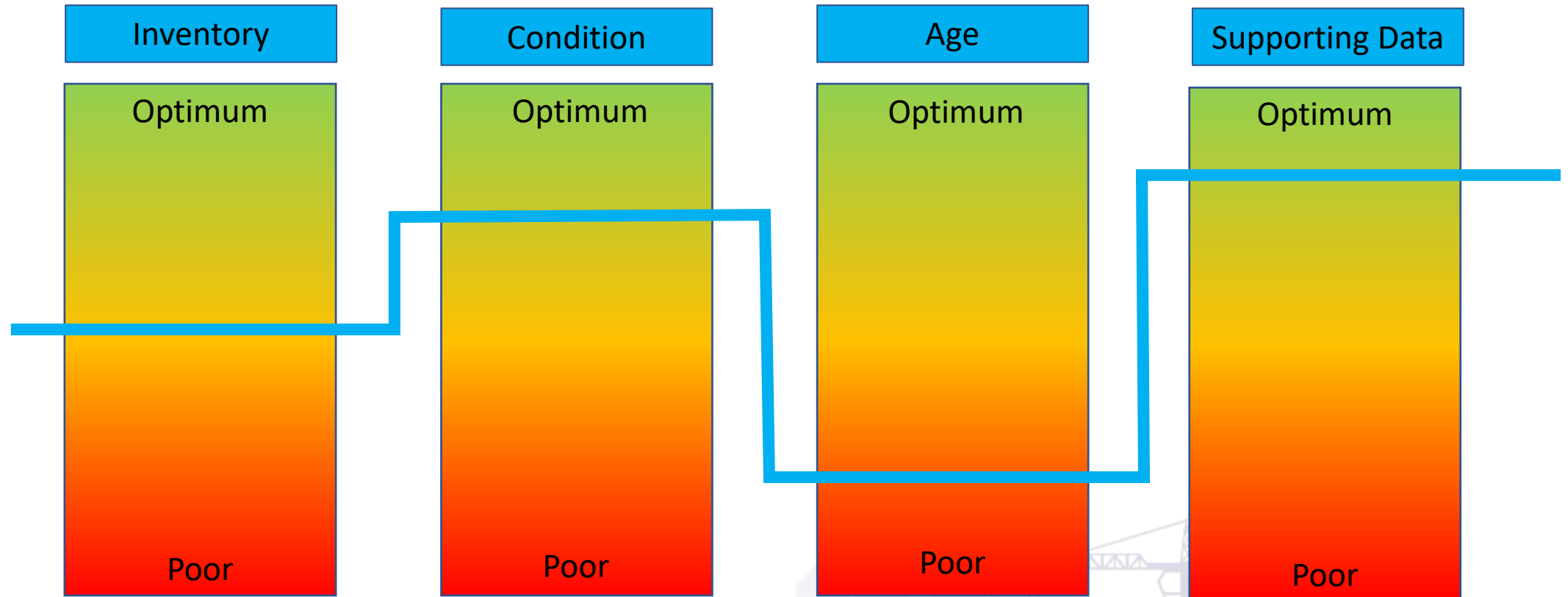
Responsibility

Who

- **Uses / Needs it**
 - Owns the data
 - Captures / Updates
 - Audits
 - Manages
 - Cleanses
 - Archives / Deletes
-
- Someone needs to be responsible



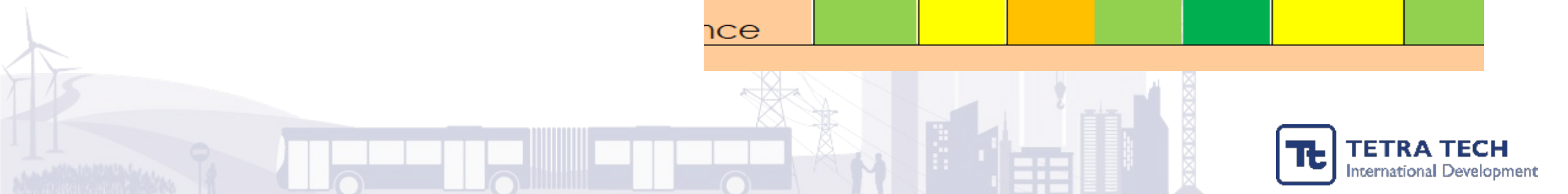
Where are you, how good is your data?



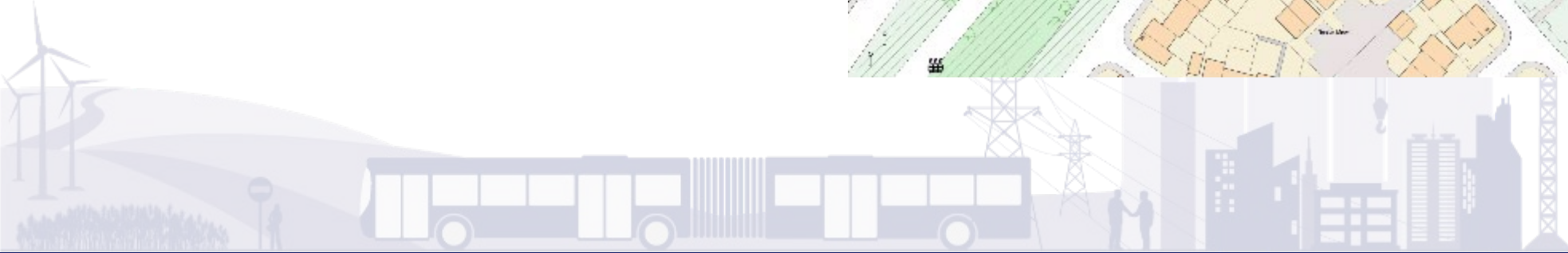
Gap Analysis

- Undertake a 'gap analysis' to check whether the data you have meets the standards you require
- Plan to resolve
 - Inventory
 - Condition
- Set target to move from
 - poor to good
 - good to complete

Analysis	Inventory Data						
	Carriageway	Footway	Drainage	Structures	Street Lighting	Traffic Signs & Lines	Traffic Control
1	Green	Pink	Pink	Pink	Light Blue	Pink	Pink
2	Light Green	Light Blue	Pink	Light Blue	Light Blue	Pink	Light Blue
3	Yellow	Light Blue	Light Blue	Pink	Light Blue	Pink	Light Blue
4	Orange	Light Blue	Light Blue	Light Blue	Light Blue	Pink	Light Blue
5	Red	Light Blue	Light Blue	Light Blue	Light Blue	Pink	Light Blue
6	Green	Yellow	Orange	Light Green	Green	Yellow	Light Green

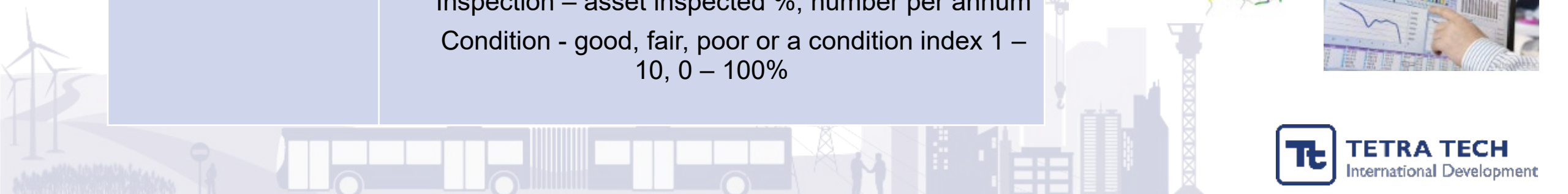
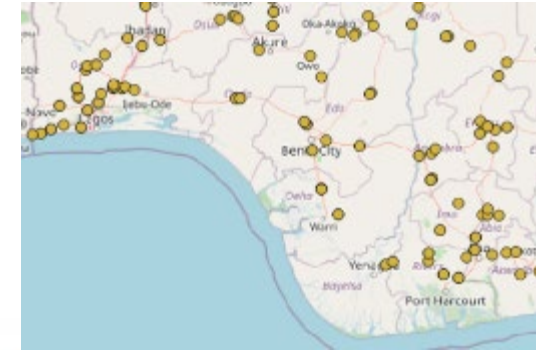


Data Capture



What data to collect?

Data Types	Data Description
Asset data	Data that records what sort of assets the organisation has - where they are, how many there are, who is responsible for them, why they are there, what condition they are in, how and when they are maintained.
Condition data	The condition of the asset, e.g. good, fair, or poor, it could be the age of the assets and its condition could be interpreted from this, new (good), middle aged (fair), old (poor).
Performance data	<p>Maintenance performance – cyclic maintenance undertaken - %</p> <p>Inspection – asset inspected %, number per annum</p> <p>Condition - good, fair, poor or a condition index 1 – 10, 0 – 100%</p>



Inventory - How much detail?

- Too little, there's nothing to work with
- Too much, and its likely to be wasted
- Its expensive to collect and update

So best to get it right

Level of Detail	Problem	Limitations
Asset Group	Is it sufficient to know how many assets you have and what they do	Can only make decisions at a network level, which means you still must decide where you need to prioritise maintenance through some other assessment
Asset	Do you need to know more about each asset	Able to identify individual assets for maintenance and replacement, generally finite life assets e.g., white lining, signs, etc.
Element	Do you need to know about the individual components and elements that make up the asset	Required where assets have components that have varying service lives suggesting that with component maintenance / replacement the asset can be kept in good serviceable condition indefinitely (infinite life assets)
Attribute	Do you need to know, colour, material, reference / serial no, size, manufacturer, guarantee	Required where assets may have specific legislative requirements; prohibitive traffic signs – Traffic Signs Manual ref no, specific colours / dimensions – yellow lines prohibitive parking

e.g. carriageways & structures

Asset group	Highways
Asset	carriageway
Elements	surface course, binder course, base course, subbase
Attributes	Hot rolled asphalt, 65 PSV, constructed 25/04/17, Contractor J Blogs

Asset group	Structures
Asset	Bridge
Elements	Abutment, Pier, Bridge deck, Parapet, Expansion joints, Bearings
Attributes	Concrete, Span, Height, Width, Bearing type

Condition - How much detail?

- Too little, there's nothing to work with
- Too much, and its likely to be wasted
- Its expensive to collect and update

Condition	Qualitative Description (Visual Inspection)	Treatment / Intervention Options
GOOD	Stable pavement structure with asphaltic overlay. No or very few potholes, or alligator cracks	Preventative maintenance
FAIR	Stable pavement structure with asphaltic overlay. Has potholes not exceeding 100m ² per km length	Repairs and pavement strengthening
POOR	Presence of undulating road sections, alligator cracks and clustered potholes with few failed sections	Corrective works (rehabilitation & general maintenance)
BAD/EMERGENCY (Failed Section)	Predominantly unstable road sections, wide alligator cracks with many failed sections up to subgrade. Pavement washout, poor surface. Not safe for vehicular traffic	Palliative and emergency works

How frequently, how much?

Inventory

- How much has the asset changed?
- What other update methods are in place?
- Reasons to update
 - Change
 - Replacement
 - New asset
 - Deleted asset

Condition

- Criticality of getting the intervention right
- Risk
 - to safety
 - of failure
- Deterioration rate
 - *e.g. white lining / vehicle restraints*



Coverage

What coverage is required to manage the asset

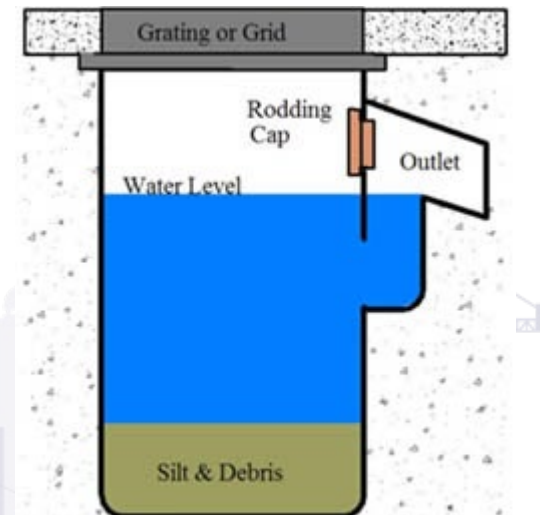
- Some
- All



Coverage	Description
All	Recommended
Sample	Can help in developing an understanding of the asset, its likely distribution and what needs to be captured. Potential to grow the sample and undertake simple lifecycle planning for budget purposes and / or understand the scale of the asset data capture required
Hierarchy	Can provide a top-down approach or bottom up, depending on the importance of the asset to the hierarchy levels
Critical Assets	Useful if funds are limited and the nature of what is critical is understood, could relate to specific structures, signals, drainage apparatus
Organisation Objectives	Collection attuned to ensure council objectives can be delivered, area, ward, hierarchy
Resilience	Based on the council's resilient network and delivering strengthened availability of the asset
Condition	Targeting areas of poor condition to determine a surgical approach to maintenance and replacement
Complaints	Targeting areas of high complaints to resolve public concern and maintain the reputation of the organisation

Specify inventory detail – Road gully

- Location - street, x y coordinates (accuracy =/ - 500mm)
- Gully type - Concrete / Clay / Brick / other
- Frame type - In line / Side inlet / other
- Grating - In line / Cross carriageway
- Grating – hinged / temp Replacement
- Environment - Paved Carriageway / Paved Footway / unbound / other
- Topography - Low / High spot
- Kerb present – Yes / No
- Channel present – Yes / No
- Footway present – Yes / No
- Verge – Yes / No
- Tree cover – Yes / No
- Farm use – Yes / No
- Detritus on road – Yes / No



Specify Data Quality

- Accurate
 - +/- margins will differ
- % Coverage
 - Complete coverage 95%
 - Sufficient for
 - projections and approximations
 - understanding what you don't know
- Currency
 - How up to date does the data need to be to be effective?
- Risk Assessed
 - Do we really need it, what's the risk if we don't have some data?



Data and risk

- Is it essential to business need?
- Will it be used?
- Its expensive to collect and update
- What are the risks of not having some data

Risk Rating	Benefit to organisation	Contribution to
Red	Essential	Understanding the asset, what we have done, Risk, Making / supporting informed decision making, Performance Management, Ongoing improvements, Future Budget requirements, Defending condition, decisions, expenditure, claims, consistency
Amber	Beneficial	Assists in design and maintenance - not essential as all new design and maintenance should be to the latest standards and be framed in response to a current view of the situation
Green	Nice to have	Not necessary



Data Risk Register

Data Set	Risk	Consequence	Likelihood	Risk Rating	Priority
Inventory	No Knowledge of asset	Exposure to claims and actions of taking no responsibility for assets in your stewardship resulting in damage injury or death	High	High	Urgent
Condition	No Knowledge of asset condition	Unable to identify or prioritise future maintenance or undertake lifecycle planning to identify current and future budget requirements	High	High	Urgent
Service life	No Knowledge of asset service life	Unable to undertake lifecycle planning to identify current and future budget requirements	Low – available through manufacturers and similar organisations	Medium	Medium / Low

Capture Methods - Manual

Method	Recording method	Description	In House	Pros	Contracted Out	Pros and Cons
Walked	Mobile device	Inspectors and surveys Highway safety inspectors	Tablet Global Positioning System (gps) enabled but visually plotted to on the ground/ map features	Slow capture, opportunity to look behind and under parked cars, in grass verges etc. that would otherwise be missed by video	Surveyors Walked	Often neglected and not seen as a priority when other jobs arise Lengthy timescale
Driven	Mobile device/video	Inspectors and surveys Highway safety inspectors	As above supported by camera and gps auto recognition or manual entry	Speedy coverage of network	Surveyor driven	Missed assets, parked cars and other obstructions
Highway safety inspectors- Driven/ walked	Video/ mobile device	Hand mounted camera Video single camera forward facing Forward and backwards, forward back and side plus downward supported by GPS at various levels at accuracy	Vehicle mounted / handheld camera	Capture network by using inspector vehicles – plenty of video Can ask contractor to download what you need	Regularly repeated video capture	Inspectors not surveyors, often conflicts with their purpose as safety inspectors and things get missed Risk is it often sits there and isn't downloaded

Capture Methods

Method	Recording method	Description	In House	Pros	Contracted Out	Pros and Cons
Video	Video / AI	Combination of high-resolution camera and software analytics to automatically determine assets by pixel recognition		Can ask contractor to download what you need	One off video	Must pay for updates or refresh videos Risk is it often sits there and isn't downloaded
Light Detection and Ranging (LIDAR)	Laser	Laser mapping captures all data to +/- mm accuracy useful for building structures highways internal details of manholes. Using photo referenced lidar capturing all features and dimensions	Machine mounted and handheld options for confined spaces	Can be used with AI to give a high definition, mm accuracy, and data capture	One off video	Expensive and still prone too error in recognising assets Accurate topographic survey, useful for flood analysis and pavement resurfacing

Data capture

- Simple Process to capture data successfully



Data Update

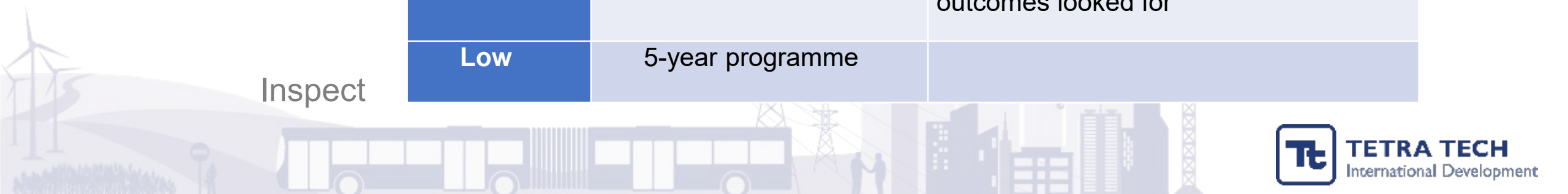
- Simple process to update data successfully



Programming inventory and condition surveys

- How soon to we need it
- One off collection
- Rolling programme

	Priority	Method	Action
Survey	Urgent	1-year collection	Consider capturing key data and returning to capture additional data during updates
Survey & inspect	Medium	2 – 3-year collection	Potential for more detail to be collected but will need prioritising so that initial data feeds support processes and outcomes looked for
Inspect	Low	5-year programme	



Audit

Capturing data is one thing
Checking it is another

If you can't trust it, then its
got little useful value

- 5 – 10 % audit

Error risk	Error mitigation
Incorrect description	drop down
Incorrect location	GPS check
Condition	sample

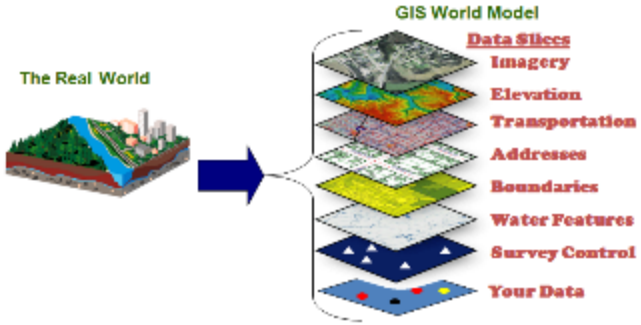


Exercise: What data do you need?

- Considering your processes, the needs of the FRN, and how data can help us, what data should be collected?
- ...



Data management



One Truth – the Holy Grail of Asset management

- No confusion – Single Source
 - No duplicate data
 - Central storage
- Consistent data based approach
- Database access
 - Reportable
 - Accessible
 - Visible
 - Sortable
- Ability to analyse

TWO TRUTHS

AND A

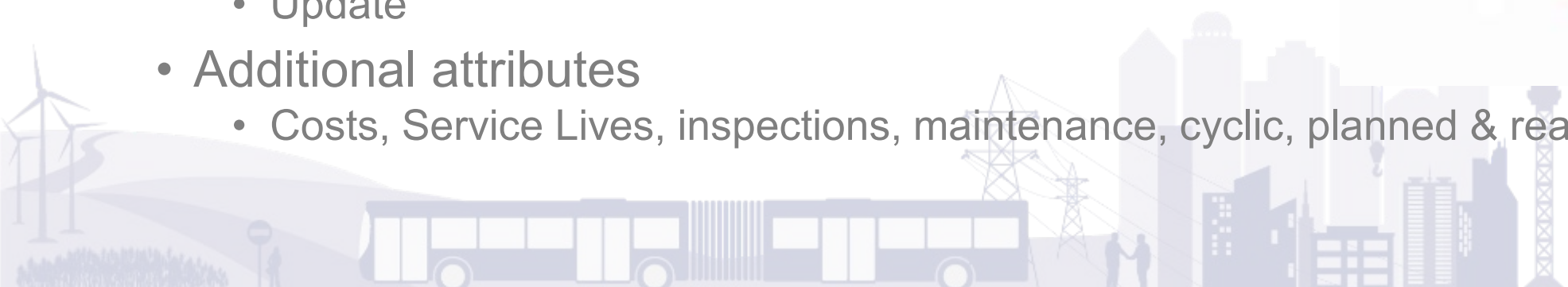


How do you store it?

- Configured database
 - Search, query, report
- Proprietary Asset Management system
 - Search, query, report - **Analyse**

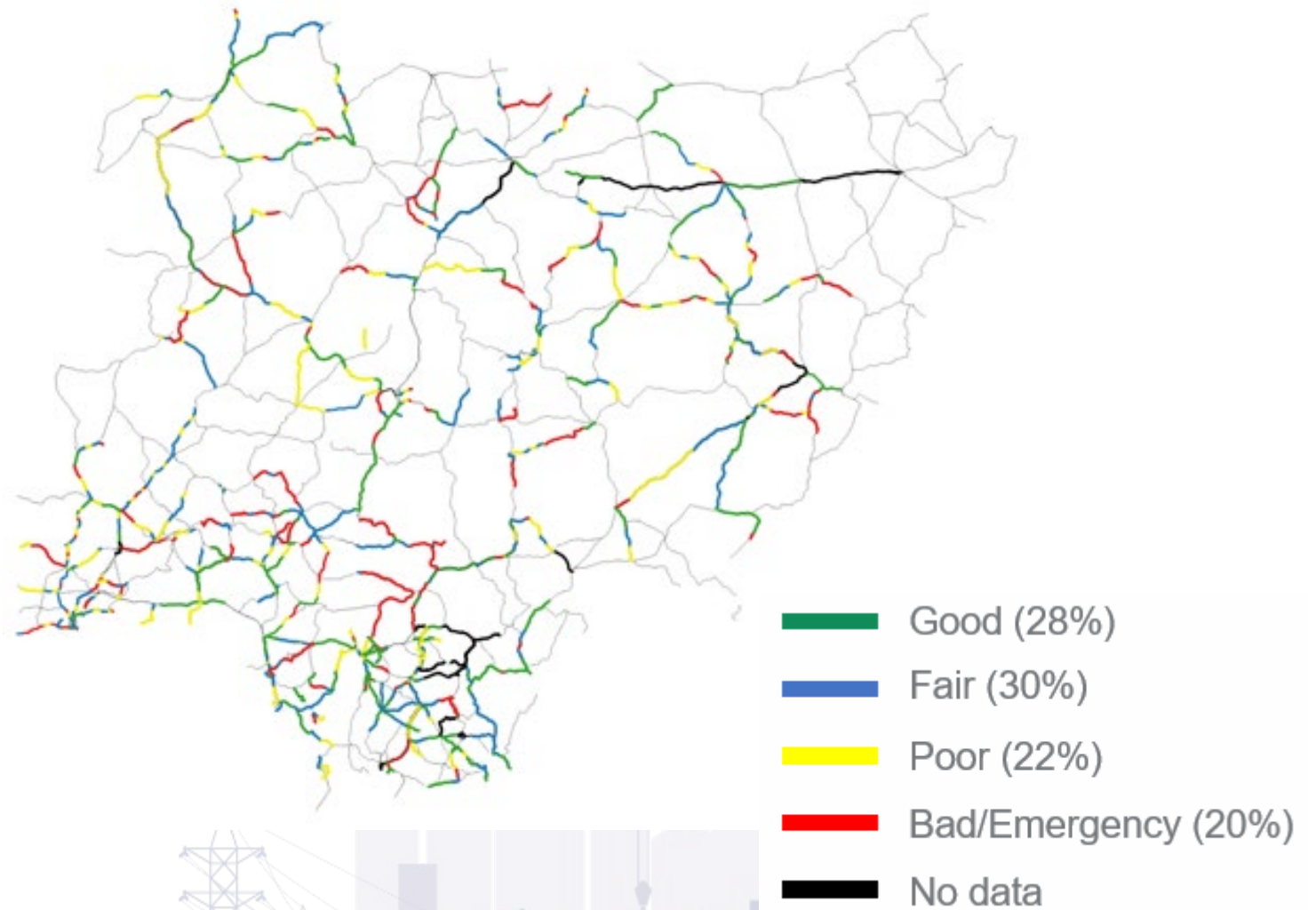
Plan the system data framework

- Asset group, Asset, element, Attribute
 - Condition
 - Update
- Additional attributes
 - Costs, Service Lives, inspections, maintenance, cyclic, planned & reactive



Reporting data

- GIS - Visual
- SQL - Reports
 - Bespoke Reports
- Specific Reports
 - Condition
 - Expenditure
 - Resources
 - Performance



Asset history

- Creation / installation
- Maintenance – cyclic planned & reactive
- Cost / expenditure
- Complaints
- Defects
- Replacement
- Deletion / removal



Asset Type	Overhead Crane
Asset ID	Crane001
Location	Building D
Area	Warehouse
Serial Number	19070141
Programmed Number or QR Code	PN001002
Status	In Service
Date	19/01/17
Downloaded	01/07/17, 14:48:59
Description	



Equipment Number or QR Code

Attributes

Type	Bridge
Capacity	20 Tons
Power	200V/100-200 W
Class IDN	Code
Host Configuration	Make & Part
Factory Medium Model ID	Class
Control Type	Remote

History

Annual Inspection	Completed 14/02/2019 by June 01
Annual Inspection	Completed 12/04/19 by June 01
Annual Inspection	Completed 11/07/19 by June 01
Annual Inspection	Completed 14/02/19 by June 01
History Report	
Mobile app	
Downloaded	01/07/17, 14:48:59
Downloaded	01/07/17, 14:48:59
Annual Inspection	Completed 06/02/19 by June 01
Annual Inspection	Completed 26/02/19 by June 01

Secure data

Back up

- Off site
- Secure



Log In

- Engineer specific
- Trackable
- Performance monitoring



Network

- One Truth
- Joined up planning
- Inspection and condition common



Cleanse and archive

Maintain data integrity

- Archive v Delete



Maintain data functionality

- Audit
 - Good data in good data out
 - Bad data in bad data out
- Cleanse
 - Duplicates
 - Input errors



Next steps

- Reflect on the asset management principles discussed today
 - Are there initiatives/topics FERMA is already working on/towards?
 - What are the Data priorities for FERMA?
 - What data Systems are in place
 - Are they joined up
 - Is there a single truth
 - Where can UKNiAF support be best targeted?
- Invitation for the next workshop will be sent out in due course – likely to be end 2021/early 2022
- Next workshop will cover:
 - Lifecycle planning
 - Deterioration Modelling / Condition Projection
 - Forward works planning



Road Hierarchy, Data Collection & Data Management

Presented by:

- Stephen Mead

UKNIAF RD0011 Workshop 2

Thank you for your presence