Technical Authority
Buildings & Architecture

The CP7 Buildings and Architecture Policy

Putting Passengers First through Mobility as a Service

November 2020

Contents

3 Introduction
4 Mobility as a Service (MaaS)
5 The 4S's
8 Challenge
11 Targets
12 Approach
15 Contact

Mobility is innate to human civilisation and growth. It reflects our society's desire to travel and progress. As we move through space and time for work, school or leisure, we support the economy, connect with people and interact with our natural and built environment.

Introduction

1

1.1 Purpose

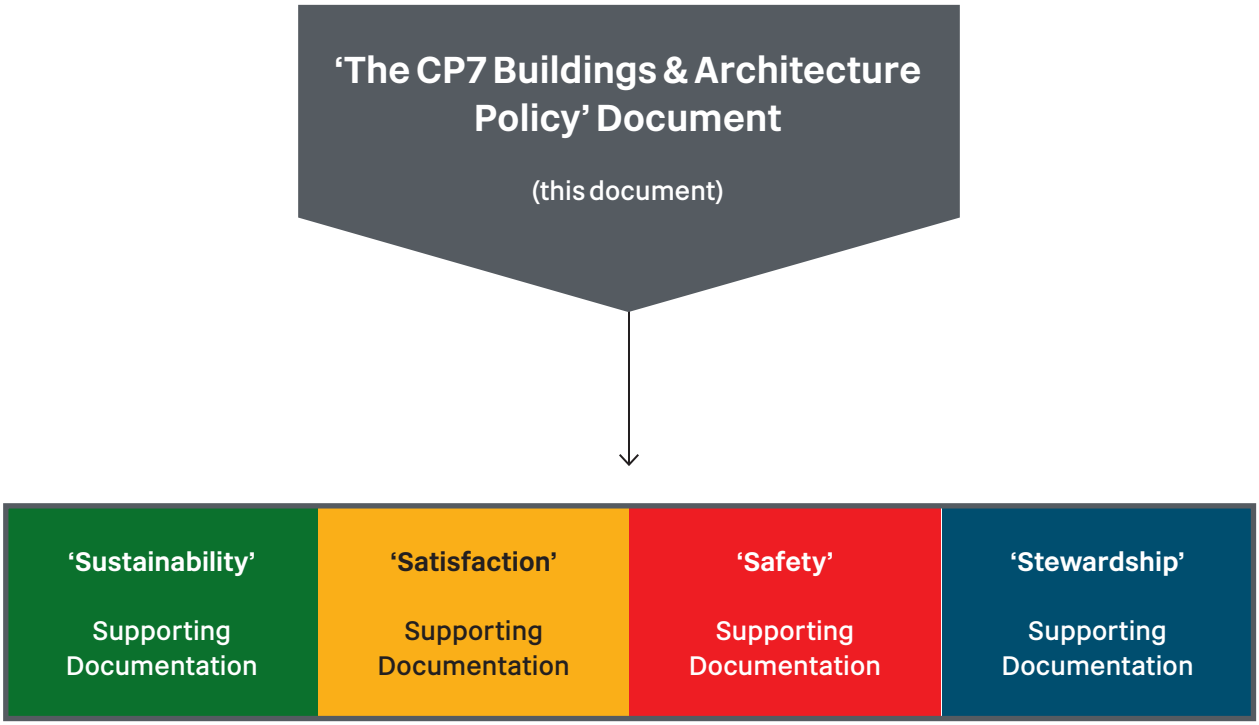
Network Rail aims to be a world leader in rail transportation that Puts Passengers First. To do so, Network Rail's Technical Authority for Buildings and Architecture are implementing a new and improved policy framework.

This policy framework covers Buildings and Architecture's diverse portfolio of over 2 million assets across Britain's rail network. The portfolio includes over 2,500 stations, 443 of which are listed, and 390 are over 120 years old. It also includes a significant stock of operationally critical buildings including 100 Light Maintenance Depots (LMDs) and 18,000 lineside buildings with 400 Maintenance Delivery Units (MDUs) and 750 Signal Boxes. The combined roofs of the estate cover at least 7 Million square meters.

This document sets out the principals of the new policy framework. It outlines the steps and initiatives the five Network Rail Regions need to focus on for CP7 to deliver a 'Mobility as a Service' Vision.

1.2 CP7 Policy

The following chart shows the planned document structure for the new CP7 Policy. It identifies this document as the principal overarching document. It will be supported by a detailed corresponding document covering each of the '4S' categories.



Mobility as a Service (MaaS)

2

The term 'mobility' used in this context is broad. It spans across different meanings — physical, social, financial, environmental and digital.

In terms of transport, mobility is derived from a long-standing desire by policymakers to deliver 'total journey solutions'. In scientific terms, MaaS is defined as a 'digital interface to source and manage the provision of a transport related service(s) which meets the mobility requirements of a customer'. Just as Isambard Kingdom Brunel worked towards a vision of end to end journeys from London to the United States of America, Mobility as a Service (MaaS) describes the end to end experience of rail journeys and the service it provides to all who interact with it.

For Buildings & Architecture, this means efficiently enabling a safe, welcoming and pleasing environment both physically and digitally for all that allows end users to enjoy our assets while taking cognisance of local environment. Framing 'mobility' in this way is key to driving positive change across the Rail Industry.

1.3 Why do we need Mobility as a Service to put passengers first?

The rail industry can unlock a wide range of opportunities by focusing on its passengers and adopting a user-centric approach. Looking at MaaS opportunities for customers, as part of an industry-wide, integrated system that moves beyond a fixed transport service, end to end travel becomes something more flexible. Given this, Buildings & Architecture Policy needs to consider that:

1. A station is a key nodal point on a passenger's end to end journey across Britain's transport network. If they cannot safely interchange, there is no end to end journey.
2. The phrases 'on demand' and 'as a service' are almost synonymous with modern living. The advent of the smartphone, and increasing prevalence of social media, digital communications and the internet means everybody is significantly better informed and expects real-time information.
3. The availability of products, information and content 24/7, has seen an explosion in digital disruption across all industries where customer feedback is there for all to see and can make or break a business.
4. The awareness and increasing evidence of the climate emergency is there for all to see

Following in the footsteps of the wider transport sector, the rail industry can meet these trends head on. Taking steps to integrate the systems and focus on passenger experience will not just meet customer demands, but also bridge the gap between user expectations and industry reality– leading to a clearly defined, smarter digital railway for all.

Building & Architecture assets, play a vital role in enabling this expectation of modern living and provide the opportunity for an end to end experience that truly Puts the Passenger First both physically and digitally. However, in an era where organisations strive for 5 star ratings from users, Buildings & Architecture assets are not 5 stars, thousands of people are injured at Stations every year, our energy consumption and carbon footprint is too big and we are doing little to move beyond a patch and mend approach. The CP7 approach has been designed to start addressing these shortcomings.

(Some excerpts above are sourced from: https://on-trac.co.uk/mobility-service-uk-rail/)

The 4 S's

3

3.1 What are the 4 S's

To deliver the strategic goals of Mobility as a Service, this new policy approach must first be unpacked. To do so, four key categories have been identified that are relevant across Network Rail's vision and work.

These four categories – the 4S's – are as follows:

Sustainability
Satisfaction
Safety
Stewardship

Network Rail already overarchingly aims to deliver the 4S's but much more can be done to achieve these specific goals within the Buildings & Architecture portfolio. By setting the 4S's as key criteria, social, environmental, economic, digital growth under Mobility as a Service can be mapped and better delivered.

In particular, the new CP7 Policy goes well beyond Stewardship and Safety when making intervention decisions. People and the planet are fundamentally crucial to the new CP7 Policy. It considers the user experience before, during and after rail journeys and the short, medium and longer-term impact of infrastructure.

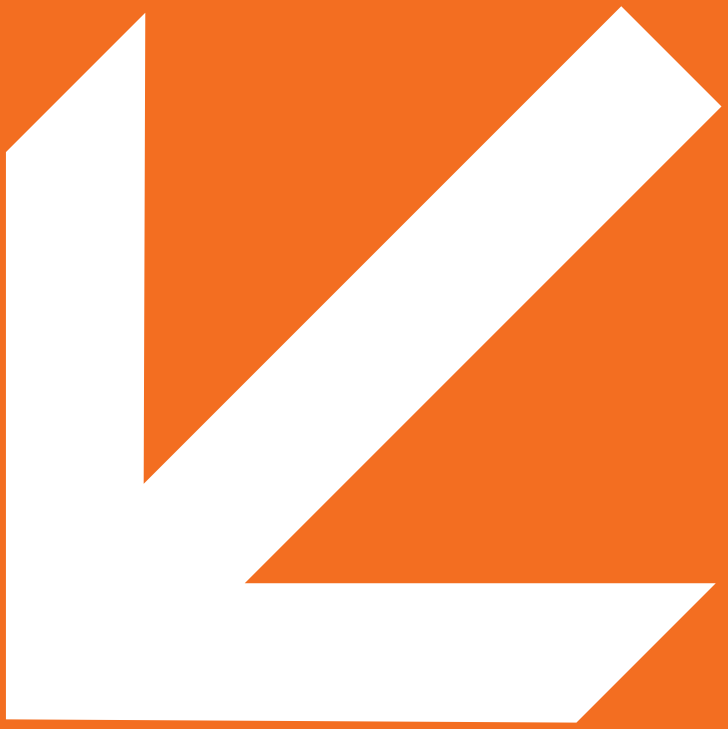
3.2 Calculating the 4 S's

A number of methods to evidence and calculate the 4 S's will be utilised. The key methods corresponding to the 4 S's are as follows:

- **Sustainability**: Energy Performance Certificate (EPC) scores at Cat B or better and kW/m2 emissions
- **Satisfaction**: Specific National Rail Passenger Survey (NRPS) scores and Network Rail Buildings Users scores
- **Safety**: RSSB Annual Health & Safety Report Stations Fatality Weighted Index (FWIs)
- **Stewardship**: Station Stewardship Measure (SSM), Condition Sustainability Index (CSI), specific Percentage Asset Remaining Life (PARLs) and Railway Trust Heritage Survey.

These evaluation methods support decision-making on a quantitative / semi-quantitative basis. These evaluations can be accompanied by qualitative data sourced from user experience, staff surveys and cross-departmental feedback to key stakeholders, suppliers and contractor engagement.

4 S's



Sustainability
Satisfaction
Safety
Stewardship

4

Challenge

The need to deliver the rail network and service as a holistic service is a vision beyond a single Control Period. However, the Control Period approach provides tactical check points upon which Mobility as a Service will be designed, planned, delivered and managed. The 4S's have been identified as key focus areas to enable this for CP7.

4.1 Sustainability

Sustainable development is commonly described as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs': (United Nation's Brundtland Report 'Our Common Future' in 1987). Sustainability is therefore the act, intention and/or ability to deliver this ambition. This broad term typically hinges on three pillars – social, environmental, economic. Climate change largely impacted by the rise in carbon emissions; the loss of biodiversity; land, water and air contamination are just few pressing environmental concerns of today. In more recent scholastic research, the importance of other related themes, such governance and technology, have been identified and three pillars have in some cases been expanded to encompass these themes.

Buildings & Architecture assets and operations have a key role to play in sustainable development, from reducing carbon emissions to supporting the health and wellbeing and social-economic welfare of local people. Aspiring to and delivering this important, complex task is a key goal for Buildings & Architecture.

The Buildings & Architecture portfolio contains one of the biggest property portfolios in the UK and Network Rail is required to manage it in a sustainable way. Previously this has simply meant ensuring the asset is passed on to future generations in a similar condition to which it was inherited and the Condition Sustainability Index (CSI) will continue to be used to represent this task. For CP7, new measures to help preserve and enhance the environment will also be utilised. Embedded carbon, energy use and energy efficiency indicators will be introduced. Initial indicative measures are shown below to highlight the current poor position of the Portfolio:

Sustainability

MDUs have an energy consumption

300% Kw/m²

higher than average

Sustainability

EPC Currently only

10%

of Stations are graded as B or above

(United Nation's Brundtland Report 'Our Common Future' in 1987)

4.2 Satisfaction

Independent national customer surveys cite the need for general improvements to the upkeep of stations. This is the single biggest influencer on customer's satisfaction with their station experience . Network Rail is committed to passenger and customer satisfaction and tasked with meeting these core needs as a priority. To help highlight these, existing measures will be leveraged to build the case for intervention:

- To embed and utilise Customer Satisfaction scores with an aim to improve station upkeep score
- To apply Network Rail's Principles of Good Design across all aspects and stages of rail enhancement and renewal projects
- To apply Network Rail Building & Architecture's Condition Reliability Index (CRI) for 2 & 24 hour faults
- To make available a 'Street View' of stations and lift and escalator operational status

The measure shown below highlights the current satisfaction with the upkeep of the franchised estate as perceived by our passengers:

4.3 Safety

Stations have a higher accident rate by an order of magnitude when compared to trains with a Fatality Weighted Index of fifty-four a year at stations compared to nine on trains. This accident rate is potentially exacerbated by the current patch and mend approach to Buildings & Architecture assets, which has perpetuated the situation where the asset base has:

- The equivalent of 54 fatalities at stations every year
- only 65% of operational platforms tactiled
- 417km of untactiled platform
- only 30% of platforms with complaint stepping distance height for their overall length
- only 7% of platforms which conform to height and offset standards
- the current renewals threshold for platform intervention means that it will take 30 Control Periods to achieve compliance to current platform standards*

*Wales Route calculations

The measure shown below highlights the current poor safety situation at stations.

4.4 Stewardship

The headline long term asset condition measure for Buildings and Architecture will remain the Stewardship Measure. This measure gives a very high-level indication as to how Network Rail are performing as the current custodians of the Buildings & Architecture portfolio of assets.

For CP7, intervention decisions will still be justified by utilising the PARL / Asset Risk Score (ARS) matrix. The important difference to CP6 is that they need to be made with due regard to the other 3 Ss. Therefore selected intervention trigger thresholds have been adjusted to reflect this, most notably:

- PARL intervention renewal trigger for platforms, canopies and MDUs has been raised to 20% with the ARS for canopies and platforms reduced to 3.

The purpose is to enable a move away from a patch and mend approach and to address the FWI (note this requires Whole Life Cost (WLC) analysis including embedded carbon calculation to confirm it is the optimal solution to be undertaken on a site by site basis).

Intervention cases can be made based on PARL/ARS at any level in the hierarchy, for Structural Assessment or Electrical Test reasons or any other industry recognised assessment approach for justifying intervention (or not) as long as they relate to the 4S's.

The measure shown below highlights the current Stewardship levels and highlights the poor situation at Maintenance Delivery units (MDUs) and Lineside Buildings.

Stewardship

Station Remaining Life

54.9%

Stewardship

MDU

40%

in Poor Condition

Stewardship

Lineside

50%

in Poor Condition

Targets

5

5.1 What opportunities are presented by Mobility as a Service and the 4S's?

To address the need and challenges in delivering Mobility as a Service, the Buildings & Architecture department of the Technical Authority at Network Rail are developing and refining a long term roadmap. However, for the end of CP7 the key quantitative targets are:

- **Sustainability:** Carbon and energy reduction: building services energy consumption at MDUs to be reduced by a factor of 3
- **Satisfaction:** Franchised station satisfaction to be increased to at least 80%
- **Safety:** FWI to be reduced by a minimum of 30%
- **Stewardship:** MDUs in Poor category to be reduced to 20%, Lineside in Poor category to be reduced to 25%

The above targets will be supplemented by specific policy requirements in CP7. The headline areas are:

- Any platforms or island platforms that have partial tactiles to be fully tactiled by mid CP7
- All Exmouth based concrete footbridges to be removed by end of CP7
- All Exmouth based concrete trestle platforms to be identified and a plan to replace them (all to be removed by end of CP8)
- Provision for improved inspection: lifts & escalators, Electrical Test & Inspection, Condition Surveying and Internet of Things (IOT) Predict & Prevent technology
- Provision for digitalisation: All sites to be 3D scanned by end of CP7
- Provision for EPC requirements

A full list of Policy focus areas will be released in the supporting documents.

Approach

The 4S's will primarily be addressed through providing tools to the Regions to identify asset interventions to meet the issued targets. A decision support framework will be provided as follows:

Asset Interventions

The Building and Architecture CP7 Policy will have 3 intervention types:

- A: New asset creation
- B: Condition driven renewal or major refurbishment
- C: Maintenance interventions

Intervention Definitions

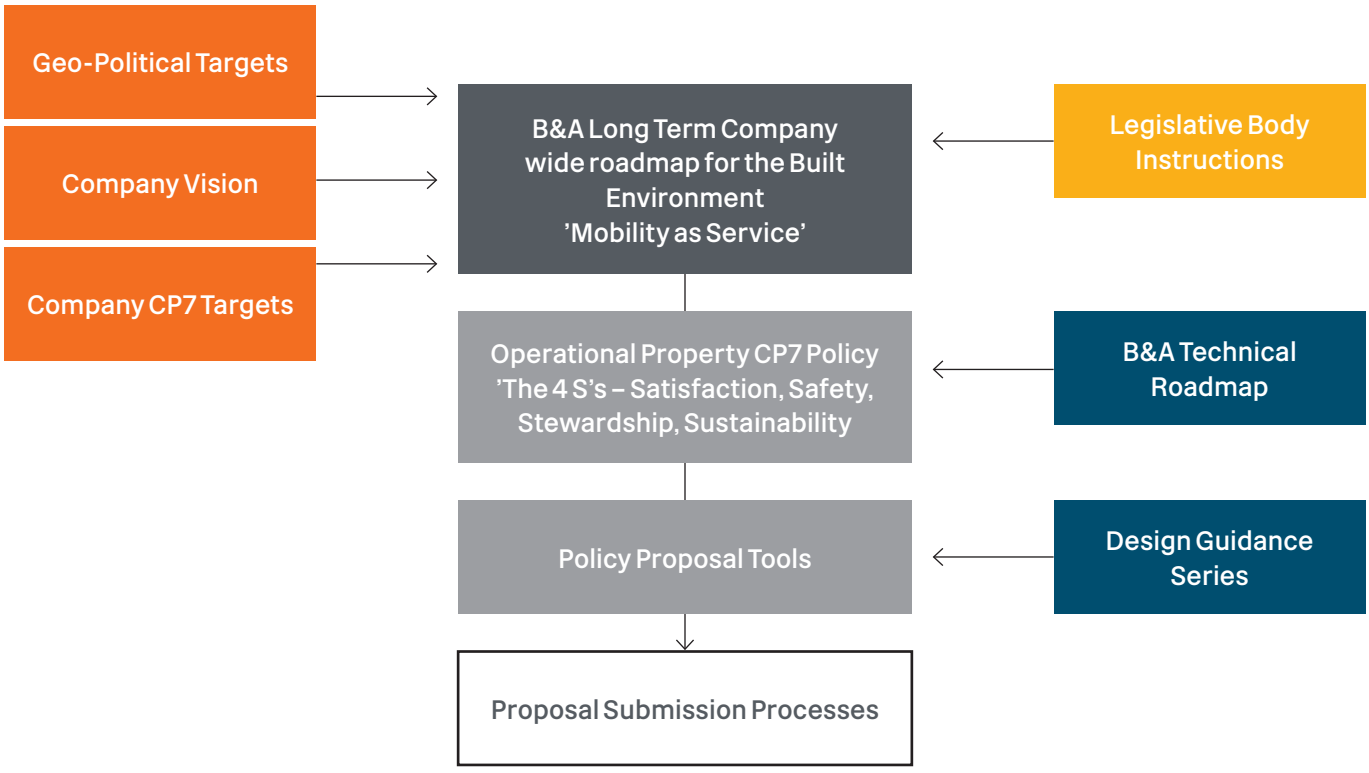
- A1: a totally new asset that provides a function that wasn't previously there, i.e. an Enhancement
- B1: a total renewal. All elements removed and rebuilt. A brand new asset block, with a full design life that is compliant with current regulations and standards will take the predecessor's place
- B2: a major refurbishment: The scope of work will provide an overall PARL of at least 50% / an intervention that will last at least 25 years
- C1: a minor refurbishment: The scope of works will provide an overall PARL improvement to between 25% & 50% / an intervention that will last at least 10 years
- C2: these are minor planned or reactive interventions that would be categorised as OPEX expenditure
- C1/C2: Predict and Prevent is recognised as an intervention reason in CP7.

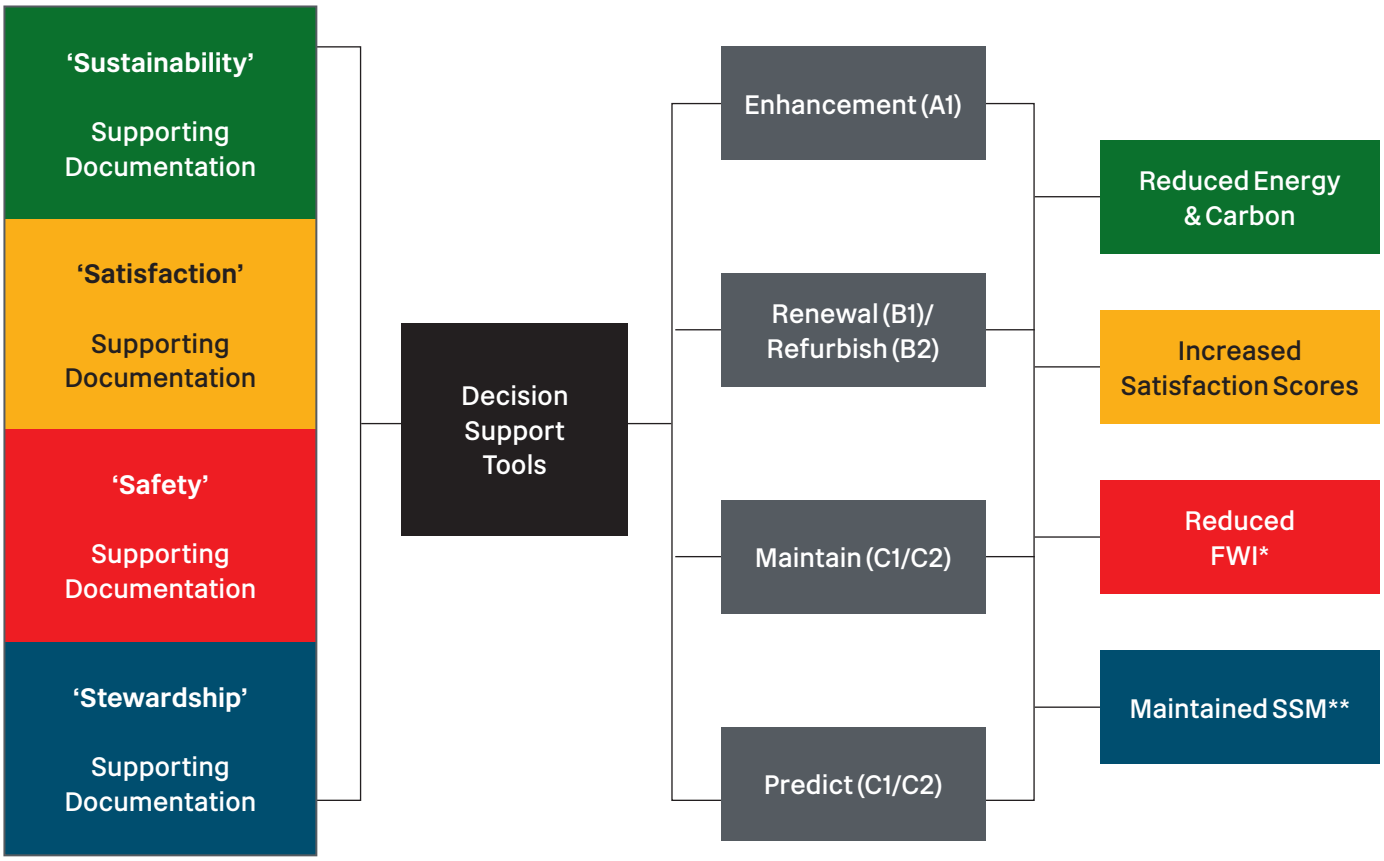
6

Intervention Principles

Once an asset intervention is identified, follow Network Rail's Principles of Good Design and give due consideration to:

1. Smart carbon neutral assets that don't need interventions
2. Smart asset interventions optimised to minimise embedded carbon in terms of reliability and longevity for:
   a. Surveying
   b. Maintenance
   c. Refurbishment / Renewal
3. Reduced cost of intervention (Time, Cost, Carbon, Quality)





Business Plan Proposal development leading to desired Outcomes

*FWI: Fatality Weighted Index, **SSM: Station Stewardship Measure

Contact

Policy Lead

Andy Jannaway
Principal Engineer

Mobile
07919 128 304
Email
andrew.jannaway@networkrail.co.uk

Building & Civils
Technical Authority

The Quadrant
MK, Milton Keynes, MK9 1EN
Furzton Building F3, Bay F

Other Contacts

Professional Head
Anthony Dewar

Materials/Fabric Lead
Ian Grimes

Systems/Structural Lead
Andy Jannaway

Building Services Lead
Russell Sweeting White

Architectural Lead
Frank Anatole

7

Stations

We maintain

2,500 stations,

443

of which are listed, and

390

are over 120 years old.

Our maintenance teams respond to

65,000

faults each year, providing

24/7

service to our passengers – that's one call every

7½

minutes

We maintain

400,000m²

of glass roofs, that would glaze

17,000

domestic green houses

Our combined roofs cover

6.3 Million m²,

enough to cover

250

Eden Projects

We maintain

18,000

lineside buildings across

16,000km

of rail, so in total one building every

780m

Footbridges

We manage

1450

footbridges , end to end these would span the English Chanel. That's

95,000

steps climbing over

17km

or twice the height of Mt Everest

Lighting & Equipment Columns

We have over

100,000

columns – stacked end on end these would rise

800 km

– that's twice as high as the International Space Station!

Platforms

We have approximately

5500

platforms – laid end to end these stretch

888km

Set off early , at a brisk pace it would take you

24 days

to walk the length!

That's around

740,000

coping stones on the platform edge , if stacked carefully these would fill

16

Olympic Swimming Pools

There are

1.4 Million m^2

of canopies – this could provide shelter for a line of people

360km long