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Northern train travelling along the Cumbrian Coast Line.
Photo credit: Adamedia
The railway industry is pleased to present the Cumbrian Coast Study and corresponding proposed railway investment packages as part of the Continuous Modular Strategic Planning (CMSP) approach being adopted for the Long Term Planning Process (LTPP).

These proposed railway investment packages seek to enhance the rail network to support the economic, social and environmental objectives for this area of Cumbria.

The railway along the Cumbrian Coast comprises the Cumbrian Coast Line which runs between Carlisle and Barrow-in-Furness (‘Barrow’), and the Furness Line, which runs between Barrow and Carnforth with services continuing to Lancaster/Preston, while some services continue to Manchester International Airport. Connections to services on the West Coast Main Line (WCML) can be made at Carlisle, Lancaster and Preston. The railway plays a fundamental role as the economic spine linking communities along the Cumbrian Coast.

To secure long term sustainable economic growth for the region, investment in the railway is vital to support the energy related developments planned to take place there in the future. Rail-led strategies being pursued by these third party developers will ensure that the route can play a fundamental role in the delivery and operation of the projects.

Network Rail has worked collaboratively with rail industry partners and third-party funders seeking to maximise the role of the railways to develop a holistic plan for investment in the Cumbrian Coast; termed the Energy Coast Rail Upgrade (ECRU). This constitutes a series of railway investment packages over the course of several years designed to support our partners in delivering their projects whilst offering opportunities for legacy benefits for passengers in the longer term.

It should be noted that the Cumbrian Coast Study was developed when NuGen, backed by their parent company Toshiba, were pursuing their plans to develop the Moorside site, adjacent to Sellafield, for the purposes of new nuclear power capabilities in West Cumbria. Whilst this Study was concluding, in December 2018 NuGen announced that they were intending to withdraw from the development of the Moorside site as part of plans to re-profile their worldwide business.

This has meant that the requirements of NuGen (and the corresponding National Grid requirements) are now not being actively considered as part of the ECRU. Nonetheless, the fact remains that the remaining requirements as part of ECRU still amount to a doubling of freight demand on the Cumbrian Coast from the base scenario.

Due to the interdependencies of all the development requirements on the Cumbrian Coast leading to the proposed railway investment packages outlined within this Study, it is too complex to specify in detail which of the interventions will now be required given that those requirements of NuGen and National Grid are now not actively being progressed. For the purposes of this study therefore, the full range of packages has been presented.

That said, to support discussions as part of the ECRU being progressed through the Rail Network Enhancement Pipeline (RNEP), a high-level review of the previous modelling outcomes using the revised requirements on the route has been undertaken which concluded the following:

- Carlisle - Wigton: There remains a constraint at the Dalston Oil Terminal requiring an intervention in this area;
- Wigton - Maryport: An intervention is still required to mitigate the long block section;
- Maryport: The station remains a constraint and as such requires an intervention to resolve conflicting moves;
- Whitehaven: A passing loop is a likely requirement to alleviate a constraint in this area;
- Whitehaven – Sellafield: An upgrade is required to...
accommodate requirements here; and

- Sellafield: Increased platform capacity is required to accommodate operational and safety requirements.

It should also be noted that Transport for the North’s requirement for two trains an hour on the route between Whitehaven and Carlisle were assessed as part of this modelling review to understand if the opportunity presented itself to bring forward an enhanced passenger service on the route.

The ECRU project has recently secured funding through the RNEP to develop on to Outline Business Case. Through this stage, further modelling will need to be undertaken to understand in greater detail the level of intervention, changes to route opening hours and timetable changes that will be required in order to accommodate the revised requirements on the Cumbrian Coast.

Lastly, it is important to note that this Study and the ECRU project have been developed in a collaborative manner to support partners in delivering a better railway for a better Britain; one that is safe, reliable, efficient, and growing. In that regard, we thank our stakeholders for their continued contributions to the ECRU.
Part B  Executive Summary

The Study is a key element of the CMSP approach adopted to support the rail industry’s LTPP. It sets out proposals and railway investment packages for the next ten years with a view to providing legacy benefits.

B.01 The Case for Change
This Study provides a clear and compelling way forward for the Cumbrian Coast for the next ten years, and sets the tone for a much more intensively used route. It outlines the combination of timetable, infrastructure interventions and extensions to route opening hours which would be necessary in order to support the planned freight demand on the route, and offers opportunities for further passenger use in the longer term.

B.02 Meeting the growing demand in rail freight
The cornerstone of the Study is the Energy Coast Rail Upgrade (ECRU); an integrated programme of railway enhancements that supports partners’ business needs in a manner which:
- delivers greater value for money rather than progressing enhancements in isolation;
- reduces the level of disruption to passenger and freight users during construction; and
- offers legacy benefits to accommodate future passenger demand.

B.03 Collaborative approach to infrastructure investment
Fundamental to the success of the ECRU project thus far has been the collaborative approach taken between a range of public and private sector organisations to define an appropriate future level of service on the route.

With that in mind, it is clear that this Study would not have been possible without the significant collaborative input, local knowledge, and expertise from our partners.

This ongoing collaboration remains crucial to the successful delivery of an integrated programme of enhancements which will deliver a route that not only supports the various needs of businesses along the route, but also plays a fundamental role in supporting the prosperity of the communities served by the line.
Part C

A line at the heart of the Community

A railway that acts as the economic spine linking communities along the Cumbrian Coast. Demonstrates the evolution of the railway along the coast. The importance of a line which will drive economic growth within Cumbria.

C.01 The Cumbrian Coast

The railway along the Cumbrian Coast comprises the Cumbrian Coast Line which runs between Carlisle and Barrow-in-Furness (‘Barrow’), and the Furness Line, which runs between Barrow and Carnforth with services continuing to Lancaster/Preston, while some services continue to Manchester International Airport. Connections to services on the West Coast Main Line (WCML) can be made at Carlisle, Lancaster and Preston. The non-electrified route between Carlisle and Carnforth is approximately 115 miles long, consisting of a mixture of single and twin track sections.

The route is illustrated in Figure 1. For the purposes of this Study, the Cumbrian Coast refers to the whole line of route, including both the Cumbrian Coast Line and the Furness Line.

These lines are at the very heart of the communities which they serve, often being the only form of public transport in the predominantly rural area. They play a critical role in providing connectivity both within and outside Cumbria through connecting people to education, key services, leisure and tourism opportunities. They also link people with key employment sites along the line; the most significant of these currently being the Sellafield reprocessing site.

The potential of the line in supporting the growing tourism economy within Cumbria should not be understated. In 2017, Cumbria and the Lake District National Park, the latter designated as a UNESCO World Heritage Site in July 2017, received over 47 million visitors1. The Cumbrian Coast therefore forms a vital transport artery supporting sustainable travel for the tourism economy, particularly to the Western Lakes.

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1 Economic Impact of Tourism – Visitor Volume and Value 2017, Cumbria Tourism
C.02 Passenger services
There are twenty four stations between Carlisle and Barrow, and nine between Barrow and Lancaster. Of these stations, fourteen are request stop meaning that passengers must notify the conductor if they wish to alight, or if passengers wish to board the train, they must signal to the driver for the train to stop.

Passenger services are operated by the Northern franchise, which was awarded to Arriva Rail North in April 2016 and is planned to continue until March 2025.

Connections to the national rail network at the northern end of the line can be made at Carlisle. Carlisle railway station is the largest station by footfall in Cumbria with over 1.97m entries and exits per annum and 365,000 interchanges. Carlisle station is located on the WCML offering direct services to Edinburgh/Glasgow in the North and Manchester, Birmingham and London in the South. It is a major interchange station for services to the following:

- Cumbrian Coast Line;
- Tyne Valley Line;
- Leeds - Settle to Carlisle Line; and
- Glasgow and South Western Line via Dumfries.

The majority of services from Carlisle on the Cumbrian Coast Line terminate at Barrow with Barrow being an important interchange for connections between the Cumbrian Coast and Furness Lines. There are approximately 652,000 rail journeys per year starting and finishing in Barrow. Additionally, a number of services do operate through Barrow and onto Lancaster and Preston on the Furness Line from the Cumbrian Coast.

On the Furness Line, alongside the through services, there are a number of services which operate between Barrow and Lancaster/Preston. Several of these offer direct services between Barrow and Manchester International Airport.

At the southern end of the route, connections can be made at Carnforth for services to Leeds via the Bentham Line, whilst passengers wishing to use services operating on the WCML such as to Windermere, Glasgow, Birmingham and London, can make connections at Lancaster or Preston.

The service levels on the route offer a broadly hourly service on the Cumbrian Coast Line, with a slightly higher service level on the Furness Line due to the presence of a number of semi-fast services which operate between Barrow and Preston/Manchester stations.

With the commencement of the Northern franchise in 2016 a series of service increments and rolling stock improvements on the Cumbrian Coast have, and continue to be delivered, as part of their franchise commitments. These improvements include the use of refurbished rolling stock on the route, the operation of further direct trains between Barrow and Manchester Airport, and the implementation of a Sunday service between Carlisle and Barrow. In recent history, there was no Sunday service between Whitehaven and Barrow with partners noting that this inhibited the economic growth in that area of Cumbria. The implementation of such services in 2018 is supporting initiatives to drive the tourist economy in the area given its proximity to the Lake District National Park, now designated as a United Nations World Heritage Site.

C.03 Freight services
The Cumbrian Coast plays a fundamental role in the transportation of freight in the county. The line currently supports the transportation of materials to and from the following sites based along the route:

- Sellafield reprocessing plant;
- Low Level Waste Repository (LLWR) at Drigg;
- the Ports at Workington and Barrow-in-Furness; and
- Dalston Oil terminal.

C.04 Going forward
As we look to the future, the freight and passenger usage of the route is projected to increase. This is expected to come from the number of business developments which are planned along the route, alongside demand generated by the franchise commitments. The rail network is central to the transportation strategies for the aforementioned developments which include:

- A new nuclear power station at Moorside (by NuGen) located to the north of Sellafield. Worker accommodation is also scheduled to be provided at Mirehouse and Corkickle which are proposed to be served by new stations and a passenger rail shuttle service;
- A new coal mine at Pow Beck (by West Cumbria Mining);
- A continued construction programme at Sellafield;
- Work to connect the Moorside site to the National Grid; and

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2 ORR Estimates of Station Usage, 2017/18
3 ORR Estimates of Station Usage, 2017/18
• An increase in traffic to the LLWR at Drigg.

The initial increase in demand on the route will be freight traffic associated with supporting the construction and operational elements for the nuclear, coal and energy industries, and in the case of NuGen, the provision of a dedicated passenger shuttle service for their operations.

It is for these reasons that this Study sets out a package of railway investment packages which support the requirements of the route up to 2026; the year currently scheduled to be the peak demand year for these collective developments.

**C.05 Conditional outputs for the route**

**C.05.01 Regional Urban Market Study (2013)**

As part of the Regional Urban Market Study (RUMS), a series of conditional outputs were established at the time with a view to guiding how the rail network could play its part in supporting economic growth in the region.

The conditional outputs recommended for the Cumbrian Coast and Furness Lines are reflected in Figure 2 below.

It is clear that since these were developed, through the franchising process, several of these conditional outputs have been, or are due to be, realised.

**C.05.02 Freight Network Study (2017)**

Subsequently the Freight Network Study (FNS) has also been published by Network Rail. This reflected the fact that several external projects were in development in West Cumbria and were set to increase the volume of freight traffic on the Cumbrian Coast, some of which would also have implications for traffic volumes on the WCML.

The FNS indicated that the associated increase in freight traffic on the Cumbrian Coast would necessitate interventions to support the construction and operational phases of the developments.

It is with that in mind that this Study reflects that level of intervention required on the route, and sets out the way forward for the Cumbrian Coast.

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**Figure 2: Conditional Outputs.**
Part D
Developing the Study

Developed through collaboration between the rail industry, funders and stakeholders.
Details the governance, structure and scope of the Study.
Sets out the strategic priorities and goals that underpin the Study.

D.01 Purpose and Scope
This Study sets out a vision for the next ten years of a route which is expected to be much more intensively used through accommodating the needs of major developments along the Cumbrian Coast. The railway will need to be better every day, safer every day, more reliable and efficient, and be able to grow to satisfy our customers more often. This is our challenge.

The Study will reflect the current capacity of the Cumbrian Coast and Furness Lines, and the lines’ abilities to support the proposed new developments and franchise changes over a number of years. The Study considers options in 2022, 2024 and 2026; these are aligned with the agreed service levels associated with the respective developments. In each of these years, where the infrastructure is unable to support the required service level in a safe and reliable manner, railway investment packages have been proposed to allow the specified services to operate.

D.02 Strategic Priorities
As part of the Study, there is a need for a series of strategic priorities which underpin the document and for the progression of railway investment packages.

To ensure continuity with Network Rail’s operational, maintenance and renewals strategies, these strategic priorities are aligned with the themes set out in Network Rail’s Strategic Business Plan for Control Period 6 (2019 - 2024). These strategic priorities (Figure 3) include:

- **Safe**
  Railway investment packages will support Network Rail’s continued pursuit of safety including that of reducing level crossing risk, driving down track accident risk and protecting workforce safety.

- **Reliable**
  Progressing railway investment packages in an integrated manner with a view to reducing performance impacts on passengers.

- **Efficient**
  Railway investment packages which make best use of new technology and offer more efficient ways of working contributing to an industry that is more lean and innovative.

- **Growing**
  Railway investment packages which deliver new capacity to support economic growth.

It is with these strategic priorities in mind that future railway investment packages will support a prosperous Britain through providing improvements for customers; jobs, housing and growth; and supporting British technology and innovation.
D.03 Underlying Principles
The following section sets out the working assumptions that have been followed in developing the Study for the Cumbrian Coast railway.

D.03.01 Safety and Performance
Network Rail is a safety critical organisation. The railway investment packages reflected within this Study will be developed in a manner which will ultimately improve the safety and performance of the Cumbrian Coast railway.

In line with Network Rail’s safety culture and “Everyone home safe every day” focus, Network Rail is working in partnership with national and local organisations to help people use level crossings correctly, to make level crossings safer, and where appropriate, remove level crossings.

The Network Rail Level Crossing Policy involves a number of objectives, including the following:

- Reducing the number and types of level crossings;
- Reducing level crossing risk;
- Ensuring level crossings are fit for purpose;
- Working with users and stakeholders; and
- Supporting enforcement initiatives.

It is the policy of Network Rail and the Office of Rail and Road (ORR) that no new level crossings on the network will be permitted. The construction of new crossings is also contrary to Network Rail’s policy to reduce level crossing risk.

In line with the national policy, Network Rail will continue to work with partners as part of the Energy Coast Rail Upgrade to look at opportunities for closing level crossings with a view to reducing the safety risk on the national rail network.

D.03.02 Resilience
A safe, reliable and resilient network underpins Network Rail’s plans for the future of the railway.

The resilience of the railway to extreme weather events plays a considerable part in this and is reflected within Network Rail asset policies and plans.

Network Rail has previously published a series of Weather Resilience and Climate Change Adaptation (WRCCA) plans. The London North Western WRCCA Plan¹ (which covers the study area) sets out a plan for the Route supported by an evaluation of the resilience of rail infrastructure to weather events and an awareness of potential impacts from regional climate change projections.

During Control Period 5 (CP5 2014 – 2019), this has already delivered increased investment for asset maintenance and with that, the strengthening of a significant number of coastal and estuarine defences. These CP5 plans were generated based on maintaining existing coastal defence asset capability, however Network Rail’s continued endeavours to increase network resilience through the development of Frontage Management Plans will seek to include:

- potential impacts from sea level rise and identification of appropriate actions to mitigate;
- the need for larger, more extensive interventions on existing areas where required; and
- improving the capability and performance of coastal defence assets and the introduction of new ‘hard’ defences where currently only ‘natural’ defences exist.

Network Rail is therefore committed to enhancing the weather resilience of assets as we go forward into Control Period 6 (CP6) from 2019 – 2024. Network Rail will seek to improve the ability to predict weather related events through enhanced risk assessments, remote monitoring and improved weather forecasting combined with a better understanding of the condition of assets. This has been reflected within the Network Rail Strategic Business Plan for CP6 and places greater emphasis on the operations, maintenance and renewals of the railway as a key part of strengthening the asset base for network resilience.

Network Rail’s continued commitment to increasing the weather resilience of the network will also be reflected within the LNW Route Extreme Weather Strategy currently being developed for CP6. This will enable Network Rail to better respond to specific weather resilience events during CP7 (2024 – 2029).

With that in mind, it is important to note that these Route Plans will have consequences for the LNW Route as a whole where over fifty sites have sea defences; the vast majority of these being located along the Cumbrian Coast with the railway embankments often forming an integral part of the coastal defence. The locations of such sea defences are illustrated in Appendix A.

¹ Network Rail, LNW WRCCA (2016)
D.04 Planning Approach

The LTPP is designed to facilitate the strategic planning of the rail network.

It takes into account the views of local stakeholders and incorporates their views on how rail can drive economic growth.

It gives passenger and freight operators the confidence they need to take their own strategic decisions in planning their services.

It is a Network Rail Licence Condition to effectively plan the future of the network.

The purpose of the LTPP is to inform funders regarding how the railway can support the UK economy in the future.

Network Rail, on behalf of the industry, leads the planning of the network over the long term. This planning informs a number of purposes including to:

- plan for committed and proposed changes to the network / system and the services that operate on it in a holistic way and identify system impacts of individual decisions with programmes in some cases stretching decades into the future;
- inform Network Rail’s asset management plans regarding the future requirements of the network and to inform infrastructure renewals investment decisions on assets with very long lives;
- inform decisions regarding the allocation of current capacity and the use of future capacity across the network / system;
- inform funders and franchising authorities of the interventions that they may wish to make in terms of investment in the network and the services that run on it; and
- enable others, particularly train operators, to plan their business with a reasonable degree of certainty.

D.05 An evolution of the Long Term Planning Process

The Cumbrian Coast Study has been developed through a CMSP approach. CMSP is Network Rail’s response to the Shaw Review (2016) recommendation regarding the requirement to better plan the railway based on customer, passenger and freight needs.

In order to meet the various funder, service specifier and wider stakeholder needs, the CMSP process is allowing the industry to become more flexible and its products more easily accessible.

The Cumbrian Coast Study is one of a number of Studies that are being developed as part of the CMSP approach to the national rail network with a view to informing the planning process for CP6 and beyond.

This Study builds upon the previous Lancashire and Cumbria Route Utilisation Study (RUS), 2008, and the Market Studies completed in the first phase of the LTPP. These covered the:

- Long distance passenger markets;
- London and south east passenger markets;
- Regional urban passenger markets; and
- Freight markets.

The Market Studies identified strategic goals, built up demand forecasts and developed conditional outputs for future rail services across the country.

The CMSP approach to the LTPP enables Network Rail to plan the future of the network, in accordance with its Licence Conditions, in a manner that will deliver:

- a safer railway for passengers and for the people who work on the railway;
- a reliable timetable; and
- the ability to adapt to technology that provides good value for money for current and future users and funders.

2 Network Rail, Market Studies (2013)
D.06 CMSP Governance

To support this CMSP process, the following governance arrangements (Figure 4) have supported the process.

**Figure 4: CMSP Governance Arrangements.**

**STEERING GROUP**
Network Rail, Department for Transport, Transport for the North, Rail North, Arriva Rail North, First TransPennine Express, Freight, Merseytravel, Rail Delivery Group

**GOVERNANCE GROUP**
Network Rail, Department for Transport, Transport for the North, Rail North, Arriva Rail North, First TransPennine Express, Freight, Rail Delivery Group

**WORKING GROUP (example)**
- Strategic Question Lead
- Network Rail
- Department for Transport
- Transport for the North
- Rail North
- Train Operating Companies
- Freight Operating Companies
- Passenger Transport Executives
- Local transport Authorities and Combined Authorities

The Steering and Governance groups identified a series of strategic questions in order to answer the challenge of supporting a dynamic and efficient industry decision making process. This has been supported by evidence drawn from multiple sources including Network Rail’s Market Studies, Transport for the North’s (TfN’s) Independent Economic Review, Rail North’s Long Term Rail Strategy, and Route Strategy Plans.

The output from these strategic questions has formed a forward view of opportunities for funders. Figure 5 below outlines the approach taken from the identification of strategic questions through to the publication of studies.

**Figure 5: CMSP Approach.**

The Strategic Question associated with the Cumbrian Coast specified the following:

“What capacity and capability does rail need to provide in order to support the economic, social and environmental objectives of Cumbria?”

Alongside the Cumbrian Coast Study being developed as part of this first phase of CMSP are the following Studies which will provide outputs that are relevant to the Cumbrian Coast and will be reflected within this Study:

- Stations Study – seeks to identify stations which may incur capacity problems in the next five, ten, and fifteen years, and deliver a stations strategy for the North of England; and
- Freight Study – using the forecasts produced by the Freight Market Study\(^3\) and Freight Network Study\(^4\) to identify constraints and enhancements where appropriate.

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\(^3\) Freight Market Study (2013), Network Rail
\(^4\) Freight Network Study (2017), Network Rail
Part E
Identification of Railway Investment Packages

Railway investment packages necessitated to support a scheduled investment pipeline of energy related developments worth £60 million[^1] which is set to:

- create 10,800 gross Full Time Equivalent jobs in West Cumbria and create 5,850 net additional jobs in the UK labour market;
- generate £16.4bn in Gross Value Added; and
- produce 7% of UK electricity.

E.01 Cumbrian Coast Capacity Study
For the purposes of the CMSP Study, a bespoke approach has been adopted to explore the requirements of the route in order to support the developers’ needs along the line.

A Cumbrian Coast Capacity Study has been undertaken by Network Rail on behalf of the Cumbrian Coast Line Programme Board. This Board was established to coordinate and remit Network Rail to work with partners to integrate industry requirements in a collaborative manner.

The Study sought to understand the line’s current capacity and capability, whilst considering the ability of the line to support the proposed new developments and franchise changes in the future. Where the current infrastructure was unable to support the required service levels, packages of investments have been proposed in order to allow the specified services to operate. This programme approach is deemed to have a range of benefits, not least through:

- providing greater certainty that essential infrastructure is in place when required to support the increasing demand;
- enabling the full and effective programming of proposed interventions in a manner that reduces disruption whilst meeting the requirements of each developer;
- creating certainty and visibility of plans and proposals to all developers and users (via Programme Board);
- providing an opportunity to minimise potential conflicts between passenger and freight service requirements;
- reducing the potential for ongoing disruption to railway operations while incremental improvements are delivered;
- placing the line in the best possible position to attract funding and improvement through standard rail investment routes;
- maximising delivery efficiencies by Network Rail; and
- supporting the creation of legacy benefits for communities and businesses.

It should be noted that this Study does not consider capacity requirements beyond the limits of the line (shown in Figure 1) and does not guarantee any paths either in the Study area or of paths beyond Currock Junction (Carlisle) in the north and Carnforth in the south of the route. It should also be stated that whilst services which operate to and from the Dalston Oil Terminal were included in the 2022 scenario for this Study, further work on the 2024 and 2026 scenarios will be required to understand the needs of these services in the longer term.

E.02 The Base Year

Through the Programme Board, the May 2018 timetable had been identified as the base year. It is from this base timetable that the future year scenarios have been built in order to understand the package of investments required in each of the respective years. This base timetable includes the current passenger and freight operations on the route, alongside the committed franchise obligations scheduled to be delivered during the course of the Northern franchise. Figure 6 illustrates this base timetable on a standard day.
E.03  2022 Scenario
To understand the capacity requirements on the line in 2022, the additional level of traffic was agreed through the Programme Board.

Table 1 specifies this additional level of traffic which is set to operate in addition to the services operating in the base timetable as illustrated in Figure 6. These 2022 services are illustrated in Figure 7. It is evident that this early demand predominantly affects the northern section of the Cumbrian Coast Line.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Additional Traffic (Daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Cumbria Mining</td>
<td>6 freight services from Currock Junction, Carlisle to Pow Beck and return</td>
</tr>
<tr>
<td>NuGen</td>
<td>1 freight service from Currock Junction, Carlisle to Moorside and return</td>
</tr>
<tr>
<td></td>
<td>1 freight service from Carnforth to Moorside and return</td>
</tr>
<tr>
<td>Sellafield</td>
<td>1 freight service from Currock Junction, Carlisle to Sellafield and return</td>
</tr>
<tr>
<td></td>
<td>1 freight service from Carnforth to Sellafield and return</td>
</tr>
<tr>
<td>Low Level Waste Repository</td>
<td>1 freight service from Currock Junction, Carlisle to Drigg and return</td>
</tr>
<tr>
<td></td>
<td>1 freight service from Currock Junction, Carlisle to Drigg and return</td>
</tr>
</tbody>
</table>

Signals at Whitehaven railway station
Figure 7: Map illustrating the 2022 scenario with each line representing a return service. These are additional train services over and above the baseline timetable of May 2018.
E.04 Railway Investment Package in 2022

E.04.01 2022 Interventions

The additional services specified to operate in 2022, in addition to those that operate in the base timetable, drive a number of interventions which are required in order to facilitate the service uplift on the route. The following are deemed essential interventions in 2022:

- a reduction in headway between Wigton and Maryport to 12 minutes;
- a reduction in headway between Workington and Whitehaven to 13 minutes;
- replacement of the Electronic Token Block (ETB) signalling system between Whitehaven and St Bees to support West Cumbria Mining operations; and
- platform lengthening at Sellafield Station so that longer trains can be accommodated in accordance with local instructions for railway operations in the area.

Although not required to facilitate the level of traffic expected in 2022, several other interventions have also been recommended. These will be required in future years to accommodate continued service level increases, and as such, it is deemed that progressing these earlier will reduce disruption in future years. These interventions are:

- The installation of a platform at Maryport in the direction towards Whitehaven. This offers greater flexibility within the timetable, allowing for a robust and resilient service to operate; and
- The extension of St Bees Loop to facilitate passing moves for longer trains whilst supporting a resilient timetable.

Further details of the infrastructure interventions for 2022 can be found in Appendix B.

E.04.02 2022 Route Opening Hours

In order to support the enhanced service levels in 2022, amendments to the route opening hours are also required alongside the above interventions. A summary of the route opening hours are reflected in Table 2 below.

E.05 2024 Scenario

In the same manner as the 2022 scenario was developed, the future train service requirements on the line in 2024 were agreed by the Programme Board. Table 3 specifies the additional level of traffic scheduled to operate in 2024 in addition to the services operating in the base timetable as illustrated in Figure 6.

A comparison of the additional traffic scheduled to operate in 2022 and in 2024 is illustrated in Figure 8. It is clear that in the 2024 scenario, demand is scheduled to take place across the full route and not just confined to the northern end as is the case in 2022.

Table 2: Changes to route opening hours between the base year and 2022 in order to accommodate additional services, Monday to Friday

<table>
<thead>
<tr>
<th>Section of route</th>
<th>2018 Opening Hours</th>
<th>2022 Opening Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlisle South Jn. - Workington</td>
<td>05:20 - 23:59</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Workington - Whitehaven</td>
<td>05:30 - 00:10</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Whitehaven - Sellafield</td>
<td>06:00 - 21:35</td>
<td>05:15 – 22:15</td>
</tr>
<tr>
<td>Sellafield - Bootle</td>
<td>06:00 - 21:35</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Bootle - Millom</td>
<td>06:00 - 21:10</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Millom - Barrow-in-Furness</td>
<td>05:20 - 23:50</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Park South Jn. (freight) - Dalton Jn.</td>
<td>06:00 - 20:24</td>
<td>As 2018 hours</td>
</tr>
</tbody>
</table>

Table 3: Agreed additional traffic scheduled to operate in 2024.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Additional Traffic (Daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Cumbria Mining</td>
<td>7 daily freight services from Currock Junction, Carlisle to Pow Beck and return</td>
</tr>
<tr>
<td>NuGen</td>
<td>6 daily freight services from Currock Junction, Carlisle to Moorside and return</td>
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<tr>
<td></td>
<td>3 return passenger services from Corkickle to Moorside (3 shift changeovers – 8 hours apart) – there is also a requirement for Empty Coaching Stock (ECS) movements in order to position trains for the start and end of the day</td>
</tr>
<tr>
<td>Sellafield</td>
<td>1 freight service from Currock Junction, Carlisle to Sellafield and return</td>
</tr>
<tr>
<td></td>
<td>1 freight service from Carnforth to Sellafield and return</td>
</tr>
<tr>
<td>National Grid</td>
<td>1 service from Sellafield to Currock Junction, Carlisle (AM departure, PM return)</td>
</tr>
<tr>
<td></td>
<td>1 service from Sellafield to Carnforth (AM departure, PM return)</td>
</tr>
<tr>
<td>Low Level Waste Repository</td>
<td>1 freight service Currock Junction, Carlisle to Moorside and return</td>
</tr>
<tr>
<td></td>
<td>1 freight service Carnforth to Moorside and return</td>
</tr>
</tbody>
</table>

Cumbrian Coast Study
Figure 8: Comparison of the additional traffic scheduled to operate on the route in 2022 and 2024. Each line represents a return service; on single line sections the actual number of services is twice what is shown on the diagram. These services are in addition to those operating in the base timetable.
The additional services specified to operate in 2024, in addition to those that operate in the base timetable, drive a number of interventions which are required in order to facilitate the service uplift on the route. The following essential interventions are required:

- All of the interventions identified as essential and recommended for the 2022 scenario, in addition to the following;
- A clock face timetable on the Cumbrian Coast Line. This would make more efficient use of the line by having a regular pattern of trains. The timetable on the Furness Line would be maintained in order to preserve existing passenger services on the WCML to Lancaster/Preston/Manchester;
- A reduction in headway between Wigton and Maryport to 11 minutes;
- Workington - Whitehaven signalling capable of allowing the Parton to Whitehaven section of double track to operate as a dynamic loop with headways of 9 minutes;
- An additional platform at Whitehaven in the direction towards Sellafield. This is required in order to reduce the amount of time that a train occupies the single line section;
- A reduction in headway between Whitehaven and St Bees to 7 minutes;
- A reduction in headway between St Bees and Sellafield to 8 minutes;
- Infrastructure to facilitate the abolition of shunting moves currently required to access Sellafield from the south or departures to the north. This could be achieved through alterations to signalling to enable a crossover at Drigg to be used or via a new crossover in the vicinity of Sellafield; and
- A reduction in headway between Ulverston and Grange-over-Sands to 10 minutes. This will allow passenger trains to run more closely behind freight along the whole of the Furness line which will help unlock capacity, whilst making the headways on all of the Furness Line consistent.

Although not required to facilitate the level of traffic expected in 2024, one further intervention has also been recommended. This will be required in future years to accommodate continued service level increases, and as such it is thought that progressing it earlier will reduce disruption in future years. The recommended intervention is as follows:

- Infrastructure required at Sellafield North Sidings to reduce the occupation of single line sections. This will allow parallel moves to occur, for example enabling a train departing Moorside heading south to do so at the same time as a northbound train is heading towards St Bees.

Further details of the infrastructure interventions for 2024 can be found in Appendix C.

### E.06.02 2024 Route Opening Hours

In order to support the enhanced service levels in 2024, amendments to the route opening hours will be required alongside the above interventions. A summary of the changes to route opening hours are reflected in Table 4 below.

<table>
<thead>
<tr>
<th>Section of route</th>
<th>2018 Opening Hours</th>
<th>2024 Opening Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlisle South Jn. - Workington</td>
<td>05:20 - 23:59</td>
<td>04:45 - 23:59</td>
</tr>
<tr>
<td>Workington - Whitehaven</td>
<td>05:30 - 00:10</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Whitehaven - Sellafield</td>
<td>06:00 - 21:35</td>
<td>05:00 - 23:15</td>
</tr>
<tr>
<td>Sellafield - Bootle</td>
<td>06:00 - 21:35</td>
<td>05:30 - 22:15</td>
</tr>
<tr>
<td>Bootle - Millom</td>
<td>06:00 - 21:10</td>
<td>06:00 - 21:45</td>
</tr>
<tr>
<td>Millom - Barrow-in-Furness</td>
<td>05:20 - 23:50</td>
<td>As 2018 hours</td>
</tr>
<tr>
<td>Park South Jn. (freight) - Dalton Jn.</td>
<td>06:00 - 20:24</td>
<td>05:45 - 20:30</td>
</tr>
</tbody>
</table>
E.07  2026 Scenario
In the same manner as the 2022 and 2024 scenarios were developed, the future train service requirements on the line in 2026 were agreed by the Programme Board. Table 5 specifies the additional level of traffic scheduled to operate in 2026 which is in addition to the services operating in the base timetable as illustrated in Figure 6.

A comparison of the additional traffic scheduled to operate in 2024 and in 2026 is illustrated in Figure 9. The most notable changes from the 2024 scenario are the following:

- An increase from three return passenger services (one at each shift changeover) per day to 10 return passenger services per day between Corkickle and Sellafield; and
- The LLWR trains are no longer required to run in 2026.

### Table 5: Agreed additional traffic scheduled to operate in 2026.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Additional Traffic (Daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Cumbria Mining</td>
<td>7 daily freight services from Currock Junction, Carlisle to Pow Beck and return</td>
</tr>
<tr>
<td>NuGen</td>
<td>6 daily freight services from Currock Junction, Carlisle to Moorside and return</td>
</tr>
<tr>
<td></td>
<td>6 daily freight services from Carnforth to Moorside and return</td>
</tr>
<tr>
<td></td>
<td>3 shift changeovers – 8 hours apart</td>
</tr>
<tr>
<td></td>
<td>AM – 2 South, 1 North</td>
</tr>
<tr>
<td></td>
<td>PM – 2 South, 2 North</td>
</tr>
<tr>
<td></td>
<td>Eve – 1 South, 2 North</td>
</tr>
<tr>
<td></td>
<td>These operate as return passenger services from Corkickle to Moorside. There is also a requirement for Empty Coaching Stock (ECS) movements in order to position trains for the start and end of the day</td>
</tr>
<tr>
<td>Sellafield</td>
<td>1 freight service from Currock Junction, Carlisle to Sellafield and return</td>
</tr>
<tr>
<td></td>
<td>1 freight service from Carnforth to Sellafield and return</td>
</tr>
<tr>
<td>National Grid</td>
<td>1 service from Sellafield to Currock Junction, Carlisle (AM departure, PM return)</td>
</tr>
<tr>
<td></td>
<td>1 service from Sellafield to Carnforth (AM departure, PM return)</td>
</tr>
</tbody>
</table>

Carlisle station
Figure 9: Comparison of the additional traffic scheduled to operate on the route in 2024 and 2026. Each line represents a return service; on single line sections the actual number of services is twice what is shown on the diagram. These services are in addition to those operating in the base timetable.
E.08 Railway Investment Package in 2026

E.08.01 2026 Interventions

In order to facilitate the service uplift on the route in 2026 from the base timetable, this drives a number of interventions, timetable changes and route opening hour amendments. The following essential interventions will be required:

- All of the essential interventions identified for 2022 and 2024; and
- Further reductions in headway on the following sections of route as shown in Table 6.

Although not required to facilitate the level of traffic scheduled for 2026, two further interventions are recommended:

- where possible all headways between Sellafield and Maryport are reduced to five minutes. This is required to:
  - allow greater flexibility when constructing the timetable;
  - help mitigate the risk of finding paths off the Cumbrian Coast Line; and
  - assist in performance recovery if there are delays.
- further infrastructure at Sellafield North Sidings in order to facilitate parallel moves with a view to reducing the occupation of single line sections in the area and to aid operational efficiency.

Further details of the infrastructure interventions for 2026 can be found in Appendix D.

| Table 6: Current headways on the route against those headways required in the 2024 and 2026 scenarios. |
|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| Headway section                                   | Current Headway (Absolute Block)                  | Headway in 2024 | Headway in 2026 |
| Wigton – Maryport                                 | 22 – 25 minutes                                   | 11 minutes      | 9 minutes       |
| Workington – Whitehaven                           | 18 – 21 minutes                                   | 9 minutes       | 6 minutes       |
| Whitehaven – St Bees                              | 10 – 14 minutes                                   | 7 minutes       | 5 minutes       |
| St Bees – Sellafield                              | 13 – 17 minutes                                   | 8 minutes       | 5 minutes       |
| Ulverston – Grange-over-Sands                     | 14 – 19 minutes                                   | 10 minutes      | 10 minutes (7 minutes recommended for performance) |

E.08.02 2026 Route Opening Hours

To support the enhanced service levels in 2026, amendments to the route opening hours are also required alongside the above interventions. A summary of the amended route opening hours are reflected in Table 7 below.

Although the majority of the route requires longer opening hours in 2026 than in 2024, there are sections where the need for longer opening hours reduces. This is related to the ability to timetable passenger services whilst still being compliant with the Train Service Requirement within the Northern franchise.

<table>
<thead>
<tr>
<th>Table 7: Changes to route opening hours between the base year and 2026 in order to accommodate additional services, Monday to Friday.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section of route</td>
</tr>
<tr>
<td>Carlisle South Junction - Workington</td>
</tr>
<tr>
<td>Workington - Whitehaven</td>
</tr>
<tr>
<td>Whitehaven - Sellafield</td>
</tr>
<tr>
<td>Sellafield – Bootle</td>
</tr>
<tr>
<td>Bootle - Millom</td>
</tr>
<tr>
<td>Millom - Barrow-in-Furness</td>
</tr>
<tr>
<td>Park South Junction (freight) - Dalton Junction</td>
</tr>
</tbody>
</table>
E.09 Railway Investment Packages Summary

It is clear that in order to deliver the specified service levels in 2022, 2024 and 2026, a combination of interventions, changes to the timetable and amendments to the route opening hours will be necessary.

These railway investment packages will play their part in delivering a reliable timetable which supports the expected demand for passenger and freight services on the route, in a manner which mitigates disruption further down the line.

These railway investment packages are collectively known as the Energy Coast Rail Upgrade.

An important aspect to reflect within this study is that this focuses purely on the ability of the Cumbrian Coast, as shown by the geographical scope map in Figure 1, to accommodate the specified levels of services to run in years 2022, 2024 and 2026. It does not consider capacity, or paths, beyond the limits of the line i.e. beyond Currock Junction at Carlisle in the north or Carnforth in the south of the route. It also doesn’t consider the longer term requirements for the Dalston Oil Terminal. Should the railway investment packages be progressed as part of the Energy Coast Rail Upgrade, further assessment will be necessary in order to consider the longer term requirements of the Dalston Oil Terminal, and indeed the available capacity and capability outside of the study area.

In the meantime for the purposes of this Study, Table 8 summarises the infrastructure and timetabling interventions required in each of the three years assessed to support the level of service agreed by the Programme Board. These are also reflected in Appendix E.

<table>
<thead>
<tr>
<th>Table 8: Summary of infrastructure and timetabling interventions.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td>Clock face timetable</td>
</tr>
<tr>
<td>Reduced headway between Wigton and Maryport</td>
</tr>
<tr>
<td>New platform at Maryport southbound</td>
</tr>
<tr>
<td>Reduced headway between Workington and Whitehaven</td>
</tr>
<tr>
<td>New platform at Whitehaven southbound</td>
</tr>
<tr>
<td>Reduced headway between Whitehaven to St Bees (through replacement of Electronic Token Block)</td>
</tr>
<tr>
<td>Extension of St Bees Loop</td>
</tr>
<tr>
<td>Reduced headway between St Bees and Sellafield</td>
</tr>
<tr>
<td>Platform Lengthening at Sellafield</td>
</tr>
<tr>
<td>Infrastructure to eliminate shunting moves approaching Sellafield station</td>
</tr>
<tr>
<td>Infrastructure to allow Sellafield North Siding Parallel Moves</td>
</tr>
<tr>
<td>Reduced headway between Ulverston and Grange-over-Sands</td>
</tr>
</tbody>
</table>

*Train shunting into Sellafield sidings*
E.09.02 Summary of Route Opening Hours

In addition to the infrastructure and timetabling interventions identified above, it will also be necessary to amend the route opening hours in order to allow the increased quantum of services to operate in each given year. These are summarised in Table 9 and reflected in Appendix F.

It should be noted that where possible route opening hours were extended as a first consideration, as opposed to specifying additional infrastructure. This was undertaken with a view to reducing the scale of the infrastructure interventions required. Should the route opening hours not be extended, additional infrastructure may well be required or a reduction in the scheduled level of traffic to operate on the route.

<table>
<thead>
<tr>
<th>Section of Route</th>
<th>Opening hours 2018</th>
<th>Opening hours 2022</th>
<th>Opening hours 2024</th>
<th>Opening hours 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workington to Whitehaven</td>
<td>05:30 – 00:10</td>
<td>05:30 – 00:10</td>
<td>05:30 – 00:10</td>
<td>05:15 – 01:00</td>
</tr>
<tr>
<td>Whitehaven to Sellafield</td>
<td>06:00 – 21:35</td>
<td>05:15 – 22:15</td>
<td>05:00 – 23:15</td>
<td>04:15 – 23:00</td>
</tr>
<tr>
<td>Sellafield to Bootle</td>
<td>06:00 – 21:35</td>
<td>06:00 – 21:35</td>
<td>05:30 – 22:15</td>
<td>05:30 – 21:30</td>
</tr>
<tr>
<td>Bootle to Millom</td>
<td>06:00 – 21:10</td>
<td>06:00 – 21:10</td>
<td>06:00 – 21:45</td>
<td>05:30 – 21:30</td>
</tr>
<tr>
<td>Park South Jn. (freight) to Dalton Jn.</td>
<td>06:00 – 20:24</td>
<td>06:00 – 20:24</td>
<td>05:45 – 20:30</td>
<td>05:00 – 21:15</td>
</tr>
</tbody>
</table>

Park South signal box
Part F
The future of the Cumbrian Coast railway – A strategy for the route

A series of railway investment packages have been identified with a view to supporting the additional freight demand and NuGen passenger services on the route.

A collaborative approach to the delivery of an integrated programme will deliver a robust and resilient investment pipeline. Forecasting future passenger demand will be a critical element of a future Study as part of the CMSP approach to LTPP. Stations will require further assessment to ensure all parts of the route can play their part in accommodating future demand.

F.01  Findings of the Cumbrian Coast Capacity Study
As reflected within Part E Identification of Railway Investment Packages, in order to accommodate the forecast demand up to 2026 on the Cumbrian Coast railway, a combination of timetable, infrastructure interventions and extensions to route opening hours will be required to support the construction and operational programmes of third party funders. This railway investment package has been developed on behalf of the Cumbrian Coast Line Programme Board and will be required to enable the delivery of the pipeline of significant investment worth in excess of £60 million along the Cumbrian Coast railway.

North of England indicates that several stations are set to face peak time capacity problems up to 2043 based on current demand data. These stations are those at Maryport, Workington, Sellafield and Millom; illustrated by Figure 10 below. Mitigation measures to address such capacity issues will be addressed by a future Study.

F.02  Future Passenger Demand
F.02.01  Stations Study
As noted within Part D Developing the Study, alongside this Cumbrian Coast Study, several other Studies are being progressed as part of the evolving approach to LTPP.

The Stations Study has been undertaken with a view to future proofing stations in the North of England. The objectives of the Station Study are to deliver a consistent service at railway stations in a manner which optimises the role and usage of the station.

For the purposes of this Study, early analysis of stations within Cumbria as part of work undertaken for the wider

Figure 10: Station Capacity from the Stations Study.1

1 Contains OS data © Crown copyright and database right (2017)
F.02.02 Passenger Demand

This Cumbrian Coast Study seeks to understand the requirements of the route in order to accommodate a specified level of service to operate up to 2026. In addition to that, a bespoke demand analysis exercise has also been undertaken to provide assurance that passenger demand on the route is adequately accommodated for up to 2026.

Utilising count data from the Railway Consultancy report 2014\(^2\), demand analysis indicates that there is likely to be sufficient seated capacity on the Cumbrian Coast Line for the majority of the day in the medium term even if demand were to double between 2013 (when the counts were produced) and 2043. Whilst approaching the longer term (i.e. 2040 and beyond), the requirement for some train lengthening may well be required in order to accommodate growing demand on the Cumbrian Coast, and with that, a requirement to assess the capacity constraints at stations.

That being said, it is clear from the work undertaken for the Cumbrian Coast Capacity Study that the potential for a step change in the level of passenger demand on the route is real. As part of a future Study, a comprehensive passenger count exercise will be required in order to support demand forecasting with a view to gaining a greater insight into the future passenger demand on the Cumbrian Coast railway.

\(^{2}\) Cumbrian Coast Line, Railway Consultancy Report, March 2014

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F.03 Franchise Commitments

In the meantime, the franchise commitments currently being delivered through the Northern franchise form a key component of the strategy for the Cumbrian Coast and will play their part in increasing demand on the route up to 2024 (the end of the current franchise agreement). These commitments will go some way to delivering improved passenger opportunities and experiences along the route, whilst supporting several of the conditional outputs reflected within Market Studies as noted in Part D Developing the Study. For example, these include the full line length Sunday service on the Cumbrian Coast Line, later evening and weekend services, and a commitment to maintaining and enhancing direct services between Barrow and Manchester International Airport.

F.04 The role of the Digital Railway in the future of the route

CP6 marks a turning point in the way in which the network operates with the introduction of more modern technology.

The Digital Railway Programme has identified the Cumbrian Coast as one of the key areas of the network which may benefit from the roll out of the Digital Railway. This is due to a number of reasons, namely there is a need for some of the signalling to be renewed, changes to the demand on the route necessitating train control to be enhanced alongside the route having a relatively self-contained fleet of rolling stock.

For the purposes of this Study, Digital Railway has been considered at a high level, however, in accordance with the Digital Railway Strategy, should the railway investment packages identified within the Study be progressed, the use of digital ready technologies should form the basis of these enhancements. This will allow for the delivery of capacity and performance benefits required for our customers in a manner which also contributes to Network Rail’s wider safety and sustainability principles.

For further details on the Digital Railway Strategy, see Appendix G.
**F.05 The continuing pursuit of safety risk reduction**

In order to reduce the risk associated with level crossings on the network, Network Rail will continue to work with partners on the development of the railway investment packages that constitute the Energy Coast Rail Upgrade.

Currently on the Cumbrian Coast railway, there are 145 level crossings between Carlisle and Carnforth, consisting of a mix of Public Footpath crossings to Automatic Half Barrier crossings and Manually Controlled crossings with gate houses. The locations of these are reflected within Appendix H.

As part of early feasibility undertaken to understand the level of risk which may be generated as a result of the level of service due to operate in 2026, as reflected within Figure 9, an average increase in risk of 21.3% is anticipated at level crossings along the line. Those level crossings between Whitehaven and Sellafield present the greatest risk increase due to the greater quantum of trains scheduled to operate over that section.

With that in mind, should the railway investment packages highlighted within this Study be considered further, Network Rail will continue to work in partnership with our stakeholders in Cumbria to deliver on the national strategy to manage, minimise and eliminate risk at level crossings.

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**F.06 Enhancement Pipeline**

Network Rail will continue to work with partners through the Open for Business initiative³ with a view to progressing an integrated programme of works as identified within this Cumbrian Coast Study in support of developer needs along the line.

The rail investment packages reflected within this Study are also intended to feed into the Department for Transport’s Rail Network Enhancement Pipeline / Market Led Proposals⁴ approach designed to capture rail enhancement proposals going forward.

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³ Network Rail, Open for Business, 2018.
Part G
Summary and Conclusions

There is a positive future for the Cumbrian Coast railway.
Railway investment packages as part of the Energy Coast Rail Upgrade are wholly reflective of partners’ requirements.
There are longer term opportunities to stimulate the wider economy, including supporting the tourism economy of Cumbria, which is now worth £2.9 billion to the region’s economy.¹

G.01 Summary
The future of the Cumbrian Coast railway is a positive one that supports not only the economic growth ambitions of partners in Cumbria, but one that also plays an important role in the wider regional and national growth agendas.
The role of the railway in the respective developer’s transportation strategies reflects an important message; one which demonstrates the power of the rail network in delivering economic growth in a manner which delivers wider social and environmental benefits. These include:
• minimising the carbon emissions associated with travel to and from developments;
• minimising the noise pollution associated with travel in residential areas;
• minimising the environmental and social impacts on the Lake District National Park (now a designated United Nations World Heritage Site) as well as the surrounding areas;
• providing a transport network able to respond to demands from existing and future developments whilst being resilient to the effects of climate change;
• reducing pressure on the major and strategic road networks and improving accessibility to town centres, employment sites and residential areas;
• improving public transport services and accessibility for visitors; and
• improving safety on the transport network and reducing the frequency and severity of accidents on the road network.

1 Economic Impact of Tourism – Visitor Volume and Value 2017, Cumbria Tourism.

The opportunity therefore presents itself for the rail network to drive improvements to various elements that make up the social fabric of a community. Such elements, including income and access to employment, are captured within the Index of Multiple Deprivation (IMD) dataset² which measures the level of deprivation in a given area. Appendix I reflect the latest IMD data for Cumbria and for those areas served by the Cumbrian Coast railway.
To achieve the greatest benefits, the railway investment packages reflected within this Study should be progressed in an integrated manner. This approach has a number of benefits not least the opportunity to minimise disruption to our customers whilst delivering the enhancements in a more cost-effective manner.

G.02 Conclusions
G.02.01 The Importance of Partnership Working
It is recognised that the collaborative working arrangements that have been shown through the Cumbrian Coast Line Programme Board has been successful on a number of levels, not least in agreeing a level of service to operate in 2026 allowing for the identification of railway investment packages to support that demand. These railway investment packages, a combination of timetable, infrastructure interventions and extensions to route opening hours, form the Energy Coast Rail Upgrade.
The Cumbrian Coast Study is further evidence that rail has a fundamental role to play in the delivery of transformative economic growth in Cumbria, in the North and for the wider UK Plc.

² The Index of Multiple Deprivation is a UK government qualitative study of deprived areas in English local councils.
G.02.02 Acknowledgments

In that regard, Network Rail would like to thank the following organisations for their participation in the development of the Cumbrian Coast Study, first those partners involved in the Cumbrian Coast Programme Board governance group arrangements, and secondly those involved through the Network Rail CMSP governance groups.

Cumbrian Coast Programme Board Governance Group:

- Cumbria Local Enterprise Partnership;
- Cumbria County Council;
- Department for Transport;
- Rail North / Transport for the North;
- Northern Rail;
- Direct Rail Services;
- NuGen Ltd.;
- West Cumbria Mining;
- Sellafield Ltd.;
- Low Level Waste Repository;
- National Grid; and
- Community Rail Cumbria – Cumbrian Coast Line CRP and Furness Line CRP.

Network Rail CMSP Governance Groups:

- Department for Transport;
- Transport for the North;
- Rail North;
- Northern Rail;
- Trans Pennine Express;
- GB Railfreight on behalf of the Freight community;
- Rail Delivery Group; and
- Merseytravel.

Workington railway station

Workington Hub
Photo credit: Story Contractors
Appendix A: Sea Defence Locations
Appendix B: Infrastructure as part the Railway Investment Package in 2022

AB.01 Headway Improvement between Wigton and Maryport
Due to the Low Level Waste Repository (LLWR) and West Cumbria Mining (WCM) requirements to operate additional freight trains in 2022, a shortened signal section between Wigton and Maryport is required to fit these services into the timetable.

The current infrastructure is one Absolute Block (AB) signalling section from Wigton to Maryport in both directions. This signalling arrangement means that a train cannot pass from Wigton to Maryport until the previous train has passed Maryport and the signaller has cleared the route (and likewise in the opposite direction).

The signalling needs to be capable of a 12 minute headway to allow the agreed level of service to operate. This would also deliver a headway with a similar capability to adjacent headway sections which aids in future planning and service recovery.

<table>
<thead>
<tr>
<th>Train Type</th>
<th>Running Time Maryport - Wigton</th>
<th>Absolute Block Headway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 156 Passenger</td>
<td>21 - 22 minutes (varies depending on station dwell times)</td>
<td>23 – 24 minutes</td>
</tr>
<tr>
<td>1600 tonne Freight</td>
<td>26 minutes</td>
<td>28 minutes</td>
</tr>
<tr>
<td>2000 tonne Freight</td>
<td>27 ½ minutes</td>
<td>29 ½ minutes</td>
</tr>
<tr>
<td>2500 tonne Freight</td>
<td>31 minutes</td>
<td>33 minutes</td>
</tr>
</tbody>
</table>

AB.02 Headway Improvement between Workington and Whitehaven
The current infrastructure is one AB signalling section from Workington to Whitehaven in both directions. This signalling arrangement means that a train cannot pass from Workington to Whitehaven until the previous train has passed Whitehaven and the signaller has cleared the route (and likewise in the opposite direction).

The signalling needs to be capable of a 13 minute headway. This would also deliver a headway with a similar capability to adjacent headway sections which aids in future planning and service recovery.

AB.03 Replacement of Electronic Token Block between Whitehaven and St Bees
The current Electronic Token Block (ETB) signalling system between Whitehaven and St Bees does not support the level of service required in 2022. Additionally, to access the WCM railhead it has been proposed a ground frame at Pow Beck could be provided. This requires trains entering the railhead to be stationary on the running line whilst the ground frame is operated; analysis of similar operations at Salthouse Junction for access to Barrow Ramsden dock shows that operation takes a minimum of ten minutes for an arrival or departure. A maximum of three return paths a day in the operating window specified can be found for services to Pow Beck with ground frame operation based on the May 2018 timetable.

To achieve the level of service requirement of six return WCM paths per day in the time frames specified, a fully signalled route is required that uses the principles of Track Circuit Block (TCB) signalling. This will enable the railhead to be accessed without requiring a stop on the mainline and removes the requirement for a ground frame.

A fully signalled route into Pow Beck for the WCM operations are likely to require restrictive aspect signalling from the north to allow trains to negotiate the turn off the main line safely. As the impact of this is not fully known at this stage of infrastructure development, it is not possible to determine the exact impact upon train speed. Limited analysis suggests that this could extend the Sectional Running Times (SRTs) between Whitehaven and WCM by three minutes.

There is a risk that the final path in to WCM may require retiming to be later than the specified operating hours. This will depend upon the final infrastructure configuration.
The signalling will be required to allow a northbound train to be routed out of WCM after the preceding southbound train has passed the turnout for the freight facility as shown in Figure 11. This will assist in times of perturbation to aid in service recovery as it allows a freight train to be moved off the running lines faster. It is likely that future increases in service level would require such an ability to maximise the capacity of the single line section.

**Figure 11:** New signalling will need to allow partial release of routes. Top: A WCM freight train (red) can be given the route in to WCM without having to wait for the previous train (blue) to be clear of the single line at St Bees.

Replacement of ETB provides a further performance benefit as the requirement for trains to halt at Whitehaven to exchange tokens is omitted, speeding up through trains that previously were required to stop and allowing them to clear the single line faster than before. It may also be beneficial to performance to increase the northbound speed limit through Whitehaven station (currently 15mph) to make the most of the elimination of the enforced token exchange stop and allow trains to clear the single line section faster. That said this speed increase is not essential to the operation of the 2022 level of service.

**AB.04 Platform Lengthening at Sellafield**

The local instructions for Sellafield in the Sectional Appendix dictate that trains formed of more than three vehicles cannot use the Down platform (the platform towards Whitehaven) and should instead be routed via the Down and Up loop as shown by Figure 12. The constraint of the single line means that there is insufficient time to allow a southbound and northbound service to use the Down and Up loop in close succession. There are times which require a train travelling in each direction to stop or pass at Sellafield simultaneously.

**Figure 12:** It is not possible to route both services via the Down and Up loop, therefore driving a requirement to enable the Down platform to be capable of accommodating a four car train.

This means that from a timetabling perspective there is a requirement for a train to use the Down platform whilst a train in the opposite direction of travel occupies the Down and Up Loop at Sellafield station as shown in Figure 13.

**Figure 13:** Shows the capability required to enable two services in opposite directions to call at Sellafield station simultaneously.
The following are recommendations to address this issue:

**Preferred Option:**
- Extension of Sellafield Down platform to allow specified four car trains – this will allow trains formed of more than three vehicles (four car is specified in the agreed level of service) to stop at Sellafield without having to use the Down and Up Loop which is at times occupied by a passenger service travelling in the Up direction (towards Barrow).

**Other Options:**
- Operate three car trains instead of four car trains – this will allow the three car train to use the Down platform as the platform length will be sufficient for the length of train. This however has the potential to constrain future passenger growth.
- Selective Door Opening (SDO) – SDO is a mechanism that allows the driver or guard to open the doors of a train selectively. Therefore in this instance a four car train can run, however one car will not fit in the platform, meaning just the three cars that are standing in the platform will have doors that will be opened. Usually, a longer station dwell time is required in order to give passengers extra time to travel from the carriage with the doors that are not being opened to a carriage that will have doors opened to safely alight the train; this would need to be taken into consideration.

**AB.05 2022 Recommended Infrastructure**
It is possible to run the agreed level of service in 2022 in addition to the existing service level with the essential infrastructure outlined above. This is achieved through timetabling the additional services so that they cross with current services on the double line section through Parton station.

That said, the result of this is that there are a large number of services running on minimum margins (be it headway, single line re-occupation or junction margins) in various places along the route.

This is of particular concern when there is a significant pressure on the single line sections of route that require consistent right time arrivals to operate smoothly such as is the case at Sellafield, St Bees and Whitehaven.

Whilst minimum margins are valid in timetable construction, running trains on a high proportion of minimum margins or successive trains at a single location on minimum margins exposes train services to a greater risk of poor performance. As such, a delay to one service has no opportunity to be recovered which can lead to a significant cumulative delay across the network.

It is therefore recommended that the following infrastructure improvements are included as part of the 2022 package:
- A new platform at Maryport in the direction towards Barrow; and
- The extension of St Bees Loop.

These interventions would give greater resilience and flexibility to recover from delay instances.

**New platform at Maryport**
The current arrangement at Maryport (Figure 14) requires up passenger services to cross the path of all down services when entering and exiting the platform.

The addition of a new platform at Maryport in the Up direction (towards Whitehaven) would prevent a delayed service in one direction from delaying another service. This would prevent the time penalty of having to potentially stop a freight train to permit an up passenger train to cross its path, resulting in a potential knock-on delay.

**Figure 14:** The Current Layout (Top) requires up trains (red) to cross the path of down trains (blue) in order to call at Maryport Station. The proposed new platform (Bottom) would eliminate these conflicts.
The extra platform removes the dependency of one direction of service being tied to the performance of the other direction in this area and therefore reduces the impact of delay. This would allow better performance in the first instance and would aid in timetable recovery in the event of delays.

Currently trains heading south from Workington Docks have to run north to Maryport to run round. This capability would need to be retained or provided somewhere else if removed from the infrastructure upgrades at Maryport.

**Extension of St Bees Loop**

The current crossing loop at St Bees has a useable length of 218m. This means that longer freight trains cannot be timetabled to cross at this location as neither train would be able to clear the single line section to allow onward passage of the other (Figure 15).

**Figure 15:** Shows the inability to pass two trains too long for the loop at St Bees as neither would clear the single line allowing the onward passage of the other train.

If the loop is not extended, a delayed freight train has the potential to be further delayed as it is held waiting for an opportunity to pass through St Bees loop, or delay an opposite direction move if it arrives in St Bees loop at the same time as another service.

Extension of the loop could potentially have a further benefit in making diversion of trains easier should the route towards Carlisle or Carnforth be unavailable. WCM trains could exit to the south if necessary or, if the line is blocked to the south, more trains could be diverted to the north. This would be much easier to achieve as trains would not be restricted by the loop length at St Bees, giving greater freedom to identify alternative paths should the need arise.

*Level crossing at St Bees station*
Appendix C: Infrastructure as part the Railway Investment Package in 2024

In order to deliver the 2024 level of service, all of the interventions identified as essential and recommended for the 2022 scenario will be required, alongside the below:

AC.01 Clock Face Timetable
In order to deliver the increased quantum of services in 2024, there is the need to have a regular pattern of trains on the route. Therefore a clock face timetable for passenger services, based on an hourly passenger service standardised between Carlisle and Barrow-in-Furness, provides an efficient use of the network.

For the purposes of this study, the following have been assumed:

- Passenger services would be fixed around the freight services that are routed beyond the Cumbrian Coast Line. To enable this, all passenger services terminate at Barrow-in-Furness, although there is an opportunity to link to onward services in some hours;
- Passenger services pass other trains predominantly at St Bees which results in passenger services departing Carlisle at xx:24 and Barrow at xx:33, passing at St Bees at xx:38 – xx:41. In order to fit around the retimed passenger services, current freight services that only operate on the Cumbrian Coast Line have been retimed as close to their original paths as possible to maximise capacity;
- Current passenger paths between Barrow and Carnforth are left unchanged in order to preserve their onward paths on the WCML at Carnforth; and
- All passenger services were planned to stop at all stations with a 30 second dwell, including at request stops, to give a robust scenario of capacity usage.

AC.02 Workington to Whitehaven Signalling
The current line section between Whitehaven and Workington is an Absolute Block (AB) signal section. This means that current planning rules only allow one train at a time in each direction in the section between Whitehaven and Workington. In order to deliver the 2024 agreed level of service, the signalling needs to be able to deliver an unrestricted headway for following trains of 9 minutes.

Figure 16: Requirements of signalling Workington to Whitehaven. Top: Train A (blue) needs to be able to depart Workington, once Train B (red) has cleared Parton. Bottom: Train A (red) needs to be able to depart Whitehaven, once Train B (blue) has cleared Parton.
The signalling will also need to be capable of allowing the Parton to Whitehaven section of double track to operate as a dynamic loop, such that two trains can be timetabled to pass on this section of line without being slowed by restrictive aspects.

**Figure 17:** Requirements of signalling to give the capability of using Parton to Whitehaven as a dynamic loop.

**AC.03 New platform at Whitehaven**
Replacement of ETB signalling between Whitehaven and St Bees, as proposed in 2022, increases the capacity of the single line section. However, to deliver the quantum of services required in 2024, each train must occupy the single line for as short a period as possible.

It is currently a requirement to have a 7 minute gap between a northbound passenger train arriving at Whitehaven, and a southbound train being able to pass through. This is reflected in the Train Planning Rules (TPRs) which consist of a 2 minute enforced dwell at Whitehaven and a 5 minute junction margin required between a northbound train departing Whitehaven and a southbound train arriving.

A new up platform enables a train to wait in Whitehaven station for the single line to clear. This reduces the required gap between a northbound train arriving at Whitehaven and a southbound train passing from 7 minutes to 1 minute. When a southbound train is not scheduled to dwell at Whitehaven, it can pass 2 minutes after a northbound train arrives.

**Figure 18:** Shows the proposed new up platform at Whitehaven which reduces the single line re-occupation time from 7 minutes to a junction margin of 1 or 2 minutes depending on stopping pattern. The new infrastructure is shown in red whilst the black dashed line represents the current single line section through Whitehaven tunnel.

**AC.04 Infrastructure to facilitate Sellafield trains crossing from the south**
Trains bound for Sellafield British Nuclear Fuels (BNF) that arrive from the south from the Barrow direction, currently travel on the Down Main into the Down & Up Loop at Sellafield, then shunt back along the Up Main until clear of the turnout before proceeding as illustrated in Figure 19. In order to meet requested service levels it is necessary to eradicate this shunting move.

**Figure 19:** Current shunting move required to enter Sellafield British Nuclear Fuels (BNF) from the South (Barrow).
This could be achieved by:

- utilising the existing crossover at Drigg — There is an existing crossover from the Up Main to the Down Main to allow services approaching from the North to enter Drigg LLWR. The Up Main would need to be signalled to allow bi-directional operation, this would then allow trains heading for Sellafield to cross from the Down Main to the Up Main and proceed directly into Sellafield without the need for a shunting move as shown in Figure 20.

**Figure 20: Re-signalling of the existing Drigg crossover to eliminate shunting move**

- a new crossover at Sellafield — this option is for a new crossover just south of Sellafield which would enable similar benefits as using the Drigg crossover but would have a lesser effect on performance and capacity due to the reduced length of the required bi-directional running.

**Figure 21: New crossover south of Sellafield would eliminate shunting move**

At certain times in the 2024 scenario, a southbound train departing Sellafield station has not cleared the Up Main to allow a northbound Sellafield BNF train to utilise the Drigg crossover. Where this occurs it is assumed that the previous shunting move occurs.

**AC.05 Headway Improvements for 2024**

A number of headways along the line are required to be further reduced. It is also worth noting that in the 2024 scenario, the need to reduce headways between Ulverston and Grange-over-Sands has become essential. The current headway, required headway for 2022 and required headway for 2024 are all shown in Table 11.

<table>
<thead>
<tr>
<th>Headway section</th>
<th>Current Headway (Absolute Block)</th>
<th>2022</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wigton – Maryport</td>
<td>22 – 25 minutes</td>
<td>12 minutes</td>
<td>11 minutes</td>
</tr>
<tr>
<td>Workington – Whitehaven</td>
<td>18 – 21 minutes</td>
<td>13 minutes</td>
<td>9 minutes</td>
</tr>
<tr>
<td>Whitehaven – St Bees</td>
<td>10 – 14 minutes</td>
<td>17 minutes</td>
<td>7 minutes</td>
</tr>
<tr>
<td>St Bees – Sellafield</td>
<td>13 – 17 minutes</td>
<td>14 minutes</td>
<td>8 minutes</td>
</tr>
<tr>
<td>Ulverston – Grange-over-Sands</td>
<td>14 – 19 minutes</td>
<td>14 minutes</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

As a further recommendation, where possible all headways between Sellafield and Maryport should be reduced to seven minutes. Although not required for capacity, this will:

- allow greater flexibility when constructing the timetable;
- help mitigate the risk of finding paths off the Cumbrian Coast; and
- assist in performance recovery if delays occur.
**AC.06 2024 Recommended Infrastructure**

It is possible to run the 2024 service in addition to the existing service level with the essential infrastructure outlined above. That said, to help mitigate delay it is recommended that the double track section north of Sellafield is extended to remove the short section of single track between Sellafield station and the NuGen Moorside loops.

This intervention would provide additional capacity and give greater flexibility to recover from delays.

**Infrastructure to allow parallel moves to the north of Sellafield**

To the north of Sellafield station is a short section (14 metres) of single track railway between Sellafield station and the NuGen Moorside loops. It is recommended that both ends of this short section of single track are joined by double track as shown in Figure 22.

**Figure 22:** Red line shows short section of single track North of Sellafield.

![Figure 22](image)

It is recommended that the capability for a parallel move between a train exiting the NuGen Moorside facility southbound and a train heading north from Sellafield to St Bees is delivered, therefore eradicating the need for junction margins and single line re-occupation in this area.

A loop could be added to the infrastructure in order to eliminate this short section of single track (as shown in Figure 23).

**Figure 23:** Red line shows the new infrastructure north of Sellafield that will eliminate the short section of single line, giving the capability of parallel moves.

![Figure 23](image)
Figure 24 below shows the parallel move capability once the infrastructure has been built eliminating the capacity pinch point.

**Figure 24:** Southbound NuGen service (blue) departing Moorside, with a northbound service departing Sellafield to St Bees (red). This diagram shows the parallel move that could take place due to the additional infrastructure.

![Crossing near Sellafield](image-url)
Appendix D: Infrastructure as part the Railway Investment Package in 2026

All of the interventions identified as essential in the 2024 scenarios, plus the following:

**AD.01 Headway Improvements for 2026**

A number of headways along the line are required to be further reduced. The current headway, required headway for 2024 and required headway for 2026 are all shown in Table 12.

<table>
<thead>
<tr>
<th>Headway section</th>
<th>Current Headway (Absolute Block)</th>
<th>2024</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wigton – Maryport</td>
<td>22 – 25 minutes</td>
<td>11 minutes</td>
<td>9 minutes</td>
</tr>
<tr>
<td>Workington – Whitehaven</td>
<td>18 – 21 minutes</td>
<td>9 minutes</td>
<td>6 minutes</td>
</tr>
<tr>
<td>Whitehaven – St Bees</td>
<td>10 – 14 minutes</td>
<td>7 minutes</td>
<td>5 minutes</td>
</tr>
<tr>
<td>St Bees – Sellafield</td>
<td>13 – 17 minutes</td>
<td>8 minutes</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Ulverston – Grange-over-Sands</td>
<td>14 – 19 minutes</td>
<td>10 minutes</td>
<td>7 minutes</td>
</tr>
</tbody>
</table>

It is recommended that where possible all headways between Sellafield and Maryport are reduced to five minutes. Although not required for capacity this will:

- allow greater flexibility when constructing the timetable;
- help mitigate the risk of finding paths off the Cumbrian Coast; and
- assist in performance recovery if there are delays.

**AD.02 2026 Recommended Infrastructure**

**Infrastructure to allow parallel moves to the north of Sellafield**

In a similar manner as the 2024 scenario, although not required to support the level of service in 2026, to help mitigate delay it is recommended that the double track section north of Sellafield is extended to remove the short section of single track between Sellafield station and the NuGen Moorside loops.

This intervention would provide additional capacity and give greater flexibility to recover from delays.

*View from the Cumbrian Coast*
## Appendix E: Summary of Infrastructure for Railway Investment Packages in 2022, 2024 and 2026

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Required in 2022</th>
<th>Required in 2024</th>
<th>Required in 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clock face timetable</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Improved Headway between Wigton and Maryport</td>
<td>12 minutes</td>
<td>11 minutes</td>
<td>9 minutes</td>
</tr>
<tr>
<td>New Platform at Maryport</td>
<td>Recommended</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Workington – Whitehaven Signalling</td>
<td>13 minutes and dynamic loop</td>
<td>9 minutes and dynamic loop</td>
<td>6 minutes and dynamic loop</td>
</tr>
<tr>
<td>New Platform at Whitehaven</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Replacement of ETB Whitehaven to St Bees</td>
<td>17 minutes</td>
<td>7 minutes</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Extension of St Bees Loop</td>
<td>Recommended</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Improved Headway between St Bees and Sellafield</td>
<td>14 minutes</td>
<td>8 minutes</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Platform Lengthening at Sellafield</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Infrastructure to allow parallel moves north of Sellafield</td>
<td>No</td>
<td>Recommended</td>
<td>Recommended</td>
</tr>
<tr>
<td>Infrastructure to allow Sellafield trains to eliminate shunting moves into Sellafield BNF site</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Improved Headway Ulverston to Grange-over-Sands</td>
<td>No</td>
<td>10 minutes</td>
<td>7 minutes</td>
</tr>
</tbody>
</table>

*River Mite, Ravenglass: looking towards the Lake District*
Appendix F: Summary of Route Opening Hours for Railway Investment Packages in 2022, 2024 and 2026

<table>
<thead>
<tr>
<th>Section of Route</th>
<th>Opening hours 2018</th>
<th>Opening hours 2022</th>
<th>Opening hours 2024</th>
<th>Opening hours 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workington to Whitehaven</td>
<td>05:30 – 00:10</td>
<td>05:30 – 00:10</td>
<td>05:30 – 00:10</td>
<td>05:15 – 01:00</td>
</tr>
<tr>
<td>Whitehaven to Sellafield</td>
<td>06:00 – 21:35</td>
<td>05:15 – 22:15</td>
<td>05:00 – 23:15</td>
<td>04:15 – 23:00</td>
</tr>
<tr>
<td>Sellafield to Bootle</td>
<td>06:00 – 21:35</td>
<td>06:00 – 21:35</td>
<td>05:30 – 22:15</td>
<td>05:30 – 21:30</td>
</tr>
<tr>
<td>Bootle to Millom</td>
<td>06:00 – 21:10</td>
<td>06:00 – 21:10</td>
<td>06:00 – 21:10</td>
<td>05:30 – 21:30</td>
</tr>
<tr>
<td>Park South Jn. (freight) to Dalton Jn.</td>
<td>06:00 – 20:24</td>
<td>06:00 – 20:24</td>
<td>05:45 – 20:30</td>
<td>05:00 – 21:15</td>
</tr>
</tbody>
</table>
Appendix G: Digital Railway

The rail industry’s Digital Railway Strategy outlines how transforming the railways using digital technology offers the chance to deliver huge benefits for passengers and freight users, and is seen to be the most cost effective way to deliver the future railway needs of Britain.

The railway industry as a whole faces three main challenges:

- A doubling in passenger numbers since 1990 on the UK’s railway network placing great strain on parts of the network;
- The prominence of technology which is becoming increasingly obsolete; and
- A continuing rise in the cost of renewing conventional signalling which has become unsustainable.

The Digital Railway programme is the rail industry’s response to these challenges and will help transform the railway over the coming years by deploying modern signalling and train control technology.

As summarised in Figure 25, the benefits are wide ranging and include the following:

![Figure 25: Digital Railway Benefits](image)

- Safety improvements through:
  - reduced opportunity for Signals Passed At Danger (SPAD);
  - improved Trackside Worker Safety through the reduction in line side equipment needing to be maintained; and
  - reduced Signaller Workload.

- Capacity improvements through:
  - improved capacity due to shorter signal sections allowing for trains to operate in closer proximity to one another whilst doing so in a safe manner.

- Performance improvements through:

1 Digital Railway Strategy (2018)
- improved asset reliability due to on-board rather than line side equipment.

Journey Time improvement opportunities through:
- improved line speed due to the ability to better optimise train operations.

Operating Cost improvements through:
- improved asset sustainability with reduced equipment at the side of the track such as signals and signage.

Passenger Experience improvements through:
- potential increase in train services depending on ratio of freight and passenger services.

Emissions/Energy improvement through:
- more uniform speed profile reducing emissions/energy consumption.

New Class 195 rolling stock which operates between Barrow and Manchester.
Photo credit: Tim Owen

Ulverston railway station
Appendix H: Level Crossing Locations
Appendix I:  
Index of Multiple Deprivation
## Abbreviations and Glossary

### AJ.01 Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Meaning</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>Absolute Block</td>
<td>Signalling system designed to ensure the safe operation of a railway by allowing only one train to occupy a defined section of track (block) at any one time.</td>
</tr>
<tr>
<td>CMSP</td>
<td>Continuous Modular Strategic Planning</td>
<td>Approach Network Rail is adopting to undertake the Long Term Planning of the railways, designed to be dynamic and customer friendly.</td>
</tr>
<tr>
<td>CP5</td>
<td>Control Period 5</td>
<td>Network Rail’s five year funding period from 2014 – 2019.</td>
</tr>
<tr>
<td>CP6</td>
<td>Control Period 6</td>
<td>Network Rail’s five year funding period from 2019 – 2024.</td>
</tr>
<tr>
<td>CP7</td>
<td>Control Period 7</td>
<td>Network Rail’s five year funding period from 2024 – 2029.</td>
</tr>
<tr>
<td>ECS</td>
<td>Empty Coaching Stock</td>
<td>A train movement without any passengers, usually to and from a depot or siding.</td>
</tr>
<tr>
<td>ETB</td>
<td>Electronic Token Block</td>
<td>A type of signalling system which uses a virtual electronic token rather than a physical token for controlling traffic on a route.</td>
</tr>
<tr>
<td>IMD</td>
<td>Index of Multiple Deprivation</td>
<td>Indices of Multiple Deprivation 2015 provide a set of relative measures of deprivation for small areas (known as Lower Super Output Areas) across England, based on seven different domains of deprivation: income deprivation / employment deprivation / education, skills and training deprivation / health deprivation and disability / crime / barriers to housing and services / living environment deprivation. A combination of these domains provides an overall relative IMD.</td>
</tr>
<tr>
<td>MLP</td>
<td>Market Led Proposal</td>
<td>Financially credible ideas and proposals to enhance the railway without government support.</td>
</tr>
<tr>
<td>LLWR</td>
<td>Low Level Waste Repository</td>
<td>A low level waste repository located at Drigg in West Cumbria.</td>
</tr>
<tr>
<td>LNW</td>
<td>London North Western</td>
<td>The Network Rail route that runs from Gretna at the Scottish Borders, through Cumbria, the North West of England, through the West Midlands and to London Euston in the South.</td>
</tr>
<tr>
<td>LTPP</td>
<td>Long Term Planning Process</td>
<td>The industry’s planning process led by Network Rail to develop strategic proposals for the rail network through analysis and consultation with a wide range of stakeholders.</td>
</tr>
<tr>
<td>ORR</td>
<td>Office of Rail and Road</td>
<td>Independent safety and economic regulator for Britain’s railways.</td>
</tr>
<tr>
<td>RNEP</td>
<td>Rail Network Enhancement Pipeline</td>
<td>A new approach for rail network enhancement proposals that require government funding.</td>
</tr>
<tr>
<td>RUS</td>
<td>Route Utilisation Strategy</td>
<td>A predecessor to the CMSP, supporting the strategic development of the railways.</td>
</tr>
<tr>
<td>RUIMS</td>
<td>Regional Urban Market Studies</td>
<td>Studies which forecast demand over a 30 year period and set out a series of conditional outputs taking into account stakeholder aspirations.</td>
</tr>
<tr>
<td>SA</td>
<td>Sectional Appendix</td>
<td>An electronic data source which contains detailed information about network capability.</td>
</tr>
<tr>
<td>SDO</td>
<td>Selective Door Opening</td>
<td>Tool employed that allows the driver or conductor/guard to open the doors of a train individually. Often used where trains are in longer formation than the platform can accommodate.</td>
</tr>
<tr>
<td>SPAD</td>
<td>Signal Passed At Danger</td>
<td>When a train passes a stop signal without authority to do so.</td>
</tr>
<tr>
<td>SRTs</td>
<td>Sectional Running Times</td>
<td>The time taken for the train to travel between two timing locations.</td>
</tr>
<tr>
<td>TCB</td>
<td>Track Circuit Block</td>
<td>A signalling system which relies on the continuous train detection throughout every block section. This gives visibility to the signaller without having to physically observe the train clearing a particular block section.</td>
</tr>
<tr>
<td>TPRs</td>
<td>Timetable Planning Rules</td>
<td>A set of rules which govern the development of railway timetables.</td>
</tr>
<tr>
<td>TSR3</td>
<td>Train Service Requirement 3</td>
<td>The level of service the Northern franchise is committed to delivering during the course of the franchise.</td>
</tr>
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</table>
**AJ.01 Abbreviations (Cont.)**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Meaning</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCM</td>
<td>West Cumbria Mining</td>
<td>Company seeking to develop the coal mining industry in West Cumbria.</td>
</tr>
<tr>
<td>WCML</td>
<td>West Coast Main Line</td>
<td>The main intercity railway which runs through the LNW route from the Scotland through to London.</td>
</tr>
<tr>
<td>WRCCA</td>
<td>Weather Resilience and Climate Change Adaptation Plan</td>
<td>Network Rail plans designed to strengthen the resilience of the railway network.</td>
</tr>
<tr>
<td>WTT</td>
<td>Working Timetable</td>
<td>The rail industry’s version of the public national timetable showing all movements on the rail network including freight trains, empty trains and those coming in and out of depots.</td>
</tr>
</tbody>
</table>

**AJ.02 Glossary**

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Half Barrier Crossing</td>
<td>A type of level crossing which features barriers that descend across only half of the road, the other half remains open to allow vehicles and passengers to move out of harm’s way.</td>
</tr>
<tr>
<td>Clock Face Timetable</td>
<td>A timetable under which services run at consistent intervals as opposed to a timetable that is purely driven by demand and has irregular headways.</td>
</tr>
<tr>
<td>Conditional Outputs</td>
<td>Ambitions for the service characteristics and frequencies for passenger and freight to be accommodated.</td>
</tr>
<tr>
<td>Dynamic Passing Loop</td>
<td>A passing loop that allows trains proceeding in opposite directions to pass each other without having to stop or slow down.</td>
</tr>
<tr>
<td>Gross Value Added (GVA)</td>
<td>A measure of the value of goods and services produced in an area, industry or sector of an economy.</td>
</tr>
<tr>
<td>Ground Frame</td>
<td>A small lever frame located beside a railway, usually at ground level, usually operated by train crew and not permanently staffed.</td>
</tr>
<tr>
<td>Headways</td>
<td>A measurement of distance or time between vehicles. A shorter headway signifies closer spacing between the vehicles.</td>
</tr>
<tr>
<td>Parallel Moves</td>
<td>The ability to path trains on independent routes to pass simultaneously through a junction or station.</td>
</tr>
<tr>
<td>Public Footpath Crossing</td>
<td>A crossing where the railway crosses a footpath or bridleway.</td>
</tr>
<tr>
<td>Route Opening Hours</td>
<td>The times at which a line of route is open for freight and passenger traffic to operate, often associated with the opening hours of signal boxes.</td>
</tr>
<tr>
<td>Shaw Review 2016</td>
<td>A review on the longer term future shape and financing of Network Rail.</td>
</tr>
<tr>
<td>Up and Down Line</td>
<td>Railway directions usually describes as Up and Down Line with Up usually being to a major location. On most of the network, Up is towards London.</td>
</tr>
</tbody>
</table>

*Spring flower bed at Wigton railway station.*
*Photo credit: Laurence Hilland*
Appendix K: Reference Material

Reference Materials


Network Rail, Long Term Planning Process: https://www.networkrail.co.uk/running-the-railway/long-term-planning/

Network Rail, Open for Business 2018: https://www.networkrail.co.uk/industry-commercial-partners/third-party-investors/network-rail-open-business/

Network Rail Strategic Business Plan, 2019 - 2024: https://www.networkrail.co.uk/who-we-are/publications-resources/strategicbusinessplan/


Railway Consultancy Ltd., Cumbrian Coast Line report, March 2014.

