

# Lincolnshire Strategic Advice

HOW CAN ECONOMIC GROWTH AND CONNECTIVITY BE BEST SUPPORTED BY THE RAIL NETWORK IN LINCOLNSHIRE?



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## Part A EXECUTIVE SUMMARY

This document is Network Rail’s long-term strategic advice for the Lincolnshire area. It is guided by an overarching focus on the opportunities available to improve rail service provision, both passenger and freight, across Lincolnshire. It is guided by the following central strategic question:

How can economic growth and connectivity be best supported by the rail network in Lincolnshire?

The railway across Lincolnshire is of strategic significance, providing vital social and economic benefits through passenger services and handling nationally significant flows of freight. On some corridors, the network is less intensively used for passenger services than other parts of the national network and serves generally dispersed flows across a sparsely populated geography.

Network Rail has worked with funders and stakeholders from across the rail industry, including the Department for Transport, train and freight operators and sub-national transport bodies as part of a collaborative process to produce this advice. The methodology has been high-level but evidence-based, assuring funders that the recommendations throughout the report are credible.

Demand forecasting, advanced timetable analysis and other technical inputs have fed the results, and all commentary and recommendations are rooted in government’s five strategic objectives for rail: meeting customers’ needs, delivering financial sustainability, contributing to long-term economic growth, levelling-up/connectivity and delivering environmental sustainability.

This link to the strategic objectives provides a line of sight between local aspirations, railway infrastructure and national government



policy. This is particularly important for Lincolnshire, where the economic case for significant capital investment can be challenging given the relatively rural nature of the county and the importance of financial sustainability for the rail network. Lincolnshire Strategic Advice does though present a positive vision for improvements, highlighting that relatively low-cost changes to the network can make a significant difference to passengers and freight-users.

This report also considers how the wider economic characteristics of Lincolnshire, including its role in food production, the Humber Freeport and the potential Geological Disposal Facility on the east coast provide opportunities for investment. Many further concepts to improve the network have been considered and are summarised throughout this report, and whilst some of these do not at present meet the threshold of being core recommendations considered likely to be affordable and value-for-money for funders immediately, Network Rail would welcome ongoing engagement with local and regional stakeholders to further explore the feasibility of these aspirations.

The core recommendations of Lincolnshire Strategic Advice are:

- to extend London Kings Cross-Lincoln services to Cleethorpes,
- to explore opportunities to improve the passenger experience at Lincoln station,
- that if funders wish to introduce a rail connected Geological Disposal Facility at Theddlethorpe, their primary option should be for infrastructure suitable for passenger as well as freight services, serving Louth and Mablethorpe. From a rail perspective the greatest value for money is likely to be via the southern approach. Funders must also consider interventions required to deliver new services on the existing network, as well as new infrastructure,
- replacing the level crossing with a footbridge at Crowle,
- exploring the operational feasibility of removing the near-three-hour gap in morning services from Barton-on-Humber,

- that funders, operators and specifiers should work with Network Rail to explore opportunities to improve multi-modal integration across the county, and
- to explore funding for electrification of the GNGE line between Peterborough and Doncaster via Lincoln as a medium-term priority.

Unless noted otherwise, all recommendations throughout this report are for further work to be undertaken on the relevant concept, allowing benefits and costs to be identified in greater detail before a commitment is made to deliver the relevant change.

Network Rail welcomes working with funders who may be interested in exploring the highlighted recommendations with further assessment, which would be equivalent to Strategic Outline Business Case-maturity.

## Part B BACKGROUND AND PURPOSE

### B.1 Strategic advice

Network Rail, as infrastructure owner and maintainer, must plan the future of Britain's rail network as a condition of its Network Licence. This obligation is managed for Lincolnshire through Network Rail's Eastern Region and is fulfilled through production of strategic advice. The production of advice is guided by an overarching strategic question or focus, is conducted impartially and collaboratively with recommendations built on a robust evidence base.

This document summarises Network Rail's long-term strategy for the Lincolnshire area. It provides an overarching focus on the opportunities available to improve rail service provision, both passenger and freight, across Lincolnshire. It is guided by the following central strategic question:

How can economic growth and connectivity be best supported by the rail network in Lincolnshire?

The analysis conducted to answer this question is designed to give clarity to specifiers and funders about where change or future investment can be most effectively deployed.

The work has been produced in collaboration with the wider rail industry, with input from train and freight operating companies, sub-national transport bodies including Transport for the North and Midlands Connect, as well as the Department for Transport. The inputs to the analysis, including wider aspirations for improvements to the rail and transport network across Lincolnshire, have been included throughout the course of this work through a series of Working Groups and ultimately endorsement of strategic advice outputs through Network Rail’s Region Investment Review Group, which includes senior representation from the organisations involved in the work.

Lincolnshire Strategic Advice is not, at this stage, a request for immediate funding for delivery of enhancements, and the need to consider investment carefully given the present affordability challenge is recognised through this work. It does not define an ‘end state’ train service or a county-wide required set of infrastructure deliverables. Instead, this work seeks to contextualise Lincolnshire’s railway as part of the wider rail and transport network, identify constraints to growth or improvement in future, and consider effective ways to resolve them which funders may wish to consider now or in the future. It offers options and recommendations for further consideration which can be used by industry partners and stakeholders to further their objectives and strategies for investment.

## B.2 Guiding objectives

Operation of Britain’s railways and the utilisation of available capacity for passenger and freight services, both now and in the

future, will be determined by the policy outcomes sought. To provide guidance to the industry and Network Rail on these outcomes, the government has set some overarching primary objectives for rail.

These objectives, shown in Table A, below, have been used as a basis for the assessment and recommendations provided in this document.

Strategic Objective	Ambition for Rail
<b>1. Meeting customers’ needs</b>	<ul style="list-style-type: none"> <li>a) Increasing value for money and improving performance, reliability and convenience of rail</li> <li>b) Meeting multi-modal expectations and reducing end-to-end journey time</li> <li>c) Maintaining a safe railway and widening accessibility</li> </ul>
<b>2. Delivering financial sustainability</b>	<ul style="list-style-type: none"> <li>a) Reducing costs to government</li> <li>b) Ensuring sustainable balance of fare/fee and government funding</li> <li>c) Increasing the efficiency of operation, asset management and capital investment - delivering on time and on budget</li> </ul>
<b>3. Contributing to long-term economic growth</b>	<ul style="list-style-type: none"> <li>a) Reducing total journey time and cost</li> <li>b) Connecting labour markets and realising agglomeration benefits</li> <li>c) Connecting places to markets, directly investing in skills, innovation and digital infrastructure</li> </ul>
<b>4. Levelling up and connectivity</b>	<ul style="list-style-type: none"> <li>a) Contributing to long-term economic growth in support of levelling up</li> <li>b) Contributing to social benefits from improved connectivity</li> </ul>
<b>5. Delivering environmental sustainability</b>	<ul style="list-style-type: none"> <li>a) Encouraging modal shift by increasing attractiveness of rail</li> <li>b) Delivering rail net-zero (traction and infrastructure), protecting biodiversity and addressing air pollution</li> <li>c) Protecting transport links by investing in climate adaption</li> </ul>

Table A: Government’s strategic objectives for rail (abridged)

## B.3 Lincolnshire’s railway

Britain’s rail network is varied in terms of the passenger and freight flows that it serves. The railway across Lincolnshire is of strategic



significance, providing vital social and economic benefits to society and handling nationally significant flows of freight. On some corridors, the network is less intensively used for passenger services than other parts of the national network and serves generally dispersed flows across a sparsely populated area.

As well as serving passenger journeys within Lincolnshire, the railway also serves an important function of connecting passengers beyond the county towards, amongst other destinations, the wider East Midlands, Yorkshire and London. The East Coast Main Line (ECML) runs through the county, with a station at Grantham, but the focus of this strategic advice is the lines to the east of the ECML which have not been subject to recent Advice by Network Rail. The southwestern part of Lincolnshire around Stamford is also excluded from this report with Figure 3, overleaf, showing the geographic scope of Lincolnshire Strategic Advice.



Figure 1: a biomass train at Immingham

For passengers, the railway in Lincolnshire provides valuable mobility within the county for relatively geographically isolated areas, supporting economic growth through connection to the wider regional and national network, and providing a transport mode which is less environmentally damaging than road.

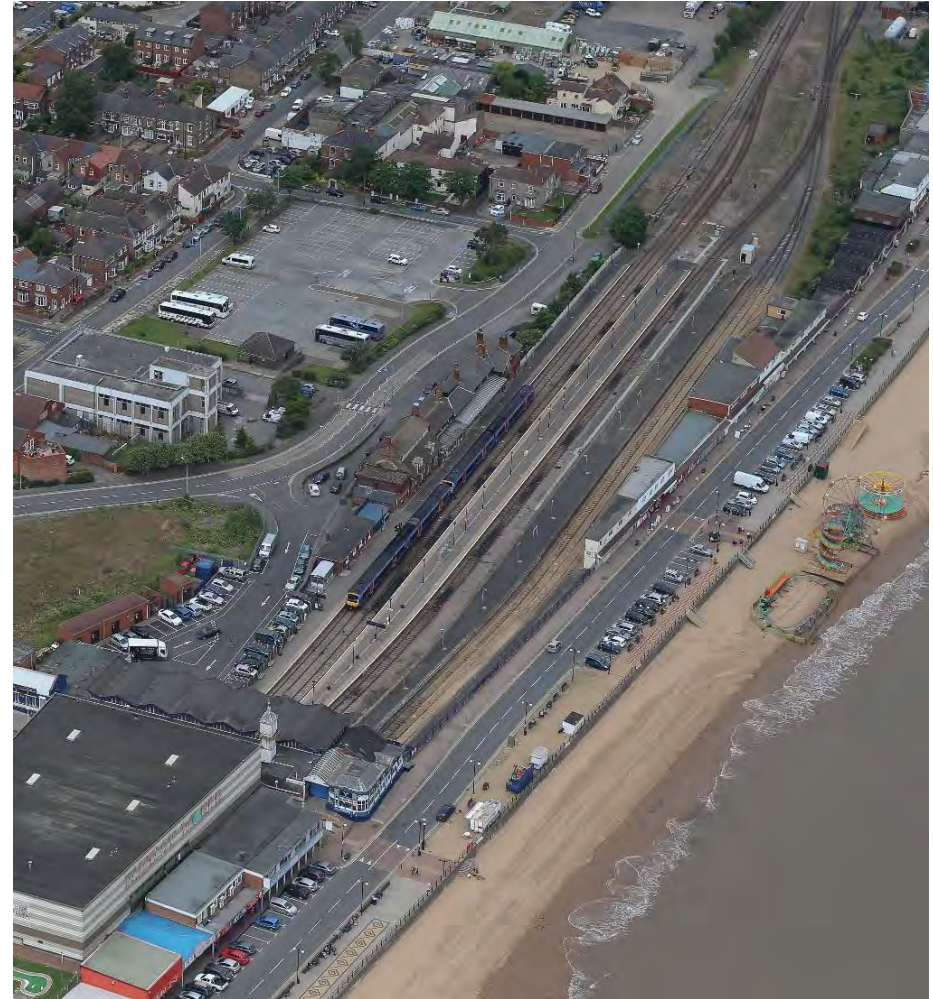


Figure 2: Cleethorpes station and surrounding area, seen from above

OFFICIAL

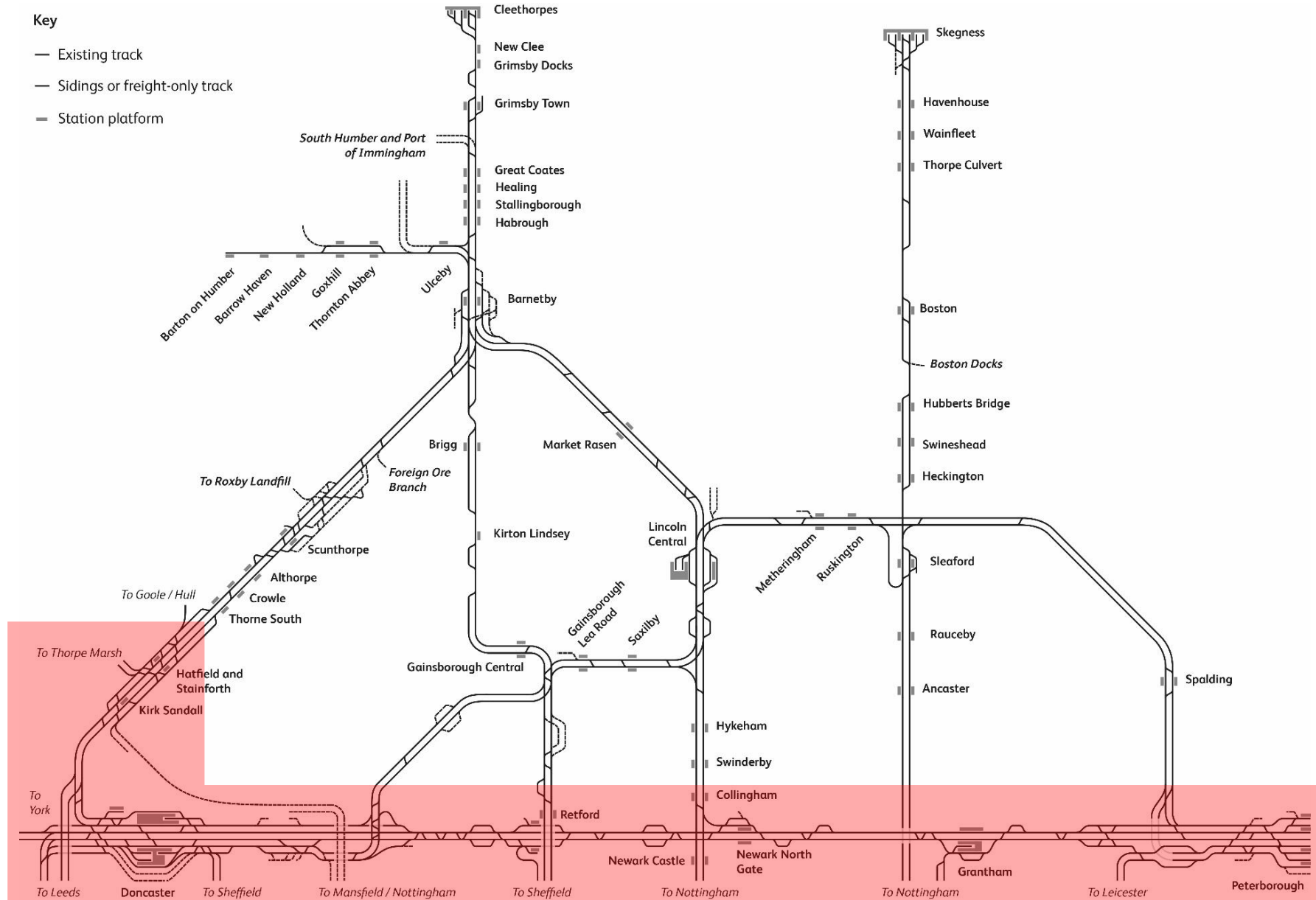


Figure 3: geographic scope of Lincolnshire Strategic Advice, with lines highlighted in red excluded from scope

## Part C METHODOLOGY AND ANALYSIS

This document provides a wide-angle and holistic consideration of the rail network across Lincolnshire. The method for assessment draws on specific capacity and economic analysis to understand future infrastructure constraints, as well as a qualitative assessment which is aimed at contextualising possible future changes to the network within the wider rail and transport system.

The options that have been identified in this strategic advice have therefore been assessed at a strategic level. Lincolnshire Strategic Advice does not offer detailed benefit and cost appraisal and instead focuses on the initial strategic and economic cases of changes, linked qualitatively to national government's overarching strategic objectives. All technical assessments provided are early-maturity and order-of-magnitude and must be treated as such.

This assessment is split effectively into two parts:

- Part D provides a qualitative overview of the rail network in Lincolnshire within the context of the wider transport system, highlighting known aspirations and the main opportunities to provide improved outcomes for passenger and freight users, and address the government's strategic objectives for rail,
- Part E uses specialist analysis, including capacity and economic analysis to explore the impacts of a set of future train service possibilities (covering nominal 2030s and 2050s scenarios). This section covers each line of route within Lincolnshire and highlights where future constraints may emerge based on forecast increased capacity utilisation. It also offers a prioritisation of enhancement options which could resolve these constraints.

The method applied, a mixture of high level, qualitative assessment and more specific capacity analysis has been used to give a strategic overview for Lincolnshire which captures opportunities around

integration and operational changes, alongside potential larger-scale infrastructure change and investment.

There are some caveats with the methods adopted in this strategic advice, and these methodology limitations are appropriate and proportionate for early-stage strategic planning of the railway network. The chosen methodology focusses on opportunity identification and is an efficient and proportionate way of understanding the challenges and feasibility of potential changes to the network at this early stage.

One specific caveat is that the analytical methodology used in this work, known as capacity utilisation, assesses individual junctions or sections of line in isolation. This can make it difficult to provide a guarantee that a specific train can be timetabled across all the lines of route and junctions that it runs on. However, the capacity utilisation method does provide a good general overview of likely future capacity constraints on a line of route basis, the advantage of which is that results which are not bound to a specific railway timetable, so have applicability beyond the next twice-yearly timetable change. It also provides a good indication of the probability of being able to successfully timetable trains on a high-performing railway.

Secondly, the economic assessment provided in this work captures only prospective changes in revenue or subsidy required for future service changes. This is intended to give a general indication of the financial impacts of service change but does not fully capture the wider range of social or economic benefits associated with improvements in passenger and freight service.

It is important that stakeholders, specifiers or funders who use this advice are aware that the findings are based on wide-angle analysis. The outputs are intended to inform further development work, aligned to the recommendations included in Part E of this report.



## Part D LINCOLNSHIRE'S RAIL NETWORK IN CONTEXT

### D.1 Lincolnshire: Population and Employment

Lincolnshire (which within the context of this work includes the non-metropolitan county of Lincolnshire and the unitary authority areas of North Lincolnshire and North East Lincolnshire) incorporates a large area of predominantly flat land on the east coast of England, bordering the River Humber's estuary in the north, Cambridgeshire and the Wash in the south, and the more densely populated urban areas of the East Midlands and Yorkshire in the west.

The county is the second largest by area in the country with a recorded population of 1,087,659 in the [2021 census](#). Accordingly, Lincolnshire is one of the most sparsely populated areas in England, with approximately 129 residents per square kilometre. Lincolnshire has a much lower population density than neighbouring counties like Nottinghamshire (396 residents per square kilometre), Leicestershire (342) or Cambridgeshire (228).

The low population density in Lincolnshire describes the general population distribution, which includes several large towns and cities, the largest of which are Lincoln, Grimsby and Scunthorpe. Lincolnshire's north includes a higher concentration of industrial businesses, particularly along the south bank of the river Humber, though the area is also comprised of rural populations living in small towns and villages which are dispersed across the county. Figure 4 shows the general distribution of population density and Figure 5, overleaf, shows Lincolnshire's Built Up Areas (BUAs).

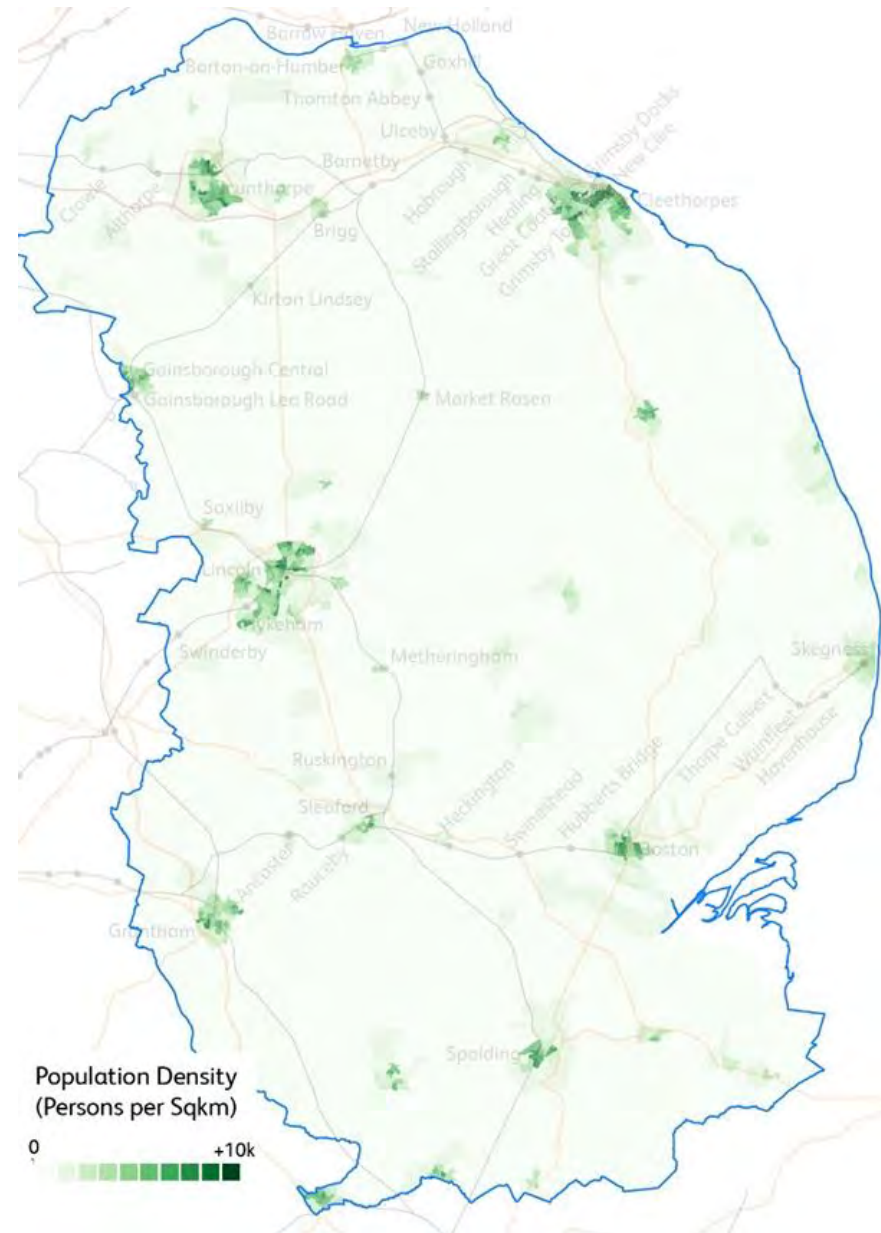


Figure 4: Lincolnshire's population density



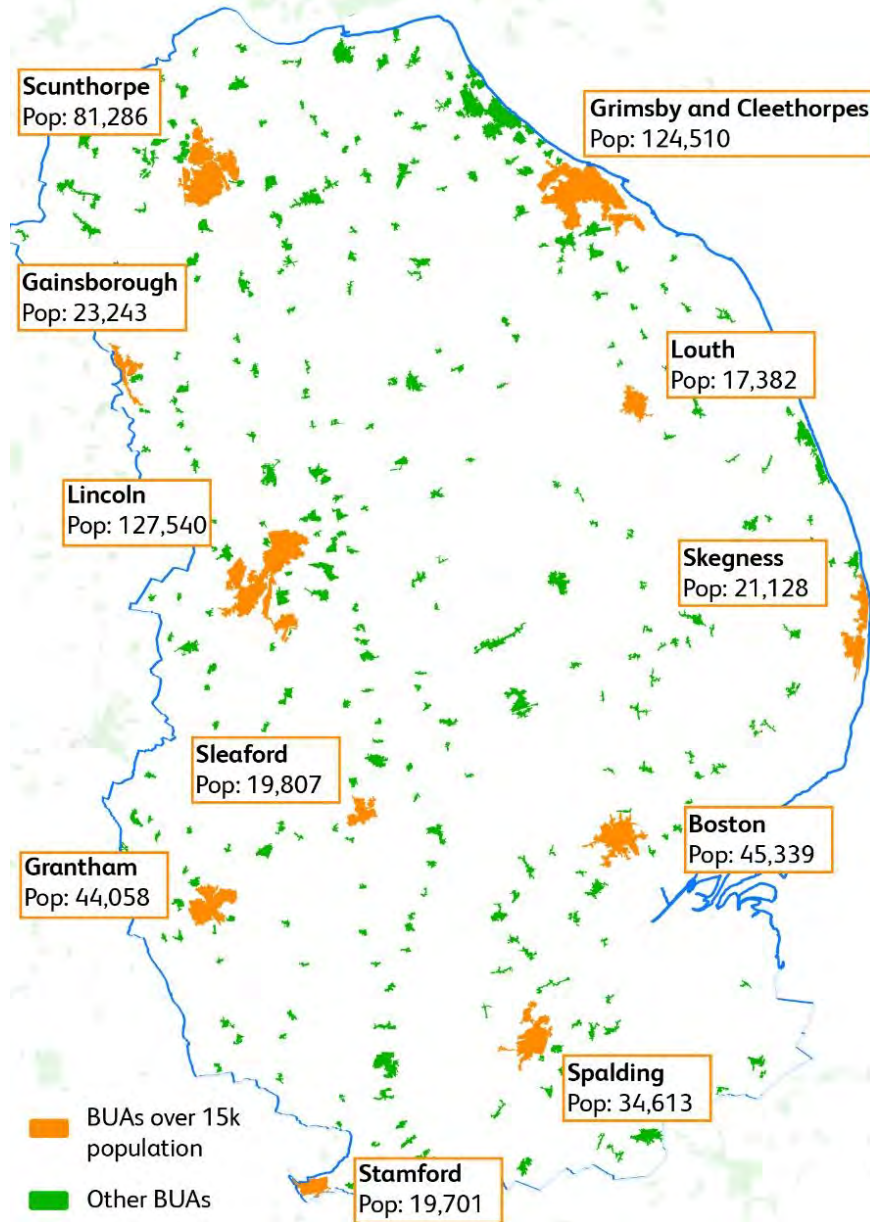


Figure 5: Built Up Areas (BUAs) within Lincolnshire

The vast majority of Lincolnshire is rural and flat in character. The area is well suited to arable cropping which has formed a large part of the local economy. Lincolnshire’s agriculture sector is strategically important at a national level, producing around 12% of the country’s entire agricultural output. Agriculture is important within Lincolnshire, supporting 75,000 food sector jobs and accounting for 18% of all employment within the county, much above the national average of 4%. These jobs are not dispersed evenly across the county, with notable ‘food clusters’ where food sector jobs focused on supply chain, logistics and fresh produce are concentrated. The agri-business sector is central to future growth and economic planning in the region, evidenced by the Greater Lincolnshire Local Enterprise Partnership’s UK Food Valley strategy. This focuses on developing market potential for Lincolnshire’s food exports, accelerating digital technology adoption and automation in supply chains, and expanding low-carbon transport and logistics at locations such as the South Lincolnshire food cluster centred around Boston and Spalding.

While the agricultural sector is important across Lincolnshire, there are also several important and high Gross Value Adding employment clusters which also represent areas for future growth and impact on transport and logistic. These include:

- port facilities at and near Immingham which, along with Hull, Goole and Grimsby, now forms part of the Humber Freeport, forming a critical part of the national logistics network for transnational intermodal freight and a potentially significant area for future employment growth due to changes in the economic regulatory environment,
- advanced manufacturing and chemicals specialism, with notable large employers in steel at Scunthorpe and a major power generation cluster in Lincoln and across the South Humber Bank enterprise zone,

- a growing energy sector with ambitious targets for clean energy growth and a decarbonisation cluster on the Humber bank,
- Britain's first Air and Defence College in Lincoln, as well as significant defence research and development organisations based at the Lincoln Science and Innovation Park, and
- several important areas for the visitor economy including Doddington Hall, Grimsthorpe Castle, RSPB Frampton Marsh, Grimsby Fishing Heritage Centre, Normandy Hall Country Park, Gainsborough Old Hall and Alkborough Flats.

More broadly, the median average age of Lincolnshire residents was 45 years, five years above the national average of 40. The district council area of East Lindsey recorded a median age of 52.9 years in 2021, the third oldest population within any local authority district in the country. This demographic structure is a contributory factor in significant demand for health and care services which represent a significant part of the local economy, supported by the transport network. These trends are likely to continue, and the local transport system will need to cater for connectivity for patients and users as well as greater access to the labour force for planned developments in the sector such as the Centre for Innovation in Rural Health.

Lincolnshire also comprises some areas of a relative economic deprivation, with significant areas of the county more than 45 minutes from the main employment centres. Though there are notably high-value clusters of employment around the county and plans for future growth, but many rural residents and seaside towns and villages geographically isolated. Some of these isolated areas have a relatively high proportion of seasonal employment and jobs with below-national-average rates of pay. In 2021, of the 21 English County Councils, Lincolnshire was the third most deprived based on the measure of Indices of Multiple Deprivation, with over a quarter of areas in the bottom 30% of deprivation. IMD provide a single measure across a series of deprivation domains, including but not limited to the proportion of the population experiencing income-

related deprivation, the proportion of the working age population involuntarily excluded from the labour market, accessibility of housing and services and the quality of the local environment. As shown in Figure 6, overleaf on the left, the general distribution of deprivation illustrates how the most deprived parts of Lincolnshire are focused on sparsely populated and coastal locations in the east of the county.

Economic deprivation can be compounded by poor transport provision and can lead to Transport-Related Social Exclusion (TRSE). In Lincolnshire, this is a particular challenge in areas of rural/urban fringe and in coastal communities, where residents may not have the same access to a private car as more affluent rural residents, but also have limited access to the public transport network. This can result in a pronounced risk of TRSE, as identified through recent work undertaken by Transport for the North shown in Figure 7, overleaf on the right.

Some parts of Lincolnshire such as clusters within major towns and across the less-densely populated coastline, exhibit some of the highest risk levels for TRSE across the north of England. This shows the relative difficulty providing strong public transport connections across Lincolnshire, especially on an east-west axis.

The general structure of the transport network across Lincolnshire largely reflects the area's primary characteristics; a generally rural and relatively sparse population distribution, but also helps to explain some of the demographic, economic and social factors described above.



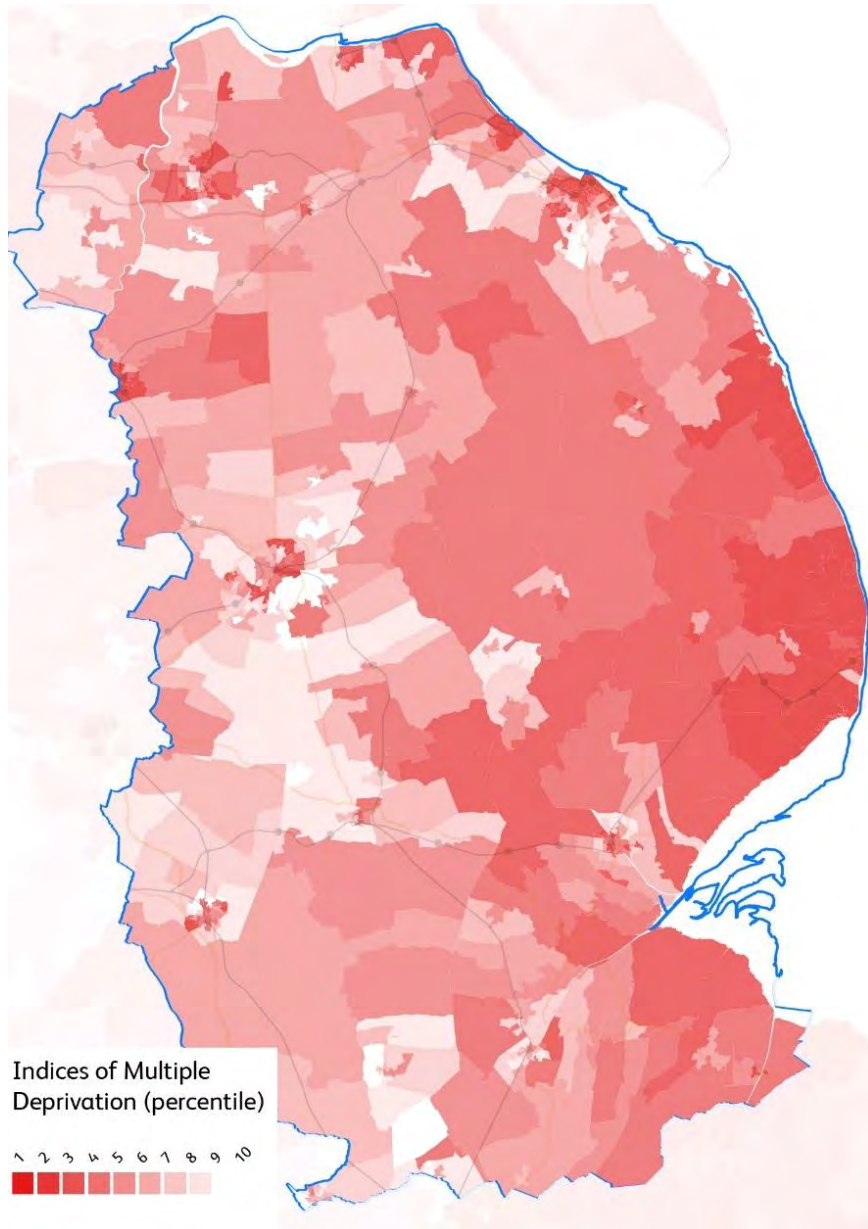


Figure 6: Lincolnshire’s Indices of Multiple Deprivation (IMD)

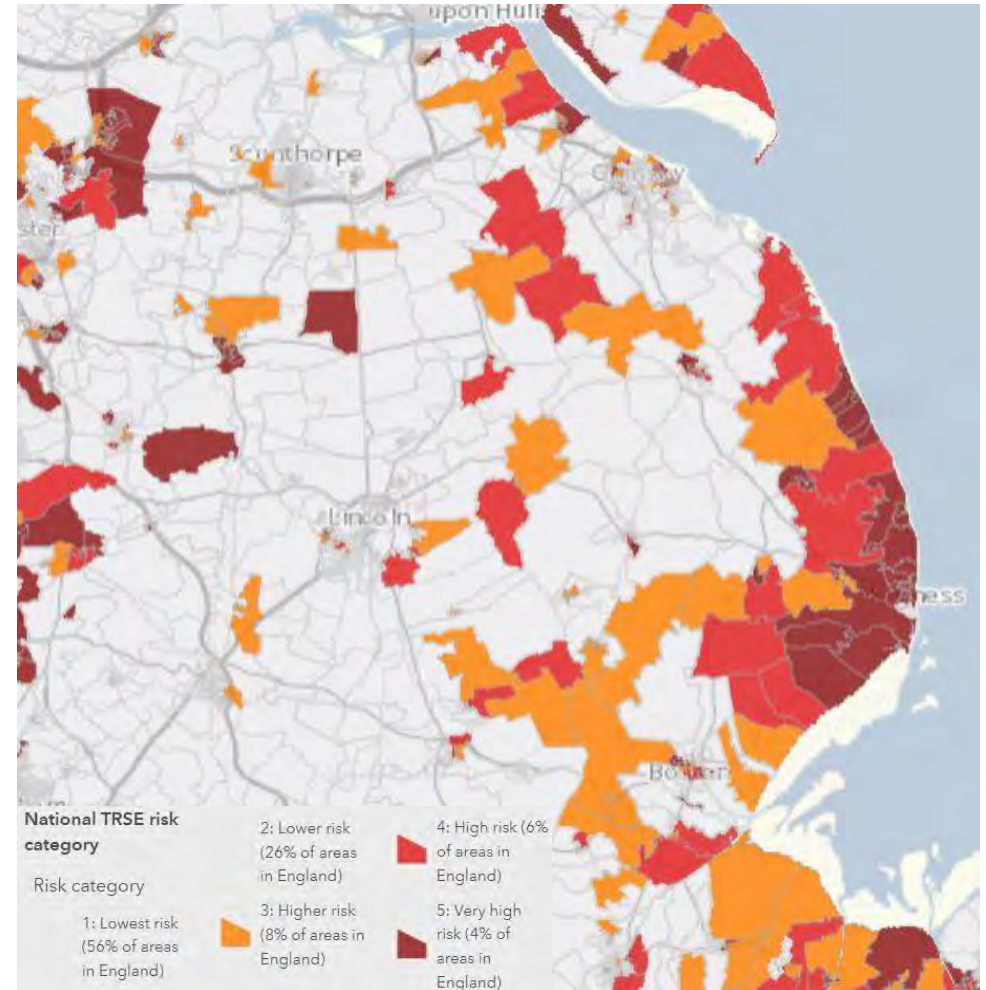


Figure 7: Lincolnshire’s Transport Related Social Exclusion (TRSE) nationally high-risk areas. Data and map taken from the Transport for the North TRSE tool, replicated with permission. Base map provided by Open Street Map. Copyright Open Street Map Contributors.

<https://data.transportforthenorth.com/portal/apps/dashboards/993bd07c0de64856a55f8a3a0b43dcd6>



## D.2 Lincolnshire's transport network

Both the road and rail networks in the east of England are to some extent oriented toward supporting north-south flows. The East Coast Main Line and the Strategic Road Network run generally north-south, largely outside the Lincolnshire border.

Connections to both the mainline railway and the M1 and the M18 (which joins the M1 and M62 via Doncaster) from Lincolnshire are provided by a series of rail and road corridors which could be considered secondary routes. Lincolnshire's only motorway, the M180, connects Scunthorpe, Grimsby and the port of Immingham with the national motorway network and offers a critical route for both private cars and around 3,500 Heavy Goods Vehicles which depart Immingham every day.

In general, the major road network in Lincolnshire is made up of single carriageways which, despite generally observing high average speeds, can become heavily congested at peak times around major towns and during the summer season on the east coast as the infrastructure swells with visitor traffic.

## D.3 The existing train service structure

The train service planned across Lincolnshire in the current (May 2023) timetable is represented in Figure 9, overleaf. This includes a range of short-distance local and longer distance passenger services, plus a significant volume of rail-freight traffic.

Cleethorpes and Grimsby are served along the South Humberside Main Line. There is an hourly service from Liverpool via Manchester and Sheffield and an hourly service to the East Midlands via Lincoln, which terminates at Grimsby Town. Local stations are served by an every-other-hourly service between Cleethorpes and Barton-on-Humber, with a gap in provision from Barton-on-Humber of almost three hours in the morning peak. A once-daily (per direction) service also runs to and from Cleethorpes to Sheffield via Brigg and

Gainsborough. This latter service is the only rail connection for Brigg, Kirton Lindsey and Gainsborough Central. A two-hourly local service is also provided between Doncaster and Scunthorpe, calling at Crowle and Althorpe.

In passenger terms, Lincoln provides a hub for passenger services and interchange, including local and interregional services via Newark, Swinderby and Hykeham from the East Midlands, and via Retford, Gainsborough Lea Road and Saxilby from Yorkshire. Long-distance services also terminate at Lincoln from London Kings Cross via the East Coast Main Line (currently every other hour).

On the southern route to Skegness, an hourly local service is currently provided from Nottingham via Grantham, and calling hourly at Ancaster, Rauceby, Sleaford, Heckington, Boston and Wainfleet, with less-than-hourly calls at other local stations.

The route between Peterborough and Doncaster via Lincoln (known as the Great Northern Great Eastern line or GNGE) is a critical route for freight, with capacity for significant volumes of rail freight to and from the East Coast Main Line via Peterborough and the Werrington dive-under. This freight generally runs to and from the Doncaster area for further distribution across the north.

This route also provides an important artery for trains carrying goods from the port of Felixstowe to major distribution centres in the north of England. Passenger services also run each hour between Peterborough and Lincoln, with five trains-per-day extending to and from Doncaster.

There is further capacity provided for hourly freight movements between the port of Immingham and Newark (via Market Rasen and Lincoln) for onward movements to the midlands, though paths are irregular in the timetable. Likewise, there is a significant volume of freight trains between Immingham and Scunthorpe, serving both local steel production as well as beyond to Drax power station.

Train services across Lincolnshire largely reflect the wider populations distribution of the county, supporting relatively limited frequencies of local, stopping services for passengers across the primary east/west routes. Intercity services via the ECML call at Lincoln, and Cleethorpes is linked across the Pennines to Liverpool, but in general, wider intercity connectivity is provided through interchange at larger 'hub' stations in the East Midlands and North.

The relatively low frequency of service across most routes to the east of Lincoln drives a trade-off between headline journey times to and from larger east coast settlements (Grimsby, Cleethorpes and Skegness) and calls at local or rural stations at intervening point. The lower frequency of services on these routes is a function of transport demand and cost of running services, but it does limit connectivity for onward interchange at more frequently served 'hub' stations.



Figure 8: Metheringham station, seen from above

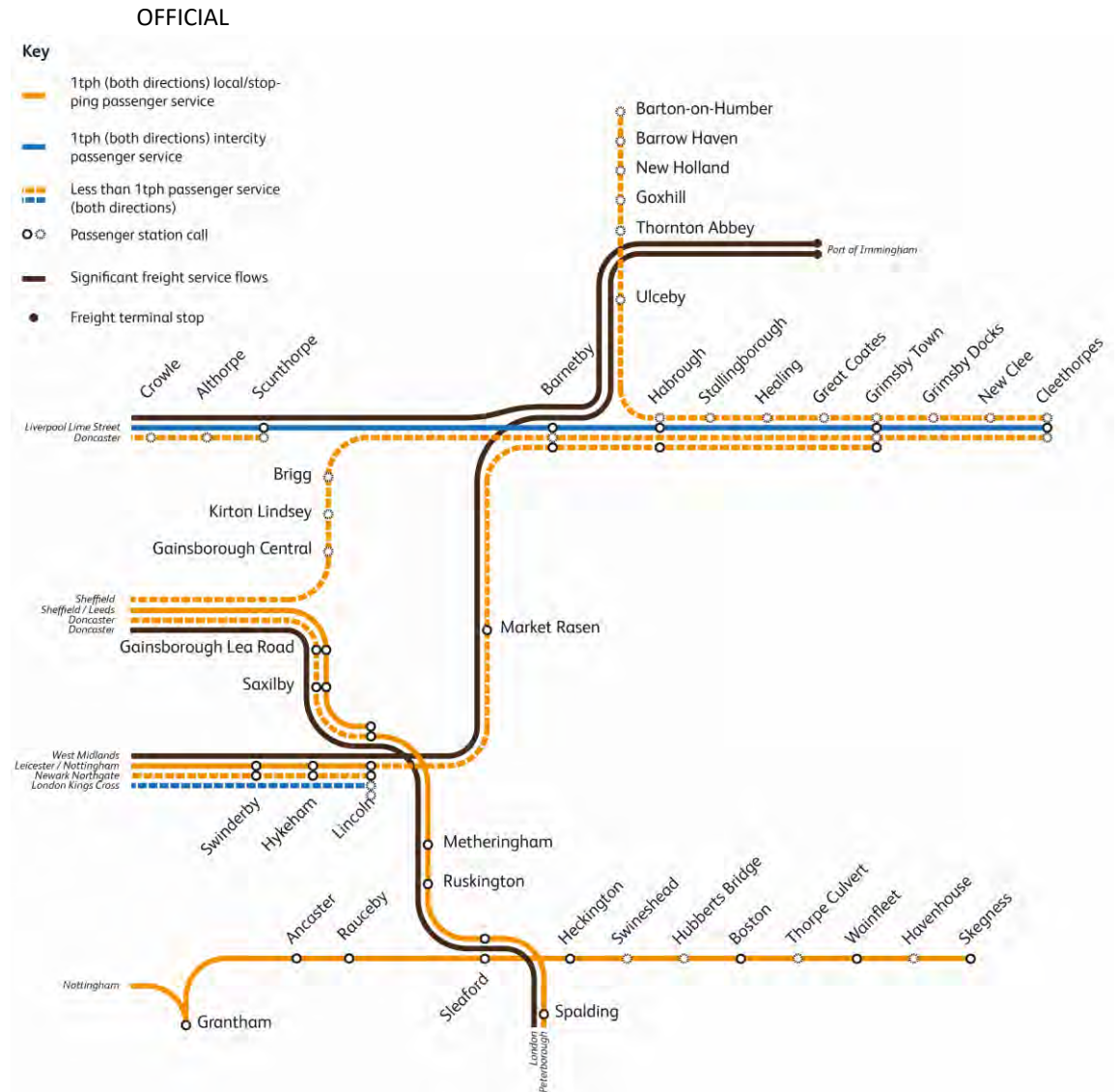


Figure 9: current train service specification in Lincolnshire, per the May 2023 timetable

## D.4 Aspirations and Opportunities

There are several areas of opportunity for improvement on the rail network in Lincolnshire. These areas of opportunity, described below, have informed the testing undertaken and described in Lincolnshire Strategic Advice.

### D.4.1 Local transport integration

A key feature of the Lincolnshire rail network is the relatively low frequency of services which serve often small or sparsely populated communities. It is unlikely that significant uplifts in capacity, both on-train in terms of seats, and on the infrastructure in terms of track capacity, would generate significantly higher revenue in the shorter term.

This suggests that in the shorter-term, focus should be given to better integrating existing services and infrastructure within the wider transport network. This could involve a holistic evaluation of rail timetables and local bus provision, maximising the availability for interchange at local stations with particular focus at major towns and tourist destinations like Skegness and Cleethorpes. Network Rail will work with specifiers and other interested organisations to explore opportunities in this area, such as Midlands Connect's emerging Access to Rail programme.

Likewise, opportunities exist across stations at Lincolnshire for improvements in provision of information as well as accessibility improvements which could drive demand and revenue without major changes to the existing train service or large-scale infrastructure enhancements.

Focusing on these so-called 'first-mile-last-mile' interventions – which do not require significant increases in rail capacity – could address social exclusion in a relatively low-cost manner and deliver on the

driving objectives for rail with a particular focus on the aspects of government's strategic objectives for rail summarised below:

- **(1b)** Meeting multi-modal expectations and reducing end-to-end journey time,
- **(2b)** Ensuring sustainable balance of fares and government funding,
- **(4a)** Contributing to long-term economic growth in support of levelling up, and,
- **(5a)** Encouraging modal shift by increasing attractiveness of rail.

Recommendations presented in this strategic advice are focussed on changes to the rail system but also consider integration with the overall transport system to generate a more immediate benefit.

### D.4.2 Improved passenger rail connectivity

While major changes to the infrastructure are likely to require significant funding, it is evident that some of the key challenges facing Lincolnshire's passenger rail network could be partially addressed through improved connectivity. This includes addressing relative economic deprivation and transport related social exclusion, especially for isolated and coastal communities in the east of the county. Achieving this may involve extending or uplifting existing services, amending timetables to make it easier for passengers to catch specific connecting trains, providing new direct connectivity between locations in Lincolnshire and the wider network, as well as raising service frequency for cross-Lincolnshire flows.

Improvements in rail connectivity may require more significant investment in operational expenditure to cover costs associated with staffing and fuel. Capital expenditure is also likely to be required to deliver infrastructure change. They could, however, contribute significantly in Lincolnshire to some of the government's strategic objectives, focusing on:

- **(1b)** Meeting multi-expectations and reducing end-to-end journey time,



- **(3a)** Reducing total journey time and cost for transport users,
- **(3b)** Connecting labour markets and realising agglomeration benefits,
- **(3c)** Connecting places to markets, directly investing in skills, innovation and digital infrastructure, crowding-in foreign investment and facilitating the housebuilding and place making agenda,
- **(4a)** Contributing to long-term economic growth in areas in support of levelling up, and,
- **(5a)** Encouraging modal shift by increasing attractiveness of rail.

The recommendations provided in this advice have considered where train service and infrastructure change could support improvements in connectivity.

### D.4.3 Support for freight growth

There is significant opportunity for growth in freight across Lincolnshire given the major logistics sites in the north of the county at Immingham and surrounding area, as well as potential for modal shift to rail within the agri-business sector as part of Lincolnshire's 'UK Food Valley' strategy. The primary opportunities for rail include:

- provision of additional capacity and/or routing options for established freight flows to and from the south Humber and port of Immingham following post-Brexit changes in international trade patterns and changes in the regulatory environment, such as the granting of Freeport status,
- uplift in capacity and routing options for cross-Lincolnshire freight flows, catering for long-term demand in national flows, notably between London and the port of Felixstowe to the south and rail terminals across the north of England, and
- Support for potential new rail terminals across Lincolnshire, which could be used by the agri-business sector and encourage modal shift from road to rail in this sector specifically.

Freight is an important part of the existing rail network in Lincolnshire but is likely to grow further in importance given the local growth potential in rail freight-using industries, as well as long-term forecasts for high growth in freight nationally. Uplifting capacity may require infrastructure enhancement and could require significant funding. This would incur cost for promoters and funders but could help achieve the following strategic objectives specifically:

- **(1b)** Meeting multi-modal expectations and reducing end-to-end journey time,
- **(3c)** Connecting places to markets, directly investing in skills, innovation and digital infrastructure, crowding-in foreign investment and facilitating housebuilding and the place making agenda,
- **(4a)** Contributing to long-term economic growth in areas in support of levelling up,
- **(5a)** Encouraging modal shift by increasing attractiveness of rail.

The advice provided in this document has considered where options to support freight growth may exist across Lincolnshire.

### D.4.4 New strategic connections

In addition to opportunities to enhance the existing train service offer and infrastructure, there is also potential to provide new heavy rail connections to support communities not currently on the national rail network. Lincolnshire Strategic Advice has considered the proposal to reconnect settlements in the east of the country, namely Mablethorpe and Louth, to the network, as well as a potential Geological Disposal Facility at Theddlethorpe, using new and/or restored infrastructure. The consideration of this strategic link follows a bid submitted by local partners to government's Restoring Your Railway Ideas Fund. This bid did not lead to further funding at the time, though the then-Secretary of State for Transport highlighted that Lincolnshire Strategic Advice would further consider the benefits

and costs of the re-opening in the context of wider strategic rail considerations.

It must be noted from the outset that provision of new strategic connections is likely to require an investment order-of-magnitudes greater than enhancements to the existing infrastructure, involving a range of additional costs associated with land acquisition and consents, as well as much more civil engineering, track and signalling work. Provision of new connections may also impact on the ability of the existing network to support growth of freight and passenger services on adjacent corridors.

While costly, new strategic connections such as the proposed Mablethorpe link do offer a long-term opportunity to deliver train services which contribute to several key strategic objectives for rail:

- **(3b)** Connecting labour markets and realising agglomeration benefits,
- **(3c)** Connecting places to markets, directly investing in skills, innovation, and digital infrastructure, crowing in foreign investment and facilitating housebuilding and place making agenda,
- **(4a)** Contributing to long-term economic growth in areas in support of levelling up,
- **(4b)** contributing to social benefits, including strengthening the Union from improved connectivity,
- **(5a)** Encouraging modal shift by increasing attractiveness of rail.

This strategic advice has considered the options for new strategic connections, and how this may affect planning for change on the existing network. As with all options considered, this report offers an assessment of strategic fit; delivery must be determined through the established business case process with further work required.

#### D.4.5 Safety, including level crossings

Lincolnshire has approximately 370 level crossings. These include very busy crossings such as Lincoln High Street, which sees upwards

of 26,000 pedestrians daily or Spalding Winsover Road with 11,000 vehicles daily. At the other extreme, Firsby No. 1 Public Footpath Crossing on the Skegness line, with an average of 2 users per day.

Network Rail continually explores ways to reduce risk, including through closure, for example when the Lincoln East Bypass was built. However, as this usually involves the provision of an alternative bridged route the financial implication can be significant.

#### D.4.6 Improvements to performance and resilience

Surveys repeatedly show that a top area of concern for passengers across Britain's rail network is its performance, with passengers expecting trains to run at the advertised time. There are many factors which affect railway performance, many of which are operational, for example crew rostering, and are out of direct scope for this work to address. However, changes to the train service and infrastructure must be made with improvements in performance in mind, making sure that the timetable can operate reliably in the future and protecting the needs of passengers and freight-users from the outset.

In Lincolnshire there will be opportunity to make changes to the train service or infrastructure which protect the performance of the timetable within Lincolnshire, meaning residents have access to a more reliable services, as well as addressing local constraints which impact the performance of services outside of Lincolnshire. This is important as performance-improving changes made to the infrastructure in Lincolnshire may, for example, provide significant direct benefits for rail users across the country, supporting the case for investment.

Likewise, improvements in performance contribute to railway safety, as delays and cancellations force passengers on to residual services, crowding the trains and creating pedestrian flow issues at stations, which exacerbate safety risks. While this may be less of a concern at less intensively used local and rural stations across Lincolnshire, it is likely to be of direct consequence at busier stations like Lincoln.

Climate change and the associated climate and nature crisis also has the potential the impact the resilience of the network. Network Rail will continue to plan for mitigations, considering the increasing likelihood of extreme weather events and the relative vulnerability of Lincolnshire given its topography.

As such, improvements to the network which target protection of performance are likely to contribute to a range of strategic objectives:

- (1a) Increasing value for money and improving performance, reliability and convenience of rail,
- (1c) Maintaining a safe railway as part of a safe transport system and widening accessibility,
- (2a) Reducing costs to government,
- (2c) Increasing the efficiency of operation, asset management and capital investment – delivering on time and on budget,
- (3a) Reducing total journey time and cost for transport users,
- (5a) Encouraging modal shift by increasing attractiveness of rail.

Progression of any of the options identified must incorporate more detailed performance modelling to quantify the impact per the standard business case development process.



Figure 10: Rowston level crossing, between Sleaford and Lincoln



Figure 11: Lincoln station

## Part E RECOMMENDATIONS AND OPTIONS

Throughout this section, reference is made to options and recommendations. High-level, order of magnitude cost ranges have been produced by Network Rail for many of the potential changes. As with any early-stage development work, these cost ranges should be considered indicative and subject to more detailed costing as recommendations are progressed. The costs have been categorised utilising a relatively low, medium, high and very high classification, using the ranges in Table B, below.

Cost label used	Cost estimate range
Relatively low	Up to £5m
Medium	£5-£50m
High	£50-£250m
Very high	>£250m

Table B: indicative order of magnitude cost ranges



## E.1 Great Northern and Great Eastern (GNGE)

The GNGE line currently supports cross-Lincolnshire passenger services between Peterborough and Doncaster, as well as offering an important freight artery and diversionary route from the East Coast Main Line. It is fully double-tracked, and gauge-cleared to W12 standard, which allows most types of trains to operate through the corridor including wider and taller freight wagons. As such, the GNGE line forms a vital rail freight artery, particularly since the Werrington dive-under near Peterborough was installed, allowing freight services to access the line more easily, avoiding the capacity-limited East Coast Main Line.

### Recommendation

The GNGE line is unelectrified, though it has been identified through previous Network Rail work as likely to require electrification, as opposed to battery or hydrogen train operation, in the coming decades if full traction decarbonisation is to be achieved across the network. To support freight growth and other policy outcomes, **it is recommended that electrification of this line is pursued as a medium-term priority.**

Whilst the significant capital outlay is acknowledged, costs have not been developed as part of this recommendation, as it is anticipated that producing a price for electrification would be better suited to a bespoke programme, potentially as part of a future prioritised programme of national decarbonisation schemes.

### E.1.1 Local Service Integration and Passenger Experience

The current passenger service is comprised of an hourly service between Peterborough and Lincoln, with five trains per-day in each direction extended between Lincoln and Doncaster. Consequently, there is an opportunity to improve cross-Lincolnshire connectivity

(between Peterborough, Spalding, Metheringham, Ruskington and Lincoln specifically) by making sure that timings of specific connecting services at Sleaford are as efficient as possible for passengers. This could generate significant generalised journey time improvements for rural residents who cannot currently rely on a ‘turn-up-and-go’ frequency at local stations.

Similarly, there may be significant opportunities to improve station integration and accessibility. This includes improved access for active travel at rural and local stations where local settlement is largely confined to within walking and cycling distance.

### Recommendation – Indicative cost range: relatively low

At Lincoln, the county’s busiest station, the existing footbridge used to change platforms is uncovered which both undermines the passenger experience and offers a safety risk through trips and falls in poor weather conditions. Further, some concerns have been raised by stakeholders about the width of the footbridge, with evidence of queuing to join the footbridge. Improvements here are likely to contribute both in passenger experience and safety, helping drive revenue and putting passengers first. **Network Rail will work with potential funders to explore opportunities to improve the passenger experience at Lincoln.**

### E.1.2 Supporting freight growth

The GNGE line serves one of the food logistics hubs targeted by the UK Food Valley strategy, specifically at Spalding with the South Lincolnshire Food Enterprise Zone at nearby Holbeach. Despite challenges in the areas such as level crossing barrier down time, this represents a significant opportunity to support government’s environmental sustainability plans, which form one of the five strategic objectives for rail. Electrification and the other recommendations given here will help support growth, but there are specific opportunities to grow rail-freight’s market share which

Network Rail welcomes working with stakeholders to explore. This includes the potential freight terminal near Spalding, with Midlands Connect in discussions around a potential case study for the UK Food Valley concept in the Spalding area.

### E.1.3 Train Service Changes

The GNGE line is less capacity restricted than other routes in Lincolnshire, with some exceptions such as Pelham Street Junction, east of Lincoln. Therefore, there is an opportunity for changes to the existing timetable which could generate incremental improvements in connectivity without the need for major infrastructure investment. Some opportunities, such as Sunday services between Lincoln and Peterborough, are constrained by operational costs rather than rail capacity. Introduction of Sunday services would support connectivity for Spalding, and Network Rail is open to working with service specifiers in the coming years to explore possible additional services where sufficient demand can be identified.

The potential for new stations on the line at Donington between Sleaford and Spalding and Deeping St. Nicholas, between Spalding and Peterborough, has been considered at a high-level. Whilst Lincolnshire Strategic Advice has not identified delivery of either station as a core recommendation, it is possible that new station calls could be accommodated within existing services, and Network Rail welcomes discussions with potential funders.

One other potential change would be the creation of new direct connections and improved capacity and frequency on the southern stretch of the GNGE by extending existing GTR services which currently terminate at Peterborough through to Sleaford, potentially significantly improving the passenger service offer in south Lincolnshire. This would need further validation to make sure that a terminating train could be reliably accommodated at Sleaford, and that the service would be economically and operationally viable. Electrification would also be required. This is especially crucial given

the importance of financial sustainability as one of government's strategic objectives for rail.

Network Rail is not currently recommending progression of this option due to the impact on level crossing barrier down time in Spalding town centre, where additional services would increase barrier down time for six level crossings. This includes Winsover Road CCTV crossing, where the railway bisects the town centre. In recent years, there have been instances of asset failure which have caused the crossing barriers to remain closed for road users for extended periods of time. These instances reduced by half between 2016 and early 2023 and Network Rail continues to explore for opportunities to reduce the impact of the network on the public. The focus of this strategic advice remains on strategic changes to the network, and we welcome working further with potential funders on whole-system solutions, noting work on the Spalding Western Relief Road commenced during 2022.

It was not possible to reliably further accommodate some services aspirations included in the 2050s scenario on the GNGE route, namely an uplift to 2tph in each direction along the full route between Peterborough and Doncaster via Lincoln.

A 2tph service, or a significant uplift in freight paths over a standard hour, was found to trigger the need to upgrade the signalling system to reduce headways (the time after one train passes before another can be safely timetabled), focused primarily on the most constrained sections between Quadring north of Spalding and Sleaford South junction (indicative cost 'medium'), and the route between Saxilby near Lincoln and Gainsborough Lea Road (indicative cost 'medium'). An increase in the number of trains which can use Pelham Street Junction east of Lincoln would also likely be required, as this junction is a significant capacity constraint. Network Rail is not recommending the signalling headway reductions as core recommendation at this stage, and other options including train lengthening may be workable should anticipated increases in demand arise.

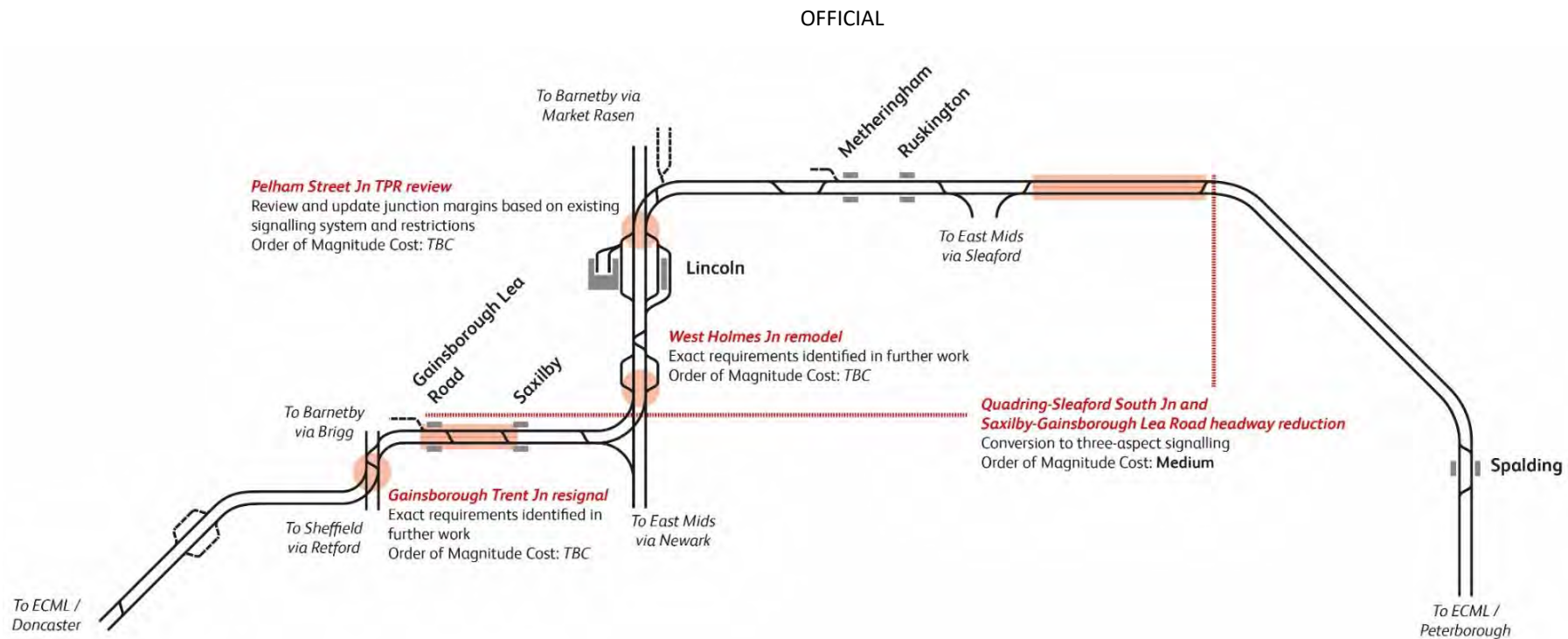


Figure 12: GNGE route infrastructure constraints and development options

## E.2 Retford to Cleethorpes, including South Humberside Main Line between Barnetby and Cleethorpes

Many passengers will be mostly familiar with the line between Doncaster and Cleethorpes, though the Strategic Route Section to and from Cleethorpes incorporates the approach to Lincoln from the East Midlands, the Brigg line to Wrawby Junction and the route section from Wrawby Junction to Cleethorpes via Grimsby. Currently, there is a one-train-per-day in each direction service operating on the Brigg Line. This service also joins the more heavily utilised South Humberside Main Line to Cleethorpes which accommodates approximately three passenger services per hour in each direction,

alongside freight services to and from the busy South Humber area, including Humber International Terminal.

### E.2.1 Local Service Integration and Passenger Experience

Improvements in connectivity on the Brigg line could be achieved in the short term by optimising timings between rail and bus, reducing interchange penalties for users. Similarly, given the relatively low population and smaller area served by the station, local transport integration is likely to be most immediately impacted by any local measures to improve active travel, and connections for those walking or cycling to the station. Network Rail welcomes working with funders



and specifiers to explore opportunities in this area and will explore options with the relevant organisations.

Should funders ever wish to run significant uplifts in freight or passenger services signalling upgrades and/or doubling the seven miles of track between Gainsborough Trent Junction and Kirton Lime Sidings (between Kirton Lindsey and Brigg) would be required (indicative cost 'high'), but this is not deemed to be a necessary recommendation at present.

Services through Grimsby to Cleethorpes are more frequent and offer direct connections to a range of locations across Yorkshire, the northwest and the Midlands. Cleethorpes hosts a notable leisure market where again there may be significant opportunity to improve local connectivity for onward bus services. The opportunity associated with planned extension of intercity services through from Lincoln could be maximised by making sure that timings with local bus services at Cleethorpes and Grimsby are aligned to arrival and departure times for less frequent, longer-distance services.

## E.2.2 Train Service Changes

As part of Lincolnshire Strategic Advice, Network Rail has worked with stakeholders to assess the impacts of potential service changes, though not all options described here can be recommended at this stage because Network Rail's analysis has not identified demand which is likely to outweigh operating and/or capital costs.

The route section between Wrawby Junction and Grimsby is twin-track. This leaves some flexibility for service extensions which could be considered without triggering the need for major infrastructure investment. This could include:

- Providing connectivity for cross-Lincolnshire flows and onward connectivity from Cleethorpes and Grimsby through extension of intercity ECML services beyond Lincoln to Cleethorpes, as noted in section E.4, and/or

- Options exist to further improve local service connectivity through to Grimsby/Cleethorpes by providing a more frequent service via the Brigg Line as noted in section E.3.

These service changes could significantly improve connectivity at local stations. Testing undertaken as part of Lincolnshire Strategic Advice suggests that capacity is available to accommodate only one of these train service uplifts without a wider need for infrastructure enhancement on this line of route. These changes would however require further assessment to establish wider benefits, as raising local service frequencies is unlikely to generate significant revenue and additional operational costs would be incurred.

The results of the future train service scenario testing showed that it was not possible to accommodate, reliably, an hourly Cleethorpes to/from Barton on Humber service alongside additional hourly services from Sheffield to/from Cleethorpes via the Brigg line and an hourly service between Newark and Grimsby. To reliably accommodate this level of service, a major remodelling project would be needed at Wrawby Junction and Barnetby. At this stage, no detailed engineering assessment has been undertaken given the complexity of the layout. This would likely be a large and potentially disruptive scheme which would require significant funding.

Another improvement in flexibility could be provided by signalling changes to allow trains to run more frequently between Barnetby and Brocklesby junctions (indicative cost 'relatively low' with around five signals needing adjustment). This would allow trains to safely run closer together in the same direction, known as reduced headways, improving general performance and the interaction between freight and passenger services, especially with additional services such as the extended Cleethorpes to London trains running. This change would be required in the longer-term scenarios tested. Whilst it does not form an immediate recommendation, it is an option which will be kept under consideration.

The most restrictive signalling and track arrangements on this line of route are on the Brigg line, where the combination of signalling and single-line sections restrict the number of trains that can be accommodated. Theoretically, an hourly passenger service could be accommodated on this section, but a combined uplift in both passenger and freight volumes would likely trigger a need for a major intervention to double the seven-mile section of track between Gainsborough Trent Junction and Kirton Lime sidings.

Services to Cleethorpes include an hourly train from Liverpool via Manchester and Sheffield. While the route is signalled to allow a train to pass in the same direction every four-minutes, the two sections of single track between Grimsby Town and Cleethorpes restrict planning flexibility and offer a significant performance risk, especially for longer-distance services, which are at greater risk of reaching the section later than planned and proliferating delays. Today, cross-Pennine services are occasionally terminated west of Grimsby rather than running onwards to Cleethorpes as planned. A significant track intervention between Grimsby Town and Cleethorpes, such as doubling the line, would create additional capacity and could enable a significant performance improvement. It is recommended that any further development of infrastructure change on this line of route capture the full range of performance benefits associated.

Network Rail would welcome discussions with funders who may wish to explore this option further as part of their own strategic priorities, this is not a priority recommendation at this stage due to likely capital costs and the need to protect the financial sustainability of the railway for users and taxpayers.

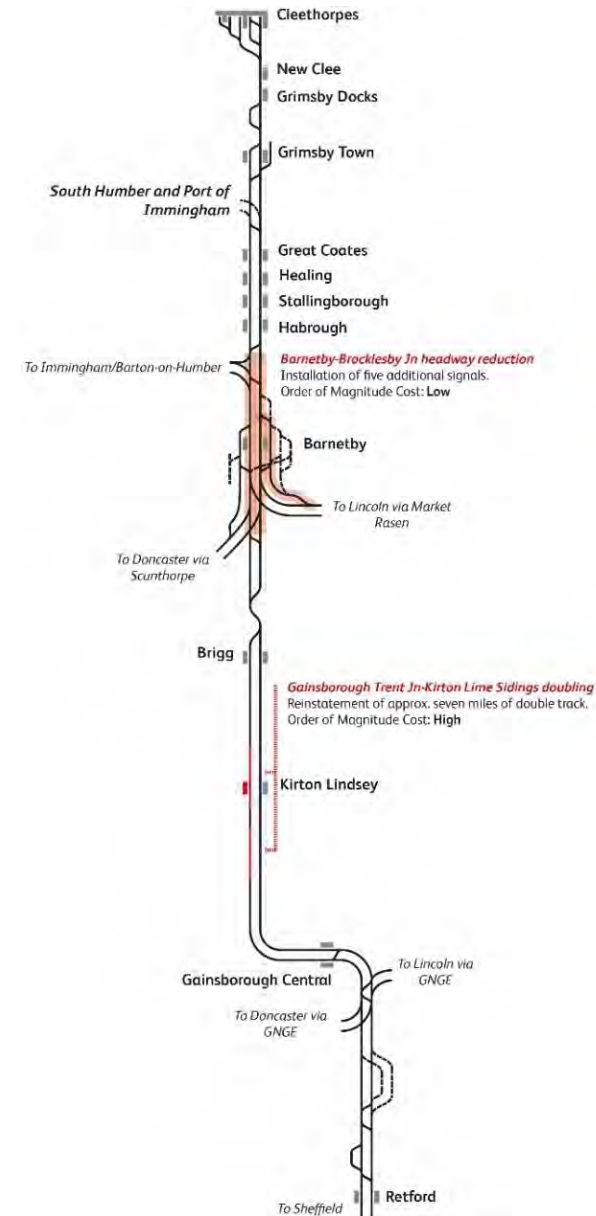


Figure 13: Retford-Cleethorpes route infrastructure constraints and options for further development

### E.3 Brocklesby Junction to Barton-on-Humber

In the May 2023 timetable, Barton-on-Humber is served by a predominantly two-hourly stopping passenger service to/from Cleethorpes, with a significant gap in service in the morning peak. As the previous section highlights, capacity is significantly constrained, with the single-line on the branch and on the adjacent section between Grimsby Town and Cleethorpes both limiting significant uplifts in passenger services to Barton-on-Humber. Analysis has shown that filling in the gaps in the service to create an hourly pattern is more likely to be achievable in capacity terms if no other new services are introduced along the South Humberside Main Line between Scunthorpe and Cleethorpes. Signal box opening hours and rolling stock availability present further constraints, with summer Sundays having a further reduced service and no trains on a winter Sunday at all.

#### Recommendation

As an incremental step to improve the service offering on the Barton-on-Humber branch, **the operational feasibility of removing the near-three-hour gap in morning services from Barton-on-Humber should be explored**. This would be with a view to providing at least one additional morning peak service from Barton-on-Humber towards Grimsby.

A bid was submitted by local promoters to government's Restoring Your Railway Ideas Fund in 2020 to restore regular passenger services between Gainsborough Central or Sheffield and Barton-on-Humber via the Brigg line. If funders wish to progress this proposal, the greatest challenge will likely prove to be making an economic case for the service, both in terms of operational costs and rolling stock, but also passenger demand.

In freight terms, significant volumes of traffic join and leave the line around Ulceby, and the South Humber area is a potential growth

opportunity tied to both Freeport status and UK Food Valley plans. These plans highlight that the South Humber area is one of three key clusters. Recommendations throughout this report, such as the signalling upgrades which would be required to support significant volumes of additional freight services via Market Rasen, are made with this growth opportunity in mind. Rail-freight plays a key role in supporting decarbonisation and decongestion of the country's road network, and Network Rail supports opportunities to encourage modal shift of goods from lorries onto the rail network.

### E.4 Doncaster to Wrawby Junction near Barnetby (South Humberside Main Line)

Analysis for Lincolnshire Strategic Advice covered Thorne Junction, around 8 miles northeast of Doncaster, but does not cover Doncaster itself, which is picked up in Network Rail's published Doncaster Area Strategic Advice (2021). This analysis did not find specific capacity challenges from Thorne Junction to Wrawby Junction, highlighting that this section of the South Humberside Main Line operates effectively, even with future forecast freight growth. Increasing the frequency of the existing Doncaster to/from Scunthorpe service to hourly rather than the present every-other-hour service would likely be feasible subject to demand. This would also improve connections for passengers travelling between Scunthorpe and Lincoln, which requires a change at Barnetby.

The relatively low permissible speed for trains along this section of route has also been considered by Lincolnshire Strategic Advice, with trains broadly limited to 55 mph. This is predominantly due to underlying ground conditions given the high water table. An ongoing programme of preventative maintenance, including the installation of piling and localised concrete rafts have been used to mitigate the worst effects of a waterlogging but for now it is not possible to raise the permissible speed over most of the route without significant investment, which is unlikely to be affordable at this time. Level



crossings also provide challenges for maximum permissible-speed, as do the footbridge at Crowle and Keadby Canal Bridge. Network Rail will continue to explore opportunities to maximise the capability of the line and its assets.

### Recommendation

One of the main constraints on the route is a pedestrian level crossing at Crowle station. This constrains services in one direction to 20 mph. Replacing the crossing with a **footbridge at Crowle** would remove a high-risk crossing and highly restrictive speed limit, benefitting services and providing a safe route for passengers between platforms.

## E.5 Newark to Wrawby Junction via Lincoln and Market Rasen

Newark Flat Crossing, between Newark and Lincoln, where the line crosses the East Coast Main Line at-grade, represents a major known constraint. Whilst it falls outside the geographic scope of this study, previous analysis shows that this constraint would require significant capital investment to resolve (indicative cost 'very high'). Network Rail will continue to explore any opportunities to identify an affordable and value-for-money case to remove the crossing, which is also a significant maintenance cost burden. Network Rail also continues to work with Midlands Connect on the potential for line speed improvements between Nottingham and Lincoln, which would improve connections between Lincolnshire and much of the Midlands; Birmingham to Nottingham journeys are also planned for improvement through the Midlands Rail Hub programme, meaning journeys from Lincoln to the West Midlands and beyond would benefit from the improvements between Nottingham and Lincoln too. Network Rail is supportive of delivering these changes subject to an affordable and value-for-money case being identified.

This line also serves the relatively sparsely populated inland corridor between Lincoln and Barnetby, serving Market Rasen. This is a strategically important freight route, carrying heavy oil trains. Lincolnshire Strategic Advice's scenario representing growth out to 2050 did find some challenges accommodating all forecast growth in services. Due to the nature of the signalling system on parts of this line, a single freight train can consume up to one-third of the available capacity in each direction each hour. If demand for additional freight services does grow as forecast over the coming decades, signalling upgrades are likely to be required. The relevant upgrade, conversion from absolute block to track circuit block signalling, has a 'medium' indicative cost and would bring other benefits such as making it easier to timetable trains to a potential new station at Cherry Willingham, which remains an aspiration of Lincolnshire County Council. Network Rail will monitor freight demand to explore whether signalling upgrades are required ahead of the planned eventual roll-out of upgraded digital signalling. Bringing forward digital signalling on corridors where it may be delivered in the future could reduce whole-system costs associated with conventional signalling upgrades.

### Recommendation

The opportunity also exists to provide connectivity for cross-Lincolnshire flows and onward connectivity from Cleethorpes and Grimsby through **extension of intercity ECML services beyond Lincoln to Cleethorpes**. Whilst Lincolnshire Strategic Advice did not identify evidence of demand for lengthening these trains from 5-car to 9-car trains, extending the route would significantly improve connectivity between north Lincolnshire and destinations further south, including London by providing a flagship direct service. Similar overall journey times between Grimsby Town/ Cleethorpes and London can be achieved today with a change at Doncaster, but research shows that passengers typically prefer direct services, so Network Rail is able to recommend introduction of this service.

Exploratory works were undertaken by LNER in early 2023 to test the feasibility of this extension and Network Rail will continue to work with all parties to explore this in the immediate term.

## E.6 New Strategic Infrastructure

### E.6.1 Mablethorpe and Louth

Network Rail has been aware for many years that local partners aspire to reconnect settlements in the east of the county, particularly Mablethorpe and Louth, to the national rail network. Major investment of this kind has very high capital costs and a bid by local partners to the Restoring Your Railway Ideas Fund did not lead to further funding. However, as noted in section D.4.4, the then-Secretary of State for Transport requested Lincolnshire Strategic Advice considered the holistic benefits and costs of re-opening in the context of wider strategic rail considerations.

Further, Network Rail was asked by Nuclear Waste Service (NWS) in early 2022 to give advice on the high-level feasibility of providing rail access to a Geological Disposal Facility (GDF) at the site of the former Theddlethorpe Gas Terminal, with the disposal of nuclear waste under the seabed. This is one of several locations nationally that are presently being evaluated. Detailed private advice on the feasibility of a rail connection has been provided. Should NWS proceed with a facility at this location, this would appear to offer the most economically feasible opportunity to unlock a new joint freight and passenger route connecting both Mablethorpe and Louth to the national rail network.

Network Rail's analysis suggests that it would be otherwise extremely challenging to identify an affordable and value for money passenger heavy rail link.

NWS have already commenced a programme of community engagement related to their Theddlethorpe option and see the choice of rail as the preferred method for the sustainable and

efficient transportation of radioactive waste from elsewhere in the country. This presents a unique opportunity for wider passenger benefits because the marginal capital cost of the relatively reduced additional infrastructure required to run passenger services is reduced when investment is shared alongside freight benefits associated with the GDF.

Network Rail would not therefore be able to recommend further investment in developing passenger feasibility studies to traditional rail investment funders on the sole basis of passenger benefits, but the potential nationally-significant importance of a GDF means Network Rail would welcome the opportunity to work with NWS or any other funder who might wish to proceed to Strategic Outline Business Case-equivalent maturity.

Three options for the potential new infrastructure have been considered as shown in Figure 14, overleaf – northern and southern connections or a through-railway, connecting North Lincolnshire towards Boston and Skegness via Louth. The through option would likely require a junction to the eastern side of Louth's urban settlement, with Mablethorpe most feasibly served by a branch from the through-route. Costs for the full through-railway are likely to significantly exceed benefits in a conventional transport appraisal. It may therefore be challenging to identify a value for money case for the through-route despite additional freight and passenger connectivity benefits. Despite this, Network Rail recognises that funders may wish to keep all options at this early stage.

Unlike the historic alignment, a northern approach would provisionally deviate from the existing railway to the west of Grimsby's built-up area and could serve a potential new station at Humberside Airport. There is an aspiration amongst stakeholders to increase accessibility to the airport, which is recognised as having constrained access for those traveling by public transport. The airport is currently undertaking a master planning exercise to cover the next five years and offers users an alternative to the now closed Doncaster

Sheffield Airport. As part of this alignment, provision of a single platform station at Louth could be made before the corridor turns towards the southeast and the Mablethorpe area. In either the north or south option the corridor reflects a route that offers both freight connectivity to a potential GDF at Theddlethorpe and passenger capability with an assumed single platform station at Mablethorpe.

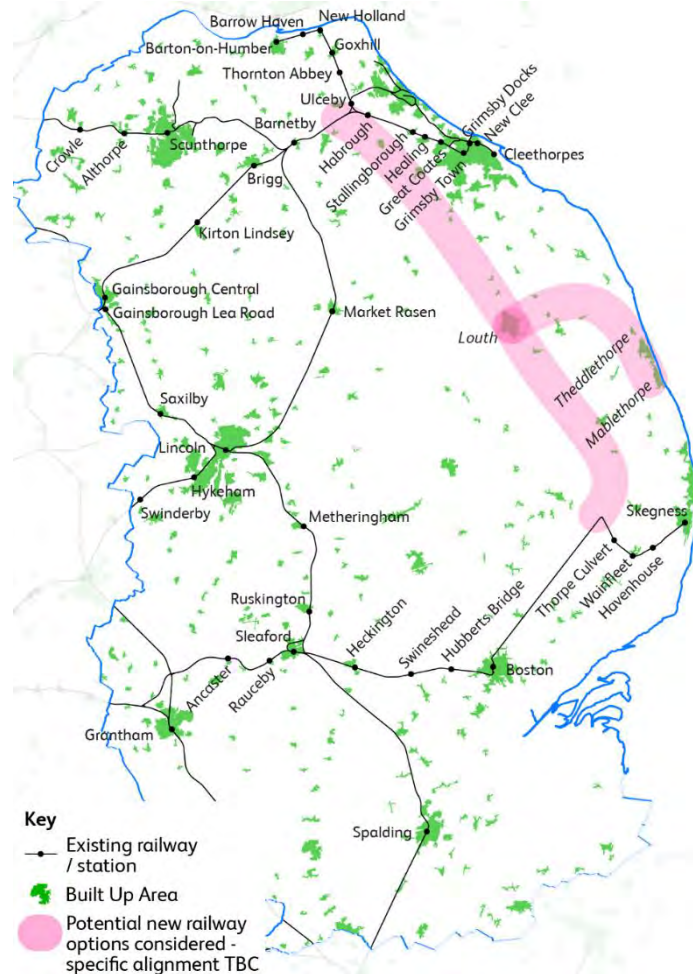


Figure 14: Map showing the indicative corridors considered for a potential reopening to Louth, Theddlethorpe and Mablethorpe

The southern route corridor would likely follow much of the historic railway formation, potentially supporting connectivity with new stations for Willoughby and Alford. It is also assumed the route is elevated on embankments to minimise the number of level crossings required and to improve resilience in the context of climate change. The new route could connect into the existing network in the Bellwater Junction to Firsby area to the northeast of Boston, on the line towards Skegness as the historic route once did. Initial feasibility indicates that much of the former rail corridor remains undeveloped, albeit outside of rail industry ownership. The southern approach would provisionally share an alignment with the northern and through approach between Louth, Theddlethorpe and Mablethorpe.

Analysis shows that, from a purely rail perspective, the greater benefit-cost ratio is likely to be via the southern-approach option. This route is likely to have a relatively stronger economic case and improved engineering feasibility compared with a northern approach.

To reach this conclusion, high-level infrastructure and railway operational implications have been considered. Table C shows the indicative marginal numbers of revenues and journeys per annum from the northern and southern approaches.

Potential routing option to Mablethorpe and Louth	Additional journeys per annum (2019 demand assumptions)	Additional passenger revenue per annum (2019 prices and demand assumptions)
Northern approach via Habrough	Up to 155,000	Up to £691,000
Southern approach via Boston	Up to 160,000	Up to £1,019,000

Table C: additional journeys and revenue from strategic rail routings  
 Whilst all three options, including the combined through route, represent a significant capital outlay (indicative cost ‘very high’ for



all options), Network Rail's analysis shows that the southern approach is likely to be marginally more affordable than the northern route. The full combined route (including Mablethorpe spur) is expected to cost around 250% the cost of the southern approach. The next section highlights that some of these costs for the southern and through routes would be incurred on the existing railway.

Despite this, in the context of a potential GDF it is recognised that there may be operational, construction logistical, security and other technical reasons why funders such as Nuclear Waste Services wish to keep all options under consideration, and Network Rail welcomes the opportunity to explore this further with potential funders.

### Recommendation

If a funder such as Nuclear Waste Services wishes to further develop plans for a rail connection to Theddlethorpe, their primary option should be for infrastructure suitable for passenger as well as freight services, **reconnecting Louth and Mablethorpe**. Funders should recognise that the southern-approach is likely to be marginally more affordable than the northern-approach and must also consider additional infrastructure required to support new services on the existing network.

## E.7 Grantham and Sleaford to Skegness

### E.7.1 Infrastructure improvements

In the context of potential reopening of the line to Louth and Mablethorpe, funders must also be mindful though that the cost of implementing the southern or through approaches includes works to enhance the line between the Sleaford area and the Firsby area, northeast of Boston, where the new line would leave the existing network. This is because capacity analysis has shown that it would not be possible to accommodate all passenger and freight services on the existing infrastructure if a potential GDF is constructed due to

limitations with the existing single-track sections of line. Doubling would be indicatively required between each of Sleaford and Heckington (indicative cost 'high'), Hubberts Bridge and Boston (indicative cost 'medium') and Boston and Sibsey (indicative cost 'high'). These locations are shown on Figure 16. Solutions would need to be sought during development of options to avoid doubling all three sections, but the high-level analysis did not find an alternative option at this stage.

For much of this corridor, the railway's current signalling system, known as absolute block, also restricts the frequency at which trains can safely run. This means that any additional freight or passenger service running in each hour would require an increase in capacity. This would likely be a combination of signalling upgrades and doubling some or all the single-track sections. It would make sense to deliver these signalling and track upgrades at the same time to reduce cost and disruption. The re-opening of the railway to Louth and Mablethorpe, driven by the strategic benefits of a GDF, would be the most likely trigger for these changes.

### E.7.2 Sleaford chord

One option considered which could be complementary to other enhancements is a new chord near Sleaford linking the Skegness line directly with the east-side of the GNGE line (as shown in Figure 15, indicative cost 'medium'). This would improve freight and passenger access from the line to Boston Docks and Skegness (and potentially Louth and Mablethorpe) towards the East Coast Main Line and other destinations, yielding significant freight benefits towards Peterborough and London. Depending on service routings, a new chord could also assist in the reduction of services over Sleaford East level crossing, improving safety at a busy crossing and reducing barrier down time.

Network Rail's analysis tested an indicative Mablethorpe to Peterborough passenger service, with additional freight also using

the chord from the Boston area. At this early stage, whilst the strategic benefits of the chord are significant, it does not, in isolation from the potential GDF proposal, form an immediate recommendation for further development work. This is because of the need to focus on the financial sustainability of the railway. Interested funders would be advised to undertake further work on the economic case for the chord, factoring in that improved signalling between Quadring (north of Spalding) and Sleaford would likely also be required to maximise benefits (indicative cost 'medium').



Figure 15: indicative map showing the potential Sleaford chord

### E.7.3 Local Service Integration and Passenger Experience

It is worth noting the seasonality of demand on the line towards Skegness, with passenger numbers to and from the coast significantly increasing during the summer months. This highlights the importance of the line and making sure it is effectively connected through improved integration of rail and other modes of transport. Key

opportunities include improved connections with local buses serving coastal leisure destinations and inland communities such as Horncastle. Options around re-timing of bus or rail services will be explored with local specifiers and partners, including opportunities to align with Midlands Connect’s emerging Access to Rail plans.

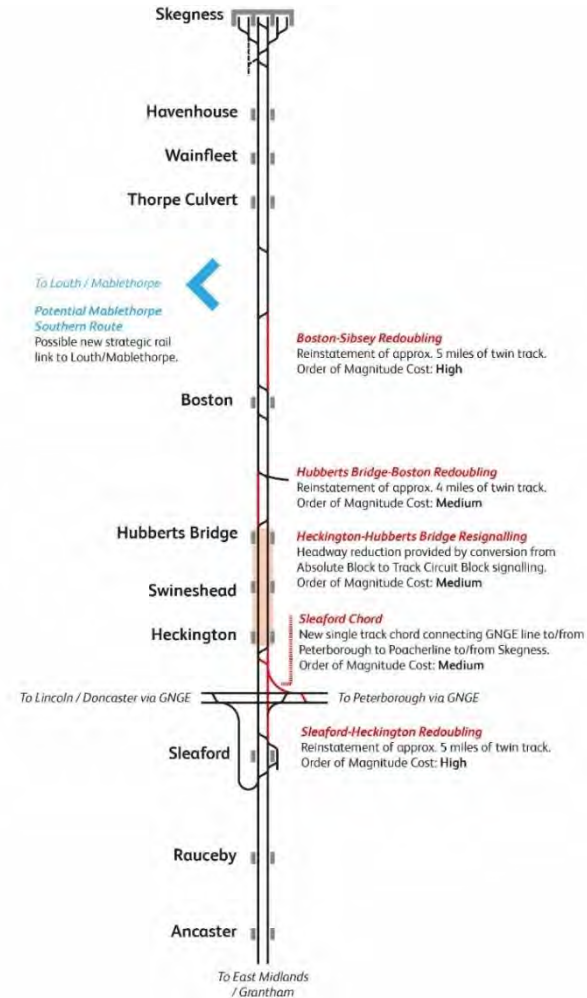


Figure 16: Grantham-Skegness route infrastructure constraints and options for further development

## E.8 County-wide integration

### Recommendation

Lincolnshire Strategic Advice has identified that significant improvements in connectivity could be achieved, particularly on an east-west axis across the county, by optimising timings between rail and bus in the local areas, reducing the inconvenience of changing modes for users. This is particularly relevant at places where local interchange is important in supporting leisure flows (such as Cleethorpes and Skegness) and for some of the less well-used stations across the county, where slight delays to a bus could lead to a long wait for a train and vice versa.

**Network Rail welcomes working with operators, funders and specifiers to explore opportunities to improve multi-modal integration** and will explore options with the relevant organisations. This includes closely engaging with Midlands Connect's emerging Access to Rail programme and other similar initiatives.

## Part F CONCLUSIONS

How can economic growth and connectivity be best supported by the rail network in Lincolnshire?

Lincolnshire Strategic Advice shows that the network across the county plays a significant role for both freight and passenger services, providing connectivity and significant social and economic benefit across geographically isolated communities. Making an economic case for significant infrastructure investment is challenging, with the railway's financial sustainability paramount in Network Rail's planning. That said, the railway offers huge potential for transformative change, and developing some of the incremental opportunities identified in Lincolnshire Strategic Advice would bring significant benefits to people's lives across Lincolnshire and the rest

of the country, be that through improved passenger connectivity or improved freight flows around the network.

The previous sections have highlighted specific opportunities on a corridor-by-corridor basis. This includes recommendations for further analysis which this collaborative and evidence-based strategy has identified to improve the network. Various options which fall short of being recommended for immediate further work have also been highlighted, which should provide funders with clarity over the feasibility of other possible aspirations.

The core recommendations of Lincolnshire Strategic Advice are:

- to extend London Kings Cross-Lincoln services to Cleethorpes,
- to explore opportunities to improve the passenger experience at Lincoln station,
- that if funders wish to introduce a rail connected Geological Disposal Facility at Theddlethorpe, their primary option should be for infrastructure suitable for passenger as well as freight services, serving Louth and Mablethorpe. From a rail perspective the greatest value for money is likely to be via the southern-approach. Funders must also consider interventions required to deliver new services on the existing network, as well as new infrastructure,
- replacing the level crossing with a footbridge at Crowle,
- exploring the operational feasibility of removing the near-three-hour gap in morning services from Barton-on-Humber,
- that funders, operators and specifiers should work with Network Rail to explore opportunities to improve multi-modal integration across the county, and
- to explore funding for electrification of the GNGE line between Peterborough and Doncaster via Lincoln as a medium-term priority.

It must be stated that, unless noted otherwise, all recommendations throughout this report are for further work to be undertaken on the relevant concept, allowing benefits and costs to be identified in



greater detail. These recommendations do not therefore represent an unconditional endorsement of delivery of any given concept.

Beyond these core recommendations, further key conclusions of Lincolnshire Strategic Advice are that:

- passenger experience and public realm improvements in and around stations may boost demand, and Network Rail welcomes working with potential funders on this,
- Network Rail will continue to monitor freight and passenger demand on key corridors to assess where signalling upgrades may be required in future,
- improvements to the single-track between Grimsby Town and Cleethorpes and a new chord at Sleaford are not core recommendations at present but remain as options for funders and would likely be supported by Network Rail if funders wish to progress development in line with their own strategic priorities, and
- Network Rail cannot recommend extension of London-bound passenger services from Peterborough to Sleaford at present due to the implications on level crossings at Spalding.

It should also be remembered that the options presented, and some of the recommendations too, are not by default required to be delivered immediately; demand for the train service scenarios considered is forecast to materialise gradually over the coming decades. This means that Lincolnshire Strategic Advice presents a corridor-by-corridor steer through which all funders can consider their investment priorities for the coming decades.

## F.1 Funding and next steps

The recommendations in this report have been produced with a range of local, regional and national funders in mind. If central government funding is to be released, development of schemes must align to the Rail Network Enhancements Pipeline (RNEP) process, established to create a rolling programme of enhancements. The decision points for investment in the railway are supported by the government's Five Case Model for business cases ensuring value for money throughout the lifecycle. Figure 17 illustrates the stages of the RNEP process and identifies where the key decisions for enhancement schemes take place. The first stage of the process, a Decision to Initiate, is the establishment of the case for intervention and agreement to produce a Strategic Outline Business Case (SOBC). This would form the next stage in progressing a recommendation, entering the potential interventions into the pipeline. Should the next stage, a 'Decision to Develop' be agreed, further development through the pipeline and business case cycle would be undertaken. Only when a 'Decision to Deliver' has been agreed would the enhancement be considered committed.

The options and recommendations of this study have been produced collaboratively with industry stakeholders to deliver a joined-up and evidence-based view on what is required from the railway to support society and the economy. Network Rail welcomes further discussions with any funders to refine credible options that meet the needs of passengers and freight users and that fit with the long-term needs of a reliable railway system.

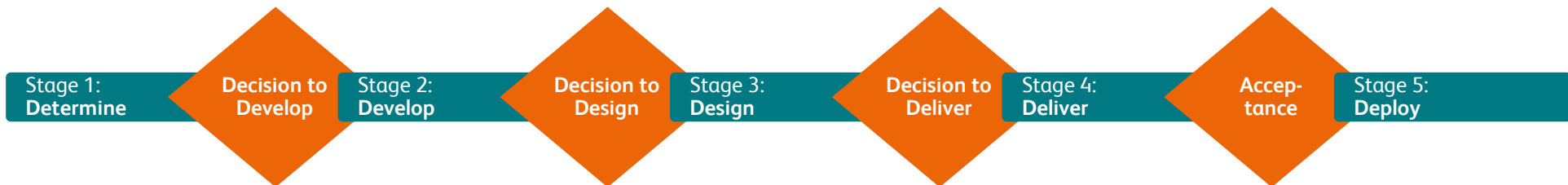


Figure 17: Summary of the Rail Network Enhancements Pipeline process



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