Fleetwood Railway Line Reopening Feasibility Study

Strategic Outline Business Case Report

Lancashire County Council

May 2021

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Executive Summary

Description of the scheme

The UK Government has an ambition to 'level up' areas in the Midlands, North and other parts of the country whose economy has fallen behind London and the South East, such that every part of the nation can be equally prosperous. Recognising the role and importance of an effective, efficient, and sustainable transport network in supporting economic growth, wellbeing, health, and the environment, this ambition has placed a spotlight on improving transport infrastructure across areas of the country that suffer from poor connectivity. One aspect of this is a renewed interest in the potential for reopening closed railway lines and stations as a means of improving accessibility to communities long cut off from the rail network. There is now widespread recognition that better connecting isolated communities can help support local economies, help meet decarbonisation targets, and help level up the country to help provide equal opportunities for all.

For these reasons there is interest in reopening the currently disused but largely intact Fleetwood Railway Line, which closed to passenger traffic in 1970 and to freight in 1999. This 8km line branched off the Preston to Blackpool North Line at Poulton-le-Fylde and at one stage had stations at Ramper Road, Burn Naze, Thornton-Cleveleys, Wyre Dock, and Fleetwood. Much of the single-track formation remains intact between Poulton-le-Fylde and Jameson Road approximately 2.5 kilometres to the south of Fleetwood town centre, although the physical track connection at Poulton Junction has been removed. North of Jameson Road, the track bed has been lost completely, mainly by an extension of the A585 built in the 1990s as well as a succession of other developments

In 2020 Atkins was commissioned by Lancashire County Council using the Government's Restoring Your Railway fund to undertake a Strategic Outline Business Case (SOBC) and early feasibility study. As such the remit of this study is to examine the case and feasibility for re-opening the line either as a heavy rail scheme integrated with the existing national rail network, a light rail scheme integrated with the existing Blackpool Transport Tram network, or a tram-train hybrid scheme in which light rail vehicles can operate on both the national rail network and Blackpool tram systems. Although assessed at a much less detailed level, consideration has also been made for enhancing non-rail modes as alternative to re-opening the railway.

Context and Case for Intervention

Fleetwood, a town of approximately 26,000 people, sits at the northern end of the Wyre Peninsula consisting of Fleetwood, Thornton and Cleveleys which has a combined population of 57,000. While the Blackpool Tram provides good north-south connectivity along the coast between Blackpool and Fleetwood, east west connectivity from Fleetwood to other areas and in particular the major economic centres of Preston, Manchester, Liverpool and Leeds is poor.

Accessing the rail network from Fleetwood currently takes 40 to 50 minutes, and requires travelling to Blackpool North, Poulton-le-Fylde, or Kirkham and Wesham before then interchanging to onward destinations such as Preston, Manchester or beyond. As a result, journeys made by public transport between Fleetwood and many places across the wider region can be slow and difficult, and usually require a change in mode. This causes many journeys to be undertaken by car (at least by those who have access to a car), contributing to high levels of congestions and low air quality. It also means that demand for travelling to and from Fleetwood is relatively constrained, resulting in constrained economic growth.

Destination	Distance from Fleetwood	Current Public Transport Journey Time	Current Average Journey Speed
Preston	20 miles	50-60 minutes	20 mph
Manchester	50 miles	130-140 minutes	21 mph
Liverpool	50 miles	140-150 minutes	20 mph

The railway between Manchester and Blackpool North has recently benefited from significant investment as part of the North West Electrification Programme, and offers fast and frequent electric services directly to a wide range of destinations across the North and beyond. This means that despite Blackpool and Fleetwood being more of less the same distance from Preston, the rail journey from Blackpool can be undertaken in just

22mins as opposed to taking an hour from Fleetwood. Similarly Blackpool to Manchester takes just 75mins and Blackpool to Liverpool just 77mins, compared to 130-150mins from Fleetwood. Reopening the branch line to Fleetwood, as either a heavy rail, light rail or tram train would transform journey times from Fleetwood, so that they are comparable to those from Blackpool.

Although the wider Wyre, Blackpool and Fylde region contains some areas of affluence and growth, there are parts of the North Fylde Coast and Fleetwood in particular that suffer some of the highest unemployment, lowest earnings and highest deprivation seen anywhere in the UK. There are a wide and complex set of reasons behind this relating to long term structural changes to employment patterns and industries, but it would also seem likely that poor transport links to Fleetwood have contributed to the lower levels of growth and economic development that have been seen compared to other better connected parts of the region

Fleetwood has low levels of car ownership and as a result many residents are reliant on public transport in order to reach places of employment, education, shopping or leisure. Improved accessibility, particularly if it can be provided to major centres of population and employment, will support meeting wider local and national objectives to increase accessibility to employment, education and leisure services, supporting development of new jobs and improving tourist opportunities. It will also support local objectives to provide new housing and development opportunities that can help reduce deprivation in the area.

At a national level the UK government has set out its plans to support economic growth through significant investment in infrastructure, skills and innovation through its “Build Back Better: Our Plan for Growth” strategy. This strategy includes a key focus on redressing Britain’s historic underinvestment in infrastructure, with a specific objective to “level up” the country and ensure the United Kingdom is a truly connected kingdom. Decarbonisation of the transport industry equally forms a key priority of the UK government with a target to reach net zero emissions targets by 2050.

Improved public transport provision on the Fylde Peninsula, will contribute towards all of these objectives by transforming connectivity and promoting modal shift to more sustainable modes.

Options under consideration

To meet the identified objectives the study has focussed on three types of rail-related options for reinstating the Poulton to Fleetwood Railway;

- as a heavy rail route operating between Preston and a terminating station on the outskirts of Fleetwood in the vicinity of Herring Arm Road / Three Lights Public House;
- a light rail route operating between Poulton-le-Fylde and Fleetwood Ferry on the exiting Blackpool Tram route, and,
- or a hybrid tram-train route operating across both the national rail and Blackpool Tram routes from Preston to Fleetwood Ferry.

Initial feasibility work concludes that all of these options are technically deliverable, and all the options would provide a transformative step change in connectivity to the region. However, the study also identified all of the options contain some significant delivery risks and uncertainties.

The heavy rail option has the significant advantage of being able to directly serve wider destinations on the national rail network such as Preston and beyond. This is a key objective for the scheme and will allow transformative journey times from Fleetwood and Thornton to key economic centres such as Preston, Manchester or Leeds. It is constrained however to serving Fleetwood from a location that, while near to some significant development opportunities, is some distance from the Fleetwood Town Centre and the existing Blackpool Tram system. It also contains some delivery risk around the re-instatement of level crossings and requirement for the delivery of new platforms and remodelling at Preston station.

The light rail option has the significant advantage of being able to integrate with the existing Blackpool Tram network and therefore offer multiple stops in the heart of Fleetwood town centre. This will make it much easier for residents of Fleetwood to access the system, although users will be required to make a less than optimal connection at Poulton-le-Fylde to access the rest of the rail network for onward travel to key economic centres in the wider region. Light rail also contains some delivery risk around the construction of new on-street sections with factors such as land availability, the diversion of utility serves and the impact on road traffic all requiring further investigation.

Tram-train that offers through running on both national rail to Preston and the Blackpool Tram system within Fleetwood may offer the best of both worlds. It is however more expensive and carries additional delivery risk due to the need for a bespoke vehicle that can safely operate on both systems, and the associated adaptations around station platforms, vehicle detection and control, wheel-rail interface and communications that are necessary to allow the inter-operability between the tram and heavy rail networks. Tram-train also offers longer term opportunities to develop wider regional transit system, perhaps by operating tram train services on other new or existing routes such the South Fylde Line.

An alternative option would be to improve existing public transport connectivity, principally by making the existing bus network faster, more reliable and more frequent. Improving the frequency of bus services and routes in the area may be welcomed, and would offer a more affordable and more easily deliverable means of improving connectivity than any of the rail options. It would not however provide the step change in connectivity as provided by any of the rail options, particularly in relation to accessing Preston, Manchester, Leeds and Liverpool. To provide significant improvements to bus journey times will require significant bus prioritisation measures such as extensive bus lanes, that are likely to be both expensive and difficult to deliver given restricted road space. As such options to enhance the bus network, whilst important and useful, are unlikely to drive the same kind of transformative economic impacts and development opportunities as rail options.

Delivery of any option is likely to require reviewing the existing public transport provision within the region to ensure an integrated public transport network that can effectively link together existing infrastructure routes and services. Delivering enhancements to the bus network to provide better connectivity to new transport hubs could be delivered through the Buses Bill and future partnerships.

Costs and Risks

A high-level estimate of the capital costs of construction has been undertaken for each of the main rail based options, providing a range from £121m to £251m in 2020 prices depending on the mode, form of electrification and frequency of service that is delivered. These options include an allowance for risk and optimism bias of 64% on the baseline cost estimates.

The cheapest option is heavy rail, with light rail costing only marginally more. Tram train represents the highest costs, as on top of all the costs of the light rail option it also needs to include budget for adapting the existing networks.

Estimated capital costs of construction (Q4, 2020 prices) including optimism bias

Option		1 train per hour	2 train per hour	3 train per hour	4 train per hour
Heavy Rail	Baseline Option (non-electrified)	£121m	£126m	£138m	£144m
	Electrified	£171m	£174m	£198m	£202m
Light Rail	Baseline Option (electrified)	£128m	£139m	£148m	£157m
Tram Train	Baseline Option (non-electrified)	£190m	£194m	£195m	£197m
	Electrified	£223m	£236m	£243m	£251m

While heavy rail potentially presents the cheapest option for reinstatement, there are some significant risks around whether the route could be operated with level crossings, in particular at Station Road. There is some uncertainty on the current status of this level crossing, but if a full re-opening process is required then this does introduce some risk to the project. RSSB's current policy is not to open further level crossing due to their inherent safety risk, so special dispensation will be required. With appropriate mitigation a good case for reopening can be made, and the proposals presented in this report offer a solution that significantly reduces the operational risk. This is an area of work requiring further investigation. Additional risk is also introduced by any changes that might be required at Preston to accommodate additional services.

Light rail only costs a little more than heavy rail and avoids many of the costs and risks associated with reinstating level crossings. However, it requires the construction of sections of on street tramway which are considerably more expensive to build and contain their own delivery risks, particularly in relation to land acquisition, impacts on traffic and property frontages, and the diversion of utility services.

Tram-train incurs the same costs as light rail, but also includes additional cost and risk to adapt the heavy rail network to accommodate trams. This will include providing low floor platforms at existing stations which will need to be properly integrated with the rest of the station, and potential track and signalling modifications on the existing heavy rail line to ensure inter-compatibility. The issue of communication between two different operating systems is also complex, but not insurmountable.

Demand Analysis

A simplistic analysis of potential demand has been undertaken by determining the trip rates of existing stations in the region based on ORR station usage data and the population and employment within 1km of the station. These trip rates were then applied to the population and employment to the catchment areas of the proposed new stations.

Existing stations in the region showed a relatively wide range of trip rates reflecting the different characteristics of the stations, such as their catchment areas, the level of train service being provided, the stations facilities and accessibility. Stations in the region with perhaps the most similar characteristics to those on a re-opened Fleetwood Branch are those on the South Fylde Line. Applying the trip rates from these stations to Fleetwood shows the total demand on the three stations on the Fleetwood Branch would be 215,000 trips per annum, although for the reasons described this estimate contains considerable uncertainty.

Demand for a light rail or tram train solution might be expected to be higher (although with shorter trip length) given the higher frequency service that might be offered and the opportunities to integrate with the existing Blackpool tram system.

To obtain a more detailed assessment of demand and journey time savings requires the development of a multi-modal or gravity based demand model, and is an area of work that would be recommended for further development.

Journey Time Savings

A reinstated heavy rail link could offer an 11 minute journey time from Fleetwood Station to Poulton-le-Fylde and a 28 minute journey time to Preston. A light rail link will be marginally slower, with directly comparable journey time from Broadwater to Poulton-le-Fylde of 12 minutes. However, light rail option offers greater connectivity into Fleetwood town centre and the opportunity for additional intermediate stops. A proposed tram service running from Fleetwood Ferry to Poulton-le-Fylde would have a journey time of around 22 minutes. A tram train will provide the same journey times from Fleetwood Ferry to Poulton-le-Fylde, but would also through running to Preston, with a 39 minute journey time between Fleetwood Ferry and Poulton-le-Fylde.

Altogether it is expected that the reinstated rail link could be around 20-30 minutes quicker than by existing public transport. However, end to end journey times are not the only things valued by passengers. Factors such as the number of interchanges, waiting time, reliability, vehicle ambiance and of course cost also all contribute to someone’s valuation of a journey, and therefore their decision on where, when and how to travel. Within demand and appraisal models these factors are usually combined with the actual journey time into a disutility known as generalised journey time, and this can often be much higher than the pure time saving. For instance, research has shown that waiting time is often valued at twice the amount elapsed time, while average lateness is valued by passengers at three times the journey time. This means that a 5 minute saving in average minutes lateness will represent a 15 minute generalised journey time reduction.

Together these effects could mean that typical generalised journey time savings for people currently using other forms of public transport could easily amount to around 25-35 minutes each way, compared to making this journey by existing bus and tram services.

Economic Appraisal

The approach to assessing the Economic Case is consistent with DfT's Restoring Your guidance, and considers the DfT's TAG, Business Case and Value for Money guidance. At this stage of the business case the economic appraisal has been undertaken using some high level assumptions, but it represents a proportionate assessment of the likely value for money given this early stage of the scheme's development.

The economic case analysis shows that based upon a high level set of baseline assumptions around demand, revenue, journey time savings, mode shift and wider benefits, all of the options are likely to represent poor value for money. Sensitivity and plausibility testing shows that for the scheme to reach a benefit cost ratio (BCR) of 1.5 and therefore be considered medium value for money, it would be required to make a combination of what would seem fairly optimistic assumptions, particularly with regard to demand. For instance, the economic appraisal shows that for the scheme to obtain medium value for money a demand of over 600,000 trips per annum are likely to be required upon opening, and that this demand will then need to continue to grow at 2% per annum over a period of 20 years. This level of demand corresponds to an average of 100 passenger per hour across a 16 hour day.

At this stage of the study a detailed forecast of expected demand has not been undertaken. Instead some relatively simplistic benchmarking has been undertaken, that has included examining current demand for existing rail and tram services in the region and assessing whether similar levels of demand might be obtainable in Fleetwood. While the scope of this demand analysis is relatively limited, it is clear that the level of demand required on the Fleetwood Line for any option to provide a BCR of more than 1.5, is likely to be much higher than demand seen elsewhere in the region.

Even assuming a relatively high initial level of demand of 600,000 trips and 2%per annum growth, the economic analysis shows that for the scheme to be medium value for money, the scheme would have to generate an average journey time saving of 35 minutes, and that wider impacts would need to provide an additional 15% of total benefits. Given that all these assumptions are relatively optimistic, obtaining a BCR of more than 1.5 is therefore likely to be challenging using standard TAG appraisal.

It is important to note however that while the BCR is an important element of the business case, the case for investing in the scheme should not be reliant upon it. In November 2020, the Treasury published a review of its appraisal guidance[1] known as the Green Book, to ensure that it was able meet the Government's wider policy objectives around levelling up and decarbonisation. The review found that BCRs by themselves may not always be aligned to the decision makers' wider policy objectives, and that they can instead over focus on those benefits that it is easy to put a monetary value upon. The new guidance makes clear that the assessment of value for money is broader than the BCR alone, and that it should assess all the relevant costs and benefits to society, not just narrowly economic ones.

The Green Book review has recommended new guidance that amongst other things puts additional emphasis on the assessment of transformative impacts, the analysis of place based impacts, and analysis of differential impacts. The review also identifies a number of the priority outcomes that are strongly focused on levelling up including;

- an outcome to raise productivity and empower places so that everyone can benefit from levelling up;
- an outcome to level up education standards: so that children and young people in every part of the country are prepared with the knowledge, skills and qualifications they need; and
- maximise employment across the country to aid economic recovery following Covid-19.

On this basis the strategic case presented in Chapter 2 shows that the study region has some areas of high deprivation, high unemployment, low productivity, and low skills. Connecting Fleetwood to the region by heavy rail, light rail or tram train options would provide a transformative change in connectivity, and will help deliver the wider policy outcomes prioritised by Government.

Even with the establishment of more sophisticated journey time and demand modelling, the full impacts of such a transformative change in accessibility may not be captured with a relatively narrow benefit cost ratio.

[1] Green Book Review 2020: Findings and Response
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/937700/Green_Book_Review_final_report_241120v2.pdf

Any case for investment, is therefore likely to be made on the potential wider transformative impacts the scheme would have on a region that suffers high levels of deprivation and social exclusion as set out in the strategic case. Although these are impacts can be quite hard to measure and quantify using standard appraisal approaches, it is still appropriate for decision makers to consider these elements with the overall context of value for money.

As the scheme further develops, the next stage of a business case would be to develop a demand model and appraisal framework that can undertake a more detailed economic appraisal. In particular, the availability of such a model would help sift options to help determine exactly which option, service frequency and destinations provide the largest benefits per pound of investment. Further work to better understand the potential wider impacts of the scheme on homes and jobs is also recommended.

Financial, Commercial and Management Cases

The scheme is still at an early stage and the financial commercial and management cases have only been progressed to a very limited extent. The key issue is likely to be around funding, which is almost certainly going to require a significant public sector contribution. At this stage the only credible source of funding identified is the Government’s Restoring Your Railway Fund, as local authorities are unlikely to be able to make significant contributions.

Further work is also required to identify both the long term operating costs and the expected revenue of each option across a different range of train service frequencies. This would help identify whether the scheme would provide an operating surplus or require ongoing subsidy for its long term operation, what the optimum frequency might be from a financial point of view, and the impact of different commercial framework for how any services should be operated and delivered.

Overall Conclusions and Next Steps

All of the rail based options investigated within this study have been shown to deliver a step change in connectivity to Fleetwood, offering journey times 10-20 minutes faster between Poulton-le-Fylde and Fleetwood than is currently possible on existing public transport. Heavy rail options have the benefit of allowing through services beyond Poulton-le-Fylde to the key economic centres of Preston, Manchester and Liverpool, while the light rail options have the benefit of providing through services onto the existing Blackpool Tram system, providing tram stops in the heart of Fleetwood. Tram train options potentially provide the best connectivity by offering through running on both heavy and light rail systems.

The study shows that reopening the route as either Heavy Rail, Light Rail or Tram-Train are all credible options, and that they are all both technically feasible and would provide a step change in improved connectivity. However, the different options do all carry some technical risks, challenges and opportunities. The heavy rail option the reopening of level crossings for which a safety case will have to be made. Light rail includes elements of on street running which contain additional delivery risks, particularly in relation to land acquisition, impacts on traffic, and the alternation of utility services. Depot and serving requirements would also need consideration. Tram train includes the same risks of light rail, but also additional cost and risk to adapt the heavy rail network to accommodate tram-train technology. Both heavy rail and tram-train solutions rely on the working assumption that the existing parcel platforms at Preston are brought back into use as part of HS2 enabling works.

Assuming the required works at Preston are undertaken, the heavy rail scheme is likely to be the cheapest and quickest to deliver, although the station location could limit its accessibility and value to parts of Fleetwood that are not near the station. Light rail and tram train options that can be integrated with the existing Blackpool Tram route through Fleetwood have the opportunity to provide much better connectivity within Fleetwood, although the tram options will require an interchange at Poulton-le-Fylde to make onward journeys to Preston and beyond. Light rail and tram train options also provide an opportunity to expand the network in the future with the delivery of a wider expansion of the Blackpool Tram System that could include for instance including through running around the South Fylde Line to create a wider regional tram train system.

Although detailed appraisal work of the options has not been undertaken at this stage of the study, the relatively high costs and low expected demand of rail based solutions, means that the scheme seems likely to have a benefit cost ratio of well under 1, and that all the options are therefore likely to represent poor value for money.

However, recent Treasury guidance has emphasised that the benefit cost ratio is only one element of an investment decision with policy makers needing to also take account of broader objectives such as the impact on wider policies, including decarbonisation and levelling up, and the transformative and place based impacts that the scheme can deliver.

It is recommended that if the scheme is to be progressed further, then the next stage of work would be to identify and develop a preferred option to a more detailed design and undertake an Outline Business Case. Key areas of work that will need to be undertaken to deliver this would include:

- Development of a demand model for the study region such that a better understanding of current and future trip making patterns can be analysed, and the expected demand of different routes and options understood.
- Further design work to develop a preferred option with an outline design. Of particular interest with developing the design further are:
    - Fleetwood Terminus (Heavy Rail) – to work with local landowners and other stakeholders to agree a suitable location
    - Level Crossings (Heavy Rail) – to further develop proposals and a safety case for reinstating Thornton Level Crossing and whether or not to close Hilylaid Road Level Crossing
    - On-street tie-in to Blackpool Tram (light rail/tram-train) – considering land ownership, highway impacts and track geometry to balance costs and journey times
    - Rail tie-in at Poulton (heavy rail/tram train) – to firm up costs and risks
    - Development of tram-train proposals to mitigate risks – focusing on wheel-rail interface, vehicle compatibility/crashworthiness and impact on existing signals, communications, maintenance boundaries
    - Development of bus alternative options, that may include guided busway and or significant sections of bus lanes and junction prioritisation measures.
- Assessment of long term operating, maintenance and renewal costs, which together with an assessment of revenue will allow the financial case to be better understood.
- Clarification over consents route (TWAO, DCO) to progress the scheme.

Contents

1. Introduction

1.1 Context for the study

The UK Government has an ambition to 'level up' areas in the Midlands, North and other parts of the country whose economy has fallen behind London and the South East, such that every part of the nation can be equally prosperous. Recognising the role and importance of an effective, efficient, and sustainable transport network in supporting economic growth, wellbeing, health, and the environment, this ambition has placed a spotlight on improving transport infrastructure across areas of the country that suffer from poor connectivity. One aspect of this is a renewed interest in the potential for reopening closed railway lines and stations as a means of improving accessibility to communities long cut off from the rail network. There is now widespread recognition that better connecting isolated communities can help support local economies, help meet decarbonisation targets, and help level up the country to help provide equal opportunities for all.

In November 2019 the Prime Minister visited the Poulton and Wyre Railway Society (PWRS), who have long been campaigning and working for the reopening of the Fleetwood Line, and pledged in the event of electoral success, to make funding available for a "Beeching Reversal Fund". Following this pledge, in January 2020 the Secretary of State for Transport visited Fleetwood and announced the establishment of a £500m Restoring Your Railway (RYR) fund with the specific purpose of re-opening closed railways and stations. This fund included the facility for local authorities and other sponsors to submit early stage proposals for reopening lines and stations, with successful applicants receiving grants to undertake the development of early stage feasibility and business case work.

On this basis Lancashire County Council, with the support of a number of key stakeholders including Blackpool Transport, Wyre Council, Fleetwood Town Council and the Poulton and Wyre Railway Society, successfully applied to the Restoring Your Railway fund to undertake a feasibility study for the reopening of the Fleetwood Branch Line which closed to passengers in 1970.

As a result, in October 2020 Atkins was appointed by Lancashire County Council to undertake an early stage feasibility and business case assessment of the scheme, with the key aim being to present an strategic outline business case (SOBC) consistent with the RYR guidance. The SOBC sets out the underlying objectives of the scheme, and makes a strategic case for further investment based on how the scheme is able to deliver against those objectives. It additionally establishes whether reopening the Branch Line is likely to be technically feasible and economically viable. The key decision being sought at the SOBC is whether the proposed scheme is able to meet the objectives and whether any of the options are worthy of more detailed development in order to take the scheme forward to the next stage of development. This report and its associated appendices represent the outcomes of this study.

1.2 Description of the scheme

The Fylde Coast is currently served by two mainline rail routes; the Preston to Blackpool North lines and the Kirkham to Blackpool South line, which branches from the Blackpool North Line at Kirkham and Wesham. These lines and their stations are shown in blue in Figure 1-1.

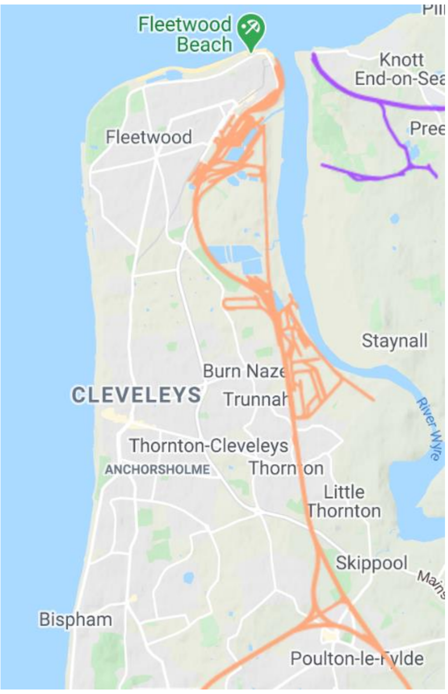
Figure 1-1 also shows in grey a disused, but largely intact, rail route between Poulton-le-Fylde and Fleetwood that at one stage had intermediate stations at Ramper Road, Burn Naze, Thornton-Cleveleys, Wyre Dock, and Fleetwood. At its peak, it comprised quite a network of lines, loops and sidings serving the docks and various riverside and other industrial plants in the area, as illustrated in Figure 1-2.

Due to limited passenger demand, Fleetwood station closed in 1966, with the rest of the branch line between Poulton-le-Fylde and Fleetwood closing to passenger services in 1970. The line remained open to freight, primarily to serve the Imperial Chemical Industries (ICI) plant until the late 1990s until all services ceased completely in 1999.

The single-track railway remains intact throughout the majority of the route corridor between Poulton-le-Fylde and Jameson Road approximately 2.5 kilometres to the south of Fleetwood town centre, although the physical track connection at Poulton Junction has been removed. North of Jameson Road, the track bed has been lost completely, mainly by an extension of the A585 built in the 1990s as well as a succession of other developments.

Figure 1-1: Existing and Closed Railway Lines and Stations in West Lancashire[2]

Figure 1-2: Historical extent of Poulton-le-Fylde to Fleetwood Railway



[2] Reproduced with permission from the New Adlestrop Railway Atlas ©Richard Fairhust

1.3 Aims of this study

The main aim of this study is to present a Strategic Outline Business Case (SOBC) for reopening the Poulton-le-Fylde to Fleetwood Line in line with requirements of the Department for Transport's (DfT) RYR guidance. This guidance identifies that the SOBC is the first step in a three-stage process for developing a business case. The primary aim of the SOBC is to identify the basic feasibility of the scheme, from an engineering, operational and business case point of view. A particular focus of the SOBC is to present a strategic case that identifies the objectives of the scheme and assesses how different options might meet those objectives.

A key issue for consideration is the technical feasibility of reopening the line as either a tram, heavy rail or hybrid tram-train route, taking account of engineering constraints, operational considerations, and the different kinds of markets that they might serve. While a summary of this work is provided within the strategic case, further technical reporting of these issues is presented in the appendix to this SOBC. The strategic case includes some high-level comparisons of the rail, tram and tram-train options with other alternative means of improving accessibility to the region, such as improvements to local bus provision. However, it is important to note that none of these non-rail based alternative options have been developed, costed or assessed to a comparative level to the rail options.

The key decision being sought at the SOBC is determining whether the re-opening of the Fleetwood Line as a heavy rail, light rail or tram train route is worthy of further study and funding. If so, then the next stage of the scheme's development would be to undertake a more detailed assessment of the costs and benefits of different options, that would identify and develop a design for single preferred option. This would then form the second business case stage – an Outline Business Case (OBC). Following further detailed scheme design and consultation of the preferred option, the final stage would be a Full Business Case (FBC), from which a final decision can be effectively taken on whether to fund and deliver the project.

2. The Strategic Case

2.1. Introduction

The Strategic Case is one of the five business case elements presented within a Strategic Outline Business Case (SOBC), and seeks to demonstrate how schemes are supported by a robust case for change that fits with wider public policy objectives. Government business case guidance sets out the need for strategic cases to demonstrate how spending proposals fit in relation to national, regional and local policies, strategies and plans

To achieve this, the strategic case firstly identifies the objectives and rationale for the scheme through assessing the issues that the scheme is trying to resolve, understanding the rationale for change, and assigning the alignment of this with local and national objectives. It then presents a summary of the different options under consideration, and assesses the ability of those options to meet the identified objectives taking account of their risks, constraints and dependencies.

On this basis the Strategic Case is structured as follows:

- The context for the scheme in terms of background information on the region's geography, socio-demographics, and transport connectivity;
- The problems identified in the area that might be resolved by the scheme;
- A summary of the rationale for change;
- The strategic objectives for the scheme building on the identified problems and rationale for change;
- Alignment of the identified objectives with local and national policies;
- A logic map which links the challenges identified to the strategic objectives and the scheme's outputs and outcomes;
- A description of the different options under consideration;
- An assessment of those options against the schemes objectives;
- The risks, constraints and dependencies associated with delivering the scheme; and,
- Conclusions to the strategic case.

2.2. Context for the Scheme

This section presents the context for the scheme by assessing the historic, current and future geographic, socio-economic and transport context of the West Lancashire Wyre and Fylde Coast region which together form the study area.

2.2.1. Geographical Context

The study areas contain the three local authority areas as shown in Figure 2-1. Wyre contains the Fylde Coast peninsula on the west coast of Lancashire, in the north of England. Blackpool is a Unitary authority that is separate from Lancashire County Council but is still important to the county and the study area. The area is well known for its beach front and is particularly attractive to tourists.

Figure 2-1: Scheme Study Area

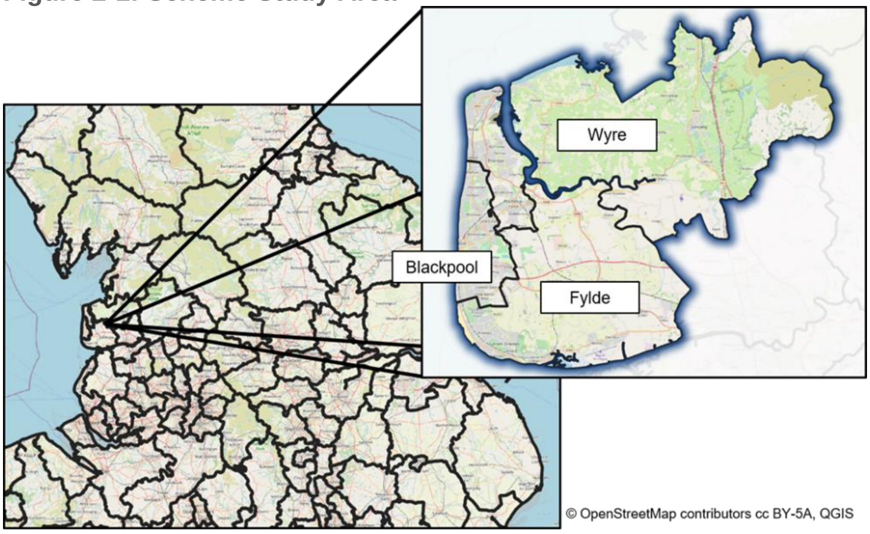


Figure 2-2 shows the main transport links into and out of the study area. The M55 links Blackpool and the Fylde Coast with Junction 32 of the M6 north of Preston. The A585 connects Fleetwood with the M55, and provides an important route linking the urban areas of the Fleetwood peninsula (Fleetwood, Cleveleys, Thornton and Poulton-le-Fylde), with the motorway network. To the south of the area, the A583 and A584 connect the towns of Kirkham, Wesham and Lytham and St Annes to Preston and Blackpool. In the east of the area the A6 provides connectivity between Garstang and the rural areas adjacent to the M6. Similarly, with the A6 corridor, it is connected to the A585 via the A586 to the west.

There are two terminus railway stations serving Blackpool, Blackpool North in the town centre and Blackpool South at the southern end of the resort core. Both lines connect Blackpool, Fylde and Wyre, with the national rail network via Preston, providing services to London, Birmingham and Scotland. The Blackpool North line has fast frequent services, including direct rail services to London, York, Liverpool, Manchester and Manchester Airport, and has recently been electrified. The Blackpool South line has a much lower frequency service to Preston and is non-electrified.

The attractiveness of the Fylde Coast to visitors and commuters is contingent on the connection routes in and out of the region. As such, travel corridors to the wider region play an important role in enabling access to jobs and services both for commuters coming into the Fylde Coast and for commuters who live in the coast but work elsewhere. Equally, the size of the labour market catchment for jobs and services within in the Fylde Coast and beyond is dependent on connectivity levels. Lancashire's physical geography has meant that transport Infrastructure has become more aligned with the North-South axis, but the population generally lives on an East-West axis. Preston, Manchester, Liverpool and Leeds are major job, population, shopping, tourist and cultural centres in the region, as such act as hubs for further growth for the wider region in the north, including the Fylde Coast.

For example, as shown in Table 2-1, the collective population of Preston, Manchester, Liverpool and Leeds are approximately 4.3 million. Likewise, the collective GDP and total job for these four regions is approximately £133 billion and 2.3 million respectively. This contrasts drastically with that of Blackpool, a key (sessional) employment site on the Fylde Coast which has a population, GDP and total jobs of approximately 220,000, £5.5 billion and 107,000 respectively.

Table 2-1: Regional cities – key facts[3]

	Blackpool	Preston	Manchester	Liverpool	Leeds
Population	220,230	372,140	2,507,020	648,900	793,140
GDP (£bn)	5.5	12.4	73.0	19.1	28.8
Total jobs	107,325	194,380	1,276,560	337,980	474,375

[3] Centre for cities: city factsheet

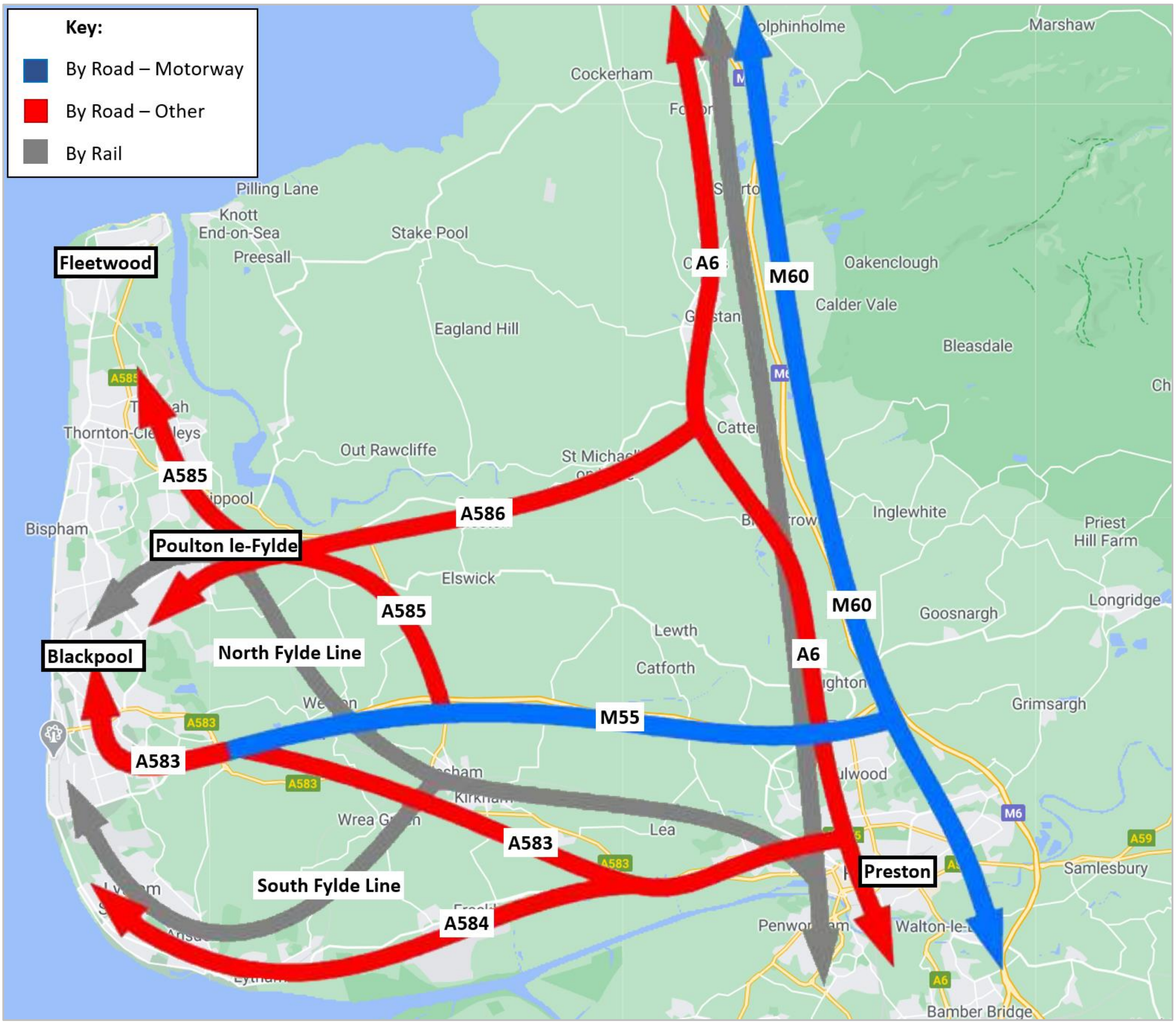
There are typically four direct trains per hour from Blackpool North to a number of destinations including Manchester Airport and Manchester Victoria, Huddersfield and Leeds. Accordingly, the station provides access to a number of key locations within the North West such as Wigan, Preston and Blackburn. This connection provides an important link between the Fylde Coast and major growth centres across the North of England, in particular to Manchester city centre.

Preston is at the heart of Lancashire’s transport network, meeting at the axis of North-South and East-West connectivity for both road and rail. Preston station is the most used in Lancashire, with an estimated 4.6m entries and exits in 2018/19, more than double that of the next station (Lancaster – 2.1m). Its proximity to Blackpool and the Fylde Coast presents a strong opportunity for strategic growth for the regions.

Blackpool Airport is located to the south of Blackpool in Fylde. Although scheduled commercial passenger services ceased in 2014 it continues to act as busy airfield for general and business aviation. The airport is also the site of an enterprise zone with a masterplan forecast to provide up to 5000 high technology jobs.

The Port of Fleetwood currently provides marine services for the offshore energy sector. Wyre docks is no longer as busy as it once used to be with the ferry to Ireland ceasing in 2010, and leaving some of the dockland derelict. However, commercial fishing still continues, and the docks also offer a passenger ferry across the estuary to Knott End, although the timetable is limited by tides and weather.

Figure 2-2: Fylde Coast Travel routes

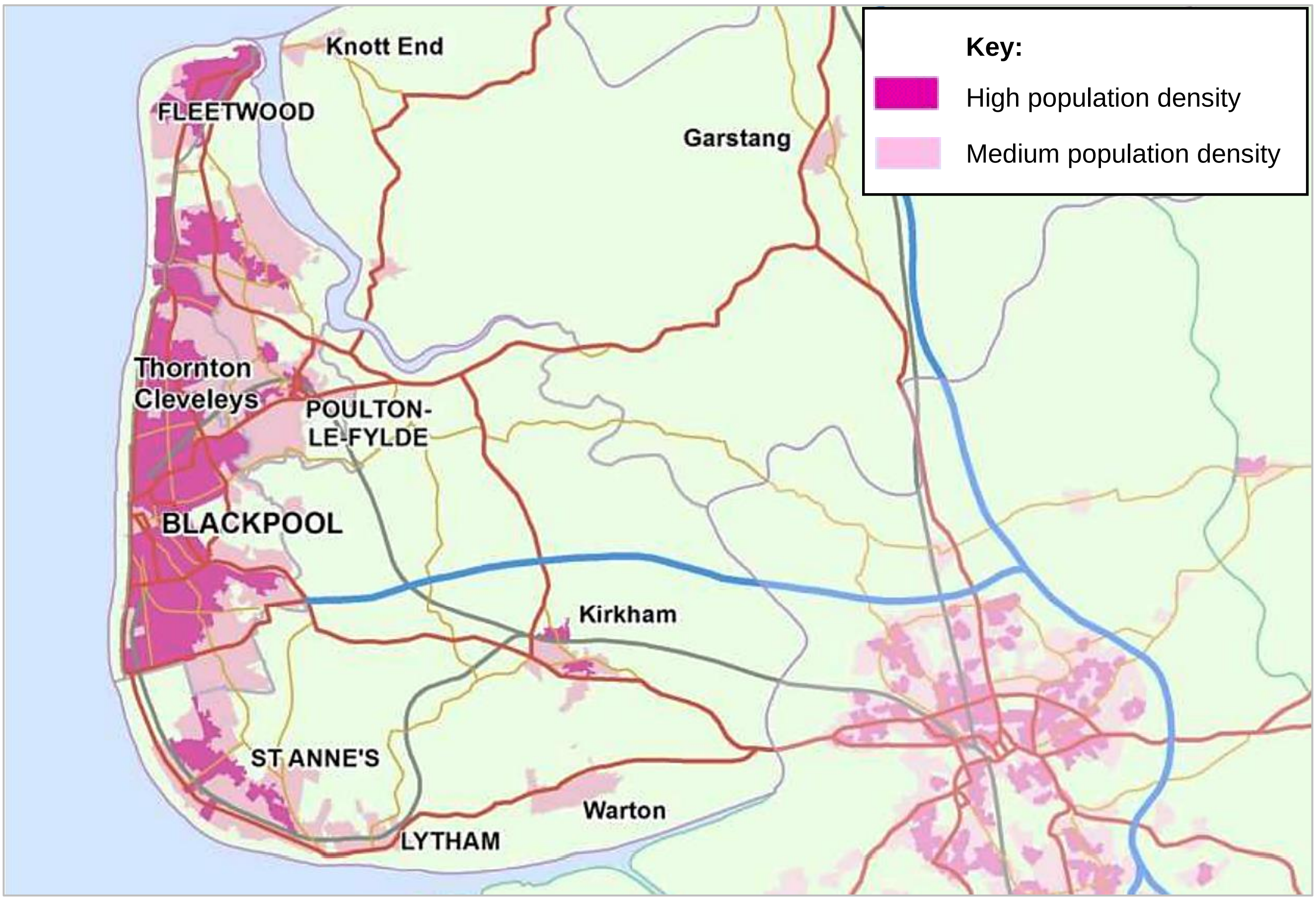


The Fylde Coast area is relatively self-contained in terms of housing, economy and travel but also has ties to both Central Lancashire and to Lancaster. However, its visitor economy, particularly to Blackpool, is important to the area.

Blackpool remains the most popular seaside resort in the UK, receiving millions of visitors every year to attractions such as the Tower, Pleasure Beach and Winter Gardens. In Wyre, Poulton-le-Fylde is a market town and the administrative centre of the borough. The nearby town of Garstang has become known as the World's First Fairtrade Town and has a wide variety of independent retailers and a popular weekly market, whilst the seaside town of Cleveleys lies on the coast to the north of Blackpool, with Thornton just inland adjacent to it. Many local employers have a heritage that is linked to the Fleetwood fishing and maritime industry and have adapted since the port closed. The Port of Fleetwood comprises two underutilised docks and a ferry terminal which has potential for future development.

Figure 2-3 shows how the population of the Fylde Coast is geographically distributed, as recorded in the 2011 Census. The largest settlements follow the line of the coast, from Fleetwood in the north of the peninsula, down through Blackpool and Poulton-le Fylde, to St Annes and Lytham in the south. Settlements scattered across the rural area are not shown; these communities have only a very limited impact on overall travel patterns because, individually, the numbers of journeys are small.

Figure 2-3: The Fylde Coast's Population Geographic Distribution[4]



2.2.2. Socio-Economic Context

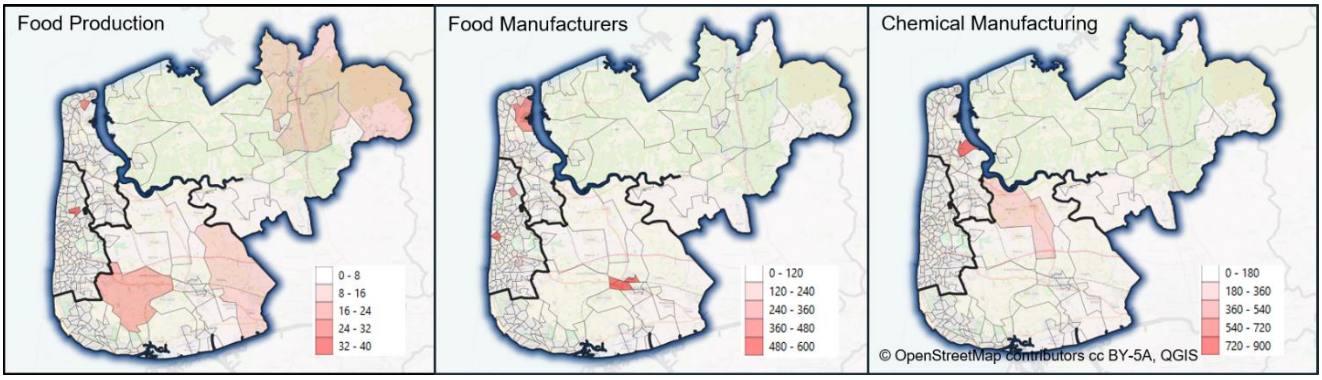
Industry and Employment

Location quotient analysis that compares the share of regional employment for different industries against national averages was undertaken to enable a deeper understanding of the specialisms possessed by the area. On this basis the main industries that appear to be clustered in the study area are presented in Figure 2-4. The industries that have a higher than average proportion of the workforce are food production, food manufacturing

[4] Fylde Coast Highways and Transport Masterplan, July 2015

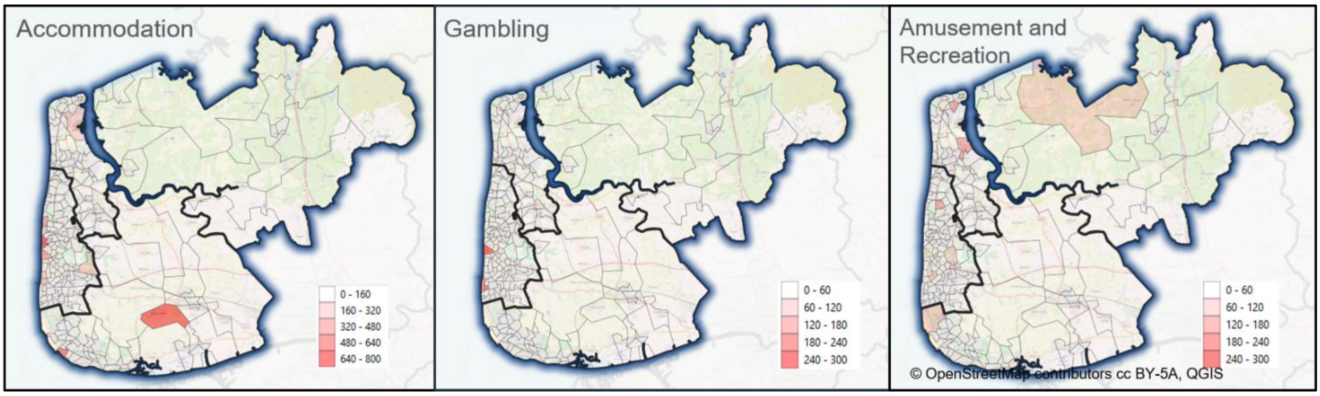
and chemical manufacturing. Food production and manufacturing are mainly related to the fishing industry and are predominately located within Fleetwood.

Figure 2-4: Main industrial clusters in the Wyre District (2018)



The main industries in Blackpool with a higher proportion of employees than the national average are accommodation, gambling and amusements and recreation. As would be expected these industries are most prominent along the golden mile in Blackpool and associated with its extensive tourist industry.

Figure 2-5: Main industrial clusters in the Blackpool City District (2018)



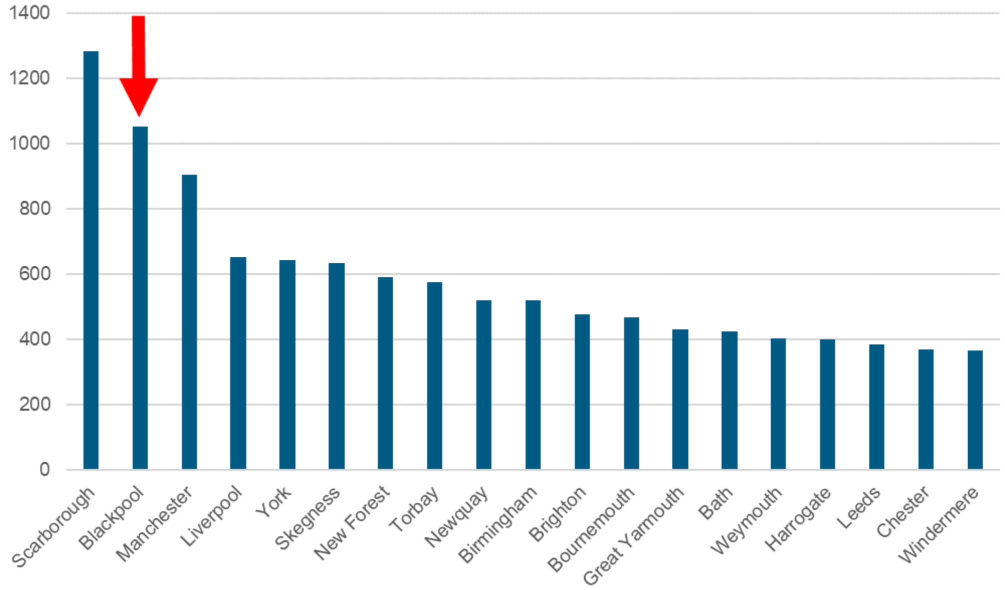
Source: Business Register of Employment Survey

As shown in Figure 2-6, Blackpool is one of the UK's most popular holiday destinations, attracting over a million holiday trips in 2018. Blackpool's economy grew by 4% (totalling £1.58bn) between 2018-2019 and visitor numbers grew to 18.2 million per annum[5]. The impressive growth of the sector in the area means Blackpool now accounts for 40% of Lancashire's tourism industry.

Tourism is very important to the Lancashire region's economy, with the sector contributing £4.4bn in 2018[6]. While much of the tourist industry is concentrated in Blackpool, the beaches and amenities of the Fylde Coast also attract many visitors and tourists, while areas such as Lytham St Annes are also popular for second home ownership and retirement. The tourism industry in Fleetwood is much less developed, perhaps in part due its poor connectivity with other parts of the region and country. If Fleetwood can attract a proportion of Blackpool's 18 million visitors it can boost the economic impact of visitor and tourism expenditure.

[5] https://www.visitblackpool.com/latest-news/another-year-of-growth-for-blackpool%E2%80%99s-tourism-eco/
[6] Marketing Lancashire, STEAM Tourism Economic Impacts, 2018

Figure 2-6: Top 20 Holiday Destinations in Great Britain (Excluding London, Thousands, 2018)[7]



While much of the tourist industry is concentrated in Blackpool, the beaches and amenities of the Fylde Coast also attract many visitors and tourists, while areas such as Lytham St Annes are also popular for second home ownership and retirement. The tourism industry in Fleetwood is much less developed, perhaps in part due its poor connectivity with other parts of the region and country.

As shown in Figure 2-7, the output growth of Blackpool and Lancaster and Wyre has been significant, outperforming both wider average in England and the North West. Between 2010 and 2019 GVA had grown by 20% in England and the North West but output had grown by 32% in Blackpool and 24% in Lancaster and Wyr, although it is worth noting, that even within these authority areas there has been considerable differences in growth at a local level.

Figure 2-7: Gross Value Added (2010-2018)

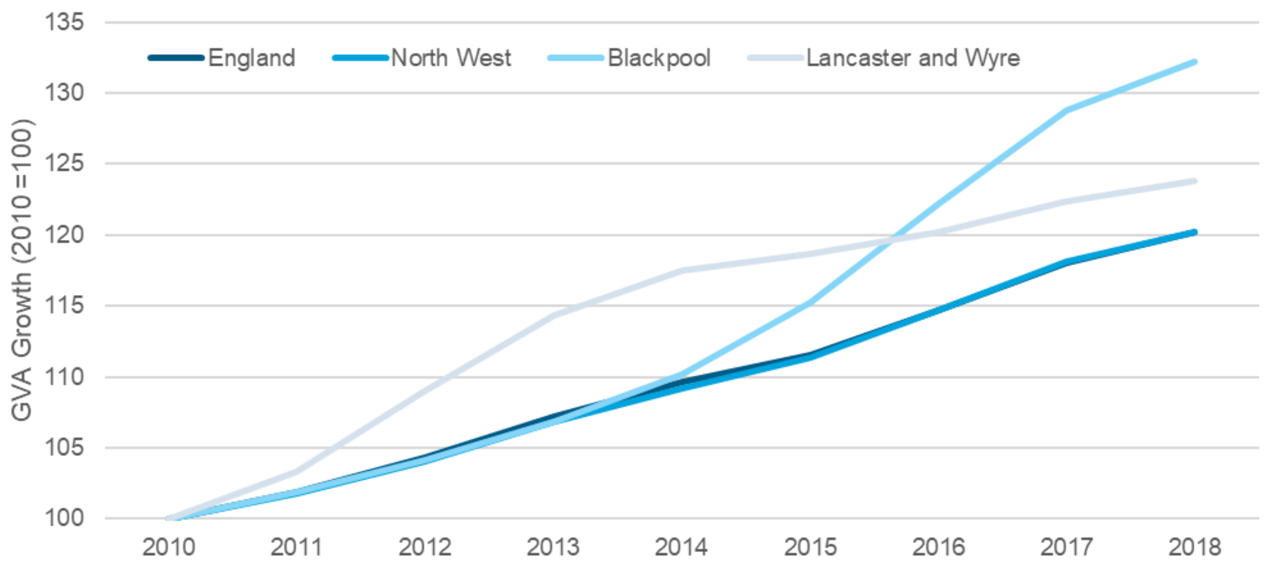


Table 2-2 identifies the proportion of workers by professional occupation. Fylde can be seen to have a significantly higher proportion of its residents working as directors and managers than the national average or the rest of the study area. This is likely to be reflective of the status of Lytham St Anne's as an attractive area with good connectivity to Preston and Manchester enabling longer distance commuting and viable second

[7] Visit England

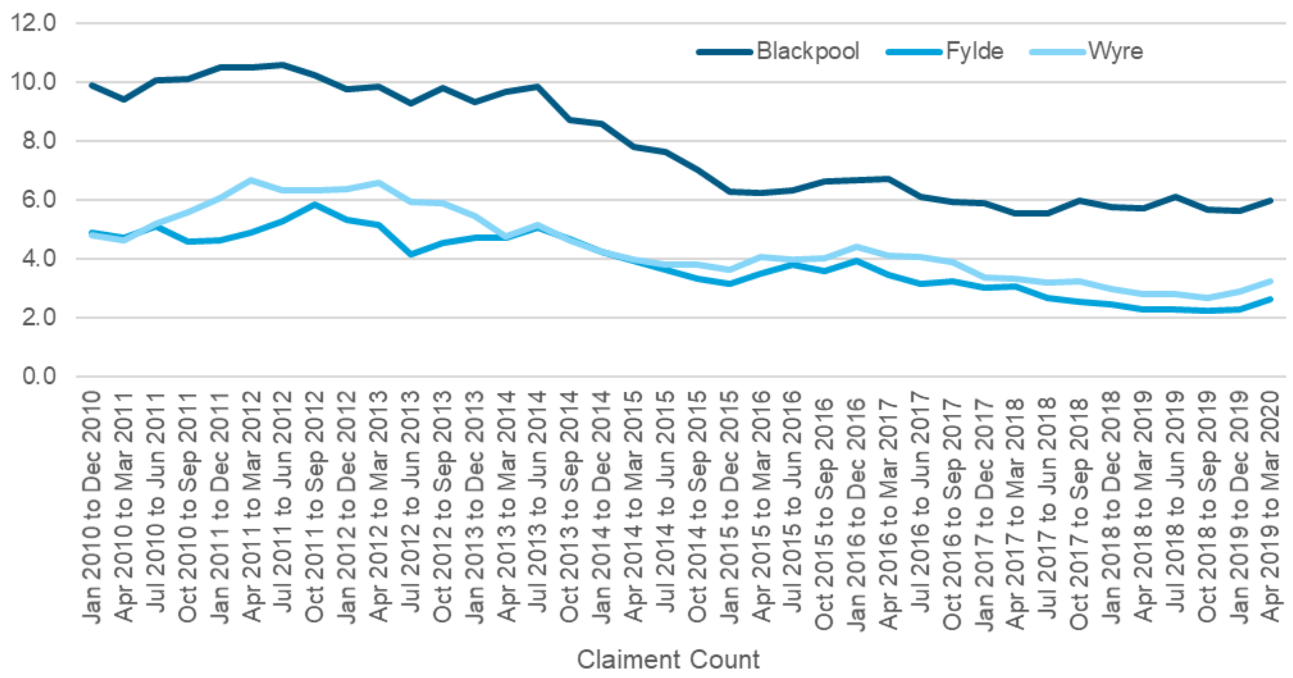
home ownership. Wyre has a significantly higher proportion of its residents employed in caring, leisure and other service occupations than the national average probably owing to its older population as discussed later in this report.

Table 2-2: Proportion of Workers in Each Occupation by District and Comparators

Occupation	Blackpool	Fylde	Wyre	Lancashire	England	North West
Managers, Directors and Senior Officials	9%	27%	14%	10%	12%	10%
Professional Occupations	20%	11%	14%	20%	24%	22%
Associate Prof & Tech Occupations	14%	12%	9%	11%	16%	14%
Administrative and Secretarial Occupations	12%	14%	6%	12%	10%	11%
Skilled Trades Occupations	5%	4%	9%	6%	5%	6%
Caring, Leisure and Other Service Occupations	12%	8%	23%	15%	11%	12%
Sales and Customer Service Occupations	11%	11%	10%	11%	8%	9%
Process, Plant and Machine Operatives	4%	0%	5%	5%	4%	5%
Elementary Occupations	14%	13%	11%	11%	10%	11%

Figure 2-8 shows the unemployment rates in the region. This shows that that Blackpool has the highest unemployment rate, but this follows a similar patter to Fylde and Wyre. The employment base of the area has been growing and unemployment had fallen from its peak of around 6% to 2% in Fylde and Wyre by 2019. Blackpool's unemployment level fell from 10% to 6% with a similar peak and trough.

Figure 2-8: Unemployment by Borough (2010-2018)

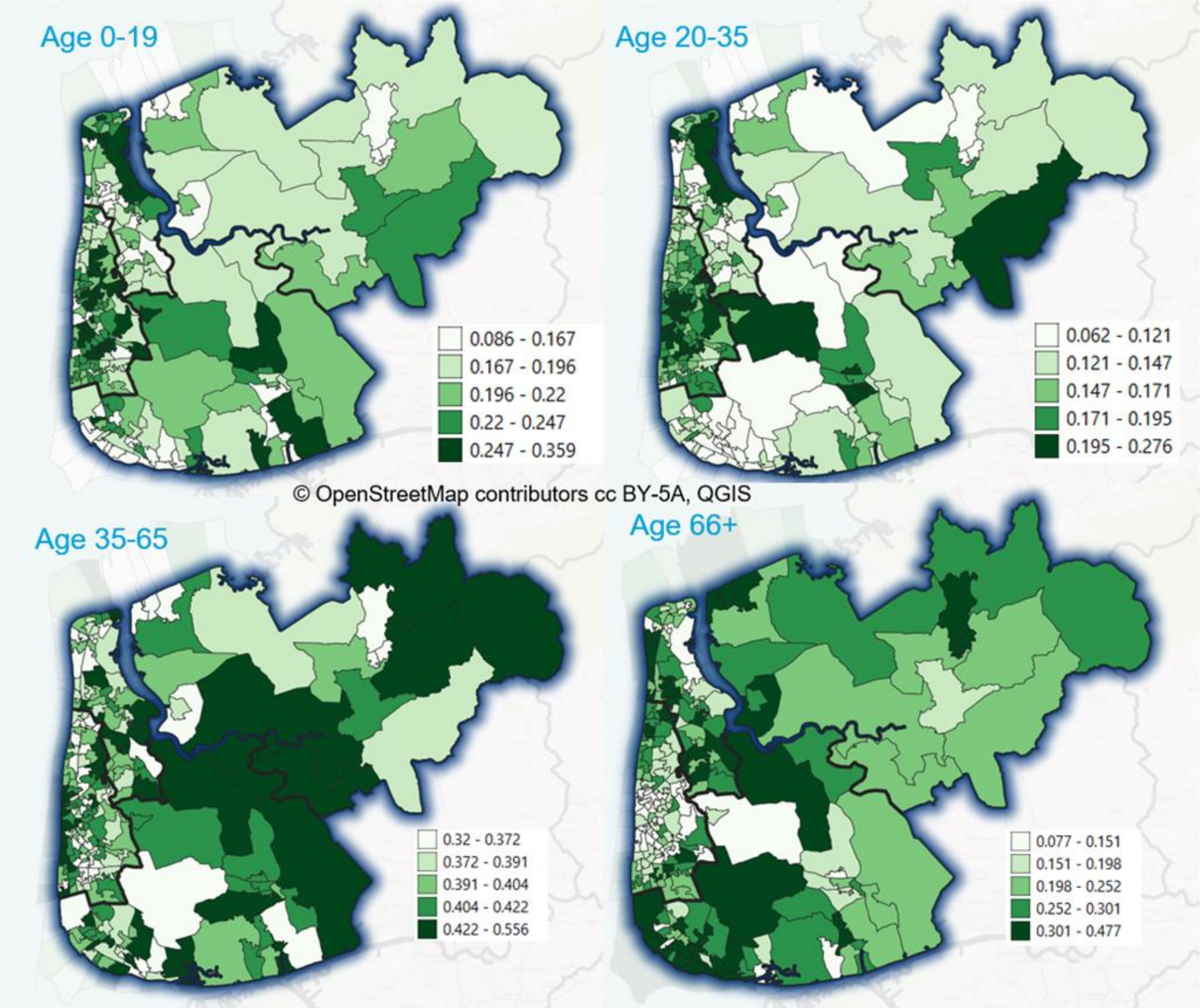


Demographics

Figure 2-9 identifies where the varying age group locate themselves. This shows that the dominant age groups for those Lower Layer Super Output Areas (LSOAs) on the east side of the Fylde peninsula are people aged 0-

19 and 20-34 suggesting the housing in the area is appealing to a younger demographic. The more affluent areas along the southern side of the coast attract an older retired demographic, while the mid-aged demographics appear to live in the locations with the strongest links to Preston.

Figure 2-9: Age Group Locations on the Fleetwood Peninsula[8]



The population of Fleetwood is 26,000 while the combined population of Fleetwood, Thornton and Cleveleys is 57,000.

2.2.2.1. Forecast growth

Table 2-3 shows the Office of National Statistics (ONS) projected growth by age group and district. These projections are built from using a top-down national approach, which although takes account of some growth trends does not take full account of the local plans.

Table 2-3: Forecasted Growth by Borough and Age Group (2018-2020)[9]

Age Group District	0-19		20-34		35-65		65+		Total	
	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute
Wyre	-2.2%	-474.2	-3%	-477.2	-2%	-870.3	43%	13,279.4	10%	11,457.7
Fylde	-1%	-220.2	1%	159.3	2%	548	56%	1,2267	16%	12,754.1

[8] Office for National Statistics Mid-Year Population Estimates
[9] Office for National Statistics

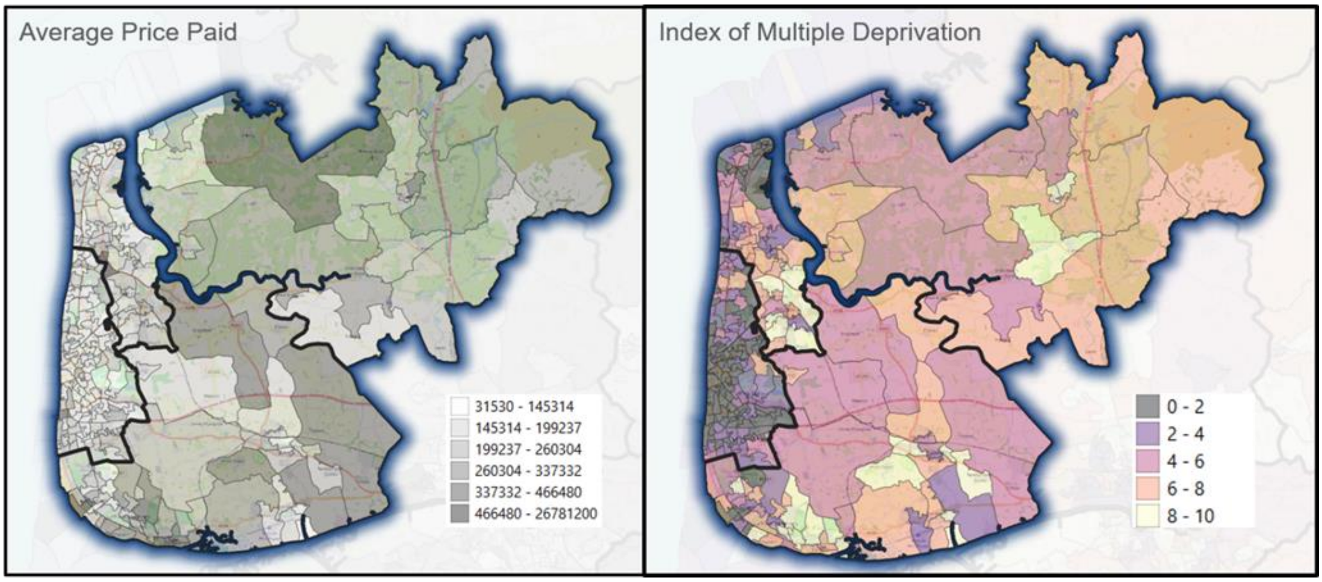
Blackpool	-2%	-537.5	-2%	-402.9	-8%	-4,181.9	26%	7,369.5	2%	2,247.2

The districts set to experience the fastest growth are Fylde and Wyre, but this is predicted to be driven entirely by the older population. This is a national trend but appears to be significant for these areas. Blackpool is set to see little growth with their middle-aged population set to be replaced with an older population, or rather their middle-aged population isn't set to move.

Housing and Deprivation

Figure 2-10 shows the region's house prices together with areas of deprivation. It can be seen that Fleetwood contains some depressed house prices and areas of high deprivation. Along the southern end of the Fylde coast, Lytham is highlighted as an area of affluence and an area with relatively high house prices. This is likely to be due to the type of resident it attracts and the professions they are likely to work in.

Figure 2-10: House Price Paid Data and Index of Multiple Deprivation (2019)[10]



Fylde is one of the most affluent areas in Lancashire, containing towns and rural areas which do not have the levels of deprivation seen in some other areas. The advanced engineering and manufacturing sector provides high paid jobs that underpin local economies. This centres on Warton, where BAE Systems has a major centre, and which is also home to one of the two existing Lancashire Enterprise Zone sites. Fylde also has a vibrant tourist economy based on the resorts of Lytham and St Annes.

Wyre is split by the River Wyre. The urban areas of Thornton, Cleveleys, Fleetwood and Poulton-le-Fylde to the west contrast with the largely rural area to the east that centres on Garstang. Only in Fleetwood are there any urban areas that suffer from significant deprivation, although rural isolation is an issue in some areas to the east of the Wyre. Many of the remaining local employers have a heritage that is linked to the Fleetwood fishing industry and have adapted since the port closed. The Port of Fleetwood comprises two underutilised docks and a ferry terminal which has potential for future development.

Blackpool is England's largest and most popular seaside resort, attracting millions of visitors yearly. Shifts in tastes, combined with opportunities for Britons to travel overseas, affected Blackpool's status as a leading resort during the late 20th century. Blackpool has always had a lower than average proportion of jobs in the manufacturing sector, with a higher rate of employment in the service and hospitality sector. The visitor economy, accommodation and food services significantly dominate economic activity in Blackpool. The seasonal nature of this work currently leads to high rates of unemployment in the winter months. Even during the tourism season, the unemployment rate in Blackpool is usually well above the county and national average.

The decline in overnight visitors to Blackpool has resulted in guest house owners seeking alternative income through converting and sub-dividing their properties to permanent residential use. This has resulted in oversupply of small, poor quality bedsits and apartments. As such, Blackpool has become a destination for low

[10] Land Registry House Price Paid Data and Ministry of Communities and Local Government

income and vulnerable households seeking cheap accommodation, including migrant workers, ex-offenders and vulnerable families. Some of Blackpool's neighbourhoods are among the most deprived in Britain[11]. This is consistent with the findings of the Lancashire Independent Economic Review.

Life expectancy is slightly below the England average in Fylde and Wyre and more significantly so for deprived areas of Wyre and for Blackpool. Blackpool has the lowest life expectancy age for males in England at 74 years and the second lowest age for females at 80. The health of people in Fylde and Wyre is generally better than the average for Lancashire. However, some areas of Fleetwood have very poor health outcomes, which are linked to the relatively high levels of socio-economic deprivation in some communities. The health of people in Blackpool is generally worse than the England average. The number of people suffering from coronary heart disease is one of the highest rates in England when compared with areas experiencing similar levels of deprivation.

This deprivation in Fleetwood and Blackpool is the result of a combination of factors including low income levels, unemployment, low education levels and poor housing, coupled with community factors such as a lack of community cohesion and higher crime levels. Many of these factors can be coupled with poor access to jobs and housing. Blackpool is especially deprived, ranking as the most deprived Local Authority District in England, and accounting for eight of the ten most deprived neighbourhoods nationally. The following wards are some of the most deprived within the study area, with Table 2-4 showing the deprivation specifically within Wyre.

- Wyre – Pharos, Rossall, Warren, Park, Jubilee, Mount
- Fylde – Kilnhouse, Ashton, Kirkham
- Blackpool – Bloomfield, Waterloo, Talbot, Claremont
- Preston – St George's Ribbleton, Town Centre

Table 2-4: Deprivation in Wyre[12]

Ward	Average Deprivation Score (out of 93)	Top % Most Deprived	Average Decile Rank[13] (out of 10)
Pharos	61.06	13%	1.25
Park	39.62	23%	2.25
Jubilee	33.61	30%	3
Rossall	39.05	33%	3.25
Warren	32.23	37%	3.67
Mount	28.91	40%	4
Wyre Average	**22.13**	**56%**	**5.6**
England Average	**21.67**	**55%**	**5.5**

It can be seen that the Fleetwood Peninsula contains wards with very high levels of deprivation. Pharos in particular, which is located at the north eastern extremity of the peninsula and is where a re-opened Fleetwood Line would terminate, has particularly high deprivation.

2.2.3. Local Development Context

Every local authority must produce a strategic housing land availability assessment (SHLAA) to accompany their Strategic Housing Market Assessment (SHMA), that includes an outlines of land available land for development. Figure 2-11 shows the SHLAA for Fleetwood and shows land for development adjacent to the Wyre and near Fleetwood's harbour, sites that are in close proximity to the trackbed of the Fleetwood Railway Line. The strategic housing Market Assessment outlines that Blackpool needs to deliver between 250-400

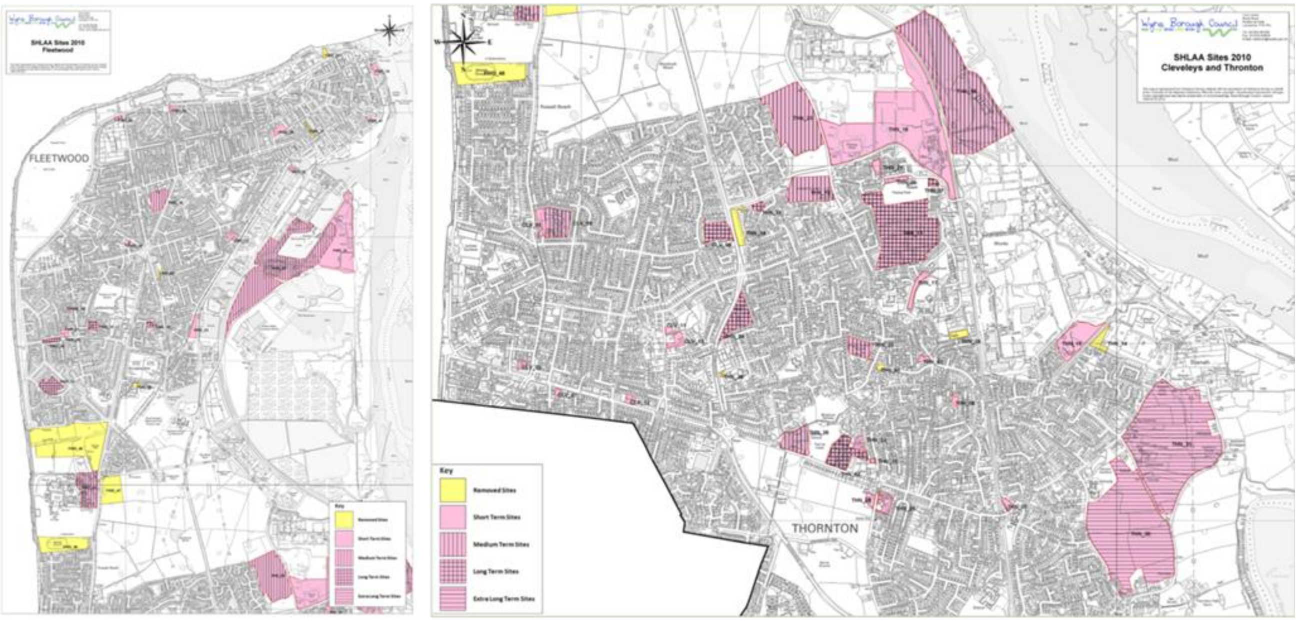
[11] Ministry of Housing, Communities & Local Government, The English Indices of Deprivation, 2019

[12] Index of Multiple Deprivation (IMD) 2019 by LSOA in England https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

[13] Deciles are calculated by ranking the 32,844 neighbourhoods in England from most deprived to least deprived and dividing them into 10 equal groups, with decile one being the most deprived and decile 10 the least deprived.

dwellings per annum, Fylde needs to deliver 300-420 dwellings per annum and Wyre must deliver 340-485 dwellings per annum.

Figure 2-11: Strategic Housing Land Availability Assessment (SHLAA) Sites[14]



The Wyre Local Plan and Blackpool Local Plan plays an important role in the future growth of the regions, and within this there are a number of key development projects at various stages of planning and delivery which may affect the feasibility, demand and business case for reinstating the Fleetwood Railway Line. The plans cover a range of local development needs including planning for new homes, communities and the economy.

Wyre's Local Plan states a minimum 9,200 dwellings and 43 hectares of employment land will be delivered within the period of 2011 to 2031. This includes 4,285 in the urban town areas of Fleetwood, Poulton-le-Fylde, Cleveleys and Thornton. The following strategic sites, as illustrated in Figure 2-12, are allocated for residential development within the Plan period, subject to the key development considerations:

- 25 dwellings in Fleetwood
- 513 total dwellings in Thornton
- 1052 total dwellings in Poulton-le-Fylde

Mixed used developments expected to be delivered by 2031 in Wyre are as follows:

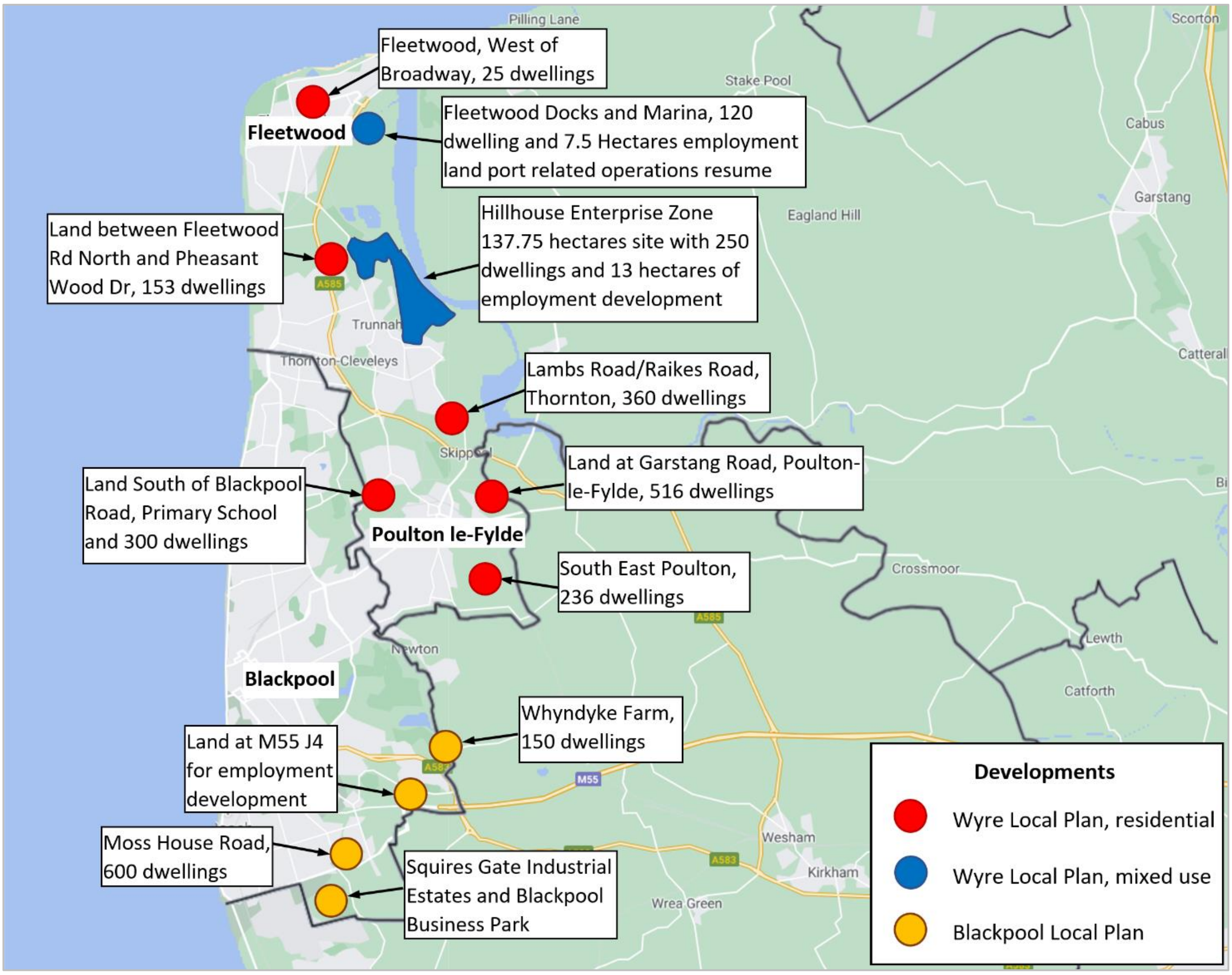
- Fleetwood Docks and Marina – 120 dwellings and 7.5 Employment Land Hectares. It is expected that the port related operations will resume on the site within the plan period and the site will be fully delivered
- Hillhouse Technology Enterprise Zone, Thornton – 137.75 hectares site with 250 dwellings and 13 hectares of employment development

Blackpool has a number of development sites predominantly in South Blackpool largely targeting employment growth opportunities, and some housing developments. Notable sites include:

- Employment development at lands close to Junction 4 of the M55 which have excellent access to the strategic transport network
- Squires Gate Industrial Estates and Blackpool Business Park, prime location for much of Blackpool's recent industrial and business development.
- 600 dwellings at Moss House Road
- 150 dwellings at Whyndyke Farm

[14] Strategic Housing Land Availability Assessment

Figure 2-12: Local strategic developments



2.2.4. Transport Context

This section assesses the transport context of the study area, and in particular how this provides connectivity within and across the wider region.

Travel to work modal analysis

Journeys are made for many purposes within the Fylde Coast, but the purpose that dominates the busiest times of the working week is the journey from home to work. According to the 2011 National Census, the majority of commuter movements revolve around Blackpool with over 4,500 commuters daily. The car is the dominant travel choice for most people for most journeys.

Figure 2-13 uses census data to map all non-private-car modes of travelling to work. This identifies that working from home is most prevalent in the rural areas, which is unsurprising given the demographic and distance to rural areas. There are also high concentrations of work from home along the Blackpool seafront which is likely to be people living in Bed and Breakfast accommodation. Active travel modes are concentrated in Fleetwood and central Blackpool because the workers in these areas are likely to be lower income and working in leisure and tourism. Car ownership for low income workers is likely to be out of reach, so they locate themselves near to where they work so they can arrive on foot or by bicycle.

Figure 2-13: Mode of travel to work[15]

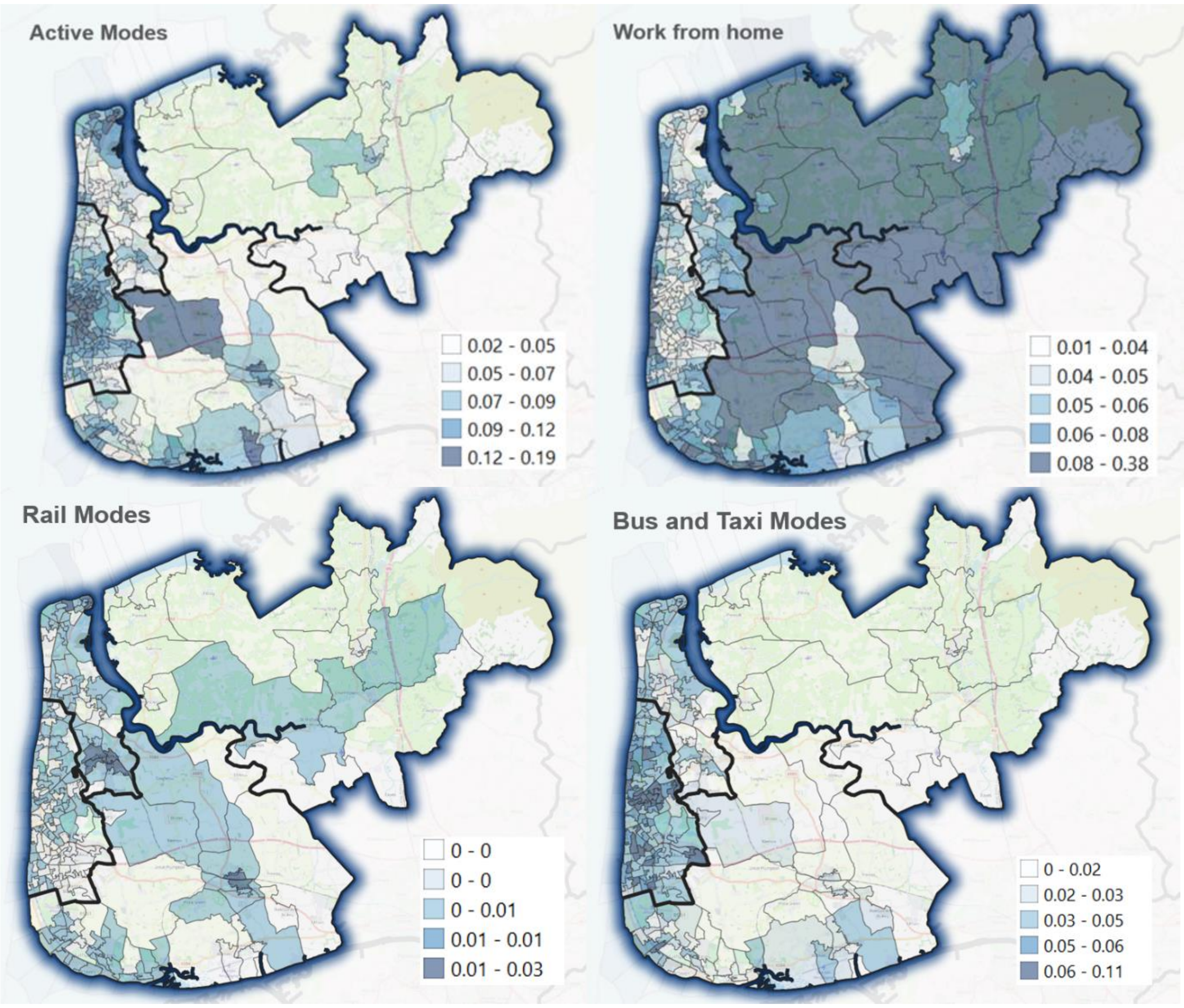
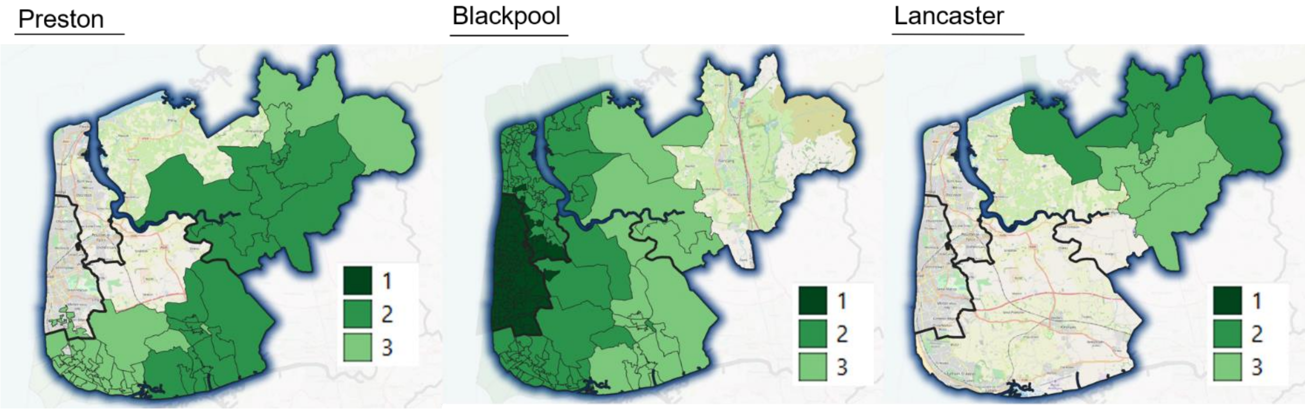


Figure 2-14 shows the most dominant travel areas for commuters in Blackpool, Preston or Lancaster, and shows that in terms of commuting the whole study region is relatively cut off and secluded. Other than the areas surrounding the city of Preston and the north eastern points of the Wyre district, everywhere looks to Blackpool as the dominant area to commute to if it's not their own district. In the main this therefore means that most commuting in the study region is undertaken within short distances within a district. The Fylde Coast is quite insular in this respect and is not well integrated.

By contrast, the Lytham St Anne's is one of the few places in the region that does include some significant commuting to Preston, Lancaster as well as Blackpool. Given this area is well connected it is no surprise it is among the most affluent in the region.

[15] Census, 2011

Figure 2-14: Dominant Travel Area[16]

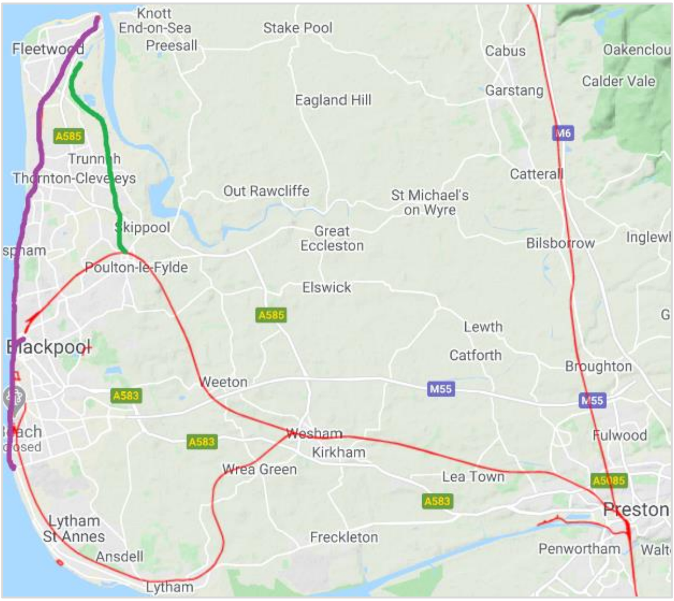


Public Transport Provision

Figure 2-15 and Figure 2-16 show the main public transport routes across the Fylde coast. There are twelve railway stations, most of which are situated on the South Fylde Line which is operated by Northern Rail. As well as providing a connection into Blackpool South and the Pleasure Beach, the line serves the towns of Lytham and St Annes with an hourly service to Preston. The North Fylde Line serves Poulton-le-Fylde and Blackpool and has frequent and fast services to Preston.

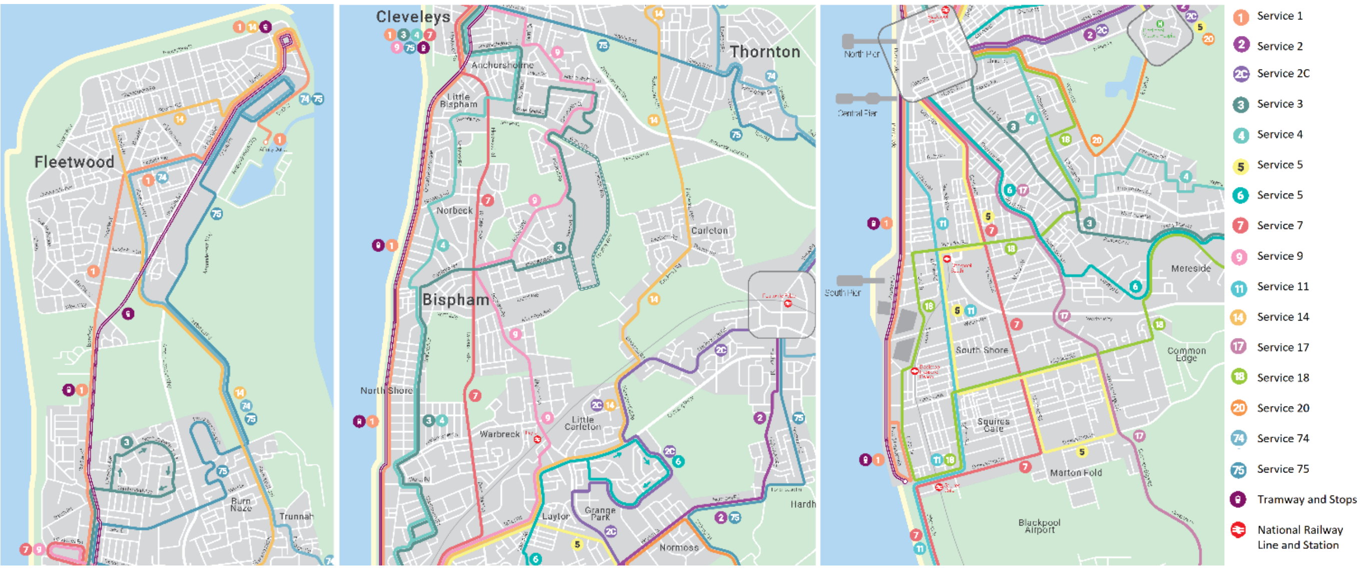
While Fleetwood no longer has a rail connection, it is part of the Blackpool Tram light rail system that links the town to Blackpool via Cleveleys (shown in purple in Figure 2-15), however this does not provide a particularly fast connection to the national rail network, and like the bus services in the area, it means that the North Fylde Coast largely has local public transport connections focused around Blackpool, and thus accessibility beyond the local area by public transport is poor.

Figure 2-15: Current rail (red) and tram (purple) network, with proposed Fleetwood Line (green)



[16] Census Travel to Work Data, note if the city is dominant it is Category 1, second dominant and it is in Category 2 and third dominant then it is in Category 3

Figure 2-16: Blackpool Transport Network Map[17]



Blackpool Tramway runs for 11 miles from Starr Gate in Blackpool to Fleetwood and is the only surviving first-generation tramway in the United Kingdom. The tramway provides an important service linking residents of Fleetwood, Cleveleys and Bispham into central Blackpool and to Blackpool North and South stations. However the tram from Fleetwood to Blackpool suffers both slow journey times has poor connectivity with the national rail network. An extension of the tram to Blackpool North is currently under construction and will significantly improve interchange opportunities with the national rail network.

Single fare bus journeys across the Fylde Coast cost £1.90 - £2.40 for adults depending on the boarding and alighting destination. Tram journeys cost £2.10 regardless of distance travelled. Single fares for children are £1.20 for both bus and tram journeys. The Fleetwood Ferry costs £2 for all passengers. Interchange here with an improved tram network would provide further connectivity benefits for passengers, whilst a train station in Fleetwood is likely to require a walk or extra trip to interchange with the ferry.

There are large inflows of commuters and visitors to the region, many of which travel through Preston as the preferred route. Public transport links from Preston to Fleetwood do exist, though they are very inefficient and time consuming. For example, a journey from Preston Town Centre to the Port of Fleetwood departing at 09:00 on a weekday typically takes 1 hour and 20 minutes[18], the majority of which is spent on the 75 bus service from Poulton-le-Fylde to Fleetwood. In contrast, the public transport link from Preston to Blackpool takes only 25 minutes as a direct journey via the North Fylde Railway Line.

Coach travel is important in the Fylde Coast, particularly in Blackpool, where up to 20% of visitors arrive by coach. Current estimates show that several hundred coaches arrive in the resort on a typical day and these numbers increase dramatically during the Illuminations

The main cycle route in the area is the promenade running continuously between Starr Gate and Fleetwood. At 12 miles long, this is the longest sea front promenade route in the country.

It can be seen that Fleetwood and the North Fylde Coast largely has local public transport connections focused around connections to Blackpool, with public transport connections beyond the local area, to the South Fylde Coast, and Preston, Manchester and Liverpool much less developed, and reliant on multiple changes of mode.

Public Transport Journey Time Analysis

Figure 2-17 and Figure 2-18 show the accessibility from Fleetwood by public transport in January and October 2020 respectively. The analysis was undertaken using Basemap TRACC software to measure the end to end journey times of making trips by public transport between an origin and destination, and to then map the results as accessibility contours. The journey times from Fleetwood Town Centre have been measured from London Road Tram Stop, and represents the fastest journey time possible using public transport between 7am and

[17] Blackpool Transport Network Map, Blackpool Transport, 2021

[18] Traveline, Journey Planner, available at: https://www.traveline.info/

10am. If it is quicker to walk than take public transport the walking time would be used. Car journey times are not shown, and no account is made for the fare.

Two scenarios are presented. While January 2020 represents public transport provision prior to the covid pandemic, October 2020 is also included presented a new bus service (74) from Fleetwood to Preston was introduced which impacted the accessibility.

The key conclusion of this analysis is that travelling anyway outside of the Fleetwood peninsula in less than an hour by public transport is challenging. Despite being directly connected via the Tram system, even travelling to Blackpool takes the best part of an hour due to the slow journey times.

Figure 2-17: Accessibility by Public Transport from Fleetwood Town Centre (January 2020)

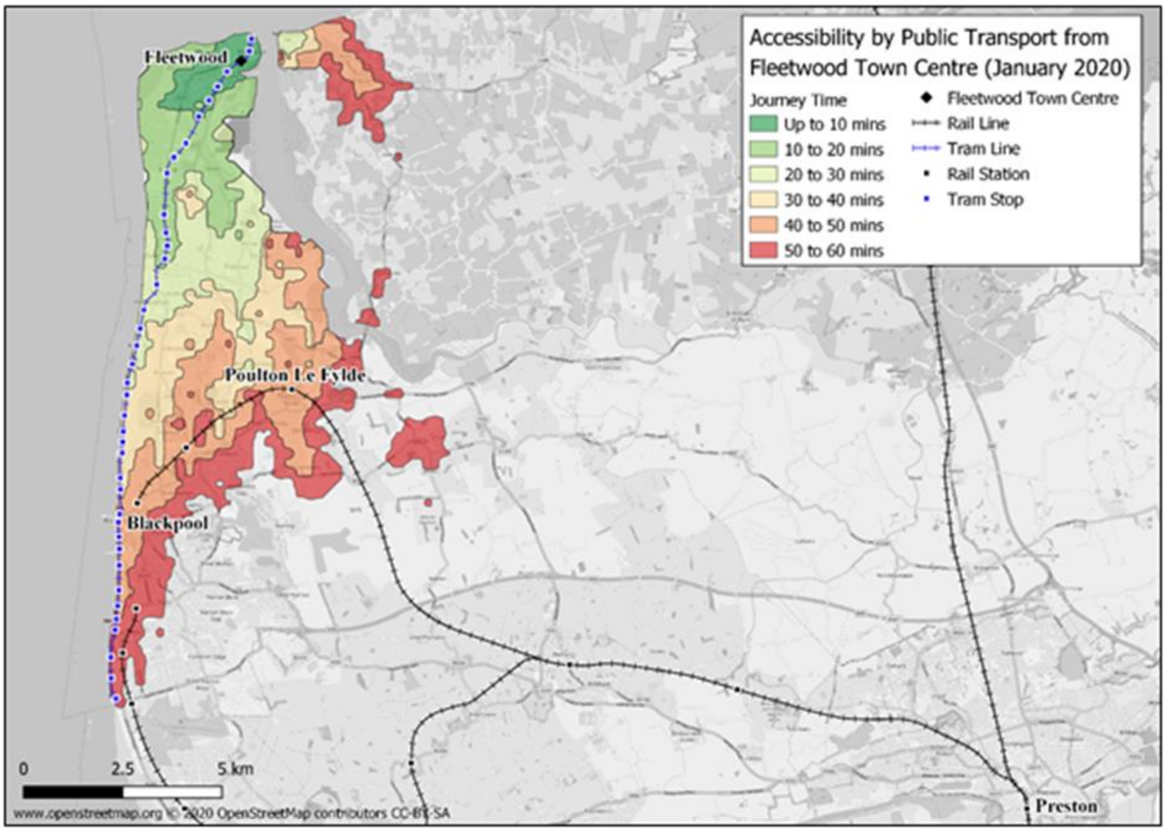


Figure 2-18: Accessibility by Public Transport from Fleetwood Town Centre (October 2020)

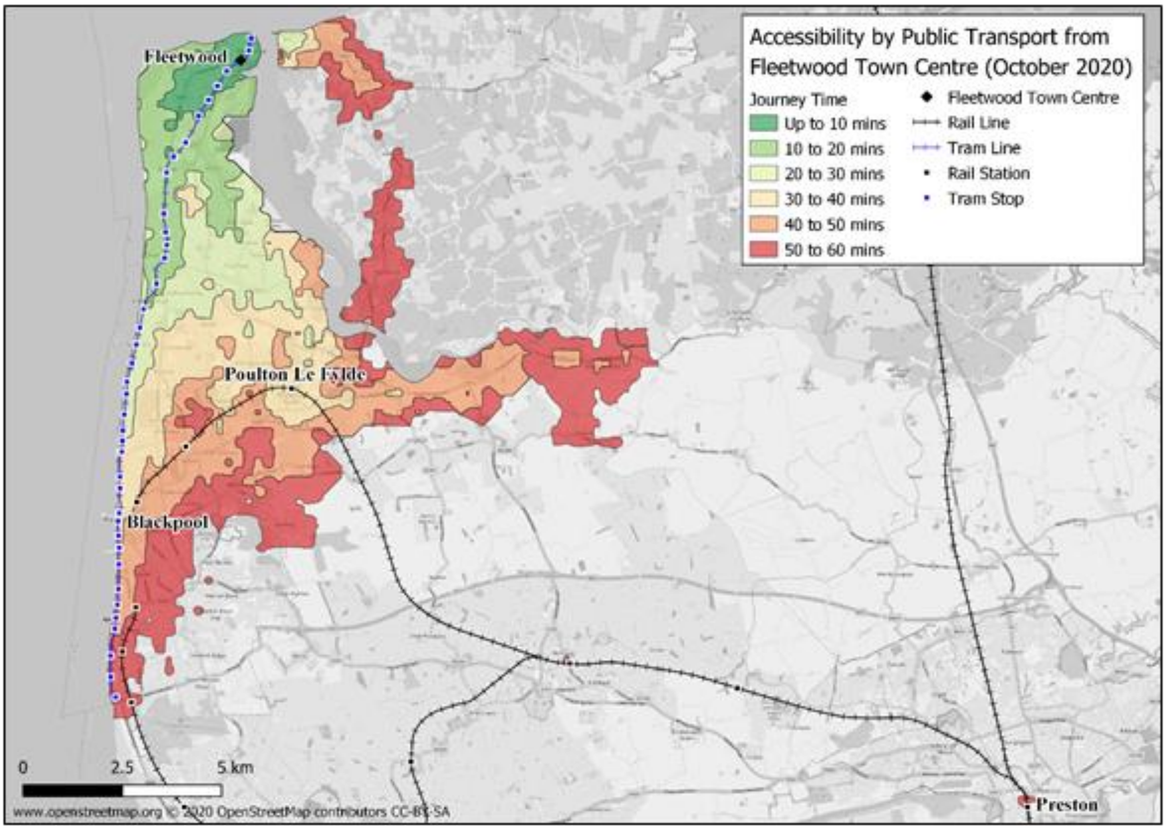


Figure 2-19, Figure 2-20, and Figure 2-21 show the public transport journey times from Preston, Manchester, and Liverpool using similar analysis to that described above.

The analysis shows that locations in the Fylde that are located on the rail network and have direct services to Preston and beyond, such Poulton-le-Fylde, Layton and Blackpool North are within 30 minutes of Preston. However, despite Fleetwood's relative proximity to Poulton-le-Fylde and Blackpool, a journey between these locations can be seen to take much longer. There are parts of Thornton along the bus route that are 40 to 50 minutes from Preston. However, the north of the peninsula, including Fleetwood town centre are 50 to 60 minutes from Preston. Residential parts of Fleetwood further out from the town centre have even worse prospects and are 60 to 80 mins from Preston. These journey times are on the upper end of what most commuters would be willing to commute to work or school.

Similarly, it is possible to travel between Manchester and areas within Fylde that are on the rail network such Poulton-le-Fylde and Layton within 80 minutes, and Liverpool within 90 minutes. However, areas that are without a railway station, such as Fleetwood, can be seen to have much higher journey times; using bus connections the journey time between Fleetwood and Manchester is 140 minutes and between Fleetwood and Liverpool 150 minutes.

Further detail on the TRACC journey time analysis is provided in Appendix A.

Figure 2-19: Accessibility by Public Transport to Preston (October 2020)

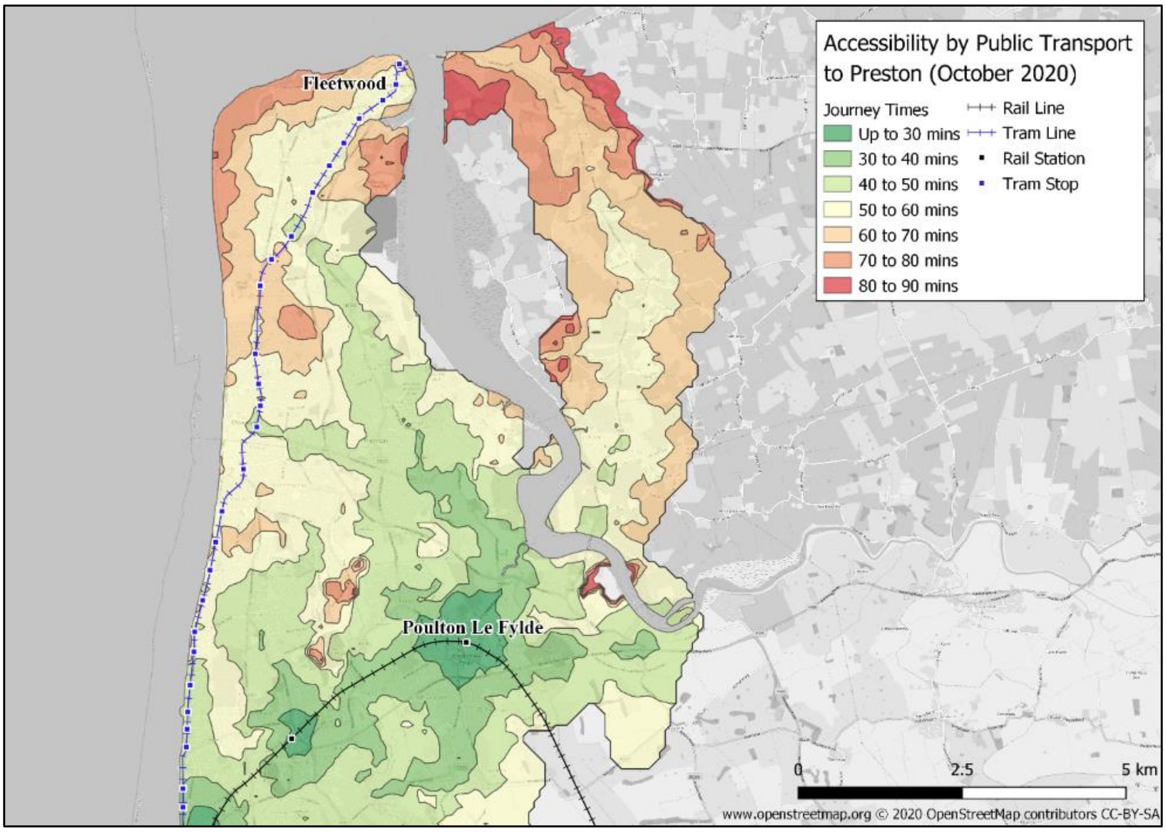


Figure 2-20: Accessibility by Public Transport to Manchester Piccadilly Gardens (October 2020)

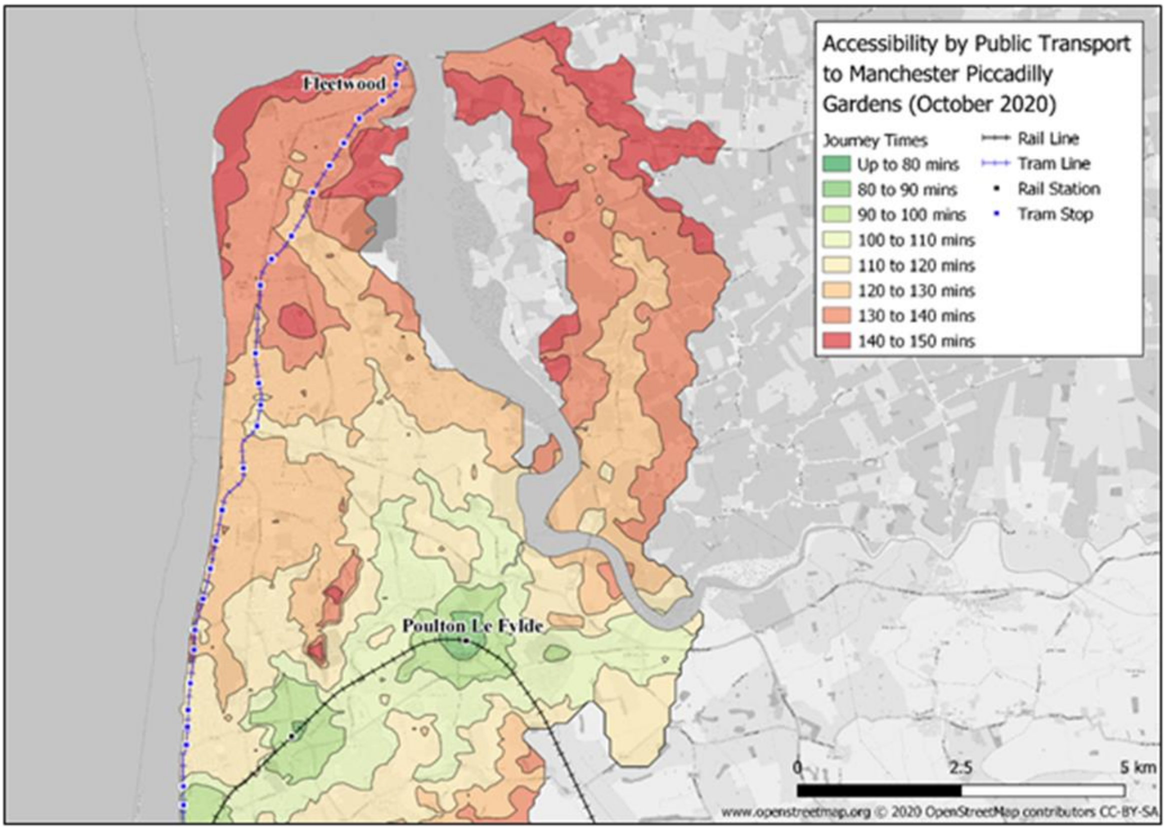
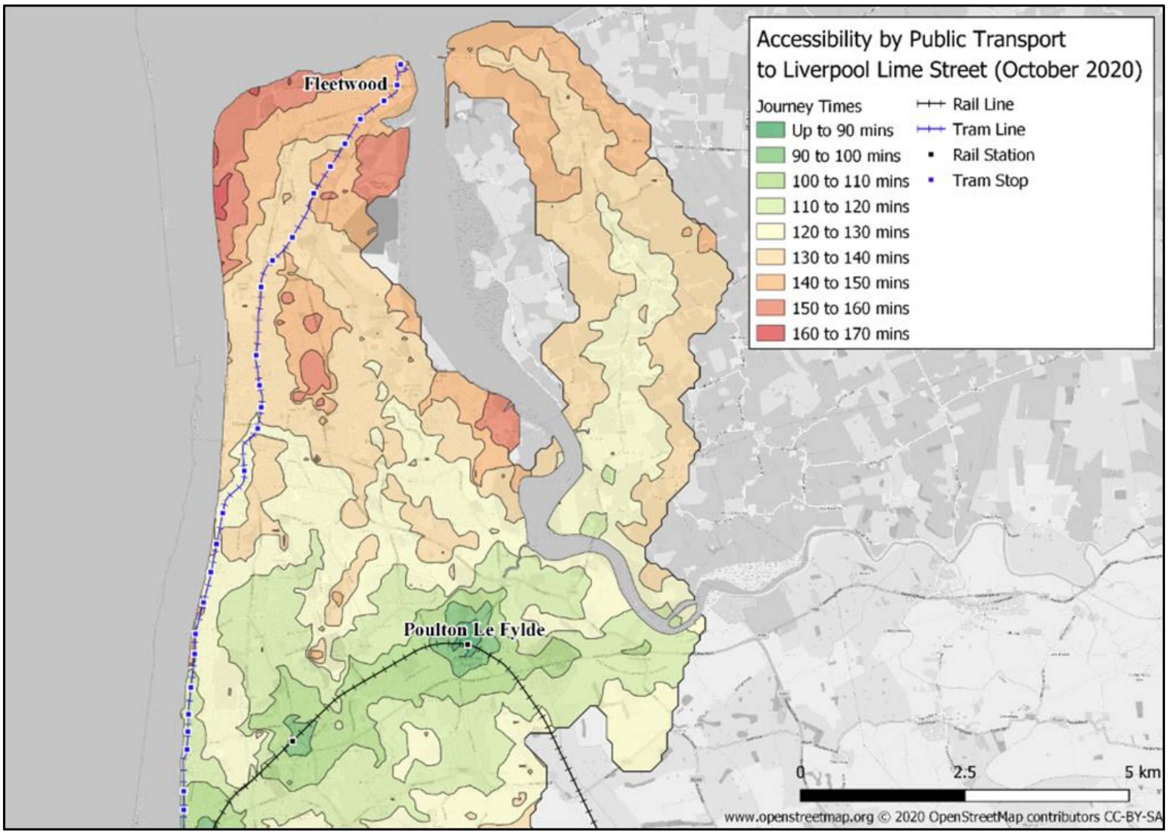


Figure 2-21: Accessibility by Public Transport to Liverpool Lime Street (October 2020)



One Hour Journey Time Catchment

Table 2-5 and Table 2-6 show the population (in absolute and percentage terms) that are based within an hour commuting distance of Fleetwood Town Centre[19]. There are 195,601 people in 64,299 households within an hour journey time of Fleetwood Town Centre. Due to the geography of the peninsula, the proportion of the population in each band increases as the time bands become higher.

Table 2-5 also shows the level of car ownership; 28,215, or 43.9% of households do not own a car, compared to an average across England of 25.6%. This level of car ownership is very low and means that residents will be particularly reliant on public transport and active modes in order to travel.

Table 2-5: Split of Key Indicators into Journey Time Bands

	Within 10 mins	10-20 mins	20-30 mins	30-40 mins	40-50 mins	50-60 mins	Total
Population	16,082	21,442	32,582	37,112	39,946	48,439	195,601
16-24-year olds	1,958	2,280	2,807	3,646	4,540	5,389	20,619
16-64-year olds	9,968	12,461	18,656	22,930	25,824	30,442	120,280
No Car Households	2,831	2,450	3,536	4,744	7,710	6,944	28,215

Table 2-6: Percentages of Key Indicators in Each Journey Time Band

	Within 10 mins	10-20 mins	20-30 mins	30-40 mins	40-50 mins	50-60 mins
Population	8%	11%	17%	19%	20%	25%
16-24 year olds	9%	11%	14%	18%	22%	26%
16-64 year olds	8%	10%	16%	19%	21%	25%
No Car Households	10%	9%	13%	17%	27%	25%

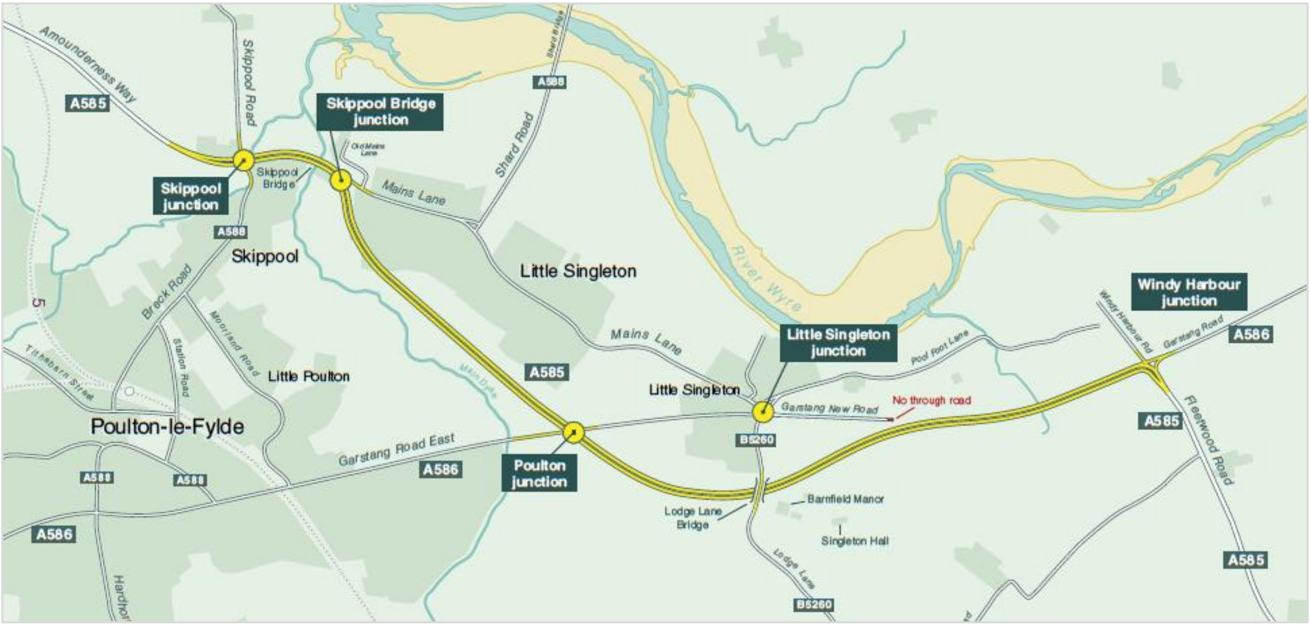
Highway Network

The M55 links Blackpool and the Fylde Coast to the M6 at Junction 32 north of Preston. The A585 trunk road provides key highway connectivity to the Fleetwood Peninsula. This road also has a poor safety record, with particularly severe congestion at the junction with the A586 at Little Singleton and the signalised junction with the A588 at Shard Road. A high number of accidents are reported at these junctions and the volume of traffic is also a concern for local people, pedestrians, equestrians and cyclists.

As a result, Highways England is currently delivering two major schemes to improve this route. A new bypass is being built between Windy Harbour to Skippool, while at the A585 Norcross roundabout work is underway to increase the size of the roundabout and widen the approaches to the junction. Together these schemes will have a dramatic improvement to road access in the area, at least for those who have a car.

[19] Based on census 2011 and Nomis (Official Labour Market Statistics)

Figure 2-22: Highways England Windy Harbour to Skippool A585 improvement scheme



Amounderness Way also forms part of the A585 trunk road in Thornton. Amounderness Way was constructed to take container traffic out of Thornton and Fleetwood. However, congestion on the A585's narrow two-lane roads to Fleetwood has made potential employers wary of expanding in Fleetwood, and contributed to the closure of the ferry service to Ireland. There are still plenty of HGV's using Fleetwood Road (B5268) as a quick route to Hillhouse Business Park and Fleetwood. Local Residents have expressed their concerns about HGV's using the road to access North Thornton and Fleetwood. Some reported damage to their properties and many felt it was unsafe to cross in order to get to local facilities such as the shops and doctors' surgery[20].

Road Congestion

The Fylde Coast has a high proportion of residents living and working in the area although there are large inflows from other parts of the county, particularly Preston, primarily due to the presence of BAE Systems and Westinghouse Springfields. These commuter movements take place in the context of a highway network that has reached or is reaching capacity in a number of places. Visitor movements in the Fylde Coast further inflate this problem. More than in any other part of the county, tourists change the pattern of congestion and also create a peak period for congestion, particularly in summer school holidays and during the Blackpool Illuminations. Unlike most commuters, these visitor movements are weather dependent and therefore unpredictable.

Figure 2-23 presents a snapshot of Tom Tom Index traffic data on a single weekday at PM peak hours to illustrate traffic congestion patterns on the Fylde Coast. The data shows Amounderness Way and adjacent roads toward Fleetwood experiences minor and major delays, including parts of the A587 from Blackpool. Likewise, the A583 and A587 experience delays in Blackpool. Most notably, the Windy Harbour to Skippool section of the A585 experiences major delays.

[20] Local Road Network Presentation, Thornton Action Group, 2013

Figure 2-23: Highway network at a) Fleetwood; b) Blackpool and c) A585 Windy Harbour to Skippool[21]

2.3. Summary of Key Issues and Challenges

The analysis above illustrates a number of key issues and challenges in relation to the transport connectivity in the region, particularly in the context of Fleetwood and Thornton. These are set out below:

- **Low car ownership and high dependency on public transport** – Fleetwood has some high areas of deprivation and low levels of car ownership that place a high dependency on public transport. While the tram network provides good public transport connectivity along the coast, public transport connectivity From Fleetwood to the wider region is poor.

- **No rail access in Fleetwood** – Fleetwood's train station closed in 1970, leaving the town isolated in its position at the top of the Fylde Peninsula. It was once the first resort in Britain to have a railway line, which opened in 1840, but investment has been channelled into the road network since 1970. The nearest station is 6 miles away in Poulton, and this takes at least half an hour to get to by public transport;

- **Poor east west connectivity from Fleetwood to the wider region** - while the tram provides relatively good north south public transport connectivity from Fleetwood to communities along the coast, including most importantly Blackpool, connectivity east west particularly to the major employment, shopping, leisure and cultural centres of Preston, Manchester, Liverpool is relatively poor. With no direct rail access, such journeys require a relatively slow bus or tram to Poulton-le-Fylde or Blackpool and then an interchange onto the rail network. Examples of journeys to Liverpool and Manchester are provided in Table 2-7 below.

[21] Tom Tom, Traffic Index, Preston Traffic (5pm on Monday 22 February 2021), available at: https://www.tomtom.com/en_gb/traffic-index/preston-traffic/

Table 2-7: Journey times from Fleetwood by public transport

Destination	Distance from Fleetwood	Current Public Transport Journey Time	Current Average Journey Speed
Preston	20 miles	50-60 minutes	20-24 mph
Manchester	50 miles	130-140 minutes	21-23 mph
Liverpool	50 miles	140-150 minutes	20-21 mph

Exemplar journeys from Fleetwood to Liverpool and Manchester[22]:

- Travelling from Fleetwood town centre to Liverpool city centre for a 09:00 start would require taking a 23 minute bus journey at 06:24 on the 74 bus service to St Chads Church in Poulton-le-Fylde, walking to Poulton-Le-Fylde station and taking the 07:08 Northern service to Liverpool Lime Street, before arriving just after 08:30 and walking for 10 minutes into the city centre
- Travelling from Cleveleys town centre to Manchester city centre for a 09:00 start would require taking a 15 minute bus journey at 06:57 on the 75 bus service to St Chads Church in Poulton-le-Fylde, walking to Poulton-le-Fylde station and taking the 07:30 Northern service to Manchester Piccadilly, arriving at 08:45 and walking into the city centre;

- **Poor integration between existing train and tram services** – Blackpool is relatively well served by train and tram services, although interchange between the two is poor, making switching between them difficult. These interchange problems are also a problem for residents in the coastal areas of Wyre. Fleetwood in particular has no rail connection and those wishing to travel by train must either take the tram to Blackpool and interchange or travel to Poulton-le Fylde and interchange. At Preston, interchange between different rail routes is made more difficult by poor platform access arrangements between the main platforms and those generally used by services to and from the Fylde Coast;

- **Highway network reaching capacity in places** – A high proportion of residents live and work in the area although there are large inflows from other parts of the county, particularly Preston. These commuter movements take place in the context of a highway network that has reached or is reaching capacity in several places. As shown in the congestion analysis in Section 2.2.4, key routes within the study area experience minor and major delays. The A585/Main Road, north of Poulton-le-Fylde, experiences minor and major delays, as does Amounderness Way, and parts of the A587 around Blackpool and north of Fleetwood[23];

- **Congestion on local roads** – Locally, one of the biggest issues is congestion. Across Fylde, around 48% of commuter journeys are made by car, even in areas of low car ownership where car sharing is more common. For some, it is a choice, often due to perceptions and lack of knowledge of alternatives. For some though, particularly in rural areas, it is a matter of necessity as there are currently only limited viable alternatives. As the congestion data shows, local roads suffer from minor delays, especially at peak time. Grasmere Road and Ansdell Road within Blackpool, Blackpool Road in Carleton, Rossall Road in Cleveleys, and Bourne Way south of Fleetwood all experience delays. Road congestion has a large impact on the reliability and journey times of the bus network, particularly during the peak periods that makes bus a very much less attractive option than it might otherwise be;

- **High volumes of car and coach traffic at certain times of the year due to summer holidays and tourist economy** – The car is the dominant travel choice for most people for most journeys. There are many reasons for this, but the most obvious impact on our roads is the amount of traffic they carry, not just in the peak hours but through the whole day. However, more than any other area of the county, the Fylde Coast, and Blackpool in particular, sees very high traffic volumes at certain times of the year, particularly in summer school holidays (Blackpool receives more than 18 million visitors a year, which accounts for 36% of all of Lancashire's visitors[24]) and during the Blackpool Illuminations. This seasonal variation in traffic is considerable. Buses suffer the same delays as other road users unless there are dedicated bus lanes. Coach travel is important in the Fylde Coast, particularly in Blackpool, where up to 20% of visitors (over 2 million visitors) arrive by coach. Current estimates show that several hundred coaches arrive in the resort on a typical day and these numbers increase dramatically during the Illuminations. As well as somewhere to drop off and pick up passengers, many of these coaches also

[22] Traveline, Journey Planner, available at: https://www.traveline.info/
[23] Tom Tom, Traffic Index, Preston Traffic (5pm on Monday 22 February 2021), available at: https://www.tomtom.com/en_gb/traffic-index/preston-traffic/
[24] Marketing Lancashire, STEAM Tourism Economic Impacts, 2018

need somewhere to park during the day, or 'layover', with facilities for the drivers. Temporary coach facilities are currently available on the Central Station site, but this is being redeveloped, so a permanent solution is needed in the longer term. More so than in any other part of the county, tourists change the pattern of congestion in this region, Chris Hardwick which coincides with when the worst congestion occurs. These visitor movements are weather dependent and therefore unpredictable;

- **Lack of viable and sustainable alternatives especially in rural areas** – Until more people have more sustainable choices that they are confident will meet their needs, the number of cars will continue to grow, at least while people can afford to run them. The cost of motoring is already a significant burden to many lower income households and this burden becomes even greater as the distance needed to be travelled increases, as happens from more rural areas;

- **Local ambitions to deliver new housing and development**. – There are a number of proposals to develop new housing and development on disused or repurposed land. Such development is currently limited by poor public transport and connectivity.

2.4. Summary of Rationale for Change

Currently, there is no direct rail access in Fleetwood or Thornton, and journeys via public transport in the Peninsula take much longer than journeys by private car. Low levels of car ownership and limited public transport connectivity from Fleetwood to the wider region mean that most people live and work relatively locally, with only limited amounts of commuting to areas beyond.

If public transport provision is not improved, more journeys will be made on the highway and local road networks, adding to existing congestion levels. The lack of viable alternatives to private car for people living in the study area, especially in rural areas, means sustainable travel, accessibility and connectivity is limited, which constrains the area's economic potential. Further to this, strategic public transport connections to Manchester and Liverpool also take much longer than the same journeys made by private car. On top of these local issues, the study area's seasonal and visitor economy adds further strain to the road network.

Fleetwood contains some of the most deprived neighbourhoods in Britain. In addition to addressing the transport problems in the study area the scheme can help deliver a number of socioeconomic benefits. These could include the following:

- Improved accessibility to employment, education and leisure services and facilities for residents of the Fylde Peninsula;
- Increased number of productive jobs and occupations, both in the Fylde Peninsula and for those who commute to economic centres such as Preston, Liverpool and Manchester, facilitated by the improved strategic connections;
- Growth in visitor numbers and visitor spending to the study area, with more using public transport to arrive and for travelling around the Fylde Peninsula;
- Increase in delivery of housing in the Fylde Peninsula and an increase in house prices in the scheme's study area;
- Reduced deprivation across the study area, and;
- Improved air quality in the study area from a reduction in private car and coach journeys,

A scheme which provides a step-change improvement to public transport connectivity will help address these issues and position the Fylde Peninsula for further investment in the future. As well as conventional economic benefits such a scheme can provide;

- A step change in where people can choose to live and work, some of which may occur as a result of the long term changes in working practices partly accelerated by covid-19;
- Land value uplift and transformational changes to land use patterns; and,
- A scheme fitting with emerging and escalating de-carbonisation agendas

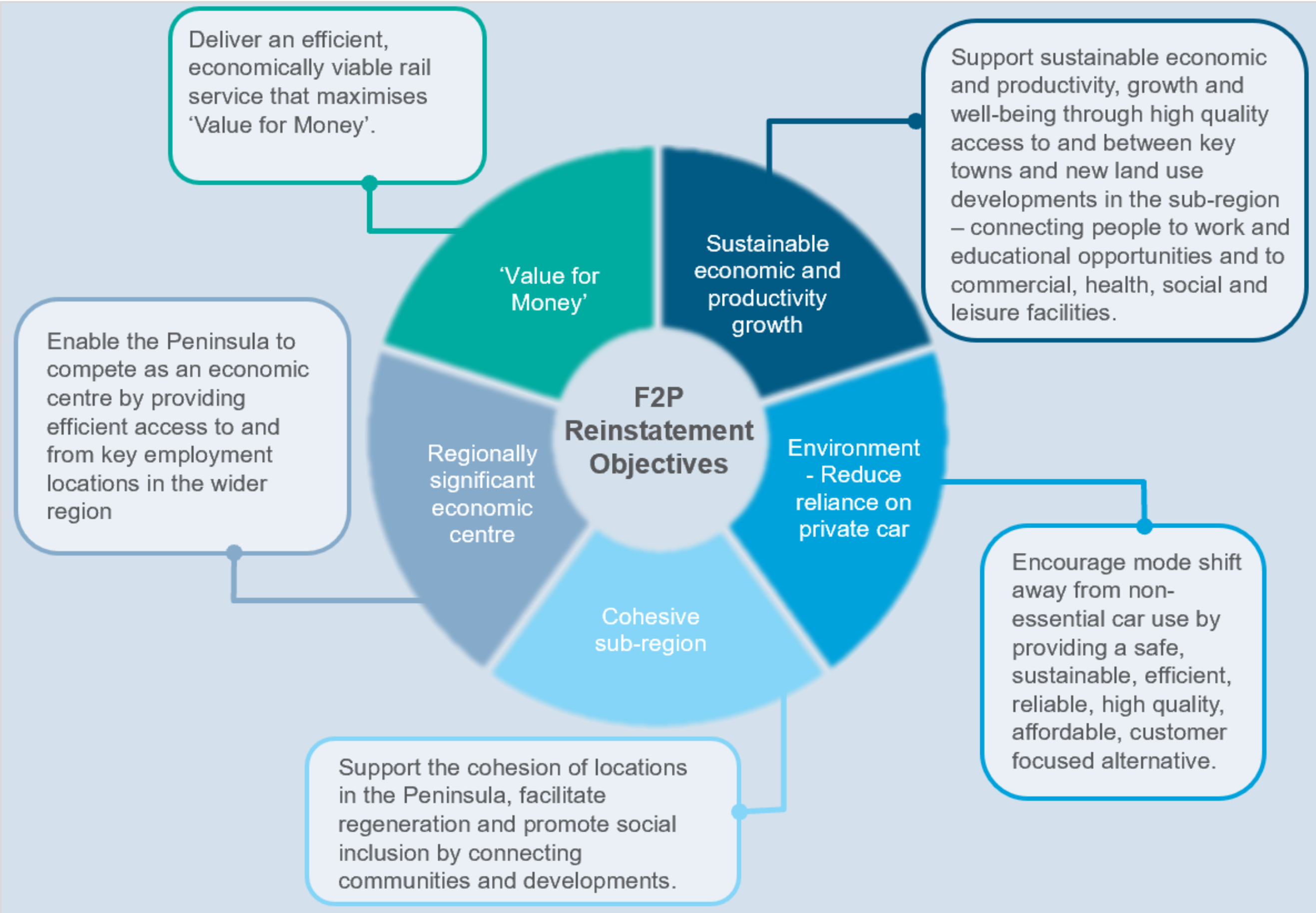
Re-establishing the rail link between Fleetwood to Poulton-le-Fylde is therefore a key strategic priority for Lancashire County Council, as well as for Blackpool Transport, Wyre Council and Fleetwood Town Council. Reinstatement of passenger services over the Fleetwood to Poulton-le-Fylde line could stimulate growth and reconnect communities that due to poor transport links are currently relatively isolated. The project's stakeholders recognise the line's potential for delivering benefits to the Fylde Peninsula, as well as providing mode shift to rail and to improve access to the regional economic hubs of Manchester and Liverpool.

2.5. Strategic Objectives

Building on the context presented above, Figure 2-24 sets out the scheme's strategic objectives. These have been developed in line with DfT's Restoring Your Railway guidance and are centred around delivering:

- Value for money that can deliver an efficient and economically viable rail service;
- Sustainable economic and productivity growth by better connecting people to work, educational, health, social, and leisure facilities;
- Environmental improvements by reducing the dependence of private car;
- Cohesive sub region that better connects communities; and
- Fleetwood as a regionally significant economic centre.

Figure 2-24: Alignment of Scheme's Strategic Objectives with Restoring Your Railway Objectives



The objectives also align with those of the Lancashire County Council Local Transport Plan 4, as set out below in Table 2-6.

Table 2-8: Alignment of Lancashire LTP4 Objectives with Scheme's Strategic Objectives

Lancashire LTP4 Objectives	Strategic Objectives	Alignment
Improve access into and between areas of economic growth and regeneration	Enable the Peninsula to compete as an economic centre by providing efficient access to and from key employment locations in the wider region, support the cohesion of locations in the Peninsula, facilitate regeneration and promote social inclusion by connecting communities and developments.	The scheme aims to support the cohesion of locations in the Fylde Peninsula by improving access between its economic centres and its communities and regeneration areas, many of which have been 'left behind' – places which have experienced deprivation and lack of investment and services, and which are often post-industrial or coastal communities[25]. For example, Index of Multiple Deprivation scores for some communities in Blackpool are rank them top 10 for deprivation across England, and some communities in Wyre rank top 100[26].
Improve people's health, safety, quality of life and wellbeing	Support sustainable economic and productivity, growth and well-being through high quality access to and between key towns and new land use developments in the sub-region – connecting people to work and educational opportunities and to commercial, health, social and leisure facilities.	The provision of public transport in the Fylde Peninsula is vital and the scheme will deliver this in the form of a safe, accessible railway. It will improve connections for residents to employment, health and leisure facilities and services.
Reduce carbon emissions	Encourage mode shift away from non-essential car use by providing a safe, sustainable, efficient, reliable, high quality, affordable, customer focused alternative.	By providing a viable alternative to private car for journeys within the study area, for strategic connections, and for visitors to the Fylde Peninsula, the scheme will deliver modal shift and reduce carbon emissions from private car

2.6. Logic Map

Figure 2-25 sets out a logic map for this SOBC, which links the challenges identified to the strategic objectives and the scheme's outputs and outcomes. This has been developed in line with DfT's logic mapping and Restoring your Railways guidance.

[25] Local Trust, "Left behind? Understanding communities on the edge", 2019, available here: https://localtrust.org.uk/insights/research/left-behind-understanding-communities-on-the-edge/

[26] Office for National Statistic, Index of Multiple Deprivation (December 2019) Lookup in England

Figure 2-25: Fleetwood to Poulton-le-Fylde Rail Link SOBC Logic Map

Challenges

No rail access in Fleetwood

Poor interchange between existing train and tram services, especially at Preston

Poor public transport connections to Liverpool and Manchester

Highway network reaching capacity in places

Congestion on local roads

High volumes of car and coach traffic at certain times of the year due to summer holidays and tourist economy

Lack of viable and sustainable alternatives, especially in rural areas

Inputs

Further development of the scheme's Transport Business Case

Funding to develop the scheme's Outline Business Case

Establishing a detailed programme to manage the delivery of the scheme

Outputs

Improved infrastructure and station facilities

Tram or Train routes serving key locations

Rail network integrated with other public transport and cycle routes

Improved safety and personal security

Outcomes

Connecting a community of 57,000 people with no railway station directly into the National Rail Network.

Reduced public transport journey times

Improved reliability and punctuality

Increased rail patronage and revenues

Modal shift away from private car helping deliver Governments net zero 2050 carbon targets.

Improved access to jobs and facilities – local and regionally (to Preston/Manchester)

Improved accessibility for those without access to a car

Impacts

Enable the Peninsula to compete as an economic centre by providing efficient access to and from key employment locations in the wider region

Support the cohesion of locations in the Peninsula, facilitate regeneration and promote social inclusion by connecting communities and developments

Encourage mode shift away from non-essential car use by providing a safe, sustainable, efficient, reliable, high quality, affordable, customer focused alternative,

Support sustainable economic and productivity, growth and well-being through high quality access to and between key towns and new land use developments in the sub-region – connecting people to work and educational opportunities and to commercial, health, social and leisure facilities.

Deliver an efficient, economically viable rail service that maximises 'Value for Money'.

2.7. Policy Alignment

In November 2020 the Government published the National Infrastructure Strategy which states 'Levelling up the whole of the UK' as a key objective. The strategy aims to use infrastructure investment to unite and level up the UK, delivering a stronger Union, thriving regions, enable cities to reach their full potential, and revitalise towns and communities. To deliver this, investments are being enabled across the country, prioritising those areas that have received less support than in the past.

'Decarbonising the economy and adapting to climate change' is another key element of the National Infrastructure Strategy. As set out in the Prime Minister's Ten Point Plan for a Green Industrial Revolution, infrastructure investment is fundamental to delivering net zero emissions by 2050. The government intends to create jobs and support the levelling up agenda by ensuring key industrial areas are at the heart of the transition to net zero.

Additionally, In March 2020 the Government issued the 'Decarbonising Transport: Setting the Challenge' consultation document. In July 2020, Transport Scotland issued its 'Rail Services Decarbonisation Action Plan'. in turn, Network Rail aligned its activities and strategic priorities in support of delivering a 'net zero' transport system.

The initial findings of the Lancashire Independent Economic Review highlight observed geographical patterns whereby economic and population concentrations are distributed along Lancashire's East-West axis, whereas transport infrastructure is more so aligned with the North-South axis. This includes Blackpool and the wider Fylde coast where population is comparatively high.

A policy review has been carried out to supplement the accessibility analysis and the socio-economic context. It is set out below in Table 2-7.

Table 2-9: Alignment of the Scheme with Key National and Regional Policy

Relevant Policies	Context
HM Treasury Build Back Better Plan for Growth	The Build Back Better Plan for Growth sets out the roadmap to recovery following the COVID-19, which includes a key focus on redressing Britain's historic underinvestment in infrastructure with £600 billion of gross public sector investment over the next five years. This will work towards "levelling up" the country and ensuring the United kingdom is a truly connected kingdom. The Government is committed to drive long-term productivity improvements via record investment in broadband, roads, rail and cities, as part of capital spending on projects worth £100 billion in 2022. Rail investment in the North is prioritised to bring transformational rail improvements to places like the Fylde Peninsula. Decarbonisation of the transport industry is also a key priority within the Plan for Growth, putting the UK on the path to meeting its net zero emissions targets by 2050. An improved tram or train network on the Fylde Peninsula will contribute towards this by promoting modal shift to more sustainable modes.
Lancashire County Council Local Transport Plan 3	The County Council's Economic Framework predicts that Lancashire has the capacity to generate substantial further growth and new jobs by focusing on a number of key sectors and identified growth sites including Fylde Coast – balancing the significant variations in economic performance across Lancashire, and Lancashire's lagging growth compared to the rest of England for a number of years. The Council's approach will focus improving access via links between areas of economic opportunity and their prospective workforce and markets, with sustainable transport being a priority for appropriate journeys. The need to develop access to employment opportunities and access to skills development is something that is important across Lancashire particularly in areas suffering from economic deprivation and at substantial risk from the impact of reductions in public expenditure such as Fleetwood.

	In Preston there are already high levels of congestion on principal routes into the city and, without action, these are forecast to get worse; this has the potential to hold back the competitiveness of the city and the ability to deliver economic growth. There are also congestion problems along the trunk road to Fleetwood.
Blackpool Council Local Transport Plan	In recent years there has been an upturn in visitor numbers, with most arriving by car. Transport and travel is an integral part of the visitor experience. It is recognised that there is a clear need to manage visitor traffic more effectively. The use of more sustainable modes can reduce congestion and improve environmental quality. The council will help to improve access to key destinations. Good access to Blackpool's town and district centres by all modes of transport is vital to support the local economy. The Blackpool Tramway Extension to North Station scheme has recently been granted. The scheme will improve access to the UK rail network from Blackpool, Fleetwood and Cleveleys.
Fylde Coast Highways and Transport Masterplan	The Masterplan recognises that there has also been a long held aspiration for the Poulton and Wyre Railway Society (a railway heritage society currently working towards operating trains along part of the former Fleetwood to Poulton line) to reinstate the heritage line. The railway society is exploring options for a station in Poulton-le-Fylde. In the longer term, there are aspirations to open more of the line and ultimately run commuter services from Fleetwood.
Lancashire Strategic Transport Prospectus	An important element of transport investment in Lancashire is strengthening the connections between and within the five sub-areas, including linking the west of the county with Central Lancashire/Preston through to Greater Manchester. One of these sub-areas is Blackpool and Fylde which through investing in transport infrastructure will increase employment and residential land supply, economic growth and the efficient movement of goods and people. The A585 remains a key route within the Fylde Coast highway network and is vital to the regeneration of Fleetwood and the success of the recently announced Enterprise Zone at the Hillhouse International Business Park at Thornton. Limited alternative transport options are available for this route at the moment.
Transport for the North's Strategic Transport Plan and associated Investment Programme	Improving strategic East-West connectivity for some of the North's important economic centres, including the Fylde Coast, will uncap the significant economic growth potential. Addressing East-West connectivity is a priority for TfN, and a failure to address current connectivity constraints would critically restrict the transformational growth potential of this corridor and the wider Northern economy. The visitor economy is also a key element of this corridor. Blackpool remains the UK's largest seaside resort, with economic renewal a key priority locally. The Investment Programme recognises enhanced public transport links to Fleetwood as a potential intervention to "improve connectivity and resilience to the Fylde Coast economic cluster". It is also recognised that tram-train has the potential to expand the rapid transit network across the North, adding additional capacity to the rail network. This also supports TfN's inclusive sustainable growth agenda, by better connecting communities with more reliable, frequent and sustainable public transport.
Transport for the North Strategic Development Corridors Strategic Programme Outline Cases (SPOCs)	The desired transport outcomes that need to be focussed on include: • Improving journey times, reliability and rail service frequency between Blackpool and Preston • Enhancing public transport links to Fleetwood

Draft North of England Long Term Rail Strategy	The Great North Rail Project is the collective name given to a collection of infrastructure and rail service enhancements being delivered by the rail industry. When complete, it will enable some of the benefits of the committed franchise investment to be realised. The programme includes electrifying the route between Manchester and Preston, and Preston and Blackpool North.
Blackpool Local Plan (20112- 2027)	Blackpool's overarching Connectivity strategy focuses on regeneration of the town centre and the Blackpool resort ensuring future development comes forward in locations that improve opportunities for sustainable travel between homes and jobs and reduce regular car journeys.
Fylde Local Plan (to 2032)	Policy T4 - Enhancing Sustainable Transport Choice. In order to secure the long term viability of the Borough and to allow for the expected increased movement of people and goods, the Council will work with neighbouring authorities and transport providers to improve accessibility across the Borough, improve safety and quality of life for residents and reduce the Borough's carbon footprint. This includes: • Improved public transport between the Strategic Locations for Development and nearby town centres, employment areas, tourism developments and to the rural parts of the Borough. • Measures to deliver a shift to public transport, away from car use over the plan period, and where appropriate, support, promote and implement innovative public transport initiatives.
Wyre Local Plan (2011- 2031)	The Port at Fleetwood remains a designated port and represents a unique asset in Wyre and the wider Fylde Coast offering the opportunity for a greater diversity in the job offer at Fleetwood and Wyre but also on the Fylde Coast sub-region. The Local Plan aims to support and stimulate port related activity and employment development and bring the Port back into use.

In summary, the delivery of public transport improvements to the study area is consistent with both local and national policy, and that there is a particular focus on improving connectivity into and out of the study area to the wider North West region.

2.8. Option Development and Assessment

2.8.1. Option Development

As noted above a primary objective for the re-instatement of the Poulton-le-Fylde to Fleetwood Line is to significantly improve public transport accessibility of the wider region with Fleetwood and Thornton, improving access to jobs and facilities. If reinstated, the rail route has the potential to provide a fast, more direct rail connection to the national rail network at Poulton-le-Fylde and, depending on the rail mode selected, the possibility of direct rail services from Fleetwood and the North Fylde to Preston and beyond. These considerations have driven the process of identifying, assessing and sifting options to arrive at a preferred baseline solution for each mode.

The study has focussed on three main types of rail based options for the reinstatement of the disused Poulton-le-Fylde to Fleetwood route into an operational railway:

- **A Heavy Rail Option** - reinstating the route to heavy rail standards on the former track bed between Poulton-le-Fylde and a new station on the outskirts of Fleetwood. This option will include providing an east-facing physical connection to the existing railway at Poulton-le-Fylde, to allow services to be fully integrated into the national rail system and run to and from Preston and destinations beyond.
- **A Tram (Light Rail) Option** – reinstating the track bed between Poulton-le-Fylde and the outskirts of Fleetwood as a tram route, and integrating this with the existing Blackpool Tram system via a brand new section of on-street (or adjacent to the highway) between the end of the existing track bed and Fleetwood Town Centre. Services could operate to and from the centre of Fleetwood either as an extension of the existing Blackpool tram services or as a simple light rail shuttle between Fleetwood and Poulton-le-Fylde. Due to differences in the tram and rail networks onward running beyond Poulton-le-Fylde is not possible, and no direct connection to the heavy rail corridor at Poulton-le-Fylde would be provided, with passengers having to interchange via a short walk.

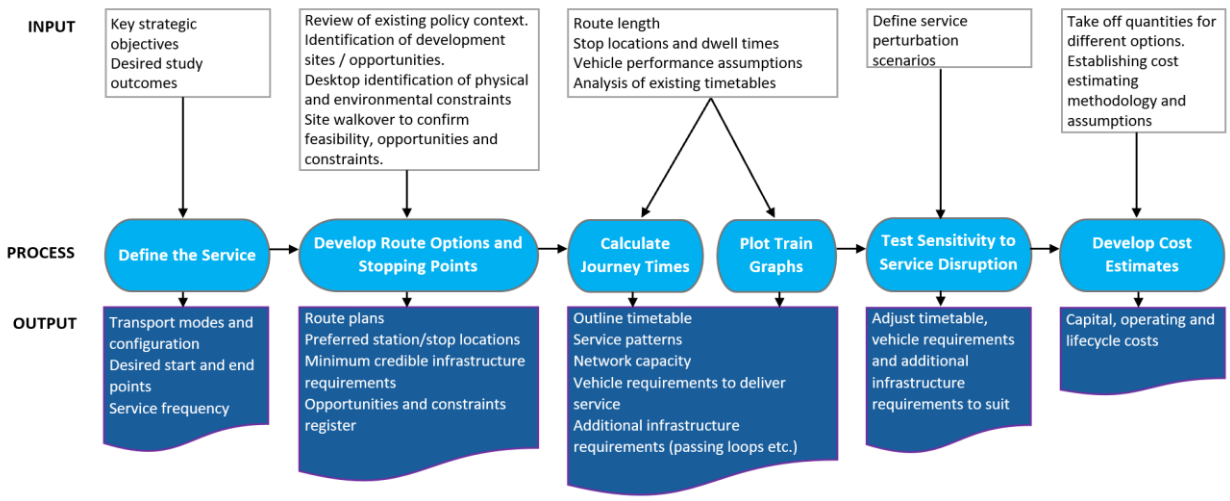
- **A Tram-Train Option** – a hybrid solution that allows direct connection to the tramway at Fleetwood as well as to the heavy rail corridor at Poulton-le-Fylde. Integrating two physically and operationally separate networks with a tram-train introduces additional complexities and compromises, as sections of the existing rail network will need modifying, due to issues such the different floor height for trams and trains requiring solutions such as split-level platforms either on the tram or the heavy rail network. Additional work would therefore be required on both the existing tram and heavy rail networks to accommodate tram-trains as well as bespoke tram-train rolling stock.

For each of these options work has been undertaken to establish a baseline solution that delivers:

- A realistic rail service in terms of journey times and frequencies that operates within network capacities and allows infrastructure requirements to be defined;
- A minimum viable solution in infrastructure terms such that the scheme costs are kept as low as reasonably practicable;
- A solution that reaches as far into Fleetwood as possible, whilst also best serving the communities between Fleetwood and Poulton-le-Fylde;
- A solution that works with and complements existing businesses as far as practicable;
- A good understanding of the likely risks and opportunities associated with each rail mode, with alternative solutions identified for potential constraints and show-stoppers.

The process for developing and assessing options for each of these modes is illustrated in Figure 2-26. The process started by taking the key strategic objectives described in section 2.5, and then using an understanding on the opportunities and constraints arising from existing infrastructure such as the old track bed, to develop preferred options around each mode that optimised service outputs and costs.

Figure 2-26: Summary of Option Development Process



The following sections provide a summary of the feasibility work undertaken against each option. Further detail on the detailed engineering feasibility work that has been undertaken against each option, including operational analysis, design and costing is provided within the engineering report in Appendix B.

2.8.2. Rail Service Requirements

Preferred service options for each mode has been developed as per Table 2-8. In considering light rail routes, a number of on-street alternative alignments were considered that move away from the disused track bed of the Poulton to Fleetwood Railway. These have been discounted as they do not deliver the significant journey time savings over existing or potential new bus-based services and are significantly more expensive and disruptive to build. The baseline light rail option therefore utilises the existing disused rail corridor with a short on-street connection to the tram network between Jameson Road and Broadwater. An alternative alignment also considered would be to utilise the disused rail corridor to Herring Arm Road, then link across to the tram via Copse Road.

Analysis of capacity on the existing Preston to Blackpool North lines shows there is capacity on this route to accommodate an additional two trains per hour per direction, which is of relevance to the Heavy Rail and Tram Train options. Additional turn around facilities may be required at Preston, although additional capacity at the station is planned as part of a wider network upgrades relating to HS2.

For a heavy rail solution, there maybe some intermediate service options that take an existing service (e.g. Preston to Ormskirk) that is otherwise stabled for a long period of time at Preston and run it through to Fleetwood, or to consider diverting existing services that run to Blackpool North (or run a double multiple unit that splits at Poulton). Such a solution, if feasible, can help to minimise the operational and vehicle leasing costs by minimising the number of additional rolling stock units required, which in turn will help to get a heavy rail service up and running for the minimum cost. This possibility is noted as an opportunity to be considered further, but does not form the basis of the case set out in this report.

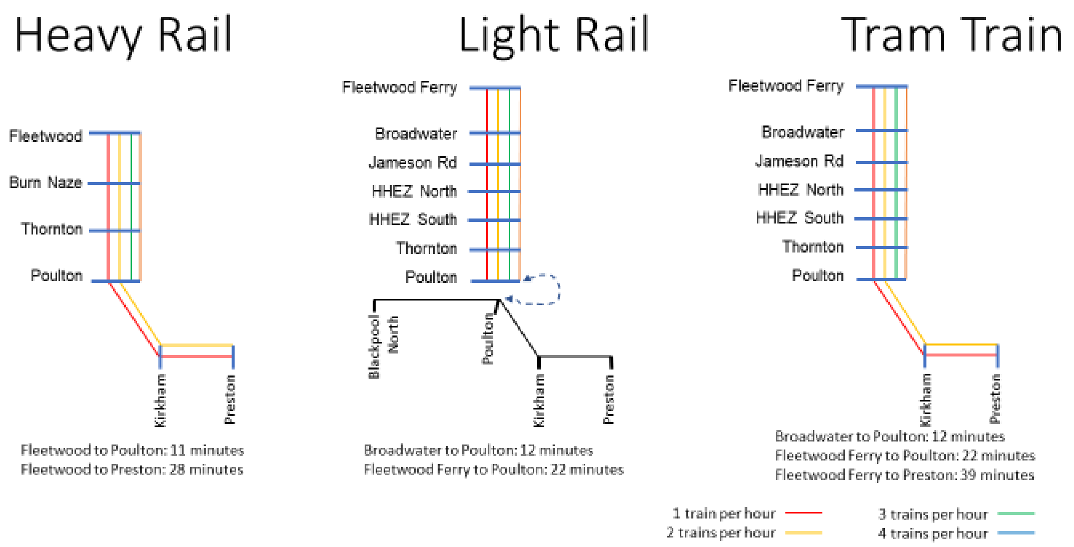
It is assumed that, due to the "line of sight" operation of the tramway, it will be straightforward to accommodate up to 4 additional services per hour between Broadwater and Fleetwood Ferry on the existing tramway.

Table 2-10: Service Assumptions

Parameter	Heavy Rail	Light Rail	Tram Train
Route	Fleetwood to Poulton and/or Preston	Fleetwood Ferry to Poulton*	Fleetwood Ferry to Poulton and/or Preston
New Stations/stops	Thornton, Burn Naze, Fleetwood	Poulton, Thornton, Hill House Enterprise Zone South, Hill House Enterprise Zone North, Jameson Rd*	Thornton, Hill House Enterprise Zone South, Hill House Enterprise Zone North, Jameson Rd Platform modifications at Poulton, Kirkham and Preston
Frequency	1, 2, 3 and 4 tph considered		
Journey Times	Modelled on estimated vehicle performance, track geometry and assumed dwell times.		
Network Capacity	Considers corridor capacity between Preston and Poulton-le-Fylde (but excludes platform capacity at Preston)	Adequate capacity on existing tram network to include additional services assumed.	As heavy rail between Poulton and Preston; as light rail for existing tram network.

The outcome of this analysis of the service, in terms of service pattern, stopping points and journey times is summarised in Figure 2-27.

Figure 2-27: Service patterns and journey times



2.8.3. Rolling Stock Requirements

Table 2-11 shows the assumed rolling stock requirements needed to operate each option.

Table 2-11: Rolling Stock Assumptions

Parameter	Heavy Rail	Light Rail	Tram Train
Vehicle Type	Up to 4-car multiple unit assumed. Dual mode (electric and diesel/electric and battery)	Bombardier Flexity 2 Tram (as per existing network). 750V DC electric	Low floor**dual voltage (25kV AC/750V DC or 25kV AC/battery) vehicle assumed of similar length and DKE to Bombardier Flexity 2
Vehicle Procurement	Leased	Purchased	Purchased
Vehicle Maintenance	In an expanded heavy rail depot (location not defined)	Expansion to tram depot assumed, either at existing site or additional lineside stabling deployed.	

** Baseline assumption to minimise impact on light rail network. High floor vehicles can also be considered to maximise potential onward running on heavy rail network.

2.8.4. Traction Power Requirements

In terms of selecting an appropriate vehicle for each mode, a key decision concerns Traction Power. The decision is no longer a straight choice between diesel or electric, as recent and rapid technological advances have been made with alternative power supplies including hybrid, battery and even hydrogen traction. Electric-diesel hybrids are already in operation elsewhere in the region, and Northern Trains will have this technology available in its Class 769 fleet. Electric-battery hybrids are also shortly to enter service on the Merseyrail network, and Northern is considering operating Class 331s with batteries. It is therefore considered a reasonable assumption that, for the Heavy Rail option at least, the branch line does not need to be electrified. If an electric-battery vehicle is chosen, the branch line is sufficiently short, and there is enough opportunity for the battery to charge when the vehicle is on an overhead line section, either running through to Preston, or pausing before turning back at Poulton-le-Fylde.

For a Light Rail solution, electrification is assumed, so that there is full compatibility with the existing tram network and tram fleet. Hybrid battery light rail options might be technically feasible and would reduce the amount of electrification required, but would require a unique fleet to the rest of the Blackpool tram networki.

For Tram-Train, the decision is a more complicated one, and is dependent on the desired extent to which the vehicle is expected to operate on the tram network. Tram trains are typically bi-mode, which can be electric-diesel, dual voltage electric or electric-battery. For the Fleetwood to Poulton line, electric-battery is a feasible option on the basis that it is also feasible for heavy rail, with two caveats;

- Vehicle maintenance is not reliant on the existing tram depot in Blackpool
- The tram-train only operates over a limited extent of the tram network (e.g. between Broadwater and Fleetwood Ferry)

If it is determined that the tram-train is to be maintained with the tram fleet at the Blackpool (which is the most likely reason for the tram-train to need to operate more extensively across the tram network), then a dual-voltage vehicle is more likely to be the preferred option, which in turn means that the Fleetwood to Poulton corridor will need to be electrified at 750V DC. Noting that this adds considerable cost to the scheme, electrification of the corridor is provided as an option rather than the baseline solution for both Heavy Rail and Tram-Train.

2.8.5. Infrastructure Requirements

Table 2-12 summarises the key infrastructure requirements needed to deliver each option. Further, more detailed technical information is provided in the appendices.

Table 2-12: Infrastructure Assumptions

Element	Heavy Rail	Light Rail	Tram Train
Reinstatement of disused railway alignment	New formation, drainage and ducting. 50% re-use of track and sleepers (for costing purposes). Lineside fencing to be made good. Single track		
Stations/Stops	100m high-floor platforms, unmanned, with shelter, lighting, CCTV, PA, and CIS. Fleetwood terminus to include pick-up/drop off, park & ride.	32m low-floor platforms with shelter, lighting, CCTV and PA.	32m low-floor platforms with shelter, lighting, CCTV and PA. Low-floor extensions required to heavy rail stations served (Poulton, Kirkham and Preston assumed).
Public Rights of Way	New footbridges required (3 no.)	Line of sight operation, so pedestrian track crossings permitted.	
Interface with neighbouring businesses	Proposals seek to work alongside, and appropriately segregate from, Alan Hargreaves to allow business and its test track to remain in situ. The Poulton and Wyre Railway Society (PWRS) has been strongly advocating the reinstatement of the railway line. Proposals seek to allow PWRS heritage features to be retained and a PWRS heritage base to not be precluded.		
Existing bridges over the railway	Assumed to be in an adequate state of repair that is the responsibility of others	To accommodate electrification, track lowering and parapet raising is assumed to be required.	
New Highway Crossings	New bridge over the railway required	Signal-controlled at-grade tram-highway junction.	
Existing Level Crossings	Thornton assumed to be re-opened as a full barrier level crossing; Hilylaid Road assumed to be closed.	Signal-controlled at-grade tram-highway junction.	
Link between reinstated railway line and Blackpool Tram network	N/A	Twin-track on-street (i.e. embedded) track assumed, with associated service diversions and modifications to property frontages.	
Link between reinstated railway line and National Rail Network at Poulton-le-Fylde	Single track with associated facing crossover between Up and Down Main; turnback track to the East of Poulton Station	No direct connection. Terminating platform with step and lift access to Station Road	As Heavy Rail
Vehicle Control and Detection	Limited signalling of the route required with associated relay room/control panel amendments.	Tram detection and comms link to control room with associated control panel amendments.	As per tram for the reinstated railway line from Poulton to Fleetwood; DC immunity required to signalling on main line. Comms link to light rail and heavy rail control rooms.
Other Heavy Rail Modifications	N/A	N/A	Some modifications assumed to raise/amend check rails according to vehicle wheel profile.

The considerations listed above are for the purposes of establishing baseline solutions for each rail mode, such that demand can be assessed and Order of Magnitude Costs (Capital, Operating and Whole Lifecycle Maintenance) can be applied to establish the economic case for reinstating the railway.

2.8.6. Tram-Train Alternatives

There is a clear decision required over vehicle configuration. The baseline assumption is that the vehicles are low-floor, as the modification of tram platforms in a highway environment to include high-floor sections and associated access is considered more problematic than adding low floor platform sections to the heavy rail network. This assumption can be re-visited at a later stage, as none of the proposals in our assessment preclude the tram-train from being a high-floor vehicle.

The baseline service assumption is that the tram-train will operate between Fleetwood Ferry and Preston. In theory, a tram-train type service could operate more widely, for example on the South Fylde line to create a Fylde Coast network, and beyond Preston. However, there is not a clear benefit to improve the strategic case for this scheme through creating a tram-train network across the Fylde Coast. Also, given the fact that the heavy rail network requires modification to accommodate tram-trains, it is important to not unfairly penalise the case for tram-train with costs other than those that provide a "like for like" comparison with the other mode options. Again, this assessment does not preclude the tram-train service from being expanded to the South Fylde line or beyond Preston.

It is also possible to re-instate the route as a tram option, as described above, and then at a later date integrate it into the heavy rail network as a tram train should this be desired, although this would require different rolling stock and on network modifications as described above.

2.8.7. Non-Rail Alternative Options

The focus of the Study has been on the three main rail options of Heavy Rail, Light Rail and Tram-Train, centred around the reinstatement of the Poulton to Fleetwood Line, and as such only limited development of non-rail based alternative options has taken place. In part this is because it is clear that non-rail modes are not able to provide the step change in connectivity, particularly over longer distances, that rail based options can provide.

Local and regional bus improvements

The towns of Thornton, Cleveleys and Fleetwood already benefit from good local transport connections focused around Blackpool. However, bus connections east-west to destinations such as Preston and Machester are relatively poor. It is therefore recommended that any bus improvement scheme should focus on providing improved connectivity to Poulton-le-Fylde station whose interchange facilities could also be improved. Improved local bus connectivity to Poulton would allow easier access to the rail network and hence improved access to Preston and Manchester. However, it should be noted that bus use is generally preferred for shorter distance journeys, and that longer distance journeys to the wider region will generally be better suited to rail

There are a range of potential options for enhancing bus connectivity. These might include;

- Developing a bus rapid transit system with dedicated bus lanes and prioritised junctions. While this could potentially provide significant improvements to current journey times, delivering such a scheme is difficult to deliver given traditional carriageway widths and competing demands for highways space including cycle lanes and on street parking. Rather than reducing congestion and improving air quality, such a scheme can therefore exacerbate problems with traffic congestion and air quality. Such schemes can therefore be both expensive to deliver and face significant local opposition.
- Providing dedicated bus links to rail stations with associated branding and on rail through ticketing. Such a service would be provided at a high frequency to tie in with the rail timetable to try and ensure as seamless an interchange as possible. In practice it is likely that this option would need additional prioritisation measures as described above in order to provide competitive journey times. Poulton-le-Fylde station is in a relatively constrained location with only limited parking, therefore providing a high-quality public transport interchange and hub at this location is not easy.
- Developing a guided busway along the alignment of the Fleetwood Branch Line instead of a heavy or light rail. This option could provide fast and reliable journey times, while allowing buses to serve a range of destinations away from the railway alignment. However developing such a guided busway is unlikely to have significantly lower capital costs than a rail based option, particularly as the width of some of the formation is constrained.

No detailed design work has been undertaken on these options as part of this study. However given that existing bus journey time from Fleetwood to Poulton-le-Fylde are in the region of 25 to 40 minutes and 80 to 100 miutes to Preston, it seems very unlikely that even very extensive bus prioritisation measures will be able to provide journey times anywhere near the journey times that a heavy rail link could provide of 11 minute to Poulton-le-Fylde and 28 minutes to Preston. What bus prioritisation and investment may provide however, are better facilities, higher frequencies, including limited stop express services, and improved reliability, such that although bus may not be competitive on journey times it is still an attractive proposition across a wide range of origin destination pairs that rail options are not be able to serve..

The region, and Blackpool in particular, already receives a high proportion of its annual visitors by coach. An enhanced coach or regional bus service again may offer some benefit, but it is unlikely to offer significant reliability and punctuality benefits or journey time savings to significantly improve accessibility or deliver modal shift from the private car.

The distance people travel is shown to be strongly correlated to income, and rail based modes which generally facilitate longer distance travel are therefore more attractive to higher income groups, while bus modes which generally operate over shorter distances can be more attractive to lower income groups.

On-street tram routes

Trams provide the opportunity to better penetrate urban areas through "on-street" running, and thus bring a rail-based service much closer to the community. However, this is very costly and disruptive to build, the choice of suitable roads to use is limited by spatial and geometrical requirements to accommodate a tram, and unless high degrees of segregation from other road users can be accommodated, will offer little or no journey time benefit over bus based alternatives. The streetscape between Poulton and Fleetwood offers very little opportunity to successfully integrate a tram into the highway.

2.8.8. Complementary Public Transport Improvements

All of the options under consideration would require integration into the wider public transport network. In particular local and regional bus services would need to be adapted to provide interchange opportunities with a reinstated railway line and maximise the accessibility for all the stations. At this stage the study has not looked in any detail at how this might be achieved or what the associated costs will be, rather the engineering development has sought to not preclude opportunities to incorporate pick-up/drop-off facilities and parking.

There is the potential with tram train options to integrate services on a reinstated Fleetwood branch into a wider scheme that might include conversion of other lines, in particular the South Fylde Line, into tram-train operation such that the reinstatement of the Fleetwood Line forms part of a much larger regional transport scheme. These kinds of proposals have not been assessed within this study, although the opportunities to develop such opportunities and the benefits of future proofing this kind of integration are noted.

2.9. Risks, Constraints and Dependencies

Analysis of all the options has been predicated on a number of assumptions that reflect the relatively high-level nature of the design work undertaken within this study. There are therefore a number of risks, constraints and dependencies that have been identified, and which a future stage of work would need to further consider in the selection of a preferred option. Further detail is provided in the engineering report in Appendix B.

2.9.1. Extent of formation, drainage and track renewals (all modes)

For the purpose of developing a cost estimate, it has been assumed that the entire corridor will need to be stripped to a designed formation, with new drainage and ducting installed and new ballast laid, and the old ballast disposed of as contaminated. Of the existing track and sleepers, 50% re-use of existing has been assumed, based on visual inspection of the asset and understanding the age of the newer sections of trackform. Further investigation is required to determine:

- How the existing corridor drains, including presence and serviceability of any existing drainage.
- Condition of the track ballast, and whether it can be cleaned and re-used.
- Condition of track and sleepers to determine if re-use potential is greater or less than assumed.

2.9.2. Interface with Lineside Businesses and Heritage Groups (all modes)

There are many properties and businesses that back onto the railway line, but two entities have a direct interaction with the railway corridor – Alan Hargreaves and the Poulton and Wyre Railway Society (PWRS). The Alan Hargreaves business is located just north of Hilylaid Road and utilises a section of the railway to test railway plant that it has repaired and refurbished. The development of options has taken the presence of this business into consideration, and there appears to be sufficient land available to accommodate the reinstated railway and allow this business to continue its operations. A key risk that will need to be considered moving forwards is the physical screening and protection required on the boundary to ensure the safe operation of the railway and this adjacent business is not compromised. There is no obvious impediment that will preclude this.

The PWRS, as well as having led the work that has resulted in the majority of the disused rail corridor being cleared and the station at Thornton being restored, has ambitions for the line to be re-opened and to showcase its heritage. PWRS is keen to retain some heritage elements within the proposals. PWRS has amassed a collection of heritage rolling stock and equipment that it wishes to display in a permanent museum on or adjacent to the railway, including some form of test track. There are definite opportunities for the reinstated railway to accommodate heritage facilities. For example, not all options require the entirety of Thornton Station to be used to operate the railway, and so there is definite potential for the station to continue as the "shop window" for the heritage aspects of the railway. There are several kilometres of single track railway required to operate each mode and service option, but the rail corridor is wide enough for twin-track railway for the majority of its length. It is therefore reasonable to consider that PWRS's aspirations can be accommodated.

2.9.3. Fleetwood Terminus Station (Heavy Rail only)

It is important to locate the Fleetwood terminus of a heavy rail solution as close as possible to Fleetwood town centre, in order to maximise its accessibility to the community it is intended to serve. To this end, a terminus station located in the vicinity of Herring Arm Road / Three Lights Public House, is the desired location, albeit that the precise siting of the station faces some challenges.

As a location, this provides a suitably central location to the population of Fleetwood, as it places approximately 10,000 residents within a 15 minute walk of the station, it is a short walk from nearby tram stops at Heathfield Road and Stanley Road, and is in close proximity to the Affinity Outlet and future residential and commercial developments in the former docks area of the town.

The challenges to providing a terminus here surround land availability. Parts of the former rail corridor north of Jameson Road have been lost over time, to the A585 for a short distance, and north of Herring Arm Road to residential, leisure, retail and industrial uses. It remains feasible to thread a route through for the railway at least as far as Herring Arm Road. It is noted that the triangle of land currently bounded by Amounderness Way to the west, Herring Arm Road to the north and the recycling centre and Fleetwood Marsh Nature Reserve to the east has been purchased with a view to it being developed (Figure 2-28). Similarly, immediately to the north of Herring Arm Road, there are plans to build new commercial space on ABP land at Fleetwood Dock (Figure 2-29).

Figure 2-28: Potential location for Fleetwood Heavy Rail terminus

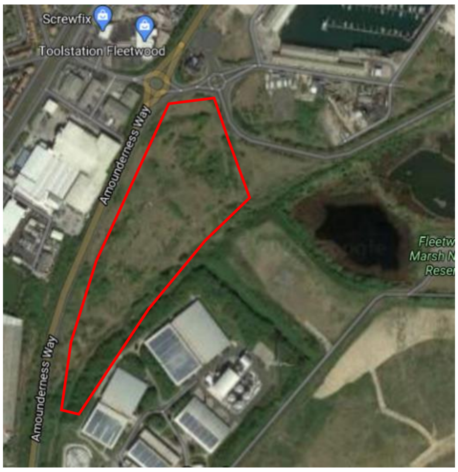


Figure 2-29: Development sites at Fleetwood Dock

The sensitivity around these plans is understood, but it is important to note the key aims of maximising rail penetration (and hence connectivity) into Fleetwood, and to complement rather than compete with existing businesses. These development proposals, and others along the corridor, could benefit considerably from an adjacent rail connection. However, given these plans there is clearly a risk that the desired penetration into Fleetwood cannot be readily achieved. It is hoped that there is a means of accommodating a single track railway and station platform in this area without compromising the plans for these developments. A potential solution is illustrated in Figure 2-30. At the next stage of development of proposals, it is important that the stakeholders concerned with these plans are consulted with a view to reaching a mutually acceptable agreement on a site for a railway station.

Figure 2-30: Potential route to Fleetwood

2.9.4. Level Crossings (Heavy Rail only)

The disused Poulton-le-Fylde to Fleetwood railway corridor has two level crossings in the Thornton area. These are located at Station Road, immediately to the south of the former Thornton Station, and at Hilylaid Road, approximately 650m to the north. With the railway line currently disused, both crossings are obviously only open to road traffic currently. In terms of the status of these crossings, it is understood that the level crossing at Thornton was re-designated in 1987 with a new order. It is possible, therefore, that this crossing has only been mothballed as opposed to being formally closed. On the other hand, Hilylaid Road does not appear to have an order so its status is less clear.

From a safety viewpoint, there has for some time been a significant push to improve the safety of level crossings. Many are being closed where opportunities exist to provide alternative means of crossing the railway, and the prevailing mood is generally to reduce the number of level crossings rather than add new or re-open existing level crossings. It is important to note, therefore, that the key risk to re-opening the railway line as a heavy rail route is whether or not these crossings can be re-opened to rail traffic, or permanently closed to highway traffic.

For the heavy rail option, it is proposed that Hilylaid Road crossing is permanently closed to traffic, and that Station Road crossing is re-opened to rail traffic. The logic behind this approach is as follows:

- Hilylaid Road – the existing highway geometry is quite poor in terms of sight lines and angle of approach, and there are suitable alternative routes available within reasonable proximity.

- Station Road – this is the main route across the railway corridor in the area, and it is not feasible to replace the crossing with a bridge over or under the railway. In terms of managing safety risks, the crossing is located immediately adjacent to the station, so all rail movements will be at very low speed. If a twin track arrangement is provided, it is possible to position the station platforms to either side of the crossing, so a train will only ever progress through the crossing from a standing start, which gives the driver the opportunity to check the crossing is clear before proceeding. As a solution, this is no less safe than a "line of sight" operation.

Figure 2-31: Hilylaid Road Level Crossing

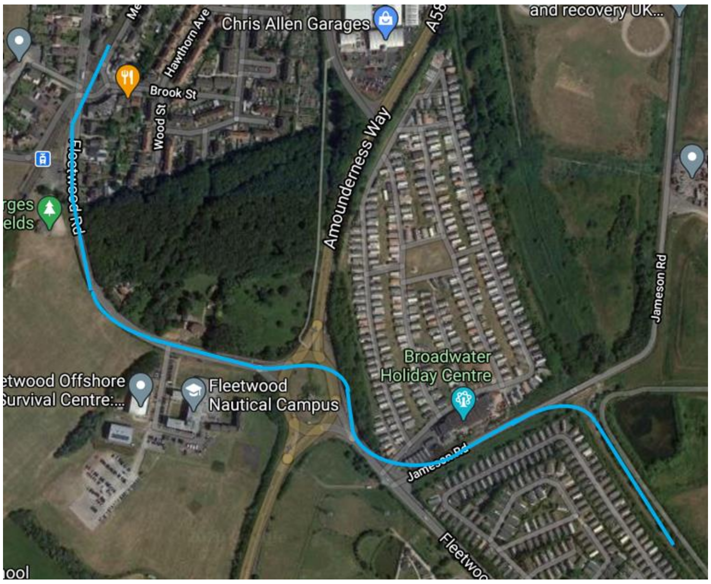
Figure 2-32: Station Road Level Crossing

As part of the Study, initial discussions with RSSB have been held to discuss the feasibility of re-opening these level crossings. The feedback received was that, whilst re-opening level crossings is generally not favoured, each case will be considered on the basis of the assessed risks specific to the location in question. Whilst this by no means guarantees that a positive decision is achievable, with careful design of the station at Thornton, including the possibility suggested above of staggering platforms to either side of the crossing so that rail vehicles only negotiate the crossing from a standing start, an acceptable solution in terms of operational safety does appear to be possible. These discussions will need to be developed further as the scheme progresses, including undertaking the appropriate risk assessment for evaluation by RSSB.

2.9.5. On-Street Connection between Existing Trackbed and Blackpool Tramway (Light Rail and Tram Train only)

The baseline assumption to connect the route of the old Fleetwood Railway with the Blackpool Tramway for the light rail and tram-train options is for an on-street route on Jameson Road and Fleetwood Road, crossing Amounderness Way in the vicinity of Eros Roundabout, and joining the tram line at Broadwater (Figure 2-33).

Figure 2-33: Proposed connection from existing route to Blackpool Tram



There are a number of significant risks and constraints associated with this, or indeed any, on-street section of tramway, and so it is important to recognise that there are several alternatives that could be considered to help overcome these. The issues to consider include:

- **Land availability** – the baseline assumption places the tramway within the road space. There is potentially space alongside Jameson Road and Fleetwood Road to position the tram adjacent to the highway. The benefits of doing this would be to ensure greater journey time reliability, reduced impact on the operation of the road network, and the possibility of only constructing a single track tramway (which would reduce costs). At this stage, it is not clear if suitable land is available, and other risks to consider include land costs.
- **Eros roundabout** – it is recognised that the roundabout is home to the Eros statue, and as such the baseline option seeks to skirt the roundabout as opposed to passing through the middle. This is assuming that land is available to do this, but more detailed work incorporating traffic modelling to properly consider the overall performance of the roundabout, will be needed to determine the optimum solution.
- **Impact on highway performance** – the on-street assumption will need to be tested in terms of highways performance through detailed traffic modelling at a future stage. This consideration is linked to land availability, with a tramway adjacent to the highway minimising the highway impact.
- **Impact on property frontages** – for this baseline assumption, there are limited properties that front Jameson Road and Fleetwood Road on this route, so as an option this is considered a fairly low risk. Whichever route is taken forward, careful consideration of the above issues of land availability and impact on the highway need to be balanced with the impact on property frontages.
- **Diversion of utility services** – A key risk with the delivery of construction of on street tramway is the location and extent of utility services, and the cost and complexity of moving and diverting them. The extent of on services and any mitigation measure required can be a key driver on the cost of delivering on street tramway.

If the risks and constraints identified above prove insurmountable for this particular route, alternative routes to be considered include:

- Jameson Road – Fleetwood Road – Amounderness Way – Copse Road
- Fleetwood Railway corridor to Three Lights/Herring Arm Road – Denham Way – Copse Road

2.9.6. Connections and Interchanges at Poulton-le-Fylde

The challenges to re-connecting a rail service on the Fleetwood to Poulton line and the existing railway through Poulton-le-Fylde is quite different for the Heavy Rail/Tram-Train options and the Light Rail option.

Heavy Rail/Tram Train

The corridor for physically re-connecting the Fleetwood line with the Blackpool North line remains. The principal constraint for achieving the connection is that the physical works will require a series of possessions of the Preston to Blackpool North lines, with associated lead times and costs. Given that the connection is immediately adjacent to an existing railway station, the signalling modifications are expected to be localised.

To protect against, and provide resilience for perturbed running, the baseline proposals provide a turnback facility immediately to the East of Poulton-le-Fylde station, regardless of service frequency (Figure 2-34).

Figure 2-34: Turnback at Poulton-le-Fylde

Under normal operating conditions, the turnback is only required where the service exceeds 2 trains per hour, so there may be an opportunity to eliminate this facility and provide a means of service recovery elsewhere at a lower cost.

Light Rail

It is not possible to physically connect the Fleetwood line to the Blackpool North line at Poulton-le-Fylde lines if the operation of the Fleetwood line is with tram technology. A new tram stop will thus be needed as close as possible to Poulton Junction/Breck Road overbridge. The track layout at Poulton, with the station being an island platform between the two running lines, will preclude a direct at-grade pedestrian connection between the tram stop and railway station. Pedestrian access between the two services will thus require passengers to exit one facility via steps or lift up to Breck Road, and then enter the other facility and descend via steps to the other platform. This interchange requires a walk and two flights of stairs and is less than ideal. It is also likely that disability legislation would require the installation of lifts at additional cost.

2.9.7. Preston Station

The situation at Preston is complex and it was beyond the scope of this study to make a detailed assessment on the impact of reinstating the Fleetwood to Poulton line on Preston Station. Parallel studies are currently being undertaken by Network Rail, HS2 Ltd and TfN, on the capacity increases needed at Preston to accommodate HS2 and other capacity enhancements. Works are likely to involve extensive remodelling, that includes using the old parcels platforms to provide additional platforms, and platform extensions to accommodate longer trains.

For the purpose of this study, the following working assumptions have been employed in order to assess feasibility and quantify costs:

- For heavy rail alternatives, the two trains per hour capacity on the line from Preston to Poulton-le-Fylde corridor can be accommodated at Preston Station. Previous studies by Jacobs in 2019 have indicated how this can be made to work in terms of forming onward services, and the timetable analysis undertaken as part of this study verifies this.
- For tram-train alternatives, the currently out-of-use parcel platforms to the west side of the station could be used for terminating tram – train services. The costs for bringing these platforms back into use has been excluded from the cost estimates, as it is recognised that HS2 plans to re-open these platforms as part of the modifications to the existing network. It is therefore a key dependency for the tram-train solution that these platforms have been re-connected to the main station.

Clearly with both of these assumptions there are risks. For the tram-train alternative in particular, the risk is increased costs to either bring these platforms into use, or to modify other platforms within the station and the associated track and signalling through which the tram-train will have to pass.

2.9.8. Additional Tram-Train Risks

It is important to recognise that tram-train technology is currently not a common feature on the UK rail network, with only one existing example in Sheffield. There are many lessons that can be learnt from that scheme, the most significant of which is that the costs and timescales associated with implementing the Sheffield example were extremely challenging to predict.

A key decision with tram – train options is whether to go for high-floor vehicles which are compatible with the heavy rail network, but not Blackpool Tram system, or low-floor vehicles that would not be consistent with the national rail network. A decision is required over what is more important – compatibility with the tram system or the heavy rail network. It is arguably simpler to add sections of low-floor platform to heavy rail stations than to build high-floor sections of platform in an urban street. This is particularly pertinent if the extent to which the tram-train is to operate is to serve (for example) Poulton-le-Fylde, Kirkham & Wesham and Preston Stations only. If, however, there are ambitions for the tram-train to operate more widely, such as across the South Fylde route to Blackpool South, then it may be prudent to opt for a high-floor solution and limit the inter-operability with the tram network.

In addition to vehicle configuration, if a tram-train is deployed in such a way that it operates on both the tram and heavy rail networks, then there are additional compatibility challenges, including:

- Bespoke vehicles – a vehicle that is compatible with Blackpool tramway and the heavy rail network will be entirely unique and bespoke. Purchase and/or lease costs are thus likely to be higher than normal, and vehicle maintenance more complex. A possible mitigation is to investigate whether the vehicle deployed in Sheffield is sufficiently compatible with the Blackpool Tramway, or can be easily modified to make it such.
- Vehicle control and detection – requiring communications links to both the tram control room and rail operating centre (presumably Manchester Rail Operations Centre). Learnings taken from the Sheffield tram-train pilot and associated learning hub are that the tram-train only communicated to one system at a time, so this can potentially be simplified (although switch-over arrangements need careful consideration)
- Driver training – drivers will not only have to be trained on driving a bespoke vehicle, but also on driving on the heavy rail network and the tram network.
- Heavy Rail Network Modifications – a tram-train is a very different type of vehicle to a normal heavy rail vehicle in terms of length, axle weight and number, structure gauge, and driving position (if low floor). Modifications are thus expected to be required to signalling (to ensure tram-trains are detected) and any switches and crossings (raised check rails may be required or alternatively swing-nose crossings installed) through which the tram-train will pass. If the tram-train solution is taken forward, further investigation is required to determine the precise modifications required.

As a concluding remark, careful consideration must therefore be given to just how far it is intended to take a tram-train service, as this will directly impact the cost of implementation in terms of acquiring vehicles, modifying the existing network, extending vehicle detection that talks to both networks, and training drivers and maintenance staff. That said, the tram-train pilot provides a valuable learning tool, and highlights a number of areas as described above where further targeted work can be undertaken to better understand and mitigate the potential challenges.

2.9.9. Approvals and Consents

The process of reinstating the Fleetwood to Poulton railway, whether as a heavy rail, light rail or tram-train service will require a clear strategy around planning approvals and statutory consents. It is normal practice, when building a new railway or tramway, to obtain a Transport and Works Act Order (TWAO), which includes authorisation for:

- The Powers to construct, alter, maintain and operate the transport system
- Compulsory powers to purchase land, or the right to use land for access
- Closure or alterations roads and footpaths

If the railway is restored as a heavy rail service, it could potentially be classed as "nationally significant" as it is more than 2km in length and will be on land that is not currently operational railway, in which case the Development Consent Order (DCO) process will apply.

A TWAO can take anything from 6 months to 2 years to complete, and a DCO is typically 15 months. It is prudent therefore to assume a period of 12-18 months is required for one of these processes.

It may be that the current legal status of the disused railway line does not require a TWAO or DCO to restore rail services to some or all of its length, and that a mixture of permitted development and local planning consents may achieve this goal. Given the number of properties and businesses that are direct neighbours to or are in the immediate vicinity of the disused railway line, this is considered unlikely.

2.10. Strategic Assessment of Options

A tailored high level Multi-Criteria Assessment Framework (MCAF) has been developed to assess the three scheme options against the project's Critical Success Factors (CSFs), which are the attributes essential for the successful delivery of the project. It is important to note that the identified critical success factors are all crucial, rather than desirable, although they are not set at a level which could exclude potential important options at this stage of the optioneering process for the Fleetwood to Poulton-le-Fylde Rail Reinstatement project. The CSFs cover a breadth of considerations across the Business Case appraisal process and are well-aligned with DfT and HM Treasury Guidance, as well as with the scheme's objectives.

In line with the guidance for this stage of assessment, the MCAF scoring has been undertaken using a 3-point qualitative scoring system with all the criteria given the same weighting. Table 2-13 sets out the alignment of the assessment criteria with the specific components of the objectives, and the data and rationale used for the judgement of scoring. The assessment is then presented in Table 2-14.

Table 2-13: Criteria for Option Assessment

Critical Success Factors	Aligned Scheme Objectives	Source of Data Used for Assessment	Rationale for Scoring
Policy Fit	Alignment with policy	Professional judgement of alignment to objectives	**+1** – the intervention is aligned with a lot of policy **0** – the interventions is aligned with some policy **-1** – the intervention has little or no alignment with policy
Contribution to Economic Growth	Improve access to and from employment, commercial, health, social and leisure facilities	Proximity to key facilities in the study area	**+1** – the intervention is in close proximity to key facilities and/or improves access **0** – neutral impact, the intervention is not in close some proximity to key facilities and does not improve access **-1** – the intervention restricts access to/from key facilities
	Support the cohesion of economic centres and regeneration areas	Improved journey times between economic centres and regeneration areas	**+1** – the intervention improves journey times **0** – neutral impact, the intervention does not improve journey times **-1** – the intervention increases journey times
Contribution to Improved Transport Network	Provide improved rail access and improved interchange with other modes	Provision of rail service and interchange	**+1** – the intervention improves local rail services and interchange **0** – neutral impact, the intervention improves local rail services or interchange **-1** – the intervention does not improve local rail services or interchange
	Provide strategic rail	Provides a rail connection to	**+1** – the intervention provides a direct rail connection to Preston, Leeds Manchester and/or Liverpool

Critical Success Factors	Aligned Scheme Objectives	Source of Data Used for Assessment	Rationale for Scoring
	connections to Preston, Leeds, Liverpool and Manchester	Liverpool and/or Manchester	**0** – neutral impact, the intervention provides an indirect rail connection to Preston, Leeds, Manchester and/or Liverpool **-1** – the intervention does not provide a rail connection to Preston, Leeds, Manchester and/or Liverpool
	Provide strategic tram connections to South Fylde	Provides a tram connection to Blackpool and other destinations in South Fylde	**1** – the intervention provides a direct tram connection to Blackpool and South Fylde **0** – neutral impact, the intervention provides an indirect tram connection Blackpool and South Fylde **-1** – the intervention does not provide a tram connection to Blackpool and South Fylde
	Address congestion on the highway and surrounding local road network	Demand for scheme option	**+1** – the intervention would reduce delays **0** – neutral impact, the intervention will have no delay change impacts **-1** – the intervention will increase delays
Contribution to Quality of Life	Address carbon emission	Demand for scheme option	**+1** – the intervention would significantly encourage modal shift away from private car **0** – neutral impact, the intervention would have a small impact on modal shift away from private car **-1** – the intervention would have no impact on modal shift away from private car
	Address deprivation and social inclusion	Proximity of scheme to areas of deprivation	**+1** – the intervention is in close proximity to areas of deprivation **0** – neutral impact, the intervention is not in close some proximity to areas of deprivation **-1** – the intervention restricts access to/from areas of deprivation
Scheme Deliverability	Affordability	Initial cost brackets	**+1** – the intervention's capital costs are expected to be below £80m **0** – the intervention's capital costs are expected to be between £80m and £110m **-1** – the intervention's capital costs are expected to be more than £110m For smaller interventions (e.g. junction improvements) professional judgement has been applied to the cost scoring.
	Engineering and environmental constraints	Professional judgement and knowledge of the scheme and local area, and scheme drawings and design	**+1** – the intervention's delivery faces no key constraints **0** – the intervention's delivery faces some constraints which may be mitigated **-1** – the intervention's delivery faces key constraints and other constraints which cannot be mitigated
	Risks and uncertainties	Professional judgement as to the key delivery risks	**+1** – the intervention's delivery faces limited delivery risks **0** – the intervention's delivery faces some delivery risks which may be mitigated **-1** – the intervention's delivery faces some key delivery risks
	Project delivery timescales	Professional judgement as to how long the	**+1** – the intervention can be delivered in under 3 years

Critical Success Factors	Aligned Scheme Objectives	Source of Data Used for Assessment	Rationale for Scoring
		project might take to deliver	**0** – the intervention can be delivered in between 3 and 5 years **-1** – the intervention is unlikely to be delivered in over 5 years
Stakeholder Support	Public acceptability	Proximity of the scheme to built-up areas, and professional judgement	**+1** – the intervention is not in proximity to built-up areas and is likely to be publicly acceptable **0** – neutral impact, the intervention is in some proximity to built-up areas and is unlikely to face significant public opposition **-1** – the intervention is in proximity to built-up areas and is likely to face public opposition

Table 2-14: Multi Criteria Assessment of Options

		Policy Fit	Contribution to Economic Growth		Contribution to Improved Transport Network				Contribution to Quality of Life		Scheme Deliverability				Stakeholder Support	Total Score
Interventions		Alignment with key policies and strategies	Improve access to and from employment, commercial, health, social and leisure facilities	Support the cohesion of economic centres and regeneration areas	Provide improved rail access and improved interchange with other modes	Provide strategic rail connections to Preston, Leeds, Liverpool and Manchester	Provide strategic tram connections to South Fylde	Address congestion on the highway and surrounding local road network	Address carbon emissions	Address deprivation and social inclusion	Affordability	Engineering and environmental constraints	Risks and Uncertainties	Project delivery Timescales	Public acceptability	
Heavy Rail	Score	+1	+1	+1	+1	+1	-1	+1	+1	+1	+1	0	0	-1	+1	8
	Summary of performance and key constraints	A heavy rail option running from Preston to Fleetwood is well aligned with all the policy objectives, particularly in terms of improving the connectivity to Preston, Leeds, Liverpool, Manchester, and the wider region beyond, as travelling to these locations would be both fast and direct. A key limitation however would be that the location of Fleetwood Station would not be particularly close to the Town Centre, and this does mean that high quality onwards connectivity by, bus, tram or active travel to/and from the station would need to be provided, which would require additional cost and funding. It may also mean that a relatively significant car park is needed at Fleetwood to support park and ride journeys. The station site does however provide good access to the enterprise zone and other potential development opportunities, and has space to be developed into a major transport hub for the area that would in time help delivery development objectives and in time shift the geographic centre of the town southwards. The engineering required to deliver heavy rail is relatively straightforward, although the re-introduction of level crossings does present some significant delivery risk. There is also the need for the proposed Preston station capacity enhancements to be delivered in order to allow additional trains to be terminated at the station. With appropriate hybrid technology, electrification of the Fleetwood line would be unnecessary and introduce a considerable cost saving to providing an electrified route. The costs for providing heavy rail are therefore relatively low, although these increase significantly if electrification is required. If diesel traction is used the carbon benefits would not be quite as significant as for an electrified or battery operated route, although there would still be considerable benefits from mode shift.														
Light Rail	Score	+1	+1	+1	+1	-1	+1	+1	+1	+1	+1	0	0	-1	+1	8
	Summary of performance	A light rail option running from Poulton-le-Fylde along the disused alignment and onto Fleetwood Town Centre via on street running and a connection with the existing tram network rail is also well aligned with all the policy objectives. While it provides less connectivity to Preston and the wider region compared to heavy rail, it does provide excellent connectivity within Fleetwood by connecting to the heart of the town centre and the existing tram														

	and key constraints	network. While offering slower journey times than heavy rail it benefits from an extra stop, further improving access to local communities. Destinations beyond Poulton would be accessed via a change onto heavy rail services at Poulton-le-Fylde, although this at the penalty of some journey time and non optimal interchange involving a short walk. The engineering required to delivery light rail is similarly as complex and expensive as it is for heavy rail; on the one hand structures and crossings required on the repurposed existing track formation will be easier to deliver, but on the other hand additional expense is required to deliver new section of on street running and connections to the existing tram system. Although hybrid battery solutions might be feasible, a light rail option is also likely to need electrification. The requirement for on street running does introduce some delivery risks, although the risks around crossings reduces. A key delivery risk for light rail														
Tram Train	Score	+1	+1	+1	+1	+1	+1	+1	+1	+1	-1	-1	-1	-1	+1	6
	Summary of performance and key constraints	A hybrid tram train option running from either Preston to Fleetwood Town Centre, or perhaps from Blackpool South via the South Fylde Line is also aligned with all the key objectives. It provides the same direct access to Fleetwood Town Centre as provided by light rail, and a similar level of connectivity as Heavy Rail to places like Preston although with slightly slower journey times. While tram-train is likely to provide the best connectivity, the delivery of tram-train option is however more costly, risky and is therefore likely to take longer to implement. As with light rail it requires the delivery of new street running sections, while also requiring the delivery of new infrastructure on the existing rail network including at Preston. Tram Train technology is still relatively immature, with particular risks associated with safely designing stations on the heavy rail network with low platforms, something that would be a novel solution in the UK.														
Improved bus connectivity	Score	+1	+1	0	0	-1	-1	0	0	0	+1	+1	+1	+1	0	4
	Summary of performance and key constraints	Improving bus services to Fleetwood from across the wider region will deliver some of the policy objectives. However, improved bus links generally favour shorter journeys. Buses will not however deliver the same level of connectivity to Preston or the South Fylde as any of the rail or light rail options as there would either have to be a change of mode at Poulton or a long bus journey. Buses are also inherently less reliable and less attractive to many users as a form of travel. Given the relative lack of improved connectivity that bus improvement offer, this option would therefore deliver less economic growth, social inclusion and provide fewer opportunities to support transformational growth and development. While the delivery of bus improvements is relatively low risk, funding and operating support would likely be required.														

2.11. Strategic Case Summary and Conclusions

Context and Case for Intervention

Although the wider Wyre, Blackpool and Fylde region contains some areas of affluence and growth, it is clear from the socio economic analysis that there are parts of Fleetwood and the North Fylde Coast that have some areas suffering from high unemployment, low earnings and high deprivation. There will of course be a wide and complex set of reasons behind this relating to changing employment patterns and industries, but undoubtedly poor transport links to the region have contributed to limited growth and economic development, especially when compared to other better connected parts of the region.

Although Fleetwood is connected to Blackpool by the Blackpool Tram system, journey times are relatively slow. More particularly the tram connections only provide links along the coast; it does not provide easy connectivity to Fleetwood from the wider region, including the major population and employment centres such as Preston, Manchester and Leeds. Journey time analysis shows that accessing Fleetwood by public transport from places as near as Poulton can take 30 to 40 minutes, while reaching Preston can take over an hour. Alongside Highways England's programme of works to improve highway connectivity into the region, given relatively low levels of car ownership a key priority is therefore to also improve public transport connections into the region.

Improved accessibility, particularly if it can be provided to major centres of population and employment will support meeting wider local and national objectives to increase accessibility to employment, education and leisure services, supporting development of new jobs and improving tourist opportunities. It will also support local objectives to provide new housing and development opportunities that can help reduce deprivation in the area.

Options under consideration

To meet these requirements the study has considered three groups of options to re-instate the Poulton to Fleetwood Railway; reinstatement as a heavy rail route, a light rail route, or a hybrid tram-train route. All of these options are technically deliverable, and all the options would provide a transformative step change in connectivity to the region.

The heavy rail has the significant advantage of being able to serve wider destinations such as Preston and beyond directly. This is a key objective for the scheme and will allow transformative journey times from Fleetwood and Thornton to key economic centres such as Preston, Manchester or Leeds. It is constrained however to serving Fleetwood from a location that, while near to some significant development opportunities, is some distance from the Fleetwood Town Centre. It also contains some delivery risk around the re-instatement of level crossings.

The light rail has the significant advantage of being able to serve the heart of Fleetwood and integrate with the existing Blackpool Tram network. This will make it much easier for residents of Fleetwood to access the system, although users will be required to make a less than optimal connection at Poulton-le-Fylde to access the rest of the rail network for onward travel to key economic centres in the wider region. It also contains some delivery risk around the delivery of new on-street sections.

Tram-train may offer the best of both worlds. It is however more expensive and contains some considerable delivery risk, particularly in relation to making the necessary network adaptations and safety case to accommodate the different sized platforms on the two systems, and the uniqueness of the required vehicles.

While improving bus connectivity in the area may be welcomed, and is much more affordable, it does not provide the step change in connectivity as provided by any of the rail options. As such it is unlikely to drive the transformative economic impacts and development opportunities that are considered crucial to the success of the scheme.

3. Economic Case

3.1. Introduction to the Economic Case

The purpose of the economic case is to demonstrate the value for money of the scheme through an assessment of the scheme's likely costs and benefits. A full value for money assessment includes assessing all the economic, environmental, social and distributional impacts of a proposal, using either qualitative, quantitative or monetised information. These impacts are not limited to those directly impacting on the measured economy, nor to those which can be monetised.

Within an SOBC and at this early stage of the schemes development it is not possible to accurately assess all of these impacts, either to assess the overall value for money of the scheme as a whole or to refine and optimise different options. Instead and, in line with DfT's RYR and TAG[27] guidance, this chapter presents a high level and proportionate assessment of the likely benefits, using pre-existing evidence sources to assess the likely scale of impact of the overall scheme.

At this stage of the scheme's development, a key limitation to undertaking an accurate quantitative assessment of the likely economic benefits is the availability of detailed demand forecasts. This requires the use of a multi-modal demand forecast model of the study area, populated with data on current trip patterns and journey opportunities that can assess any changes in people's travel choices, including the rerouting and redistribution of trips, mode shift, and trip generation. Unfortunately, at this early stage of the scheme's development no such model currently exists and developing such a model is out of scope of the current study.

In line with the RYR guidance, the economic case within this SOBC therefore presents the likely scale of benefits across different types of categories that would be needed to deliver value for money against the scheme's costs. The expected key drivers for different types of benefits are presented, together with the key assumptions and conditions that would be needed to drive those benefit drivers to achieve a given value for money position against the scheme's costs. The study considers the likely plausibility of those assumptions drawing on high level analysis, context of what is known about the study area, or any evidence and benchmarking from similar kinds of schemes where available.

The key parameters that will drive the scheme's value for money, and which therefore also provide the focus of the economic case analysis within this chapter, are as follows;

- **Costs:** The scheme's cost include both the initial capital costs of construction, and the ongoing costs of operation including maintenance and renewal.
- **Demand:** The likely level of demand using the re-instated railway is a critical driver of both benefit and revenues. The more people use the railway the higher the likely benefits.
- **Time Savings:** The amount of time saved by people using the railway over alternatives modes drives benefits. The greater the average time saving the higher the likely benefits.
- **Mode Shift:** Encouraging mode shift from road to rail benefits not only benefits those users who experience faster journey times, but also the wider community from decreased congestion, improved air quality and reduced carbon emissions. Increased mode shift will generate increased benefits.
- **Wider Economic Impacts:** Wider impacts are the economic productivity gains resulting from improvements in how well businesses are connected to each other as well as potential employees, and benefits arising from structural changes as businesses and households relocate. For some types of scheme, particularly those that are providing transformative opportunities resulting in structural changes to the locations of homes and businesses, these wider benefits can be a key driver the business case.
- **Revenue:** Any farebox revenue raised by passengers using the scheme is used to offset the scheme costs.

[27] https://www.gov.uk/guidance/transport-analysis-guidance-tag

3.1.1. DfT's TAG Benefit Categories

DfT's standard TAG approach to appraisal considers the impacts to transport users, to transport providers or operators, and the impacts to the public accounts in terms of the scheme costs and potential need for public subsidy. The transport user impacts typically assess changes in journey times and demand that would usually be determined by a detailed transport model of the study area, while transport provider impacts would account for investment and operating costs offset by fare revenues. For a rail scheme of this type, a typical economic appraisal could be broken down into the following component benefit categories:

Scheme users:

- **Journey times:** the creation of new routes and rail services enables some travellers to reduce their end-to-end journey times or journey costs by switching to the new services;
- **Journey quality:** perceived user benefits from new facilities or facilities that are better than those they previously used;
- **Journey reliability:** reductions in travel time variability, where new public transport services create alternative options that may mitigate late running of existing timetabled services or enable travellers to avoid unexpected delays on highways.

Non-users:

- **Highway decongestion and road safety:** the reductions in delay and proportional accident savings to highway users as a result of some highways users switching to rail;
- **Environmental impacts:** the changes in air quality, noise and greenhouse gas emissions and other marginal external impacts as a result of some highways users switching to rail;
- **Crowding impacts:** perceived journey quality impacts across the rest of the public transport network as a result of some users switching to the new rail services;
- **Option and non-use values:** willingness-to-pay for the availability of the new rail options, even if it is never personally used for altruistic reasons or reasons of indirect use.

Transport operators:

- **Fare revenue:** demand-related changes in fare revenues;
- **Operational costs:** all costs associated with operating the new rail services and facilities;

Public Accounts:

- **Capital costs:** all costs associated with implementing the scheme;
- **Indirect tax:** changes in fuel duty paid, in line with changes in highways fuel consumption; and
- **Changes in infrastructure investments:** marginal changes in future maintenance and renewals costs on existing infrastructure due to changing levels of 'wear and tear' as a result of mode shift.

Wider Economic Impacts:

- **Induced investment:** increased output in imperfectly competitive markets;
- **Employment effects:** changes in labour supply, i.e. more people working, or where jobs are located; and
- **Productivity impacts:** static agglomeration.

A full economic appraisal of these benefits and costs would enable the quantification of the Benefit to Cost Ratio (BCR) for the scheme, which would then provide perspective on the scheme's overall Value for Money (VfM) position. Table 3-1 presents a summary of the DfT's VFM framework categories.

Table 3-1: DfT Value for Money Categories

VfM Category	Implied by
Very High	BCR greater than or equal to 4
High	BCR between 2 and 4
Medium	BCR between 1.5 and 2
Low	BCR between 1 and 1.5
Poor	BCR between 0 and 1
Very Poor	BCR less than or equal to 0

The analysis presented in this chapter focuses on understanding and assessing the assumptions that would need to be made for the scheme to achieve a BCR greater than 1.5 and therefore at least a medium value for money rating.

3.1.2. Structure of the Economic Case

The economic case is structured around understanding the range of assumptions that would be needed to drive a medium value for money assessment which implies a benefit cost ratio of at least 1.5. For each parameter identified in section 3.1 above, benchmarked analysis has been undertaken to understand the potential range of plausible assumptions that might reasonably be expected. These high level assumptions have then be used tested within a TAG compliant appraisal process to understand the likelihood of the scheme achieving value for money in relation to some high level cost estimates.

As such the economic case is structured around the following sections:

- Analysis of costs
- Analysis of demand
- Analysis of journey time savings
- Analysis of mode shift benefits
- Analysis of wider economic impacts
- Analysis of other impacts
- Analysis of revenue potential
- Economic appraisal findings
- Summary and conclusions

3.2. Costs

3.2.1. Capital Cost of Construction

High-level estimates of the capital costs of building each of the main options have been prepared by Faithful and Gould using the assumptions summarised in Table 3-2. Further detail on the cost estimation process is provided in the the engineering report in Appendix B.

Table 3-2: Assumptions used to derive capital cost estimates

Item	Elements	Units
Track	Formation, drainage, ballast, sleepers, rails	Per linear metre
	Switches and Crossings	Each
	Embedded on-street slab track (for tram and tram-train only)	Per linear metre
Lineside Equipment	Comms and LV power cabling, ducting, fencing	Per linear metre
Buried Services	Required diversions for on-street tram section	Lump sum estimate
Electrification	OLE, sub-stations, HV cabling	Per linear metre
Stations/Stops	Platforms, including shelter, lighting, CCTV, passenger information, signage	Per platform
Railway Crossings	New footbridges/highway bridges	Each
	Strengthening / parapet works (existing bridges)	Each
	Level Crossings (heavy rail only)	Each
	Highway Junctions (Light rail/tram-train only)	Each
Signalling / Train Control	Heavy Rail signalling	Rate per SEU
	Tram/Tram-Train control on new corridor	Lump sum estimate
	Control Room/Control Panel changes	Lump sum estimate
Existing network tie-ins	Additional switches and crossings and associated signalling; modifications to existing track, OLE and lineside cabling; possession costs.	Lump sum estimate
Depots and Stabling	Provision for cleaning, maintaining and stabling additional vehicles required to operate the service	Lump sum “do something” estimate + per vehicle uplift
Land Acquisition	For re-instating disused railway line	Excluded (assumed not required
	For tram / tram-train connection between disused rail corridor and tram corridor	Lump sum estimate
Extras	Design Costs	10% Uplift
	Preliminaries	25% Uplift

Using the assumptions above, a high-level capital cost estimate for each option was developed, with the outputs summarised in Table 3-3. At this stage the cost estimates are presented at Q4 2020 prices and exclude any contingency and risk allowance.

Table 3-3: Estimated capital costs of construction (Q4, 2020 prices) excluding contingency and risk

Option		1 train per hour	2 train per hour	3 train per hour	4 train per hour
Heavy Rail	Baseline Option (non-electrified)	£74m	£77m	£84m	£88m
	Electrified	£104m	£106m	£121m	£127m
Light Rail	Baseline Option (electrified)	£78m	£79m	£90m	£96m
Tram Train	Baseline Option (non-electrified)	£116m	£118m	£119m	£120m
	Electrified	£136m	£138m	£149m	£154m

Additional costs for providing Fleetwood Heavy Rail Station with park and ride facilities are estimated to be £1m.

The cost differential between the different service frequencies (1, 2, 3 and 4 trains per hour) are the result of two key cost drivers:

- The higher frequency services require more vehicles, so an increased allowance has been included for modifying existing depots to accommodate the extra vehicles.
- For 3 and 4 trains per hour services on the heavy rail options, passing loops will be required. These loops will need to be twice as long for 4tph as 3tph. The positions of these loops will also require additional platforms at stations/stops.

The cost differential between heavy rail, light rail and tram train are the result of the following cost drivers:

- **Heavy rail.** Heavy rail is generally less expensive as the route length is shorter, has fewer stations, and electrification is not essential. It does incur greater costs at Station Road Level Crossing, at Hill House Enterprise Zone (where a new road over rail bridge would be required) and at public rights-of-way (3 no.) where footbridges would be required. It would also incur the costs of the reinstated junction and turnback at Poulton, including an allowance for possessions.
- **Light rail.** Light rail would incur the additional costs of electrification of the corridor, plus significant additional costs for the twin-track on-street section connecting the old track bed of the Fleetwood Line to the Blackpool Tramway (which includes allowances for land acquisition, service diversions, traffic management and modifying property access). It would also have additional costs to modify the tramway at its junction, and additional stops at Hill House Enterprise Zone and Poulton. The latter stop would require steps, a lift and modification to Breck Road Bridge to form the access. The cost of providing light rail stops is however lower cost than the cost of providing heavy rail stations, and the costs of a signal controlled highway junction at Station Road in Thornton is much lower than for a full barrier level crossing needed in a heavy rail option. Additionally, light rail would not incur the significant costs associated with reinstating Poulton Junction, nor building a turnback at Poulton-le-Fylde.
- **Tram-Train.** Tram-Train costs are likely to be identical to those for the tram between Poulton-le-Fylde and Fleetwood, including the connection to the tram network. However, for the baseline option electrification costs are excluded on the basis that hybrid battery-based solutions might be used. At Poulton-le-Fylde, tram-train would not incur the costs of a separated tram stop, but would incur the same costs as the heavy rail options for reinstating Poulton junction, building turnback facilities, and including an allowance for possessions. Tram-train would also incur additional costs at Poulton-le-Fylde, Kirkham & Wesham and Preston stations for providing a low-floor section of platform at each of these stations, and a per unit cost for modifying every signal, and track switch and crossing between Poulton-le-Fylde and Preston. Further additional costs for tram train would be incurred for providing communications connections that can interface with both networks (Heavy Rail and Tram options have costs for a single connection), and an uplift on depot costs to reflect the additional complexity and equipment required for a bespoke vehicle.

In addition to these high-level differences between each service frequency and mode, there are some more general risks and opportunities associated with the way the cost estimates have been prepared. In summary:

- **Track costs:** There is an intact single track railway for the majority of the disused rail corridor. For all modes, we've assumed the route needs stripping to formation, with new drainage installed and 50% re-use of rail and sleepers. Further investigation of the existing corridor in terms of structural integrity, drainage performance and adequacy of existing rail and sleepers will allow this assumption to be tested and amended (all modes). In particular for light rail and tram-train, a lesser requirement may emerge. The Risk/Opportunity (RAG) rating is therefore low.
- **Track costs for tram-train:** Assumed that every point end and check rail between Poulton and Preston will need to be modified (either raised check rails or swing nose crossings required as discussed in the Tram Train Learning Hub). Any modifications to replace sections of existing tramway with a deeper groove, which was required on the Sheffield pilot, have been excluded. The Risk/Opportunity (RAG) rating is therefore medium
- **On-Street tramway (tram and tram-train):** The estimates for the 850m on-street section of tramway between Jameson Road and Broadwater include lump sum allowances of £5M for service diversions and £5M for land and accommodation works for adjacent properties. Although the area through which this passes has very limited property frontages and highway space including verges is reasonable,

experience of on-street tramways elsewhere in the country highlights a significant risk that these costs can escalate. The Risk/Opportunity (RAG) rating is therefore high.

- **Lineside equipment:** New cabling and ducting will be required through the route. There is the potential for fluctuations in rates per linear metre for installation, and the unit cost of equipment and cabling may vary. At this stage, the precise quantity of lineside or track detection equipment is not defined. The Risk/Opportunity (RAG) rating is therefore medium.
- **Lineside fencing:** The cost estimates currently assume 50% of the existing lineside boundary fencing will need to be replaced for all modes. Clearly at future stages of the project this can be refined to reflect detailed investigations of the adequacy of existing perimeter fencing. Requirements will be more stringent for heavy rail to guarantee segregation, and for tram and tram-train requirements will be more focused on sight lines for line-of-sight operation. The Risk/Opportunity (RAG) rating is therefore medium.
- **Electrification:** Rates applied from recent projects. The Risk/Opportunity (RAG) rating is therefore low.
- **Stations/Stops:** Cost estimates assume a very basic level of provision for an unmanned station. Potential risk that a higher specification is required. The Risk/Opportunity (RAG) rating is therefore medium.
- **Railway Crossings:** Footbridges (heavy rail only) – standard span/height steel bridges assumed. The Risk/Opportunity (RAG) rating is therefore low.
- **Railway Crossings:** Road bridges (heavy rail only) – deck replacement at Jameson Road and new bridge over railway in HHEZ assumed, with a unit cost applied (based on data from similar projects) as opposed to an itemised breakdown. Assessment of Jameson Road bridge required to determine if replacement of strengthening required; HHEZ road bridge can be developed as a concept to allow price to be established. The Risk/Opportunity (RAG) rating is therefore medium.
- **Railway Crossings:** Level Crossings (heavy rail only) – very difficult to establish a potential cost for these works, so an estimate of £2M has been included for reinstating Thornton and closing Hilylaid Road crossing. The Risk/Opportunity (RAG) rating is therefore medium.
- **Railway Crossings:** Signal Controlled junctions (tram and tram-train) – each highway crossing has been assumed to be a complex traffic signal installation for the purpose of applying costs. The Risk/Opportunity (RAG) rating is therefore low.
- **Signalling and Train Control:** Heavy Rail – The application of Signalling Equivalent Units (SEUs) is a standard practice for establishing costs, and the sums involved are large. The main opportunity surrounds the passive provision incorporated into the existing signalling at Poulton for the reinstatement of Poulton Junction. For amendments to existing signal panel(s), a sum of £5M has been allowed. This assumes there is space within an existing panel for the reinstated line. The Risk/Opportunity (RAG) rating is therefore medium to high.
- **Signalling and Train Control - Light Rail:** The assumption is the existing tram control system can be added to/extended to pick up the new line, and a value of £10M has been applied The Risk/Opportunity (RAG) rating is therefore medium.
- **Signalling and Train Control - Tram Train:** For the reinstated section of railway, the same train control costs are applied as for Light Rail. There are also costs assumed for modifications at each signal between Preston and Poulton, to which we've applied a 50% SEU rate. Extra cost has also been allowed to ensure the lineside communications for tram-train can link to both networks. There is considerable scope for refining these assumptions, with some focused work to develop the tram-train solution. The Risk/Opportunity (RAG) rating is therefore high.
- **Existing network tie-ins:** For both the tie-ins to the existing tramway at Broadwater (light rail and tram-train) and to the heavy rail network at Poulton (heavy rail and tram-train), high-level unit costs have been applied. There is considerable opportunity to refine these as the design for a chosen mode is developed. The Risk/Opportunity (RAG) rating is therefore high.
- **Depots and Stabling:** The working assumption for all modes is that an existing facility can be appropriately expanded to accommodate the new vehicles. The risk is that a new facility is required. The opportunity is that passive provision already exists. Further development of the scheme should consider vehicle maintenance strategy to refine the requirements. The Risk/Opportunity (RAG) rating is therefore high.
- **Land Acquisition:** High-level assumptions only at this stage. The Risk/Opportunity (RAG) rating is therefore medium.
- **Design and Preliminaries:** These figures represent normal costs associated with the design and build phase of the scheme. They do not include the costs of the future phases of option development to get

from SOBC through to OBC (outline business case) and FBC (final busines case) and the procurement of design and build services.

Risk, Uncertainty and Optimism Bias

The costs presented in Table 3-3 do not include any contingency for risk, uncertainty, or optimism bias. DfT's TAG guidance[28]: sets out that for a project at this early stage of development (known as GRIP 1[29]) that an optimism bias uplift of 64% should be applied to the net capital costs. On this basis the capital costs of construction including a provision for optimism bias of 64% are shown in Table 3-4 below.

Table 3-4: Estimated capital costs of construction (Q4, 2020 prices) including optimism bias

Option		1 train per hour	2 train per hour	3 train per hour	4 train per hour
Heavy Rail	Baseline Option (non-electrified)	£121m	£126m	£138m	£144m
	Electrified	£171m	£174m	£198m	£208m
Light Rail	Baseline Option (electrified)	£128m	£130m	£148m	£157m
Tram Train	Baseline Option (non-electrified)	£190m	£194m	£195m	£197m
	Electrified	£223m	£236m	£244m	£253m

3.2.2. Rolling Stock Costs

This study assumes that heavy rail rolling stock would be procured on a lease while light rail or hybrid tram-train rolling stock would be purchased. Heavy rail lease costs are based on a 4 car class 331 and assumed to be £14k per month per unit. This study also assumes the lease costs for either diesel or electric heavy rail rolling stock would effectively be comparable. Tram purchase costs are assumed to be £2.5m for light rail and £3.5m for tram-train, for which considerable extra technical complexity is needed.

On this basis the estimated costs of leasing and/or purchasing rolling stock are summarised in Table 3-5.

Table 3-5: Rolling stock cost summaries (Q4, 2020 prices) excluding contingency and risk

Option	Cost Type	Train Frequency			
		1 tph	2 tph	3 tph	4 tph
Heavy Rail (Fleetwood to Preston)	Lease costs (per annum)	£336k pa (2 units)	£504k pa (3 units)	£672k pa (4 unit)	£840k pa (5 units)
Light Rail (Fleetwood Ferry to Poulton-le-Fylde)	Purchase costs	£2.5m (1 units)	£5m (2 unit)	£7.5m (3 unit)	£10m (4 units)
Tram Train (Fleetwood Ferry to Poulton-le-Fylde)	Purchase costs	£6.9m (2 units)	£13.8m (4 units)	£17.2m (5 units)	£17.2m (5 units)

28 https://www.gov.uk/government/publications/webtag-tag-unit-a5-3-rail-appraisal-may-2018
29 https://www.networkrail.co.uk/wp-content/uploads/2018/02/Investing-in-the-Network.pdf

It can be seen that the cost of tram train vehicles is considerably more than that required for light rail vehicles, both because more vehicles are required and because the unit costs of tram train are higher as a result of the relatively bespoke technical requirements.

Risk, Uncertainty and Optimism Bias

The costs presented in Table 3-5 do not include any contingency for risk, uncertainty, or optimism bias. As both leasing or purchasing rolling stock are viable options, for the purpose of optimism bias assumptions, the rolling stock costs for all options are considered to be operating costs, for which TAG recommends an optimism bias uplift of 41%. On this basis the rolling stock costs including optimism bias are shown in Table 3-6 below.

Table 3-6: Rolling stock cost summaries (Q4, 2020 prices) including optimism bias

Option	Cost Type	Train Frequency			
		1 tph	2 tph	3 tph	4 tph
Heavy Rail (Fleetwood to Preston)	Lease costs (per annum)	£474k pa (2 units)	£711k pa (3 units)	£948k pa (4 unit)	£1,184k pa (5 units)
Light Rail (Fleetwood Ferry to Poulton-le-Fylde)	Purchase costs	£3.5m (1 units)	£7.1m (2 unit)	£10.6m (3 unit)	£14.1m (4 units)
Tram Train (Fleetwood Ferry to Preston)	Purchase costs	£9.7m (2 units)	£19.5m (4 units)	£24.3m (5 units)	£24.3m (5 units)

3.2.3. Maintenance and renewal costs

It is assumed that the ongoing maintenance and renewals costs for tack, signalling and stations will be 1% of the original capital costs per annum.

Long term maintenance and renewal costs for rolling stock is based around the following assumptions:

- For leased vehicles (heavy rail) it is assumed that long term maintenance costs are included within the lease costs (so no additional lifecycle maintenance costs would be incurred); and
- For purchased vehicles (light rail and tram-train) it is assumed that full fleet replacement will be undertaken after 30 years. There is potential for some costs associated with maintenance over the fleets' 30-year lifespan, but at this stage, the appraisal has not separately estimated these costs.

Further to the above, in accordance to TAG guidance all maintenance and renewal costs have been uplifted by a further 41% to account for optimism bias.

3.2.4. Present Value of Costs

The appraisal of costs follows the approach set out in TAG Unit A1.2 – Scheme Costs. The general assumptions relevant for the economic assessment of costs are summarised as follows.

- The cost estimates presented in the sections above are provided at Q4 2020 prices and as factor costs. For the appraisal all scheme costs are rebased to 2010 prices using the GDP deflator, adjusted to market prices, and discounted to give Present Value Costs (PVC) in line with WebTAG guidance[30];
- The appraisal assumes that construction commences in 2024 and takes three years, with the capital costs distributed evenly from 2024/25 to 2026/27;
- The assumed scheme opening year is 2027, with a 60-year appraisal period ending in 2086;
- For leased rolling stock, capital lease costs (£/annum) are assumed fixed in nominal terms over the appraisal period.
- For purchased rolling stock, the costs assessment assumes renewal after 30 years;

[30] https://www.gov.uk/government/publications/webtag-tag-unit-a1-2-scheme-costs-july-2017

- The total whole-life maintenance and renewal costs are estimated as being 1% of capital costs per annum starting in assumed opening year 2027;
- Operating costs, which would vary depending on service frequencies, have not been estimated at this stage. Therefore, instead of accounting for operating costs for each option, the starting point for this appraisal is to assume that all operational costs, including drivers and station staff, would be fully covered by revenue; and
- This appraisal considers the potential scales of revenue impacts at high-level, but given the assumption that revenue would cover operational costs, the initial appraisal and discussion around value for money assumes there will be no revenue impact on the BCR.

In addition to the costs adjustments to convert to present values, as outlined above, this appraisal includes optimism bias at the following rates, in line with rail network enhancement projects at GRIP Stage 1[31]:

- Capital costs: 64% of present value capital expenditure;
- Lifecycle costs: 41% of present value maintenance, renewal and operational costs;
- Rolling stock costs (lease or purchase): 41% – the Level 1 rate for operational expenditure.

At this early design stage, it is assumed that the high optimism bias should sufficiently account for cost uncertainty including the effects of construction price inflation or real price growth for operational or rolling stock costs. Also at this early stage, the appraisal is based on the lowest costs per each option, assuming a minimum one train per hour service. As a Table 3-7 below summarises the total present value costs, including optimism bias, over the 60-year appraisal period.

Table 3-7: Present values of costs including optimism bias (£m, 2010 prices and values)

Option	Capital costs	Rolling stock costs	Maintenance, renewal costs	Total PVC
Heavy Rail: Non-Electrified (1 tph Fleetwood to Preston)	£131.8m	£13.7m	£30.3m	£175.8m
Heavy Rail: Electrified (1 tph Fleetwood to Preston)	£185.2m	£13.7m	£42.5m	£241.5m
Light Rail: Electrified (1 tph Fleetwood Ferry to Poulton-le-Fylde)	£138.9m	£5.2m	£31.9m	£176.0m
Tram Train: Non-Electrified (1 tph Fleetwood Ferry to Preston)	£206.6m	£14.3m	£47.5m	£268.3m

3.2.5. Additional Operating costs

Although lease and some maintenance costs are included in the present value of costs presented in Table 3-7 above, it should be noted that daily operating costs, including staff, fuel and day to day maintenance costs have not been included.

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To further understand the potential scale of operating costs, a high level operating cost estimate has also been derived from Transport for the North's Rail Operating Cost Model. This model estimates operating costs based on assumptions around the unit rates for the different elements of operating costs, and then applies these unit rates to vehicle mileages. It does not take fully account for the detailed staff and vehicle rostering requirements but provides a good estimate on the expected scale of operating costs.

Table 3-8 shows the annual operating costs for 2026/27 forecast by the TfN cost model for a three car electric DMU operating between Fleetwood and Preston at 1, 2 and 4 trains per hour. In practice the heavy rail options will a require a battery hybrid unit, but the overall costs should be similar. The costs in Table 3-8 are presented without any optimism bias or risk adjustment and are presented in 2020 prices.

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[31] https://www.gov.uk/government/publications/webtag-tag-unit-a5-3-rail-appraisal-may-2018

This shows that annual operating costs, including lease costs, would be in the region of £3m per annum for 1 train per hour, increasing to £5m and £11m for 2 and 4 trains per hour.

It can also be seen that staff costs are the biggest cost drivers, accounting for nearly half of the overall operating costs. The remaining costs are mainly related to the lease and maintenance costs, which are already included within the PVC cost estimate presented in Table 3-7.

The costs of just running a shuttle between Poulton-le-Fylde and Fleetwood are about 40% of the costs of running to Preston. Such a service therefore needs to raise at least £1.2m of annual revenue between Fleetwood and Poulton in order for it to cover its annual operating and lease costs. Further discussion on this is presented in sections 3.8 and 3.9.6 below.

Table 3-8: 2026/27 Annual operating costs (2020 factor prices) derived from TfN Operating Cost Model (for Fleetwood to Preston (excludes optimism bias)

Heavy Rail Operating Costs (3 car EMU)	1 tph	2 tph	4 tph
Track Access Costs	£0.1m	£0.2m	£0.4m
Electricity Costs	£0.6m	£1.2m	£2.5m
Diesel costs	£0.0m	£0.0m	£0.0m
Capital lease costs	£0.6m	£0.8m	£1.7m
Non-capital lease costs	£0.3m	£0.4m	£0.8m
Maintenance costs	£0.3m	£0.5m	£1.0m
Staff costs	£1.1m	£2.2m	£4.4m
Variable and Fixed Overhead costs	£0.0m	£0.0m	£0.0m
TOTAL	£2.9m	£5.4m	£10.8m

Table 3-9 below shows the present value of these operating costs over a 60 year appraisal period. These costs are presented in 2010 prices and include optimism bias.

Table 3-9: Present value of operating costs including optimism bias derived from TfN Operating Cost Model (2010 prices and values) for Fleetwood to Preston

Heavy Rail Operating Costs (3 car EMU)	1 tph	2 tph	4 tph
Track Access Costs	£2.3m	£4.7m	£9.3m
Electricity Costs	£13.5m	£27.0m	£54.1m
Diesel costs	£0.0m	£0.0m	£0.0m
Capital lease costs	£15.3m	£23.0m	£46.0m
Non-capital lease costs	£5.4m	£8.1m	£16.2m
Maintenance costs	£5.2m	£10.4m	£20.9m
Staff costs	£39.4m	£78.9m	£157.8m
Variable and Fixed Overhead costs	£0.0m	£0.0m	£0.0m
TOTAL	**£81.2m**	**£152.1m**	**£304.2m**

The presented values are modelled for heavy rail services. By way of a comparison, operating costs for Tram-Train, which would ostensibly travel over very similar distances, would thus be similar in magnitude to those for heavy rail. Electricity, maintenance and track access costs will likely be lower due to the smaller vehicle. A

Light Rail service is likely to be noticeably less expensive to operate, due to the much shorter operating distances involved.

3.3. Demand

3.3.1. Introduction to Demand Forecasting

The numbers of passengers using the scheme will be a key driver of the transport user benefits, as more users will yield more benefits and revenue, especially if they are transferring from other private modes. While a wide variety of factors will ultimately determine the level of demand on any kind of re-opened railway, some of the key drivers of passenger demand are as follows:

- **Service Provision:** The types of rail services provided, such as the service frequency, journey times, destinations, type of rolling stock and reliability will have a significant impact on demand. Options for reopening that provide fast, frequent journeys to a wide range of destinations will attract higher levels of demand than options with more limited journey opportunities.
- **Station Locations:** Passenger demand at different locations could be influenced by the density of resident population, employment, leisure, tourism, and other facilities in the vicinity of the station. For example, research collated by Passenger Demand Forecasting Council[32] (PDFC) suggests that, for most new stations, typically 80% or more of the station demand would come from people living within 2km of the station[33].
- **Station Accessibility:** Demand will be influenced by the accessibility of the station in terms of highway access, parking facilities and costs, and public transport and active travel links. Some stations with very good accessibility can act as a rail head for a relatively wide area, whereas other stations with more limited access will just serve their local communities in the immediate vicinity of the station. The location of the station and its ease of access relative to where people want to ultimately travel to and from is likely to have a significant impact on demand.
- **Competitiveness of Alternative Modes:** The competitiveness of alternative modes in terms of journey times and costs is crucial to the level of demand that might be expected on a new rail line. The level of highway congestion, journey times, parking and fares all determine the competitiveness of different modes. Levels of car ownership can also impact the attractiveness of public transport modes.
- **Wider economic and demographic trends:** The propensity for people to undertake journeys is correlated with wider economic and demographic trends. Factors such as population, employment and income all impact the number of journeys that might be expected. At the moment there is a great deal of long-term uncertainty about how long-term trends in travel behaviours might be impacted by the effects of the Covid pandemic and Brexit.

To accurately assess the demand effects of these factors, and others, a detailed demand forecasting model would be needed. For example, a calibrated multimodal gravity type demand model could forecast the number of expected trips by origin, destination, and route, by using data collected around existing patterns of trip making, and the costs and journey times of existing modes. A model of this type could then be used to assess and understand the demand implications of different design choices, to help optimise the design of options and maximise the expected benefits.

In the absence of such a tool, this study considers a comparative analysis of historic demand at existing stations and tram stops within the study region to offer some indications on the level of demand that might be expected on the re-opened route to Fleetwood. While such analysis is relatively crude, it does provide some understanding of the level of demand that might be possible on the new route as benchmarked against other services in the area.

3.3.2. Analysis of Heavy Rail Demand in the Study Region

Overview of current heavy rail demand in the region

The Office for Road and Rail (ORR) publishes estimated station usage figures derived from ticket sales data, although with some adjustments where this may not be fully representative. Figure 3-1 summarises the ORR's

[32] https://www.raildeliverygroup.com/pdfc.html

[33] PDFH v5.1, Section C10.3 (April 2013)

station usage (entries and exits) for the year 2019/2020 alongside an indicative estimate on the level of population and employment within 1km of the station using GIS analysis of census data.

Figure 3-1: Station usage together with the population and employment within 1km of the station

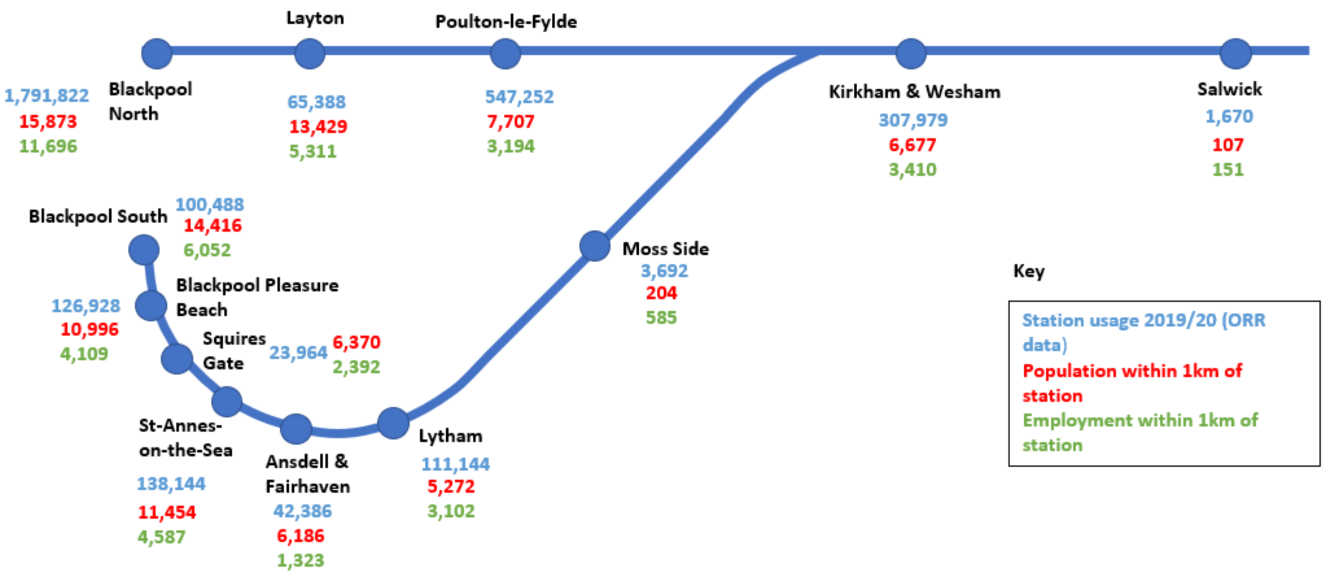
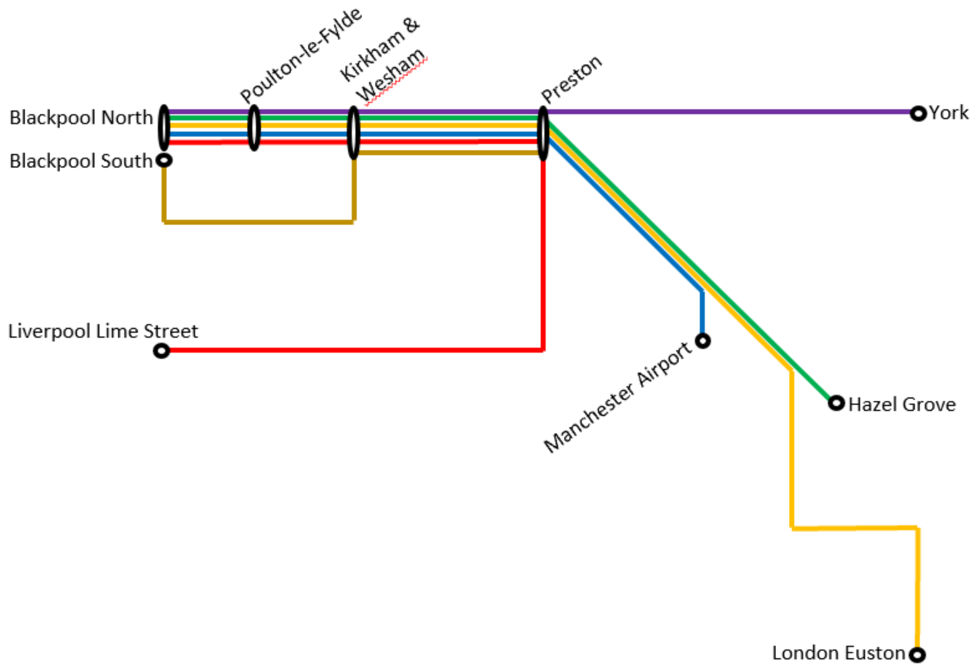


Figure 3-1 indicates there is considerable variation in the number of users across different stations within the study region. To take the two extremes for instance, Blackpool North, which is by far the most popular station in the region, has over 1000 times the annual demand of Salwick, which is the least popular. As briefly introduced in Section 3.3.1, these variations in demand can be driven by a number of factors, including the level of population and employment in the vicinity of the station, the rail service provision and the facilities and accessibility of the station.

Figure 3-2 below summarises the service frequency for stations within the study area and the key destinations that are served. All services are hourly, apart from the London Euston service which is typically 4 services per day. It can be seen that stations on the South Fylde line are generally served by one train per hour to from Preston to Blackpool South, while the line to Blackpool North is currently served by 6 to 7 trains per hour, although not all services stop at all stations, with Layton and Salwick having a much lower level of service.

Figure 3-2 – Existing Rail Services Frequency



The level and type of service on the South Fylde Line, which usually has one train per hour running between Blackpool South and Preston, is perhaps best representative of the type of service that might run on a re-opened Fleetwood Line. As such demand on the South Fylde Line could form a useful benchmark for an expected level demand that might be experienced on a reopened Fleetwood Line.

Blackpool South and Blackpool Pleasure Beach have quite high demand partly driven by Blackpool's extensive tourist attractions tourist industry, while Moss Side has particularly low demand due to the relatively isolated nature of the station. Of the remaining stations on the South Fylde Line, Squires Gate, St-Annes-on-the-Sea, Ansdell and Fairhaven, and Lytham, the average station usage is 79,000 entries and exits per annum.

Trip Rate Analysis of existing Rail Demand

While the level of usage of stations on the South Fylde line can perhaps form a starting point for understanding the likely level usage of any new stations on reinstated line to Fleetwood, a better understanding can be gained by assessing the level of demand in comparison to the level of population and employment within the vicinity of the station. The level of trip making at these stations can then be used to estimate the level of demand for any new stations on the reinstated line to Fleetwood.

To do the population and employment within a kilometre of the proposed new station locations at Thornton, Burn Naze and Fleetwood was also assessed, as summarised in Table 3-10 below.

Table 3-10: Population and Employment within 1km of proposed stations

Proposed Station	Estimated Population within 1km	Estimated Employment within 1km
Thornton	9,387	1,171
Burn Naze	3,994	2,115
Fleetwood	8,201	3,520

Applying the average trip rates from Lytham, Ansdell & Fairhaven, St-Annes-on-the-Sea and Squires Gate to the population and employment within a kilometre of Thornton, Burn Naze and Fleetwood, suggests that a total 214,000 entries and exits might be recorded at the three proposed stations on the re-opened Fleetwood Line as presented in Table 3-11. Although total entries and exits are not an exact measure of the total number of journeys, if it is assumed that most trips would go beyond those three stations, then total patronage on the line would be 214,000 trips per annum, or an average of around 600 trips per day.

However it should be noted that the trip rates on the South Fylde Line are very much lower than the trip rates at Poulton and Kirkham and Wesham. In part this is due to those stations having more frequent train services to a much wider range of destinations, but it is likely there are other factors too, including the different size catchment areas of different station. For instance if the trip rates seen at Poulton and Kirkham and Wesham are applied to Thornton, Burn Naze, and Fleetwood, then total demand across the three stations on the Fleetwood branch could be much higher at around 1,150,000, or around 3,200 trips per day.

It is important to note that this analysis is of course very simplified. It takes no account of the different accessibility of the stations, train services or ease of alternative modes. It also takes no account of any trip substitution that might occur across different services and stations. In reality some of the demand using services on the Fleetwood branch, may well already be travelling by rail from stations such as Poulton-le-Fylde, Kirkham and Wesham, and Blackpool, and hence these stations may see a reduction in demand.

Table 3-11: Range of estimates of demand obtained from trip rate analysis

Proposed New Station	Estimate based on trip rate seen at Lytham, Ansdell & Fairhaven, St-Annes-on-the-Sea and Squires Gate	Estimate based on trip rate at Poulton and Kirkham and Wesham
Thornton	80,000	426,000
Burn Naze	46,000	247,000
Fleetwood	89,000	473,000
Total	**215,000**	**1,150,000**

Future Growth in Rail Demand

The demand analysis presented above is based on analysis of demand and trip rates in 2019/20. On average, heavy rail passenger demand in the study area, as shown in Figure 3-1, has increased by 2% per annum from 2010/11 to 2019/20 in terms of passenger trips.

Although there is a great deal of uncertainty on the long terms impacts of the covid pandemic on the demand for rail, in the long term timescales of this scheme it seems plausible to assume that demand for rail travel may continue to further grow from the levels seen in 2019/20. Table 3-12 below presents the results of what annual demand may be in 20 years should this growth trend continue at between 1 and 2%.

Table 3-12: Range of estimates of demand assuming growth of 1-2% pa for 20 years

Proposed New Station	Estimate based on trip rate seen at Lytham, Ansdell & Fairhaven, St-Annes-on-the-Sea and Squires Gate	Estimate based on trip rate at Poulton and Kirkham and Wesham
Thornton	99,000 - 119,000	520,000 - 633,000
Burn Naze	56,000 - 68,000	301,000 - 367,000
Fleetwood	109,000 -132,000	577,000 - 703,000
Total	**260,000 - 320,000**	**1,400,000 - 1,700,000**

3.3.3. Analysis of Light Rail Demand in the Study Region

Overview of existing demand

Blackpool Transport operates 2 tram services per hour (every thirty minutes) throughout the day running between Thornton (Little Bispham) and Fleetwood (Fleetwood Ferry). However, service frequency increases in the Summer to accommodate seasonal tourist demand, with 6 services per hour (every 10 minutes) throughout the day, reducing to 4 services per hour in the evenings (every 15 minutes).

Figure 3-3 shows that the number of passengers alighting and boarding at tram stops on the section of route between Little Bispham and Fleetwood Ferry stops in 2019 using data provided by Blackpool Transport. It can be seen that there are significant differences in the level of demand at different stops on the route. This will be driven by a number of factors, but could in part be due to issues around the use of multi-use tickets which are automatically recorded at the end fare stage. However, it is clear from this data that with an average usage at each stop of 186,000 boarders and alighters, that usage at most tram stops is higher than many rail stations in the region, even though the tram stops are geographically much closer together.

Figure 3-3: 2019 annual light rail usage

Light Rail Demand Estimates

A benchmark of the potential level of demand that might be seen at any new tram stops on a light rail line along the Fleetwood Line, by looking at the lowest, highest and the average demand at the nearest tram stops to Thornton, Burn Naze and Fleetwood as shown in Figure 3-4. Table 3-13 shows the results of this analysis.

Figure 3-4 - Proposed New Stops and nearest existing Light Rail stops

Thornton
- Little Bispham
- Anchorsholme Lane
- Cleveleys

Burn Naze
- West Drive
- Thornton Gate
- Rossall Beach
- Rosall School
- Rosall Square

Fleetwood
- Broadwater
- Heathfield Road
- Lindel Road
- Stanley Road
- Fishermans Walk
- London Street
- Victoria Street
- Fleetwood Ferry

Table 3-13: Range of estimates of demand obtained from existing light rail usage

Proposed New Station	Estimate based on average usage of nearest tram stops	Estimate based on the nearest tram stop with lowest usage	Estimate based on the nearest tram stop with highest usage
Thornton	172,000	110,000	708,000
Burn Naze	87,000	62,000	156,000
Fleetwood	200,000	78,000	280,000
Total	**460,000**	**250,000**	**1,145,000**

Assuming that Thornton, Burn Naze and Fleetwood tram stops get the same level of demand as seen on the existing tram line would imply between 250,000 to 1,145,000 per trips per annum. If each boarding and alighting on the route represented a unique trip (which given the short nature of many tram trips is unlikely to the case) then this would corresponds to between 685 to 3120 trips per day.

Future Growth in Demand Based on Light Rail Estimates

As was the case in the estimates of demand based on heavy rail analysis, it is also important to consider the impact of future growth in demand and how this could impact passenger numbers in the future based on light rail analysis. When looking at tram usage over the previous three years from 2017 to 2019, it has been found that patronage has increased by 1% over this period. Table 3-14 below presents a range of estimates of what demand may be in the future over a 20-year period, should this trend continue based on light rail analysis.

Table 3-14: Range of estimates of demand based on light rail - Future Growth (1% per annum)

Proposed New Station	Estimate based on average usage of nearest tram stops	Estimate based on the nearest tram stop with lowest usage	Estimate based on the nearest tram stop with highest usage
Thornton	210,000	134,000	864,000
Burn Naze	106,000	76,000	190,000
Fleetwood	244,000	95,000	342,000
Total	**560,000**	**305,000**	**1,395,000**

3.3.4. Demand Estimates from Halcrow Study

A previous study undertaken by Halcrow in 2006[34] considering the reinstatement of passenger and freight rail services on the line between Fleetwood and Poulton, used high level analysis to estimate the number of rail passenger demand by 2028 potentially up to 850,000 trips per annum, depending on varying service frequencies.

Table 3-15: Halcrow 2028 demand forecast for heavy rail (trips per annum, per station)

Proposed New Station	90-minute frequency	60-minute frequency	30-minute frequency
Thornton	80,600	188,200	367,800
Burn Naze	24,900	97,200	177,600
Fleetwood	77,400	178,300	303,200
Total	**182,900**	**463,700**	**848,600**

Halcrow's analysis seems broadly consistent with the trip rate analysis presented above. It is worth noting that Halcrow's forecasts undertaken 16 years ago forecast a general increase in rail demand across the region that has turned out to be higher than actual demand. It is also noticeable that Halcrow's estimates show the significance of service frequency, with a near doubling of demand as the service increase from hourly to half hourly, something the trip rate analysis undertaken above is unable to show.

3.3.5. Demand Estimates Conclusions

In the absence of a detailed demand forecasting model, this study has undertaken a simplistic benchmarking exercise to assess historic demand at existing stations and tram stops within the study region. While this offers some useful indications on the level of demand that might be expected on the re-opened route to Fleetwood, the analysis is high level and shows that a there is a relatively wide range of demand that could be considered plausible.

Based on trip rates on the South Fylde Line demand of at least 215,000 trips per annum on the Fleetwood Line would seem plausible for heavy rail with 1tph, although noting that a forecast by the 2006 Halcrow Study demand could be much higher if demand were to replicate the trip rates seen at some other stations in the region such as Poulton-le-Fylde. Demand across the region has been growing at around 2% per annum, and despite the medium term impact of the covid pandemic, it seems plausible that these travel trends could continue in the future.

It is also noticeable that demand at tram stops is generally seen to be much higher than the demand at heavy rail stations. This will partly be driven by the existing tram route offering relatively frequent services along the golden mile serving all the tourist and leisure facilities of Blackpool's tourist industry, and also because the Fleetwood to Blackpool corridor attracts a lot of trips. It may also be the case however that with tram stops highly accessible and located close to people's homes and travel destinations, demand for light rail could be higher.

3.4. Journey Time Savings

As discussed in Section 2.2.4, the current levels of public transport accessibility on the Fylde coast peninsula are relatively poor. The TRACC public transport journey time accessibility analysis presented in section 2.2.4 found that typical end to end journey times between Fleetwood and Poulton by existing public transport are around 50 minutes each way, including access, wait and interchange times.

As an example travelling from Fleetwood Town Centre to Poulton-le-Fylde Railway station will require taking the 74 or 75 Blackpool Transport Bus service which takes at 25-40 to minutes dependent on the time of day and levels of congestion. Additional journey time is then needed to interchange onto heavy rail services at

[34] Halcrow Group Limited (2006). "The future of the Unused Poulton to Fleetwood Railway Line", Chapter 4 Option Assessment, Table 4.7.

Poulton-le-Fylde. Car and taxi journey times are of course quicker and will typically take around 20-25 minutes. Direct bus services to Preston are also available, although these typically take 1 hour 20 minutes to 1 hour 40 minutes.

By contrast a reinstated heavy rail link could offer an 11 minute journey time from Fleetwood Station to Poulton-le-Fylde and a potentially a 28 minute direct journey time to Preston. Some time allowance would be needed to access the railway station which would be located on the edge of the town centre, but such a heavy rail link could offer a journey time saving of up to half an hour on journeys to Poulton-le-Fylde, and up to an hour and 5 minutes on journeys to Preston.

A light rail or tram-train rail link will be slightly slower in terms of end to end journey times, with directly comparable journey time from Broadwater to Poulton-le-Fylde of 12 minutes. However, a light rail or tram train option offers greater connectivity into Fleetwood town centre, and can provide a direct journey time from Fleetwood Ferry to Poulton-le-Fylde of 22 minutes. By contrast the same journey using a heavy rail option will require walking or travelling by public transport to get to from Fleetwood Ferry to the heavy rail station which could take up to half an hour.

Tram train would provide similar journey times to light rail for those travelling between Fleetwood and Poulton-le-Fylde, but it would also provide through connectivity to Preston, with a 39 minute journey time between Fleetwood Ferry and Poulton-le-Fylde. Tram train, with the ability to offer through running on both the light and heavy rail networks, is therefore likely to offer the greatest timesaving over the widest range of journeys.

These journey time savings are summarised in Table 3-16 below. Significant journey time savings are obtainable across all modes to the key economic centres of Manchester, Preston and Liverpool. Further detail showing the detailed journey time impact of the different options is provided in Appendix A.

Table 3-16: Exemplar journey time savings from Fleetwood

Journey	Current public transport	Heavy rail	Light rail	Tram Train
Fleetwood (Fisherman's Walk) – Poulton-le-Fylde (Station)	30-50 minutes (via 74 or 75 bus)	26 minutes (15 minute walk to station plus 11 minute rail journey)	17 minutes direct	17 minutes direct
		5-25 minute journey time saving	**15-35 minute journey time saving**	**15-35 minute journey time saving**
Fleetwood (Fisherman's Walk) – Preston (Station)	90-110 minutes (via 74 or 75 bus)	45 minutes (15 minute walk to station plus 30 minute rail journey)	60 minutes (17 minute tram journey plus 20 minute interchange plus 19 minute rail journey)	35 minute tram train journey
		45-65 minute journey time saving	**30-45 minute journey time saving**	**55-75 minute journey time saving**
Fleetwood (Fisherman's Walk) – Manchester (Piccadilly Station)	120-140 minutes (30-50mins via 74 or 75 bus to Poulton plus 15 minute interchange plus 75 min rail journey to Manchester)	115 minutes (15 minute walk to station plus 11 minute rail journey to Poulton plus 15 minute interchange plus 75 min rail journey to Manchester)	105 minutes (17 minute tram journey to Poulton plus 15 minute interchange plus 75 min rail journey to Manchester)	105 minutes (17 minute tram journey to Poulton plus 15 minute interchange plus 75 min rail journey to Manchester)
		5-25 minute journey time saving	**15-35 minute journey time saving**	**15-35 minute journey time saving**

Fleetwood (Fisherman's Walk) – Liverpool (Lime Street Station)	120-140 minutes (30-50mins via 74 or 75 bus to Poulton plus 15 minute interchange plus 75 min rail journey to Liverpool)	115 minutes (15 minute walk to station plus 11 minute rail journey to Poulton plus 15 minute interchange plus 75 min rail journey to Liverpool)	105 minutes (17 minute tram journey to Poulton plus 15 minute interchange plus 75 min rail journey to Liverpool)	105 minutes (17 minute tram journey to Poulton plus 15 minute interchange plus 75 min rail journey to Liverpool)
		5-25 minute journey time saving	**15-35 minute journey time saving**	**15-35 minute journey time saving**

The table above shows the end to end to journey time savings that might be available for different types of journey. However end to end journey times are not the only things valued by passengers. Factors such as the number of interchanges, waiting time, reliability and vehicle ambiance also all contribute to someone's valuation of a journey, which can be combined with their journey time in a disutility known as generalised journey time. For instance, research has shown that waiting time is often valued at twice the weight of elapsed time, while average lateness is valued by passengers at three times the journey time. This means that a 5 minute saving in average minutes lateness will represent a 15 minute generalised journey time reduction.

Together these effects could mean that typical generalised journey time savings for people currently using other forms of public transport could easily amount to around 25-35 minutes each way, compared to making this journey by existing bus and tram services.

In addition to the savings felt by public transport users, the reopened railway line could also offer journey time benefits to those switching to rail from other modes. Although there has not been demand forecasting to understand the full spectrum of travellers' journey characteristics, such as the numbers of trips by mode, their origins and destinations or frequency of travel, it would be reasonable to expect that the amount of journey time savings for any given individual and/or mode could vary over wide range – i.e. by switching to the new rail services some people may save small amounts of time, while others may save larger amounts of time.

If it can be assumed that dedicated and timetabled rail services between Fleetwood and Poulton would offer a high level of journey time reliability at all times, then it could then be assumed that some proportion of highways users, even just between Fleetwood and Poulton, could be persuaded to switch to rail, and their combined perceived benefits of generalised journey time savings could include the differences in journey costs (rail fares weighed against vehicle running costs and costs of car parking) and reliability.

The appraisal assumes that passenger demand for light rail options might be weighted toward more local and shorter-distance trips (i.e. potentially lower average journey time savings), while demand for heavy rail options might naturally include a passenger market over a larger geographic area (i.e. potentially higher average journey time savings). Based on these considerations, as a starting point for assessment, this appraisal assumes that the wide variety user types and their perceived benefits associated with journey time savings could be represented with a simple range of average generalised journey time savings per trip, with some variations between the options. Table 3-17 summarises the assumed average generalised journey time savings, across all user types, with slight variations between heavy rail, tram-train and light rail that has been assumed as a starting point of the economic analysis, and which is consistent with Table 3-16 above.

Table 3-17: Assumed generalised journey time savings by option used in the baseline appraisal

	Assumptions about the types of trips likely to benefit	Potential average Generalised Journey Time savings across all user types
Heavy rail	Full mix of "local area", "short, medium and long distance" rail	35 minutes per trip
Light rail	"Local area rail" only	25 minutes per trip
Tram-train	Mix of "local area" and "short distance" rail	30 minutes per trip

3.5. Mode Shift Benefits

The creation of new rail routes and services between Fleetwood and Poulton would help facilitate mode shift from highways to rail. The consequent benefits of reduced highways congestion can be assessed as marginal external impacts, and monetised following the principles and guidance set out in TAG Unit A5-4: Marginal External Costs. Table 3-18 presents an overview of each element of the marginal external costs that can be monetised using this marginal external cost approach.

Table 3-18: Marginal external impact from mode shift

Impact	Description
Road decongestion (indirect tax element)	Marginal reductions in indirect tax attributed to reduced highways congestion due to mode shift from road to active modes, i.e. those continuing to travel by road will have slightly lower fuel costs as a result of decongestion
Road decongestion (user element)	Marginal changes in road users travel times due to changes in road congestion
Other infrastructure investment	Reductions (or increases) in local or central government expenditure on highways maintenance, due to reduced (or increased) wear and tear on highways, due to reductions (or increases) in vehicle kilometres travelled
Accidents	Marginal changes in the frequency of road collisions due to changes in vehicle kilometres travelled
Local air quality, Noise, Greenhouse gases	Marginal changes in air quality, noise and greenhouse gas emissions due to changes in vehicle kilometres travelled

Calculations of marginal external costs are based on the following three key parameters.

- Road-rail diversion factor: As per the standard TAG assumption, it is assumed **31%** of rail demand along the Fleetwood to Poulton route comprise trips that have switched from highways mode[35];
- Vehicle occupancy: to convert ‘highway trips’ to ‘vehicles’, as per TAG, assumed an ‘All Week Average Car’ occupancy of 1.57[36] persons;
- Highways mileage: Using NTS analysis it is assumed an average of 8.5 miles per trip[37].

The marginal external cost approach mean the scale of non-user benefits are driven primarily by the level of rail demand – the more rail users, the greater the mode shift and resultant external non user benefits. However, as a rule of thumb, these non user benefits are only likely to have a small influence on the total level of benefits and are generally not going to be deciding factors in determining the value for money of the scheme.

3.6. Wider economic impacts

Wider economic impacts (WEIs) encompass any economic impacts which are additional to the impacts felt by transport users. These impacts are driven by changes in connectivity, transport accessibility, or transport costs that may lead to long term structural changes in population and employment patterns. The three types of impacts recognised by TAG that can feed into a value for money assessment are:

- Induced investment – increased output in imperfectly competitive markets;
- Employment effects – changes in labour supply, i.e. more people working, or where jobs are located; and,
- Productivity impacts – static agglomeration.

[35] Databook Table A5.4.5, v1.14 July 2020. Assuming the rail flow category: “Non-London Short Distance non-PTE” (PTE is Passenger Transport Executive area).
[36] Databook Table A1.3.3, v1.14 July 2020.
[37] National Travel Survey, Table NTS0409b, miles per car trip derived from statistics on average annual miles per person and annual trips per person.

3.6.1. Induced investment

Improved accessibility and/or reductions in generalised travel costs lower the costs of production. Where markets are perfectly competitive, these savings are reflected in business user impacts which are accounted for in the core transport economic efficiency assessment. In the case of imperfectly competitive markets where the costs of production are lower than the values of the outputs, the generalised travel cost savings lead to an increase in profits which can be reinvested, and in turn lead to increased output. When travel cost savings allow a firm to increase output, the value to the firm (and society) is greater than the time saving captured in the conventional appraisal of business user benefits and the additional benefit is captured as a WEI.

A high-level approach commonly used to value this effect is to apply a 10% uplift factor on the business users' transport impacts[38].

3.6.2. Employment effects

Employment effects are very context specific, but in broad terms could comprise changes in the amount of employment and the locations of employment, summarised as follows.

- Changes in labour supply, for example any changes in commuting costs, including generalised journey times, can effectively tip the balance to make employment economically worthwhile for some of the population, or effectively be perceived as wage increases; and
- Shifts to more/less productive jobs, for example as changes in transport accessibility could lead to jobs relocating.

It is generally considered that most of the welfare impacts of changes in commuting costs are accounted for in the transport user benefits. There is potential for additional feedback effects in the wider economy, especially where a transport intervention leads to changes in land use and changes in the behaviour of firms and the population however the effects are typically of a small scale because generally only a small part of the population experiences these effects.

Although these types of impacts are not quantified at this stage, consideration of these could potentially become materially important if there is strong evidence that the proposed services between Fleetwood to Poulton could trigger transformational shifts in the regional employment and labour market, through changes in land use and population densities.

3.6.3. Static agglomeration

Improved transport accessibility effectively brings firms closer to other firms, sources of inputs, labour markets, and customers. This increased interaction can lead to innovation through knowledge spill overs, better linkages and collaboration, while any effective reductions in travel time or travel costs between areas also play key roles in fostering agglomeration economies by increasing effective economic density – i.e. businesses can reach more economic mass more quickly.

It is widely accepted that if a scheme does result in agglomeration impacts, these would generally make up most of the additional benefits that accrue at Level 2 – economic impacts without land-use change. Typically, for schemes that might generate productivity gains from static agglomeration, the scales of these impacts are generally in the range of 10% to 30% of total transport users' travel time impacts[39].

Without any detailed assessment of economic densities in the study area and potentials for change, and in the absence of origin-destination demand analysis, a high level assumption is assume that the scheme might generate a baseline level of static agglomeration amounting to 10% of transport users' impacts.

3.7. Option and non-use values

The reintroduction of new rail-based services between Fleetwood and Poulton, with the creation of new station stops or tram stops, would represent a substantial change in the availability of public transport on the Fylde coast peninsula. In these cases, people living in the vicinity of the new services may value the option of using the services even if they may not normally intend to use the services. The perceived benefits of the availability of additional transport choice could be measured in terms of people's willingness-to-pay for having the option.

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[38] TAG Unit A2.2 – Induced Investment, Section 4.3 (May 2020).

[39] TAG Unit A2.4 – Appraisal of Productivity Impacts, Section 6.1.5 (May 2020).

Option values can theoretically be monetised but the evidence underpinning these values is considered less robust, therefore this appraisal acknowledges that there would be potential option values, but these are not formally quantified for purposes of assessing the plausible scales of quantified benefits that may arise from the scheme[40].

3.8. Revenue potential

Farebox revenue is typically a function of ticketing prices and structures, and demand. However, we have not included revenue impacts within the appraisal due to the simplifying assumption that revenue would offset operational costs. Nonetheless, it remains the case that any proposals that change a train operating company's revenue could potentially affect the overall Public Accounts, depending on the circumstances of any given franchise contract or service agreement. For example, in the case of a newly created rail service, the central case assumption for new franchising would be that any extra revenue over and above operational costs would accrue to government; and conversely that shortfalls in revenue against the transport provider's operating costs would be met through subsidies[41].

These revenue transfers or subsidies would offset or contribute to the total public investment needed and so an assessment of the levels of net change in farebox revenue could become an important consideration in gauging a scheme's affordability; and so the following sections consider the fare structures in operation in the region to gauge the possible ranges of farebox yield the scheme might generate to offset operating costs.

3.8.1. Blackpool Transport – tram fares

Table 3-19 shows the current adult fare structure on Blackpool Transport. These timed fares currently apply across the peninsula.

Table 3-19: Current fares on Blackpool Transport[42]

Time Period	Adult
1 hour	£3.00
24 hour	£5.20 (c.£5.20/day)
3 day	£11.50 (c.£3.83/day)
5x 24 hour	£23.50 (c.£4.70/day)
7 day	£14.50 (c.£2.07/day)
30 day	£54.00 (c.£1.80/day)
365 day	£540.00 (c.£1.48/day)

The adult fares summarised in Table 3-19 indicate average daily tram fares ranging from around £1.50-£5.00 per day depending on the mix of fare types (i.e. daily fares or weekly, monthly or annual season fares). If we apply a high-level simplifying assumption that a typical tram user would take two trips per day, the average yield for trams might range from around £0.75 to £2.50 per trip.

3.8.2. National Rail fares

Table 3-20 shows a selection of National Rail fares for journeys within the study region, focusing on journeys between Poulton, Blackpool and the key regional destinations of Preston, Manchester, and Liverpool, to try to capture a reasonable representation of the potential ranges of fares that might apply for rail passengers travelling to or from the Fylde coast peninsula.

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[40] DfT, TAG Unit A1.1 (May 2018)
[41] DfT TAG Unit A5.3 (May 2018), Section 3.4.
[42] https://www.blackpooltransport.com/fares-and-tickets

Table 3-20: Samples of National Rail fares[43]

Journey	Adult off-peak single	Adult off-peak return
Poulton-le-Fylde – Blackpool	£3.40	£3.50 (£1.75/trip)
Poulton-le-Fylde – Preston	£7.20	£7.30 (£3.65/trip)
Blackpool – Preston	£8.50	£9.40 (£4.70/trip)
Poulton-le-Fylde – Manchester	£9.50	£18.80 (£9.40/trip)
Blackpool – Manchester	£9.00	£18.80 (£9.40/trip)
Poulton-le-Fylde – Liverpool	£9.20	£17.20 (£8.60/trip)
Blackpool – Liverpool	£8.90	£20.30 (£10.15/trip)

The rail fares summarised in Table 3-20 suggest that, even within a limited regional area, rail fares may vary depending on the specific origin and destination pair, for example:

- Within the immediate local area, between Blackpool and Poulton, rail fares seem broadly competitive with tram fares – i.e. £1.75 per trip as part of a return journey, or £3.40 per single trip;
- To/from Preston: Blackpool fares are slightly higher than from Poulton; and return fares are only slightly higher than single fares. This high-level review indicates that average yields per rail trip between the Fylde coast peninsula and Preston might range from £3.65-£4.70 per trip as part of a return journey, or up to £7.20-£8.50 per single trip;
- To/from Manchester or Liverpool: Poulton fares are slightly higher than from Blackpool; and the average yields per trip are broadly similar for single or return fares. This high-level review indicates that average yields per rail trip could amount to around £9 per trip to/from Manchester or £9-£10 per trip to/from Liverpool.

3.8.3. Fare yields and potential revenue

Building on the high-level summaries of the potential ranges of fare yields, this study considers the order of magnitude of revenue potential. Table 3-21 presents a summary of conclusions from high-level reviews of tram and rail fares, broadly segmented by their corresponding journey distances.

Table 3-21: Summary of typical yields

Journey Type	Approximate yield
Trams (Blackpool Transport)	£0.75 to £2.50 per trip
"Local-area" (e.g. between Blackpool and Poulton)	£1.75 to £3.40 per trip
"Short distance" rail (e.g. between Fylde coast peninsula and Preston)	£3.65 to £4.70 per trip (return) £7.20 to £8.50 per single trip
"Medium-to-longer distance" rail (e.g. to/from Manchester and Liverpool)	£9 to £10 per trip

By considering the typical yield ranges according to their journey distance categories, Table 3-22 considers an example set of plausible average yield ranges for this scheme and presents the corresponding gross annual revenues for a notional demand level of 215,000 trips per year – this simply provides an indication of the scales of potential gross annual revenue, regardless of operating costs.

Table 3-22: Indicative fare yield and revenue

[43] Sample fares have been based on typical mid-week daytime fares, retrieved using National Rail's journey planner, https://www.nationalrail.co.uk/h

Potential average yield (£/trip)	Notional annual revenue (for 215,000 trips per year) (2010 prices and values)	Present value of revenue (over a 60-year appraisal period[44]) (2010 prices and values)
£8	£1.7m	£99.7m
£6	£1.3m	£74.8m
£4	£0.9m	£49.8m
£2	£0.5m	£24.9m

Further consideration of operational costs in the next stages of design development could be combined with a more refined revenue forecast based on more detailed understanding of origin-destination linked travel demand to understand the potential offsetting effect that any surplus revenue might have on the investment costs.

3.9. Economic appraisal – obtaining value for money

The sections above identify some high-level assumptions around the key drivers of transport economic impact that would help determine the value for money of the scheme. Given the present value of costs for a one train per hour service range from £176m (for the lowest cost, diesel heavy rail or light rail option) to £268m (for the highest cost, tram-train option), the levels of benefits that would be needed for the scheme to achieve a benefit cost ratio (BCR) above 1.5 can be established. Such a BCR would ensure at least medium value for money or better.

Using this approach, this section seeks to understand the assumptions around demand, journey time savings, proportions of wider impacts and net revenues that would be required to generate enough benefits to reach this threshold. The plausibility and sensitivity of any required assumptions are discussed in relation to the benchmarking analysis undertaken in the previous sections.

3.9.1. Appraisal assumptions and parameters

To support this analysis a bespoke spreadsheet-based appraisal tool, following TAG guidance, has been developed to test the sensitivity of each category of benefits against the different input assumptions of demand, journey time savings, wider impacts and net revenues.

For the appraisal calculations demand is segmented by journey purpose as per TAG's average assumptions by mode. A value of time (also segmented by journey purpose) is then applied to the assumed potential ranges of journey time savings over a 60-year appraisal period. Additionally, non-user impacts resulting from mode shift are calculated using TAG's standard approach as presented in section 3.5. Estimated wider impacts are based on proportions of either business users' or all transport users' impacts as applicable.

The full range of inputs and assumptions that feed into this high-level appraisal approach can be broadly broken into two categories:

- General appraisal assumptions, mostly from default standard practice within TAG guidance and recommendations; and
- Scheme specific assumptions, many of which have been introduced in the sections above.

The general assumptions are summarised in Table 3-23 below.

[44] Note: Average yield assumed to grow by RPI+0% annually, and passenger demand of 215,000 in opening year assumed to grow by 2% annually for 20 years, then to grow in line with population growth for the subsequent 40 years.

Table 3-23: TAG appraisal assumptions

Parameters	Assumptions	Source
Appraisal Period	60-year period	TAG Unit A1.1 Section 2.3
Period of Construction	Costs split over three years 2024/25 to 2026/27	high level assumption given the stage it's currently at
Scheme Opening Year	2027 assumed	assumption
Discounting rate and year	2010 base year, discounted 3.5% p.a. for 30 years from 2021 and 3% thereafter	TAG Table A1.1.1
TAG Databook	July 2020 v1.14 sensitivity test	DfT TAG
Demand growth	Year 1-20: 2% demand growth; Year 21-60: background population growth	Assumption
Journey Purpose	Heavy rail: Commute 43.4%, Business 7.8%, Leisure 48.7% Light rail: Commute 34.9%, Business 3.0%, Leisure 62.1%	TAG Table A1.3.4
Market price adjustment	19% uplift from factor prices	TAG Unit A1.2 Scheme Costs, Appendix A
Optimism Bias	CAPEX 64% OPEX 41%	TAG Unit A5.3 Rail Appraisal, Table 3
Capex and Opex real price inflation	Included in OB at this stage	Assumption at GRIP1
Values of time	Average values of all working persons' time, and values of non-working time	TAG Table A1.3.1 and Annual Parameters
Marginal external costs	UK weighted average values	TAG Table A5.4.2
Road-rail diversion factor	31% (of new rail trips have shifted from road)	TAG Table A5.4.5
Highway vehicle occupancy	1.57 average passengers per car trip, all-week average	TAG Table A1.3.3
Highway mileage per car trip	Average 8.5 miles per car trip	Long-term all-England average 2002-2019, NTS0409b
Highway mileage per car trip	Average 8.5 miles per car trip	Long-term all-England average 2002-2019, NTS0409b

Table 3-24.provides the baseline appraisal assumptions that feed into the plausibility and sensitivity analysis presented in the sections below.

Table 3-24: Scheme baseline assumptions used for appraisal analysis

Parameters	Baseline assumptions	Source
Heavy Rail and Tram Train Demand	215,000 trips per year in opening year with 2% demand growth for 20 years from the opening year in 2027 to 2047, and background population growth thereafter	Section 3.3.2
Light Rail Demand	460,000 trips per year in opening year with 1% demand growth for 20 years from the opening year in 2027 to 2047, and background population growth thereafter.	Section 3.3.3
Journey time savings	Average 25 minutes per trip for light rail Average 30 minutes per trip for tram-train Average 35 minutes per trip for heavy rail options	Section 3.4
Wider economic impacts	10% of business user impacts 10% of transport economic efficiency	Section 3.6.1 and 3.6.3
Net Revenue	Net revenue is assumed to be zero. That revenue for the scheme is the same as any day to day operating costs not already captured within the cost assumptions. This mainly relate to staff costs. Implicitly this assumes the following. • For a one train per hour service between Poulton-le-the staff costs are estimated to by £16m in present value terms over a 60 year appraisal period • For revenue to equal £16m in present value terms implies an average yield per trip of £1.27 between Fleetwood and Poulton-le-Fylde (assuming 215,000 trips per year as above).	Section 3.2.5 and 3.8.3

3.9.2. Baseline Appraisal

An appraisal of the scheme has been undertaken using the baseline assumptions discussed in the previous sections. Table 3-25 below shows that under these assumptions the benefit to cost ration of all options is substantially below 1 between 0.1 and 0.3, even with the inclusion of wider economic impacts. This would imply that all the options under consideration are likely to represents poor value for money.

It should be noted however that the baseline assumptions used in the appraisal above have all been assessed using high level assumptions and analysis. As such there is considerable uncertainty around these assumptions, particularly those around demand, revenue and journey time savings. For this reason further analysis has been undertaken in the subsequent sections to show what assumptions that would be needed for the scheme to reach a medium value for money rating. The plausibility of those assumptions can be assessed by comparison with the baseline assumptions above.

Table 3-25: Baseline Appraisal using baseline assumptions (2010 prices and values)

	Heavy rail, non-electric (Diesel)	Heavy rail, electric	Tram-train	Light rail
Demand (trips per year)	215,000 with 2% demand growth	215,000 with 2% demand growth	215,000 with 2% demand growth	460,000 with 1% demand growth
Average generalised journey time saving	35	35	30	25
Average NET revenue per trip	£0.00	£0.00	£0.00	£0.00
WEI	10%	10%	10%	10%
Present Value of Benefits	£39.8	£39.8	£34.6	£46.5
Present Value of Costs	£175.8	£241.5	£268.3	£176.0
Net Present Value	-£136.0	-£201.7	-£233.7	-£129.5
Benefit to Cost Ratio (excluding Wider Economic Impacts)	**0.2**	**0.2**	**0.1**	**0.3**
Induced investment	£0.7	£0.7	£0.6	£0.4
Agglomeration	£3.9	£3.9	£3.4	£4.6
Adjusted PVB	£44.4	£44.4	£38.6	£51.5
Adjusted BCR (including Wider Economic Impacts)	**0.3**	**0.2**	**0.1**	**0.3**

3.9.3. Demand Needed to Obtain Medium Value for Money

Using the baseline journey time savings, wider impacts, and net revenue and operating costs assumptions as summarised in Table 3-24, this section considers the demand assumptions that would be needed for each option to provide at least a medium value for money (vfm),. Table 3-26 shows the given present values of costs, the total adjusted present values of benefits required to achieve a BCR of 1.5, and the estimated annual demand needed. It should be noted that as per the appraisal assumptions in Table 3-23, the appraisal approach assumes that demand is forecast to grow at 2% per annum between 2027 and 2047.

Table 3-26: Demand needed for medium vfm using baseline assumptions (2010 prices and values)

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
Present Value of Costs	£176m	£241m	£268m	£176m
Net Revenue (revenue minus staff operating costs)	£0m	£0m	£0m	£0m
Present Value of Benefits	£264m	£362m	£402m	£264m
Benefit to Cost Ratio	1.5	1.5	1.5	1.5
Demand needed in 2027 (trips/year)	**1,270,000**	**1,750,000**	**2,230,000**	**2,390,000**
Demand needed in 2047 (trips/year)	**1,890,000** (2% growth pa)	**2,600,000** (2% growth pa)	**3,310,000** (2% growth pa)	**2,920,000** (1% growth pa)

It can be seen that assuming the baseline assumptions presented in Table 3-24, the level of rail demand using the new stations needed for the scheme to reach medium value for money needs to total at least 1,270,000 trips per year, and rise to £1,890,000 trips per year by 2047. The level of demand needed to support the more expensive light rail and tram-train options is even higher.

This level of demand seems very high compared to existing rail usage in the area. Blackpool North, by far the busiest station in the region currently attracts around 1.8m passengers per year. Blackpool North is however serving a large conurbation with a large tourist industry, and it provides frequent services to a wide range of destinations.

While demand on the current tram system is much higher than seen at heavy rail stations in the region, the level of demand needed to deliver a medium value for money is still much higher than the level of demand seen at tram stops in the local area on the existing system.

The result of this analysis suggests that given the other baseline assumptions presented in Table 3-24, that the scheme would likely need to deliver a transformative change in the level of trip making in the region for the scheme to achieve a BCR of 1.5.

3.9.4. Journey Time Savings Needed to Obtain Medium Value for Money

Using the baseline demand, wider impacts, and net revenue and operating costs assumptions as summarised in Table 3-24, this section considers the journey time assumptions that would be needed for each option to provide at least a medium value for money. Table 3-27 shows the given present values of costs, the total adjusted present values of benefits required to achieve a BCR of 1.5, and the journey time assumptions that would be needed for each option to provide at least a medium value for money.

Table 3-27: Time savings needed for medium vfm using baseline assumptions (2010 prices and values)

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
Present Value of Costs	£176m	£241m	£268m	£176m
Net Revenue (revenue minus staff operating costs)	£0m	£0m	£0m	£0m
Present Value of Benefits	£264m	£362m	£402m	£264m
Benefit to Cost Ratio	1.5	1.5	1.5	1.5
Journey time savings (min/trip)	**220**	**300**	**340**	**140**

This test suggests that, for the light rail option, for which a higher level of potential underlying demand has been assumed, the average journey time savings – keeping all other impacts unchanged – would have to exceed 2 hours for the BCR to reach 1.5 on the basis of journey time savings alone. Significantly larger average journey time savings on the order of 3-4 hours per trip would be needed for either of the heavy rail and tram-train options – though this ‘step change’ in journey time savings required would have been influenced substantially by the lower estimated passenger demand for heavy rail and tram-train options.

With reference to the estimated potential journey time savings outlined in Table 3-16 and Table 3-17, it would seem that savings in average generalised journey times per trip of this scale is not plausible; and based on the high-level qualitative understanding of demand and journey time potential discussed in Section 3.4, it would seem unlikely that the potential aggregate total journey time savings across the population would be sufficient to suggest that a value for money case could rest solely on gains in transport users’ time benefits. This intuition could however be tested in the later stages of design development with detailed travel demand forecasting and generalised journey time modelling.

3.9.5. Wider Impacts Assumptions Needed to Obtain Medium Value for Money

Using the baseline demand, journey time savings, and net revenue and operating costs assumptions as summarised in Table 3-24, this section considers the wider impact assumptions that would be needed for each option to provide at least a medium value for money. Table 3-28 below shows the given present values of costs, the total adjusted present values of benefits required to achieve a BCR of 1.5, and the estimated scale of wider impacts that would be needed for each option to provide at least a medium value for money.

Table 3-28: Wider impacts benefits needed for medium vfm using baseline assumptions (2010 prices and values)

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
Present Value of Costs	£176m	£241m	£268m	£176m
Net Revenue (revenue minus staff operating costs)	£0m	£0m	£0m	£0m
Present Value of Benefits	£264m	£362m	£402m	£264m
Benefit to Cost Ratio	1.5	1.5	1.5	1.5
Uplift on TEE benefits	**560%**	**810%**	**1050%**	**470%**

With reference to the ‘rule of thumb’ assumptions that induced investments could plausibly amount to around 10% of business user benefits (Section 3.6.1) and that static agglomeration impacts, where relevant to a scheme, might typically amount to around 10%-30% of total transport user benefits (Section 3.6.3), this simple analysis of the order of magnitude requirement suggests that the scheme would need to trigger somewhat greater ‘wider impacts’ in aggregate than just the relatively modest improvements in business productivity and increased employment in the area.

Aggregate ‘wider impacts’ of a magnitude that represent a five-fold, or greater, increase upon core transport user benefits would likely require the scheme to enable transformational step-changes in the structure of the regional economy, for example, including potentially significant changes in housing, land use and economic productivity.

3.9.6. Net Revenue Needed to Obtain Medium Value for Money

The baseline assumptions in Table 3-24 (section 3.9.1) assumes the scheme generates no net revenue, that is revenue from the scheme fully offsets any additional operating costs not captured within the PVC estimate. As discussed in Section 3.2.5 these additional operating costs are likely to be mainly related to staff costs, which the TfN operating cost model suggests for the operation of one train per hour service between Poulton-le-Fylde and Fleetwood will be £16m in present value terms over 60 years (Table 3-9).

The baseline assumption in section 3.9.1 is therefore implicitly assuming that the scheme will generate £16m of revenue (in present value terms over 60 years) such that the net revenue is zero. Assuming the baseline demand assumptions of 215,000 trips, this would require an average yield per trip of £1.27 between Fleetwood and Poulton-le-Fylde. This level of average yield seems highly plausible given the analysis of the existing fares structures presented in section 3.8.

Table 3-29 below shows the net revenue and operating costs that would be needed to provide a medium value for money scheme, assuming the benefits are determined from the baseline demand, journey time savings, and wider impact assumptions as summarised in Table 3-24 above.

This shows that for the scheme to reach medium value for money, net revenue and staff costs of at least £146m would be required for the heavy rail option, with even higher values needed for the light rail and tram train options. Assuming as above staff costs of £16m over 60 years, this requires the revenue to be at least £162m over 60 years. Assuming the baseline demand assumptions of 215,000 trips, this would require an average yield per trip of £13.00, which by itself is not plausible given the short journey distance and current fare structure.

Table 3-29: Net revenue and operating Costs needed for medium vfm using baseline assumptions (2010 prices and values)

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
Present Value of Costs	£176m	£241m	£268m	£176m
Net Revenue (revenue minus staff operating costs)	**£146m**	**£212m**	**£242m**	**£141m**
Present Value of Benefits	£45m	£45m	£39m	£52m
Benefit to Cost Ratio	1.5	1.5	1.5	1.5
Average yield[45] (£ per trip)	£13.00	£18.30	£20.80	£7.00

3.9.7. Costs Needed to Obtain Medium Value for Money

To achieve a BCR of 1.5 under the baseline assumptions on journey times, demand, wider impacts, and revenues requires assuming that net present value costs will be around £27m in present value terms as shown in Table 3-30 below. This implies the capital cost in nominal 2020 prices would need to be less than £10m in 2020 prices, a clearly implausible amount.

Table 3-30: Net revenue and operating Costs needed for medium vfm using baseline assumptions (2010 prices and values)

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
PV Capital Costs of Construction	£10.4	£10.4	£14.5	£13.6
PV Rolling Stock Costs	13.7	13.7	5.2	14.3
PV Maintenance and Renewals	£2.4	£2.4	£3.3	£3.1
Present Value of Costs	**£27**	**£27**	**£23**	**£31**
Net Revenue (revenue minus staff operating costs)	£0	£0	£0	£0
Present Value of Benefits	£45m	£45m	£39m	£52m
Benefit to Cost Ratio	1.5	1.5	1.5	1.5

3.9.8. Combined Assumptions

The section above shows that on the basis of the baseline assumptions, none of the options would deliver a BCR above 1. The section above also identified the sensitivity and impact of changing any single assumption from the baseline in order to analysis to generate a BCR of 1.5, with most assumptions quickly seen to reach the limits of plausibility.

This section builds on the analysis above to identify a combination of assumptions that could potentially generate a BCR of 1.5. It starts by assuming that WEI's could provide 15% of benefits rather than the 10% as assumed in the baseline. It then assumes that average journey time savings are 35 minutes across all options, not just heavy rail. The average yield for all modes is assumed to be £3 rather than £1.27 (for heavy rail) that is implicitly assumed in the baseline. Finally the demand is determined at a level that provides the benefits and revenues needed to drive a BCR of 1.5. Table 3-31 shows the combined set of assumptions that would

[45] Note this yield is calculated on the basis of the baseline demand assumptions presented in Table 3-24, whereby light rail and heavy rail and tram-train have different demand assumptions

potentially provide at least a medium value for money for each option, while Table 3-32 shows the impact on the appraisal.

Table 3-31: Combined assumptions needed to achieve medium value for money

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
WEI agglomeration (% of transport user benefits)	15%	15%	15%	15%
Average GJT saving (minutes per trip)	35	35	35	30
Average yield[46] (£ per trip)	£3.00	£3.00	£3.00	£3.00
Demand in 2027 (trips per year)	610,000	810,000	900,000	810,000
Demand in 2027 (trips per year)	910,000	1,200,000	1,340,000	990,000
Net Revenue (revenue minus staff operating costs[47])	£90m	£125m	£141m	£103m

Even under these relatively optimistic assumptions around wider impacts, journey time savings, and average yield, demand would still have to be higher than 610,000 trips per year in 2027 for heavy rail and 900,000 trips per year for tram train, rising to 910,000 and 1,340,000 trips per year for tram train. This level of required demand still seems optimistic given existing station usage in the study region, and the fact that these options, for the purpose of this analysis at least, are all providing a relatively low frequency service.

Table 3-32: Combined assumptions appraisal summary (2010 prices and values)

	Heavy rail, non-electric, 1tph	Heavy rail, electric, 1tph	Tram-train, 1tph	Light rail, 1tph
Present Value of Benefits	£113m	£150m	£166m	£96m
Present Value of Costs	£176m	£241m	£268m	£176m
Net Revenue (revenue minus staff operating costs)	£90m	£125m	£141m	£103m
Benefit to Cost Ratio (excluding Wider Impacts)	**1.3**	**1.3**	**1.3**	**1.3**
Induced investment	£2.0m	£2.7m	£3.0m	£0.7m
Agglomeration	£17m	£22m	£25m	£14m
Adjusted Present Value of Benefits	£132m	£175m	£194m	£111m
Adjusted Benefit to Cost Ratio (including Wider Impacts)	**1.5**	**1.5**	**1.5**	**1.5**

46 Note this yield is calculated on the basis of the demand assumptions presented in the top row of this table

47 As per Table 3-9 these are assumed to be £16m in present value terms over a 60 year appraisal period for a 1 train per hour service.

3.10. Wider Considerations

In November 2020, the Treasury published a review of its appraisal guidance[48] known as the Green Book, to ensure that it was able meet the Government's wider policy objectives around levelling up and decarbonisation. The review found that BCRs by themselves may not always be aligned to the decision makers' wider policy objectives, and can instead focus on those benefits that it is easy to put a monetary value upon. The new guidance makes clear that the assessment of value for money is broader than the BCR alone, and that it should assess all the relevant costs and benefits to society, not just narrowly economic ones

The Green Book review has recommended new guidance that amongst other things puts additional emphasis on the assessment of transformative impacts, the analysis of place based impacts, and analysis of differential impacts. The review also identifies a number of the priority outcomes that are strongly focused on levelling up including;

- an outcome to raise productivity and empower places so that everyone can benefit from levelling up;
- an outcome to level up education standards: so that children and young people in every part of the country are prepared with the knowledge, skills and qualifications they need; and
- maximise employment across the country to aid economic recovery following Covid-19.

The strategic case presented in Chapter 2 shows that the study region has some areas of high deprivation, high unemployment, low productivity, and low skills. Transformatively connecting Fleetwood to the wider region, which can only be achieved by heavy rail, light rail or tram train options, will help deliver the outcomes prioritised by Government, but which even with more sophisticated modelling, may not be captured with a relatively narrow benefit cost ratio.

3.11. Economic Case Summary and Conclusions

This approach to assessing the Economic Case is consistent with DfT's Restoring Your Railway (Beeching) Ideas Fund guidance, and considers the DfT's TAG, Business Case and Value for Money guidance. The approach taken to inform the economic case is a proportionate assessment at this stage of the scheme's development, although more detailed demand modelling and analysis would certainly need to be undertaken during the next stages of the scheme's development.

The economic case analysis shows that based upon a high level set of baseline assumptions around demand, revenue, journey time savings, mode shift and wider benefits, all of the options are likely to represent poor value for money. Sensitivity testing shows that for the scheme to reach a benefit cost ratio (BCR) of 1.5 and be considered medium value for money, requires making a combination of relatively optimistic assumptions around all of these assumptions, but in particular demand. The analysis shows that a demand of at least 610,000 trips per annum is likely to be required upon opening, and that this demand will then need to continue to grow at 2% per annum over a period of 20 years. It would also need to be assumed that the scheme can generate an average journey time saving of 35 minutes, and that wider impacts provide 15% of total benefits.

At this stage of the study, detailed analysis of these assumptions, and in particular demand forecasting, has not been undertaken. Instead some relatively simplistic benchmarking has been undertaken, that has included examining current demand for existing rail and tram services in the region and assessing whether similar levels of demand might be obtainable in Fleetwood. While the scope of this demand analysis is relatively limited, it is clear that the level of demand required on the Fleetwood Line for any option to provide a BCR of more than 1.5, is likely to be much higher than demand seen elsewhere in the region. This indicates that obtaining a BCR of more than 1.5 is therefore likely to be challenging using standard TAG appraisal.

Any case for investment, is therefore likely to be made on the potential wider transformative impacts the scheme would have on a region that suffers high levels of deprivation and social exclusion as set out in the strategic case. Although these are impacts can be quite hard to measure and quantify using standard appraisal approaches, it is still appropriate for decision makers to consider these elements with the overall context of value for money. Moreover it is clear from a recent Government review of the appraisal process that in future additional emphasis will be placed on these non-monitised impacts, particularly when they can be demonstrated to meet wider policy objectives, such as around levelling up and decarbonisation.

[48] Green Book Review 2020: Findings and Response
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/937700/Green_Book_Review_final_report_241120v2.pdf

As the scheme further develops, the next stage of a business case would be to develop a demand model and appraisal framework that can undertake a more detailed economic appraisal. In particular, the availability of such a model would help sift options to help determine exactly which option, service frequency and destinations provide the largest benefits per pound of investment. Further work to better understand the potential wider impacts of the scheme on homes and jobs, and social distribution of benefits across different users is also recommended.

4. Financial Case

4.1. Introduction

This chapter presents, at a high level, the costs and affordability of the Fleetwood to Poulton Railway Line Re-opening scheme. The capital costs are yet to be presented for the three options and will be broken down by item type. No operational cost estimates are available at this stage. A number of potential funding sources are under consideration, although the RYR fund has been identified as the main funding source for the scheme.

At this stage the financial case is at an early stage of development, with further details to be established should the project and business case progresses further.

The structure of the Financial Case is as follows:

- Costs;
- Funding Sources;
- Funding Profile; and
- Conclusion

4.2. Costs

As set out in the Economic Case, four options have been appraised with a range of forecast benefits and costs considered. From this appraisal no option has been presented as the preferred option, and this is supported by the strategic appraisal in the Strategic Case. Table 3-4 presents that the expected capital costs of construction, including optimism bias, could range from £121m to £251m in 2020 prices depending on the mode, form of electrification and frequency of service. Assuming a 4 year construction period, this would mean expected annual capital expenditure over the construction period might be £30m to £63m per annum in 2020 prices.

Operating costs have only been assessed at this stage at a high level using the TfN operating cost model. This shows that annual operating costs for a heavy rail option that includes a vehicle lease charge might range from £3m to £11m per annum (excluding optimism bias).

Revenue would off set some of these costs, but as this stage of analysis has not included detailed demand forecasts further analysis would be required in this area. However based on the demand forecasts presented in section 3.3 it seems unlikely that revenue would be as high as the operating costs, meaning some kind of ongoing support would be necessary.

At this stage, no single option outturn nominal capital costs have been presented. These will be developed, alongside operational costs and revenue costs, for the preferred option at the next stage of the Business Case process.

4.3. Funding Sources

The Government's Restoring Your Railway Fund (RYR) has been identified as the primary funding source for the scheme, with no obvious alternatives available at this stage. It is assumed that RYR funding would support the delivery of the heavy rail, light rail and tram-train options, such that it is not just restricted to the restoration of heavy rail services. It is also assumed that RYR funding would not be available to support other forms of public transport investment, such as improved bus services

It is known that there are other schemes underdevelopment in the region, such as Clitheroe-Hellifield and South Fylde line, that may be competing for funding from both RYR funding as well as Lancashire County Council. Lancashire County Council is unlikely to have significant level of capital resources to deliver the scheme without a central Government funding contribution

4.4. Funding Profile

Timescales for the RYR funding programme have yet to be published, so the funding profile for the Fleetwood to Poulton Railway Line Re-opening scheme is uncertain at this stage. This will become clearer at the next stage of the Business Case process.

4.5. Conclusion

At this stage of the Business Case process the Financial Case is still at an early stage. Once a preferred option has been selected, the capital and operating costs will be developed, and the funding source and profile will be set out. It is clear however, that the scheme will be heavily dependent on national rather than local funding.

5. Commercial Case

5.1. Introduction

The Commercial Case for the Fleetwood to Poulton Railway Line Re-opening scheme outlines the delivery partners and the procurement strategy, as well as the statutory and other regulatory processes which need to be managed. At this stage the commercial case is at an early stage of development, with further details to be established should the project and business case progresses further.

The structure of the Commercial Case is as follows:

- Procurement Strategy, including:
  - Delivery Partners
  - Procurement Method
- Statutory and Other Regulatory Consents; and
- Conclusion

5.2. Procurement Strategy

At this stage early stage of the Business Case process the procurement strategy has yet to be identified. Depending on the option chosen this could be procured through Lancashire County Council, Network Rail or a third party.

5.2.1. Delivery Partners

Lancashire County Council have identified the following key partners for delivering the scheme;.

- Network Rail
- Department for Transport
- Blackpool Transport
- Poulton & Wyre Railway Society
- Blackpool Council
- Wyre Council
- Fylde Borough Council

5.2.2. Procurement Method

Were Lancashire County Council to have responsibility for the procurement of this scheme, then they would follow the most economically advantageous tender (MEAT) criterion during the procurement process to enable the best reflection of qualitative, technical, and sustainable aspects of the tender submissions, as well as prices. This process will also consider the comparative risk of delivering options. For example, Network Rail are likely to be best placed to deliver the Heavy Rail option, and therefore a direct award for this would seem most appropriate to manage the risks and overall delivery of the scheme.

5.3. Statutory and Other Regulatory Consents

Although Lancashire County Council would prefer to acquire any land via negotiation, there is likely to be the need for Compulsory Purchase Orders (CPO) required for land along the route. As well as obtaining land on the old Fleetwood trackbed, tram options will also require additional land and public highway running rights. The heavy rail options will need to close roads and re-open level crossings for which consents will have to be obtained.

5.4. Conclusion

At this stage of the Business Case process the Commercial Case has identified the key delivery partners and introduced the proposed procurement method, which will follow MEAT principles.

6. Management Case

6.1. Introduction

The Management Case for the Fleetwood to Poulton Railway Line Re-opening scheme, when developed, will outline the appropriate governance structure for the delivery partners, the high level project programme with key dependencies and milestones, and the project's risk register. At this stage the management case is at an early stage of development, with further details to be established should the project and business case progresses further.

The structure of the Management Case is as follows:

- Implementation of Similar Projects;
- Governance Structure;
- Project Programme;
- Key Risks; and
- Conclusion

6.2. Implementation of Similar Projects

At the next stage of the Business Case process, Lancashire County Council will demonstrate its experience of delivery and implementing transport projects.

6.3. Governance Structure

At this next stage of the Business Case process the proposed governance structures for Lancashire County Council and Network Rail for delivering the scheme will be set out.

6.4. Project Programme

At the next stage of the Business Case process a project programme will be set out. This will include the key milestones and dependencies which are crucial to the scheme's delivery.

6.5. Key Risks

At the next stage of the Business Case process a Risk Register will be developed. This will include many different types of risks to the delivery of the scheme, such as strategic risks to funding and political alignment, and those specific to engineering challenges. Mitigation measures will also be identified at this stage.

6.6. Conclusion

At this stage of the Business Case process the Management Case is under development.

7. Overall Conclusions and Next Steps

The remit of work was to examine the feasibility of restoring the Fleetwood Railway Line as either a heavy rail, light rail or tram train route, and to undertake an early stage Strategic Outline Business Case in accordance with the Department for Transport's Restoring Your Railway Guidance.

All of the options have been shown to deliver a step change in connectivity to Fleetwood, offering journey times 10-20 minutes faster between Poulton-le-Fylde and Fleetwood than is currently possible on existing public transport. Heavy rail options have the benefit of allowing through services beyond Poulton-le-Fylde to the key economic centres of Preston, Manchester and Liverpool, while the light rail options have the benefit of providing through services onto the existing Blackpool Tram system, providing tram stops in the heart of Fleetwood. Tram train options potentially provide the best connectivity by offering through running on both heavy and light rail systems.

The study shows that reopening the route as either Heavy Rail, Light Rail or Tram-Train are all credible options, and that they are all both technically feasible and would provide a step change in improved connectivity. However, the different options do all carry some technical risks, challenges and opportunities. The heavy rail option requires the delivery of additional platforms at Preston, which have not been costed as part of this scheme, and the reopening of level crossings for which a safety case would have to be made. Light rail includes elements of on street running which contain additional delivery risks, particularly in relation to land acquisition, impacts on traffic, and the alternation of utility services. Depot and serving requirements would also need consideration. Tram train includes the same risks of light rail, but also additional cost and risk to adapt the heavy rail network to accommodate trams including the delivery of new platforms at Preston station, the costs of which have not been included this study.

Assuming the required works at Preston are undertaken, the heavy rail scheme is likely to be the cheapest and quickest to deliver, although the station location could limit the its accessibility and value to parts of Fleetwood that are not near the station. Light rail and tram train options that can be integrated with the existing Blackpool Tram route through Fleetwood have the opportunity to provide much better connectivity within Fleetwood, although the tram options would require an interchange at Poulton-le-Fylde to make onward journeys to Preston and beyond. Light rail and tram train options also provide an opportunity to expand the network in the future with the delivery of a wider expansion of the Blackpool Tram System that could include for instance including through running around the South Fylde Line to create a wider regional tram train system.

Although detailed appraisal work of the options has not been undertaken at this stage of the study, the relatively high costs and low expected demand of rail based solutions, means that at this stage they all seem likely to have a benefit cost ratio of well under 1. This means that all options are likely to represent poor value for money.

However, recent Treasury guidance has emphasised that the benefit cost ratio is only one element of an investment decision with policy makers needing to also take account of broader objectives such as the impact on wider policies, including decarbonisation and levelling up, and the transformative and place based impacts that the scheme can deliver.

It is recommended that if the scheme is to be progressed further, then the next stage of work would be to identify and develop a preferred option to a more detailed design and undertake an Outline Business Case. Key areas of work that will need to be undertaken to deliver this would include:

- Development of a demand model for the study region such that a better understanding of current and future trip making patterns can be analysed, and the expected demand of different routes and options understood.
- Further design work to develop a preferred option with an outline design. Of particular interest with developing the design further are:
  - Fleetwood Terminus (Heavy Rail) – to work with local landowners and other stakeholders to agree a suitable location
  - Level Crossings (Heavy Rail) – to further develop proposals and a safety case for reinstating Thornton Level Crossing and whether or not to close Hilylaid Road Level Crossing
  - On-street tie-in to Blackpool Tram (light rail/tram-train) – considering land ownership, highway impacts and track geometry to balance costs and journey times
  - Rail tie-in at Poulton (heavy rail/tram train) – to firm up costs and risks

    - Development of tram-train proposals to mitigate risks – focusing on wheel-rail interface, vehicle compatibility/crashworthiness and impact on existing signals, communications, maintenance boundaries
    - Development of bus alternative options, that may include guided busway and or significant sections of bus lanes and junction prioritisation measures.
- Assessment of long term operating, maintenance and renewal costs, which together with an assessment of revenue will allow the financial case to be better understood.
- Clarification over consents route (TWAO, DCO) to progress the scheme.

Indicative Timescales

The work undertaken to date to develop the SOBC constitutes concept design. The further work identified above will all be required to feed into the next stage in the process, which is the development of an OBC. Running in parallel with an OBC will be the development of the concept design towards a single preferred option. To complete this additional work and develop and OBC and identify a single preferred option will likely take up to 12 months.

Acceptance of a single preferred option and the OBC will then allow the scheme to progress to the preparation of the TWAO or DCO application, which will be required to provide the statutory powers to build, operate and maintain the scheme. The preparation of a TWAO or DCO is highly involved and will take at least 12 months. If the scheme is Tram or Tram-Train, the process will be a TWAO. If the scheme is Heavy Rail, then the process may be DCO or TWAO. A TWAO will typically take 12-18 months from application to determination, although in exceptional circumstances this can be as little as 6 months. A DCO can be expected to take 15 months.

The Design and Build phase for this scheme will take approximately 9-12 months to procure, and between 3 and 4 years to deliver. The heavy rail solution should be slightly quicker and easier to construct, whereas light rail and tram-train will have the added complexity of building the on-street section to link the disused rail corridor to the existing tramway. The procurement phase could be carried out in parallel with the progression of the TWAO/DCO. If funding is available at this time, then design could be commenced while the TWAO/DCO is progressing, but noting the risk that the TWAO/DCO process may require the scheme to be amended and as such in trying to compress the delivery programme, abortive costs may be incurred in design.

It is important to note that it is very rare for a scheme to progress from SOBC to OBC to TWAO/DCO without any delays or pauses between phases. Each stage will need a level of approval, and funding for the next stage will need to be quantified and secured. Also, procurement for each stage will take time.

In terms of the key differences between each mode in terms of timescales, heavy rail is expected to be the quickest to deliver. This is because the TWAO/DCO should be more straightforward, and construction should be the shortest timeframe. For light rail and tram-train, the on-street connection will likely complicate the TWAO in terms of addressing objections, and will make the construction phase longer. As an additional potential delay to a tram-train solution, addressing the additional complexities around inter-compatibility between tram and heavy rail systems (vehicle configuration and crashworthiness, wheel-rail interface, signalling and train control, communications) will likely require more time to be spend in developing a single preferred option.

The resultant best-case indicative comparison on timescales is as illustrated in Table 7-1. It is important to realise that, for schemes of this type, experience shows that each phase (and in particular the approvals and securing of funding between phases) can take a lot longer than shown.

Table 7-1: Indicative Timescales for Scheme Delivery

	Heavy Rail	Light Rail	Tram Train
Evaluation of SOBC and procurement of OBC / Option Development	6 months	6 months	6 months
Completion of OBC / Single Option Development	Q3 2022	Q3 2022	Q1 2023
Evaluation of OBC/Single Option and procurement of next phase	6-9 months	6-9 months	6-9 months
Completion of TWAO/DCO Application	Q2 2024	Q2 2024	Q4 2024
Completion of FBC	Q2 2025	Q2 2025	Q4 2025
TWAO/DCO Determination	Q3 2025	Q3 2025	Q1 2026
Procurement of Design and Build Phase	9-12 months	9-12 months	9-12 months
Design & Build Commencement	Q4 2025	Q4 2025	Q2 2026
Design & Build Completion	Q2 2029	Q4 2029	Q2 2030

Appendices

Appendix A - Accessibility Analysis

1. Introduction

To discern changes in accessibility as result of implementing rail / light rail services between Poulton-le-Fylde and Fleetwood, an accessibility analysis was undertaken using the industry standard Basemap TRACC Version 1.3.0. This software measures journey times between an origin and destination and can use these figures to create accessibility contours. The OS Open Roads network, public transport timetable data and the location of stops, as well as an origin grid and destination point, were used to run the calculations. For each origin point, the journey time is calculated to the specified single destination point by using the inputted road network and public transport data and includes a walk time at the beginning of a journey from the origin point to a public transport stop and at the end of the journey to the destination point.

2. Analysis of Current Accessibility

2.1. Accessibility from Fleetwood

To show the impacts of the proposed rail-based services, baseline maps of the current situation were undertaken for comparison.

London Road Tram Stop was used as the origin to represent Fleetwood Town Centre. A destination grid with 200m between points was used to calculate travel times in the local area. The model was run between 7am and 10am. The software will calculate the fastest journey between the origin and destination possible using public transport within the time limits and use this as the journey time. If it is quicker to walk than take public transport the walking time would be used. Contours can then be created using the grid of journey times.
Two scenarios were initially modelled, January 2020 and October 2020. January 2020 was modelled due to it being pre-COVID and hence services would be running to a “normal” timetable and frequency. October was modelled as a comparison, due to a new bus service from Fleetwood to Preston being introduced which impacted the accessibility. The comparisons between the two are shown in Figure A-1 and Figure A-2.

The main difference between the plots is the extension eastward from Poulton Le Fylde in the October scenario that is not possible within an hour in the January scenario. This is due to the new 74 bus route introduced in July extending the distance you can travel. There is also increase accessibility northwards from Poulton Le Fylde on the other side of the river Wyre to Fleetwood. In October it is also possible to reach the centre of Preston within an hour and Poulton Le Fylde within 40 minutes. The only other changes between January and October are minor, and so based off the large impact of the new bus route it was determined that October 2020 would be used as the baseline scenario. It should be noted that certain services may be running at lower frequency due to Covid-19 reductions however, this does not appear to have a significant impact.

Figure A-1 - Accessibility by public transport from Fleetwood town centre (January 2020)

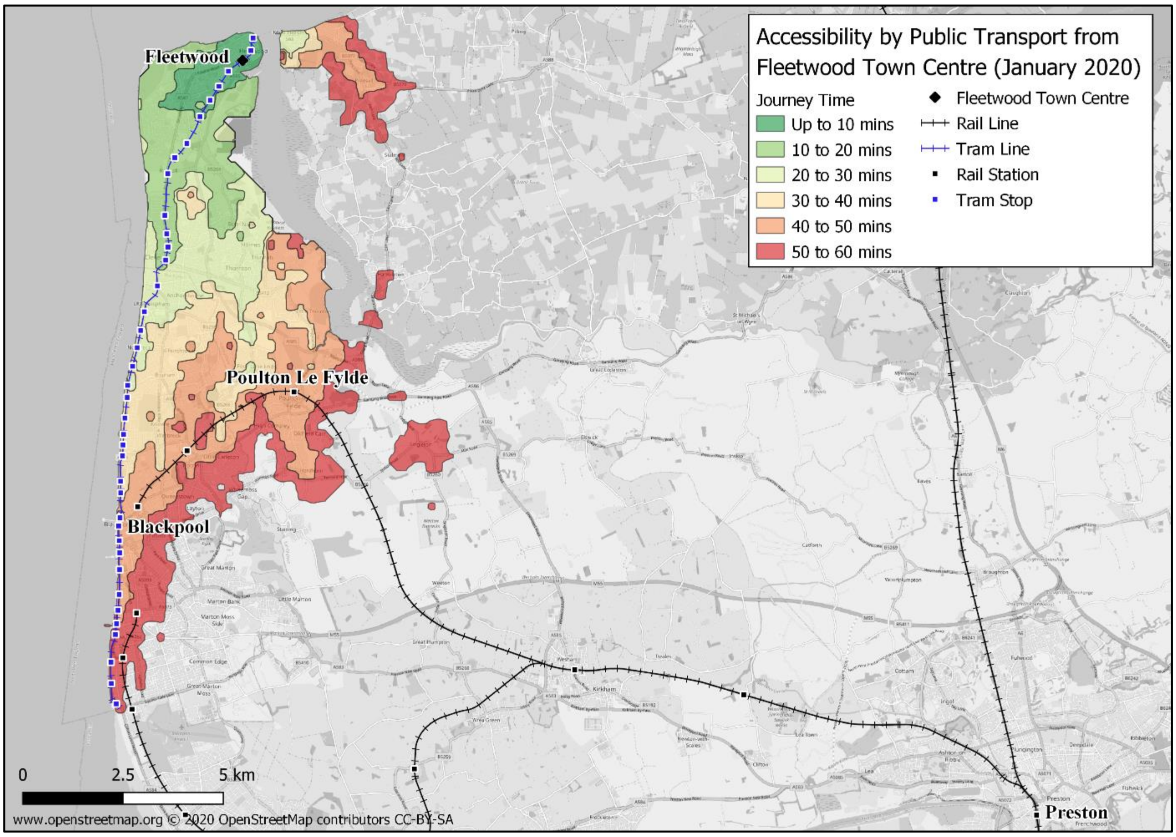
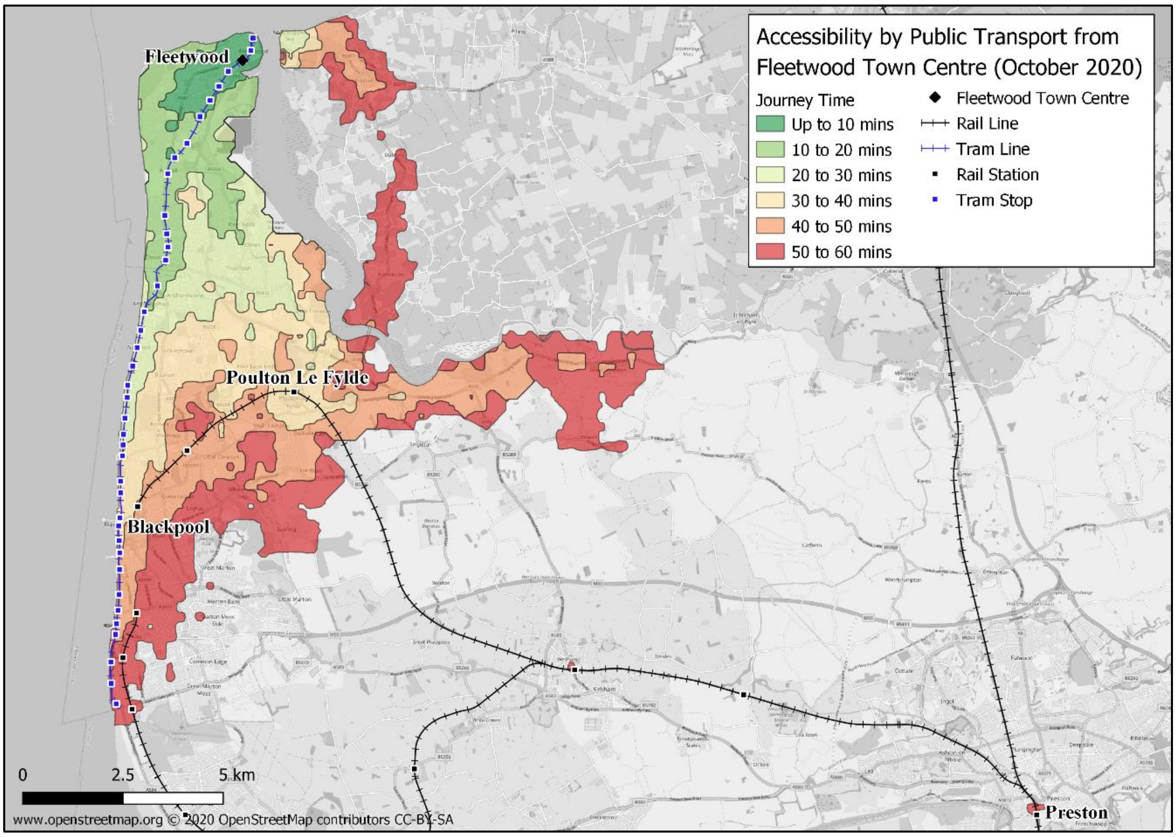


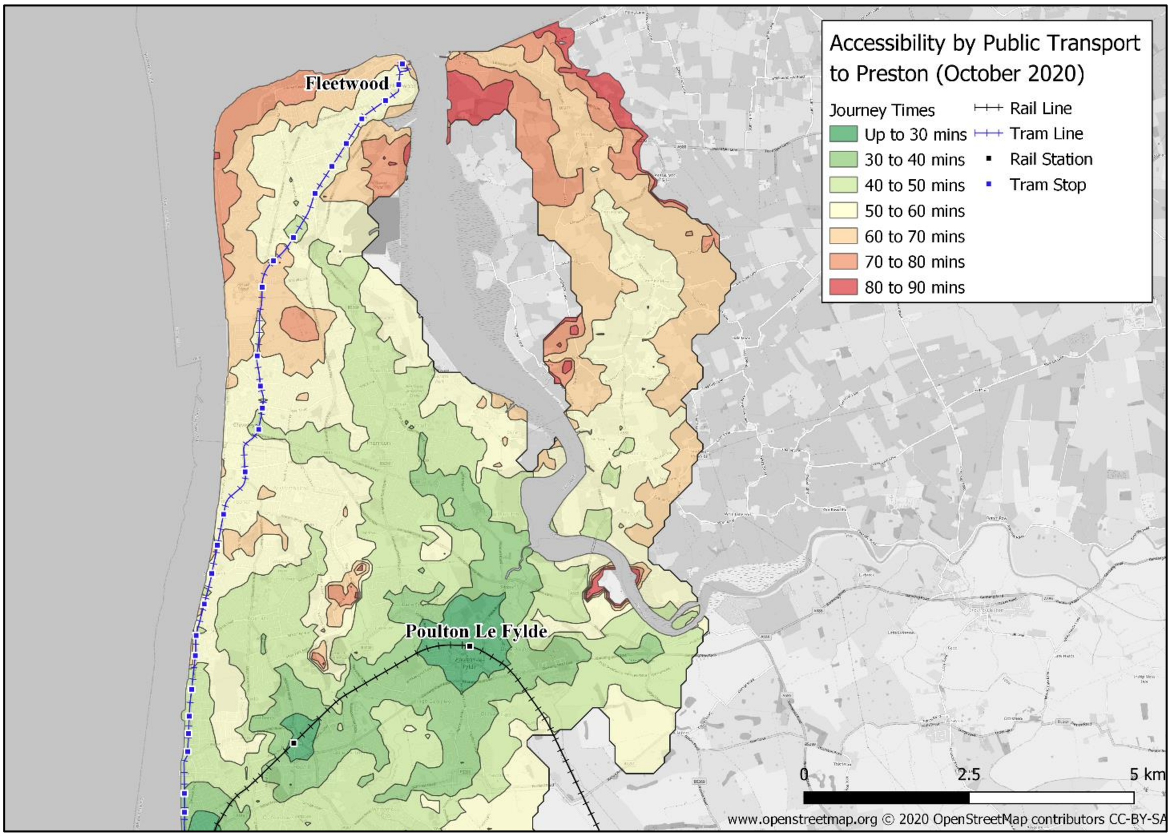
Figure A-2 - Accessibility by public transport from Fleetwood town centre (October 2020)



2.2. Destinations from Fleetwood

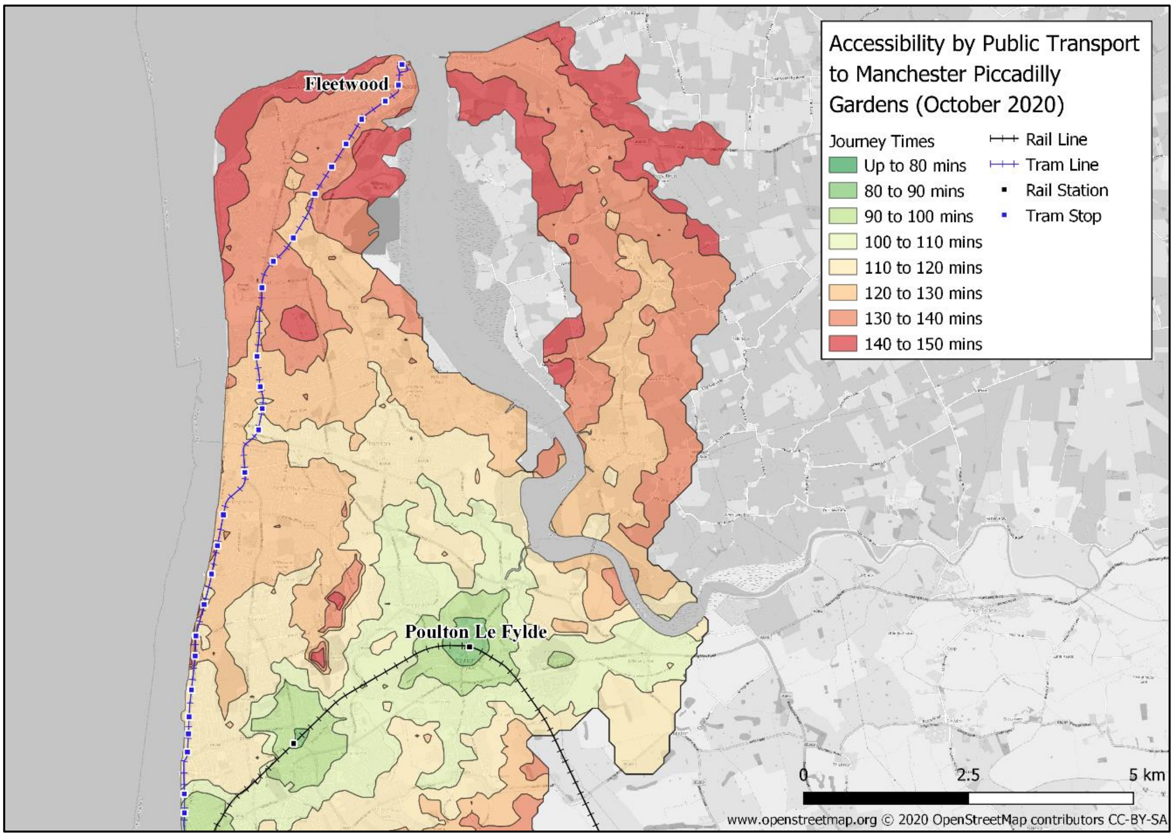
Three destinations were looked at to determine what the travel times from Fleetwood are at present. These were Preston, Manchester, and Liverpool. For each option a destination was placed, respectively outside Preston Station, Piccadilly Gardens, and outside Liverpool Lime Street. An origin grid was placed over Fleetwood and the surrounding area to determine for each point how long it would take to get to either of the three destinations. The resulting contour plots are shown in Figure A-3, A-4 and A-5.

Figure A-3 - Accessibility by public transport to Preston (October 2020)



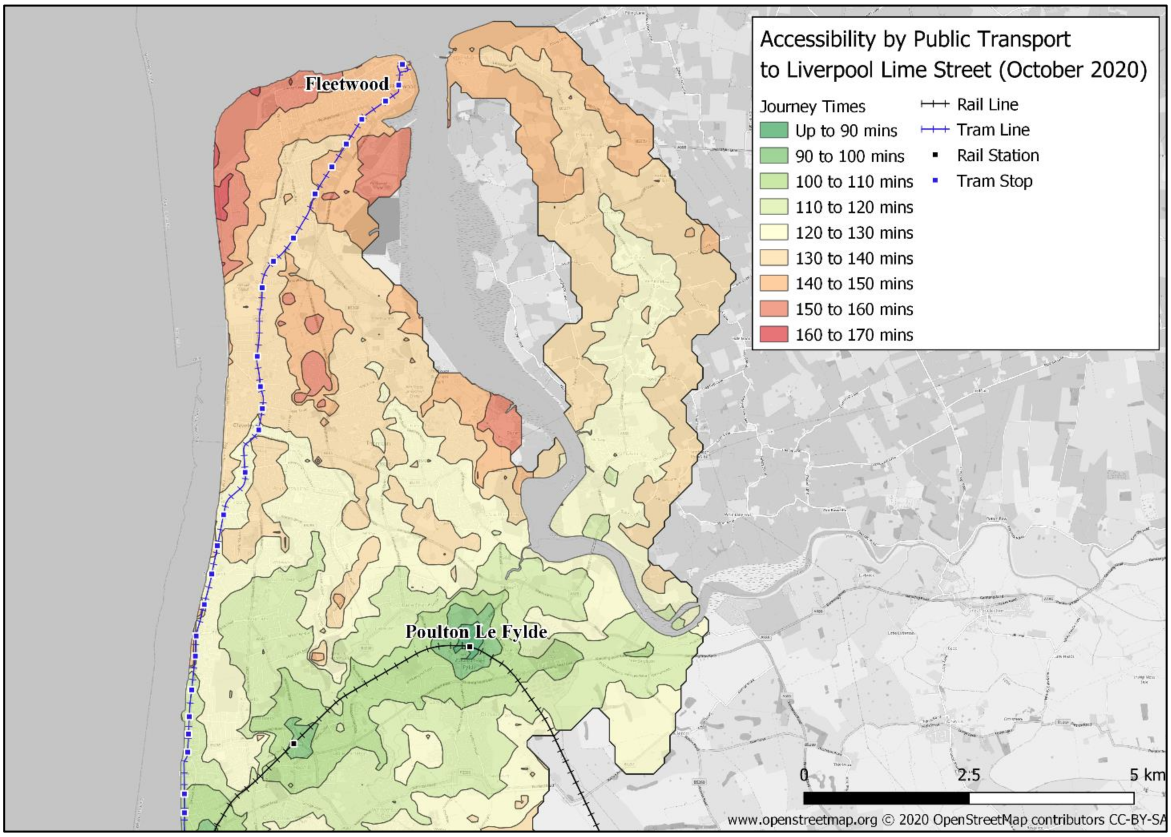
It is possible to reach Preston within 30 minutes from parts of Poulton Le Fylde, and near Layton and Blackpool North stations. There is a section heading upwards into Fleetwood where it is possible to get to Preston in 40 to 50 minutes which follows along the bus route. However, once you get up the north of the peninsula and nearby to Fleetwood town centre it would take 50 to 60 minutes. Residential parts of Fleetwood further out from the town centre have even worse prospects, taking between 60 to 80 mins to reach Preston. These journey times are on the upper end of what people would be willing to commute to work or school.

Figure A-4 - Accessibility by public transport to Manchester Piccadilly Gardens (October 2020)



It is possible to reach Manchester within 80 minutes from parts of Poulton Le Fylde, and the next train station along at Layton. However, once you get 2km away from a train station the accessibility drops off quite a lot. There is a section heading upwards into Fleetwood where it is possible to get to Manchester in 120 to 130 minutes which follows along the bus route. Once you get up the north of the peninsula and to Fleetwood town centre it would take 130 to 140 minutes. Residential parts of Fleetwood further out from the town centre have even worse prospects, taking 140 to 150 mins to reach Manchester. With these journey times, it would not be possible for the people of Fleetwood to commute to Manchester for work or school.

Figure A-5 - Accessibility by public transport to Liverpool Lime Street (October 2020)



It is possible to reach Liverpool within 90 minutes from parts of Poulton Le Fylde, and the next train station along at Layton. However, once you get 2km away from a train station the accessibility drops off quite a lot. There is a section heading upwards into Fleetwood where it is possible to get to Liverpool in 130 to 140 minutes which follows along the bus route. Once you get up the north of the peninsula and to Fleetwood town centre it would take 140 to 150 minutes. Residential parts of Fleetwood further out from the town centre have even worse prospects, taking 150 to 160 mins to reach Liverpool. With these journey times, it would not be possible for the people of Fleetwood to commute to Liverpool for work or school.

2.3. Baseline Population Statistics

In order to understand the impacts of the proposed rail-based services on the economy, it is important to understand the demographics of the locality that will potentially be affected. A range of indicators from the Census 2011 and Nomis (Official Labour Market Statistics) have been identified to provide the existing socioeconomic context of the area including, population and ages, and prevalence of cars.

The following figures are based on the population within an hour of Fleetwood as determined by the contour plots in Section 2. Each output area was split up into sections in the same journey time band. The population was assumed to be evenly distributed across each OA and was split up into each time band using the proportion of the OA that fell into that band by area. These values were then summed up to get a value for each time band. The results are shown in Table A-1 and the percentages in each time back are shown in Table A-2.

Table A-1 - Split of key indicators into journey time bands

	Within 10 mins	10-20 mins	20-30 mins	30-40 mins	40-50 mins	50-60 mins	Total
Population	16,082	21,442	32,582	37,112	39,946	48,439	195,601
16-24-year olds	1,958	2,280	2,807	3,646	4,540	5,389	20,619
16-64-year olds	9,968	12,461	18,656	22,930	25,824	30,442	120,280
No Car Households	2,831	2,450	3,536	4,744	7,710	6,944	28,215

Table A-2 - Percentages of key indicators in each journey time band

	Within 10 mins	10-20 mins	20-30 mins	30-40 mins	40-50 mins	50-60 mins
Population	8%	11%	17%	19%	20%	25%
16-24 year olds	9%	11%	14%	18%	22%	26%
16-64 year olds	8%	10%	16%	19%	21%	25%
No Car Households	10%	9%	13%	17%	27%	25%

The smallest percentage of people, both overall and for each age band, live within 10 minutes of Fleetwood Town Centre. The percentage gets larger as the time bands become larger.

The percentage of no car households is particularly high in the Fleetwood area. There are 64,299 households within an hour journey time of Fleetwood Town Centre. Table A-1 gives the number of these households without a car as 28,215, which would give a percentage of 43.9%. This is very high when compared to the average in England of 25.6%.

2.4. Overall Picture

The overall picture of accessibility in Fleetwood in the present day is poor, with it taking at least half an hour to get to the nearest rail station. To get to Preston from Fleetwood town centre takes approximately 50-60 minutes which is on the upper end of what people will be willing to commute daily. Both Manchester and Liverpool are over 2 hours away by public transport. This combined with the high percentage of non-car owning households means people living in the area will struggle with access to employment opportunities.

3. Analysis of Do Something Accessibility

3.1. Scenarios

Four Do-Something (DS) scenarios have been considered. These are as followed:

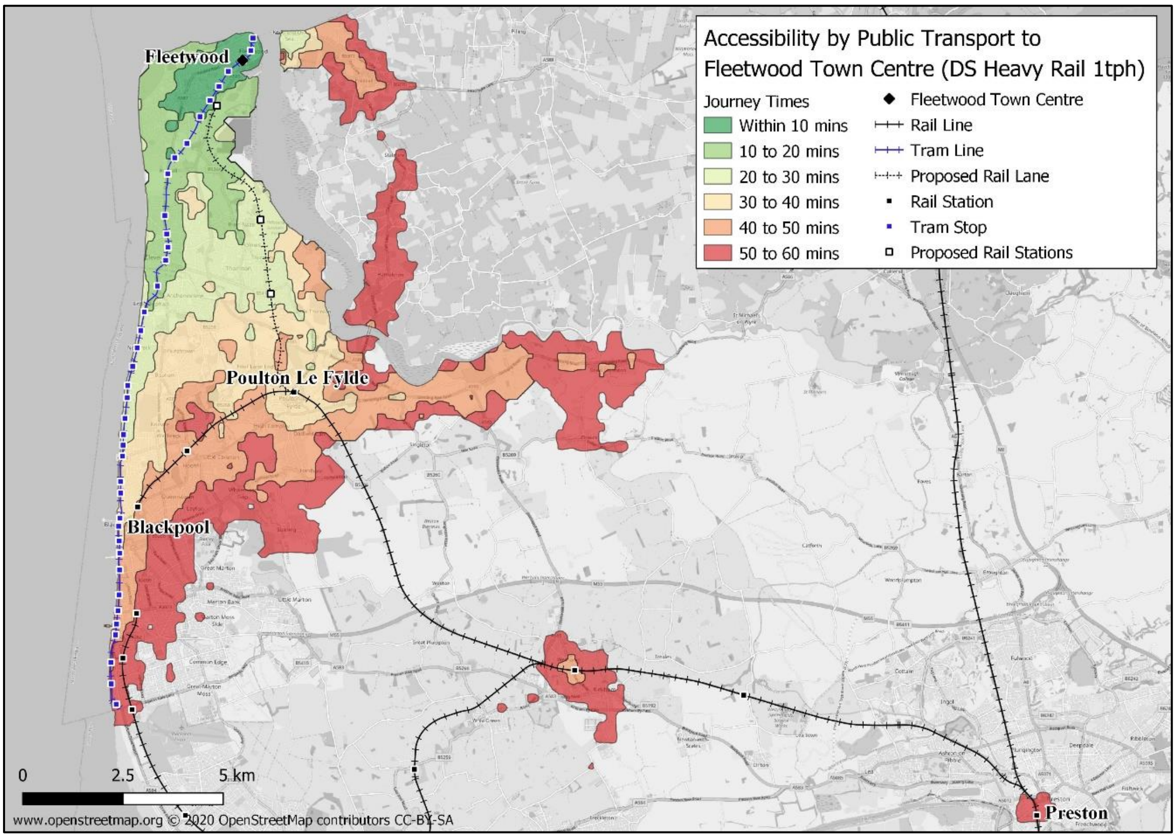
- DS Heavy Rail 1tph – A single train running between Poulton Le Fylde and Fleetwood an hour, stopping at Thornton and Burn Naze stations
- DS Heavy Rail 4tph – a four trains per hour running between Poulton Le Fylde and Fleetwood, stopping at Thornton and Burn Naze stations
- DS Heavy Rail 1tph through to Preston – a once an hour service running between Preston and Fleetwood, stopping at Kirkham and Wesham, Poulton Le Fylde, Thornton, and Burn Naze
- DS Light Rail 4 tph – Four trams an hour running between Poulton Le Fylde and Fleetwood Ferry, stopping at Thornton, Burn Naze, joining the existing tram network at Broadwater tram stop and stopping at all subsequent stops

TRACC has been run for each scenario modelling same as the baseline the accessibility into Fleetwood Town Centre, and the accessibility to Preston, Manchester, and Liverpool from the Fylde Coast Peninsula area.

3.2. DS Heavy Rail 1tph

The additional train has been timed to interchange with existing services at Poulton Le Fylde as best as possible. The accessibility into Fleetwood town centre once the new train service has been introduced is shown in Figure A-6.

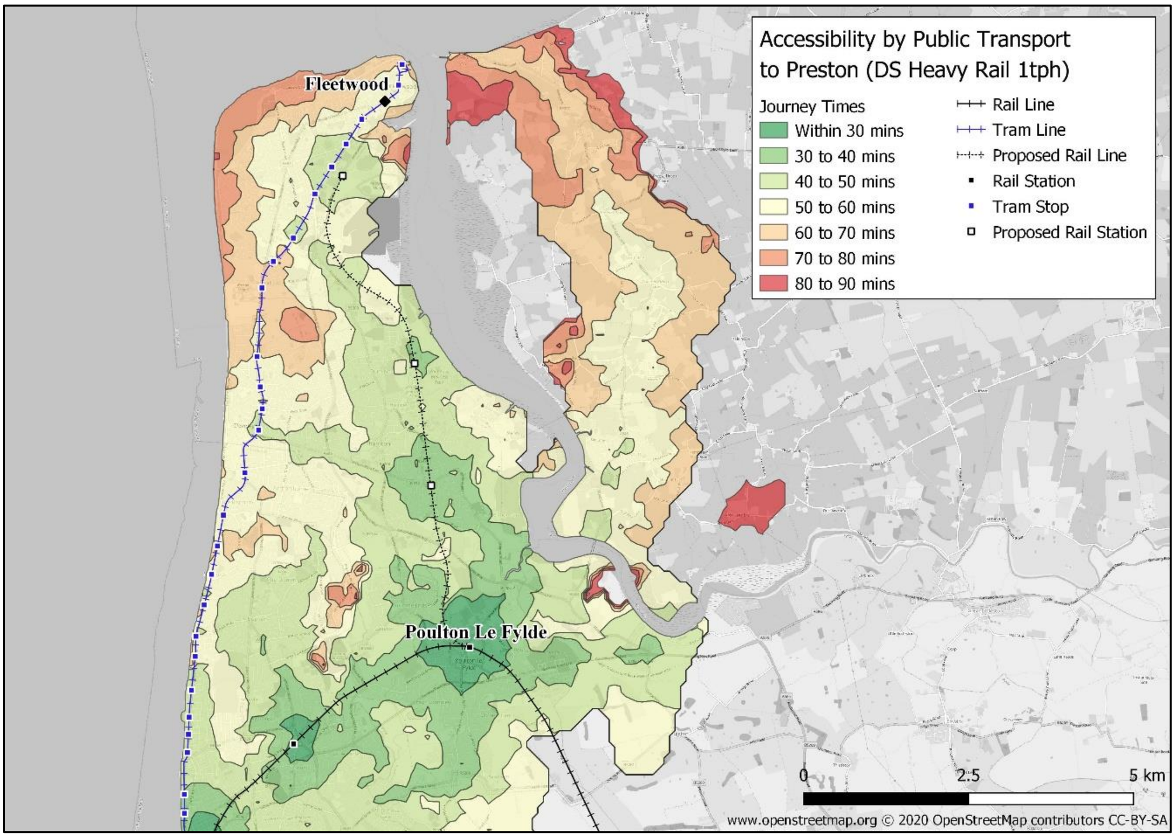
Figure A-6 - Accessibility by public transport to Fleetwood town centre (DS Heavy Rail 1tph)



Compared to the baseline scenario shown in Figure A-2, the accessibility to Kirkham and Preston has improved, with the area around Kirkham station able to reach Fleetwood town centre in 40 to 50 minutes, and a wider area around both stations within an hour. There is little to no difference in the accessibility elsewhere. This may be down to the fact the Fleetwood rail station is not located in the town centre, and it would require an alternative form of transport or an almost 20-minute walk to reach the centre. This means that any time saving made by the addition of the train service over other forms of public transport are being negated by the need to interchange, and poor connection between services. There are few bus services stopping within the immediate vicinity of the proposed station location, with only the 75 bus providing an hourly service.

The accessibility to Preston from the Fylde Coast Peninsula is shown in Figure A-7.

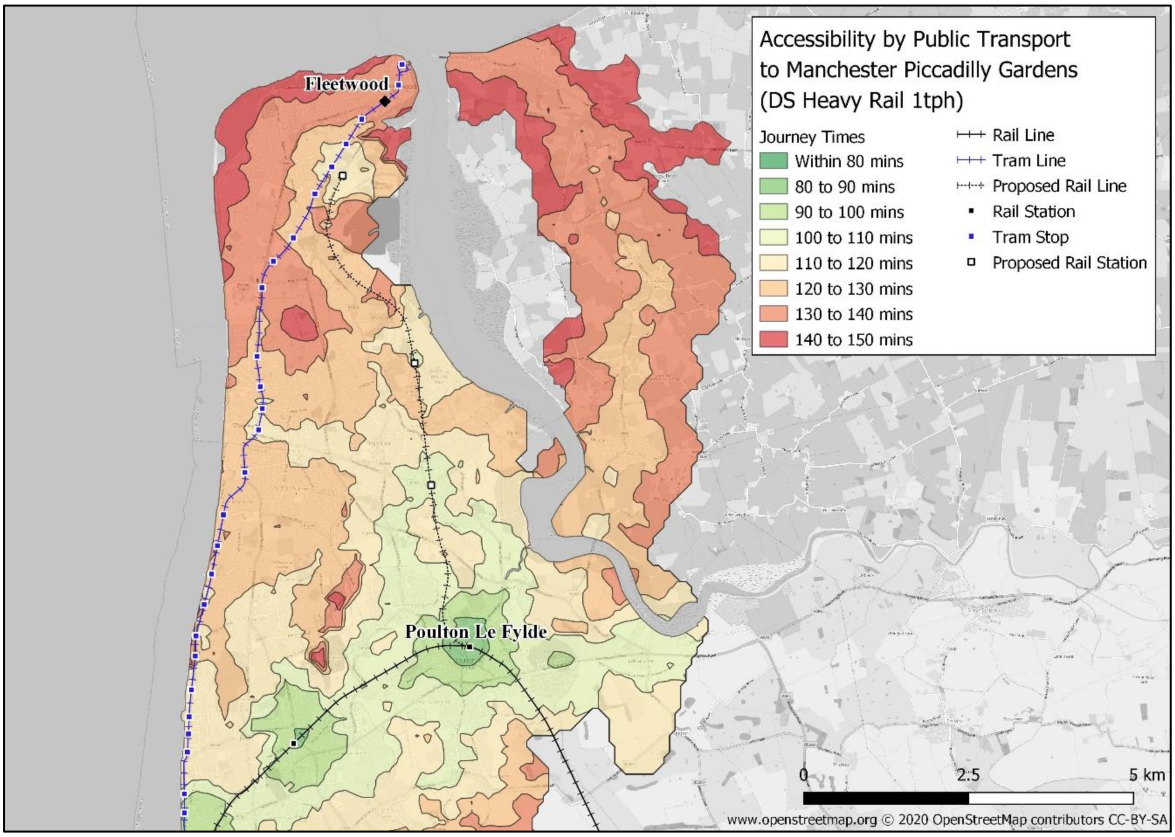
Figure A-7 - Accessibility by public transport to Preston (DS Heavy Rail 1tph)



Compared the baseline accessibility results to Preston shown in Figure A-3, accessibility around all of the proposed station locations has improved, particularly at Thornton and Fleetwood. The accessibility has improved to the east of Burn Naze station, but not to the west. This is down to a lack of access between Bourne Road and Butts Road, which reduces accessibility to the residential area located on Butts Road. The travel time improvements around the Fleetwood station location do not reach the town centre, again due to lack of accessibility around the proposed location.

The accessibility to Manchester from the Fylde Coast Peninsula is shown in Figure A-8.

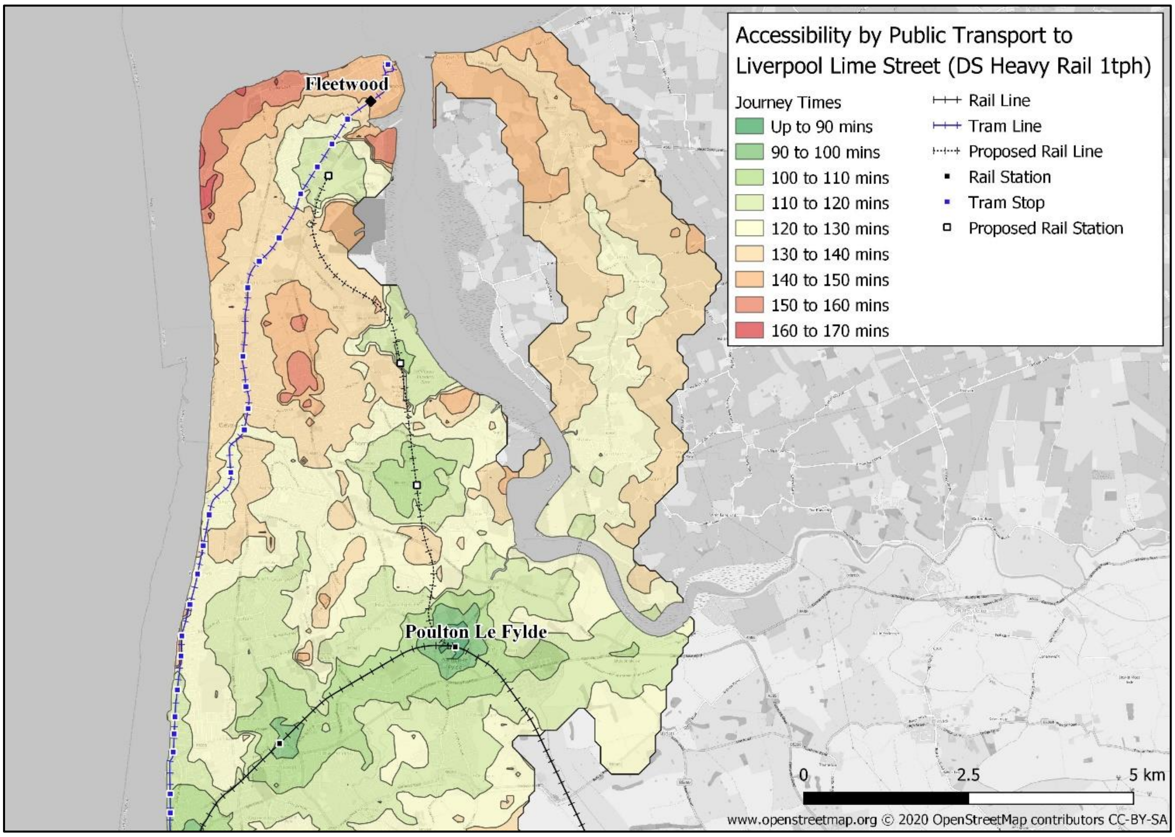
Figure A-8 - Accessibility by public transport to Manchester Piccadilly Gardens (DS Heavy Rail 1tph)



Compared to the baseline accessibility to Manchester shown in Figure A-4, the accessibility have improved to the areas around the proposed station locations. Similar to above, there are limited improvements at Burn Naze due to the lack of access. Journey time improvements do not reach Fleetwood town centre.

The accessibility to Liverpool from the Fylde Coast Peninsula is shown in Figure A-9**.**

Figure A-9 - Accessibility by public transport to Liverpool Lime Street (DS Heavy Rail 1tph)

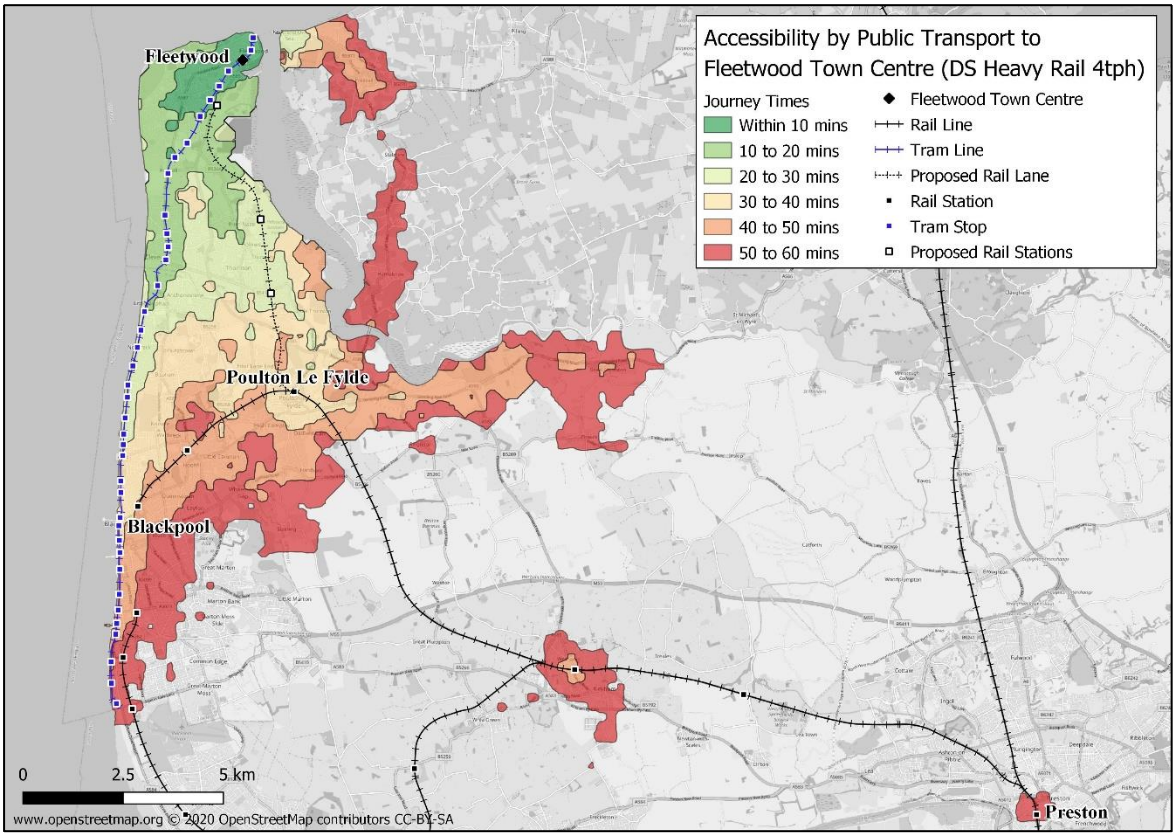


Compared to the baseline accessibility to Liverpool shown in Figure A-5, there are quite significant improvements to the accessibility around the proposed stations, barring west of Burn Naze. There is also a slight improvement in journey time from the southern half of Fleetwood town centre. The improvements are slightly better to Liverpool than Manchester due to the train service integrating better with the Liverpool service at Poulton Le Fylde station.

3.3. DS Heavy Rail 4tph

The additional trains have been timed to interchange with existing services at Poulton Le Fylde as best as possible. The accessibility into Fleetwood town centre once the new train services have been introduced is shown in Figure A-10.

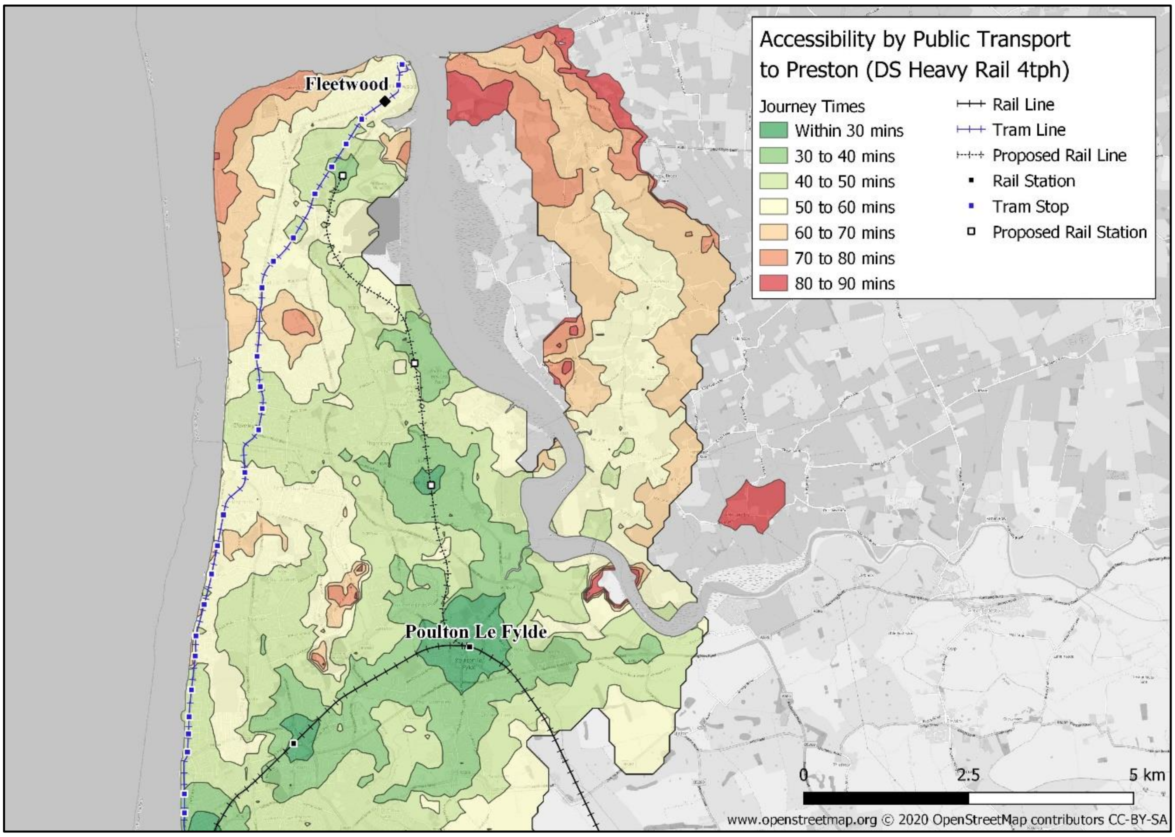
Figure A-10 - Accessibility by public transport to Fleetwood town centre (DS Heavy Rail 4tph)



Compared to the 1 train per hour scenario shown in Figure A-6, there are few improvements despite the additional train services. The only difference between the two scenarios is the ability to reach Singleton within an hour. This lack of change shows that the interchanging at both Poulton Le Fylde off services from Preston and at the proposed Fleetwood station towards Fleetwood town centre is very poor, and a more regular service still does not align well with existing services.

The accessibility to Preston from the Fylde Coast Peninsula is shown in Figure A-11.

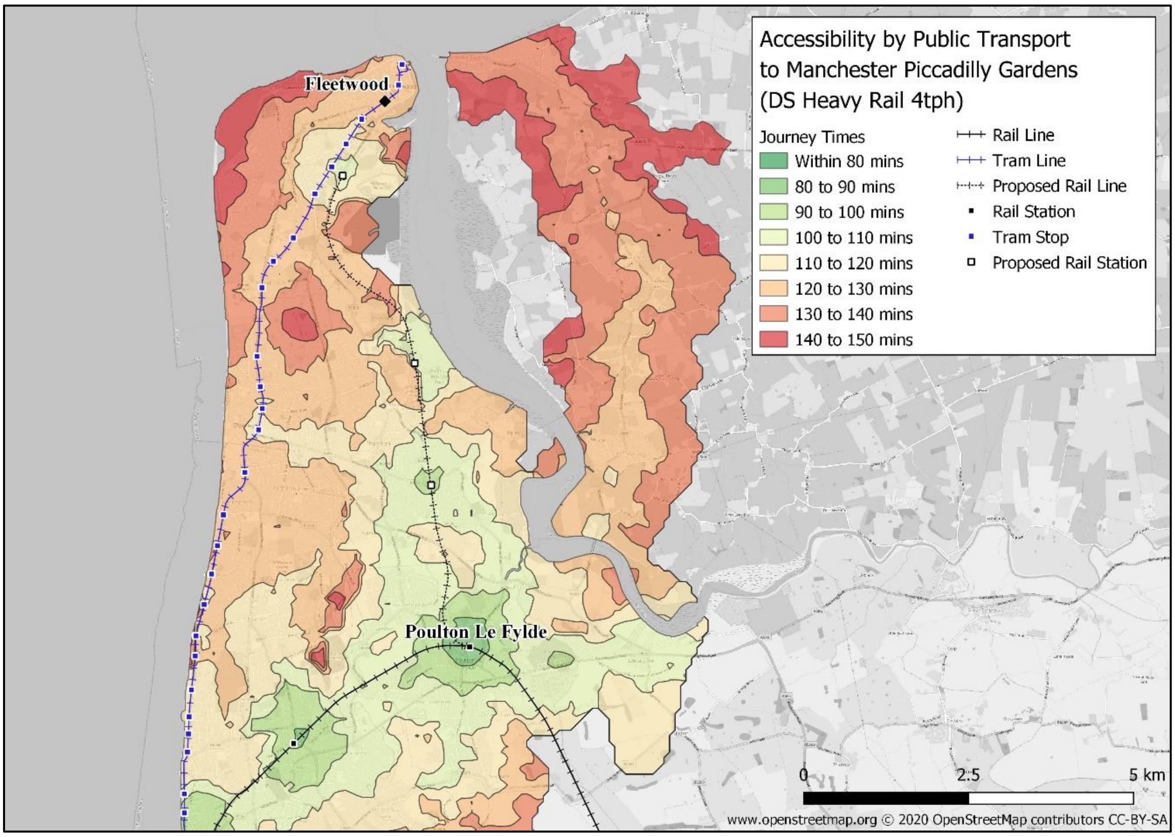
Figure A-11 - Accessibility by public transport to Preston (DS Heavy Rail 4tph)



Compared the 1 train per hour scenario shown in Figure A-7, there is improved accessibility around the proposed station locations to Preston. Thornton station is now within 30 mins, and Fleetwood station within 30 to 40 mins due to better aligning at Poulton Le Fylde with train services heading towards Preston. There is no improvement from Fleetwood town centre due to the poor connectivity at the Fleetwood station location.

The accessibility to Manchester from the Fylde Coast Peninsula is shown in Figure A-12.

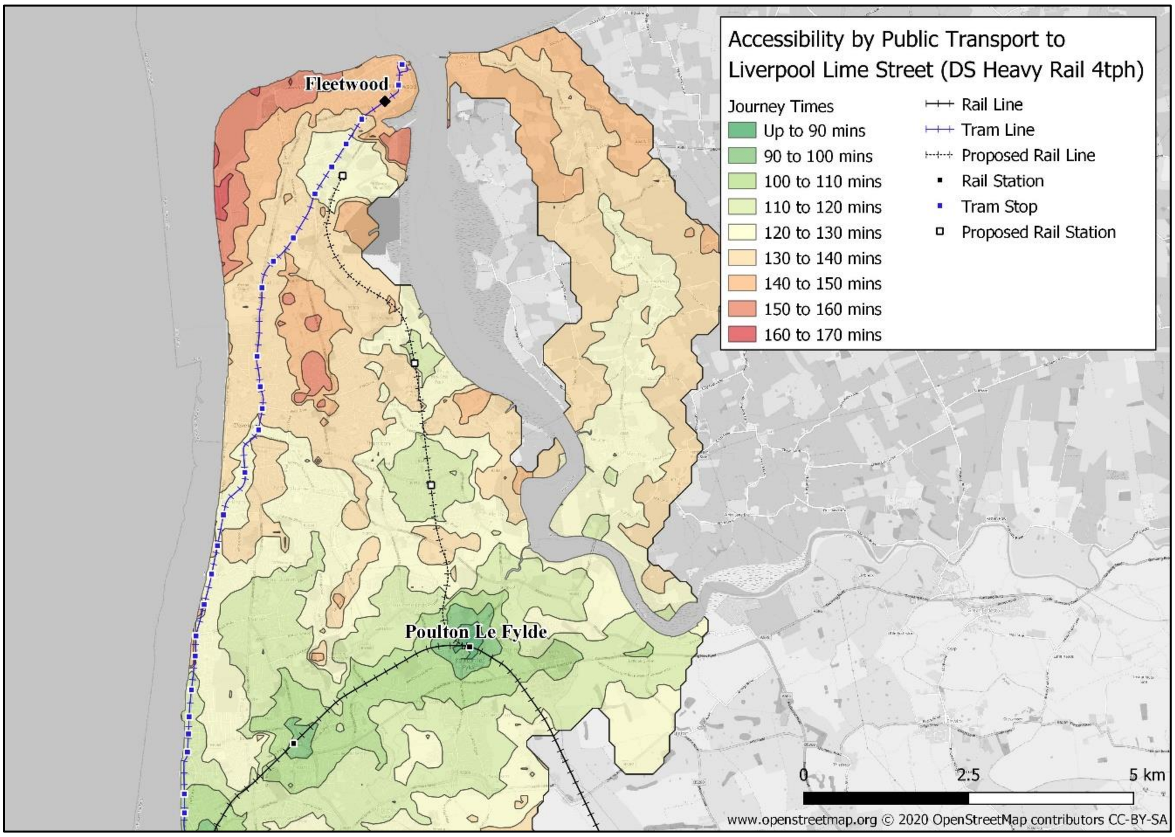
Figure A-12 - Accessibility by public transport to Manchester Piccadilly Gardens (DS Heavy Rail 4tph)



Compared the 1 train per hour scenario shown in Figure A-8, there is improved accessibility around the proposed station locations to Manchester. Thornton station is now within 90 to 100 mins, and Fleetwood station within 110 to 120 mins due to better aligning at Poulton Le Fylde with train services heading towards Preston. There is a slight improvement at Fleetwood town centre, with it being possible to reach Manchester in 120-130 mins.

The accessibility to Liverpool from the Fylde Coast Peninsula is shown in Figure A-13.

Figure A-13 - Accessibility by public transport to Liverpool Lime Street (DS Heavy Rail 4tph)

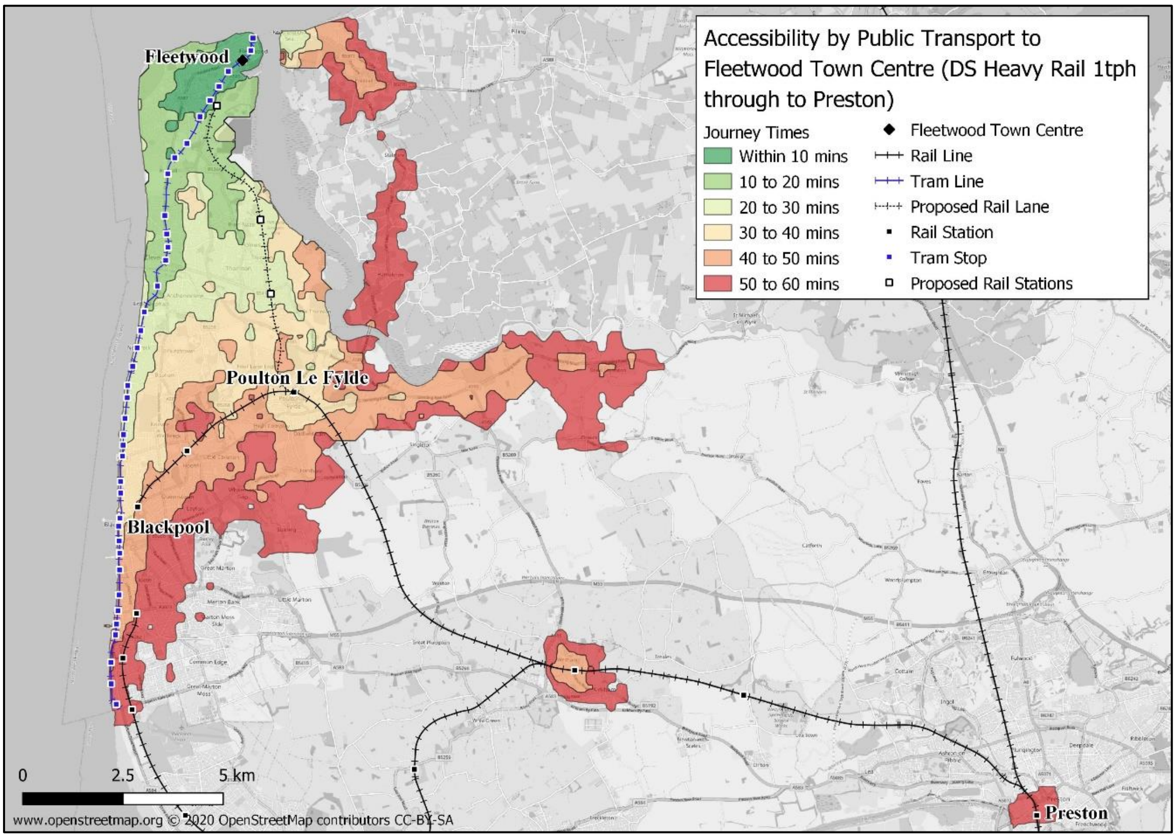


Compared the 1 train per hour scenario shown in Figure A-9, there is an increase in journey times for all of the areas surrounding the proposed station locations. The fact the trains are running at 4 per hour involves using 2 trains and hence the timetable is constrained by the need for passing loops. This means that the times of arrival at Poulton Le Fylde will not perfectly match that in the 1tph scenario. The services in this scenario do not link into the service to Liverpool as well as in the 1tph scenario, hence the increase in journey times. The journey times are an improvement compared to the baseline scenario, however.

3.4. DS Heavy Rail 1tph through to Preston

The additional train has been timetabled to avoid clashing with the Blackpool South service to Preston as best as possible. The accessibility into Fleetwood town centre once the new train service has been introduced is shown in Figure A-14.

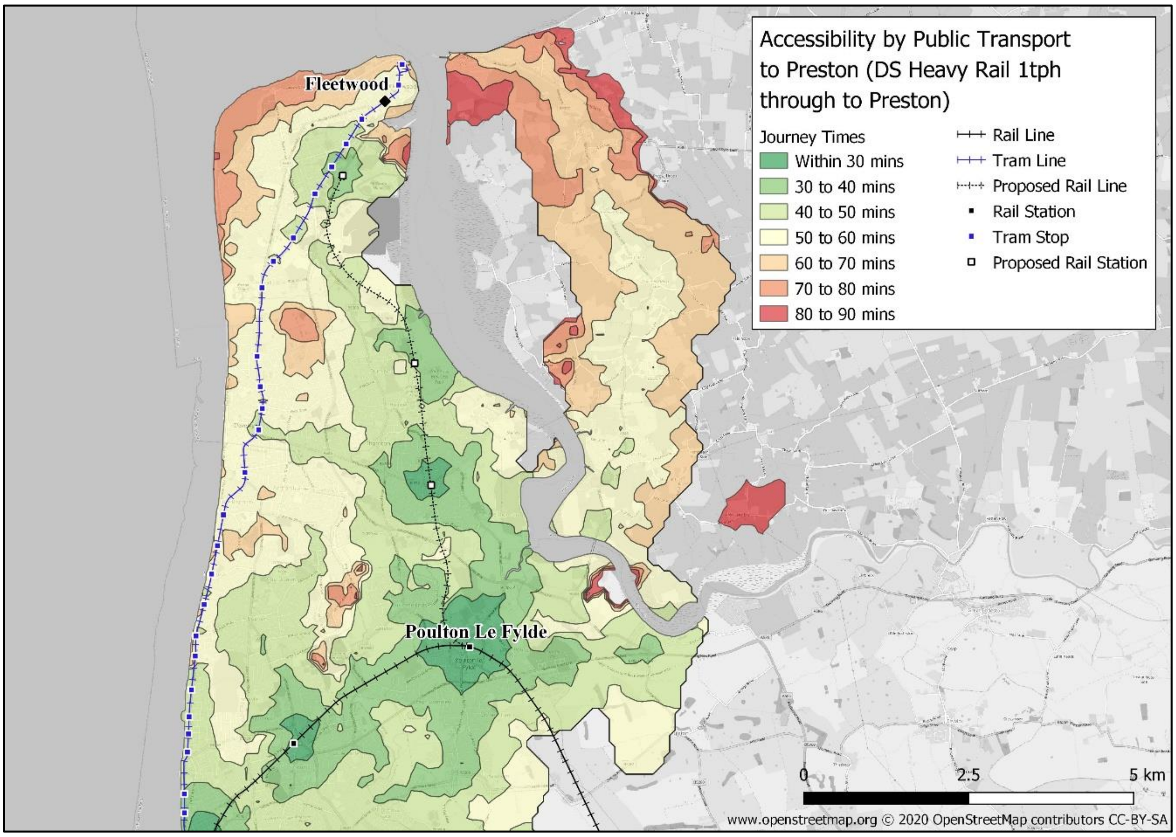
Figure A-14 - Accessibility by public transport to Fleetwood town centre (DS Heavy Rail 1tph through to Preston)



Compared to the 1 train per hour to Poulton Le Fylde scenario shown in Figure A-6, there is a slight improvement to the area in Kirkham within 50 to 60 mins, and the area within 60 mins in Preston. The improvements are not significant, and there is no improvement on the peninsula beyond that which the train from Poulton Le Fylde provides.

The accessibility to Preston from the Fylde Coast Peninsula is shown in Figure A-15.

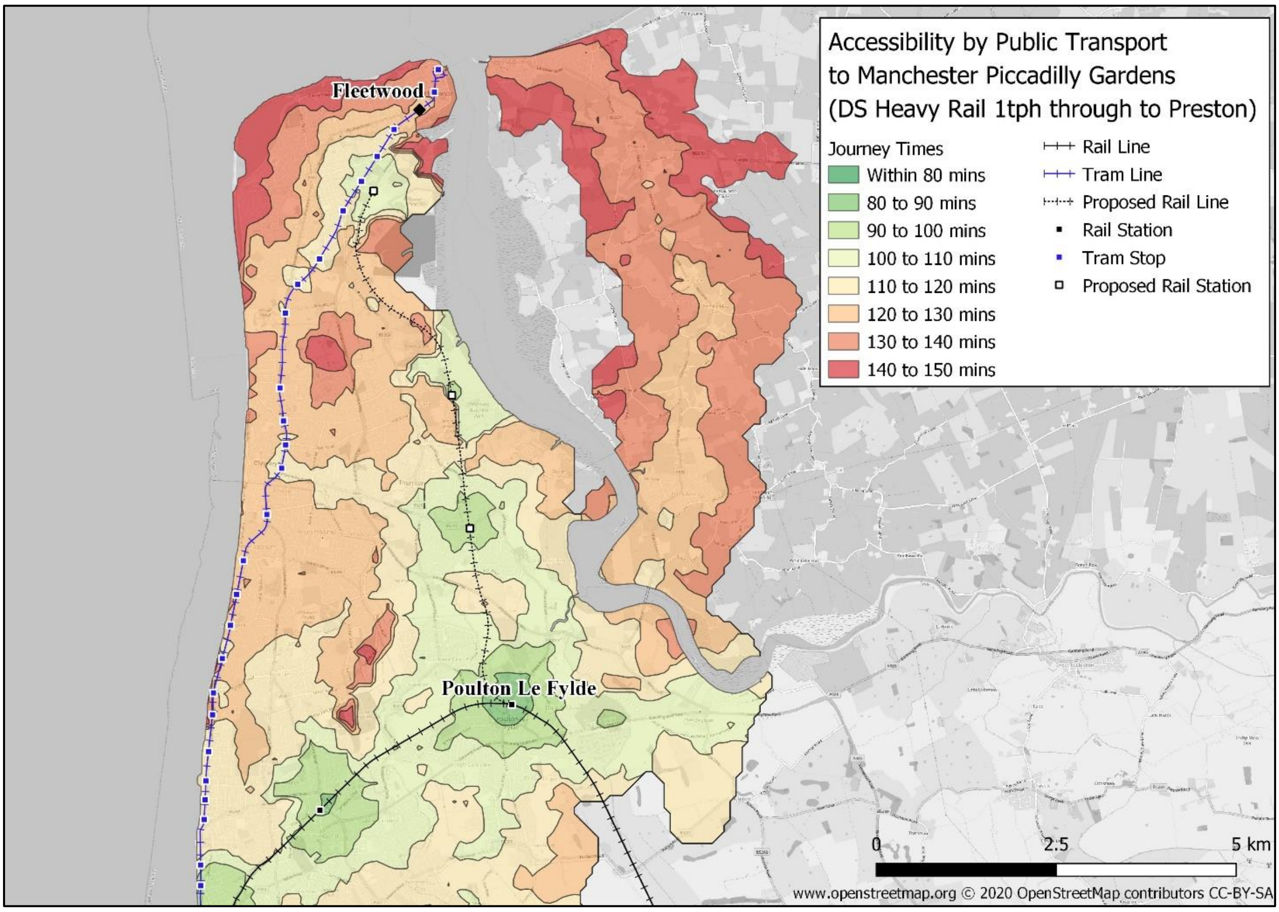
Figure A-15 - Accessibility by public transport to Preston (DS Heavy Rail 1tph through to Preston)



Compared the 1 train per hour from Poulton Le Fylde scenario shown in Figure A-7, there is improved accessibility around the proposed station locations to Preston. This is due to the need to no longer interchange at Poulton Le Fylde station. Thornton station is now within 30 mins, and Fleetwood station within 30 to 40 mins. There is no improvement from Fleetwood town centre due to the poor connectivity at the Fleetwood station location. This is similar to the improvements seen in the 4tph scenario.

The accessibility to Manchester from the Fylde Coast Peninsula is shown in Figure A-16.

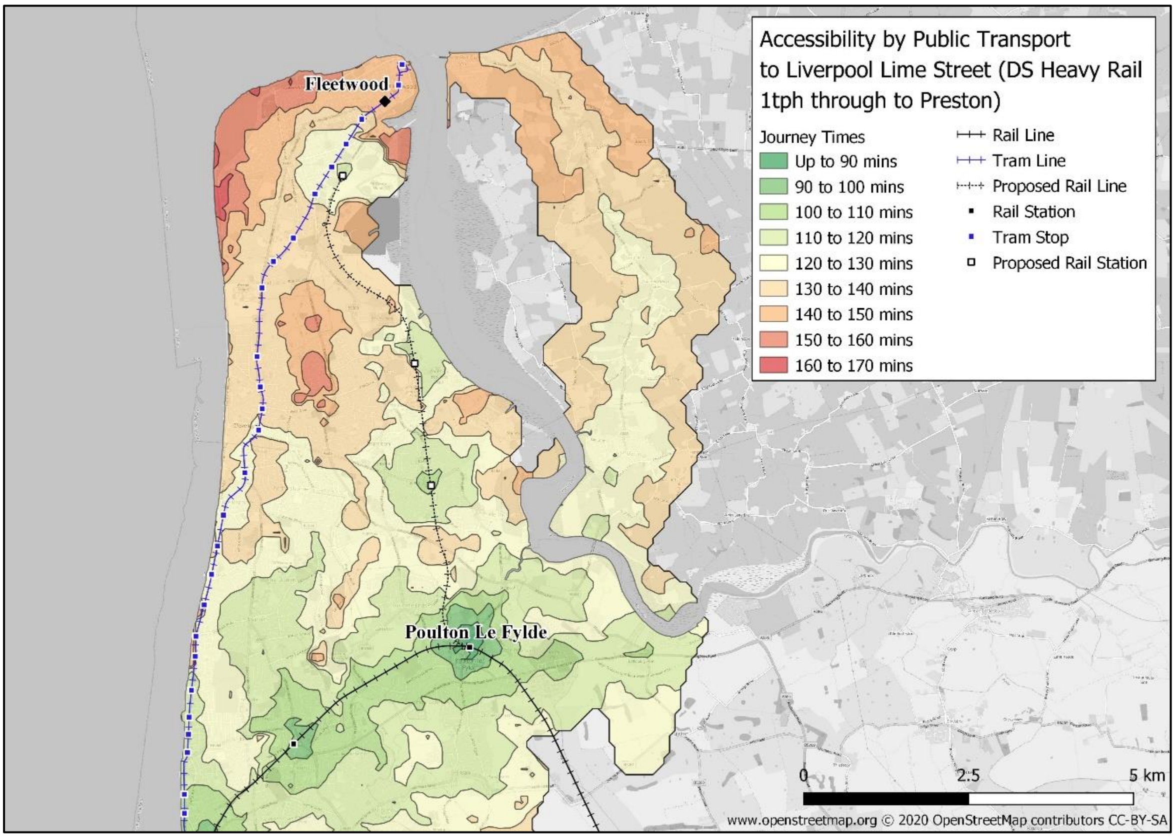
Figure A-16 - Accessibility by public transport to Manchester Piccadilly Gardens (DS Heavy Rail 1tph through to Preston)



Compared the 1 train per hour to Poulton Le Fylde scenario shown in Figure A-8, there is improved accessibility around the proposed station locations to Manchester. Thornton station is now within 90 mins, Burn Naze station within 90 to 100 mins and Fleetwood station within 100 to 110 mins due no need to interchange at Poulton Le Fylde. There is also an improvement down the tram corridor towards Blackpool that is not seen in the train to Poulton scenario.

The accessibility to Liverpool from the Fylde Coast Peninsula is shown in Figure A-17.

Figure A-17 - Accessibility by public transport to Liverpool Lime Street (DS Heavy Rail 1tph through to Preston)

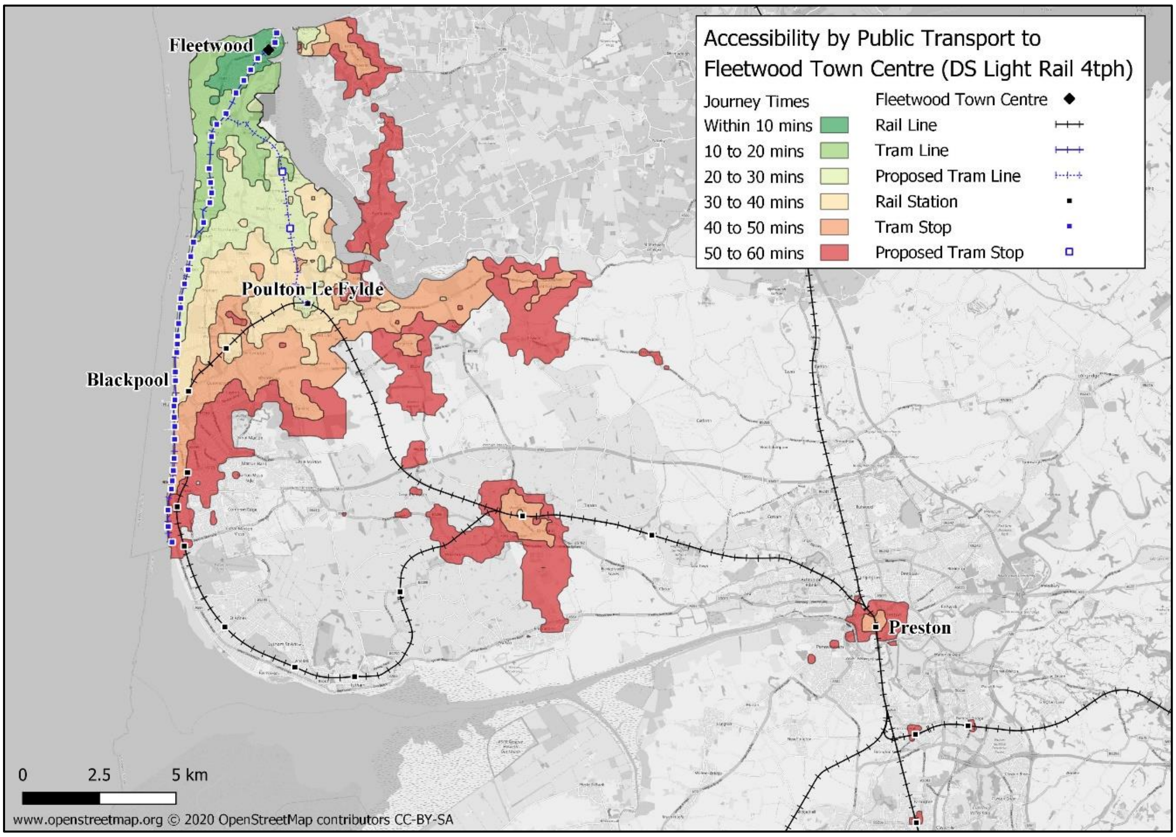


Compared the 1 train per hour to Poulton Le Fylde scenario shown in Figure A-9, there is an increase in journey times for all of the areas surrounding the proposed station locations. As before, the decision to timetable this train to avoid the Blackpool South train means the times of arrival at Poulton Le Fylde will not perfectly match that in the 1tph scenario. The service will increase accessibility to Preston, but there would still be an interchange either there or at Poulton Le Fylde that does not align as well as in the 1tph scenario. The journey times are an improvement compared to the baseline scenario, however.

3.5. DS Light Rail 4tph

The additional tram services have been timetabled to integrate with current tram services at Broadwater as best as possible. The accessibility into Fleetwood town centre once the new tram service has been introduced is shown in Figure A-18.

Figure A-18 - Accessibility by public transport to Fleetwood town centre (DS Light Rail 4tph)

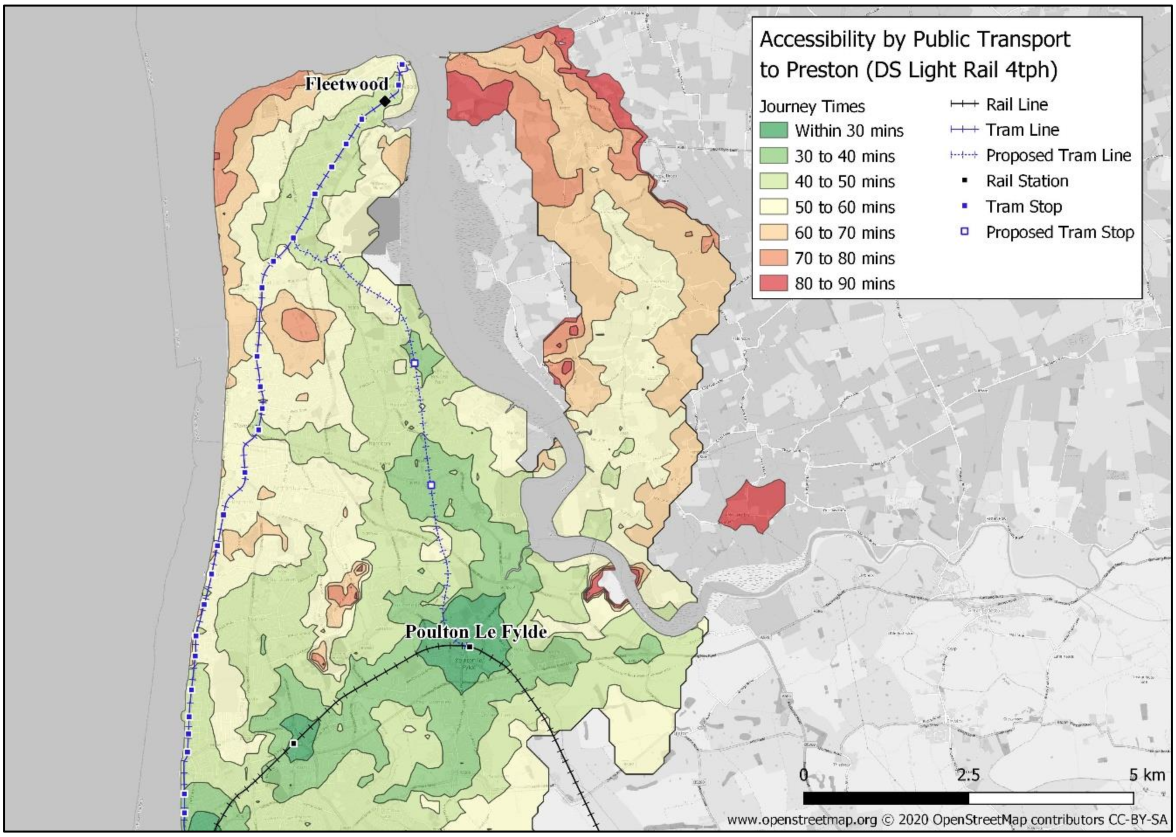


Compared to the baseline scenario shown in Figure A-2, there are large improvements to accessibility from Kirkham and Preston with Fleetwood town centre being within 40 to 50 minutes. It is also possible to reach Fleetwood town centre from places like Lostock, Bamber Bridge, and Leyland within an hour. The accessibility from Poulton Le Fylde, Thornton, and Burn Naze all improve in the vicinity of the tram stops, as well as from the area around Layton train station.

Compared to a similar frequency of services run using heavy rail instead, as shown in Figure A-10, the improvements to Kirkham and Preston are bigger, as well as the improvements are Burn Naze and Poulton Le Fylde stations. This is due to the tram connecting in well with other services at Broadwater tram stop, both tram and a large number of bus routes that stop near the tram stop. The possibility for Broadwater to become an interchange has merit, as there is space for better waiting facilities at the current tram stop.

The accessibility to Preston from the Fylde Coast Peninsula is shown in Figure A-19.

Figure A-19 - Accessibility by public transport to Preston (DS Light Rail 4tph)

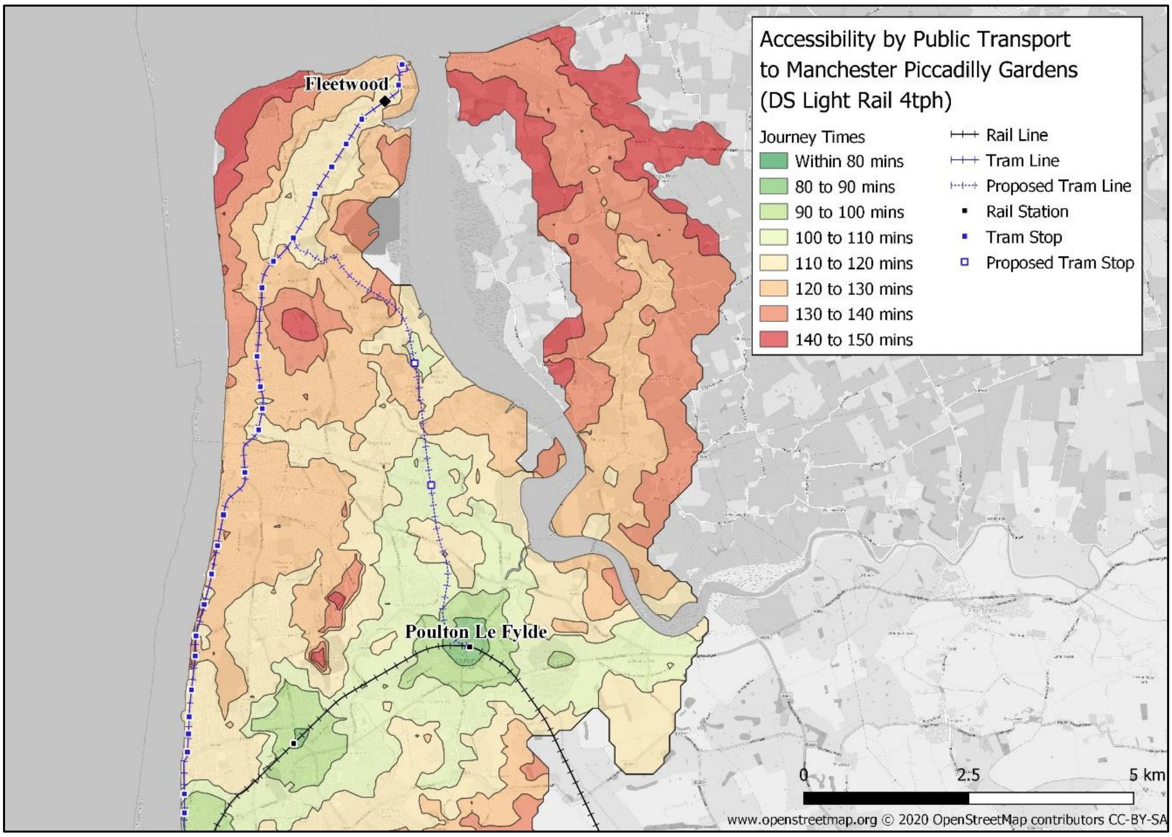


Compared to the baseline scenario shown in Figure A-3, there are large improvements at all proposed stations and up into Fleetwood town centre. Fleetwood town centre is now within 40 to 50 minutes of Preston, whereas in the baseline it is 50 to 60.

Compared to a similar frequency of services run using heavy rail instead, as shown in Figure A-11, the improvements to Kirkham and Preston are bigger, as well as the improvements are Burn Naze and Poulton Le Fylde stations. This is due to the tram connecting in well with other services at Broadwater tram stop, both tram and a large number of bus routes that stop near the tram stop. The possibility for Broadwater to become an interchange has merit, as there is space for better waiting facilities at the current tram stop.

The accessibility to Manchester from the Fylde Coast Peninsula is shown in Figure A-20.

Figure A-20 - Accessibility by public transport to Manchester Piccadilly Gardens (DS Light Rail 4tph)

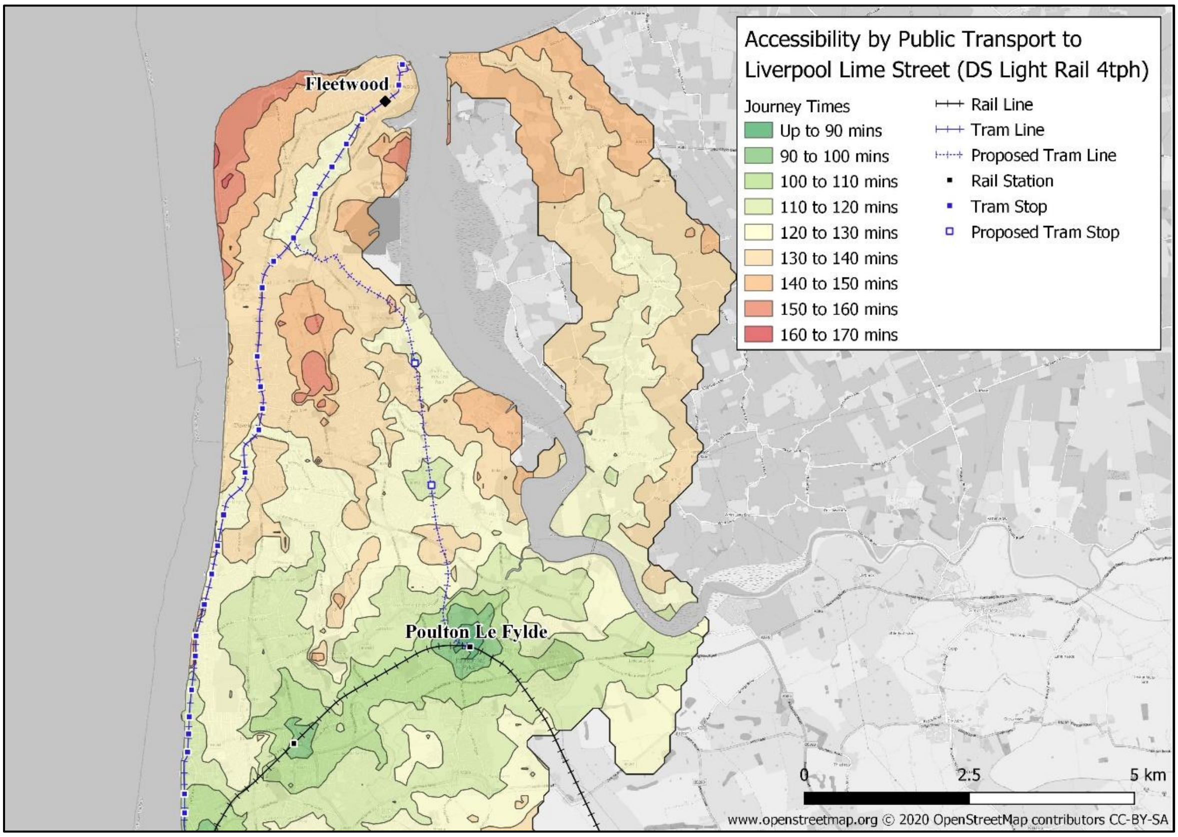


Compared to the baseline scenario shown in Figure A-4, there are large improvements at all proposed stations and up into Fleetwood town centre, with Thornton and Burn Naze within 100 to 110 mins. From Broadwater tram stop up into Fleetwood town centre is now within 110 to 120 mins, which is a big improvement from 130-140 mins in the baseline scenario.

Compared to a similar frequency of services run using heavy rail instead, as shown in Figure A-12, the journey times from Thornton and Burn Naze are slower as the tram journey times as longer. There is an improvement to Fleetwood town centre, as the area within 110 to 120 extends up into the town due to the greater penetration of the tram, as well as further south along the tram route due to connecting well into services heading towards Blackpool at Broadwater.

The accessibility to Liverpool from the Fylde Coast Peninsula is shown in Figure A-21.

Figure A-21 - Accessibility by public transport to Liverpool Lime Street (DS Light Rail 4tph)



Compared to the baseline scenario shown in Figure A-5, there are large improvements at all proposed stations and up into Fleetwood town centre, with Thornton and Burn Naze within 110 to 120 mins. From Broadwater tram, but not quite up to Fleetwood town centre is now within 120 to 130 mins.

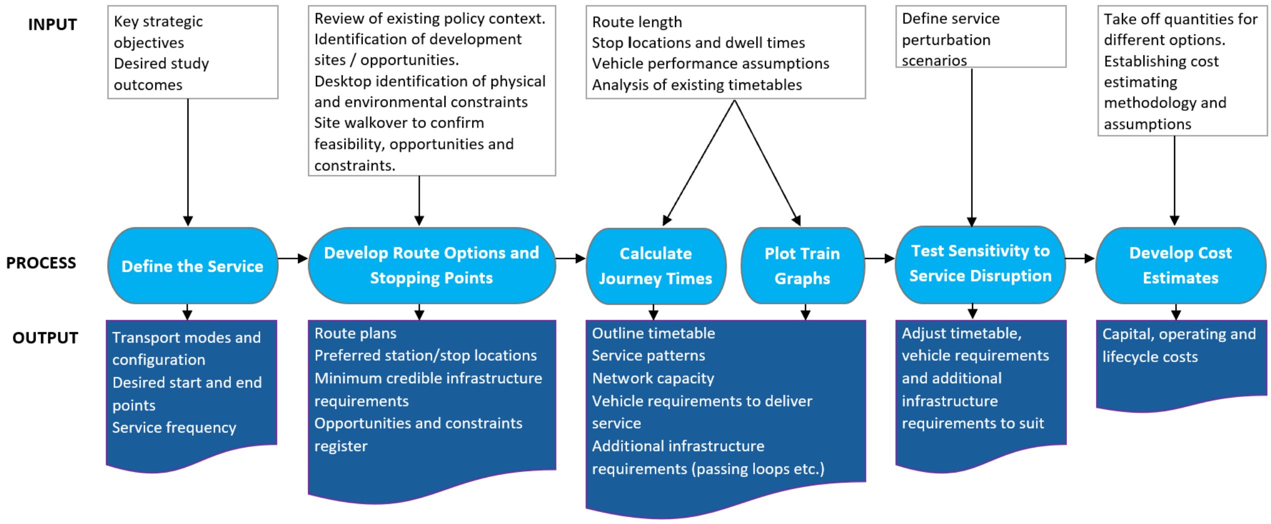
Compared to a similar frequency of services run using heavy rail instead, as shown in Figure A-13, the improvements to Burn Naze and Poulton Le Fylde stations are not as large due to longer tram journey times. Similarly to the Manchester results, the area within 120 to 130 minutes extends further north towards Fleetwood town centre, as well as south towards Blackpool.

Appendix B - Engineering Feasibility Assessment

1. Introduction

The Engineering Report provides the detail behind the process of option development and assessment summarised in Figure B-1.

Figure B-1: Option Development Process



2. Technical Considerations

Given the heavy rail and light rail provision already serving the Fylde Coast, the feasibility assessment considers three transportation modes, as follows:

- **A Heavy Rail Option** - reinstating the route to heavy rail standards on the former track bed between Poulton-le-Fylde and a new station on the outskirts of Fleetwood. This option will include providing an east-facing physical connection to the existing railway at Poulton-le-Fylde, to allow services to be fully integrated into the national rail system and run to and from Preston and destinations beyond.
- **A Tram (Light Rail) Option** – reinstating the track bed between Poulton-le-Fylde and the outskirts of Fleetwood as a tram route, and integrating this with the existing Blackpool Tram system via a brand new section of on-street (or adjacent to the highway) between the end of the existing track bed and Fleetwood Town Centre. Services could operate to and from the centre of Fleetwood either as an extension of the existing Blackpool tram services or as a simple light rail shuttle between Fleetwood and Poulton-le-Fylde. Due to differences in the tram and rail networks onward running beyond Poulton-le-Fylde is not possible, and no direct connection to the heavy rail corridor at Poulton-le-Fylde would be provided, with passengers having to interchange via a short walk.
- **A Tram-Train Option** – a hybrid solution that allows direct connection to the tramway at Fleetwood as well as to the heavy rail corridor at Poulton-le-Fylde. Integrating two physically and operationally separate networks with a tram-train introduces additional complexities and compromises, as sections of the existing rail network will need modifying, due to issues such the different floor height for trams and trains requiring solutions such as split-level platforms either on the tram or the heavy rail network. Additional work would therefore be required on both the existing tram and heavy rail networks to accommodate tram-trains as well as bespoke tram-train rolling stock. A more detailed analysis of tram-train is provided in Section x.x.

For each rail mode our overall aim has been to establish a baseline solution that delivers:

- A realistic rail service in terms of journey times and existing network capacity to allow infrastructure requirements to be defined;
- A minimum viable solution in infrastructure terms such that the scheme costs are kept as low as reasonably practicable;
- A solution that reaches as far into Fleetwood as possible, whilst also best serving the communities between Fleetwood and Poulton-le-Fylde;
- A solution that works with and complements existing businesses as far as practicable;
- A good understanding of the likely risks and opportunities associated with each rail mode, with alternative solutions identified for potential constraints and show-stoppers.

2.1. Service Configuration

In considering each of the three different transportation modes described above, the service configuration is based around the following working assumptions.

Table B-1: Service Options

The Service		Heavy Rail	Light Rail	Tram Train
	Route	Fleetwood to Poulton and/or Preston	Fleetwood Ferry to Poulton*	Fleetwood Ferry to Poulton and/or Preston
	Frequency	1, 2, 3 and 4 tph considered		
	Journey Times	Modelled on estimated vehicle performance, assumed dwell times		
	Network Capacity	Considers corridor capacity between Preston and Poulton-le-Fylde (but excludes platform capacity at Preston)	Adequate capacity on existing tram network to include additional services	As heavy rail between Poulton and Preston; as light rail for existing tram network.

2.2. Vehicle Configuration

For each transport mode, in order to establish the infrastructure requirements and develop whole life cost estimates, working assumptions need to be derived for the **vehicle dimensions** and **traction power**. For tram-train technology, there are additional considerations:

- Train control, and particularly the interface with Network Rail;
- Vehicle safety / crashworthiness
- Reduction in heavy rail network flexibility
- Vehicle compatibility
- Station stepping distances / boarding gaps
- Station accessibility

2.3. Vehicle Dimensions

For **Heavy Rail**, the existing PBN lines have recently been electrified to 25kV standard. The assumption for the purpose of this study is that a heavy rail service utilising this line will be operated by Northern Trains. Through consultation with Northern Trains regarding their existing fleet and future plans, the following is understood:

- The only diesel service operating on the PBN route currently is the Blackpool to York service, which operates in either 2 or 3-car DMU formation.
- Other services currently operating on the PBN route are electric multiple units of either 3 or 4-car configuration.

The heavy rail options assume a train length of up to 4 cars for the purposes of sizing and costing the railway stations.

For **Light Rail**, the Flexity 2 Tram which operates the Blackpool Tramway is assumed. It is 32.2m in length with a low-floor configuration.

For **Tram-Train**, an equivalent vehicle in terms of length and floor height to the Flexity 2 Tram is assumed. This means that the vehicle is capable of operating "line of sight" when on the tram network, but it must also be able to be signal controlled and detected to operate on the heavy rail network too. This provides a baseline set of assumptions regarding vehicle control, station/tram stop interfaces and accessibility.

2.4. Traction Power

Traction power is no longer a straight choice between diesel or electric, as recent and rapid technological advances have been made with alternative power supplies including hybrid, battery and even hydrogen traction. Electric-diesel hybrids are already in operation elsewhere in the region, and Northern Trains will have this technology available in its Class 769 fleet. Electric-battery hybrids are also shortly to enter service on the Merseyrail network, and Northern is considering operating Class 331s with batteries. It is therefore considered a reasonable assumption that, for the **Heavy Rail** option at least, the branch line does not need to be electrified. If an electric-battery vehicle is chosen, the branch line is sufficiently short, and there is enough opportunity for the battery to charge when the vehicle is on an overhead line section, either running through to Preston, or pausing before turning back at Poulton-le-Fylde.

For a **Light Rail** solution, electrification is assumed, so that there is full compatibility with the existing tram network and tram fleet. Hybrid battery light rail options might be technically feasible and would reduce the amount of electrification required, but would also require a unique fleet to the rest of the Blackpool tram network.

For **Tram-Train**, the decision is a more complicated one, and is dependent on the desired extent to which the vehicle is expected to operate on the tram network. Tram trains are typically bi-mode, which can be electric-diesel, dual voltage electric or electric-battery. For the Fleetwood to Poulton line, electric-battery is a feasible option on the basis that it is also feasible for heavy rail, with two caveats;

- Vehicle maintenance is not reliant on the existing tram depot in Blackpool
- The tram-train only operates over a limited extent of the tram network (e.g. between Broadwater and Fleetwood Ferry)

If it is determined that the tram-train is to be maintained with the tram fleet at the Blackpool Depot (which is the most likely reason for the tram-train to need to operate more extensively across the tram network), then a dual-voltage vehicle is more likely to be the preferred option, which in turn means that the Fleetwood to Poulton corridor will need to be electrified at 750V DC. Noting that this adds considerable cost to the scheme, electrification of the corridor is provided as an option rather than the baseline solution for both Heavy Rail and Tram-Train.

2.5. Further Tram-Train Considerations

Simplistically a tram-train is a light rail vehicle capable of operating on a street tramway and a conventional railway. The concept of tram-train has been talked about for many years in the UK, but the key reasons for considering tram-train, as opposed to purely tram, are associated with:

- Making best use of existing infrastructure – accessing untapped capacity in the existing rail network;
- Bringing rail services much closer to where people want to go (jobs, leisure destinations and transport hubs) in a single journey, by linking heavy rail and light rail networks;
- Achieving a step change in public transport provision whilst minimising new infrastructure required; and
- Achieving higher operating speeds than conventional tram (60mph) for longer distance routes.

Tram-train technology has been advancing at a fast rate in recent years, and the emergence of battery power options in particular offers a potential solution to the challenges of electrification which could otherwise add considerable cost to a project.

Tram-trains were pioneered in Karlsruhe in Germany in 1992. The major implementations to date are in Germany (in the Karlsruhe, Saarbrücken, Kassell, Zwickau and Nordhausen areas), with some other smaller systems in western Europe (including the UK) and others in North America albeit the latter tend to run heavy rail services at night away from the passenger services rather than mixing in true tram-train style. Tram-trains are generally a combination of train features in a tram, although some vehicles which have tram features in a train have also been implemented. They can operate on line-of-sight on a street running tramway, with low-floor platforms and level boarding, but also at high speeds and over longer distances between stops on heavy rail lines mixing with other heavy rail traffic, including with 25kV electrification rather than the 750V commonly found on street-running tramways.

2.6. Typical Uses and Benefits

Broadly speaking the benefits of tram-trains are the connectivity, operational flexibility and improved customer service that they provide. The dis-benefits are the additional capex and opex costs for the assets as well as the technical challenges to be resolved to allow safe running in two very different environments. There are essentially three types of tram-train application which bring with them slightly different technologies and approaches:

1) Providing extension of urban centre street running tram services to suburbs or adjacent towns, running on the heavy rail network with longer distances between stops and higher speeds, or providing cross-city suburb to suburb links;
2) Providing 'last mile' penetration of a heavy rail service into a city centre to bring a commuter service predominantly running over longer distance on heavy rail lines to an on-street terminus in the urban centre;
3) Some tram-train products are also suitable for use exclusively on heavy rail lines to provide a low-cost alternative to even lightweight traditional heavy rail vehicles on lightly used lines, particularly in rural areas.

Type 1 is essentially known as the Karlsruhe model after the German city that pioneered the approach and has been copied in a growing number of German cities. It consists of tram/light rail trains and commuter/regional rail trains running on the same set of tracks, generally between or outside of urban areas.

Type 2 is an inversion of the Karlsruhe model and has been used in Zwickau. It does not appear to have been as widely adopted as the Karlsruhe model.

Type 3 is considered out of the scope of this study but has been mentioned here for completeness.
The introduction of services that can operate both on street-running tramways through urban centres and on heavy rail lines to suburban areas offer several benefits and potential solutions to transport problems experienced in many cities:

- The tram-train concept allows suburban commuter rail services to leave the rail network on entering a town or city and penetrate through the urban centre, bridging the gap between the main railway station and destinations within the city centre. This provides passengers with seamless journeys reducing interchange, takes them closer to desired city centre destinations, and can free up capacity at terminal stations to allow expansion of other rail services.
- The higher speeds facilitated by railway signalling systems enables tram-trains to achieve higher maximum speeds than for street-running tramways, typically up to 60mph compared to the usual 50mph for trams, making them more attractive over longer distances compared to extension of an on -street tram route.
- By making use of existing infrastructure, both heavy and light rail, tram-trains can allow new inter-urban routes to be introduced at a lower capital cost, and with fewer planning and environmental issues, than constructing all new dedicated fixed track links. It is important to note that this benefit doesn't really apply here, as there is a substantial amount of infrastructure required to connect heavy and light rail networks via the Fleetwood Branch Line corridor.

- Extensive use of existing infrastructure also reduces the risk associated with buried services, ground conditions, planning and environmental issues, although historic conditions or alternative uses of former routes can bring risks.
- Depending on the service specification, tram-trains can introduce a more attractive passenger experience at locations currently only served by main line trains, including higher frequency services, better accessibility, and improved safety, security and station facilities.
- Subject to sufficient capacity on existing routes, the introduction of tram-train services can facilitate the development of new stations built to light rail standards on existing routes, in communities currently poorly served by public transport.

The local characteristics of the Fylde Coast make tram-train services possible in the form of the ‘Type 2 described above.

- Much of the Fleetwood Branch Line corridor remains available for reinstatement, including space to re-connect at Poulton-le-Fylde
- There are potential options to physically connect the Fleetwood Branch Line corridor to the Blackpool Tramway close to Fleetwood town centre.

It is important to note, however, that there are a number of characteristics of the area that will not make the introduction of Tram-Train a lower cost option than Heavy Rail or Light Rail:

- Compatibility between the two networks is not straightforward, with the Blackpool Tramway being low-floor;
- Several kilometres of railway need to be reinstated, whichever option is chosen; and
- Tram-train brings with it additional costs associated not only with the compatibility challenge mentioned above but in a number of other areas described in Sections a to g.

2.7. Technical Considerations and Lessons

The interoperability between different infrastructure systems presents various technical challenges to be overcome in the development of a tram-train scheme.

2.7.1. Floor / Platform Height

Lesson: South Yorkshire Tram-Train

In Sheffield, stops on the tram system are 375mm high. Network Rail platforms are considerably higher, with the current standard being 915mm. Where joint use of an existing rail station was proposed, the solution was to add a new tram-height section of platform onto the existing platform. This had the unintended consequence that passengers behaved as they would at any other low-height platform on the tram system and freely crossed the heavy rail tracks between platforms creating a serious safety hazard. The issue was resolved through provision of barriers between tracks and warning signs.

Blackpool Tramway operates with a low-floor configuration. This presents a problem when introducing tram-train services that need to share heavy rail lines with trains and stop at heavy rail stations. Typically, either a large stepping distance will result which will not comply with the rail vehicle accessibility regulations and thus be dependent on securing a derogation, or separate lower platforms will need to be built as extensions to the existing platforms to suit the tram-trains, as was implemented in Sheffield. This also relies on sufficient space being available for the extensions and brings issue in terms of passenger behaviour at ‘tram’ platforms normally associated with an on-street environment. The working assumption for this Study is that a low-floor configuration will be adopted for the tram-train. As such low-floor sections of platforms will be required at heavy rail stations served – Poulton-le-Fylde, Kirkham & Wesham and Preston.

This is a working assumption for the purposes of this Study. A high-floor vehicle could be selected instead, in which case careful consideration of how the tram-train connects with and shares tram infrastructure will be required.

2.7.2. Platform Stepping / Structure Gauging

Lesson: South Yorkshire Tram-Train
On the Sheffield tram network, the standard horizontal stepping distance is less than the Rail Vehicle Accessibility (Non-Interoperable Rail System) Regulations 2010 specified maximum stepping distance at any wheelchair-accessible doors of 75mm. However, the light rail vehicle profile is not compatible with the W6A lower sector gauge profile on ballasted track meaning that the required clearance could not be achieved at stations on Network Rail. The solution adopted was to design track fixity blocks to achieve high track fixity to maintain stepping standards whilst still allowing tamping of ballasted track and avoid the 'hard spots' use of track slab would introduce.

Under the Rail Vehicle Accessibility (Non-Interoperable Rail System) Regulations 2010, the horizontal stepping distance at any wheelchair-accessible doors on a rail vehicle cannot exceed 75mm at any point over the life of the system, unless manually operated boarding ramps are deployed. This is not feasible on typical tram systems, which are operated using driver only operation and stops are not staffed. However, at platforms on the mainline rail network, platform offsets will need to be set at the Network Rail standard minimum value of 730mm to accommodate the larger passenger and freight trains likely to be using the same lines.

To avoid gauging problems at other platforms or structures on the existing tram network, any new tram-train vehicle will need to fit within the kinematic envelope of the existing Flexity 2 tram. Existing tram platforms have a standard platform offset that achieves a 75mm stepping distance, accounting for all construction, operational and maintenance tolerances. On the heavy rail network, very careful consideration will be needed as to how to achieve a similar stepping distance. It may be possible to employ a similar solution to that applied in Sheffield. The alternative is to equip the tram-train vehicles with a sliding step, such as is proposed for the new class 777 rolling stock being introduced imminently on the Merseyrail network. The reliability of such a mechanism will have to be assured to avoid severe inconvenience to mobility or visually impaired passengers, but the introduction of the Merseyrail system will offer the opportunity for any lessons learnt to be taken into account in the procurement of a tram-train vehicle for the Fylde Coast.

2.7.3. Signalling / Train Protection

The vehicles procured to operate any tram-train service will need to be equipped with the relevant signalling and safety systems to operate on line of sight and under the Blackpool Tramway operating system, and also be compatible with current and future signalling systems on Network Rail lines.

Whilst new vehicles can be specified to allow for space for the equipment it can become very crowded in a light rail vehicle cab which does not have the space that a heavy rail vehicle has. It is also important to note that tram-train vehicles are shorter with smaller wheels, fewer axles and generally lighter in weight than heavy rail vehicles, so detection at heavy rail signals may require some modification to the existing signalling network.

The impact of new technologies starting to be introduced on Network Rail, particularly European Train Control System (ETCS), will need to be considered, although proposals for implementation and the technology requirements have become clearer in recent years.

2.7.4. Wheel-Rail Interface

Lesson: South Yorkshire Tram-Train
On the Sheffield system the tram wheel flanges are narrower than a typical wheel profile used on Network Rail and a shallower depth. This meant that a special 'stepped' wheel profile had to be developed to cope with the wider clearances on Network Rail and rails had to be changed on the Supertram system to deal with the deeper flanges required on tram-trains.

Whilst running to the same track gauge, trams have smaller wheels and different wheel flange dimensions, which increases the risk of derailment on heavy rail pointwork and other track features, and also increases the risk of derailment on curves. Therefore, careful consideration must be given to the selection of an appropriate wheel profile for a tram-train vehicle, and its compatibility with existing rail profiles on the tramway and railway routes on which it will operate.

Groove widths on street-running tramways are relatively narrow to minimise trip hazards to pedestrians and cyclists, and skidding hazards for road vehicles. As a result, a stepped wheel profile, similar to the solution employed in Sheffield, would be required for the tram-train to enable the vehicle to safely operate through raised check rails on Network Rail track.
The groove depth of grooved rails must also be sufficient to accommodate the typically deeper wheel flanges of tram-train vehicles. The compatibility of the existing Blackpool Tramway track will need to be considered when selecting a tram-train vehicle and wheel profile. A detailed wheel-rail interface study will be required at a later date to establish suitable parameters for the procurement of a tram-train vehicle and identify any interface issues with existing Blackpool Tramway or Network Rail infrastructure. For the purposes of this study, the working assumption employed to allow costs to be determined is that some modifications at heavy rail pointwork will be required.

2.7.5. Crashworthiness

Tram-trains generally have a lighter car body construction than a train and thus are lighter overall. As tram-trains will mix with heavy rail services, crashworthiness (i.e. the ability of a light vehicle to withstand collision with a much heavier vehicle body strength and resistance to collision impacts) has to be considered.
This issue caused a major delay with the earlier inter-operability implementation on the Tyne & Wear Metro when it was extended over national rail lines to Sunderland. The eventual solution, which avoided the need for existing vehicles to be upgraded or new vehicles procured to meet crash worthiness standards, was to implement 'double blocking' i.e. rather than allowing trains to run and be protected one signal block section apart, they were separated by two signal block sections to mitigate the risk of a signal passed at danger (SPAD) and subsequent potential collision. This was facilitated by the relatively light usage on the Sunderland route, but this is not a suitable solution for the BPN lines, which have a much higher frequency of service.

On Sheffield, the tram-train vehicles chosen were designed to comply with heavy rail crashworthiness standards to allow them to operate on the National network, although this adds weight and cost to the vehicles. In Germany, acceptance on the state railway network was achieved through the much better braking characteristics of the trams compared to heavy rail trains, although this would not mitigate against a collision from a heavy rail train. A typical mitigation would be to fit an automatic train protection system to all services running on shared routes, combined with the use of the tram track brake (subject to confirmation that any track circuits would not be affected) to mitigate against collisions at level crossings.

In the UK, the Train Protection and Warning System (TPWS) has now been rolled out at key locations across the heavy rail network. TPWS ensures that, if a train passes a signal at danger, it is immediately brought to a stand and thus any potential collision avoided. The continued rollout of this system may mitigate the need to procure vehicles that meet the crashworthiness standards in the future, if the tram-trains and all routes on which they will run are TPWS equipped.

The light weight of tram-trains may also give insufficient electrical contact between wheel and rail leading to problems with activation of track circuits and subsequently level-crossing warning equipment failing to operate (barriers/warning lights/bells) or conflicting train movements being signalled. This may result in the need to fit track-circuit actuators (as applied to light weight heavy rail diesel multiple units), with space more likely to be available under the high-floor trams. However, the industry is moving towards axle-counters which do not rely on electrical contact but the passage of the wheel itself, which should mitigate this issue on lines so fitted.

2.7.6. Depot Issues and Modifications

Additional vehicles will require additional stabling and maintenance facilities. At Sheffield, the existing depot at Nunnery was expanded to cater for the additional vehicles, although is understood to be operating close to capacity.

In addition to capacity, upgrades will likely be required to stores facilities, cranage and test equipment for vehicles fitted with 25kV pantographs and equipment, as well as staff training. Potentially, facilities for testing vehicles on 25kV could also be considered. Finally, if tram-train vehicles are longer than the existing Flexity 2 fleet, this might have a major effect on stabling capacity and maintenance building size.

At this stage, costs have been allowed for making modifications to an undefined depot to allow a bi-mode vehicle to be maintained, with a "per vehicle" add-on for additional stabling and parts.

2.7.7. Network Rail Operational Interface

A key difference between tramway operations and main line railway operations is that the tramway operates on line-of sight like any other road vehicle, whilst on the main line operations are to a much more closely defined timetable with driving under the control of mainline signals.

Tram-train operators will also effectively become a main line Train Operating Company, with services intermingled with other train operating companies and subject to the main line conditions including the performance and compensation regime. As well as paying appropriate access charges, a means must be found of 'presenting' tram-trains to the main line network in line with their timetabled slot, but more importantly the impact of perturbations on the tramway will need to be managed so as not to adversely transfer to other train operating companies. This will require setting up the appropriate communications routes and protocols, regulation and physical 'handover' arrangements, and agreed operating procedures including arrangements for recovery of a failed tram-train on the main line network.

From the Sheffield tram-train pilot, the tram-train only communicated with one system at a time, which meant that there was a switch-over point for the tram-train to change from being linked to the tram network to being linked to the rail network. A key challenge here is in how that switchover occurs (static or dynamic and associated time impacts), and where.

2.7.8. Human Factors

Other softer issues also have to be managed, such as the transition from driving on line-of sight on a tramway to driving under the control of mainline signals to a closely defined timetable and under the performance regime of main line railways. This also brings the challenge of a driver having to know and be able to apply the rule books of two different systems.

2.7.9. Regulatory Issues

Various railway and guided transport system operational and safety regulatory requirements and standards exist. A challenge of implementing a tram-train operation in the UK was to determine which regulatory requirements and standards applied and to which part of the combined operation. Part of the purpose of the Sheffield trial was to establish an approach to this and the route to approval of vehicles and operations. Arising from the trial, the Rail Safety and Standards Board (RSSB) issued a Guidance Note on the regulatory requirements for operating non-main-line vehicles on mainline infrastructure (Dec 2014). This document sign posts the relevant legislation with case studies on the approaches to safety approval and integration of tram-trains on the UK Rail Network.

Amendments were also specifically made to the Railway Interoperability Regulations 2011, the Railways and Other Guided Transport Systems (Safety) Regulations (ROGS) and Guide to ROGS (2018) to refer to the exclusion of tram-trains from certain main line requirements. This clarifies the parts of the network on which tram-trains have to comply with heavy rail safety requirements and standards for operation, and thus where tramway safety requirements and standards apply.

In Sheffield, the Office of Rail and Road (ORR) agreed to a single combined process for safety approvals. A key message is to engage with the ORR in terms of the safety approval regime and approach for new tram-train proposals at an early stage.

It should also be noted that, in Sheffield, a case had to be made for derogations from Railway Group Standards that were not applicable to tram-train technology, and the infrastructure on the tram network that needed modifying to cater for the tram-trains, such as the replacement of rails for groove depth, adjusting platform coper positions and tram detection equipment locations. The safety approval for integration of the tram-trains onto the tram network was the responsibility of the tramway operator (Stagecoach in that instance) to manage under their safety case.

2.7.10. Summary of Vehicle Assumptions

Table B-2 Summary of Vehicle Assumptions

Rolling Stock		**Heavy Rail**	**Light Rail**	**Tram Train**
	Vehicle Type	Up to 4-car multiple unit assumed. Dual mode (electric and diesel/electric and battery)	Bombardier Flexity 2 Tram (as per existing network). 750V DC electric	Low floor**dual voltage (25kV AC/750V DC or 25kV AC/battery) vehicle assumed, of similar length and DKE to Bombardier Flexity 2
	Vehicle Procurement	Leased	Purchased	Purchased
	Vehicle Maintenance	In an expanded heavy rail depot (location not defined)	Expansion to tram depot assumed, either at existing site or additional lineside stabling deployed.	Expanded depot (location not defined).

3. Line of Route and Stopping Points

3.1. Context of the Disused Fleetwood Route

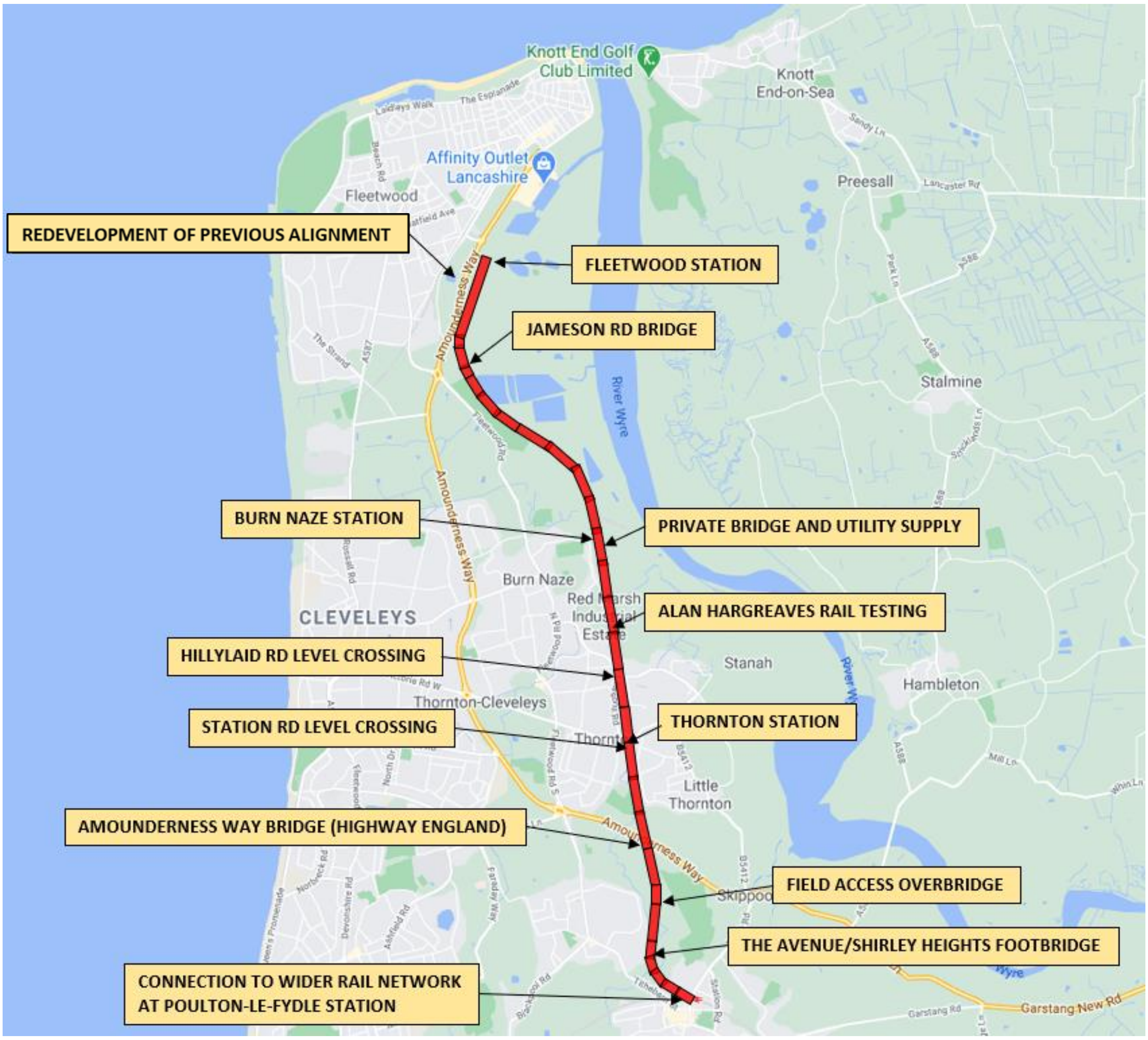
A detailed review of the corridor is provided in Annex 1, and an overview is illustrated in Figure 3-1. The disused rail corridor between Poulton-le-Fylde and Fleetwood has two distinct elements. From Poulton-le-Fylde station to Jameson Rd bridge (approximately 2.5km from Fleetwood town centre), the corridor is largely intact. The rails and sleepers remain insitu, and due to the extensive work carried out by the PWRS, the route has largely been cleared of vegetation, and the old station at Thornton has been restored. Between Jameson Rd bridge and Fleetwood town centre/Fleetwood docks, some of the rail corridor remains but the rail assets have been removed and there are elements that have been built over (North of Herring Arm Road and infilled (Jameson Road Bridge). As a result, there is not an existing site to re-claim for the terminating station in Fleetwood.

In summary, the Fleetwood Branch Line corridor comprises:

- A railway corridor of sufficient width for two tracks for the much of its length.
- Single track rails and sleepers insitu between Poulton-le-Fylde and Jameson Road (circa. 6500m), some of which will be suitable for re-use.
- Existing disused railway stations at Thornton and Burn Naze.
- 2 No. level crossings that are currently closed off to the railway.
- 2 No. at-grade pedestrian crossings of the corridor
- 4 No. overbridges and 1 No. underbridge
- Adjacent business (Alan Hargreaves) approximately 700m south of Burn Naze, that utilises a section of the railway line to test flatbed wagons.

The corridor passes through the Hillhouse Enterprise Zone (HHEZ), the Masterplan for which was published in 2018 and acknowledges that the Fleetwood to Poulton railway is closed but safeguarded. In conclusion, the Fleetwood Branch Line corridor is available and suitable for reinstatement as a railway line, albeit with some opportunities and constraints that vary by mode, and which are described in Section 3.4.

Figure B-2: Disused Fleetwood Branch Line Corridor Overview

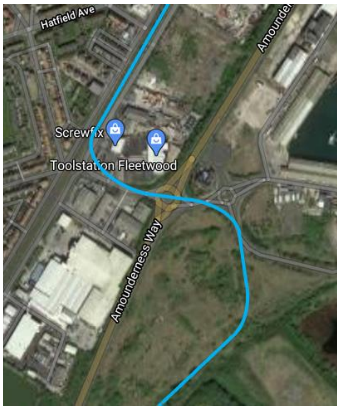


3.2. Connecting to Blackpool Tramway (Light Rail and Tram-Train Only)

There are several alternatives that could be adopted to achieve an effective connection between the Fleetwood Branch Line route and Blackpool Tramway. As a desktop exercise, the following alternatives have been considered:

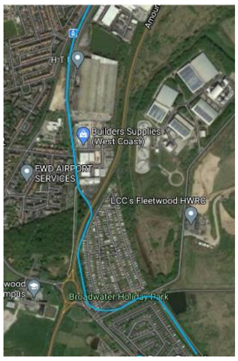
OPTION 1: Stanley Road Stop - Copse Road – Denham Way – Herring Arm Road – Windward Avenue – Fleetwood Branch Line

A short on-street connection, but geometrically quite tight. This option positions a light rail service on-street in a location that impacts on access to planned developments to the north and south of Herring Arm Road, and is reliant on the corridor of land north of Jameson Road being available to a rail service, in particular through the plot of land shown in Figure x.x below. PROS – shortest length of on-street tramway required. CONS – potential land availability issues.



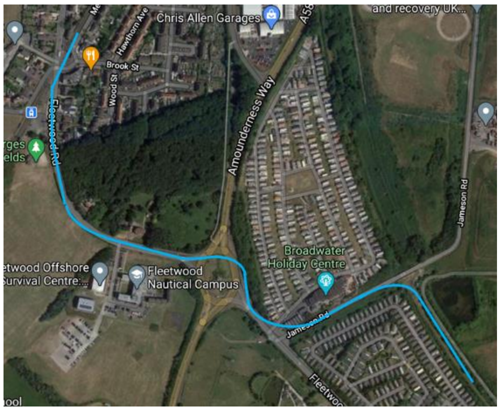
OPTION 2: Heathfield Road Stop – Copse Road – Amounderness Way – Fleetwood Road – Jameson Road – Fleetwood Branch Line

This option utilises the Fleetwood Branch Line route for its entirety to its current termination point at Jameson Road. To simplify the Amounderness Way crossing, this option crosses to the North of Eros Roundabout. It is thus a relatively long on-street connection. PROS: Potentially reduced impact on highway network performance, including Eros roundabout. Avoids potential land availability risks on Fleetwood Branch Line corridor north of Jameson Road CONS: Much higher cost due to length of street-running and associated property access and service diversion costs.



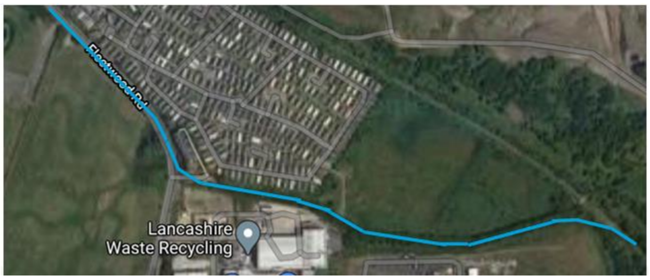
OPTION 3: Broadwater Stop – Fleetwood Road – Jameson Road - Fleetwood Branch Line

Similar to Option 2, this option utilises the Fleetwood Branch Line route for its entirety to its current termination point at Jameson Road. This option provides the shortest connection between Jameson Road and the existing tramway. There are a number of sub-options potentially available as to how this option crosses Amounderness Way in the vicinity of Eros Roundabout. PROS: A relatively straightforward connection that avoids potential land availability risks on Fleetwood Branch Line corridor north of Jameson Road, and shortens on-street interface. CONS: Potential traffic impacts and engineering complexity at Eros Roundabout.



OPTION 3A: Broadwater Stop – Fleetwood Road – Fleetwood Branch Line

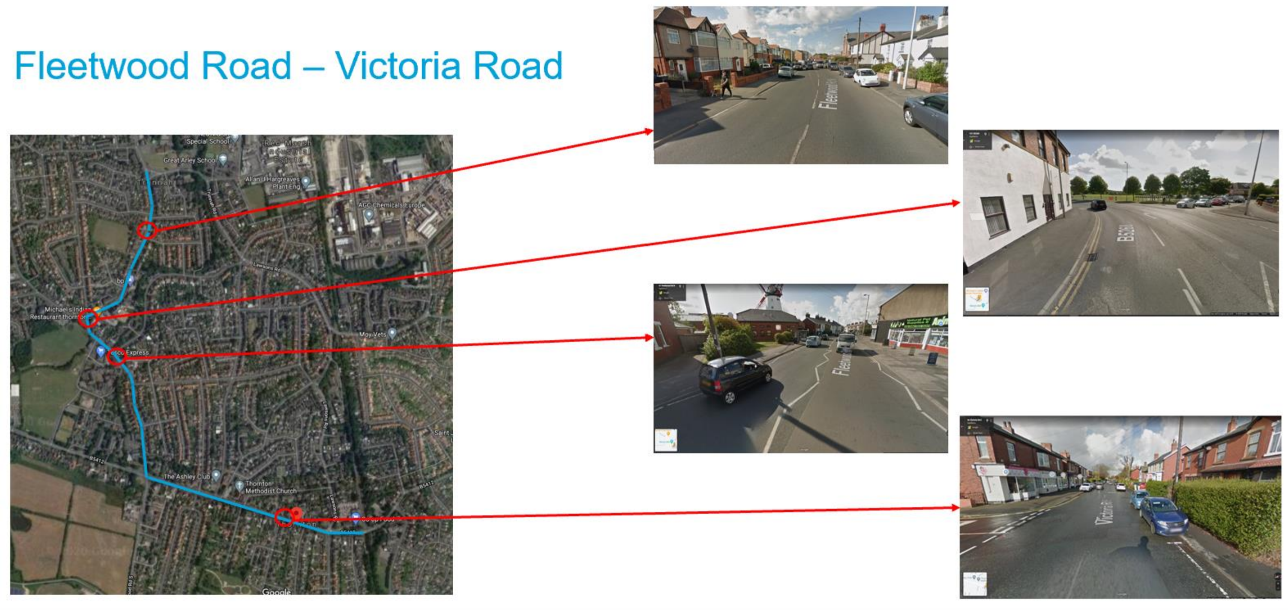
A variation on Option 3 that avoids Jameson Road, but instead passes between the Cala Gran caravan park and the waste recycling plant. This potentially makes the tram more accessible and visible, but at considerable extra cost.

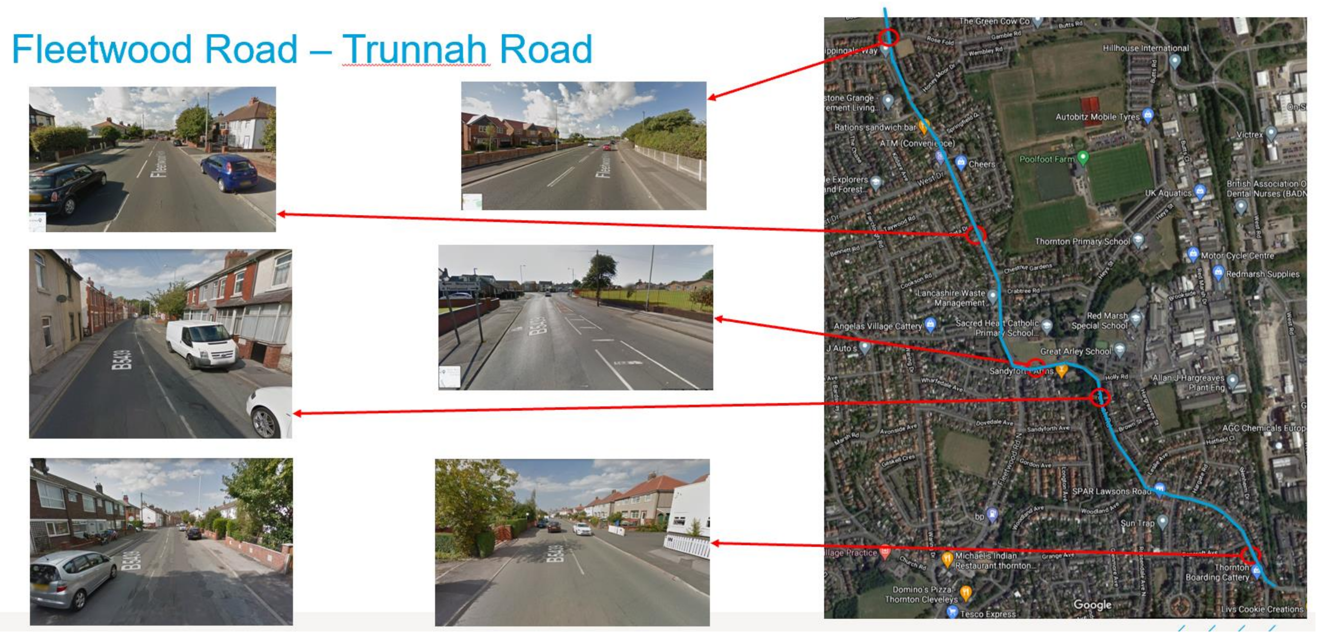


There isn't a great deal to choose between these options, and there are other variants that could be made to work. However, for the purpose of providing a solution that balances cost and risk, Option 3 has been taken forward for costing and journey time assessments. This does not preclude any of the other options from being considered further in future stages of the Study.

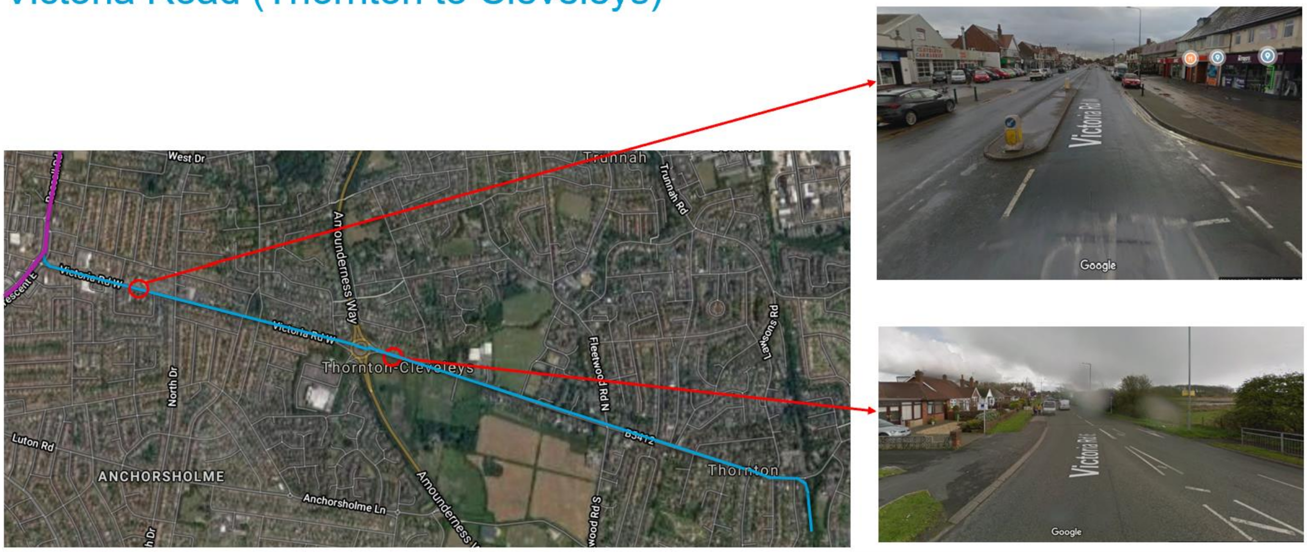
Further On-Street Alternatives Considered

In addition to achieving a relatively localised connection between the WPS corridor and the Blackpool Tramway, consideration was given to more extensive on-street alternatives through Thornton, as illustrated in figures below:





Victoria Road (Thornton to Cleveleys)



3.3. Stations and Stops

In order to determine where best to position railway stations and tram stops, a balance has been sought between minimising costs and journey times and maximising accessibility. As a minimum, the reinstated railway line should provide stopping points at Thornton and Fleetwood, to serve the two main towns through which the route passes. In addition, the Hill House Enterprise Zone (HHEZ) is the main focal point for future development in the area and, being situated on the Fleetwood Branch Line route between Thornton and Fleetwood, is ideally positioned for intermediate stop(s).

The baseline assumption is thus that, for Heavy Rail, new stations are provided at Fleetwood, Hillhouse Enterprise Zone and Thornton. For Light Rail and Tram-Train, the enterprise zone is served by two stops, serving the North and South sides of the zone.

Further opportunities exist to provide additional stopping points within the enterprise zone, at Hilylaid Road and also at Jameson Road if demand warrants the expenditure.

3.3.1. Fleetwood Terminus (Heavy Rail Only)

The disused Fleetwood Branch Line route currently terminates at Jameson Road Bridge, which has been infilled. To the north of Jameson Road, a corridor still exists immediately to the East of the caravan park and Amounderness Way. This opens out into a triangle of land bounded by Amounderness Way to the west, Herring Arm Road/Windward Avenue to the north and the recycling centre and Fleetwood Marsh Nature Reserve to the east (Figure B-3). It is understood that there is much sensitivity around this plot of land, as it has been purchased by a local business with a view to it being developed. Similarly, immediately to the north of Herring Arm Road, there are plans to build new commercial space on ABP land at Fleetwood Dock (Figure B-4).

Ideally, a heavy rail station can be accommodated in this area, as it brings the railway to within a reasonable walking distance of Fleetwood town centre, and less than 800m from the nearest tram stop. It is important to note that the key aims of re-opening the railway line are to maximise rail penetration (and hence connectivity) into Fleetwood, and to complement rather than compete with existing businesses. These development proposals, and others along the corridor, could benefit considerably from an adjacent rail connection.

Figure B-3

Figure B-4

The working assumption for this Study is that a suitable solution can be found to allow the railway to at least skirt these sites, and a station comprising track and platform be accommodated. Figures B-5 and B-6 show two such options. The green hatched area shows a potential location for pick-up, drop-off and bus/taxi interchange facilities.

Figure B-5

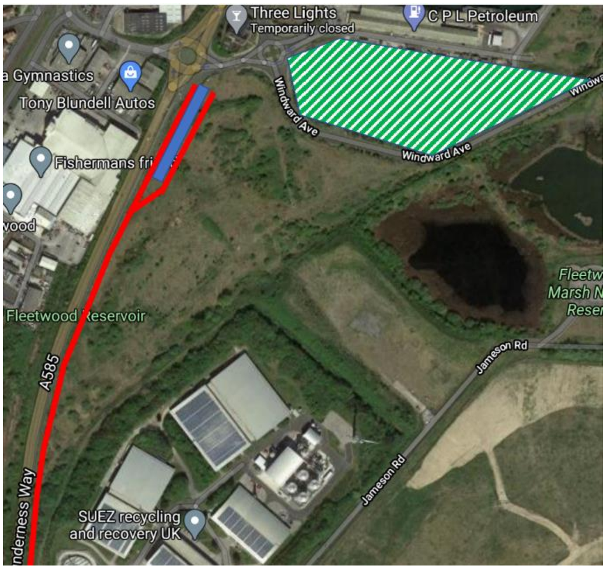


Figure B-6

If neither can be made to work due to insufficient land being available, then a fall-back option of a terminus station at Jameson Road can be adopted.

3.3.2. Hillhouse Enterprise Zone (HHEZ)

The location of Hillhouse is illustrated in Figure B-7 below. The Masterplan recognises that the disused Fleetwood Branch Line corridor is safeguarded, and incorporates plans for a northern access that crosses the railway corridor, either via a bridge, tunnel or at-grade crossing.

Figure B-7 Hillhouse Enterprise Zone

Source: Hillhouse Technology Enterprise Zone Marketing Brochure, 2018

In terms of serving the enterprise zone with a reinstated railway, the location of this crossing presents an obvious opportunity to provide a railway station or tramstop. The alternative location is further south, in the vicinity of the former Burn Naze railway station. For a Heavy Rail solution, it is assumed that one of these locations will be used to establish a railway station. For Light Rail or Tram-Train, it is more appropriate to provide a stop at or near both locations, and so this is the baseline assumption for these modes.

3.3.3. Thornton

The old station at Thornton provides the ideal location to reinstate a station or tram stop, and for a **Heavy Rail** system, it will also help to de-risk the operational safety of a reinstated level crossing on Station Road, as the presence of the station will significantly reduce rail operating speeds. The risk assessment and design of the station and adjacent crossing will require very careful consideration, with particular attention given to the rail/highway interface and inter-visibility between rail and road.

For lower service frequencies, the line only needs to be single track, and so the existing platform alongside the co-op is the obvious location for a single platform (See figure B-8). Northbound services will be slowing to a stop as they cross Station Road, and southbound services will proceed from a standing start only.

Higher service frequencies will require sections of twin track for the railway to operate efficiently. A twin-track arrangement at Thornton Station does present the opportunity to stagger the platforms to either side of Station Road as illustrated in Figure B-9. Such an arrangement will significantly improve the operational safety of a level crossing in this location. This is because all trains will be proceeding from a standing start through the level crossing. Operational speed will thus be minimised, and also train drivers will be checking that the crossing is clear and the barriers closed before deciding to proceed.

Figure B-8: Heavy Rail single platform

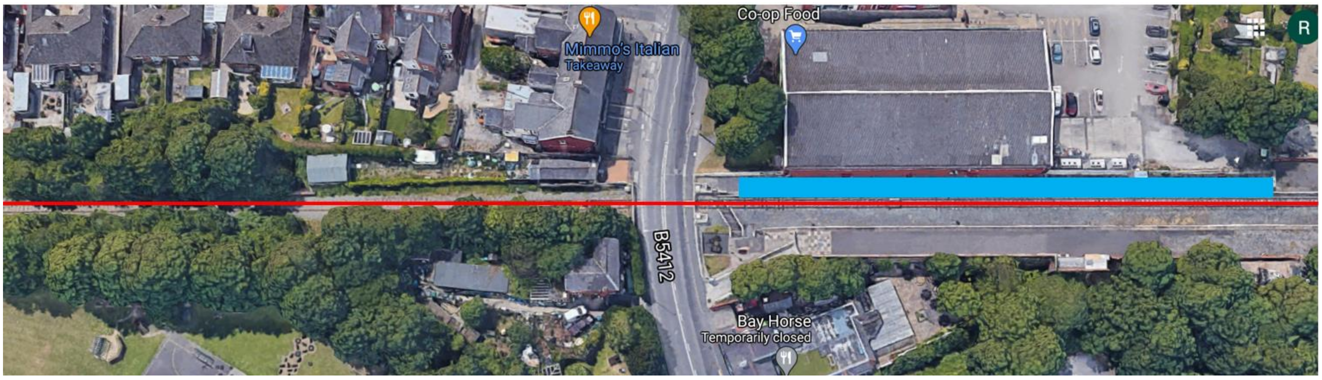
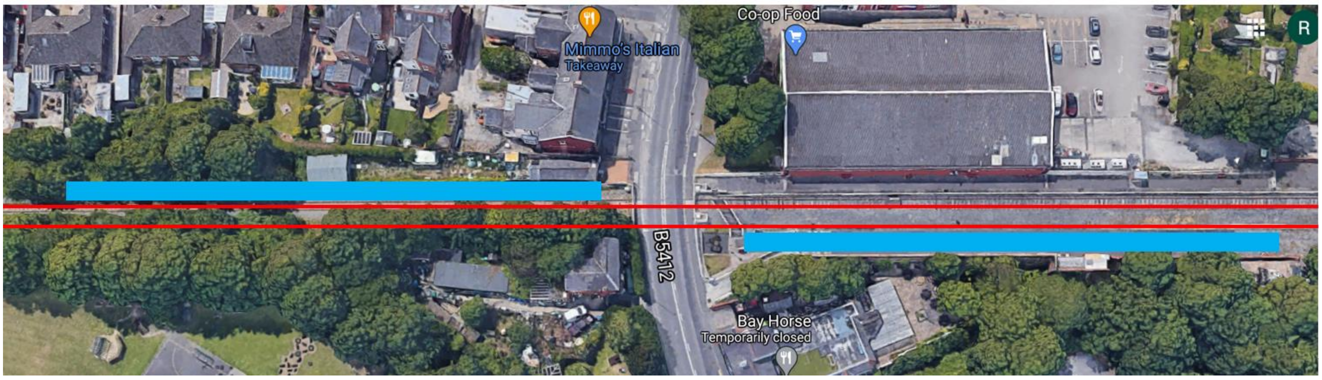


Figure B-9: Heavy Rail twin platform



It is also worth noting the spatial opportunity that is created with either solution to accommodate the Poulton And Wyre Railway Society (PWRS), potentially with some sort of visitor centre or at least a means of permanently housing and displaying heritage equipment, furniture and signage. With the single platform arrangement, there is a large linear area to the East side of the operational line including the disused southbound platform. With the twin platform staggered arrangement, the disused platform adjacent to the Co-op becomes available.

For **Light Rail** and **Tram-Train**, the situation is similar to heavy rail (in terms of platform layout) but is much simpler due to the platforms being significantly shorter and lower, as illustrated in Figures B-10 and B-11. The Station Road crossing is also much simpler to implement, as trams and tram-trains operate on "line of sight" in this environment, and so the crossing becomes a conventional signal-controlled junction as opposed to a level crossing.

Figure B-10: Light Rail and Tram-Train single platform

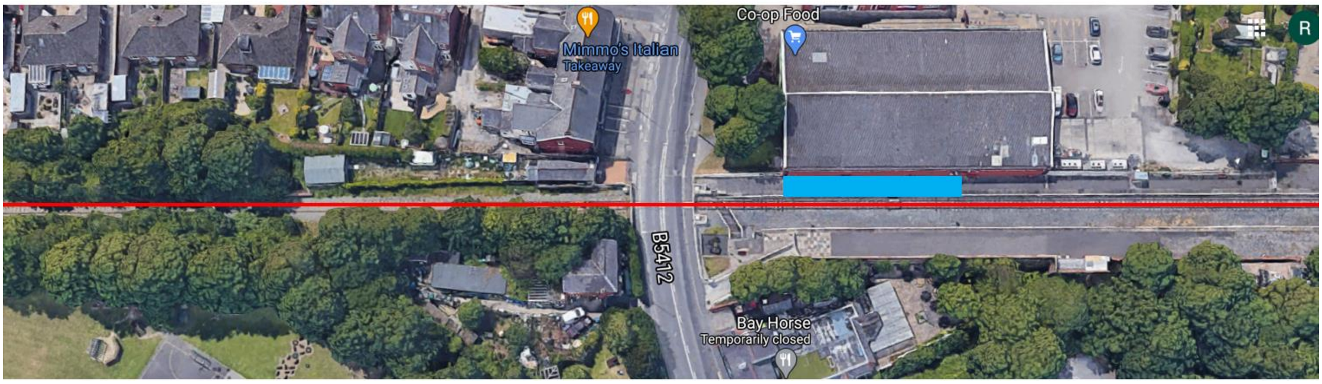


Figure B-11: Light Rail and Tram-Train twin platform

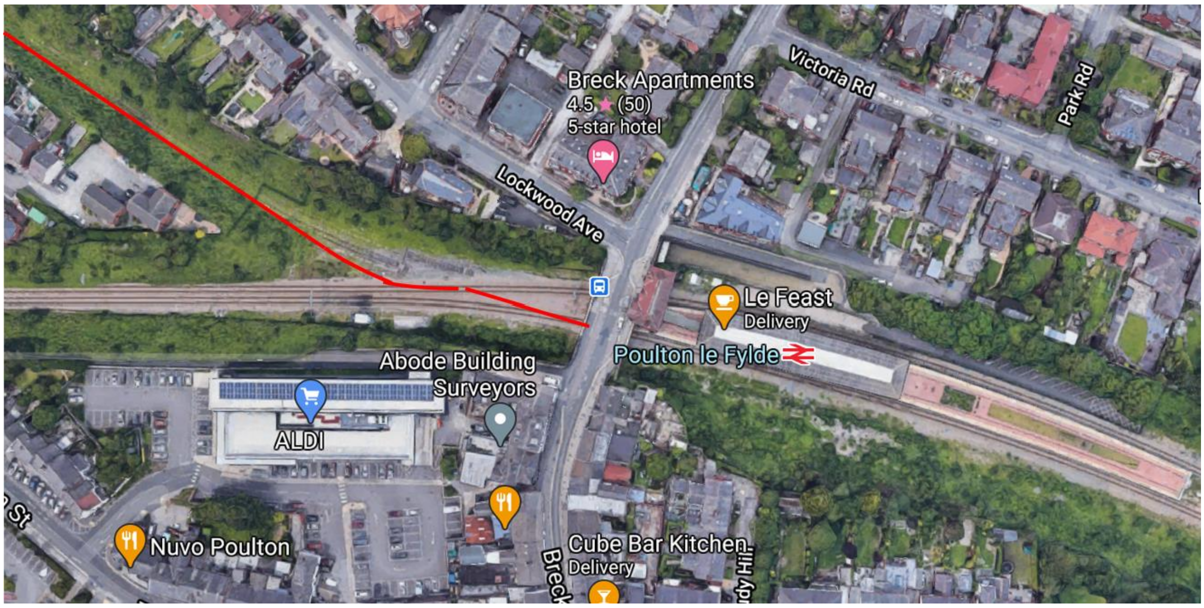
3.3.4. Poulton-le-Fylde

The challenges to re-connecting a rail service on the Fleetwood to Poulton line and the existing railway through Poulton-le-Fylde is quite different for the Heavy Rail/Tram-Train options and the Light Rail option.

Heavy Rail/Tram Train

The corridor for physically re-connecting the Fleetwood line with the Blackpool North line remains. The principal constraint for achieving the connection is that the physical works will require a series of possessions of the Preston to Blackpool North lines, with associated lead times and costs. Given that the connection is immediately adjacent to an existing railway station, the signalling modifications are expected to be localised.

Figure B-12: Heavy Rail/Tram Train connection at Poulton-le-Fylde



To protect against, and provide resilience for perturbed running, the baseline proposals provide a turnback facility immediately to the East of Poulton-le-Fylde station, regardless of service frequency (Figure B-13).

Figure B-13 – Turnback at Poulton-le-Fylde

Under normal operating conditions, the turnback is only required where the service exceeds 2 trains per hour, so there may be an opportunity to eliminate this facility and provide a means of service recovery elsewhere at a lower cost.

3.4. Light Rail

It is not possible to physically connect the Fleetwood line to the Blackpool North line at Poulton-le-Fylde lines if the operation of the Fleetwood line is with tram technology. A new tram stop will thus be needed as close as possible to Poulton Junction/Breck Road overbridge. The track layout at Poulton, with the station being an island platform between the two running lines, will preclude a direct at-grade pedestrian connection between the tram stop and railway station. Pedestrian access between the two services will thus require passengers to exit one facility via steps or lift up to Breck Road (shown in green in Figure B-14), and then enter the other facility and descend via steps to the other platform. This interchange requires a walk and two flights of stairs and is less than ideal. It is also likely that disability legislation would require the installation of lifts at additional cost.

Figure B-14 – Light Rail stop at Poulton-le-Fylde

3.4.1. Summary of Stations and Stops

Table B-3 Summary of Station Stops

	New Stations/stops	Thornton, Burn Naze, Fleetwood	Poulton, Thornton, Hillhouse Enterprise Zone South, Hillhouse Enterprise Zone North, Jameson Rd	Thornton, Hillhouse Enterprise Zone South, Hillhouse Enterprise Zone North, Jameson Rd Platform modifications at Poulton, Kirkham and Preston

3.5. Risks, Constraints and Dependencies

Analysis of all the options has been predicated on a number of assumptions that reflect the relatively high-level nature of the design work undertaken within this study. There are therefore a number of risks, constraints and dependencies that have been identified, and which a future stage of work would need to further consider in the selection of a preferred option.

3.5.1. Extent of formation, drainage and track renewals (all modes)

For the purpose of developing a cost estimate, it has been assumed that the entire corridor will need to be stripped to a designed formation, with new drainage and ducting installed and new ballast laid, and the old ballast disposed of as contaminated. Of the existing track and sleepers, 50% re-use of existing has been assumed. Further investigation is required to determine:

- How the existing corridor drains, including presence and serviceability of any existing drainage.
- Condition of the track ballast, and whether it can be cleaned and re-used.
- Condition of track and sleepers to determine if re-use potential is greater or less than assumed.

3.5.2. Level Crossings (Heavy Rail only)

The disused Poulton-le-Fylde to Fleetwood railway corridor has two level crossings in the Thornton area. These are located at Station Road, immediately to the south of the former Thornton Station, and at Hilylaid Road, approximately 650m to the north. With the railway line currently disused, both crossings are obviously only open to road traffic currently. In terms of the status of these crossings, it is understood that the level crossing at Thornton was re-designated in 1987 with a new order. It is possible, therefore, that this crossing has only been mothballed as opposed to being formally closed. On the other hand, Hilylaid Road does not appear to have an order so its status is less clear.

From a safety viewpoint, there has for some time been a significant push to improve the safety of level crossings. Many are being closed where opportunities exist to provide alternative means of crossing the railway, and the prevailing mood is generally to reduce the number of level crossings rather than add new or re-open existing level crossings. It is important to note, therefore, that the key risk to re-opening the railway line as a heavy rail route is whether or not these crossings can be re-opened to rail traffic, or permanently closed to highway traffic.

For the heavy rail option, it is proposed that Hilylaid Road crossing is permanently closed to traffic, and that Station Road crossing is re-opened to rail traffic. The logic behind this approach is as follows:

- Hilylaid Road – the existing highway geometry is quite poor in terms of sight lines and angle of approach, and there are suitable alternative routes available within reasonable proximity.
- Station Road – this is the main route across the railway corridor in the area, and it is not feasible to replace the crossing with a bridge over or under the railway. In terms of managing safety risks, the crossing is located immediately adjacent to the station, so all rail movements will be at very low speed. If a twin track arrangement is provided, it is possible to position the station platforms to either side of the crossing, so a train will only ever progress through the crossing from a standing start, which gives the driver the opportunity to check the crossing is clear before proceeding. As a solution, this is no less safe than a “line of sight” operation.

Figure B-15: Hilylaid Road Level Crossing

Figure B-16: Station Road Level Crossing

As part of the Study, initial discussions with RSSB have been held to discuss the feasibility of re-opening these level crossings. The feedback received was that, whilst re-opening level crossings is generally not favoured, each case will be considered on the basis of the assessed risks specific to the location in question. Whilst this by no means guarantees that a positive decision is achievable, with careful design of the station at Thornton, including the possibility suggested above of staggering platforms to either side of the crossing so that rail vehicles only negotiate the crossing from a standing start, an acceptable solution in terms of operational safety does appear to be possible. These discussions will need to be developed further as the scheme progresses, including undertaking the appropriate risk assessment for evaluation by RSSB.

3.5.3. Interface with Lineside Businesses and Heritage Groups (all modes)

There are many properties and businesses that back onto the railway line, but two entities have a direct interaction with the railway corridor – Alan Hargreaves and the Poulton and Wyre Railway Society (PWRS). The Alan Hargreaves business is located just north of Hilylaid Road, and utilises a section of the railway to test railway plant that it has repaired and refurbished. The development of options has taken the presence of this business into consideration, and there appears to be sufficient land available to accommodate the reinstated railway and allow this business to continue its operations. A key risk that will need to be considered moving forwards is the physical screening and protection required on the boundary to ensure the safe operation of the railway and this adjacent business is not compromised. There is no obvious impediment that will preclude this.

The PWRS, as well as having led the work that has resulted in the majority of the disused rail corridor being cleared and the station at Thornton being restored, has ambitions for the line to be re-opened and to showcase its heritage. PWRS is keen to retain some heritage elements within the proposals. PWRS has amassed a collection of heritage rolling stock and equipment that it wishes to display in a permanent museum on or adjacent to the railway, including some form of test track. There are definite opportunities for the reinstated railway to accommodate heritage facilities. For example, not all options require the entirety of Thornton Station to be used to operate the railway, and so there is definite potential for the station to continue as the "shop window" for the heritage aspects of the railway. There are several kilometres of single track railway required to operate each mode and service option, but the rail corridor is wide enough for twin-track railway for the majority of its length. It is therefore reasonable to consider that PWRS's aspirations can be accommodated.

3.5.4. On-Street Connections between Tram and Heavy Rail corridors

There are a number of significant risks and constraints associated with this, or indeed any, on-street section of tramway, and so it is important to recognise that there are several alternatives that could be considered to help overcome these. The issues to consider include:

- **Land availability** – the baseline assumption places the tramway within the road space. There is potentially space alongside Jameson Road and Fleetwood Road to position the tram adjacent to the highway. The benefits of doing this would be to ensure greater journey time reliability, reduced impact on the operation of the road network, and the possibility of only constructing a single track tramway (which would reduce costs). At this stage, it is not clear if suitable land is available, and other risks to consider include land costs.
- **Eros Roundabout** – it is recognised that the roundabout is home to the Eros statue, and as such the baseline option seeks to skirt the roundabout as opposed to passing through the middle. This is assuming that land is available to do this, but more detailed work incorporating traffic modelling to properly consider the overall performance of the roundabout, will be needed to determine the optimum solution.
- **Impact on Highway** – the on-street assumption will need to be tested in terms of highways performance through detailed traffic modelling at a future stage. This consideration is linked to land availability, with a tramway adjacent to the highway minimising the highway impact.
- **Impact on Property Frontages** – for this baseline assumption, there are limited properties that front Jameson Road and Fleetwood Road on this route, so as an option this is considered a fairly low risk. Whichever route is taken forward, careful consideration of the above issues of land availability and impact on the highway need to be balanced with the impact on property frontages.

3.5.5. Preston Station

The situation at Preston is complex and it was beyond the scope of this study to make a detailed assessment on the impact of reinstating the Fleetwood to Poulton line on Preston Station. As such, the following working assumptions have been employed in order to assess feasibility and quantify costs:

- For heavy rail alternatives, identified capacity on the Preston to Blackpool corridor can be accommodated at Preston Station. Previous studies by Jacobs in 2019 have indicated how this can be made to work for up to 2 trains per hour, in terms of forming onward services, and the timetable analysis undertaken as part of this study verifies this.
- For tram-train alternatives, the currently out-of-use parcel platforms to the west side of the station could be used for terminating tram – train services. The costs for bringing these platforms back into use has been excluded from the cost estimates. It is therefore a key dependency for the tram-train solution that these platforms have been re-connected to the main station.

Clearly with both of these assumptions there are risks. For the tram-train alternative in particular, the risk is increased costs to either bring these platforms into use, or to modify other platforms within the station and the associated track and signalling through which the tram-train will have to pass.

3.5.6. Additional Tram-Train Risks

It is important to recognise that tram-train technology is currently not a common feature on the UK rail network, with only one existing example in Sheffield. There are many lessons that can be learnt from that scheme, the most significant of which is that the costs and timescales associated with implementing the Sheffield example were extremely challenging to predict.

A key decision with tram – train options is whether to go for high-floor vehicles which are compatible with the heavy rail network, but not Blackpool Tram system, or low-floor vehicles that would not be consistent with the national rail network. A decision is required over what is more important – compatibility with the tram system or the heavy rail network. It is arguably simpler to add sections of low-floor platform to heavy rail stations than to build high-floor sections of platform in an urban street. This is particularly pertinent if the extent to which the tram-train is to operate is to serve (for example) Poulton-le-Fylde, Kirkham & Wesham and Preston Stations only. If, however, there are ambitions for the tram-train to operate more widely, such as across the South Fylde route to Blackpool South, then it may be prudent to opt for a high-floor solution and limit the inter-operability with the tram network.

In addition to vehicle configuration, if a tram-train is deployed in such a way that it operates on both the tram and heavy rail networks, then there are additional compatibility challenges, including:

- Bespoke vehicles – a vehicle that is compatible with Blackpool tramway and the heavy rail network will be entirely unique and bespoke. Purchase and/or lease costs are thus likely to be higher than normal, and vehicle maintenance more complex.
- Vehicle control and detection – requiring communications links to both the tram control room and rail operating centre (presumably Manchester Rail Operations Centre).
- Driver training – drivers will not only have to be trained on driving a bespoke vehicle, but also on driving on the heavy rail network and the tram network.
- Heavy Rail Network Modifications – a tram-train is a very different type of vehicle to a normal heavy rail vehicle in terms of length, axle weight and number, structure gauge, and driving position (if low floor). Modifications are thus expected to be required to signalling (to ensure tram-trains are detected) and any switches and crossings (raised check rails required or swing nose crossings) through which the tram-train will pass. If the tram-train solution is taken forward, further investigation is required to determine the precise modifications required.

As a concluding remark, careful consideration must therefore be given to just how far it is intended to take a tram-train service, as this will directly impact the cost of implementation in terms of acquiring vehicles, modifying the existing network, extending vehicle detection that talks to both networks, and training drivers and maintenance staff.

3.6. Summary of Infrastructure Requirements and Assumptions

Table B-4 Summary of Station Stops

Infrastructure	Heavy Rail	Light Rail	Tram Train
Reinstatement of Fleetwood Branch Line Route	New formation, drainage and ducting. 50% re-use of track and sleepers (for costing purposes). Lineside fencing to be made good. Single track		
Stations/Stops	100m high-floor platforms, unmanned, with shelter, lighting, CCTV, PA, and CIS. Fleetwood terminus to include pick-up/drop off, park & ride.	32m low-floor platforms with shelter, lighting, CCTV and PA.	32m low-floor platforms with shelter, lighting, CCTV and PA. Low-floor extensions required to heavy rail stations served (Poulton, Kirkham and Preston assumed).
Public Rights of Way	New footbridges required (3 no.)	Line of sight operation, so pedestrian track crossings permitted.	
Interface with neighbouring businesses	Proposals seek to work alongside, and appropriately segregate from, Alan Hargreaves to allow business and its test track to remain insitu. The Poulton and Wyre Railway Society (PWRS) has been strongly advocating the reinstatement of the railway line. Proposals seek to allow PWRS heritage features to be retained and a PWRS heritage base to not be precluded.		
Existing bridges over the railway	Assumed to be in an adequate state of repair that is the responsibility of others	To accommodate electrification, track lowering and parapet raising is assumed to be required.	
New Highway Crossings (Hillhouse Enterprise Zone)	New bridge over the railway required	Signal-controlled at-grade tram-highway junction.	
Existing Level Crossings	Thornton assumed to be re-opened as a full barrier	Signal-controlled at-grade tram-highway junction.	

	level crossing; Hilylaid Road assumed to be closed.		
Electrification	Not required***	750V DC electrification[+]	
Link between Fleetwood Branch Line and Tram Network	N/A	Twin-track on-street (i.e. embedded) track assumed, with associated service diversions and modifications to property frontages.	
Link between Fleetwood Branch Line and Heavy Rail Network	Single track with associated facing crossover between Up and Down Main; turnback track to the East of Poulton Station	No direct connection. Terminating platform with step and lift access to Station Road	As Heavy Rail
Vehicle Control and Detection	Limited signalling of the route required with associated relay room/control panel amendments.	Tram detection and comms link to control room with associated control panel amendments.	As per tram for the reinstated Fleetwood Branch Line line; DC immunity required to signalling on main line. Comms link to light rail and heavy rail control rooms.
Other Heavy Rail Modifications	N/A	N/A	Some modifications assumed to raise/amend check rails according to vehicle wheel profile.

***Costs have also been developed for an electrified Heavy Rail Option.

[+] For compatibility with existing tram vehicles and network. For tram-train, if limited onward running on tram network is required, then consideration can be given to not electrifying the Fleetwood Branch Line corridor with traction power provided by battery instead.

The considerations listed above are for the purposes of establishing baseline solutions for each rail mode, such that demand can be assessed and Order of Magnitude Costs (Capital, Operating and Whole Lifecycle Maintenance) can be applied to establish the economic case for reinstating the railway.

4. Journey Time and Network Capacity Assessment

4.1. Introduction

Journey times have been calculated utilising spreadsheet models that consider:

- Vehicle performance in terms of acceleration and braking capabilities, and maximum permissible speed;
- Track geometry at curves and switches and crossings, which limits achievable speed;
- Station dwell times; and
- Delays at major rail junctions (for heavy rail) and highway junctions (for light rail).

All journey times have been benchmarked using timetable data for existing heavy rail and tram services.

The following working assumptions have been deployed for this exercise:

- For the Fleetwood to Poulton WPS corridor, maximum speed of 70mph assumed (geometry permitting) for heavy rail and tram-train, and 45mph for the tram (based on the performance characteristics of the Flexity 2 light rail vehicle).
- At stations, a dwell time of 2 minutes assumed for heavy rail, and 30 seconds assumed for light rail and tram-train.
- Terminating services have an assumed 5 minute turn-around time.
- For heavy rail, the Fleetwood terminus is located immediately to the South of Herring Arm Road.
- For light rail and tram-train, the service operates on the WPS between Poulton and Jameson Road, then runs on-street to Broadwater where it joins the Blackpool tramway to run to Fleetwood Ferry.

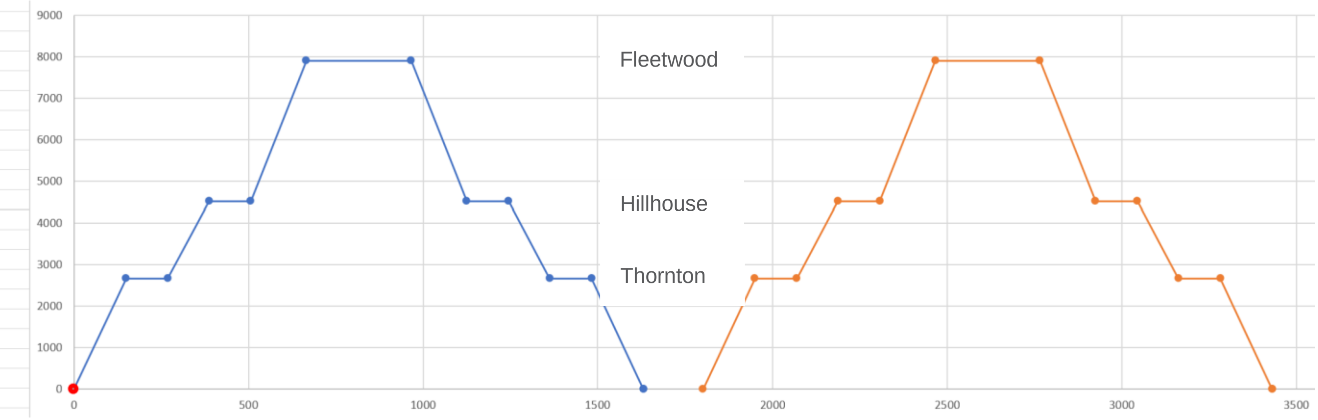
4.2. Fleetwood to Poulton-le-Fylde

The modelled journey time for each mode is as follows:

- Poulton-le-Fylde to Fleetwood (Heavy Rail) – 11 minutes
- Poulton-le-Fylde to Fleetwood Ferry (Light Rail/Tram-Train) – 22 minutes (13 minutes from Poulton to Broadwater, and an estimated 9 minutes from Broadwater to Fleetwood Ferry).

In terms of the reinstated WPS route, this translates to the corridor working from an operational perspective as a single-track railway for 1 and 2 trains per hour, as illustrated in Figure B-17 for heavy rail, where the services clearly don't overlap (note the horizontal axis is in seconds, and the vertical axis is chainage, with the stops at Thornton, Hillhouse and Fleetwood shown).

Figure B-17: 30 minute service frequency (2 trains per hour)



For 3 and 4 trains per hour, as illustrated in Figures B-18 and B-19 respectively, it can be seen that there is the need for some twin tracking to allow services to pass. For a standard timetable, this is occurring in the vicinity of Thornton and Hillhouse stations.

Figure B-18: 20 minute service frequency (3 trains per hour)

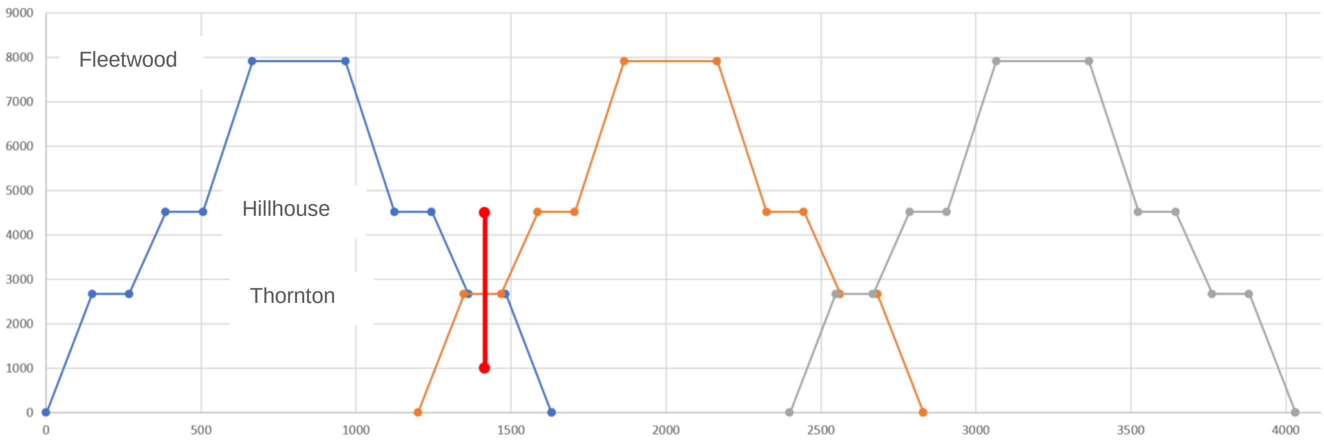
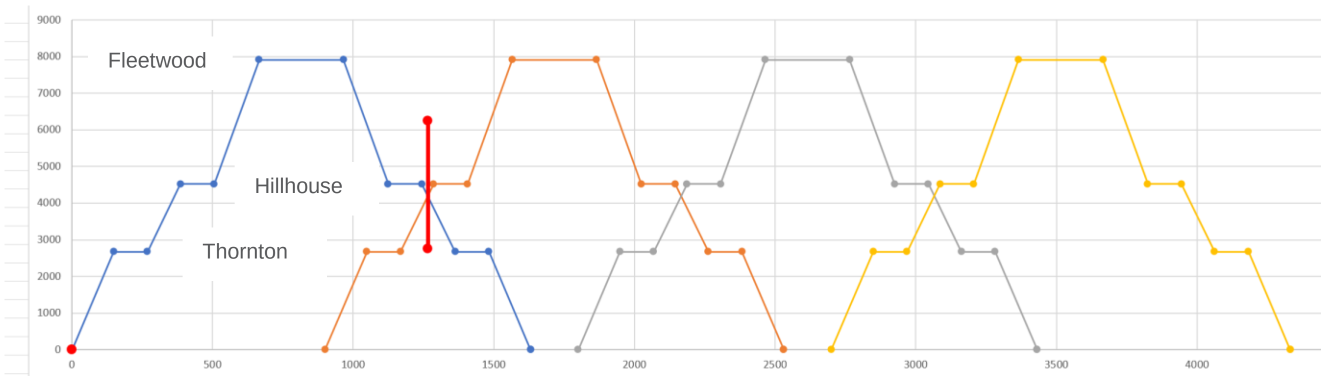


Figure B-19: 15 minute service frequency (4 trains per hour)



Figures B-17 to B-19 illustrate the heavy rail scenario. For tram, the picture is similar, as the tram/tram train spends a similar period of time on the WPS corridor.

Considering service perturbation, if a train is delayed by 5 minutes leaving Fleetwood (due to a late running incoming service), then the impact is as follows:

Figure B-20: 3 trains per hour with a five minute delay

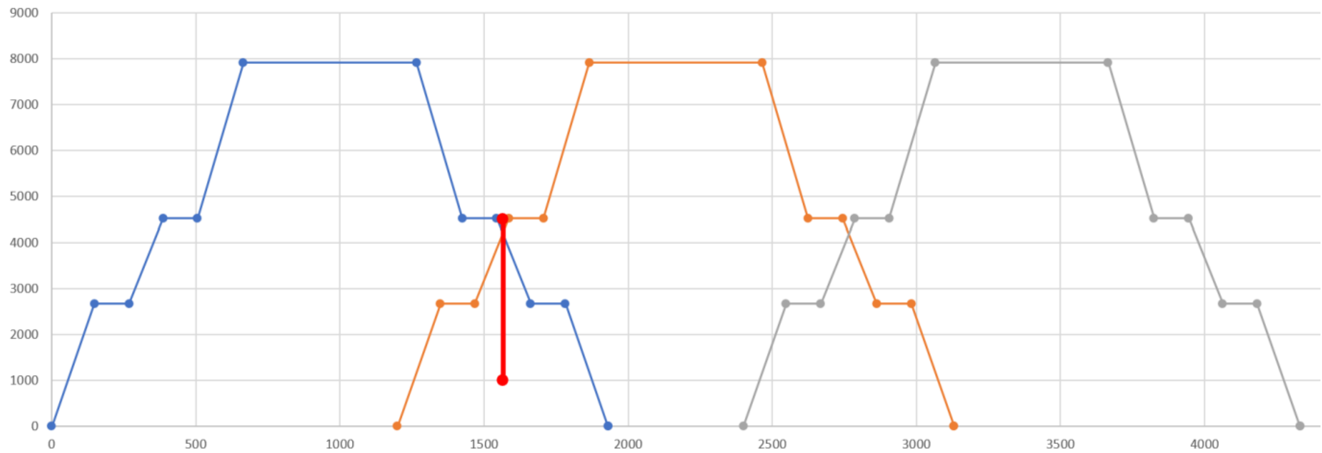
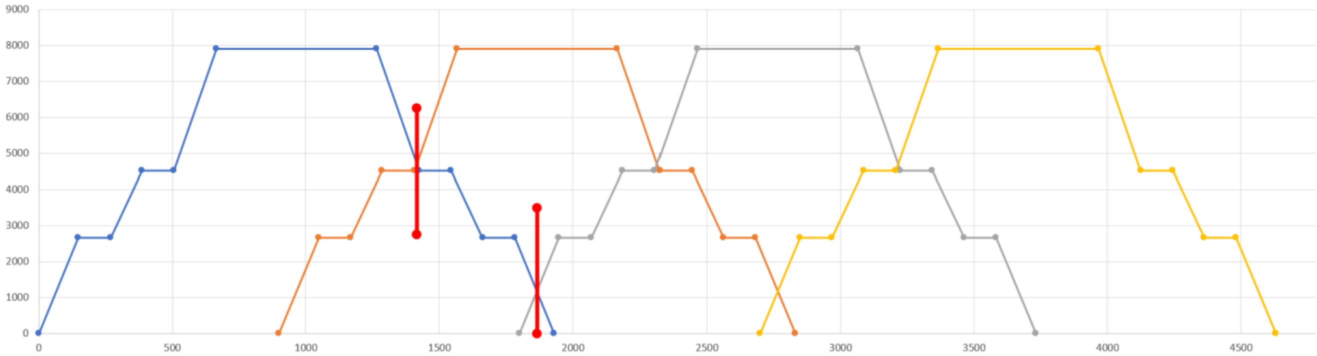


Figure B-21: 4 trains per hour with a five minute delay



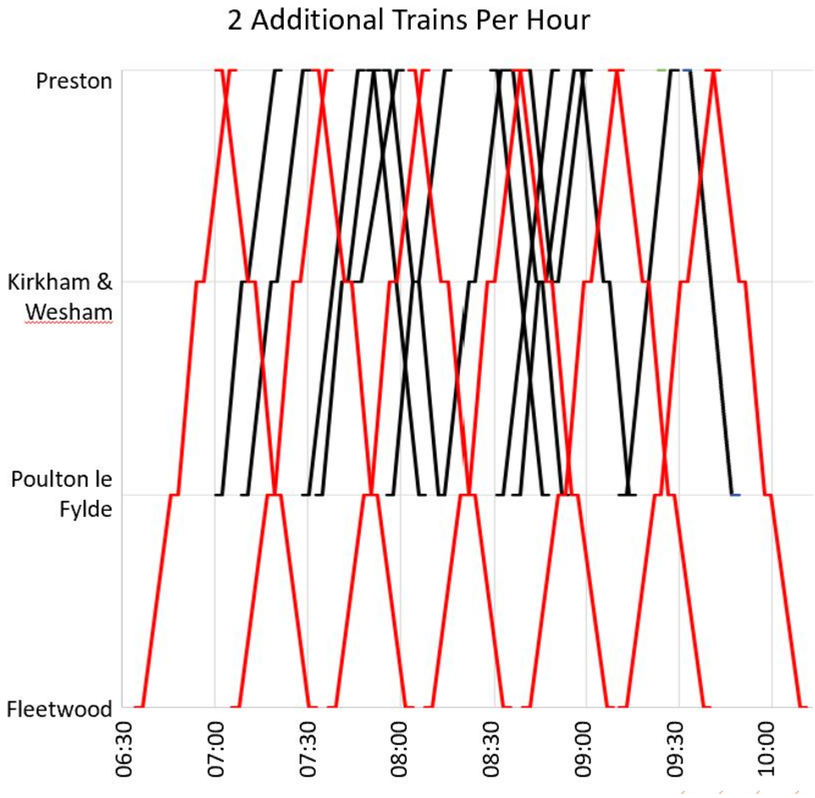
For a 20-minute service frequency (3tph), the overlap doesn't change significantly – it's still a single overlap between Thornton and Hillhouse. For a 15-minute service frequenct (4tph), it can be seen that there are now two overlaps over approximately 4 kilometres of the route.

Based on this assessment, the infrastructure requirements for 1 and 2tph are that the route can be single track throughout, but an additional platform face is provided at Fleetwood to allow for some service disruption. For 3tph, a dynamic loop that spans between Thornton and Hillhouse is assumed (approximately 2km in length). For 4tph, a longer dynamic loop that can span from south of Thornton to Hillhouse is assumed (approximately 4km in length).

4.3. Poulton-le-Fylde to Preston

For heavy rail and tram-train, a key benefit of either mode is the ability to run a service through to Preston and beyond. Capacity on the network has been assessed based on the December 2019 and May 2020 timetables (i.e. considering the timetable pre-Covid 19). The analysis of the corridor indicates that, whilst the BPN corridor is quite busy with hourly services between Blackpool North and York, Manchester Airport, Liverpool Lime Street and Hazel Grove, plus hourly services along the South Fylde line and four trains per day between Blackpool and London, there is capacity on the route for at least a further two trains per hour, as illustrated in Figure 4-6. Existing services are illustrated in black, and the two additional trains per hour to and from Fleetwood in redd.

Figure B-22: Existing network capacity



It is worth noting that there may be further capacity beyond two train per hour, but based on analysis of the current timetable, this would not be to a "clockface" timetable (i.e. the same time every hour). The Study has thus assumed that up to two trains / tram-trains per hour can run through to Preston, and any additional services will turn back at Poulton-le-Fylde.

4.4. Vehicle Requirements

The timetable analysis summarised above achieves two purposes:

- Determining required infrastructure to facilitate the desired service;
- Determining the required number of vehicles to operate the service.

The narrative above describes the passing loops required (i.e. the infrastructure requirements).

In terms of vehicle numbers, the situation varies between the different modes. The calculations are illustrated in Section 4.3.1, 4.3.2 and 4.3.3.

4.4.1. Heavy Rail Vehicle Requirements

1 train per hour requires 2 vehicles							
Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0725	1	0700	0711	0728	2
0757	0814	0825	2	0800	0811	0828	1
2 trains per hour requires 3 vehicles							
Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0725	1	0700	0711	0728	3
0724	0741	0752	2	0730	0741	0758	1
0757	0814	0825	3	0800	0811	0828	2
				0830	0841	0858	3
3 trains per hour requires 4 vehicle							
Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0725	1	0700	0711	0728	4
0717	0734	0745	2	0722	0733		
	0750	0801	3	0737	0748	0805	1
0757	0814	0825	4	0800	0811	0828	2
0817	0834	0845	1	0822	0833		3
				0837	0848	0905	4
4 trains per hour - 4 or 5 vehicles							
Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0725	1	0653	0704	0721	3
	0729	0740	2	0708	0719		2
0727	0744	0755	3	0723	0734	0751	4
	0759	0810	1	0738	0749		1
0757	0814	0825	4	0753	0804	0821	2
	0829	0840	3	0808	0819		3
0827	0844	0855	2	0823	0834	0851	1
	0859	0910		0838	0849		4

4.4.2. Light Rail Vehicle Requirements

Light Rail Vehicle Numbers					
2 trams per hour requires 2 vehicles					
Fleeetwood	Poulton		Poulton	Fleetwood	
0	22	1	27	49	
30	52	2	57	79	
60	82	1	87	109	
3 trams per hour requires 3 vehicles					
0	22	1	27	49	
20	42	2	47	69	
40	62	3	67	89	
60	82	1	87	109	
80	102	2	107	129	
4 trams per hour requires 4 vehicles					
0	22	1	27	49	1
15	37	2	42	64	2
30	52	3	57	79	3
45	67	4	72	94	4
60	82	1	87	109	1
75	97	2	102	124	2
90	112	3	117	139	3

4.4.3. Tram-Train Vehicle Requirements

1 Tram-train per hour requires 2 vehicles

Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0736	1	0649	0711	0728	2
0757	0814	0836	2	0749	0811	0828	1
0857	0914	0936	1	0849	0911	0928	2

2 tram-trains per hour requires 4 vehicles

Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0736	1	0649	0711	0728	3
0724	0741	0803	2	0719	0741	0758	4
0757	0814	0836	3	0749	0811	0828	1
0824	0841	0903	4	0819	0841	0858	2
0857	0914	0936	1	0849	0911	0928	3
0924	0941	1003	2	0919	0941	0958	4

3 tram-trains per hour requires 5 vehicles

Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0705	0722	0744	1	0649	0711	0728	4
0725	0742	0804	2	0711	0733	0750	5
	0802	0824	3	0729	0751		3
0805	0822	0844	4	0749	0811	0828	1
0823	0840	0902	5	0811	0833	0850	2
	0902	0924	3	0829	0851		3
0905	0922	0944	1	0849	0911	0928	4
0923	0940	1002	2	0911	0933	0950	5
				0929	0951		3
				0949	1011	1028	1

4 tram-trains per hour requires 5 vehicles

Preston	Poulton	Fleetwood		Fleetwood	Poulton	Preston	
0657	0714	0736	1	0642	0704	0721	2
	0729	0751	4	0657	0719		4
0727	0744	0806	2	0712	0734	0751	3
	0759	0821	5	0727	0749		5
0757	0814	0836	3	0742	0804	0821	1
	0829	0851	4	0757	0819		4
0827	0844	0906	1	0812	0834	0851	2
	0859	0921	5	0827	0849		5

4.5. Summary

The journey time and corridor capacity work generates the following vehicle requirements, which have been used to generate cost estimates for the scheme.

Table B-5 Summary of vehicles required

Mode	1 Service per hour	2 services per hour	3 services per hour	4 services per hour
Heavy Rail	2 vehicles	3 vehicles	4 vehicles	5 vehicles
Light Rail	1 vehicle	2 vehicles	3 vehicles	4 vehicles
Tram Train	2 vehicles	4 vehicles	5 vehicles	5 vehicles

The principal reason for the differences is the travel distance. The Light Rail option, as it only shuttles between Poulton-le-Fylde and Fleetwood Ferry, has the fewest vehicle requirements and these are not special vehicles, merely additional tram vehicles.

Both Heavy Rail and Tram-Train run through to Preston for up to 2 services per hour. The Tram-Train requires more vehicles, because at the Fleetwood end it is running to Fleetwood Ferry, which adds 11 minutes to the journey. At 4 services per hour, the Heavy Rail option is borderline between 4 and 5 vehicles, so for the purpose of a robust assessment, 5 vehicles has been assumed.

5. Cost Assessment

5.1. Approach to Capital Cost Estimates

High-level estimates of the capital costs of building each of the main options have been prepared by Faithful and Gould using the assumptions summarised in table B-6.

Table B-6 – Assumptions used to derive capital cost estimates

Item	Elements	Units
Track	Formation, drainage, ballast, sleepers, rails	Per linear metre
	Switches and Crossings	Each
	Embedded on-street slab track (for tram and tram-train only)	Per linear metre
Lineside Equipment	Comms and LV power cabling, ducting, fencing	Per linear metre
Buried Services	Required diversions for on-street tram section	Lump sum estimate
Electrification	OLE, sub-stations, HV cabling	Per linear metre
Stations/Stops	Platforms, including shelter, lighting, CCTV, passenger information, signage	Per platform
Railway Crossings	New footbridges/highway bridges	Each
	Strengthening / parapet works (existing bridges)	Each
	Level Crossings (heavy rail only)	Each
	Highway Junctions (Light rail/tram-train only)	Each
Signalling / Train Control	Heavy Rail signalling	Rate per SEU
	Tram/Tram-Train control on new corridor	Lump sum estimate
	Control Room/Control Panel changes	Lump sum estimate
Existing network tie-ins	Additional switches and crossings and associated signalling; modifications to existing track, OLE and lineside cabling; possession costs.	Lump sum estimate
Depots and Stabling	Provision for cleaning, maintaining and stabling additional vehicles required to operate the service	Lump sum “do something” estimate + per vehicle uplift
Land Acquisition	For re-instating disused railway line	Excluded (assumed not required
	For tram / tram-train connection between disused rail corridor and tram corridor	Lump sum estimate
Extras	Design Costs	10% Uplift
	Preliminaries	25% Uplift

Using the assumptions above, a high-level capital cost estimate for each option has been developed, with the outputs summarised in table B-7. At this stage the cost estimates are presented at Q4 2020 prices and exclude any contingency and risk allowance.

Table B-7: Estimated capital costs of construction (Q4, 2020 prices) excluding contingency and risk

Option		1 train per hour	2 train per hour	3 train per hour	4 train per hour
Heavy Rail	Baseline Option (non-electrified)	£74m	£77m	£84m	£88m
	Electrified	£104m	£106m	£121m	£127m
Light Rail	Baseline Option (electrified)	£78m	£79m	£90m	£96m
Tram Train	Baseline Option (non-electrified)	£116m	£118m	£119m	£120m
	Electrified	£136m	£138m	£149m	£154m

Additional costs for providing Fleetwood Heavy Rail Station with park and ride facilities are estimated to be £1m.

The cost differential between the different service frequencies (1, 2, 3 and 4 trains per hour) are the result of two key cost drivers:

- The higher frequency services require more vehicles, so an increased allowance has been included for modifying existing depots to accommodate the extra vehicles.
- For 3 and 4 trains per hour services on the heavy rail options, passing loops would be required. These loops would need to be twice as long for 4tph as 3tph. The positions of these loops would also require additional platforms at stations/stops.

The cost differential between heavy rail, light rail and tram train are the result of the following cost drivers:

- Heavy rail is generally less expensive as the route length is shorter, has fewer stations, and electrification is not essential. It does incur greater costs at Station Road Level Crossing, at Hill House Enterprise Zone (where a new road over rail bridge would be required) and at public rights-of-way (3 no.) where footbridges would be required. It would also incur the costs of the reinstated junction and turnback at Poulton, including an allowance for possessions.
- Light rail would incur the additional costs of electrification of the corridor, plus significant additional costs for the twin-track on-street section connecting the old track bed of the Fleetwood Line to the Blackpool Tramway (which includes allowances for land acquisition, service diversions, traffic management and modifying property access). It would also have additional costs to modify the tramway at its junction, and additional stops at Hill House Enterprise Zone and Poulton. The latter stop would require steps, a lift and modification to Breck Road Bridge to form the access. The cost of providing light rail stops is however lower cost than the cost of providing heavy rail stations, and the costs of a signal controlled highway junction at Station Road in Thornton is much lower than for a full barrier level crossing needed in a heavy rail option. Additionally, light rail would not incur the significant costs associated with reinstating Poulton Junction, nor building a turnback at Poulton-le-Fylde.
- Tram-Train costs are likely to be identical to those for the tram between Poulton-le-Fylde and Fleetwood, including the connection to the tram network. However, for the baseline option electrification costs are excluded on the basis that hybrid battery-based solutions might be used. At Poulton-le-Fylde, tram-train would not incur the costs of a separated tram stop, but would incur the same costs as the heavy rail options for reinstating Poulton junction, building turnback facilities, and including an allowance for possessions. Tram-train would also incur additional costs at Poulton-le-Fylde, Kirkham & Wesham and Preston stations for providing a low-floor section of platform at each of these stations, and a per unit cost for modifying every signal, and track switch and crossing between Poulton-le-Fylde and Preston. Further additional costs for tram train would be incurred for providing communications connections that can interface with both networks (Heavy Rail and Tram options have costs for a single connection), and an uplift on depot costs to reflect the additional complexity and equipment required for a bespoke vehicle.

5.1.1. Risk, Uncertainty and Optimism Bias

The costs presented in Table B-7 do not include any contingency for risk, uncertainty, or optimism bias. DfT's TAG guidance[49]: sets out that for a project at this early stage of development (known as GRIP 1[50]) that an optimism bias uplift of 64% should be applied to the net capital costs. On this basis the capital costs of construction including a provision for optimism bias of 64% are shown in Table B-8 below.

Table B-8: Estimated capital costs of construction (Q4, 2020 prices) including optimism bias

Option		1 train per hour	2 train per hour	3 train per hour	4 train per hour
Heavy Rail	Baseline Option (non-electrified)	£121m	£126m	£138m	£144m
	Electrified	£171m	£174m	£198m	£208m
Light Rail	Baseline Option (electrified)	£128m	£130m	£148m	£157m
Tram Train	Baseline Option (non-electrified)	£190m	£194m	£195m	£197m
	Electrified	£223m	£226m	£244m	£253m

5.2. Rolling Stock Costs

This study assumes that heavy rail rolling stock would be procured on a lease while light rail or hybrid tram-train rolling stock would be purchased. Heavy rail lease costs are based on a 4 car class 331 and assumed to be £14k per month per unit. This study also assumes the lease costs for either diesel or electric heavy rail rolling stock would effectively be comparable. Tram purchase costs are assumed to be £2.5m for light rail and £3.5m for tram-train, for which considerable extra technical complexity is needed.

On this basis the estimated costs of leasing and/or purchasing rolling stock are summarised In table B-9.

Table B-9: Rolling stock cost summaries (Q4, 2020 prices) excluding contingency and risk

Option	Cost Type	Train Frequency			
		1 tph	2 tph	3 tph	4 tph
Heavy Rail (Fleetwood to Preston)	Lease costs (per annum)	£336k pa (2 units)	£504k pa (3 units)	£672k pa (4 unit)	£840k pa (5 units)
Light Rail (Fleetwood Ferry to Poulton-le-Fylde)	Purchase costs	£2.5m (1 units)	£5m (2 unit)	£7.5m (3 unit)	£10m (4 units)
Tram Train (Fleetwood Ferry to Poulton-le-Fylde)	Purchase costs	£6.9m (2 units)	£13.8m (4 units)	£17.2m (5 units)	£17.2m (5 units)

It can be seen that the cost of tram train vehicles is considerably more than that required for light rail vehicles, both because more vehicles are required and because the unit costs of tram train are higher as a result of the relatively bespoke technical requirements.

[49] https://www.gov.uk/government/publications/webtag-tag-unit-a5-3-rail-appraisal-may-2018
[50] https://www.networkrail.co.uk/wp-content/uploads/2018/02/Investing-in-the-Network.pdf

5.2.1. Risk, Uncertainty and Optimism Bias

The costs presented in Table 3-5 do not include any contingency for risk, uncertainty, or optimism bias. As both leasing or purchasing rolling stock are viable options, for the purpose of optimism bias assumptions, the rolling stock costs for all options are considered to be operating costs, for which TAG recommends an optimism bias uplift of 41%. On this basis the rolling stock costs including optimism bias are shown in table B-10 below.

Table B-10: Rolling stock cost summaries (Q4, 2020 prices) including optimism bias

Option	Cost Type	Train Frequency			
		1 tph	2 tph	3 tph	4 tph
Heavy Rail (Fleetwood to Preston)	Lease costs (per annum)	£474k pa (2 units)	£711k pa (3 units)	£948k pa (4 unit)	£1,184k pa (5 units)
Light Rail (Fleetwood Ferry to Poulton-le-Fylde)	Purchase costs	£3.5m (1 units)	£7.1m (2 unit)	£10.6m (3 unit)	£14.1m (4 units)
Tram Train (Fleetwood Ferry to Preston)	Purchase costs	£9.7m (2 units)	£19.5m (4 units)	£24.3m (5 units)	£24.3m (5 units)

5.3. Maintenance and Renewal Costs

It is assumed that the ongoing maintenance and renewals costs for tack, signalling and stations will be 1% of the original capital costs per annum.

Long term maintenance and renewal costs for rolling stock is based around the following assumptions:

- For leased vehicles (heavy rail) it is assumed that long term maintenance costs are included within the lease costs (so no additional lifecycle maintenance costs would be incurred); and
- For purchased vehicles (light rail and tram-train) it is assumed that full fleet replacement will be undertaken after 30 years. There is potential for some costs associated with maintenance over the fleets' 30-year lifespan, but at this stage, the appraisal has not separately estimated these costs.

Further to the above, in accordance to TAG guidance all maintenance and renewal costs have been uplifted by a further 41% to account for optimism bias.

5.4. Detailed Cost Estimating Tables

	Non-Electrified Heavy Rail	1 tph	2 tph	3 tph	4 tph
A	Refurbish route, 6650m and extend to 7,900m	15,209,887.34	15,209,887.34	15,209,887.34	15,209,887.34
B	Loop at Fleetwood Station	398,750.00	398,750.00	398,750.00	398,750.00
C	Loop at Thornton Station	0.00	0.00	3,008,775.00	4,931,850.00
D	Reinstatement of Thornton Station	207,018.08	207,018.08	414,036.16	414,036.16
E	Reinstatement of Burn Naze Station	207,018.08	207,018.08	207,018.08	414,036.16
F	Reinstatement of existing level crossing at Thornton	2,750,000.00	2,750,000.00	2,750,000.00	2,750,000.00
G	New 7m wide single platform station at Fleetwood	260,669.68	260,669.68	260,669.68	260,669.68
H	Jameson Road overbridge	5,225,000.00	5,225,000.00	5,225,000.00	5,225,000.00
J	200 space car park, with park & ride and drop off points	1,236,981.09	1,236,981.09	1,236,981.09	1,236,981.09
K	Integration with existing rail at Poulton-Le-Fylde	13,750,000.00	13,750,000.00	13,750,000.00	13,750,000.00
L	Provision of 3 nr footbridges to maintain rights of way	2,062,500.00	2,062,500.00	2,062,500.00	2,062,500.00
M	Hill House Enterprise Zone overbridge	8,937,500.00	8,937,500.00	8,937,500.00	8,937,500.00
N	Depot provision	5,500,000.00	8,250,000.00	11,000,000.00	13,750,000.00
P	Signalling	19,387,500.00	19,387,500.00	21,312,500.00	21,312,500.00
	TOTAL	**75,132,824.27**	**77,882,824.27**	**85,773,617.35**	**90,653,710.43**
	Cost Minus P&R	73,895,843.18	76,645,843.18	84,536,636.26	89,416,729.34

	Electrified Heavy Rail	Hourly	Thirty Min	Twenty Min	Fifteen Min
A	Refurbish route, 6650m and extend to 7,900m	17,925,512.34	17,925,512.34	17,925,512.34	17,925,512.34
B	Loop at Fleetwood Station	398,750.00	398,750.00	398,750.00	398,750.00
C	Loop at Thornton Station	0.00	0.00	3,008,775.00	4,931,850.00
D	Electrification	20,639,642.00	20,639,642.00	27,800,699.75	28,800,699.75
E	Track lowers	1,677,087.00	1,677,087.00	1,677,087.00	1,677,087.00
F	Reinstatement of Thornton Station	207,018.08	207,018.08	414,036.16	414,036.16
G	Reinstatement of Burn Naze Station	207,018.08	207,018.08	207,018.08	414,036.16
H	Reinstatement of existing level crossing at Thornton	2,750,000.00	2,750,000.00	2,750,000.00	2,750,000.00
J	New 7m wide single platform station at Fleetwood	260,669.68	260,669.68	260,669.68	260,669.68
K	Jameson Road overbridge	5,225,000.00	5,225,000.00	5,225,000.00	5,225,000.00
L	200 space car park, with park & ride and drop off points	1,236,981.09	1,236,981.09	1,236,981.09	1,236,981.09
M	Integration with existing rail at Poulton-Le-Fylde	17,875,000.00	17,875,000.00	17,875,000.00	17,875,000.00
N	Provision of 3 nr footbridges to maintain rights of way	2,062,500.00	2,062,500.00	2,062,500.00	2,062,500.00
P	Hill House Enterprise Zone overbridge	8,937,500.00	8,937,500.00	8,937,500.00	8,937,500.00
Q	Depot provision	6,500,000.00	8,250,000.00	11,000,000.00	13,750,000.00
R	Signalling	19,387,500.00	19,387,500.00	21,312,500.00	21,312,500.00
	TOTAL	**105,290,178.27**	**107,040,178.27**	**122,092,029.10**	**127,972,122.18**
	Total Minus P&R	104,053,197.18	105,803,197.18	120,855,048.01	126,735,141.09

	Light Rail	Hourly	Thirty Min	Twenty Min	Fifteen Min
A	Refurbish route, 6650m and extend to 7,500m	28,063,731.00	28,063,731.00	28,063,731.00	28,063,731.00
B	Loop from Ch 0 to 2000	0.00	0.00	1,101,375.00	0.00
C	Loop from Ch 0 to 3500	0.00	0.00	0.00	0.00
D	Passing loop at Thornton Station, 3,500m	0.00	0.00	0.00	1,730,438.00
E	Electrification	19,025,131.00	19,025,131.00	27,995,193.00	32,335,227.00
F	Track lowers	1,677,087.00	1,677,087.00	1,677,087.00	1,677,087.00
G	Reinstatement of Thornton Station	145,617.00	145,617.00	291,234.00	291,234.00
H	New Platform at Hill House Enterprise Zone South	145,617.00	145,617.00	145,617.00	291,234.00
J	Highway Junction at Thornton and Hilylaid Road	1,787,500.00	1,787,500.00	1,787,500.00	1,787,500.00
K	Signalised junction and roundabout crossing	797,500.00	797,500.00	797,500.00	797,500.00
L	Tram connection at Broadwater	825,000.00	825,000.00	825,000.00	825,000.00
M	Poulton-le-Fylde new stop and accesses	1,375,000.00	1,375,000.00	1,375,000.00	1,375,000.00
N	New platform at Hill House Enterprise Zone North	138,228.00	138,228.00	138,228.00	138,228.00
P	Signalised junction at Jameson Road	206,250.00	206,250.00	206,250.00	206,250.00
Q	Signalised junction at Hill House Enterprise Road	206,250.00	206,250.00	206,250.00	206,250.00
R	Transition ramp at Jameson Road	95,880.00	95,880.00	95,880.00	95,880.00
S	Tram control system	13,750,000.00	13,750,000.00	13,750,000.00	13,750,000.00
T	Tram vehicles	2,500,000.00	5,000,000.00	7,500,000.00	10,000,000.00
U	Depot provision	2,750,000.00	3,781,250.00	4,812,500.00	5,843,750.00
V	Accommodation works	6,875,000.00	6,875,000.00	6,875,000.00	6,875,000.00
	TOTAL	**80,363,791.00**	**83,895,041.00**	**97,643,345.00**	**106,289,309.00**
	Cost excluding vehicles	77,863,791.00	78,895,041.00	90,143,345.00	96,289,309.00

	Tram Train Costs	Hourly	Thirty Min	Twenty Min	Fifteen Min
A	Refurbish route, 6650m and extend to 7,500m	28,063,731.00	28,063,731.00	28,063,731.00	28,063,731.00
B	Loop from Ch 0 to 2000	0.00	0.00	1,101,375.00	0.00
C	Loop from Ch 0 to 3500	0.00	0.00	0.00	0.00
D	Passing loop at Thornton Station, 3,500m	0.00	0.00	0.00	1,730,438.00
E	Electrification				
F	Track lowers	0.00	0.00	0.00	0.00
G	Reinstatement of Thornton Station	145,617.00	145,617.00	291,234.00	291,234.00
H	New Platform at Hillhouse Enterprise Zone South	145,617.00	145,617.00	145,617.00	291,234.00
J	Highway Junctions at Thornton and Hilylaid Road	1,787,500.00	1,787,500.00	1,787,500.00	1,787,500.00
K	Signalised junction and roundabout crossing	797,500.00	797,500.00	797,500.00	797,500.00
L	Tram connection at Broadwater	825,000.00	825,000.00	825,000.00	825,000.00
M	Integration with existing rail at Poulton-Le-Fylde	13,750,000.00	13,750,000.00	13,750,000.00	13,750,000.00
N	New platform at Hill House Enterprise Zone	138,228.00	138,228.00	138,228.00	138,228.00
P	Signalised junction at Jameson Road	206,250.00	206,250.00	206,250.00	206,250.00
Q	Signalised junction at Hill House Enterprise Road	206,250.00	206,250.00	206,250.00	206,250.00
R	Transition ramp at Jameson Road	95,880.00	95,880.00	95,880.00	95,880.00
S	Tram control system	13,750,000.00	13,750,000.00	13,750,000.00	13,750,000.00
T	Tram-Train vehicles	6,875,000.00	13,750,000.00	17,187,500.00	17,187,500.00
U	Depot provision	6,000,000.00	8,000,000.00	8,500,000.00	8,500,000.00
V	Accommodation works	6,875,000.00	6,875,000.00	6,875,000.00	6,875,000.00
	Low platform for tram train at existing station	6,875,000.00	6,875,000.00	6,875,000.00	6,875,000.00
	Additional signalling on existing rail network	31,075,000.00	31,075,000.00	31,075,000.00	31,075,000.00
	Additional Comms for linking to Heavy Rail and Tram	5,000,000.00	5,000,000.00	5,000,000.00	5,000,000.00
	TOTAL	**122,611,573.00**	**131,486,573.00**	**136,671,065.00**	**137,445,745.00**
	Cost excluding vehicles	115,736,573.00	117,736,573.00	119,483,565.00	120,258,245.00

	Electric Tram Train Costs	Hourly	Thirty Min	Twenty Min	Fifteen Min
A	Refurbish route, 6650m and extend to 7,500m	28,063,731.00	28,063,731.00	28,063,731.00	28,063,731.00
B	Loop from Ch 0 to 2000	0.00	0.00	1,101,375.00	0.00
C	Loop from Ch 0 to 3500	0.00	0.00	0.00	0.00
D	Passing loop at Thornton Station, 3,500m	0.00	0.00	0.00	1,730,438.00
E	Electrification	19,025,131.00	19,025,131.00	27,995,193.00	32,335,227.00
F	Track lowers	1,677,087.00	1,677,087.00	1,677,087.00	1,677,087.00
G	Reinstatement of Thornton Station	145,617.00	145,617.00	291,234.00	291,234.00
H	Reinstatement of Burn Naze Station	145,617.00	145,617.00	145,617.00	291,234.00
J	Reinstatement of existing level crossing at Thornton	1,787,500.00	1,787,500.00	1,787,500.00	1,787,500.00
K	Signalised junction and roundabout crossing	797,500.00	797,500.00	797,500.00	797,500.00
L	Tram connection at Broadwater	825,000.00	825,000.00	825,000.00	825,000.00
M	Integration with existing rail at Poulton-Le-Fylde	13,750,000.00	13,750,000.00	13,750,000.00	13,750,000.00
N	New platform at Hill House Enterprise Zone	138,228.00	138,228.00	138,228.00	138,228.00
P	Signalised junction at Jameson Road	206,250.00	206,250.00	206,250.00	206,250.00
Q	Signalised junction at Hill House Enterprise Road	206,250.00	206,250.00	206,250.00	206,250.00
R	Transition ramp at Jameson Road	95,880.00	95,880.00	95,880.00	95,880.00
S	Tram control system	13,750,000.00	13,750,000.00	13,750,000.00	13,750,000.00
T	Tram-Train vehicles	6,875,000.00	13,750,000.00	17,187,500.00	17,187,500.00
U	Depot provision	6,000,000.00	8,000,000.00	8,500,000.00	8,500,000.00
V	Accommodation works	6,875,000.00	6,875,000.00	6,875,000.00	6,875,000.00
	Low platform for tram train at existing station	6,875,000.00	6,875,000.00	6,875,000.00	6,875,000.00
	Additional signalling on existing rail network	31,075,000.00	31,075,000.00	31,075,000.00	31,075,000.00
	Additional Comms for linking to Heavy Rail and Tram	5,000,000.00	5,000,000.00	5,000,000.00	5,000,000.00
	TOTAL	**143,313,791.00**	**152,188,791.00**	**166,343,345.00**	**171,458,059.00**
	Cost excluding vehicles	136,438,791.00	138,438,791.00	149,155,845.00	154,270,559.00

6. Desktop/Site Walkover

To establish any key constraints the proposed line of route was walked, and also reviewed using desk top tools. Working from south to north, the following provides a commentary on the features and condition of the disused rail corridor

CH0000

- The Fleetwood corridor has been disconnected from the rail network 30m to the west of Poulton station, with the removal of several switches/crossovers and approximately 10m of track from two parallel tracks

CH0030 – CH0600

- Twin tracks on wooden sleepers, which are unsuitable for reuse
- Existing track formation appears stable and suitable for reuse
- Existing pedestrian overbridge (Bridge A, connecting The Avenue and Shirley Heights) at CH0600 in good condition, with sufficient width for two lines underneath. Bridge deck is cast iron girders with brick arches. Bridge to be checked for modern rolling stock clearance

CH0600 – CH1100

- Existing switch, ducting and cabinets abandoned and unsuitable for reuse
- Existing railway changes to single track, however there is adequate width for twin tracks to continue (circa 6m width)
- Existing track formation appears stable and suitable for reuse
- Existing field access underbridge (Bridge B, connecting two fields) at CH1100 appears in good condition. Bridge deck is steel. Bridge strength to be calculated for modern rolling stock loading.

CH1100 – CH1700

- Existing track changes to concrete sleeper at approximately CH1600, and may be suitable for reuse
- Existing track formation appears stable and suitable for reuse
- Corridor width is adequate for twin tracks (circa 7m)
- Existing highway overbridge (Bridge C, carrying the A585) at CH1700 in very good condition, with sufficient width for two lines underneath. Bridge deck is steel girders and concrete. Bridge to be checked for modern rolling stock clearance

CH1700 – CH2000

- Existing single track continues on concrete sleepers with track formation still suitable for reuse
- Corridor width is not well defined from CH1700 to CH2000, but is capable of supporting a single track
- Existing pedestrian at-grade crossing (connecting New Lane to New Road) at CH2000. This is to be considered during the Engineering optioneering as whether to be retained, replaced or closed.
- Existing wastewater pumping station at CH2000. This increases the likelihood of utility diversions at this location.

CH2000 - CH2700

- Existing single track continues on concrete sleepers with track formation still suitable for reuse
- Corridor width is poorly defined from CH2000 to CH2600 but is capable of supporting a single track
- Existing closed level crossing (Station Rd) and infrastructure at CH2650. This is to be considered during the Engineering optioneering as whether to be retained, replaced or closed.
- Existing closed Thornton Station at CH2700. Thornton station has two side platforms, approximately 150m in length and capable of twin track running throughout.

CH2700 – CH4450

- Existing single track continues on concrete sleepers with track formation still suitable for reuse
- Corridor width is not well defined from CH2700 to CH3300, but is capable of supporting a single track
- Existing closed level crossing (Hillylaid Rd) and infrastructure at CH3300. This is to be considered during the Engineering optioneering as whether to be retained, replaced or closed.
- The corridor width increases from CH3300 and is capable of supporting twin tracks (circa 9m width)
- Alan Hargreaves, existing business at CH3750. Alan Hargreaves utilises the disused railway to test rail beds. This is to be considered in the Engineering optioneering as to what measures (protection, alternative testing area) may be required
- Existing pedestrian overbridge (Bridge D, connecting the Hillhouse) at CH4450 in good condition, with sufficient width for two lines underneath. Bridge deck is cast iron girders with brick arches. Bridge to be checked for modern rolling stock clearance
- Existing closed Burn Naze Station at CH4450. Burn Naze station has two side platforms, approximately 115m in length and capable of twin track running throughout.

CH4450 – CH 6650

- Existing track between CH4700 and CH5500 is a mix of single, twin track, and switches and with a mix of wooden and concrete sleepers, which can all be considered unsuitable for reuse
- Existing track formation appears stable and suitable for reuse to CH5850
- Existing track formation from CH5850 to CH6650 is poor and unsuitable for reuse
- Existing pedestrian at-grade crossing at CH5500. This is to be considered during the Engineering optioneering as whether to be retained, replaced or closed.
- Corridor width reduces at CH5300 to single track only and continues to CH6650 (circa 5m wide)
- Existing Jameson Rd bridge

Jameson Rd bridge (CH6650) to Fleetwood (CH7900)

As noted in 3.2.1, the majority of the railway from CH6650 to Fleetwood has been demolished. The potential routes into Fleetwood are unpopulated to approximate chainage CH7900. It can be assumed that work undertaken beyond CH6650 will be full new construction, and that the reinstatement of Jameson Rd bridge will require monitoring and assessment to evaluate its safety.