Local Full Fibre Network (LFFN) Wave one: Programme evaluation

Final evaluation

Tameside PSAR project

For the avoidance of doubt, the principle purpose of the Local Full Fibre Network (LFFN) wave one projects was not to provide the secondary benefits laid out in this report. For Public Sector Building Upgrades (PSBU)/ Public Sector Anchor Tenancy (PSAT) and Public Sector Asset Reuse (PSAR) projects that purpose is the improvement of public sector connectivity to meet a need, generally demonstrated through a business case, either to reduce the cost of equivalent connections or to provide improved connections which will enable a concomitant improvement in productivity or the provision of public services. PSAR projects followed what is known as the Market Economy Operator Principle (MEOP), which means that they had clear projected commercial outcomes and that these outcomes have been externally validated before the projects began. MEOP is an EU test as to whether a measure is commercial, and thus not State aid, which is a test relevant for those projects commenced prior to the end of the transition period.

The wider benefits which this report describes are secondary to these purposes; however, that does not mean that they are not of legitimate interest to government, local and central, as part of ongoing monitoring of digital connectivity.

To situate this report and the analysis within, note that it was submitted in November 2023.

Contents

1 Introduction

Ipsos UK was commissioned by Building Digital UK (BDUK) in May 2018 to undertake an evaluation of the wave one projects funded through the Local Full Fibre Network (LFFN). This report sets out the final evaluation findings for the Tameside 'Thin Layer' Public Sector Asset Reuse project.

1.1 Description of the programme

BDUK launched the LFFN Programme in 2017 with £200 million funding. The aims of the programme were to accelerate and de-risk the deployment of the next generation of digital infrastructure, create UK digital leadership and drive productivity and growth. The programme provided funding to local councils and other public bodies to achieve these aims. Local councils could choose from three delivery models to apply and deliver locally:

- **Public Sector Anchor Tenancy (PSAT):** Bringing together local public sector customers, to create enough broadband demand to reduce the financial risk of building new full-fibre networks;

- **Public Sector Building Upgrades (PSBU):** Directly connecting public sector buildings, such as schools and hospitals, and

- **Public Sector Asset Re-use (PSAR):** Opening up public sector assets, such as existing ducts, to allow fibre to be laid more cheaply.

A Gigabit Broadband Voucher Scheme offering full-fibre broadband connection vouchers for businesses, to increase take-up of services is operated in parallel to the three delivery models above. However, the Gigabit Broadband Voucher Scheme is subject to a separate evaluation, and is therefore not covered in this study.

Wave one of the LFFN programme comprised a selection of pilot projects for the wider LFFN programme, which aimed to demonstrate how the interventions can operate and provide learning for the remaining LFFN projects. The Tameside PSAR 'Thin Layer Model' project was selected as one of these four projects.

1.2 Context

1.2.1 Context at time of LFFN launch

At the time the LFFN programme was designed and launched in 2017, the government had recognised that there was a growing need for ultrafast and gigabit-capable networks in the UK, in order to support businesses and residents. Faster broadband was of growing importance to firms, with greater bandwidth required to take advantage of a range of new digital services and assure reliability and continuity of operations. For residents, ultrafast speeds were needed to support growing demand for data – for example, content-rich websites, streaming services and cloud services. They were also expected to produce significant social benefits by supporting the development of applications enabling remote service delivery such as remote medical diagnostics.

At the end of 2016, the UK lagged behind a range of international comparators in terms of gigabit-capable deployment, with just 2 percent of premises covered by gigabit-capable networks at the end of 2016 compared with 100 percent in South Korea, 97 percent in Japan, and 86 percent in Portugal.[1] The UK was third from the bottom of 22 European countries for Fibre to the Premises (FTTP) coverage[2]. Traditional copper-based circuits are insufficient to support the high-capacity and highly reliable infrastructure which ultrafast broadband and 5G infrastructure depend upon. 92 percent of homes in the UK were connected through part-fibre, part-copper lines that operate at superfast speeds[3], such as Fibre to the Cabinet (FTTC). The Superfast Broadband Programme has significantly bolstered the coverage of FTTC networks[4]. However, these technologies are insufficient to meet the demands outlined above.

Several factors were thought to have constrained the roll-out of full fibre networks in the UK in 2017. These included:

- Other countries having a greater share of the population dwelling in highly dense buildings of multiple occupation, increasing the commercial viability of the technology.

- Topological issues, with other countries being flatter, making investment less costly.

- Uncertainty around the willingness of consumers to pay for a service which they may not currently need.

- Regulatory barriers such as requirements in relation to wayleaves.

- Market structure issues, with dominant suppliers in the UK utilising technologies which could not, at that time, provide gigabit-capable networks.

- Lack of public investment, with other countries having significant public investment to boost FTTP coverage. For example, in France the state-owned telecoms company rolled out FTTP in response to regulatory pressure, and the French government invested EUR 20 billion in FTTP rollout.

1.2.2 Current context

Since 2017, there have been significant changes to the landscape of the broadband market. There has been a lot of venture capital investment. Investors recognised the position of the UK regarding fibre networks and the need to provide these, which could offer long-term returns on their investment. This meant that some smaller network providers had more resources to expand their fibre networks, and there were many new market entrants who provide gigabit-capable networks. The regulatory position of Ofcom, which encouraged competition in the

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[1] The most recent Ofcom Connected Nations Report (2018) estimated that there were almost 1.8 million homes and businesses (6%) with FTTP connections compared to 840,000 (3%) in 2017. However, the 2% presented in the main text is the most recent estimate available for international comparison.
[2] Ofcom (2017), "International Communications Market Review"
[3] Ofcom (2017), "International Communications Market Review"
[4] Ipsos MORI, Simetrica, Barrett, G. Koutroumpis, P. (2018). Evaluation of the Economic Impact and Public Value of the Superfast Broadband Programme

market, also contributed to this increase in competition in the market. Finally, a period of low interest rates also encouraged network providers to utilise finance to further expand their networks.

This increase in market competition has also been characterised by small network providers trying not to overbuild each other's networks, as it would reduce the returns they could generate from their network build.

Further to this, the larger providers of broadband networks, Openreach and Virgin Media, have also increased their investment in fibre networks. In early 2022, it was reported that Virgin Media was seeking to raise hundreds of millions of pounds of investment to support their fibre network rollout.[5] Openreach have also committed to expanding their fibre network, and in 2021 the cost of this additional roll out was estimated to be £15 billion to provide fibre coverage to 80 percent of UK premises.[6]

With an increase in finance and planned commercial roll out, and small competitors trying to avoid each other, the coverage of gigabit-capable networks has grown rapidly over the past six years. This is shown by the latest Ofcom Connected Nations publication (2022), which shows that 70 percent of premises in the UK now have gigabit-capable coverage, compared to two percent in 2016.

Examples of the increase in investment include:

- Connectfibre receiving "significant" investment in March 2022;[7]

- Lightspeed Broadband receiving a cumulative total of £115 million investment by December 2021;[8]

- Truespeed receiving £75 million in January 2022;[9]

- Borderlink receiving a cumulative £174.5 million investment by January 2022;[10]

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[5] https://www.ispreview.co.uk/index.php/2022/01/virgin-media-o2-uk-reportedly-seeks-funding-for-fttp-rollout.html (Accessed March 2022)

[6] https://www.ispreview.co.uk/index.php/2021/05/bt-raise-fttp-broadband-target-to-25-million-uk-premises.html (Accessed March 2022)

[7] https://www.ispreview.co.uk/index.php/2022/02/connect-fibre-get-funding-for-full fibre-rollout-in-east-of-england.html (Accessed March 2022)

[8] https://www.ispreview.co.uk/index.php/2021/12/lightspeed-broadbands-uk-fttp-rollout-gets-gbp60m-funding-boost.html (Accessed March 2022)

[9] https://www.ispreview.co.uk/index.php/2022/01/truespeed-start-2022-with-gbp100m-boost-for-uk-full fibre-rollout.html (Accessed March 2022)

[10] https://www.ispreview.co.uk/index.php/2022/01/borderlink-get-gbp164m-for-full fibre-rollout-in-north-england-and-scotland.html (Accessed March 2022)

- Toob receiving £87.5 million in December 2021;[11]

- Zzoomm securing £100 million debt investment in October 2021;[12]

- Cityfibre receiving £1.1 billion in finance in September 2021;[13]

- Digital Infrastructure (DI) launching after receiving £100 million investment in 2021;[14]

- ITS securing £100m in April 2022;[15]

- Telcom securing £63 million in July 2021;[16]

- Gigaclear securing £525 million in debt funding in 2020;[17] and

- Hyperoptic securing £750 million in two deals in 2018;[18]

This shows that the context for the evaluation is hugely different to the context the UK faced when the LFFN programme was designed and launched.

1.3 Study aims

The key research questions for the evaluation of LFFN wave one projects as defined in the Invitation to Tender, are set out in the table below. These broad questions were further refined as part of an initial planning stage that was completed in May 2019, which involved the agreement of bespoke evaluation questions for each of the projects and evaluation approach. This report builds on a baseline, process and early impacts assessment that was completed in July 2019 and the interim evaluations which took place in 2020-2022.

This evaluation report focuses on both the short-term outcomes around coverage and connectivity, alongside the longer-term outcomes and impacts relating to public sector service provision.

Table 1.1: Key evaluation questions

Question area	Sub-questions

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[11] https://www.ispreview.co.uk/index.php/2021/12/toob-gets-gbp87-5m-funding-to-boost-uk-fttp-broadband-rollout.html (Accessed March 2022)

[12] https://www.ispreview.co.uk/index.php/2021/10/zzoomms-uk-gigabit-fibre-rollout-boosted-by-gbp100m-investment.html (Accessed March 2022)

[13] https://www.ispreview.co.uk/index.php/2021/09/cityfibre-secure-gbp1-1bn-to-fuel-uk-fttp-broadband-rollout.html (Accessed March 2022)

[14] https://www.digitalinfra.co.uk/latest-news/new-era-full fibre-network-operator-accesses-ps100m-investment (Accessed March 2022)

[15] https://www.ispreview.co.uk/index.php/2022/04/its-technology-get-gbp100m-funding-for-uk-full-fibre-rollout.html (Accessed June 2023)

[16] https://www.ispreview.co.uk/index.php/2021/07/full-fibre-isp-telcom-group-gets-gbp63m-uk-investment-boost.html (Accessed June 2023)

[17] https://www.ispreview.co.uk/index.php/2020/04/rural-isp-gigaclear-signs-525m-long-term-funding-strategy.html (Accessed March 2022)

[18] https://www.ispreview.co.uk/index.php/2022/02/hyperoptic-aim-gigabit-broadband-at-2-million-uk-homes-by-2023.html (Accessed March 2022)

What outcomes can be attributed and were they as intended?	What is the range of local level outcomes from LFFN?
	What local level changes made a difference, were there other explanations?
	What, if any, were the wider benefits of LFFN?
	Were there any unintended outcomes?
How has LFFN achieved these outcomes?	To what extent is this affected by context or circumstance?
	How can LFFN achievements be enhanced?
What can we learn to improve future policy designs and implementation?	LFFN Programme
	Other government broadband infrastructure policy or programmes
	Other government future telecommunications infrastructure policy or programmes (including 5G)
	Demand-led delivery approaches

Source: BDUK Invitation to Tender

1.4   Methodology

The evidence compiled for this report comprised:

- **Review of Management Information and project documentation:** Documentation on the design and the operation of the project, such as business cases, contractual information provided by BDUK, information about premises passed and buildings connected, annual project and project close down reports have been reviewed to aid understanding of the projects objectives and progress made.

- **Analysis of secondary data:** A range of secondary sources were examined to explore changes in the supply and demand for FTTP in areas nearby the assets brought into use for broadband deployment with LFFN funding. This drew primarily on the Connected Nations dataset published by Ofcom which provides postcode level data on superfast and ultrafast availability, FTTP coverage, connections and data usage. Further data was drawn from ThinkBroadband and the published FTTP roll-out plans of Openreach and other telecommunications suppliers to provide local and regional context for the project. Finally, a variety of additional Office for National Statistics data on the evolution of the local economy was drawn on to provide further evidence on local trends on employment growth and unemployment.

- **Semi-structured qualitative interviews with project stakeholders:** Consultations with stakeholders in the projects were undertaken in between September 2022 and April 2023 to gather views on how the projects had delivered against their intended objectives, the wider impacts achieved, barriers encountered and lessons learned. Stakeholders consulted included project leads and Cooperative members. Interviews covered emerging demand for fibre services and connections and impacts of the LFFN project on organisations and the local area. The report also builds on previous consultations undertaken for the interim and early impacts research, which included interviews with the same stakeholder groups as above, alongside those involved with the management of the infrastructure build, and BDUK staff. The findings from the interviews were analysed thematically.

- **Econometric analysis:** The most recent longitudinal Connected Nations dataset available at the time of research was for 2022. This data was used to explore the connectivity impacts of the projects to date in terms of FTTP / gigabit-capable coverage,

ultrafast, download speeds, number of connections and data usage in the areas surrounding the LFFN build. The research team worked with BDUK to identify a suitable comparator area for the Tameside PSAR project. The comparator group selected were similar areas within the Liverpool City Region.

A matching exercise was completed using postcode level data for the Tameside PSAR project and the comparator areas, to enhance the comparability between the treatment and comparator group. The matching exercise sought to find areas matching in characteristics including the details of the telecommunications infrastructure of the postcodes, including distance from the serving exchange as well as the availability of ultrafast and gigabit-capable connections in previous years. More details of the selection of the counterfactual areas and the matching approach are provided in the technical annex.

1.5 Limitations

There are several limitations to the methodological approach described above. These are:

▪ **Connected Nations discontinuity:** The results make extensive use of the Ofcom Connected Nations datasets. The Connected Nations dataset is the most comprehensive dataset which provides data on broadband coverage and usage. Therefore, it has been used extensively in this research. However, there are some challenges when utilising the dataset to undertake longitudinal analysis. The network providers which provide information to inform the dataset are not consistent over time. Additionally, the methodology used to compile this data has evolved and there are inconsistencies between years. For the years 2018 and 2019, there are notable decreases in some postcodes in terms of broadband coverage. This was due to a change in the methodology used by Ofcom. This change related to the method used to identify premises, with the addition of more premises in areas diluting coverage in some places. This means that we are unable to clearly separate the impact of changes in the data to those impacts on coverage driven by LFFN. Ipsos initially conducted analysis on LFFN areas, which includes approximately 10,000 postcodes, which was then extended to all postcodes in the 2018 and 2019 cross sections. A fuller breakdown of the analysis conducted is available in the technical annex for the wave one reports. These challenges should be considered when interpreting the results presented.

▪ **Challenges with approach to measure impact:** The approach to measure the impact of the Tameside PSAR project, described above, has some limitations. The first of these is that the geographic boundary to measure the impact of the project has been selected at 1km away from the network build. However, the project aimed to bring a new provider to the area who could provide greater gigabit connectivity across the whole of Tameside. The geographic area was selected as the areas closer to the network build were anticipated to be the most likely to benefit from the project, and measuring the impact at a borough level would be difficult (at a larger geographic level the impact would need to be much larger to be detectable in the analytical framework). Therefore, the analysis focuses on a smaller geographic area for practical reasons, while it should be acknowledged that some impacts of the project may be overlooked. A second limitation

is the selection of a comparator area, which has been selected to closely match the characteristics of the project area. However, it was not possible to know at the point of selection what network provider commercial roll out plans were, which could mean that there were unobservable differences between the project and comparator areas.

- **Challenges with qualitative research:** There were challenges with undertaking the planned qualitative research for this evaluation. The main challenge was in arranging interviews with stakeholders with a knowledge of the programme and how the project has supported their organisation. These challenges included:

  - **Project completion:** The project has been completed and project closure activities have taken place. This means that some of the staff involved in the projects have moved onto other projects or roles. Therefore, it has been challenging to arrange interviews, and where they have been some interviewees did not have insight into the history of the project or the longer term impacts.

  - **Lack of contact details for indirect beneficiaries:** The initial evaluation plan aimed to explore the impact of the LFFN wave one projects on businesses in the areas surrounding the network build. The delivery of this project was delayed, as shown below, which means that take up of gigabit connections in project areas is still low. As a result, there are limited businesses that have upgraded at this stage. Secondly, the projects do not hold (and were not requested to collect) any details of businesses that are utilising the network, creating an additional challenge for the researchers. The route to obtaining business contact details would have been through their Internet Service Provider, which was not possible.

- **Limitations of Management Information:** LFFN wave one projects faced some challenges in collecting useful Management Information. This was partially the result of the projects being set up as pilots with the aim of generating learning. An issue was the timeliness, completeness and accuracy of Management Information, there were some issues with delays in BDUK receiving Management Information and some inconsistencies between Management Information provided by the same project. These issues were addressed by BDUK for subsequent phases of the LFFN programme delivery, but they did present challenges for the wave one evaluation.

- **Limitations given progress of projects:** The completion of the Tameside PSAR project was in line with expectations. However, a challenge for the evaluation of the Tameside PSAR project is that there has still been a limited amount of time for the longer-term impacts to be realised. This is due to the nature of the intervention, as it sought to provide infrastructure for other commercial network providers to build from. A further challenge for the realisation of the longer-term outcomes was the COVID-19 pandemic, which hampered businesses ability to plan and will have prevented longer term outcomes from being realised as quickly as anticipated. Therefore, it is still possible that some of the longer-term outcomes and impacts for the projects could be realised in the future, and it is still early to form conclusions about the wider impact of some projects.

Table 1.2: Progress of projects

Project	Baseline (prior to build activity)	Project completed	Interim evaluation research	Years post network build / connections completion for final evaluation fieldwork
Tameside	2017	2018	Early 2020	4

▪ **Limitations of matching approach:** Undertaking a PSM to improve the comparability of the treatment and comparator areas has some limitations. These are that the approach is data intensive, it discards observations in both the treatment and comparator areas that are not matched. A reduction in the number of observations reduces the statistical power of the regression models, despite increasing the comparability of the two areas. Therefore, large samples are needed, and the LFFN projects were delivered in relatively small local areas, meaning that the statistical power of the models is low. Secondly, the matching between treatment and comparator areas can only use variables where data exists, but there are factors which could influence broadband rollout and economic performance where data does not exist (such as broadband rollout plans). Therefore, the matching can only be as good as data availability.

▪ **Openreach Fibre First:** Openreach rolled out their Fibre First programme in many of the areas the LFFN programme has operated in and also in comparator areas. This presents a challenge for the analysis. The impact the LFFN programme, had on Fibre First roll out is unclear. For example, would Openreach have brought forward FTTP deployments at this speed without the leadership displayed by BDUK in the LFFN programme? Therefore, for the econometric analysis, areas where the Fibre First Programme[19] has been rolled out have been excluded from the analysis.

In addition to these wave one portfolio level limitations, there were also some project specific limitations. These were:

▪ **Pre-existing initiatives in Tameside:** LFFN wave one funding was used to add spurs to an existing fibre ring developed by Tameside Metropolitan Borough Council from 2012 onwards. Additionally, a digital infrastructure co-operative was established in 2018 to commercialise the network, with BDUK providing support to help establish the co-operative. Attempts to separate the impact of two were made in the econometric analysis by allowing effects to vary by both distance from the LFFN funded spurs and distance from the existing fibre ring. However, this may not fully identify the marginal effect of the LFFN funded spurs. Extending the network may produce positive externalities by making the existing fibre ring more commercially attractive.

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[19] The Fibre First programme from Openreach delivered commercial roll out of gigabit-capable networks to over eight million premises between 2018 and 2022.

▪ **LFFN funded expansion of CNI:** The CNI network has also expanded to include Blackpool and Manchester City Centre, which received funding from waves two and three of the LFFN programme and also links to the Trans Pennine Initiative. Tameside Metropolitan Borough Council also received further funding under LFFN wave two to expand their network from Mossley station, via Stalybridge and Guide bridge stations to the Manchester Internet Exchange. These LFFN funded expansions of the network may also produce further externalities that drive further commercial FTTP deployments closer to the fibre ring, creating further challenges in isolating the marginal effect of the LFFN project. These types of effect cannot be identified through econometric modelling.

▪ **Tameside PSAR and Trans Pennine Initiative operating in the same area:** There is a potential attribution challenge in some areas as the LFFN wave one Trans Pennine Initiative project and the Tameside PSAR project operate in the same area. Additionally, the Greater Manchester LFFN projects in wave two and the other expansions mentioned above will impact on the same area. As these projects are contributing towards similar outcomes and impacts, it may be difficult to disentangle the effects of the multiple projects within the Tameside area.

These limitations relate to different strands of the research. However, by combining the findings from across the different research strands, the evaluation provides robust conclusions about the likely outcomes and impacts the LFFN Tameside PSAR project has contributed towards as of 2022.

1.6 Structure of the report

The remainder of this report is set out as follows:

▪ Section 2 provides the intervention logic for the project;

▪ Section 3 provides details of how the LFFN Tameside PSAR project has been delivered;

▪ Section 4 provides the broadband outcomes for the LFFN Tameside PSAR project;

▪ Section 5 presents the wider outcomes and impacts of the LFFN Tameside PSAR project; and

▪ Section 6 presents the conclusions from the evaluation of the LFFN Tameside PSAR project.

2 Intervention logic

This section provides a detailed description of the LFFN Tameside PSAR project, providing a brief description of the project, the anticipated outcomes and impacts, an assessment of how far the project has achieved its intended outcomes and the key learnings from the project.

2.1 Rationale

Tameside Metropolitan Borough Council started to invest in its own fibre network in 2012 when existing telecommunications contracts came up for renewal. These contracts had a renewal value of approximately £1.5m, which were paid by the council and other public sector organisations. The motivation for investing in their own network were to:

- Ensure any network investment covered the nine towns in Tameside,

- Retain economic activity in the area in light of expectations that other, more "commercially attractive" areas would receive investment in FTTP networks first, and

- Ensure a "dig once" policy was enacted across Tameside to secure duct space for future use.

At the time of DCMS' first survey of the area in advance of the launch of the LFFN programme, there were no FTTP connections to businesses in Tameside. The network of ducting and fibre grew to around 15km prior to LFFN investment. However, Tameside Metropolitan Borough Council only just had enough money to connect each of the towns in a fibre ring network and could not cover the cost of extending the network to key business hubs and public sector buildings. In 2017, Tameside Metropolitan Borough Council responded to DCMS' Call for Evidence for LFFN to secure funding to make this network more attractive and resilient for future FTTP investment.

Prior to LFFN funding, Tameside Metropolitan Borough Council were in the process of creating a digital cooperative. This has since been renamed Cooperative Network Infrastructure, or CNI for short. The purpose of CNI was to commercialise the investment, leverage private sector investment, and bring high speed internet service to businesses and residents. Tameside Metropolitan Borough Council launched a Notice of Intention for local Internet Service Providers and telecommunications businesses in the wider Tameside region that saw investment in the area on their own as too high an initial cost. Tameside Metropolitan Borough Council believed that LFFN funding would attract a variety of small and large internet service providers to join and invest in CNI. This would add resilience and expand the network in Tameside. It also had the potential to attract digital businesses and advanced manufacturing industries to Tameside. The CNI includes both public and private sector members who have an equal vote in the management of CNI whether a user, contributor or investor member.

2.2 Description of the intervention

In 2017, Tameside Metropolitan Borough Council were awarded LFFN funding to expand its fibre network to further public sector buildings via seven Points of Presence or "mini-Digital Exchanges" in each of the main towns on the fibre-8 ring, to enable further fibre network build.

These can be seen in Figure 2.1 on page 17. The investment was expected to provide significant running cost savings for Tameside Metropolitan Borough Council and other public sector members over time and provide resilience across the backbone network Tameside Metropolitan Borough Council had established. The aim of the Tameside PSAR project was to:

▪ Expand the Tameside fibre network to increase accessible fibre capacity. This would extend the existing asset to enable it to support connectivity for public sector buildings through seven Points of Presence across the Tameside area. The following public sector members have all contributed to the network alongside Tameside Metropolitan Borough Council and stood to benefit from expanding the network:

– Tameside College

– Pennine Care NHS Foundation Trust

– NHS Tameside and Glossop Care Commissioning Group

– Tameside and Glossop Integrated Care NHS Foundation Trust

– Ashton Sixth Form College

▪ The network will pass 38,000 businesses and residential premises within 200m which will be able to access FTTP connections and connect to a Digital Exchange in nearby Ashton Old Baths. This includes Jigsaw Group housing association, a member of CNI.

▪ Create a digital exchange in Ashton Old Baths that leverages planned investment in a shared public sector data centre. Pay for five racks within the digital exchange where cooperative members can install their equipment to provide fibre networks.

Through this provision, and by supporting CNI, the project aimed to provide more reliable and cost-effective broadband to public sector organisations, which would improve public services in the area. The improvements in the network were also expected to generate spillover build in the local areas in proximity to the fibre ring, increase the number of network providers offering services through CNI, and increase take-up of fibre services in Tameside. There was also an objective to utilise the project to generate learning for CNI, BDUK and for other local authorities in the UK.

Under LFFN wave two, Greater Manchester Combined Authority expanded CNI network to key population and business hubs across Tameside and Glossop. These are represented by the pink lines in figure 2.1 on page 17). NHS Tameside and Glossop Care Commissioning Group, a member of CNI, acted as an anchor tenant for multiple sites in the project. The LFFN wave two project is out of the scope of this evaluation.

Figure 2.1 on the next page illustrates the location of the LFFN wave one investment, and the LFFN wave two extension in Tameside.

Figure 2.1: LFFN wave one funded Points of Presence (stars) and extension "spurs" (orange), LFFN wave two extensions (pink)[20]
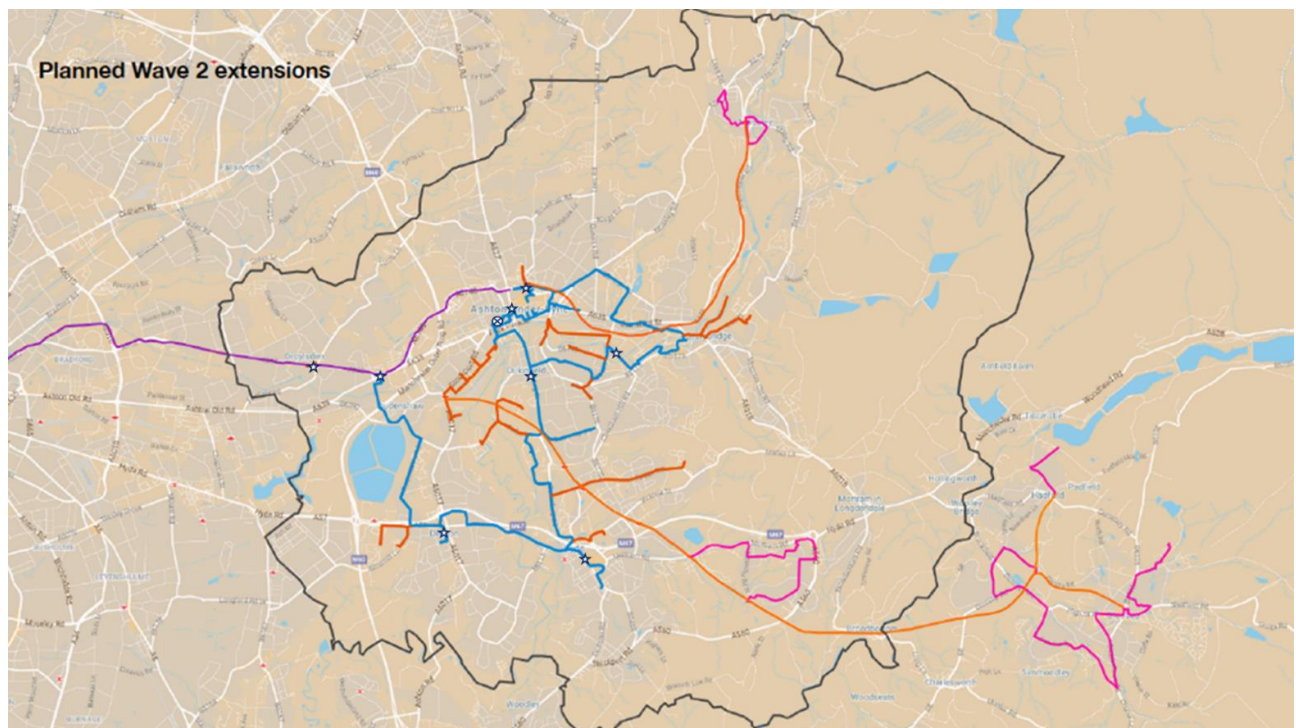
Source: Tameside Metropolitan Borough Council report to Strategic Planning and Capital Monitoring Panel, September 2018; The blue line indicates the existing fibre network in Tameside, and the purple line presents the backhaul route to Manchester Digital Exchange. The black line in the diagram indicates the boundary of Tameside.

2.3 Theory of change

2.3.1 Inputs

The main input into the project was expected to be capital investment. The capital investment was expected to come mainly from BDUK. Alongside the capital investment, resources from within BDUK and Tameside Metropolitan Borough Council were expected to be required to deliver the project. These were staff time and expertise required to deliver the project. No direct private sector investment would be required to deliver the Tameside fibre network LFFN expansion. The Tameside project has, and is expected to continue to, lead to private investment in the form of suppliers and telecommunications businesses engaging in CNI.

2.3.2 Activities

The key activities outlined for the delivery of the Tameside PSAR project were:

- Enhance existing Tameside fibre network (ducting and fibre cable): The LFFN funding was used to fund the Council's existing civil engineering operation costs associated with extending the ducting and fibre associated with the existing 15km fibre ring (the blue line

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[20] Blue lines denote the existing fibre-8 ring in Tameside funded by Tameside Metropolitan Borough Council in 2012.

in Figure 2.1 presents the existing fibre ring; the orange lines show the extensions funded by the LFFN project). The cable laid would be back-hauled to the Manchester Internet Exchange, shown as the purple line in Figure 2.1, and supported by LFFN funded Points of Presence and a connection to the Digital Exchange in Ashton Old Baths.

▪ Install Points of Presence: LFFN funding would be used to install a Point of Presence in each of the main towns on the fibre ring, to enable further fibre network build.

▪ Cooperative model would be used as an operating vehicle: CNI continues to be run as an operating vehicle for commercial use and investment after the additional cable was installed. This would not be an LFFN funded activity, but a complimentary activity that determined the impact of the build.

▪ Recruit new members to CNI model: Tameside Metropolitan Borough Council had already started engaging with Internet Service Providers to form CNI when they responded to DCMS' Call for Evidence in 2017. LFFN funding aimed to make Tameside more attractive to investment, and as such increase membership of both public and private sector organisations. This was not an activity that is LFFN funded, but a complimentary activity that will determine the impact of the build.

▪ Market FTTP connections: CNI members would, and continue to, stimulate demand for fibre services. Again, this activity was not funded by the Tameside PSAR project, but a complimentary activity that would affect the impact of the build.

2.3.3 Outputs

The outputs of the Tameside PSAR project were:

▪ Enhance Tameside fibre network with 17km of fibre cable and ducting: The project aimed to enhance the Tameside fibre network by 17km of fibre cable and ducting provided by public sector contributor members of CNI. The fibre will then be owned and maintained by CNI[21].

▪ Install seven Points of Presence: The Points of Presence would allow Internet Service Providers to access the fibre cable and provide FTTP connections to businesses and households in the seven towns around the Tameside area.

▪ Pass 38,000 premises: The fibre network installed aimed to pass within 50m of 29,000 premises (2,000 businesses and 27,000 households) and within 200m of 38,000 premises (nearly 34,000 households and 4,000 businesses). This means the network

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[21] TMBC Strategic Planning and Capital Monitoring Panel (2018); Available at:
http://tameside.moderngov.co.uk/documents/s37823/ITEM%205%20-%20Digital%20update%20FINAL.pdf

would pass within 200m of over half of all businesses in Tameside and over one third of households.

▪ Digital Exchange: The fibre network would be connected to a Digital Exchange in Ashton Old Baths which was undergoing refurbishment. The funding would be used to purchase five of the 15 racks in the digital exchange for CNI members to use. The other racks would be used by the NHS and Tameside Metropolitan Borough Council. Alongside the LFFN investment, Tameside Metropolitan Borough Council was developing the Ashton Old Baths building to provide workspaces, meeting rooms and coworking opportunities, with access to the Digital Exchange. This aimed to provide spaces for small digital and creative businesses to promote Tameside as a hub for digital industries.

### 2.3.4 Outcomes and impacts

The Tameside PSAR project did not specify longer-term outcomes and impacts, however BDUK developed some expected outcomes during an evaluation scoping exercise. BDUK expected the project to lead to several medium and longer-term outcomes and impacts that can be summarised into the following categories:

▪ **Connectivity outcomes:** It was expected that the project would reduce the marginal cost of extending the network from the Points of Presence, leading to increases in FTTP availability and take-up of ultrafast and gigabit-capable lines. It is hoped this will increase competition for fibre in the local area. It is also expected that the network will provide improved speeds and reliability and end-users should, in turn, take up new fibre connections.

▪ **Growth of CNI:** It was hoped that LFFN investment in the project would also influence outcomes relating to the success of the CNI by creating incentives to join, leading to an expansion in membership, and demonstrating the commercial viability of the model.

▪ **Public sector learning:** A key outcome was to enhance learning for public sector organisations participating in the project. This includes working with suppliers through CNI, barriers to adoption and development, and implications for state aid compliance. Other learnings also included maintenance and build of infrastructure, and understanding the opportunities present for all stakeholders.

▪ **Business use and economy:** As businesses take up new fibre connections along the network it is anticipated that firms may relocate to Tameside's key business hubs, including the data centre in Ashton Old Baths. A secondary objective of the project was to attract small digital and creative businesses to Tameside and enable technological enhancements of existing manufacturing businesses. This may enable clustering of similar businesses to the area and has potential for further job creation and development of the area's digital economy.

▪ **Social and environmental:** Specific social and environmental effects were not to be achieved within the evaluation period, and have not been included in the Theory of Change. However, as the project has the potential to lead to spill over FTTP build to residential properties, general social and environmental impacts could potentially be

anticipated. This may include reduced commuting enabled by remote working, increases in leisure time or reducing the digital divide in the community through initiatives like digital education programmes. The latter stages of the evaluation will explore the extent to which the project led to these types of impact.

A summary of the initiative's pathways to impact, outlining how the inputs and activities are expected to translate into immediate outputs, short and medium-term outcomes and longer-term impacts, is set out in the Figure 2.2.

Figure 2.2: Logic model for the Tameside PSAR project
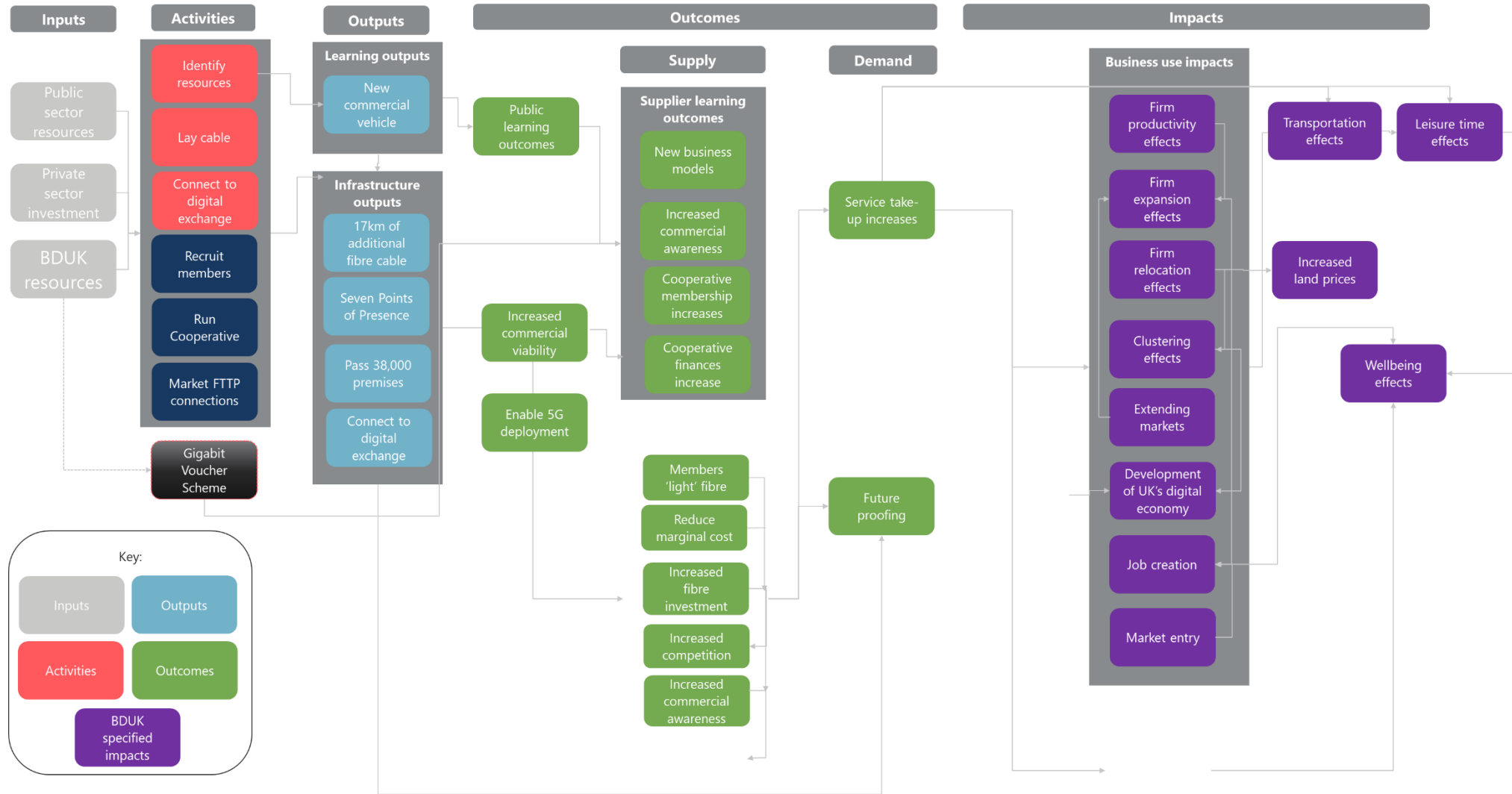
3 Delivery

This section discusses the physical works to deliver the LFFN Tameside PSAR project. It presents the expenditure, an assessment of the physical works.

3.1 Background to the project

Tameside Metropolitan Borough Council had invested in its own fibre network, and had been able to connect the nine towns in a fibre ring. However, due to a lack of funds they had not reached key public sector buildings, like the Pennine Care NHS Foundation Trust hospitals and day centres and Ashton Sixth Form College. At the time of the first survey by DCMS there were also no FTTP connections to businesses. In 2017, Tameside Metropolitan Borough Council responded to DCMS' Call for Evidence for LFFN to secure funding to ensure their network reached key communities and businesses, in turn making this network more attractive and resilient for future FTTP investment. Through improving the quality of the local network, it was also anticipated that public services would be delivered more effectively for local businesses, residents and taxpayers.

3.1.1 Establishment of CNI

In 2017, Tameside Metropolitan Borough Council launched a Notice of Intention for local Internet Service Providers and telecommunications businesses to participate in the network development and better understand their needs and barriers to deployment. Feedback from providers suggested that they would not be able to further develop the network "on their own" due to high upfront costs associated with establishing FTTP connections in the absence of sufficient demand (according to consultations, FTTP services are "too expensive" for consumers and as such demand for services has remained low). Tameside Metropolitan Borough Council considered that DCMS funding would add resilience to the network, and in turn attract these local Internet Service Providers to invest and ultimately be able to provide lower-cost FTTP services to businesses and residents in Tameside.

Tameside Metropolitan Borough Council sought to build on this feedback, ensure a channel for future fibre investment in Tameside and provide access to public sector assets at a mutable cost. To do this, they independently established a cooperative of private and public sector members who would be able to contribute and sell or rent dark fibre space across Tameside. For public sector members, they mainly sought to sell, where internet service providers and telecoms providers sought to rent. A representative of Community Broadband Network also sits on the co-operative as representatives from a wider consortium of independent consultants working to offer advice and support to those using the co-operative model for digital infrastructure.

CNI provides a channel for the private sector to engage in the project. CNI continues to run as an operating vehicle for commercial use and investment after cable has been installed.

There are three types of members that form CNI:

- User member: User members pay wholesale fees, a minimum of £500 per month, to access the dark fibre and rack space. User members include Internet Service Providers, IT and telecoms businesses.

- Contributor member: Contributor members provide infrastructure to be used by CNI, such as ducting, floor or roof space. They receive fee of £0.60/m per year for ducting for 10 years.[22] Contributor members include public sector organisations, landowners and network providers.

- Investor member: Investor members provide a minimum of £5,000 investment into CNI. They receive an "interest-style" return.

The members of CNI, whether user, contributor, or investor, each have one vote.

CNI activity has not been funded by LFFN, however, is a complimentary activity that will determine the impacts of the build and as such are considered as part of the evaluation for this project.

3.2 Funding

The physical work associated with the Tameside PSAR project was delivered in 2018. LFFN wave one funding set out to enhance Tameside's existing fibre-8 ring with 17km of fibre cable and ducting, seven Points of Presence in key towns in Tameside, and ensure the network passed 38,000 premises.[23] The project was broadly delivered as planned, though the length of ducting brought into use with the LFFN wave one investment was 4km short of the target at 13km.

Including the LFFN investment, the CNI network aimed to lay 50km of fibre cable into existing ducts. These were provided by public sector members of the CNI, and the network would also provide connectivity to key business and residential sites across the nine towns of Tameside near to where LFFN Points of Presence were installed. LFFN wave one funding was made available for three key areas of investment:

- £910,000 for core infrastructure equipment, such as ducting and Points of Presence;

- £123,000 for connectivity and resilience, including rack space at Ashton Old Baths; and

- £1,229,000 for fibre infrastructure across the network.

Total project spending targets were met in 2018 at £2,262,000.[24]

3.3 Physical build

The LFFN funded work was completed in autumn 2018. The work was completed on schedule and within the set budget. There are 15 products provided by LFFN wave one funding in Tameside's network, including seven Points of Presence across Tameside towns. The fifteen LFFN Wave One products made 13.5km[25] of fibre and ducting available for use by suppliers including installation of "spur" ducting extensions and connecting networks through Points of Presence. Combined with the existing assets provided by public sector members of CNI which includes Tameside's pre-existing fibre-8 ring, there is 42.3km of ducting available. Additionally, LFFN wave one funding led to 1,176

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[22] Members Prospectus v10

[23] TMBC Strategic Planning and Capital Monitoring Panel (2018); Available at:
http://tameside.moderngov.co.uk/documents/s37823/ITEM%205%20-%20Digital%20update%20FINAL.pdf

[24] Figures taken from 'LOCAL FULL FIBRE NETWORK FUNDING: STRATEGIC PLANNING AND CAPITAL MONITORING PANEL' dated September 2018; confirmation of full Wave 1 project spend from interviews with BDUK and TMBC.

[25] Ipsos UK have made an assumption on the unit of measurement from MI data and have sought clarification from BDUK and TMBC.

fibre cores being laid by suppliers and 299 wireless access points created. Combined with the existing fibre-8 ring network, 2,280 fibre cores have been laid and 712 access points created.[26]

The fibre network installed passes within 50m of 29,000 premises, of which around 2,000 are businesses and 27,000 are households. The network also passes within 200m of 38,000 premises, 34,000 of which are households and the remaining 4,000 are business premises. This means the network passes within 200m of over half of all businesses in Tameside and over one third of households.[27]

The Tameside fibre network is connected to a data centre in Ashton-under-Lyne which has been refurbished alongside the project. The centre houses a Digital Exchange, and five rack spaces were bought with LFFN wave one investment for Tameside Metropolitan Borough Council to rent back to Cooperative members as planned. Consultations with stakeholders suggested all five racks are rented. Tameside Metropolitan Borough Council and NHS have also purchased rack space to provide resilience to their public-sector networks additional to LFFN funded space.[28]

The stakeholder interviews explored the degree to which the Tameside PSAR project had brought forward the developments of the 'thin layer' model. In the absence of the LFFN funding, it was reported that the public sector organisations involved in the model would have had a fibre ring which was connected along the most cost-effective route at the current time. This would not include the additional spurs into commercially viable areas or the Points of Presence. However, these are developments that the public sector would have targeted in the future, but did not currently have the funds to undertake the work. It is estimated that the LFFN brought these developments forward by at least ten years, but probably longer.

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[26] Management Information provided by BDUK provided by TMBC (January 2020)
[27] No further information on premises passed was provided by BDUK or TMBC in Management Information.
[28] Management Information data does not indicate sold or rented rack space (costs to do this only).

4 Broadband coverage in the local area

4.1.1 Number of network providers

The Connected Nations dataset does not break down coverage by supplier, making it difficult to establish how far any changes in coverage can be linked to the scheme or attributed to individual network providers. ThinkBroadband provides a breakdown by supplier and is more up to date than Connected Nations and was used to provide some insight into how far the observed changes in gigabit-capable coverage was driven by different suppliers in Tameside, and whether suppliers were utilising the network.

In 2019, at baseline, there were only two network providers offering connections in a small number of areas: Hyperoptic FTTP, with a small amount of coverage and Openreach native FTTP.

By 2023, there was evidence of increases in provision. The figures below present the coverage of suppliers of gigabit-capable coverage in Tameside. There was evidence of at least four network providers offering gigabit-capable services in the delivery or adjacent area. These are Openreach native FTTP, Hyperoptic, Virgin Media and ITS. Virgin Media and ITS are both CNI members, meaning the only new entrants into the Tameside market since 2019 are CNI members.

In addition to the increase in coverage from CNI members, there has been a large increase in Openreach native FTTP coverage all across Tameside other than in Ashton under Lyme, and a small increase in Hyperoptic coverage in Moston and Gorton.

This suggests that there has been an increase in competition among network providers in the Tameside area. This could lead to an increase in products available to customers which would lead to improved consumer outcomes in the area.

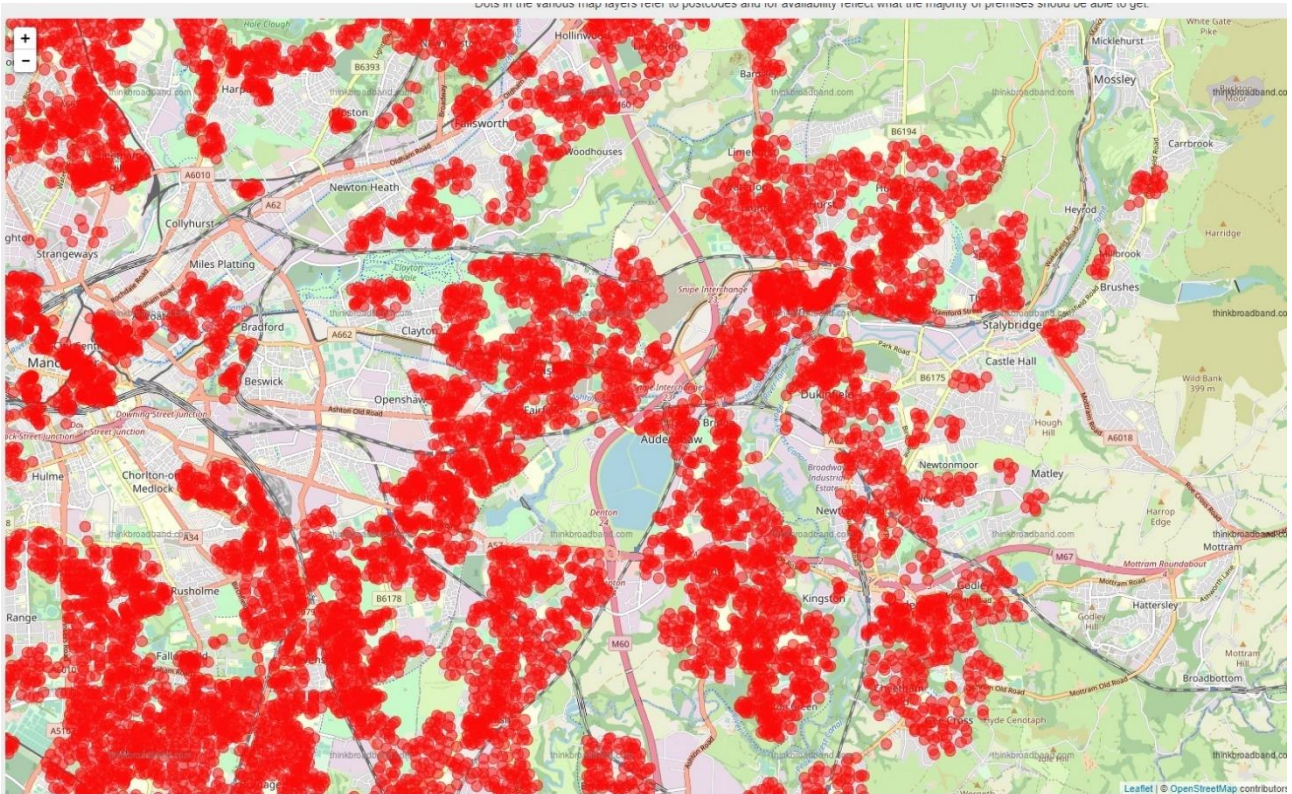**Figure 4.1: Openreach native FTTP coverage in Tameside, January 2023**
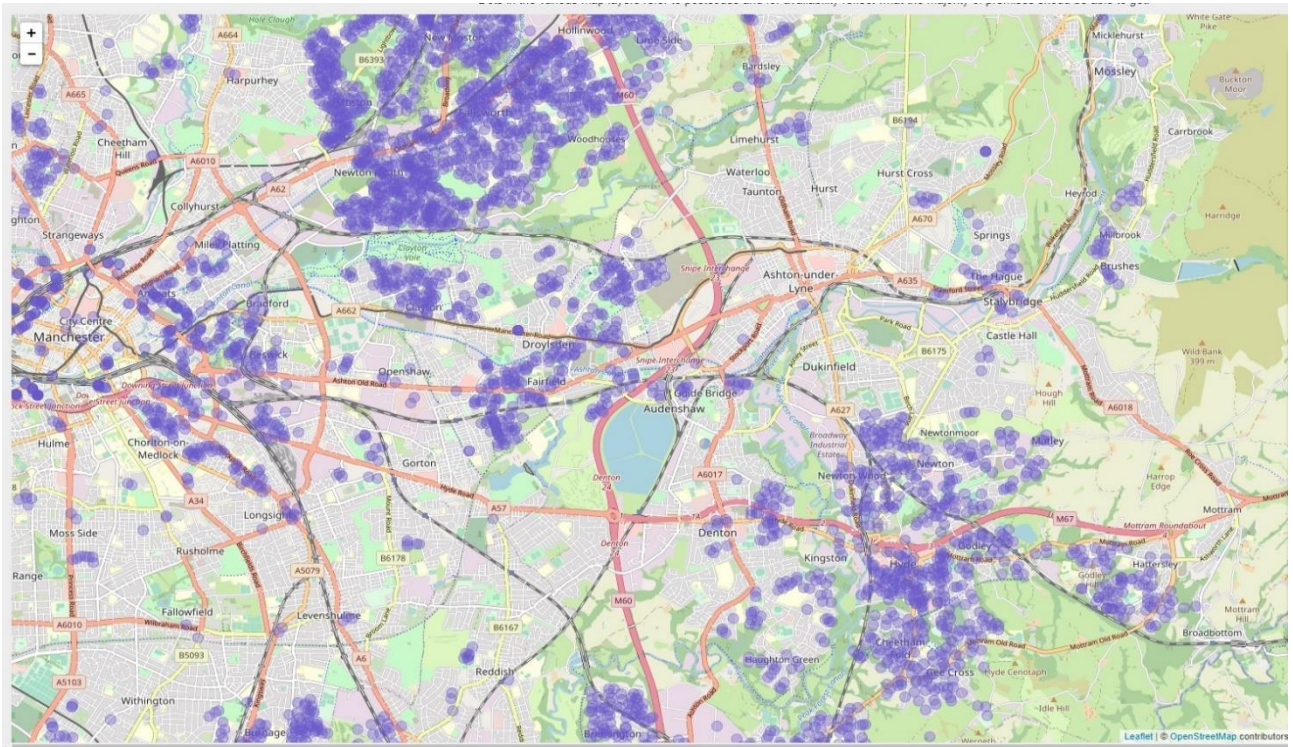
Source: ThinkBroadband

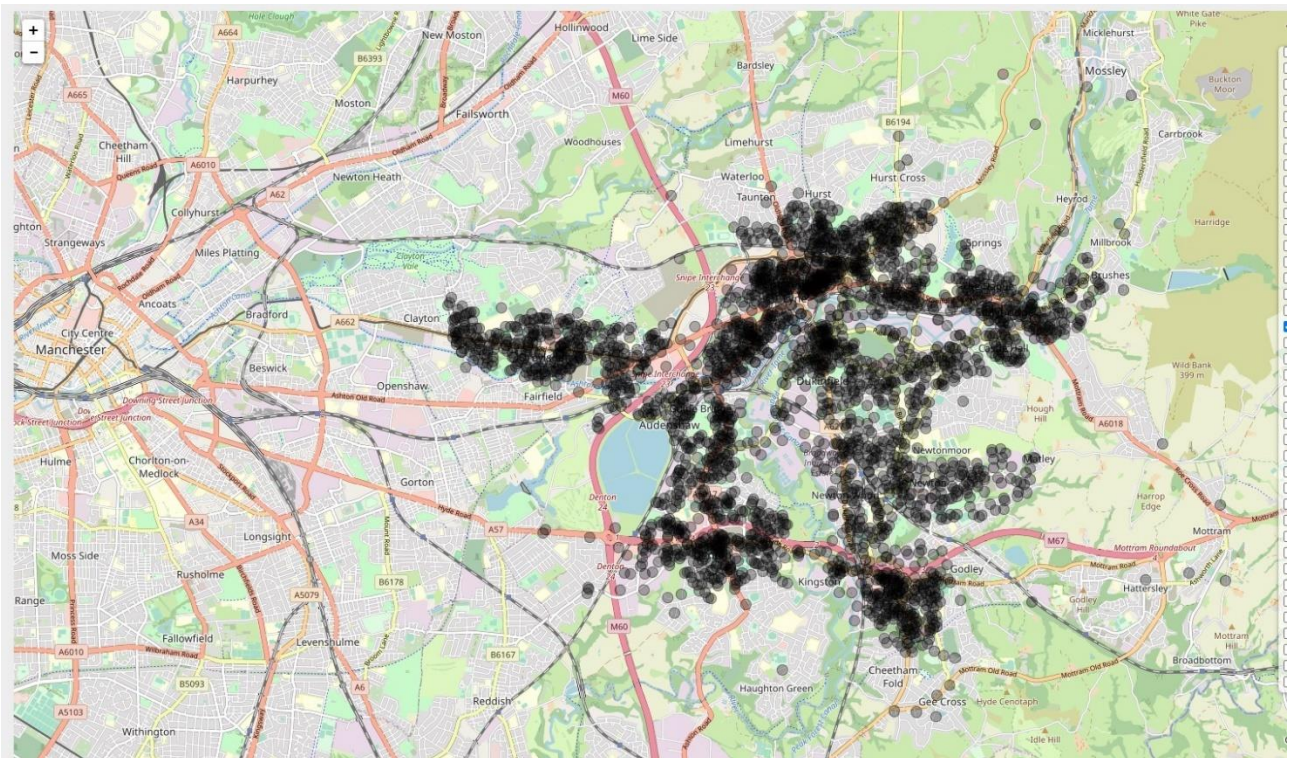**Figure 4.2: Hyperoptic coverage in Tameside, January 2023**
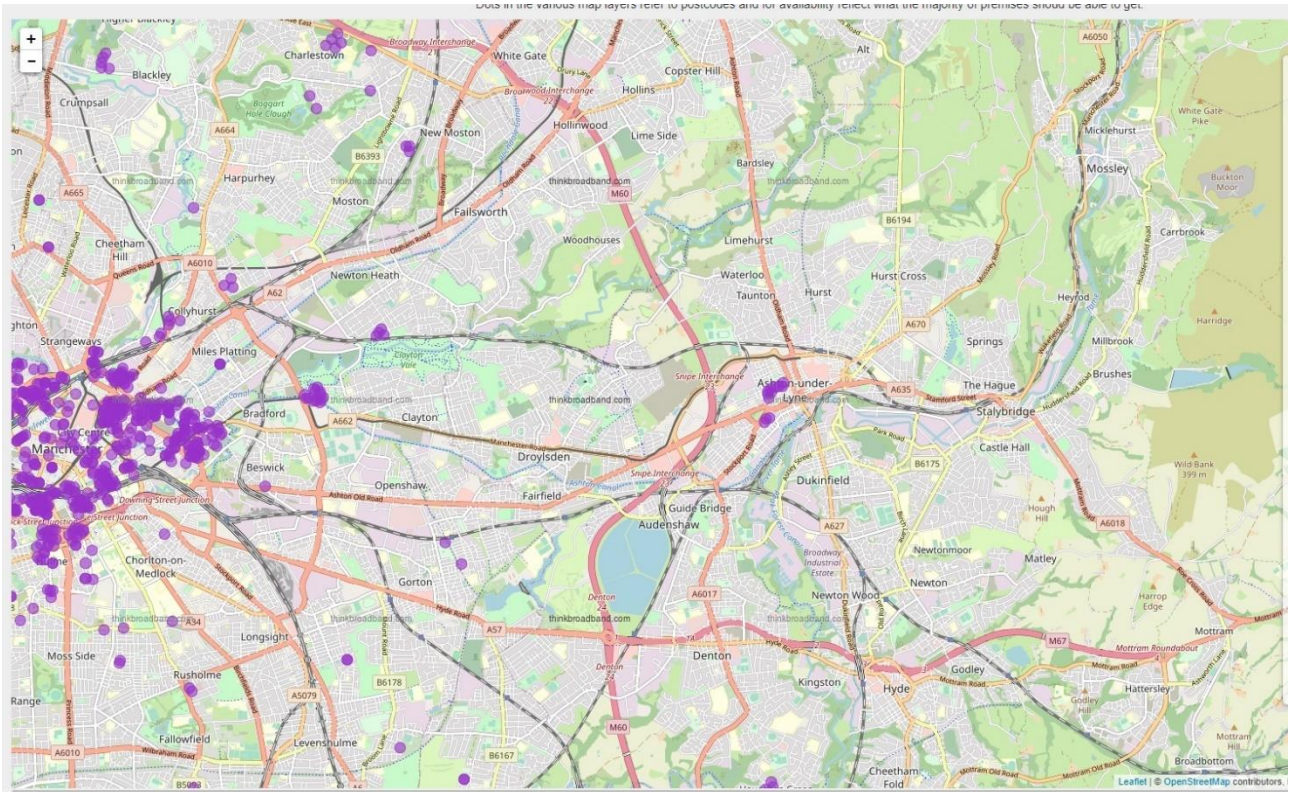
Source: ThinkBroadband

Figure 4.3: Virgin Media gigabit-capable coverage in Tameside, January 2023

Source: ThinkBroadband

Figure 4.4: ITS gigabit-capable coverage in Tameside, January 2023

Source: ThinkBroadband

4.1.2 Broadband coverage

The Connected Nations dataset provides data on broadband coverage at the postcode level. This allows a detailed analysis of how broadband coverage in areas close to the LFFN build has altered

over time. However, there have been some changes to the Connected Nations dataset which impacts upon this analysis. In 2020, Connected Nations introduced gigabit-capable coverage as a new variable, whilst removing the FTTP variable from their publicly available data. FTTP and gigabit-capable are similar, in that all FTTP coverage is gigabit-capable, however the gigabit-capable variable also includes other technologies that deliver gigabit-capable speeds but are not FTTP, such as cable. The analysis below presents the FTTP and gigabit capable variables together as a single time series, but the change in definition explains the large increase in 2020.

The figures below present the evolution of superfast[29], ultrafast[30] and FTTP / gigabit-capable[31] coverage in the areas within 1km of the fibre-8 ring in Tameside. This shows that prior to the LFFN funding, superfast coverage in Tameside was above the national average, and this has continued to be the case up to 2022. Ultrafast coverage was close to zero, which is broadly in line with the national average in 2015 and 2016. This has increased in Tameside, initially at a slower rate than nationally up to 2017, but then at a faster rate than nationally with a large leap in Tameside in 2018. Ultrafast coverage is now at a higher level than the national average at 69 percent in 2022, seven percentage points higher than the national average.

The trend in gigabit-capable coverage in Tameside follows the same trend as for ultrafast broadband, where Tameside was initially at the same level as the national average for gigabit-capable coverage, but then fell behind. in 2021 Tameside saw a leap which meant their coverage rose to 67 percent by 2022, compared to a national average of 60 percent.

A comparator area for the Tameside LFFN project has been formed using postcodes in similar areas of the Liverpool City Region. For more details see the technical annex. The evolution of superfast, ultrafast and gigabit-capable networks in the comparator area is also presented in the figures below. This shows that in Liverpool the leap in ultrafast broadband coverage happened one year earlier than in Tameside, with the leap to over 50 percent coverage occurring in 2017. Other than this, Liverpool followed a very similar pattern to Tameside. Ultrafast broadband coverage remains 11 percentage points higher in Liverpool than in Tameside in 2022. The same relative pattern is seen in the evolution of gigabit-capable coverage in Liverpool, with a leap in coverage taking place in 2020 for Liverpool, one year prior to the leap in gigabit coverage in Tameside in 2021. In 2022 gigabit-capable coverage in Liverpool was around seven percentage points higher than in Tameside.

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[29] Superfast broadband connections provide download speeds from 30 Mbps up to 300 Mbps.
[30] Ultrafast broadband connections provide download speeds of over 300 Mbps.
[31] FTTP / Gigabit broadband connections provide download speeds of over 1,000 Mbps.

Figure 4.5: Superfast broadband coverage within 1km of the fibre-8 ring in Tameside, nationally and in Liverpool comparator area, 2015 - 2022
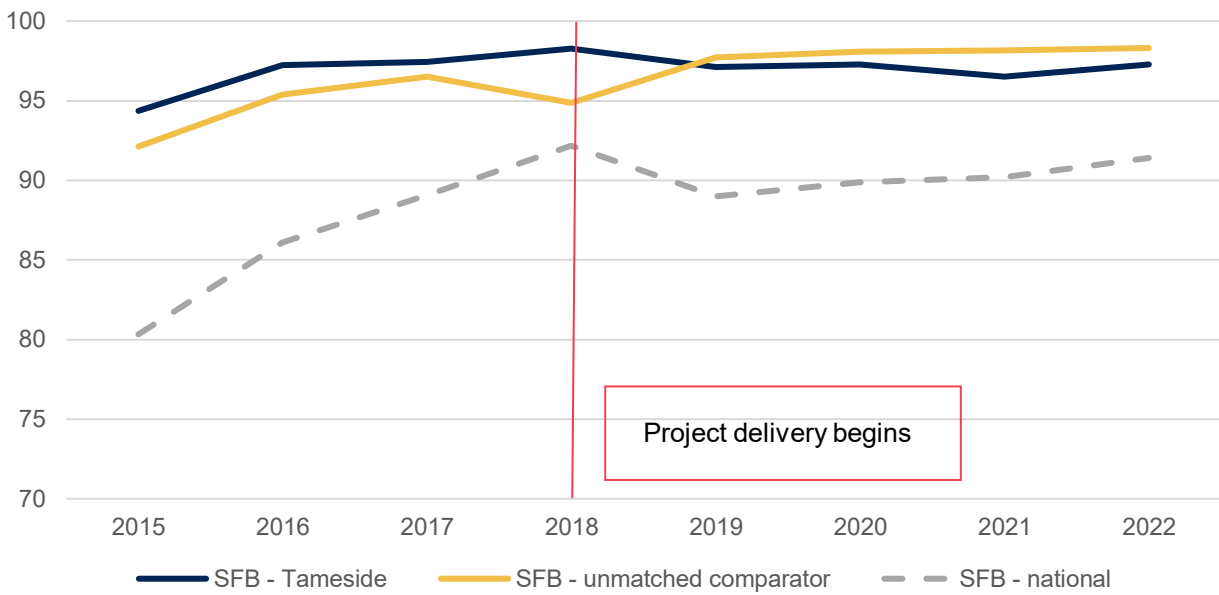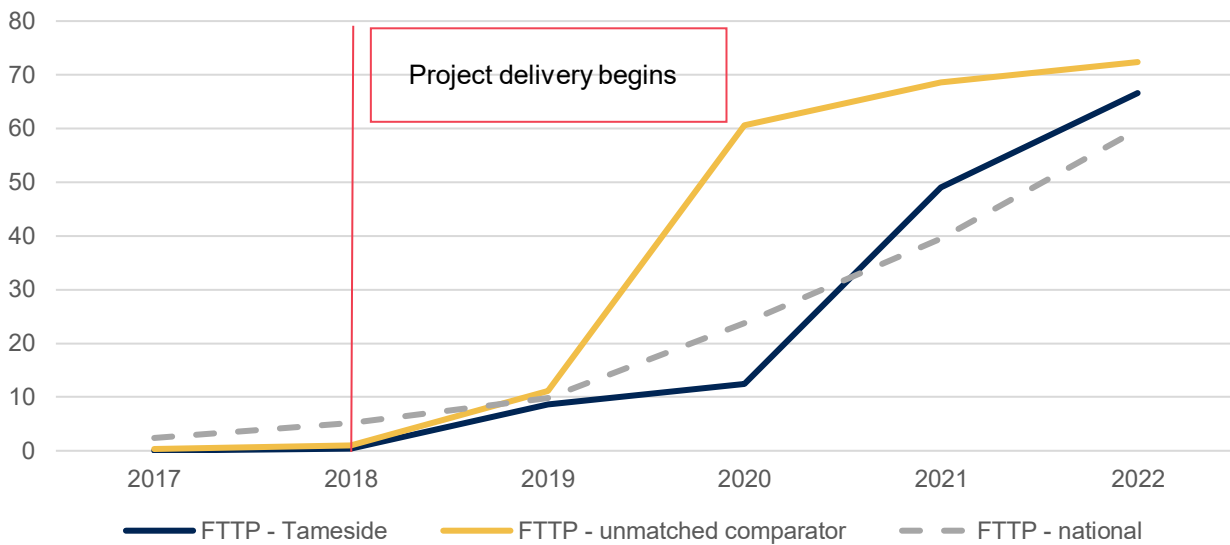

Source: Connected Nations, Ofcom

Figure 4.6: Ultrafast broadband coverage within 1km of the fibre-8 ring in Tameside, nationally and in Liverpool comparator area, 2015 - 2022
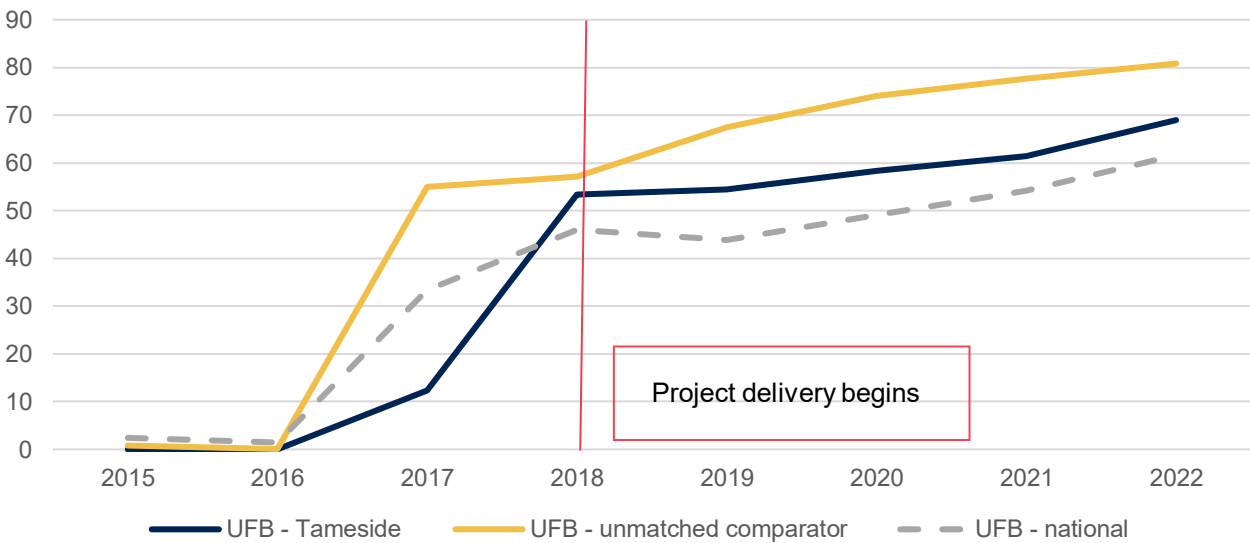
Source: Connected Nations, Ofcom

Figure 4.7: Gigabit-capable / FTTP broadband coverage within 1km of the fibre-8 ring in Tameside, nationally and in Liverpool comparator area, 2015 – 2022

Source: Connected Nations, Ofcom

The change in ultrafast and gigabit-capable networks has also been analysed at different distances from the funded build. The table below presents the findings from this analysis, which shows that the biggest changes in coverage are seen further away from the LFFN funded network build, particularly for ultrafast networks.

Table 4.1: Percentage point change in ultrafast and gigabit-capable / FTTP coverage in Tameside areas between 2018 and 2022 by distance from the fibre-8 ring

Distance from fibre-8 ring	Change in Ultrafast availability	Change in Gigabit-capable availability
Within 50m	-5.07	62.22
50m to 100m	6.43	72.08
100m to 150m	18.64	79.61
150m to 200m	19.11	79.03
200m to 500m	31.17	80.68
500m to 1000m	40.9	77.17

Source: Connected Nations, Ofcom

Evidence from stakeholder interviews also suggests that CNI members have provided connectivity outside the 1km radius used for this analysis. Members have provided connectivity in Mossley and Broadbottom using LFFN funded infrastructure. For Mossley this was provided utilising the Trans Pennine Initiative infrastructure. Both of these are outside the scope of this analysis, but are still noteworthy as examples of additional connectivity from the Tameside PSAR project. Additionally, as CNI members have focussed on providing connections to businesses and public sector buildings, rather than residential buildings housed closer to the LFFN funded network, there is additional connectivity which is supported by the Tameside PSAR project which is not captured here.

4.1.3 Impact of the Tameside PSAR project

To provide a clearer view of the impact of the LFFN wave one project in Tameside on gigabit-capable coverage, postcodes within 1km of the LFFN funded infrastructure were compared to similar postcodes sharing similar characteristics in the Liverpool City Region. For more details, please see the LFFN wave one technical annex.

An econometric analysis was undertaken using a fixed effects analytical framework. For more details of the analytical approach please see the technical annex. The analysis comparing gigabit and ultrafast capability in areas within Tameside to matched areas in Liverpool found that the LFFN programme had a statistically significant positive impact on ultrafast coverage in Tameside of 6.7 percentage points. However, the modelling also indicated that the LFFN project had a statistically significant negative effect of 14 percentage points on gigabit-capable coverage.

The explanation for the ultrafast coverage results could be because the comparator area experienced an increase in ultrafast coverage in 2017, before the LFFN programme in Tameside had been completed. Given what is known about the members of CNI, this seems a more logical explanation than there being a significant increase in ultrafast coverage with a decrease in gigabit-capable coverage in Tameside.

One potential explanation for the negative impact of gigabit-capable coverage could be that network providers who are not members of CNI, like Openreach, Netnomnia and Hyperoptic, have been discouraged from entering Tameside as a result of CNI. Additionally, the connectivity which the LFFN funding supports will not necessarily be within 1km of the LFFN funded network. This means that it will not show as additional connectivity in the analysis. CNI members can use the Points of Presence to provide connections outside this radius and have done this to provide connections to specific businesses and public sector buildings.

This estimated impact on gigabit-capable coverage around the LFFN build area is similar to those seen in two other project areas, where there was not a positive impact on gigabit-capable coverage. Only the Trans Pennine Initiative demonstrated a positive impact on coverage, and this could be due to the urban areas the route passes through.

4.2 Take-up

The Connected Nations dataset provides data on the number of connections taken up at a postcode level. This allows a detailed analysis of how broadband coverage in areas close to the LFFN build has altered over time. The Connected Nations data does not suggest widespread take-up of FTTP or ultrafast in Tameside as of 2022 with the average number of connections per postcode approaching 1.5 in 2022. However, the take-up has shown a rapid increase since 2019, where connections per postcode were still hovering around zero. The increase in take-up of ultrafast connections in Tameside has been at a slower rate than observed in Liverpool, where take-up has increased at a faster rate since 2019 to over two connections per postcode. This is illustrated in the figure below.

Figure 4.8: Ultrafast broadband connections, 2015-2022
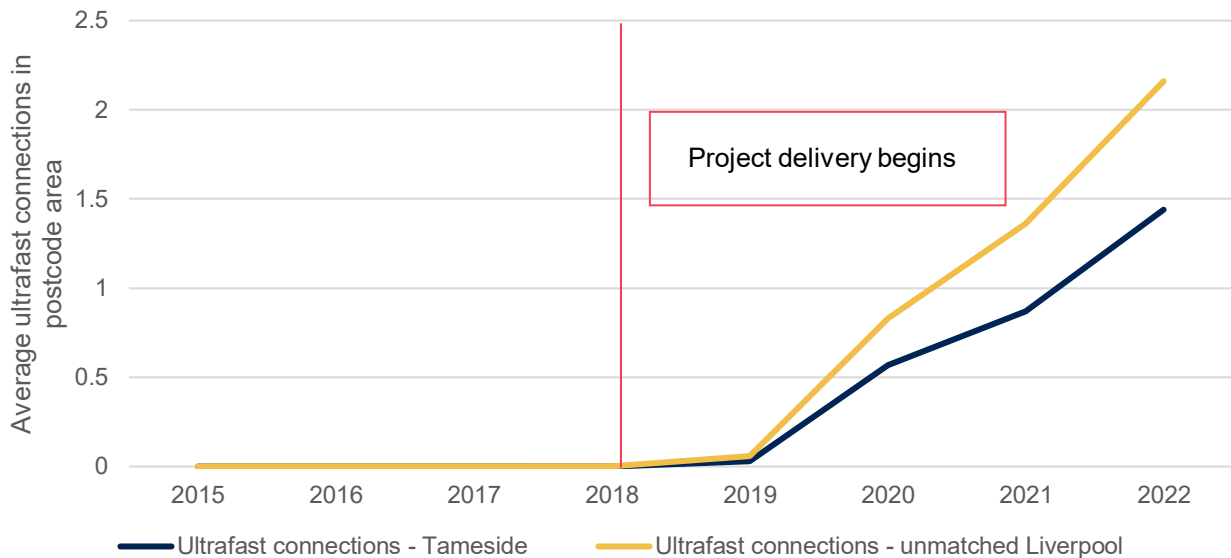
4.2.1 Impact of the Tameside PSAR project

To provide a clearer view of the impact of the LFFN wave one project on take-up of faster broadband connections, postcodes within 1km of the Tameside network build were compared to similar postcodes sharing similar characteristics in the Liverpool City Region. An econometric analysis was undertaken using the same fixed effects analytical framework as described above. The analysis found that the LFFN programme had a significant negative impact on take-up of ultrafast connections, with a decrease of 0.11 premises per postcode. This decrease is in line with the negative impact on coverage described above.

This change in connections can also be partially explained by how members of CNI have operated. The members have specifically targeted businesses and public sector buildings, with residential offerings lagging behind. The majority of premises in Tameside are residential; therefore, this lagging will have an impact on the average number of gigabit connections in the area. Further, some of the businesses and public sector buildings connected by members of CNI are outside the 1km range of the analytical framework, meaning these connections will be missed from the analysis.

This estimated increase in ultrafast take-up around the Tameside PSAR project is broadly in line with the findings from the other LFFN wave one projects. The estimations for the other projects mostly showed either no significant impact or a negative effect on take-up, which again is in line with the estimated changes in gigabit-capable coverage in the other project areas. Only the Trans Pennine Initiative showed any positive effect on take up of ultrafast connections.

5 Knowledge and spillover benefits

This section provides an overview of the evidence obtained of the wider outcomes and impacts generated by the Tameside PSAR project. These include knowledge outcomes for CNI, outcomes for public sector buildings connected to gigabit-capable networks, and wider social and economic outcomes.

5.1 Expansion of CNI

Since 2017 membership of CNI has grown across public sector and private organisations. Members are listed on the of CNI website, and as of February 2023, there were 38 members. New members have included large, national Internet Service Providers and Network Providers such as Virgin Media and City Fibre. Another new member is an organisation with ducting infrastructure with the potential to extend the network to Glasgow, Brighton, London and Birmingham. 10 or 12 local authorities were also reportedly interested in joining CNI. Members reported being positive of their working relationships established through CNI and believed this to be a key success of the model.

5.1.1 Geographic expansion of CNI

CNI has also expanded geographically. As of February 2023, there were eight local councils within CNI, and Greater Manchester Combined Authority is also a member. The councils that have joined aim to use the CNI model to commercialise assets in their areas. Some examples of the councils that have joined CNI are:

- **Blackpool Council** joined CNI in December 2019. Blackpool Council received £3m LFFN wave two funding to expand the fibre network across the coastline in Blackpool centre and connect 39 public buildings and 13,657 premises.[32] Members reported being "quite excited about the potential that new infrastructure will bring". Additionally, members said Blackpool Council have facilitated marketing opportunities for suppliers and network providers including introductions to the Federation of Small Business and Chamber of Commerce in Blackpool.

- **Manchester City Council** officially joined CNI in January 2020, though CNI members have not yet established connections in Manchester City. CNI members stated that the Manchester City Council joining the network was "very welcome" and as many existing CNI members have existing customers across Oldham, Rochdale and other Greater Manchester areas, "anything that would help us get out to those regions as well would be extremely welcome".

- **Mid-Sussex Council** joined CNI and CNI partnered with them on their £2.2 million LFFN wave two funded development of Burgess Hill. This development also connected into Brighton Digital Exchange which was funded under the Superconnected Cities programme in 2015.[33]

CNI continues to allow further local authorities and councils join, with Kirklees Council also expressing an interest in joining CNI.

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[32] Presentation by BDUK Justin Lees entitled 'LFFN: Are You Ready?' (document name 'DCMS-LFFN-Feb2019') accessed via https://cni.coop/
[33] https://broadband.coop/brighton-digital-exchange

This shows that the commercial model being promoted by CNI is of interest outside Tameside, and to a wide variety of infrastructure providers, demonstrating a key achievement of the commercial model and the Tameside PSAR project.

5.2   Public service provision

CNI members have focussed on the provision of connections to local businesses and public service providers, ahead of residential connections. With this focus, they have provided connections to multiple public service providers, including colleges, GP practices, NHS organisations and council buildings. This has supported with the provision of public services in multiple ways. The most direct impact has been a reduction in the cost of internet connections for public sector buildings. Previously, many buildings would require leased lines from commercial providers, which were very expensive. Now, the buildings can obtain their connection from Cooperative members without the need for a leased line and reduce the cost of their internet connection. There was also a reported reduction in the maintenance cost for the networks for public sector buildings.

5.2.1 Connection of schools

CNI have provided gigabit-capable connections to over 30 schools within the Tameside area. These connections would lead to similar outcomes and impacts as described in the LFFN Schools PSBU report, such as improved efficiency among administration staff, changes in the way schools communicate with pupils and their carers, increased use of online learning materials and an improvement in pupil satisfaction. For more details see the LFFN Schools PSBU project report.

5.3   Public sector learning

A key outcome for the project is to learn lessons from the innovative delivery approach of CNI to be better able to use this delivery model in other areas in the future.

Cooperative members, including Tameside Metropolitan Borough Council, have reported learning around State aid and the legal and commercial requirements for setting up a cooperative model. The State aid compliance arrangements for the project were addressed during the application and due diligence stages by Tameside Metropolitan Borough Council. This was done with BDUK staff, before funding was released. Stakeholders consulted suggest that Tameside Metropolitan Borough Council have shared this advice with other local authorities and CNI members, adding further value to the project learning. Additionally, CNI has held meetings and shared learning events on their model with BDUK to explain the aims of the project and ways of working to other local authorities. Stakeholders believed this shared learning exercise was a strength of the Tameside project. CNI members have also delivered presentations at infrastructure meetings and events, providing further learning to network providers, Internet Service Providers and other interested infrastructure providers about how the CNI model can work. Further, these learnings are provided more widely to other local authorities, who can then explore whether the CNI model may work in their area.

Public sector members consulted suggested that as membership of CNI expanded, they learned more about how broadband markets work and commercial requirements for operating a vehicle such as CNI. When a large network provider joined CNI, stakeholders consulted said they gained a better understanding of the relationships between suppliers and how to work better with Internet Service Providers.

Members further asserted that as membership expanded, it encouraged thinking around marketing and communications to end-users. Originally, local authorities anticipated that CNI would operate "in the background" with suppliers marketing its services to users in their area directly. However members suggested that public sector "backing" provides potential customers with confidence, for

example, assuring them of the strengthened resilience of the network or explaining the benefits of fibre connectivity to local businesses.[34]

5.4   Economic impacts

It should be noted that the qualitative research suggested that the economic impacts of the project may be limited. This is because there was no evidence that the local areas surrounding the Tameside build has increased connectivity when examined alongside a comparator area. However, CNI has largely targeted businesses and public sector organisations for connections so far rather than residential build, therefore it is reasonable to explore whether any economic outcomes have been achieved.

Additionally, the £2.2 million investment from the LFFN wave one project is relatively modest to produce a transformative effect in the Tameside area, in a time of major macroeconomic factors driving change, such as Brexit and the Covid-19 pandemic. Therefore, as well as the impacts being longer-term, it would also be expected that the impacts would be relatively small.

5.4.1 Investment and regeneration

Alongside the LFFN project Tameside Metropolitan Borough Council undertook a refurbishment of Ashton Old Baths, which hosts a digital exchange and a digital hub offering workspace. The refurbishment of the Old Baths building won the Global Data Centre Architecture Award in 2021. The refurbishment is being used as a basis for further regeneration investment into Tameside, such as the St Petersfield Masterplan, which aims to provide a development which contains housing, commercial and office space, hotel and food and drink offerings. Although the LFFN funding does not directly contribute to the regeneration plans or any investment into Tameside, stakeholders felt that the connectivity provided within Tameside by CNI, the dark fibre, Digital Exchange and the Ashton Old Baths building increased the attractiveness of the investment proposition for investors.[35]

The LFFN funding and provision of connectivity from CNI was also reported to help support the SWIFT wi-fi service in Tameside town centres. SWIFT wi-fi is a service provided by the council to allow all individuals to access the internet in town centres using the same policies as internet access at libraries. To provide the SWIFT service, wi-fi signals are transmitted from council buildings, which are connected to CNI network.

5.4.2 Labour supply

The tables below highlight the labour supply across in Tameside and a selection of other local authority areas, alongside the national averages. This shows that the economic activity rate in Tameside is in line with the national average, and higher than the other highlighted local authority areas, with the exception of Stockport. This is a similar pattern to that observed in 2017, with Tameside having a higher economic activity rate than all the highlighted areas other than Stockport, although in 2017 the rate in Tameside was slightly below the national average. Tameside has seen an increase in economic activity between 2017 and 2022, but this increase has also been observed in all the highlighted local authority areas, with the exception of Rochdale. Unemployment in Tameside was also broadly in line with the national average in 2022, and although this had decreased since 2017, the decline seen in Tameside was similar to that observed in most other

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[34] There is no Marketing and Communications plan for CNI, however, consultations suggest guidance for private and public sector organisations joining will be provided to enable further growth and connections from the network.

[35] https://www.tameside.gov.uk/Businesses/Ashton-Mayoral-Development-Zone/Future-St-Petersfield

highlighted local authority areas (with the exception of Stockport, which saw an increase in unemployment).

Tameside has a slightly lower proportion of the population qualified to degree level than the national average. This proportion has increased since 2017, but has increased at a slower rate than all the other highlighted local authorities and at a slower rate than nationally.

Table 5.1: Labour supply characteristics in Tameside and selected other local authorities (2022)

Area	Economic activity rate (% aged 16-64)	Unemployment rate (% aged 16-64)	NVQ4+ (% aged 16-64)[36]	Population aged 16-64 (%)	Population aged 65+ (%)
Tameside	78.4	3.7	36.6	78.2	21.8
Oldham	76.0	4.5	29.6	76.3	23.7
Rochdale	69.1	2.8	31.1	77.6	22.4
Stockport	82.9	5.1	46.7	77.1	22.9
Liverpool	71.9	2.7	44.1	83.2	16.8
UK	78.3	3.6	41.3	77.1	22.9

Source: ONS Annual Population Survey (APS)

Table 5.2: Change in labour supply characteristics, 2017 to 2022

Area	Economic activity rate (aged 16-64)	Unemployment rate (aged 16-64)	NVQ4+ (aged 16-64)[37]	Population aged 16-64	Population aged 65+
Tameside	2.2p.p	-1.4p.p	0.4p.p	-0.2p.p	0.2p.p
Oldham	4.4p.p	-2.9p.p	2.1p.p	-3.4p.p	3.4p.p
Rochdale	-3.0p.p	-3.6p.p	6.1p.p	-1.3p.p	1.3p.p
Stockport	2.3p.p	0.8p.p	3.9p.p	-0.9p.p	0.9p.p
Liverpool	0.7p.p	-3.2p.p	9.2p.p	0.6p.p	-0.6p.p
UK	0.1p.p	-0.9p.p	4.9p.p	-0.9p.p	0.9p.p

Source: ONS Annual Population Survey (APS)

5.4.3 Impact on unemployment

The Department for Work and Pensions (DWP) provide data on unemployment claimant counts at a Lower Super Output Area (LSOA) level on a monthly basis. To provide a clearer view of the impact of the Tameside PSAR project on unemployment, LSOAs which contained a postcode within 1km of the Tameside PSAR project were compared to similar LSOAs sharing similar characteristics which are in the Liverpool City region. An econometric analysis was undertaken using the fixed effects analytical framework as described in Section 4. The analysis found that the Tameside PSAR project had not impact on unemployment in the area.
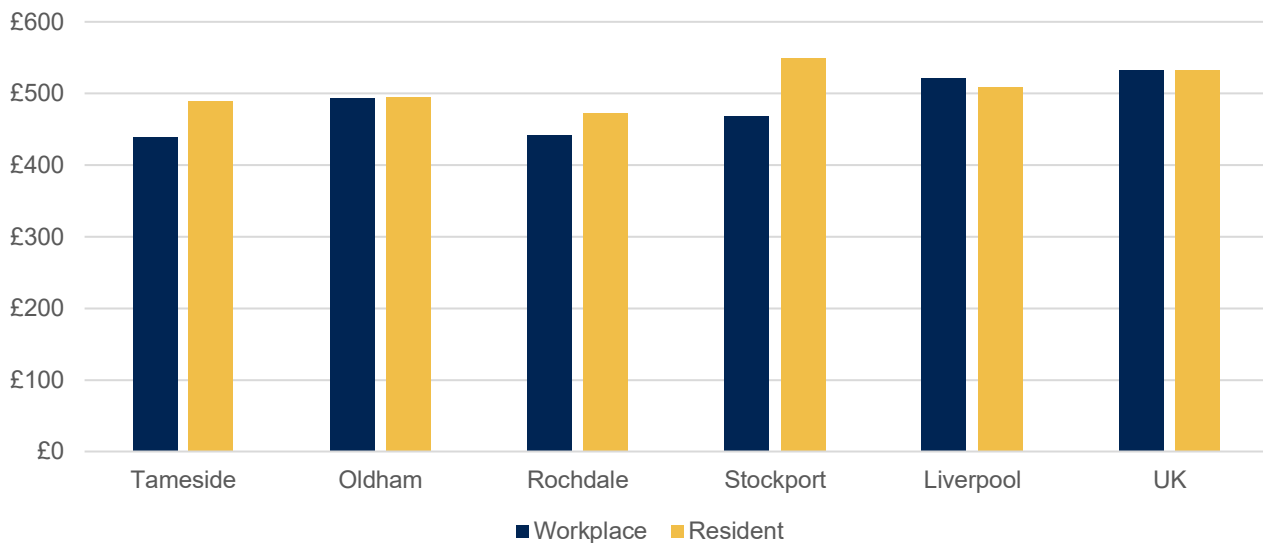
5.4.4 Earnings

Figure 5.1 highlights pay in Tameside, comparable areas of Greater Manchester, Liverpool and the UK average. This figure looks at how much employers pay, labelled workplace, and how much residents earn, labelled resident. We see that employers in Tameside pay below the national average earnings, and this is matched in all other selected local authority areas. Resident earnings are slightly higher than workplace earnings in Tameside, though they still remain lower than the national average. This pattern of higher resident earnings than workplace earnings is seen in

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[36] Most recent data available for 2021

[37] Most recent data available for 2021

most other selected local authority areas. Liverpool is the exception to this, though this would be expected as it is a city area.

Figure 5.1: Median hourly pay in Tameside and selected local authorities in 2022

Source: ONS Annual Survey of Hours and Earnings (ASHE) 2022. Workplace earnings refers to employees working in each area; Resident earnings refers to workers that live in each area.

Changes in earnings can be viewed as a proxy measure for changes in productivity, as employers are more likely to pay productive staff higher wages. Median wage growth for employers in Tameside was lower than the national average, and lower than in all other selected local authority areas at under 12 percent. For resident wage growth, earnings in Tameside at 22 percent, which is faster than the national average. The table below presents the changes in earnings in Tameside and other selected local authority areas.

Table 5.3: Change in earnings, 2017 to 2022

Area	Percentage growth in earnings (%) - workplace	Percentage growth in earnings (%) – resident
Tameside	11.7%	22.0%
Oldham	38.7%	22.7%
Rochdale	19.6%	24.2%
Stockport	14.5%	15.8%
Liverpool	20.7%	21.4%
UK	18.7%	18.7%

Source: ONS Annual Survey of Hours and Earnings (ASHE) 2022. Workplace earnings refers to employees working in each area; Resident earnings refers to workers that live in each area.

5.4.5 Impact on earnings

The ONS Secure Research Service allows access to more granular data on earnings. To provide a clearer view of the impact of the Tameside PSAR project on earnings, the research team examined workplace-based earnings for businesses near the project. Businesses in Output Areas that contain a postcode within 1km of the LFFN supported network were examined, and compared to businesses in comparator areas of Liverpool. An econometric analysis was undertaken using

the fixed effects analytical framework as described in Section 4. The analysis found the Tameside PSAR project had no impact on earnings. More details on the modelling approach are presented in the technical annex.

5.4.6 Impact on businesses

The ONS Secure Research Service allows access to granular data on business performance through the Business Structure Database. This data was also examined using a similar framework to that described in Section 4.2.2, and explored the impact of the LFFN schools PSBU project on the number of jobs, turnover and productivity (turnover per worker) on businesses located within 1km of the project. The analysis found that there was no statistically significant impact on the number of jobs, turnover or productivity.

5.4.7 House prices

Data from the Land Registry provides information about the prices paid for premises at a postcode level. Using this data, the research team have been able to explore the evolution of house prices within 1km of the Tameside PSAR project. The figure below presents the evolution of house prices within 1km of the project build from 2013 to 2022. This shows that there has been a general positive trend in house prices.

Figure 5.2: Evolution of house prices within 1km of the Tameside PSAR project, by type of premises (2013 to 2022)
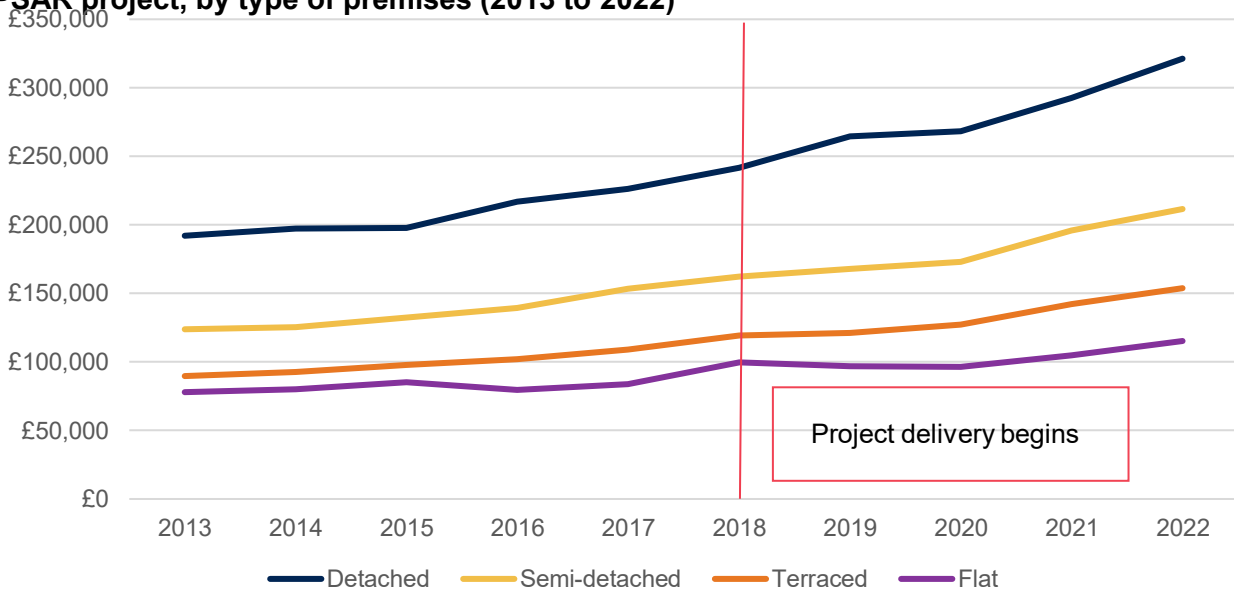
Source: Land Registry, 2013 to 2022.

Exploring the change in prices in more detail, house prices have increased markedly for all property types, by between 38 and 42 percent between 2017 and 2022 (2017 being the year prior to work starting on the Tameside PSAR project). These changes were compared to the changes in house prices for properties in comparator areas in Liverpool City Region. Base house prices in Liverpool were broadly comparable with those seen in Tameside in 2017. However, the growth in prices in Tameside have exceeded those observed in the Liverpool City Region for all property types.

The analysis here presents an overview of house prices in two areas, but does not attempt to draw inferences of the impact the Tameside PSAR project has had on house prices. This is because the qualitative findings did not suggest that there has been widespread use of the networks to provide additional gigabit-capable coverage to the Tameside area. Without this we would not expect to see changes to house prices being driven by the Tameside PSAR.

Table 5.4: Change in house prices, 2017 to 2022

Area	Tameside PSAR project		Liverpool City Region comparator area	
	Average price 2017 (£)	Increase in price 2017-2022 (%)	Average price 2017 (£)	Increase in price 2017-2022 (%)
Flat	£83,700	37.7%	£110,500	12.4%
Terraced	£109,100	41.0%	£102,000	32.2%
Semi-detached	£153,300	38.0%	£167,800	31.3%
Detached	£226,300	42.0%	£302,500	32.3%

Source: Land Registry data (2017-2022).

6 Conclusions

The key findings from the Tameside evaluation are:

- The project was completed in 2018. The LFFN wave one build was 4km short of the 17km target set out in 2017, and the wider network is 7.7km below the 50km target (as of January 2020 data).

- Cooperative membership has grown substantially since 2018 including new national suppliers such as Virgin Media and CityFibre. Recent growth in membership has also been driven by local authority and council members, indicating lessons from the Tameside PSAR project are being utilised in other areas of the UK.

- Deployment of gigabit-capable networks within 1km of the LFFN build has increased between 2017 and 2022. The econometric analysis undertaken, comparing connectivity outcomes in Tameside to Liverpool indicates that the project has had a negative impact on gigabit-capable coverage and take-up of ultrafast broadband connections. This could be due to roll out activity outside Tameside and other network providers opting not to build in Tameside.

The table below summarises the Tameside PSAR project achievements against its original stated objectives and those included in the Theory of Change:

Table 6.1: Summary of Tameside PSAR project achievements – green highlights strong evidence of achievement, orange indicates limited evidence of progress towards objective

Objective	Achieved
Generate learning	Learning generated for Tameside Metropolitan Borough Council, BRUK, other local authorities and Cooperative members.
Public sector cost savings	Evidence public sector buildings have experienced cost savings.
Enhanced (public sector) service provision	Evidence that public service providers have been able to enhance the services they provide.
Improve resilience	Evidence that there is improved resilience for organisations connected to the fibre network.
Future proofing	Evidence that public service providers have capacity to deliver more services in the future, and Tameside has futureproofed broadband provision in the area.
Broaden connectivity	Limited evidence of enhanced connectivity in Tameside in comparison to comparator area.
Introduce new commercial models	Evidence that CNI commercial model is established and is being used in other Local Authority areas.
Economic and social outcomes	Limited evidence that the project has led to economic and social benefits as of 2022.

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