Coast to Capital

COAST TO CAPITAL LOCAL GROWTH FUND FULL BUSINESS CASE	
Project Title:	**Research & Innovation Fibre Ring**
Lead delivery organisation:	Brighton & Hove City Council
Organisation Address:	Hove Town Hall, Norton Road, Hove, BN3 3BQ
Lead contact name:	Max Woodford Max.Woodford@brighton-hove.gov.uk
Issue Date:	

This document provides a template for a Full Business Case (FBC) for Coast to Capital to invest in a project through the Local Growth Fund (LGF). Please ensure you read the full guidance document to assist you in completing this form.

Projects funded from the Growth Deal are expected to contribute towards the Coast to Capital Gatwick 360 Strategic Economic Plan (SEP); to deliver economic outputs as detailed within the 8 priorities listed in the SEP, or to support the medium term delivery of our Strategy.

Projects can only request funding as stated within the EOI application; from **£500,000 and up to £2,000,000,** and must demonstrate a minimum of a 50% matched funding contribution.

The information provided in this form will help our Investment Committee, determine the eligibility of your project, and formally decide which projects called for the FBC stage have been successful following a presentation from applicants, that will allow opportunity for Committee members to ask questions. As part of this scrutiny Croydon Council as the acting Accountable Body for Coast to Capital will be ensuring all projects are State Aid compliant and therefore sufficient evidence is required.

The Investment Committee have delegated authority from Coast to Capital Board to make funding awards up to £2million, and make decisions on full or partial funding awards, or any funding conditions. Decisions made would be noted to the October Board meeting, following which funding awards will be announced.

FBC must submitted any time before: **12noon on Friday 16th August 2019. Any FBC not received after this deadline will NOT be accepted and will be returned to the applicant.** FBC submissions will be acknowledged by email within 24 hours.

Applicants must be able to evidence as part of the FBC that they are able to incur full LGF project costs (to include elements of matched funding), by **31st December 2020**.

Coast to Capital also reserves the right to withdraw / reclaim and re-allocate, all funding, if at any point in the delivery of successful projects, our Board believes that the full draw down will not be made.

If you have any queries or require further information please contact Coast to Capital on **localgrowthfund@coast2capital.org.uk**

Coast to Capital Disclaimer

By submitting this FBC, Project Applicants are agreeing to the following;

- Grant payment (in arrears) will not be made until a funding agreement is signed by both parties.
- All funds provided by Coast to Capital must be used for capital expenditure under the definition of capital provided within HM Treasury, CIPFA and International accounting standards.

- All costs and charges incurred as a result of making this application cannot be claimed as part of the project.
- All FBC submissions will be treated in the strictest confidence, and will only be shared with those involved with the evaluation and the processing of your application (Coast to Capital Officers, London Borough or Croydon Accountable Body, Coast to Capital Investment Committee Members, and Board members).
- Successful FBC submissions who are awarded funding are required to agree as a condition of applying for this funding that their business case will be published in the public domain in full.
- Coast to Capital will keep a record of your contact details, and application on file. We may use your contact details to send you further information, notify you of further funding opportunities, and/or invite you to events organised by Coast to Capital or its partners. Your personal and business information will remain confidential.
- Applicants submitting an FBC will in doing so warrant to have agreed to be bound by the following conditions:

1. Applicants will indemnify Coast to Capital against any claim for loss, costs or damages as a result of being unsuccessful at FBC stage.
2. Applicants who are successful in obtaining a grant funding award following scrutiny of the FBC, agree to pay a fee to Coast to Capital to cover the cost of processing and preparing the funding agreement. This fee will be payable in advance and is set at a flat rate of **£9,500.00**, to cover legal and administration costs. This fee cannot be recovered through applications.
3. Applicants who are unsuccessful following their submission and scrutiny of the full business case, accept that they will be informed in writing on the reasons for this decision in accordance with the attached Guidance, with further feedback only being provided to the extent and discretion decided by Coast to Capital officers.
4. Applicants agree to not issue any written or verbal statements to any third party which could reasonably be seen to be designed to defame, discredit, or to undermine the decision reached by Coast to Capital in not awarding grant funding following their submission and scrutiny of the FBC.
5. That the decision of the Coast to Capital Investment Committee and/or Board is final in deciding what FBC submissions are awarded funding, and there is no right of appeal.
6. That no applications for information under the Freedom of Information Act (FOI) will be accepted from the applicant or any other party, as to the reasons for an application not being invited to full business case stage, or for feedback on the reasons why funding has not been awarded following the submission of an FBC, as Coast to Capital is not bound by this Act.
7. The applicant warrants that they have not colluded with any other applicant to attempt to benefit their own application through falsification of information or reliance on other applications being successful.
8. That applications made are on an unconditional basis.
   The applicant warrants that their application is state aid compliant. Applications at FBC submission must provide evidence and/or will be asked if they have taken independent legal advice that their application is state aid compliant. Applicants must accept that if subsequently at any point their project is established to not be state aid compliant, Coast to Capital, solely at the discretion of its Board, will withdraw and reclaim any funding awarded.

I Max Woodford on behalf of Brighton & Hove City Council confirm that we agree to be bound by the above application contractual terms.	**Signed:** 	**Dated:** **15/08/2019**

1. Executive Summary

1.1) Overview of the project including what opportunity or barrier the investment will unlock:

[Please provide a clear & concise overview of the project ensuring that you set out what the LGF will be used to fund and what opportunity or barrier the investment will unlock.]

This project will deliver on Coast to Capital's goal, as stated in its Strategic Economic Plan (*Gatwick 360*) to establish a "fibre ring around Brighton & Hove to extend the reach of the Digital Catapult 5G Brighton Testbed."

The Brighton Research & Innovation Fibre Ring will be a publicly-owned, 5G-ready, shared-access duct infrastructure under the stewardship of BHCC that links a number of core strategic education, research and public sector assets including the Pavilion Estate, Preston Barracks, the MET and others.

Using an open access model, the project will enhance business access to key university R&D resources, significantly augmenting the value generated from the existing 5G-testbed technology. The Brighton Research & Innovation Fibre Ring will allow connections with larger employers, digital and technology SMEs, and the wider public sector. The ring will create a scaffold through which to leverage other opportunities for investment in 5G and fibre deployment, reducing fixed cost barriers to investment, and making effective use of government fibre funding (through, for example, the LFFN Voucher scheme).

A central element of this project are enhancements to the connectivity and expandability of the nationally-recognised 5G Brighton testbed. The UK's first SME-accessible 5G testbed is an existing distributed facility, housed across the Brighton Digital Exchange, the FuseBox innovation hub and the Brighton Dome & Corn Exchange. The funding to the testbed provides two key, value-generating benefits. It will act as the first user of the fibre ring infrastructure and establish an example, and test, of the open access approach to the ring. It will also significantly enhance the testbed's technical breadth and capacity, providing access for businesses and others, supporting them to design and develop new applications that utilise 5G to deliver value, growth and productivity gains for all across our region. The testbed enhancements will include deploying new stable 5G infrastructure compliant with 3GPP Rel.15 and 16, providing new 5G Services, neutral hosting, 5GNR intra band aggregation, Dual Connectivity (EN-DC), Enhancement on MIMO for NR, LAN support in 5G (5GLAN), NR mobility enhancements and 5G energy efficiency.

The potential of the innovation resources aggregated in New England House will be extended with a 5.5km fibre spine, publicly owned and open for shared access by multiple private and public-sector users. A cooperative neutral host will manage access to the fibre, maximising opportunities for digital and technology businesses to innovate, differentiate and scale, adding value with new connectivity products and services. The same benefits available to digital-tech businesses will also provide opportunities for public sector bodies to improve their methods of service delivery.

The Brighton Research & Innovation Fibre Ring will remove barriers that stand in the way of innovation and investment and so unlock opportunities for public and private sector stakeholders.

In particular:

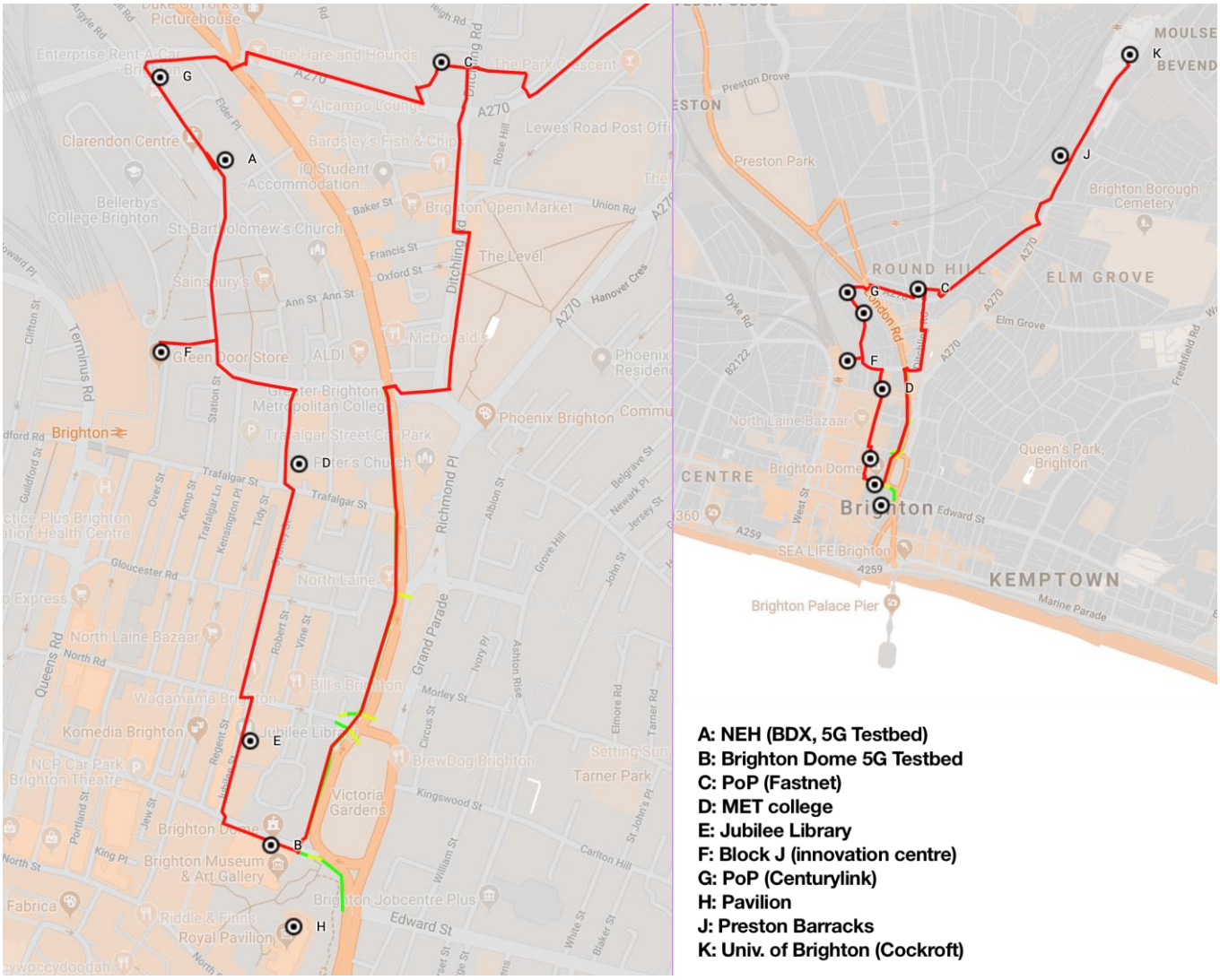
The 5G Testbed will be enhanced and integrated and, through the ring, connected with core research and educational institutions. It will also enable the provision of remote access to the testbed by SMEs, removing significant barriers to researching and developing 5G products and applications that would often exclude businesses of this size.

The fibre spine will be operated by the cooperative neutral host for the mutual benefit of engaged businesses and public sector bodies. This will create a valuable core network that ISPs and operators, including new, smaller disruptive providers, can invest in and build out from. It will make possible direct access to 'dark' fibre to such smaller and scaling businesses, providing them with new growth opportunities.

The Brighton Research & Innovation Fibre Ring is structured to deliver multiple opportunities for local digital, tech and creative businesses to innovate and grow, and to partner with larger businesses and research institutions, and collaborate with public sector partners.

It is designed to be successfully delivered within the time constraints of the funding, but to kick-start new opportunities for knowledge-based employment, value generation and productivity growth for many years to come.

This strategic investment sets a clear direction for the region. It delivers innovation-enabling infrastructure through a world-class 5G facility that businesses and organisations across the region will be able to access and benefit from, and provides a means to kick-start and accelerate full-fibre in Brighton, while acting as a key asset in the deployment of infrastructure throughout the region.



Planned Route for the 5G Ring (and spur), 5G Testbed and key stakeholder locations

1.2) Please choose a priority area that is most appropriate to your project. For further information around each priority area please review our Gatwick 360 Strategic Economic Plan.	Priority 1: Deliver Prosperous Urban Centres ☐ Priority 2: Develop Business Infrastructure and Support ☐ Priority 3: Invest in Sustainable Growth ☐ Priority 4: Create Skills for the Future ☐ Priority 5: Pioneer Innovation in ☐

	Core Strengths	
	Priority 6: Promote better transport and Mobility	☐
	Priority 7: Improve digital network capability	**X**
	Priority 8: Build a strong National and International profile	☐

1.3) The fit with Coast to Capital Strategic Economic Plan: Gatwick 360, and the chosen priority above. Please identify if this project fits in with other priorities as above.

The ring will directly assist delivery of the 2018-2020 ambitions in **Priority 7: Improve digital network capability** in several ways.

The project delivers directly against the SEP action to establish a "fibre ring around Brighton & Hove to extend the reach of the Digital Catapult 5G Brighton Testbed."

The Brighton Research & Innovation Fibre Ring (BR&IR) extends the reach of the 5G Brighton testbed to connect Brighton Dome with New England House using open-access dark fibre. This will provide ultra-high capacity, resilient connectivity between the main centres of the extended testbed.

The inclusion of both locations in Brighton as the first tenant of the neutral hosting infrastructure to be commissioned by the project fibre ring activities addresses specifically this SEP action.

By combining an enhanced open-access 5G testbed with a highly-specified open-access fibre spine, the Brighton Research & Innovation Fibre Ring will provide a rich source of experience and expertise on how to engage agile and innovative digital-tech SMEs in building, operating and applying the digital infrastructure that will drive productivity and accelerate growth in the region.

As well as Priority 7, there is a particular alignment with **Priority 5: Pioneer innovation in core strengths**. The Brighton 5G Ring provides a valuable link between the two priorities by providing the infrastructure to support all parts of the innovation process, from idea to product delivery, in a form that can be utilised by the digital-tech and creative sector in the region.

The Brighton Research & Innovation Fibre Ring enhances, leverages and complements existing projects and aspirations in the region, in particular:

- The Gigabit West Sussex Local Full Fibre Networks (LFFN) Wave 1.
- The Burgess Hill Fibre Exchange LFFN Wave 2 project will be connected directly to the Brighton Digital Exchange and hence to the Brighton Research & Innovation Fibre Ring.
- The West Sussex-led project to extend open access fibre connectivity, building on the LFFN projects.
- The LINK public sector network, which will use the fibre to reduce costs.
- The Brighton Digital Exchange, created as part of the HMG's Superconnected Cities programme and the Brighton & Hove City Deal, which operates using the cooperative neutral host model.
- The complementary LGF bid from West Sussex CC: "Converged Fibre Connectivity Programme"
- The potential for open access fibre deployment as part of the Brighton mainline upgrade and 'digital railway'.

The Brighton Research & Innovation Fibre Ring not only aligns with these other fibre infrastructure projects in the region, it enhances them, delivering the opportunity to access innovation support through the testbed and a carrier-neutral Internet hub whose s neutrality permits investment by multiple operators and providers using different investment and business models (PSAT, PSAR, PSN).

The Brighton Research & Innovation Fibre Ring is designed for growth. The use of a cooperative neutral host asset sharing model will support further private and public investment, both to provide access to the ring and to extend it. As a growing infrastructure it will play a key role in the achievement of the 2020-2030 ambitions:

- By forming the core of a highly-specified infrastructure to support Brighton's development as a highly-connected and leading smart city.
- By enhancing the role of the Brighton Digital Exchange as the regional Internet hub, serving urban centres throughout the C2C region.
- By offering local businesses an opportunity to innovate, differentiate and add value with access to fibre infrastructure and 5G testbed facilities.

The Brighton Research & Innovation Fibre Ring further will help advance the other seven priorities in the SEP, and this is summarised in the table below.

Priority 1: Deliver prosperous urban centres	**Prosperous urban centres need fibre.** Brighton lacks an open access full fibre infrastructure that is essential to sustain the prosperity of its urban centre. The Brighton Research & Innovation Fibre Ring will support rapid deployment of 5G and smart city capability, enhancing the ways that citizens, visitors and businesses can access information and experiences. The Brighton Research & Innovation Fibre Ring encircles the Brighton digital-tech-creative cluster and connects to BDX where they can gain access, trade and exchange data. This will support employment and supply chain opportunities in the urban centre.
Priority 2: Develop business infrastructure and support	**Shared infrastructure opens opportunities for business.** This project connects a number of key business locations (including NEH, Preston Barracks and Block J). Partners will provide a programme of support in developing new business applications utilising the fibre and 5G.
Priority 3: Invest in sustainable growth	**New digital infrastructure is part of a sustainable growth model** A fully shared and open access digital infrastructure is a valuable tool for supporting sustainable growth. By underpinning the development of Brighton as a smart city it can increase the capacity of the city to sustain a growing, economically active population. By supporting R&D translation links between universities and innovative business, for example around sensor technologies, the Brighton Research & Innovation Fibre Ring can help the development of local models for sustainable growth in digital economy .
Priority 4: Create skills for the future	**Build it ourselves means wide and varying skills needed** The 5G Brighton Testbed Acceleration Programme will directly assist businesses in gaining the new skills needed to play a role in the 5G economy. Building, maintaining and operating the infrastructure provides local supply chain opportunities with consequent employment in a range of skills: such as fibre deployment and splicing, electronics and telecommunications. The partnership between education institutions and business will help open up wider and ongoing skills development - the Greater Brighton MET college is a key partner.

Priority 5: Pioneer innovation in core strengths	**Digital is a core strength, 5G is becoming one** The 5G Testbed has already made Brighton a centre of 5G product innovation and the Testbed Acceleration Programme will build on this success, complementing other strengths in areas like VR and sensors. By opening up access to the infrastructure - the fibre itself - for SMEs and startups, the ring will maximise opportunities for the innovation that happens a) when you can cross between network layers; b) with high capacity data peering; c) with access to 5G technologies.
Priority 6: Promote better transport and mobility	**Open access fibre supports transport innovation** Innovators using digital technology to tackle problems like congestion, or to make use of transport open data, benefit greatly by having access to infrastructure - using tools such as layer 2 data exchange to avoid Internet bottlenecks and costs. Additionally the electricity network upgrade that will be needed to support EV charging across the city will provide 'dig once' opportunities to extend the fibre network at low cost.
Priority 7: Improve digital network capability	**Core priority for this project: See above for full details**
Priority 8: Build a strong national and international profile	**Brighton's 5G Testbed supports the region's reputation** The 5G Brighton Testbed is the UK's first non-academic 5G testbed and the first to be focused on SME engagement. This project will enhance it and the region's reputation for delivering technical innovation in a way that benefits a wide base.

1.4) Expected Total Project Cost and source of funding. Please also complete the funding breakdown tab on the supporting spreadsheet. A Matched funding contribution of at least 50% is required (percentage of the total project costs). (Please name the source of match funding). **(Please name the source of match funding).**

[Please complete the summary table provided and also complete the funding breakdown tab of the supporting excel spreadsheet. Please ensure you name the source of funding.]

	Amount	**% of Total Cost**
Total Project Cost	£1,665,293	100%
Applicant own funds	£333,045	20%
Other public funds		
Private sector funds	£499,602	30%
Funding requested from Coast to Capital LEP*	£832,647	50%

Other – add or delete where necessary		

*Funding requested from Coast to Capital must be more than £500,000 but cannot exceed £2,000,000.

1.5) Expected tangible core outputs/outcomes:
Please also complete the outputs tab of the supporting spreadsheet – add or delete where appropriate.
*Applicants should add in outputs that link directly with the SEP priority they are applying for.

[Please summarise the outputs to be delivered by completing the table. If the project will not deliver any of the specified outputs please enter 0 against that output. Please also complete the outputs tab of the supporting spreadsheet.]

Output/outcome	**Metric**	**Number to be delivered**
Employment- created and/or safeguarded	No.	19
Employment unlocked	No.	436
Businesses assisted- financial and non- financial	No.	45
Skills- new apprentices	No.	0
Skills – Training for high value skills	No.	0
New housing unit completions	Units	0
New housing unlocked	Units	0
New floor space constructed/Refurbished-	Sqm	0
Commercial floor space unlocked	Sqm	0
Carbon reduction	Tonnes of CO2	0
Productivity increase (total GVA uplift over 5 years)	£m	94
New products and services	No.	8
New fibre	km	5.51
Access chambers	No.	55
Premises passed 50m	No.	3,140
Premises addressable 50m-200m	No.	9,435

Priority 7: Improve digital network

The project will result in:

- A 5.5km fibre ring available for public, research and commercial application, and designed to support further commercial investment.
- A functional 5G testbed in two locations in Brighton: Fusebox and the Brighton Dome upgraded to the latest standards.

Fibre ring

BHCC will deliver a 5.5km fibre spine ring in central Brighton. The ducting will be publicly owned. It will have capacity for up to 8 144-core cables. This will pass within reach of more than 12,000 premises.

Based on a cost-benefit analysis (see 3.5) commercialisation of this asset will result in a discounted GVA uplift of over £115m (NPV at 3.5% over 10 years), without the grant of any aid or subsidy.

By engaging local businesses in the operation and maintenance of the ring through the cooperative neutral host model, at least 3 new products will be created by at least 3 businesses.

Testbed

Digital Catapult will deliver an enhanced 5G test-bed with technical capabilities such as WiFi, LTE (4G), 5G, LTE-M, NB-IoT, eMBMS and MEC and also 5G network capabilities such as SDN and NFV.

Digital Catapult will deliver a three-year 5G Testbed Acceleration Programme (5GTAP) which will manage on average two or three open calls with active promotion each year with each call looking to recruit at least 5 SMEs. This will result in at least 45 SMEs directly benefiting from the enhanced 5G Testbed. We estimate at least 10 of those will be new companies established in the last three years.

Through an "open door" policy and existing links with the research institutions in the region, we foresee at least 15 collaborations resulting between SMEs and the regional research base enabled by the usage of our testbed.

From the SMEs assisted we expect to generate at least 10 skilled, high-value, knowledge-intensive jobs and safeguard 7 others by making sure these SMEs have a competitive edge in the new connectivity marketplaces that are opening and can be exploited early on by local businesses.

Other outcomes include at least 5 new to the firm products and 5 new to market products that will be the result of our 5GTAP activity. This progression of results is in line with previous programmes run by the DIgital Catapult.

1.6) Main risks and issues the project will need to manage? Explain contingency plans to ensure full draw down of funding if ultimately awarded. **Please also submit a full risk register as an annex to this document**

[Please summarise the key risks to the project that will need careful management. We also expect a full risk register to be submitted as an annex.]

The Brighton Research & Innovation Fibre Ring has three principal classes of risk:

- Construction delays
- 5G standards uncertainty
- Low engagement

Our general approach to these risk classes is described below. Please refer to our comprehensive risk register for further details on the risks falling in these classes and our management of them.

Construction delays

There are a number of potential causes of construction delays, including delays on permissions and wayleaves, difficulty in matching timing to take advantage of other construction projects (Valley Gardens, GB MET), slow mobilisation by suppliers, insufficient supplier resource.

Construction delays could potentially lead to cost overruns and/or difficulty in completing the project within the funding window. They may also impact the launch of the updated 5G Testbed to take advantage of the application of Rel 16.

The risk register describes how we intend to mitigate these risks, none of which scores above "green".

Methods include:

- Rapid procurement of construction partner through frameworks, with potential to appoint additional suppliers to accelerate work.
- Readiness to adopt alternative routes.
- Adequate contingency budget and if necessary additional funding (or if severe, reduced scope) to deal with cost overruns.

5G Standards uncertainty

There is not yet full certainty on the supply of equipment and compatible software to complete the upgrade to 3GPP Rel 16 and, in particular, integration of the 5GNR equipment with 5G core software.

This risk does not score above “green”. Digital Catapult has extensive experience dealing with this class of risk for 3GPP Rel 15 and has a strong relationship with equipment and software suppliers. This relationship gives us the confidence that access to suitable equipment/software and the appropriate support will be secured.

Low engagement

The project is largely dedicated to creating opportunities for engagement and collaboration by SMEs and research bodies. Such engagement and collaboration is voluntary and there is a risk that it will be less than anticipated, whether in using fibre or the Testbed or both.

These risks do not score above “green”.

Wired Sussex, BDX and Digital Catapult, have extensive experience and incentive to drive engagement, and can adapt activities such as open calls to respond to any slow take up.

2. Strategic Case

2.1) Describe the compelling case for change.

[In this section you should explain why public funding is required. What problem or opportunity is the project intended to address in terms of market failure or demand or the contribution the project will make to the delivery of the Coast to Capital Strategic Economic Plan and any other relevant plans and strategies.]

Why public funding is required

The Brighton Research & Innovation Fibre Ring applies public investment to enhance and leverage the benefits of assets that are present in the C2C LEP region and in Brighton & Hove, and so realise significant secondary and multiplier economic effects. These assets include specifically:

- The thriving and growing digital-tech-creative cluster in and around Brighton;
- The collaboration and innovation opportunities for SMEs in that cluster to access advanced infrastructure through the 5G Brighton Testbed and the Brighton Digital Exchange.

The proposed public investment performs two important functions:

- Enhancing the existing Testbed to support testing and development using the coming evolution of 5G standards, and across a wider ‘distributed’ testbed in Brighton.
- Creating a financially-sustainable and scalable fibre infrastructure that will support shared use by public, research and private sector bodies.

The public funding unlocks two path dependencies to enable maximum engagement by SMEs working together with public and research bodies:

- By creating a shared spine, public sector along with smaller and innovating telecoms operators and service providers can access dark fibre infrastructure that otherwise would not be available.

- By creating a shared, distributed Testbed, compliant with the latest 5G standards, smaller and innovating digital-tech businesses, along with public research bodies can access technology that they otherwise could not at this stage.

In both cases the public investment creates the conditions for investment by smaller digital-tech and creative businesses working together and with public sector partners.

This is possible because of the focus on ensuring shared access for collaboration using:

- A proven and UK-leading Testbed engagement model;
- A proven 'neutral host' model to support shared use and investment.

The 5G context

It is now widely recognised that 5G technologies will be extremely significant for the future delivery of public sector service provision, high value business growth and for helping meet social and citizen needs. Through its ability to provide extremely fast, highly stable and very adaptable connectivity with exceptionally low latency, 5G can enable new, more effective and efficient products, services and experiences, improving productivity and enhancing capacity in the process. This is clearly recognised by HMG in their Industrial Strategy Future Telecoms Infrastructure Review, which called for significant increases in investment in full fibre and 5G to ensure that "the UK remain globally competitive in a digital world". Subsequent recent statements from the Prime Minister's office have further emphasised its importance.

As a LEP, C2C has been at the forefront of acknowledging the significance of 5G and developed and funded a testbed model which DCMS have subsequently adapted and used across the UK. This project builds on that earlier activity by connecting an enhanced 5G testbed to major strategic sites in Brighton, enabling a range of businesses and other organisations to connect into a new fibre ring and linking that up with other fibre and connectivity projects across the region.

Whilst a number of national network providers (like Vodafone and EE) have publicly announced 5G rollouts, for some time to come the underlying impact will be limited and very different to what is being proposed in this project. First, because network providers will tend to focus initially and primarily on hotspots in urban areas that are typically larger than those that exist in the C2C LEP region. Second, because access for small businesses to 5G is often limited and inappropriate (ie not configured for early use testing and Proof of Concept). And third because the opportunity to innovate utilising the connectivity is limited (for instance Nb-IoT is available in limited form and with a cost from Vodafone only in their Newbury-based lab). Essentially, this is because the connectivity is, for the network providers, primarily a commodity. For us, and as designed for this project, it is strategic: it is a way of improving commercial and public sector value generation, and enhancing business growth and employee productivity.

There is a gap between the finalisation of cellular network standards and their commercial availability. This project closes that gap between confirmed standards and broad market take-up of the technology by making it available to start-ups, scale-ups and SMEs much earlier than it otherwise would. It then provides ways that these businesses' engagement with 5G can generate innovation and value, either via the testbed or via the neutral host or through a combination of both.

A sustainable and scalable infrastructure

Brighton & Hove has important assets that are crucial for driving economic growth and opportunities for its citizens and the wider economy. These include a recognised digital-tech-creative sector, centres of research and teaching excellence in further and higher education, and a city-centre economy that provides opportunities to test and deploy new digital technologies, particularly using 5G. The 5G Brighton Testbed and the Brighton Digital Exchange are both significant, and almost unique in the UK, for the opportunities they provide SMEs to access advanced infrastructure.

The Brighton Research & Innovation Fibre Ring is designed to take advantage of these assets to create beneficial change:

• To accelerate the growth of the digital-tech-creative cluster in Brighton by providing new opportunities to work with the public sector and education, to create new digital and 5G products and services, and to capture more of the value chain;

• To leverage the existing assets such as the 5G Brighton Testbed and Brighton Digital Exchange, increasing the opportunities for collaboration and attracting new investment in applications and services;

• To lower the barriers to new investment in infrastructure, both public and private, using the ring to deploy new radio (5G) and fixed line connectivity, taking advantage of opportunities to deploy at low cost using 'dig once', and providing a scaffolding to leverage funding such as Gigabit vouchers.

2.2) Investment Objectives- detail the specific objectives to achieve the anticipated outcomes.

[Detail the specific objectives to achieve the anticipated outcomes. The objectives should be stated in clear and measurable terms with a specified time frame.]

The project objectives to achieve the desired outcomes are:

BHCC to:

- Deploy 5.5km primary ducting in a ring and spur topology within the funding envelope.
- Populate the ducting with at least 96 fibre cores for public and research use.
- Connect strategic sites directly to the fibre, including:
    - BDX/5G Testbed in New England House
    - Brighton Dome and Corn Exchange complex and Testbed
    - GB MET college campus
    - University of Brighton Cockroft Building
    - Block J innovation centre
    - Fastnet PoP
    - Centurylink/Xoomtalk PoP
    - Jubilee Library, including the new Business and Intellectual Property Centre
- Provide for connections in other strategic sites, including:
    - Preston Barracks development
    - 10 BHCC sites currently connected to LINK
    - Brighton Pavilion
- Deploy at least 96 fibre cores for shared use, mediated by BDX
- Terminate in key PoP sites BDX, Fastnet, Centurylink/Xoomtalk
- Fully test and verify fibre

BDX to:

- Launch product set.
- Appoint maintenance contractor in consultation with BHCC.
- Invite membership including from CNI (national cooperative neutral host - Virgin Media, ITS etc)

Digital Catapult to:

- Upgrade the 5G Brighton testbed with commercial-grade 5G New Radio equipment and corresponding core network (5GCore) software, to make it work in compliance with the 5G standards.
- Upgrade to latest 3GPP standards. The testbed will support WiFi, LTE (4G), 5G-NR, LTE-M, NB-IoT and eMBMS in access side and fully functional in SDN and NFV in networking side to support MEC with fully functional 5G core.

- This will offer SMEs and enterprises engaging with the 5G Brighton testbed the ability to develop, test and demonstrate new products and services right at the forefront of the 5G network capabilities in the country, and in the world.

2.3) Stakeholder Engagement carried out.

[Please explain what stakeholder engagement has been undertaken and what engagement remains to be undertaken. What support has been received? Have businesses been engaged and will continue to be engaged throughout the life of the project.

Endorsements should be evidenced if possible.]

C2C LEP undertook considerable partner engagement during the preparation of Gatwick 360, and it is that engagement that created the proposal for a Research & Innovation Fibre Ring.

Since then, discussions have been held with all the principal stakeholders listed below and with a section of local businesses that have consequently expressed strong support for this project including: Plug-in Media, Site Visibility, Cogapp, Tech 75, Fastnet and CurveIT. The input and engagement of the stakeholders and interested businesses has been critical in the initiation and evolution of this project.

Letters of support from these stakeholders and from local businesses can be provided should that be required.

The table below summarises engagements.

Stakeholder	Engagement
Brighton & Hove City Council	Lead body.
Digital Catapult	Partner. Participated fully in creating this bid.
Brighton Digital Exchange	Partner. Closely involved in creating this bid.
University of Brighton	Fully informed of the bid. Full support.
University of Sussex	Fully informed. Full support.
Greater Brighton Metropolitan College	Fully informed of the bid. Full support.
The LINK	Fully informed of the bid. Full support.
Wired Sussex	Closely involved in the development of this bid.
The Dome, Brighton	Fully informed of the bid. Full support.
Mid Sussex District Council	Fully informed of the bid. Full support.

2.4) List the key stakeholders and their interest areas.

[Please list the key stakeholders and their interest areas in the table provided.

Stakeholder	Interest area
Brighton & Hove City Council	Owns and is responsible for key sites passed by the ring with opportunities for cost savings and service improvements. Key partner for project delivery including wayleaves and related permissions. Providing match funding through the Valley Gardens development.
Wired Sussex	Closely involved in the development of this bid. Experience of advising businesses on Connection Vouchers. Able to engage businesses from the digital-tech-creative cluster to use and benefit from the assets.
University of Brighton	Keen to take advantage of the opportunities for collaboration. Can benefit from cost savings using the fibre connection to BDX.
University of Sussex	The planned innovation centre as part of the Block J development is passed by the 5G ring. Opportunity to connect with potential interest in a science park development in Burgess Hill.
Greater Brighton Metropolitan College	Key site passed by the 5G ring. Providing match funding through its new campus development. Keen to take advantage of the opportunities for collaboration around future skills provision.
The LINK	Public Sector network that already serves a number of public sector sites passed by the ring. The LINK is interested in using the ring to provide end users with more cost-effective connections (faster, cheaper or both) by switching these to the ring.
Digital Catapult	Operates the 5G Brighton Testbed. Is currently undertaking deployment of testbed extension at Brighton Dome. Digital Catapult will take responsibility for the testbed upgrade to meet evolving 5G standards.
Brighton Digital Exchange	BDX is a cooperatively-owned fibre network and carrier-neutral co-location facility, managed and supported by local internet service providers and tech businesses, including Fastnet, XoomTalk and CurveIT. BDX will perform the function of cooperative neutral host to enable private sector businesses to share access to the fibre ring. Members of the BDX cooperative are keen to take advantage of the opportunity this project provides to invest in new fibre and radio deployments outside New England House.
Brighton Dome and Corn Exchange	International performance and cultural venue hosting 5G testbed. and key site passed by the ring. Keen to take advantage of the opportunities to trial 5G applications.
Mid Sussex District Council	Mid Sussex (MSDC) is constructing a complementary fibre network with a connection to BDX that will complement the 5G Ring. MSDC is keen to take advantage of the opportunities for collaboration with Brighton educational institutions and businesses.

2.5) What are the strategic issues, risks and constraints that may impact successful delivery of the project?

[Please provide details of the strategic issues, risks and constraints that may impact successful delivery of the project. E.g. Overarching issues that relate to the approvals, resource implications, finances or other general strategic issues that can impact on the delivery of the project.]

Strategic issues, risks and constraints that could impact successful delivery of the project broadly match the risk classes outlined in 1.6. Each of these risk classes is strategic but scores low as a risk:

Construction delays

This applies particularly to difficulty in coordinating deployment to match existing construction projects. Taking advantage of 'dig once' opportunities would be a success factor for the project delivery with its potential for adoption on a wider scale across Brighton and the C2C region, and hence this is a strategic risk. However failure to take advantage of these opportunities would not threaten the project overall.

5G standards uncertainty

By its very nature the 5G Testbed is at the edge of the evolving technology and the success of the Testbed upgrade relies on making new standards available quickly. Any difficulties in this area therefore are strategic. However, such difficulties would be overcome by advancing discussions with equipment providers as well as with the research and standardisation bodies and would not threaten the overall success of the project.

Low engagement

A primary objective of this project is to open opportunities for engagement and collaboration by SMEs and research bodies. Low engagement by them therefore would be a strategic issue. However the risk is low and the partners have extensive experience and multiple tools available to drive engagement.

2.6) Project Dependencies

[Summarise any project dependencies that the project has or if there are other projects that are dependent on this delivery (either LGF funded or not) and state the impact to the project if these are not met.]

The project is partially dependent on the timely advancement of related projects and developments. These are summarised in the table below.

Project/development	Dependency	Mitigation
Brighton Dome restoration	Full operation of testbed extension will not be possible until the restoration of the Corn Exchange is complete	The testbed extension can be partially commissioned in the Dome only and tested ready for full operation
Valley Gardens development	Part of the fibre ring cannot be deployed before the corresponding phase of the Valley Gardens redevelopment.	The fibre ring only depends on VG phases 1 and 2, which are already in construction.
Greater Brighton MET campus development	Full connection to the MET will not be possible until the development is complete. A small part of the fibre route passes through the development.	MET connection could be enabled later. An alternative route could be used for a small additional cost.
Availability of 5G SA Radio	The Testbed upgrade cannot be completed until equipment becomes available to support the new 5G SA radio standard.	Equipment will be ordered in advance and delays should not threaten the project deadline. We will work closely with 5G Radio manufacturer to know when the 5G-NR SA would be available and which capabilities it can support within the timeline.
Availability of 5G Core to support 5G-NR SA	The Testbed upgrade cannot be completed until the 5G Core software to support the new standard becomes available.	We will work closely with the 5G core provider. The 5G Core development is a high priority for 3GPP and should not be delayed.

2.7) Project disruption

[Please explain the disruption to the local area during the period of project execution and how you are looking to minimise these disruptions.]

The project does involve disruption through digging to deploy fibre ducting. This disruption can be minimised:

- By working in parallel with developments that are happening anyway, in particular the Valley Gardens developments and the Greater Brighton MET campus development. This is factored into the design.
- By avoiding deployments along and across major arteries and installing duct in walkways and cycleways where possible. This is factored into the design.
- By spacing out the deployment so that disruption is not concentrated in any one area at any one time.
- By working with potential partner projects to deploy additional infrastructure at the same time, for example power conduit for new EV charging points.

3. The Economic Case

3.1) Please describe the options that have been considered in selecting the project proposal, completing both box 1 and 2.

[Please describe the options that have been considered in selecting the project proposal completing both box 1 and 2.
This should include a minimum of 3 options:-
Do nothing, do minimum or status quo
The proposed option (as set out in the executive summary)
An alternative option (which may be based on changes to the scale, scope and cost of the proposed option)]

We examine three options:

Do nothing, do minimum or status quo. No new infrastructure is built. The testbed is not upgraded. There is no Layer-2 connectivity for 5G research (see note 2). No cost savings on connectivity for BHCC.

The proposed option (as set out in the executive summary). Fibre ring is built. Testbed is upgraded. Layer-2 connectivity between 5 sites for research provided by the ring. Cost savings on on connectivity for BHCC.

An alternative option (which may be based on changes to the scale, scope and cost of the proposed option). No fibre ring is built. Testbed is upgraded. Layer-2 connectivity between 5 sites for research is procured through an alternative route. No cost savings on connectivity for BHCC.

Box 1:

Option Name:	Description:	Total cost:	Amount requested:	Core outputs (see 1.6)
Do nothing, minimum or status quo	No new infrastructure is built. The testbed is not upgraded.	£0 Capital £64,090 revenue costs	£0	Status quo

	There is no Layer-2 connectivity for 5G research. No cost savings on connectivity for BHCC.	over 5 years - see note 1.		
Proposed option	Fibre ring is built. Testbed is upgraded at NEH and Brighton Dome. Layer-2 connectivity between 5 sites for research provided by the ring. Cost savings on on connectivity for BHCC. Neutral Host makes fibre available for commercial operators and investors.	£1,115,691 capital £689,869 net revenue cost over 5 years, including: operational costs income from neutral host	£832,646	GVA uplift £115m over 10 years 436 jobs through growth 19 Jobs directly created/ safeguarded. 45 SMEs assisted 3,600 SMEs within reach of fibre .
Alternative option:	No fibre ring is built. Testbed is upgraded. Layer-2 connectivity between 5 sites for research is procured through alternative route - see note 2. No cost savings on connectivity for BHCC.	£499,602 capital cost £822,235 revenue cost over 5 years, including: operational costs of new connections ongoing revenue costs for BHCC connections that cannot be switched	£499,602	45 SMEs assisted 12 jobs directly created/ safeguarded

Notes

1. Continuing ongoing revenue costs for public sector connections that cannot be switched. LINK expects to be able to make savings of around £12.8k annually using the preferred option. This cost is therefore counted in the other two options.

2. Layer-2 connectivity enables high capacity data sharing not possible with Internet.

3. No new fibre is deployed except with the preferred option. Over time it is likely that investment by commercial operators will increase the number of options for fibre connections between the sites, however evidence shows that such investment rarely results in increased availability of dark fibre. The availability of dark fibre is essential to the delivery of GVA uplift here reported, and assists research outcomes.

Box 2:

Option Name:	Advantages:	Disadvantages:
Do nothing, minimum or status quo	No project cost. No disruption.	Benefits not achieved. No savings for BHCC on connectivity.
Proposed option	Benefits and outcomes fully achieved. Dark fibre connections provide research options for data exchange at very high speeds. Legacy fibre and duct network will continue to make savings and earn revenues.	Project capital cost. Disruption.
Alternative options:	No construction disruption. Rapid deployment of limited Layer-2 network. Lower project cost over 5 years. Layer-2 connections allow data sharing.	Limited to 10Gbps. Higher revenue costs. No funder identified for Layer-2 connection revenue costs. Project finishes after 5 years - no legacy. Many of the strategic, economic or financial benefits outlined in this document are not achieved. Minimal opportunities for private sector investment in extending infrastructure. No opportunities for public sector savings using dark fibre. Reduced opportunities for research and collaboration.

3.2) The preferred option

[Please state the preferred option with supporting justification for selection.]

The preferred option is the construction of a shared access duct and fibre ring and full upgrade of the testbed to 5G SA working:

- Public sector partners use the ring to deploy fibre to meet their requirements, save costs and enable new service developments.
- The sites of the 5G Testbed are fully integrated with no effective bandwidth limit to enable maximum scope for innovation.
- The 5G Testbed becomes as close as possible to be fully compliant with Release 16 providing SME and research partners with access to latest evolution.

- The cooperative neutral host deploys its own fibre and rents access to private and public sector dark fibre users.
- The local authority owns a long-life asset that can save costs for public sector over time.
- The neutral host shared access model provides maximum opportunity for collaboration between education, digital-tech-creative businesses and the public sector.

3.3) Issues with preferred option.

[If there are any issues to be resolved before this option may proceed, please provide an overview.]

We are not aware of any issues that need to be resolved before our preferred option can proceed.

3.4) What are the top 5 risks of this option?

[A summary of the top 5 risks of the preferred option should be provided here and a full risk register which includes quantification, ownership and mitigations for each risk should be sent as an annex to the business case.]

Please see our comprehensive risk register for further detail.

The 5 top-scoring risks are all construction related. None of them scores above "green". They are:

- Contractor mobilisation delays - leading to delays in overall completion. This is mitigated by preparing to engage multiple suppliers.
- Delays due to timing of linked construction projects - leading to delays in overall completion. This can be mitigated by adjusting the project schedules or re-routing if necessary.
- Delays in obtaining necessary permissions and wayleaves for construction - leading to delays in overall completion. This is mitigated by use of public highways where possible. There may also be an option to obtain code powers.
- Failure to match project timing with dig-once opportunity in Valley Gardens - leading to increased costs. This is mitigated by adjusting project schedules or using contingency budget.
- Failure to match project timing with reduced deployment cost during MET college redevelopment - leading to increased costs. This is mitigated by adjusting project schedules or using contingency budget.

Please complete the boxes below, answering only those relevant for the theme of your project, referring to the guidance available. Please also complete the outputs tab of the supporting excel spreadsheet.

3.5) Economic impact

[Projects in all themes should answer this question.

How does the project positively affect the level of economic activity in a given area? What is the economic impact?]

Fibre infrastructure impact

The economic impact of the fibre infrastructure (not including the impact of the testbed) has been assessed numerically, based on:

- Numbers of business premises that could be connected - using well established methodology
- Additional estimates of new start up businesses.
- Additional estimates of business that could be connected using Gigabit vouchers.
- Consequent measure of businesses assisted.

- Consequent estimates of GVA growth and jobs impact.

Findings are summarised in the table below:

Spine network length	**5,512**
SMEs with 50m of a chamber	**948**
Addressable	**30%**
SMEs within 200m > 50m	**2,860**
Addressable	**15%**
SMEs affected	**713**
Take up	**30%**
GVA uplift NPV 10 years	**£115,517,976**
GVA per FTE	**£65,400**
Jobs created	**436**

This model only looks at businesses that can benefit from a connection.

It does not include:

- Cost savings for the public sector;
- New investment;
- GVA and jobs created through secondary and tertiary effects;
- Opportunities for residences to connect;
- Education opportunities;
- Growth for service provider and other businesses exploiting the network.

Testbed impact

Additional investment in the proposed extension for the 5G testbed can unlock significant economic benefits, both to the regional economy and to catalyse growth nationally. Economic benefits from 5G will come from a number of sources, particularly the potential for new and improved products, and increased productivity through better efficiency in their production and the emergence of new business models. Given the disruptive nature of 5G, specific projection of the scale of benefits is challenging; however recent research on use cases within manufacturing indicates that improvements in efficiency through improved asset management could translate into 25% cost reductions.

This means that 5G is likely to have an economic effect well beyond any short-term commercial return to companies directly engaged in the programme. Specifically, the test bed will help accelerate and enable:

- The introduction of new goods and services, with higher data rates and lower latency expected to enable greater use of IoT devices
- Improve business efficiency in producing and delivering goods and services, and enable scope for greater innovation and the development of new products.
- Improve health and social outcomes, for example wearable technology and IoT devices will help people better access health and education services in a more timely and personalised fashion

3.6) Environmental Impact

[Projects in all themes should answer this question.

What are the environmental consequences, both positive and negative of the project?]

The construction of the ring will have a temporary adverse environmental impact due to disruption, construction traffic, construction waste.

We will minimise these adverse impacts by:

- Reducing disruption and construction waste by maximising the use of dig-once opportunities and duct deployment in footway.
- Ensuring that contractors meet appropriate environmental standards.

Further, maximum benefit accrues for the environmental cost because of the collaborative shared asset model:

- The open-access neutral-host model will mean that telecoms businesses and ISPs wishing to deploy their own fibre have no need to re-dig.
- MNOs wishing to deploy 5G radio equipment will have access to existing fibre assets and carrier-neutral co-location at BDX, reducing the need to re-dig or deploy new facilities.
- There will be an opportunity to deploy new ducting to support power to EV charging points, eliminating the need to re-dig.

The shared infrastructure will also produce some indirect local environmental benefits:

- Switch to full fibre and 5G working reduces maintenance load and energy costs associated with legacy copper networks - fewer callouts and disruption, lower energy consumption;
- Opportunities for at-distance collaboration and data exchange will reduce journeys.

3.7) Social Impact

[Projects in all themes should answer this question.
What are the social consequences, both positive and negative of the project?]

The commercialisation model is designed to ensure access to opportunities for small and growing businesses, and ensure that the wealth generated by the ring is kept within local communities. This accords with the city council's goals around *community wealth building*, as expressed in the Fair City strand of the city's Economic Strategy. Digital Catapult 5G Brighton Testbed was the first non-academic 5G testbed in the country (credit to C2C LEP funding in 2016), designed specifically to maximise opportunities for local SMEs to access state of the art technology.

- The project will generate significant economic growth and research collaboration with consequent education, training and working opportunities.
- The project construction will provide opportunities, potentially for businesses employing locally and training in skills such as fibre splicing.
- Ongoing operation and maintenance of the ring will provide opportunities for businesses employing locally and training in telecoms skills.
- The chosen neutral-host commercialisation model will encourage collaboration between and with public and private sector, helping to encourage the sustainable and stakeholder-focused business culture in Brighton.

3.8) The number of people and businesses positively impacted by the intervention?

[Projects in all themes should answer this question.
Please try and give an indication of the number of people and businesses that will be positively impacted by the intervention.]

- The fibre ring will pass within reach of more than 12,000 premises, including 3,800 business premises.
- Fully open access through the neutral host will enable multiple ISPs to launch high-specification competitively priced products including broadband using fibre and 5G.
- At least 10 businesses will have opportunities to launch new products by engaging with the testbed and/or operation of the fibre.
- The 5G Testbed Acceleration programme open calls will aim to recruit at least 5 SMEs 2 or 3 times a year, leading to at least 45 SMEs benefiting from the 5G Testbed features. We estimate at least 10 of those will be new companies established in the last three years.
- We foresee at least 15 collaborations resulting between SMEs and the research base enabled by the usage of the testbed.
- From the SMEs assisted we expect to generate at least 10 high-value, knowledge-intensive jobs and safeguard 7.

3.9) Follow on Investment

[Projects in all themes should answer this question.

Does the project have any follow on investment potential? If yes, at what level and is this confirmed? An example may be if the LGF is being requested to fund a roundabout that opens up land for development.]

The Brighton Research & Innovation Fibre Ring is designed to reduce barriers to investment and to open opportunities for linking with other initiatives. This will result in numerous opportunities for follow-on investment:

- The upgraded testbed will provide digital-tech SMEs with an opportunity to develop and test new products and services, leading to significant investment opportunities and growth.
- The ring passes within 200m of an estimated 4000+ SMEs. These create a potential market for investors to address using their own funds and Gigabit vouchers.
- The ring passes close to 10 public sector sites already served by the LINK providing opportunities to connect these for a small investment with consequent revenue savings and service improvements.

The fibre ring is designed to be extended. A key advantage of the cooperative neutral host model is that it provides a mechanism to support additional investment by multiple partners without overbuilding. Potential investors include public as well as private sector bodies looking for an opportunity to obtain reliable returns by building on a strong core.

3.10) Skills projects only- Impact on Skills Provision

3.11) Business and enterprise projects only- Impact on business growth

[How does this project address business growth in terms of a 20% increase in turnover and jobs over the next 3-5 years? Either directly if the project sponsor is a business or indirectly by impacting more than one businesses, for example through the supply chain or id the project is for business premises.]

3.12) Infrastructure and Regeneration and Housing projects only- Physical and aesthetical impact- Does the project make a positive and lasting contribution to the physical, human and cultural environment?

[Both Infrastructure and Regeneration and Housing projects are required to answer this question.

Please explain whether the project makes a positive and lasting contribution to the physical, human and cultural environment.]

Once construction of the Brighton Research & Innovation Fibre Ring is complete there will be no visible legacy impact on the environment.

The ring will directly encourage innovation in the use of 5G technology to enhance user and visitor experience at locations including Brighton Dome, the Pavilion and Jubilee Library, as well as potentially throughout the Valley Gardens outside environment.

The ring infrastructure is designed to last a minimum of 25 years. The shared access neutral host model will minimise the need for other fibre deployments in the future.

Secondary impacts of the new infrastructure such as reduced need for journeys will help meet environmental targets.

The ring and testbed will enable the development and deployment of 'smart city' applications such as environmental monitoring and improved traffic management.

3.13) If your project results in service and other improvements then please provide baseline data below.

[All projects that result in service or other improvements are required to answer this question.

Please provide baseline data for any service improvement or other improvement metric along with what the intervention will achieve.]

Metric	Baseline		What the intervention will achieve	
	Figure	Year	Figure	By when

It is anticipated that public sector partners will use the ring to enable significant service improvements. These will result from innovation and follow-on investment. Thus it is not possible to provide a comprehensive list or baseline data yet, however examples are:

- Public sector Wifi/5G deployment enables roaming for workers, improving efficiency;
- Lower cost Internet connectivity for public sector partners, thus making new services viable;
- Low cost hyper-fast connectivity between local authority sites will improve opportunities for data sharing;
- The ring will provide public sector bodies with easy access to multiple service providers with opportunities to improve digital service resilience.
- The ring will assist deployment of new 'smart city' applications that will improve service delivery, such as improved traffic management.

4. The Commercial Case

4.1) Please provide details of your envisaged procurement route.

Please provide information in relation to all parts of the project that will be procured for external delivery not just the LGF funded elements. Procurement must be in line with the Public Contracts Regulations 2015 and other applicable

laws as this is public money Please follow the link below to read the regulations http://www.legislation.gov.uk/uksi/2015/102/pdfs/uksi_ 20150102_en.pdf

BHCC will procure:

- Dig and duct deployment including chamber location and detailed planning.
- Deployment and test of fibre for own use.
- Deployment and test of fibre for commercial sale.

Existing frameworks will be used to reduce procurement time. In particular there is an opportunity to use the SCAPE framework which is already being used in Mid Sussex. This will allow sufficient teams to be mobilised to meet the funding deadline.

Digital Catapult will procure:

- 5G Brighton Testbed Specification, procurement, installation, integration, testing and commissioning of the extensions (Hardware/Software).
- 5G equipment: upgrade to 5G Core software (future 3GPP releases), 5G NR hardware, 5G NR indoor cells, servers with multiple GPUs, etc.
- 5G Brighton Testbed installation and testing in both Brighton Dome and New England House

Digital Catapult will use existing frameworks it has linked to the 5G Brighton testbed construction to reduce procurement time. Digital Catapult will use its existing knowledge of the 5G hardware and software markets in order to secure competitive quotes in line with our procurement policy, looking to meet the ambitious timeline of the project.

4.2) Involvement of private development partners.

[If private development partners will be required to deliver the project, at what stage are discussions/negotiations?]

- Digital Catapult is a not-for profit company limited by guarantee and is a partner in this project.
- Brighton Digital Exchange (BDX) is a cooperative society and is a partner.
- BHCC has been invited to join the BDX cooperative, so that BDX members can be offered non-exclusive access to the BHCC assets.
- Balfour Beatty has been engaged under the SCAPE framework by Mid Sussex district council, with a requirement to deploy fibre in Brighton connecting to BDX. Discussions have started on extending this work to include the B5GFR project.
- BHCC is already engaged with contractors that can assist with deployment.

4.3) Procurement plan and timescales.

[Please outline the procurement plan and timescales, including statutory and other consents required such as planning.]

Action	Target completion
Appoint primary construction partner using SCAPE framework	+1 month from award
Appoint secondary construction partner	+2 months from award
Appoint fibre deployment and maintenance partner	+1 months from award
Place equipment orders for 5G Radio	+0 months from award
Raise section 50 consents where needed	+1 months from award
5G Brighton core procurement	+7 months from award

4.4) How will the project contribute towards social value?

[All Coast to Capital delivery bodies will be required to show how the project increases social value in accordance with the Social Value Act 2012. In particular you should demonstrate how your project will increase opportunities for small and medium sized businesses and increase opportunities for local residents to enhance their skills and career progression prospects. Please also include details of how you will deliver social value in any other way.]

Social value lies at the heart of the Research & Innovation Fibre Ring project. It also lies at the heart of Brighton & Hove's Economic Strategy 2018.

Local SME ecosystem

The project is designed to ensure access to opportunities for small and growing businesses. So for example:

- The 5G Brighton Testbed is democratising access to advanced connectivity technology for the innovator community.
- Local companies who are producing connectivity-related innovations either in hardware or software can test and enhance them on the latest 5G standards, with open access to the testbed including the possibility to programme the network.
- Application developers from other industrial sectors (such as creative companies or AI reliant) can use the 5G infrastructure to test products and future proof them for commercial deployment.
- The commercialisation model for access to the fibre will provide multiple opportunities for local SMEs to access infrastructure that would otherwise be beyond their reach, and to play a role in the operation and maintenance. This ensures that the wealth and prosperity generated by the fibre ring stays local.

Skills opportunities

- Ensuring engagement of local and growing digital-tech businesses will lead to opportunities for apprenticeships, training and career development - for example in fibre splicing and telecoms skills.

Collaborative and sustainable business culture

- The neutral-host model will encourage collaborative approaches, promoting cooperation between and with public and private sector.
- This will encourage the development of the collaborative, sustainable and stakeholder-focused business culture in Brighton.

Open innovation culture

- By offering opportunities to experiment and innovate using digital technology, the project will enhance Brighton's position as a cultural and tech centre and enhance the lives of its citizens with opportunities to learn and engage.

4.5) State Aid Compliance.

Please refer to the State Aid summary provided with the bid application guidance and provide your justification to show that your project is state aid compliant.

In support of the above please provide as an annex to this business case

- Practising solicitor's letter or counsel's advice/ independent legal advice setting out compliance with state aid tests set out in the summary document provided.

[Please provide an explanation of how your project is State Aid compliant and how you came to that opinion? If you have received any external advice please send as an appendix. If your project is likely to involve you in economic activity, then regardless of whether you are a public authority, you need to provide state aid justification. The key questions to consider can be found in the attached document (including possible exemptions).]

We confirm that the project will not involve the grant of any state aid. Please find appended to this bid a letter from the city council's solicitor confirming this position.

The ring will have three applications:

- Research: the research activity by Digital Catapult is not economic activity and therefore does not involve the grant of any aid.
- Public sector: use of the ring by public sector bodies to enable cost savings and service improvements does not involve economic activity.
- Commercialisation: commercial access to the infrastructure will be mediated through the cooperative neutral host at market rates and so will not involve the grant of any subsidy or aid in accordance with the Market Economy Operator Principle (MEOP). The rates have been benchmarked in a report from PwC for another local authority, available in redacted form.

Rationale

In line with the guidance provided, our rationale for this conclusion is as follows:

- The infrastructure will be publicly owned and will serve purposes that are not economic activity - specifically the research purposes undertaken by Digital Catapult, and the provision of connections to public sector sites.
- Access to the infrastructure (that will constitute economic activity) will be made available to private sector users on a non-exclusive, non-discriminatory basis through the cooperative neutral host, a neutral intermediary that will pay BHCC a commercial rate to deploy its own fibre in BHCC ducts. This commercial rate has been benchmarked (against rates charged by Openreach).

Additionally:

- The neutral host will provide wholesale access to the fibre to its members. This is 'raw' access to the fibre itself. The members create their own telecoms and Internet services using this.
- Membership is open to anyone meeting the specified membership criteria. These are designed primarily to ensure equitable sharing of resources and responsible wholesale use of the infrastructure, and are not onerous. BHCC will itself be a member.
- The neutral host will not be granted any exclusivity of access.

Supporting evidence

- Digital Catapult is extensively funded from public sources to carry out its non-economic activity and can provide evidence supporting this.
- The cooperative neutral host uses a commercialisation model developed in Tameside. The state aid treatment of this was examined by PwC in a report, made available by DCMS in a redacted form (and attached as an appendix). The report examines all the transactions between local authority and the cooperative neutral host and concludes that each is in accordance with MEOP.
- Mid Sussex District Council will use the same model to commercialise access to infrastructure that it is deploying, including a connection to BDX.

5. The Financial Case

5.1) what is the estimated total project cost and the amount of LGF being applied for? Please complete the funding breakdown tab in the supporting excel spreadsheet.

[Please complete the table provided to show the total project cost and LGF amount being applied for in each financial year, and broken down in each quarter. Please also complete the funding breakdown tab in the supporting excel spreadsheet.]

LGF financial year starts from 1st April – 31st March (Q1 would therefore be April-June). **No rounding up.**

Quarter	Matched Funding Contribution	LGF
19/20 – Q1		
19/20 – Q2		
19/20 – Q3	45,637	59,083
19/20 – Q4	97,030	205,476
20/21 – Q1	142,648	375,537
20/21 – Q2	148,953	157,342
20/21 – Q3	40,726	35,208
Total	474,995	832,646

5.2) Please set out the project expenditure items – No rounding up.

Please state the date of this estimate- July 2019

Projects costs (delete or add as appropriate)	**Total cost (£)** (LGF plus Matched funding)	**LGF (£)** Capital items only.	**Match funding (£)**
Land Acquisition			
Planning and Feasibility studies	£16,500	£16,500	£0
Surveys	£7,000	£7,000	£0
Construction, inc-materials, equipment and labour	£938,552	£713,417	£225,136
Fit out (inc. equipment and furnishings not included in construction)	£90,000	£90,000	£0
Project management	£35,730	£5,730	£30,000
Consultancy			
Operational costs (to March 2023)	£549,602	£0	£549,602
Contingency*	£27,909	£0	£27,909
Total Net Cost	**£1,665,293**	**£832,646**	**£832,647**
VAT	**£333,059**	**£166,529**	**£166,529**

Total Gross Cost	**£1,998,351**	**£999,176**	**£999,176**

Please ensure the matched funding and LGF amount to the total costs and that the LGF requested does not exceed the 50% percentage allowed.

Notes
Operational costs consist of:

- Running 5G Testbed Accelerator Programme (personnel, travel and subsistence, other costs) until March 2023
- Contribution to BDX operational costs to March 2022

* Contingency associated with risk of fibre ring cost overruns, e.g. if need to re-route

5.3) Net Present Value cash flow analysis.

[*Please provide a Net Present Value cash flow analysis for each of the options. Workings should be included as an appendix.*
You should also detail your project assumptions and discount rate used.]

Options	**NPV**
Do nothing, minimum or status quo	-£57,874
Proposed option	-£1,234,876
Alternative option	-£1,210,419

Please detail your project assumptions and discount rate used-

NPV

- All NPVs are calculated over 5 years starting 1 April 2019.
- All NPVs use the Green Book recommended rate of 3.5%.

Do nothing, minimum or status quo

- The 5G Brighton testbed is not upgraded.
- There is no layer 2 connection between Brighton Dome testbed extension and the main testbed in NEH (connection is by Internet).
- There is no layer 2 connectivity between the testbed in NEH and HE/FE research sites.
- No new fibre is built.
- There is a continuing cost to BHCC of connections for 10 sites that could be connected using the BR&IR, calculated by The LINK at £12,800 per year.
- The NPV of that cost is shown.

Proposed option

- The 5G Brighton testbed is upgraded.
- There are consequent operational costs associated with the Testbed Accelerator Programme and provided as match funding.
- A 5.5km duct and fibre ring is built.

- There is full, resilient layer 2 connectivity between Brighton Dome testbed extension and the main testbed in NEH.
- There is full, resilient layer 2 connectivity between the main testbed in NEH and 3 research sites.
- BHCC saves the cost of connections for 10 sites by using its own fibre. Savings calculated by The LINK at £12,800 per year. For comparison this cost is counted as zero in the NPV calculation.
- There are annual fibre operational costs.
- There are BDX operational costs covered by BHCC to support expansion over 2.5 years.
- BDX pays BHCC an annual fee for duct access.
- BDX pays BHCC an annual share (50%) of the fibre operational costs.
- BHCC has in place a depreciated asset at the end of the 5-year period (duct and fibre).
- Depreciation on duct is counted at 40 years (DCMS recommended).
- Depreciation on fibre is counted at 25 years (expected life).
- The net present value of these revenues and costs is shown.

Alternative option

- The 5G Brighton testbed is upgraded.
- There are consequent operational costs associated with the Testbed Accelerator Programme provided as match funding.
- No fibre ring is built.
- Layer 2 connectivity (10Gbps) between Brighton Dome testbed extension and the main testbed in NEH is purchased from Openreach on a 5-year contract. BDX member Fastnet is used to provide a backup route.
- Layer 2 connectivity (10Gbps non-resilient) between the main testbed in NEH and 3 research sites is purchased from Openreach on a 5-year contract
- There is a continuing cost to BHCC of connections for 10 sites that could be connected using the BR&IR, estimated by The LINK at £12,800 per year. This is counted as a cost in the NPV calculation for comparison.
- The net present value of all these costs is shown.

5.4) Value for money

[Please detail how the project offers value for money. You should look to address the following. Cost per job, cost per home, deadweight, displacement, benefit cost ratio and any other evidence of value for money.]

The Brighton Research & Innovation Fibre Ring aims to leverage two assets that are unique to Brighton, and which result in very significant multiplier effects for the impact of the investment:

- The 5G Brighton Testbed is unique in its focus on SME applications and has a track record helping drive SME innovation and growth.
- The thriving Brighton creative-digital-tech ecosystem with collaboration at its heart, driven by partner organisations Wired Sussex, Digital Catapult and Brighton Digital Exchange.

The rapid growth in the sector means that careful use of public funds can stimulate very significant economic growth. This is demonstrated in the GVA uplift figures here reported based on a conservative model.

Similar leverage applies to direct public sector use of the new infrastructure, with potential for very large savings in public service delivery.

The unique offer of the 5G Brighton Testbed results in minimal deadweight during the life of the project since no alternatives exist and the early availability of a test and development platform is a key outcome.

The cooperative neutral host commercialisation model minimises deadweight in fibre deployment because it provides an open access platform for new investors, who can focus investment funds where there is no available asset.

The table below summarises some key statistics drawn from the impacts planned for the project.

VfM	
Total project	£1,665,293
Cost per indirect job	£3,819
Cost per job directly created or safeguarded	£87,647
Benefit cost ratio 5 year GVA	56

5.5) VAT status

VAT payable on construction and other works incurred by BHCC will be reclaimed by BHCC.

VAT payable on equipment and other costs incurred by Digital Catapult will be reclaimed by Digital Catapult.

5.6) Financial Sustainability

Please explain how the project will be sustained financially after the investment of LGF is completed?]

The Brighton Research & Innovation Fibre Ring will be sustainable financially.

Fibre ring

Operation and maintenance costs for the fibre will be fully covered through commercialisation arrangements:

- BHCC will charge BDX duct rental fees;
- BHCC may also charge duct access fees to public sector partners;
- BHCC will be responsible for repairs to ducting. This is most likely required because of damage caused during construction works and can be reclaimed.
- Overall these arrangements will leave BHCC with a net income.

BDX will:

- Charge members dark fibre rental fees;
- Pay BHCC for duct rental;

- Pay maintenance fees to an appointed supplier;
- Pay interest on capital subscribed by members;
- Hold accumulated surplus for investment in network extensions.

This business sustainability model is in line with practice elsewhere in the UK where the cooperative neutral host model is being applied.

5G Brighton Testbed

Operation and maintenance costs for the Testbed will continue to be the responsibility of Digital Catapult. Digital Catapult will use its own funding to cover these costs. Digital Catapult will also seek further collaboration with equipment and industry partners in order to secure further support for experimentation and proof of concept development, using the built facilities. All the collaborations with telecom or other sector focused industry built by the Digital Catapult will respect our technological neutrality, driving the adoption of advanced digital technologies by UK industry verticals and encouraging further scaling of the existing investments.

6. The Management Case

6.1) In which financial year do you expect your project to commence?	2019/20
6.2) In which financial year do you expect your project to complete?	2022/23

6.3) Please set out the key milestones related to the project. Please include planning permissions, funding secured, PR and events.

[Please provide the quarter and financial year in which you anticipate the project to start. This may have already started. For most projects this would be the start on-site date.

Please provide the quarter and financial year in which you anticipate the project to complete.

Please set out the milestones using the table provided adding more rows as necessary. Please also attach a project plan as an appendix if one is available.]

- 6.1: The project will start from the grant award, assumed in September (end Q2 2019/20)
- 6.2: The project will last until March 2023
- All LGF-funded elements will be complete and tested by December 2020 (Q3 2020/21)
- A detailed project plan will be created following procurement of contractor

Milestone	Start date	Completion date
Overview		
Grant Agreement signature	Sep 2019	Sep 2019
Fibre construction	Oct 2019	Oct 2020
5G Testbed extension	Oct 2019	Dec 2020
5G Testbed accelerator programme (TAP)	Apr 2020	Mar 2023

Construction and fibre		
Contractor procurement (construction)	Sep 2019	Oct 2019
Detailed fibre design (chamber locations etc)	Oct 2019	Oct 2019
Construction Sectors	Jan 2020	Oct 2020
Sector 1 North	01/01/2020	29/04/2020
Sector 2 Level	01/11/2019	24/01/2020
Sector 3 London Road	01/04/2020	07/10/2020
Sector 4 North Laine	01/04/2020	24/06/2020
Sector 5 North spur	01/04/2020	28/10/2020
Sector 6 Valley Gardens	01/01/2020	13/05/2020
Fibre deployment	Feb 2020	Nov 2020
First connection	Jun 2020	Jun 2020
Connection of The Dome	Jun 2020	Jun 2020
Connection of GB MET	Jul 2020	Jul 2020
5G Testbed Extension		
5GBr Equipment specification	Oct 2019	Dec 2019
5GBr Equipment procurement	Jan 2020	June 2020
5GBr Extension commissioning	Jun 2020	December 2020
5G Testbed Accelerator Programme (TAP)		
5G Accelerator Programme cohorts and showcase / demo	Apr 2020	Mar 2021
5G Accelerator Programme cohorts & showcase / demo	Apr 2021	Mar 2022
5G Accelerator Programme cohorts and showcase / demo	Apr 2022	Mar 2023

6.4) Project management arrangements

[Please set out the project management arrangements that will be used to successfully manage the project to time and budget.]

Project management will be overseen by the Project Board (see 6.6 Governance). The project board consists of:

- BHCC
- C2C LEP
- Digital Catapult
- Brighton Digital Exchange
- Key stakeholders

Further details of the project board are given in 6.6.

Individual partners will take responsibility for financial and project management of individual components, reporting to the Project Board. This is summarised in the table below.

Project component	**Responsible partner**	**Individual**
Project oversight	Project Board	BHCC to nominate chair
Fibre ring construction	BHCC	Max Woodford
Testbed extension construction and operation, including Accelerator Programme delivery	Digital Catapult	Ray Lambe
Fibre ring commercialisation	Brighton Digital Exchange	Joe Kerr
Project evaluation	Project board	BHCC to nominate
Business engagement	Wired Sussex	Phil Jones

6.5) Key project roles and responsibilities

[Please set out the key project roles and responsibilities involved in delivering the project.]

Key roles and responsibilities are given in the table below.

Partner	**Responsibility**
Project board	**Project oversight** ● Approve specifications and design ● Approve construction contractor procurement ● Monitor milestones **Project evaluation** ● Monitor KPIs
BHCC	**Fibre ring construction** ● Commission detailed duct design and specification ● Procure duct construction and fibre deployment ● Project manage construction **Finance** ● Maintain project accounts ● Funding drawdowns and distribution
Digital Catapult	**Testbed Extension construction** ● Finalise detailed design ● Procure equipment ● Commission installation ● Test **Testbed Extension utilisation** ● Facility maintenance ● 5G TAP delivery

	• Report on Testbed KPIs
Brighton Digital Exchange	**Fibre ring commercialisation** • Product design and pricing • Fibre maintenance • Report on commercialisation KPIs

6.6) Governance, oversight and accountability

[Please explain what governance, oversight and accountability arrangements will be put in place if your project is awarded Local Growth Funding.]

Governance and oversight will be the responsibility of a Project Board, consisting of the project partners and key stakeholders:

- BHCC
- C2C LEP
- Digital Catapult
- Brighton Digital Exchange
- Key stakeholders (see below)

The key stakeholders expected to join the Project Board are:

- The LINK
- University of Brighton
- University of Sussex (SinC)
- Greater Brighton MET
- Brighton Dome
- Wired Sussex

The Project Board will oversee the project. Individual partners will take responsibility for project management of individual components, reporting to the Project Board. This is detailed in 6.4.

Continuation and stewardship role

The project board will continue to operate after December 2020, and potentially beyond the 5-year timeline for the project. This will allow it to take on a longer-term stewardship role as opportunities arise to add new assets. In this role the Project Board will represent stakeholders and advise BHCC on the use and extension of BHCC-owned assets, including the Research & Innovation Fibre Ring duct and publicly-owned fibre deployed in that duct. The project board will undertake:

- Stewardship of new shared assets added to the infrastructure using dig-once opportunities;
- Engagement with private and public bodies interested in investing to extend the fibre infrastructure;
- Engagement with other stakeholders;
- Continuing evaluation of the use of the infrastructure.

Digital Catapult

Digital Catapult will engage with private and public bodies interested in investing to extend the 5G Testbed capability and associated programmes.

Brighton Digital Exchange (BDX)

BDX will act in the role of cooperative neutral host. In this role it will pay BHCC a (market-rate) duct rental fee for non-exclusive access to BHCC duct, so that it can deploy and operate its

own fibre for shared access by its members. In line with cooperative principles, BDX is an autonomous body:

- BDX is governed by its (corporate) members;
- Each member has one vote and full sight of finances and operations;
- Members adhere to a code of practice;
- Members elect a board which can be replaced at any time;
- BHCC will join BDX.
- Digital Catapult will consider becoming a member of the BDX, in order to access managed dark fibre service.

6.7) Communications and stakeholder management

[Please set out the strategy and plan for communications and stakeholder management?]

The Project Board will oversee communications and stakeholder engagement for the duration of the project.

The communications and stakeholder engagement strategy will pursue the following objectives:

- Ensure all partners and stakeholders are aware of progress, developments and decisions taken;
- Ensure that the Project Board and partners are aware of the currently expressed needs and aspirations of stakeholders;
- To the degree possible, ensure that the development of the project reflects the evolving needs and aspirations of stakeholders;
- Raise awareness in the business and citizen community of the successes and achievements of the project, and of the opportunity to engage;
- Recruit new partners and stakeholders (although see role of BDX below).

The strategy will incorporate and apply methods including:

- Meetings and events;
- Mailing list and social media;
- Web pages.

Project partners will assume responsibility for particular elements. Their roles and planned activities are summarised in the table below.

Area/stakeholders	**Responsible partner**	**Activities**
Digital sector and wider community	Wired Sussex	Events; Monthly update.
Testbed access	Digital Catapult	Open calls; Events and seminars; Showcases / demos.
Fibre access	BDX	Awareness raising events; Web site; Mailing list.
ISP and telecoms services	BDX members	Chosen marketing channels.

6.8) Benefits management

[Please set out the strategy and plan for dealing with the management and delivery of benefits.]

The benefits of the project come in five main areas:

- **Testbed**: potential for digital-tech sector businesses to engage in and use the testbed;
- **Fibre**: potential for Internet and telecoms providers, including public sector, to access and use the fibre;
- **Collaboration**: potential for creative and digital-tech businesses, public sector and research bodies to collaborate in research and development;
- **Investment**: potential for telecoms and Internet operators and investors to invest in network expansion for a commercial return;
- **End users**: potential for end users to access new connectivity products and services.

Delivery of these benefits is central to the purpose of the project, and success will be monitored and evaluated by the Project Board.

Each of the benefits is managed and mediated by a project partner. This is summarised in the table below.

Benefit	**Responsible partner(s)**	**Form of mediation**
Testbed	Digital Catapult	Testbed Acceleration Programme, includes open calls and curated engagement.
Fibre	BDX	Membership, products and price list
Collaboration	Digital Catapult, Wired Sussex	Events, open calls
Investment	Project board, BDX	Dialogue, BDX membership
End users	BDX members, BDX	Marketing and awareness raising

6.9) Project evaluation – This will be a requirement at the completion of a project.

[Please set out the arrangements you envisage for post project evaluation.]

The Project Board will oversee project evaluation at the completion of the project (5 years), and will continue to monitor and manage benefits of the fibre ring for the life of the infrastructure.

Project evaluation will focus on the 5 benefits:

- **Testbed**: digital-tech sector businesses using of the testbed;

- **Fibre**: Internet and telecoms providers, including public sector, accessing and using the fibre;
- **Collaboration**: creative and digital-tech businesses, public sector and research bodies collaborating in research and development;
- **Investment**: investment in network expansion for a commercial return;
- **End users**: end users accessing new connectivity products and services.

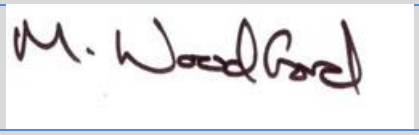
These benefits will be evaluated using KPIs, monitored by project partners and overseen by the Project Board. This is summarised in the table below.

Benefit	Responsible partner(s)	KPIs
Testbed	Digital Catapult	• New products under development; • Start-up and growing businesses engaged.
Fibre	BDX	• Number of members; • Products taken up.
Collaboration	Digital Catapult, Wired Sussex	• Known collaborative projects; • Known spin-out JVs and partnerships.
Investment	Project board, BDX	• Investors; • Invested sums.
End users	BDX members, BDX, LINK	• End users reported. • Public sector end users.

Recommendation & Declaration

Recommendation- please state clearly the recommended action this business case supports.

That Local Growth Funding support is given to the Brighton Research & Innovation Fibre Ring Project.

Declaration:	**I certify that the information provided in this Business Case is complete and correct at the time of submission.**
Signature:	
Print Name:	Max Woodford
Title:	Assistant Director City Development & Regeneration
Date:	15/08/2019

Before submitting your Business Case ensure you have all the required supporting documentation:

- **One electronic copy of the business case template, signed and dated**
- **Excel Spreadsheet (both tabs completed)**
- **Full risk register**
- **Any other Supporting documents and evidence required (e.g. letter of support from Area Partnership**
- **Written evidence to the satisfaction of the Coast to Capital Accountable Body from a practicing solicitor / Counsel that the project is compliant with the EU state aid rules.**
- **VAT external advice if applicable.**