WHOLESALE BROADBAND ACCESS SERVICES IN JERSEY: PRICE REVIEW PROPOSALS

A report for the JCRA
Redacted version ✂

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EXECUTIVE SUMMARY

The JCRA has engaged Frontier Economics to support it in this review of the pricing of JT's wholesale broadband access services in Jersey. This report sets out the underlying analysis supporting the JCRA's proposals for this price review and should be read alongside the Draft Decision document issued by the JCRA for consultation. The consultation asks for comments on the analysis and the proposals set out in this report.

Fixed broadband services in Jersey are predominantly provided over fibre-based technology. The incumbent JT started investing in Fibre-to-the-Home (FTTH) infrastructure in 2012 and by 2018 achieved island-wide coverage. After completing its FTTH roll-out, JT has migrated its retail and wholesale customers to fibre and decommissioned its copper network.

In addition to JT, there are Other Licensed Operators (OLOs): Sure Jersey and Homenet who provide retail broadband services using JT's FTTH network[1]. Airtel – currently a mobile only operator – is planning to launch retail broadband services using wholesale access to JT's network in the next few months.

An overarching objective for this review, which flows from the Jersey Government policy, is to ensure the benefits of the JT fibre network are maximised though effective service-based competition, i.e. access seekers are able to provide differentiated retail services to consumers at a competitive price.

Based on the above overarching objective and wider considerations, the key objectives of this wholesale price review are:

- **Enabling retail competition in the market**, by ensuring wholesale products allow access seekers to compete effectively and to provide a choice of retail products for consumers;
- **Achieving cost based prices,** ensuring that wholesale and hence retail prices are not excessive while ensuring that JT is able to recover its efficiently incurred costs and to earn an appropriate rate of return on its investment;
- **Maximising take-up** of broadband services on the fibre network; and

Reflecting these objectives, the overall scope of the work is to:

1) Assess the appropriate set of regulated wholesale broadband products to be offered by JT to access seekers;
2) Assess the appropriate regulatory cost-orientated pricing regime for the wholesale products; and
3) Provide a recommendation on the appropriate level of prices for wholesale broadband products, using an appropriate cost model where required.

[1] Homenet also provides services using its WiMax and FTTH networks, although its FTTH network has limited coverage.

The appropriate set of wholesale broadband products to price regulate

There are two types of wholesale access products currently provided in the market:

- Wholesale access products with pre-defined download speeds (500Mb/s and 1 Gb/s) and pre-defined contention ratios. Previously, lower speed products were available, with download speeds of 50 Mb/s, 100Mb/s and 250Mb/s. However, these were gradually replaced with the current higher-speed products.
- The recently introduced bitstream product, which allows OLOs to offer differentiated retail products as they can self-manage their customers' needs in relation to speed (up to 1 Gb/s), contention and quality of service.

As part of this review, we needed to establish what wholesale products need to be price regulated to enable OLOs to provide differentiated broadband services to their customers.

Based on OLO's responses to an information request we conclude demand is focused on bitstream and there is potential demand for lower speed broadband services in Jersey. This demand can be served using the existing bitstream product as it is sufficiently flexible and allows OLOs to determine the speed of retail broadband services they want to offer to their customers. Therefore, we do not propose the JCRA require JT to introduce any additional wholesale products with pre-defined speeds.

However, for the existing bitstream product, we consider the possibility of an alternative charging structure, which would be more conducive to product differentiation (discussed below).

Our proposed regulatory approach

In principle, there are two potential approaches to regulating the price of access to JT's network:

- **Cost orientation**. Under this approach, wholesale prices are set on the basis of the cost of providing the service. It ensures that operators can cover costs that are efficiently incurred and receive an appropriate return on their investment.
- **Ex-ante margin squeeze test (MSQ).** Under this approach, the wholesale price is not regulated directly. However, there is an assessment whether access seekers can profitably replicate the retail broadband offers of the SMP operator, given the level of wholesale prices charged by the SMP operator.

We consider that, given the circumstances in the fixed broadband market in Jersey, it is appropriate for the JCRA to set wholesale access prices based on cost-orientation. This is due to the following considerations:

- **The Jersey Government's objective is to maximise the use of JT's network rather than to promote infrastructure-based competition** – as discussed earlier, the Jersey Government's objective is to promote service-based rather than infrastructure-based competition. In light of that, it is appropriate to set regulated prices in a way that allows JT to recover its

efficiently incurred costs and to earn an appropriate rate of return, rather than to incentivise access seekers to invest in their own fibre networks. This is best achieved through setting cost-oriented wholesale prices.

- **The lack of external price constraints** – there are no alternative fixed broadband products in Jersey (e.g. alternative fibre or cable networks) that would act as an effective constraint on JT's pricing of its fibre products.[2]
- **The demand and the cost of JT's network are predicable** – JT has already achieved island-wide coverage and its FTTH network is fully established. Demand for its network has been broadly stable since all JT's customers (both retail and wholesale) have been migrated to fibre. Moreover, as the network is already built and operational for several years, build costs are known and future maintenance costs are predictable.

Further, we discuss the most appropriate approach to implementing cost-orientation. We conclude that a 'top-down' approach is more appropriate than a 'bottom-up' approach, given the market characteristics (JT's FTTH network is well-established) and given that a top-down model requires fewer resources to implement so is proportionate to the small size of the jurisdiction.

We propose the JCRA set cost-oriented wholesale prices for JT's bitstream product for the years 2021 - 2025. Using a five year charge control period is consistent with EC recommendations and wider best practice.

Proposed wholesale prices for the bitstream product

We consider two potential approaches to structuring the cost-oriented wholesale bitstream prices:

- A fixed fee – this approach is similar to the approach currently implemented in Jersey. It implies that OLOs pay a uniform price per customer irrespective of their customers' data usage or the speed of broadband services they are offered;
- A 'two-part' tariff – this is an alternative approach. Under this approach, the wholesale charge consists of a fixed fee (which is the same across all customers) and a variable component based on customers' busy hour (BH) usage.

The second approach implies that OLOs would face different wholesale charges depending on the speed they offer to their retail customers: lower charges for lower-speed products (as lower speeds would imply lower BH usage) and higher charges for higher speed products. This approach is considered as it could better support retail differentiation by OLOs.

The two approaches are mutually exclusive, and each has its strengths and weaknesses (these are discussed in detail in the main body of the report). We have

[2] If JT's wholesale prices are set based on cost-orientation, there is no need to further impose an ex-ante margin squeeze obligation. This is because the risk of a margin squeeze under cost-oriented wholesale pricing is low. While the ex-ante margin squeeze is not needed going forward, the JCRA would continue to have the power under competition law to investigate whether JT engages in margin squeeze on an ex-post basis.

included both approaches in order to better understand stakeholders' preferences through the JCRA consultation process.

JT's bitstream service under the "fixed fee" pricing structure

The bitstream price is currently set at £20.15 per month (excluding GST). A wholesale line rental (WLR) is also required, which is currently set at £11.10 per month. Therefore, the total wholesale charge required to provide a service to retail customers is currently £31.25 per month.

In modelling the fixed fee, we retain the split between the WLR and the additional bitstream price in order to maintain the consistency with the existing pricing structure. Assuming that the WLR charge remains at the current £11.10/month price over the price control period, the cost-based bitstream prices and the overall wholesale charges (WLR + bitstream price) for the period 2021-2025 are presented in Figure 1 below.

Figure 1 Estimated wholesale rental unit cost for JT's Bitstream service: 2021-2025

		2021	2022	2023	2024	2025
WLR	£ / BB sub / month	11.10	11.10	11.10	11.10	11.10
Additional bitstream price	£ / BB sub / month	✂	✂	✂	✂	✂
Total bitstream charge (inclusive of WLR)	**£ / BB sub / month**	✂	✂	✂	✂	✂

Source: Frontier

The total wholesale charge (including WLR) for 2021 is estimated at £✂/month, reducing to £✂/month in 2025. The reduction over time reflects two overarching trends: (1) a reduction in annual costs for wholesale broadband services and (2) an expected increase in the number of broadband subscribers, which means these costs are recovered over a larger customer base.[3]

JT's bitstream service under the "two-part tariff"

The table below summarises the estimated fixed fee and busy hour usage charges under the two-part tariff pricing structure, for the years 2021-2025.

[3] The broadband subscriber base is expected to grow by 1.5%/year over the period, consistent with historical growth.

Figure 2 Estimated fixed fee and busy hour usage charge under the "two-part tariff" pricing structure: 2021-2025

		2021	2022	2023	2024	2025
Bitstream charge - fixed fee (inclusive of WLR)	£ / BB sub / month	✂	✂	✂	✂	✂
Bitstream charge - busy hour usage charge	£ / BH Mbps in the month	✂	✂	✂	✂	✂

Source: Frontier

In 2021 the estimated fixed fee is £✂/subscriber/month, with a busy hour usage charge of £✂/busy hour Mbps. These decline over time, with a fixed fee and busy hour usage charge of £✂ and £✂ respectively in 2025.

- The decline in both fees reflects the same trends driving the reduction in the bitstream price under the "fixed fee", i.e. the reduction in capital and operating costs and the expected increase in broadband subscribers over time.
- The busy hour usage charge falls more significantly than the fixed fee element over time, driven by the expected growth in busy hour usage for each subscriber over time.

In practice, the actual bitstream charge that would be paid by OLOs would depend on the actual busy our usage across their broadband base in the given month. This will be driven by the actual range of product speeds that they offer, the mix of their base across these products, and the actual usage profile of those customers.

The figure below sets out the total "fixed fee + usage charge" that an OLO would pay on a per subscriber basis in 2021, if all of its customers were on a given product speed and the busy hour usage of those customers reflects the usage profile that has been assumed in cost model.

- An OLO with all customers on the 1Gbps product would pay a total price per subscriber of £✂/month (£✂ + £✂ usage charge), larger than the charge of £✂/subscriber/month under the "fixed fee" pricing structure.
- On the other hand, an OLO with all customers on a 50Mbps product would pay a lower price of £✂/month (£✂ + £✂usage charge).

Figure 3 "Total" bitstream charge per subscriber under the "two-part tariff" – by product speed: 2021

✂

Source: Frontier

1 INTRODUCTION AND CONTEXT

In this section of the report, we first set out our understanding the current state of the fixed broadband market in Jersey, at the retail and wholesale level. We then formulate the overarching objectives of this wholesale price review, based on the Jersey Government's objectives. We conclude this section by outlining the scope of this report and its structure.

1.1 Fixed broadband market in Jersey

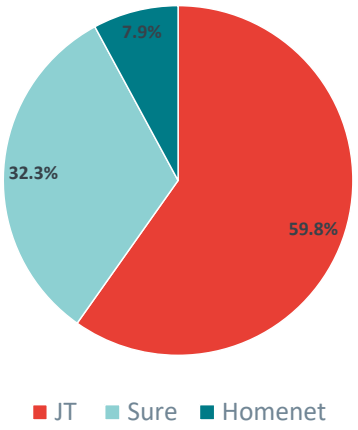
1.1.1 Retail market

Fixed broadband services in Jersey are predominantly provided over fibre-based technology. The incumbent JT started to invest in Fibre-to-the-Home (FTTH) infrastructure in 2012 and by 2018 achieved island-wide coverage. After completing its FTTH roll-out, JT has migrated its retail and wholesale customers to fibre and decommissioned its copper network. In 2019, JT's retail market share was 59.8%.[4]

In addition to JT, there are two other fixed broadband operators in Jersey: Sure Jersey and Homenet. They provide retail broadband services using wholesale access to JT's FTTH network. Homenet also provides services using its WiMax and FTTH networks, although its FTTH network has limited coverage. In 2019, Sure's market share was 32.3% and Homenet's market was 7.9%.[5] Airtel – currently a mobile only operator – is planning to launch retail broadband services using wholesale access to JT's network in the next few months.

Figure 4 below shows the market share by number of subscribers in 2019.

Figure 4 Fixed broadband market shares by number of subscribers in 2019



Source: Telecommunications Statistics and Market Report 2019

[4] Market shares sourced from the Telecommunications Statistics and Market Report 2019.

[5] Ibid

Figure 5 below provides an overview of the retail plans available to broadband customers in Jersey. Generally, there are two types of plans - with download speeds of 500Mb/s or 1Gb/s maximum, which correspond to the wholesale access products available in the market.[6] JT's plans have data caps, ranging between 20GB and 300GB, while Sure offers unlimited broadband plans. Monthly prices for these plans start at £44 for packages with 500 Mb/s download speed and increase to £78-81 for packages with 1 Gb/s speed.

Homenet's packages are significantly cheaper - £26. However, it is not clear whether they are comparable to other offers in terms of speed and availability.

Figure 5 Overview of fixed broadband plans

Operator	Download speed	Data allowance (8am-midnight)	Price (excl GST)
JT	500 Mb/s	20 GB	£44
	500 Mb/s	100 GB	£49
	1 Gb/s	300 GB	£81
Sure	500 Mb/s	Unlimited	£45.74
	1 Gb/s	Unlimited	£78
Homenet	unclear	Unlimited	£26.24

Source: Frontier Economics, based on the information provided on the operators' websites (as of 04/11/2020)
Note: Triple play services combining broadband, mobile and landline were not considered.

In March 2020, in response to the Covid-19 pandemic, all customers on the JT network had their speed boosted to symmetrical 1Gb/s at no extra cost.[7]

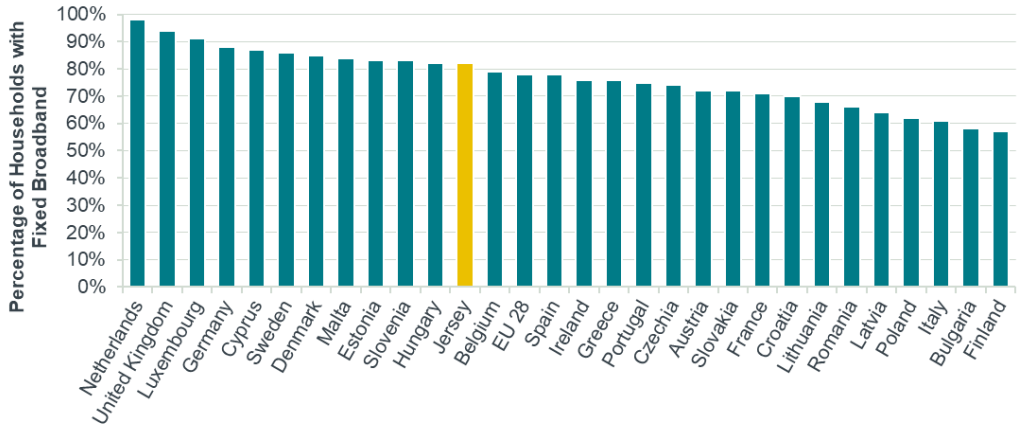
Fixed broadband take-up

In 2019, fixed broadband penetration in Jersey was slightly higher than in the EU on average (82% in Jersey vs. 78% in the EU on average). However, eleven countries in the EU have higher fixed broadband penetration. Some of these countries have lower incomes than Jersey (Hungary, Estonia) or more challenging topography (Sweden, Denmark).

6 We discuss the wholesale products in more detail in Section 1.2 below.

7 https://www.ispreview.co.uk/index.php/2020/03/covid-19-everyone-on-jersey-to-get-1gbps-broadband-upgrade.html

Figure 6 Percentage of households with a fixed broadband subscription, 2019



Source: EU data from Eurostat. Jersey data calculated based on 1) fixed line subscriptions data from the Telecommunications Statistics and Market Report 2019; 2) number of households estimated as the population forecast for 2019 divided by the average number of persons per dwelling in the 2011 Jersey census.

It appears that affordability may be one reason for a relatively modest take-up of fixed broadband services in Jersey, as according to the 2019 Jersey Opinions and Lifestyle Survey, 29% of the households without fixed broadband connection said they could not afford it. There may also be substitution with mobile broadband.

We further observe that in other markets, consumers tend to have a choice between slower cheaper products and faster more expensive products. For example, in the UK, TalkTalk charges start at £23.50 per month (download speed of 38Mb/s) and increase to £32 (download speed of 150Mb/s). Vodafone charges £21.50 per month for products with download speed of 63 Mb/s, etc. Higher speeds are available in areas where BT has invested in FTTH, and range between £40 and £60 per month.[8] This range of choice, may be one of the factors that support higher take-up of fixed broadband in the UK than in than in Jersey - at c.93%.

1.1.2 Wholesale market

In January 2019, the Channel Islands Competition and Regulatory Authority (CICRA), the predecessor of the JCRA, published its final decision on the "Market review: Market Definition and SMP findings". In this decision, JT was designated as an operator with Significant Market Power (SMP) in the market for:

> *"Wholesale access to the Internet at a fixed location using an access network based on fibre or cable or using the 4G and ultimately 5G wireless access network via a fixed device in the whole Bailiwick of Jersey."*[9]

As set out in its Telecommunications License, JT is obliged to provide access to its network to access seekers. When access is requested, this provision should

[8] https://www.ispreview.co.uk/index.php/2020/03/isp-bt-prices-new-uk-gigabit-and-full-fibre-broadband-plans.html

[9] https://www.gcra.gg/media/597964/broadband-market-market-review-final-decision.pdf

occur "*as soon as reasonably practicable and shall be provided on fair and reasonable terms, conditions and charges (…)".*[10]

More specifically, JT is required to offer access to its fibre active wholesale products, while access to its passive infrastructure is not required.

JT currently provides two types of wholesale broadband services to access seekers: wholesale broadband access services and bitstream.

Wholesale Broadband Services

These services provide access seekers with pre-defined download and upload speed options, with specific contention ratios. There are currently 3 standard and 2 superior wholesale access products available (summarised in Figure 7 below).

Figure 7 Overview of wholesale broadband services

Product type	Download speed	Upload speed	Contention	Price (exlc GST)
Standard	500 Mb/s	50 Mb/s	40:1	£20.50
Standard	500 Mb/s	500 Mb/s	40:1	£36.75
Standard	1000 Mb/s	100 Mb/s	40:1	£52.92
Superior	500 Mb/s	50 Mb/s	10:1	£29.76
Superior	1000 Mb/s	100 Mb/s	10:1	£198.99

Source: JT Wholesale Broadband Agreement, Charges

In addition, OLOs are also required to pay £11.10 per month as a Wholesale Line Rental (WLR) charge. This charge applies equally to all customers, irrespective of whether they purchase 'voice only', 'broadband only' or voice and broadband together.[11]

Previously, JT provided wholesale access products with lower download speeds (50 Mb/s and 100 Mb/s). However, in the course of 2018 and 2019, JT increased the download speeds to 250 Mb/s and 500 Mb/s, and more recently to 500 Mb/s and 1 Gb/s.

Bitstream

In 2020, a new bitstream product was introduced with the maximum download speed of 1 Gb/s. This product allows OLOs to offer differentiated retail products as they can self-manage their customers' needs in relation to speed, contention and quality of service. The service is currently priced at £20.15 per month (excluding GST).[12] As above, a wholesale line rental is also required, which is currently set at £11.10 per month.

The current bitstream price is an interim price. In February 2020 the JCRA issued a Final Notice which set out a price for the service, set by reference to a cost model.

[10] https://www.jcra.je/media/597633/t1248gj-revised-jt-licence.pdf

[11] In addition to the monthly charges, access seekers may incur certain one-off charges: connection charge of £15.72; change of bandwidth charge of £8.88; and take-over charge of £15.72.

[12] In addition to the monthly charge, non-recurring charges include: move of Broadband or Bitstream service with telephone service move to new premises - £15.72; move of Broadband or Bitstream service if requested after telephone service move to new premises have been completed - £15.72; change of billing / service details when telephone number is changed - £8.88; speed change - £8.88.

However, this Notice was appealed by JT. The appeal was subsequently withdrawn in June 2020 and the current interim price introduced, subject to this price review.

CP Interconnection services

In addition to the wholesale products described above access seekers need to purchase CP interconnection services, which provide a connection between JT's and access seekers' networks.

Current regulation of JT's wholesale products

As set out above, there is an obligation on JT to provide access to its network on fair and reasonable terms. There is also an obligation to ensure that there is no margin squeeze, i.e. that the margin between its retail and wholesale price is sufficient for access seekers to cover their downstream costs and to compete with JT in the retail market[13].

We note in June 2020, the JCRA fined JT for failing to maintain the appropriate downstream margin for fixed line broadband products and had previously directed JT to adjust its wholesale and retail prices.[14]

1.2 Overarching objectives for the price review

An overarching objective of the price review is to ensure that the pricing of wholesale access to JT's fibre network is regulated in a way that contributes to achieving the Jersey Government's telecoms objectives. These are set out in the Telecoms Strategy for Jersey and in the Telecoms Action Plan.[15]

In particular, the Jersey Government wants to ensure that the benefits of the fibre network are maximised though effective service-based competition, i.e. access seekers are able to provide differentiated retail services to consumers at a competitive price:

> *"The benefits of fibre must be complemented by proportionate regulation so that all telecoms operators can offer retail services to customers that enable effective competition in the market, enabling as many residents as possible to access the service they require at efficient costs".*[16]

In line with this objective, the Strategy Action Plan makes the following recommendation:

> "*CICRA/JCRA should ensure that JT supplies other operators with wholesale access to the Gigabit network on a fair, reasonable and non-discriminatory (FRAND) basis, and that wholesale access seekers get*

[13] JT's Licence Condition 34

[14] JCRA, Contravention of licence condition 34 – financial penalty

[15] https://www.gov.je/Industry/TelecomsStrategy/Pages/index.aspx

[16] https://www.gov.je/Industry/TelecomsStrategy/Pages/JerseyTelecomsStrategyActionPlan.aspx

access to wholesale products, which allow access seekers to compete based on differentiated retail services."[17]

Based on the above, the key objectives of this wholesale price review are:

- **Enabling competition in the market**, by ensuring wholesale products allow access seekers to compete effectively and to provide a choice of retail products for consumers;
- **Achieving competitive prices,** ensuring that wholesale and hence retail prices are not excessive;
- **Maximising take-up** of broadband services on the fibre network;
- **Incentivising JT to invest** by ensuring that JT is able to recover its efficiently incurred costs and to earn an appropriate rate of return on its investment.

We note that, unlike in some other jurisdictions in the EU, promoting network competition is not a policy objective. Instead, the Telecoms Strategy document states: "*On balance, encouraging network competition … is unlikely to be efficient or commercially feasible*."

It further recommends to "*promote retail competition (not network competition) as the most effective way of delivering the benefits of next generation connectivity to consumers and businesses*."

1.3 Scope of this review

The JCRA has engaged Frontier to support it in carrying out the price review of wholesale broadband access services in Jersey. Consistent with the Information Note issued by the JCRA[18], the overall scope of the work is to:

1) Assess the appropriate set of JT wholesale broadband products to be price regulated.
2) Assess the appropriate regulatory pricing regime, including the need for cost-orientated pricing for the wholesale products.
3) Provide a recommendation on the appropriate level of prices for wholesale broadband products, using an appropriate cost model where required. This would primarily focus on the monthly rental prices.

Any recommendation on proposed regulation should follow international best practice, while recognising the need for a proportionate and pragmatic approach, tailored to Jersey.

We have also drawn on the views of relevant stakeholders that have been engaged during the development of the review. These views have been gathered through workshops with key stakeholders, and through information requests sent to both JT and access seekers.

The remainder of this report sets out the findings of our review.

[17] Jersey Telecoms Strategy Action Plan, https://www.gov.je/Industry/TelecomsStrategy/Pages/FinalOxeraReportOnTelecomsStrategyForJersey.aspx#anchor-0

[18] JCRA, Wholesale broadband access services: price review, Information Note

- Section 2 sets out our assessment of the appropriate set of wholesale broadband products in Jersey.
- Section 3 then provides our assessment of the appropriate regulatory pricing approach for these wholesale broadband products.
- Section 4 outlines our assessment of the appropriate monthly rental prices for the wholesale broadband products, and the specification of the costing model that has been used to inform these prices.
- Section 5 then provides our assessment of the pricing of JT's CP Interconnection Services.

2 THE APPROPRIATE SET OF WHOLESALE BROADBAND PRODUCTS IN JERSEY

In this section we discuss what wholesale products best enable OLOs to provide differentiated broadband services to their customers, considering both the technical differences between the products and future OLO demand.

2.1 Our assessment of the required set of wholesale broadband products

It is important to establish what wholesale products are needed to enable OLOs to provide differentiated broadband services to their customers. There are two types of wholesale access products currently provided:

- Wholesale access products with pre-defined download speeds (500Mb/s and 1 Gb/s) and pre-defined contention ratios. Previously, lower speed products were available, with download speeds of 50 Mb/s, 100Mb/s and 250Mb/s. However, these were gradually replaced with the current higher-speed products.
- The recently introduced bitstream product, which provides flexibility for OLOs to determine the speed they want to offer to their customers (up to 1 Gb/s).

We understand that before the bitstream product was introduced, Sure requested JT to re-introduce lower speed wholesale access products, with download speeds of 50Mb/s and 100Mb/s at a lower price. The JCRA consulted on this issue and recommended to re-introduce these two products.[19]

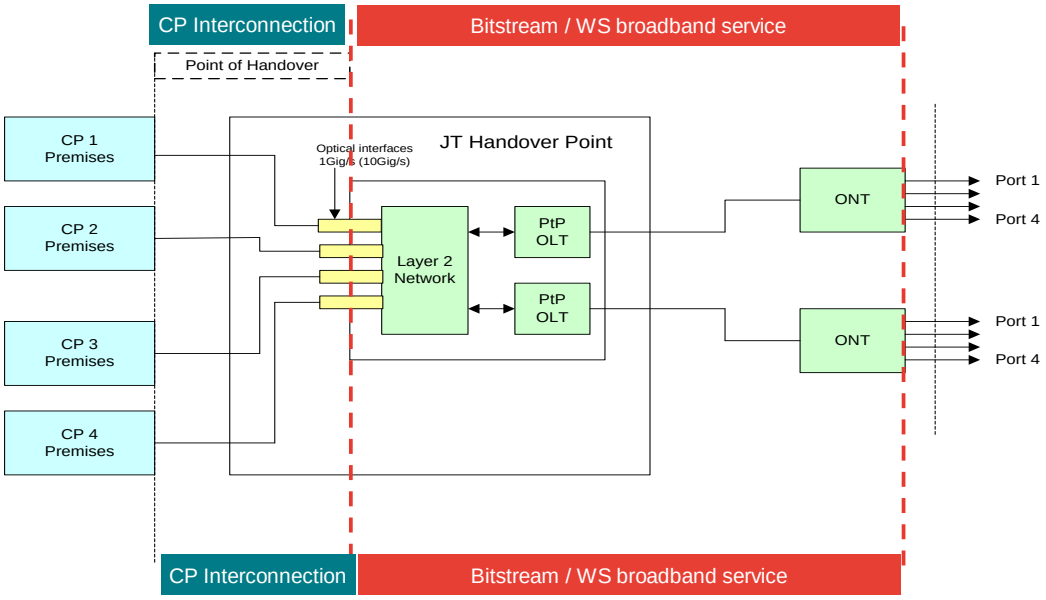
In the intervening period, however, bitstream was introduced and there was the boost in broadband speeds in response to the Covid-19 pandemic (noted above on page 10). These changes made the re-introduction of the lower speed wholesale services less urgent. Therefore the Initial Notice was withdrawn and the issue of how to support lower speed services has instead been considered in this review.

Technical differences between the products

In order to understand technical differences between the two types of products and OLOs' demand for them, we have issued data requests to JT and to OLOs. From the information provided by JT, we understand that both products (i.e. the wholesale broadband services and the bitstream services) utilise the same elements of JT's network and, therefore, from the network usage perspective, they are effectively identical. This is illustrated by Figure 8 below.

[19] WHOLESALE BROADBAND SERVICES – 50 AND 100 MBPS, https://www.jcra.je/media/598119/t1453gj-50-and-100mbps-broadband-access-final-decision.pdf

Figure 8 A diagrammatic representation of the network elements associated with the provision of Bitstream and W/s BB access products



Source: JT

The key differences between the two types of the wholesale access products are the speed and contention ratios. While the wholesale broadband services have fixed speeds (currently 500 Mb/s and 1 Gb/s) and fixed contention ratios (40:1 and 10:1), the bitstream product allows OLOs to define speeds (up to 1Gb/s) and contention ratios.

Demand for different wholesale access products

In order to assess demand for different types of wholesale access products, we asked OLOs to provide information on:

- The types of wholesale access services they are currently using; and
- whether they have demand for lower speed wholesale broadband products (i.e. speeds below 500Mbps).

Based on the OLOs' responses we understand that they are currently using/ planning to use the bitstream product. For example, Sure states[20]:

> "*Our preference, now that the bitstream service has been successfully launched, is for all of our customers to have their retail service underpinned by bitstream, rather than JT's wholesale broadband service*"
>
> *"Sure's preference would be to use a lower priced Bitstream product to achieve differentiation in the market, due to the greater control that this gives Sure as a service provider."*

Similarly, Homenet states: "✂".

[20] Sure's response to Frontier's data request

Airtel has expressed an interest in lower speed wholesale access products, ✂. In particular, Airtel stated:

"✂"

Further, Airtel stated:

"✂"

Our assessment

Overall, the bitstream product is sufficiently flexible at a technical level to allow OLOs to provide differentiated services at the retail level and is more flexible than a set of wholesale access broadband products with pre-defined speeds.

For example, the bitstream product allows OLO A to provide services with a download speed of 200 Mb/s, while OLO B might choose to provide retail services with a download speed of 250Mb/s. Moreover, OLOs can change the speed of their offerings over time, in line with consumer demand.

On the other hand, a set of wholesale broadband products with pre-defined speeds does not have the same flexibility. OLOs would need to request JT to change the speed of their offerings. Moreover, a product with a particular speed that an OLO might want, might not be provided by JT.

This assessment is also supported by OLO responses to the information request, with OLO's focusing on the bitstream product.

Therefore, we do not propose to require JT to provide additional wholesale access products with pre-defined speeds. We consider that if the bitstream product is priced appropriately, it should provide OLOs the flexibility to offer differentiated services at the retail level.

However, we acknowledge that if the price of the bitstream product does not vary by speed/ data usage, i.e. if OLOs are charged the same price for the bitstream service, irrespective of whether they provide 1Gb/s services to their customers or 100 Mb/s speed, there is less scope for differentiation with OLOs having little incentive to offer lower speed services at a lower cost. An alternative charging structure for the bitstream product, which will be more conducive to product differentiation is discussed in Section 4.1.

2.2 Recommendation

In light of the above, we do not propose JCRA require JT to introduce any additional wholesale products with pre-defined speeds. However, we consider the possibility of an alternative charging structure for the bitstream product, which will be more conducive to product differentiation. This is discussed in detail in Section 4.1.

For the avoidance of doubt, in the context of this price review, we do not propose JCRA set regulated prices for the existing wholesale products with 500Mb/s and 1 Gb/s download speed. As explained above, these products are effectively becoming redundant, i.e. no longer demanded by OLOs. In light of this, setting the regulated price for these products is not required.

3 APPROPRIATE REGULATORY PRICING APPROACH

In this section, we first assess whether wholesale access to JT's network should be regulated based on cost-orientation or based on an ex-ante margin squeeze test. Based on our considerations, we propose JCRA set prices based on cost orientation and then go on to discuss the most appropriate approach to implementing this and over what time period.

3.1 Cost orientation vs. margin squeeze test

In principle, there are two approaches to regulating price of wholesale access products: 1) an approach based on cost-orientation and 2) an approach based on an ex-ante margin squeeze test.[21] More specifically:

- **Cost orientation**. Under this approach, wholesale prices are set on the basis of the cost of providing the service. It ensures that operators can cover costs that are efficiently incurred and receive an appropriate return on their invested capital.
- **Ex-ante margin squeeze test.** Under this approach, the wholesale price is not regulated directly. However, there is an assessment whether access seekers can profitably replicate the retail broadband offers of the SMP operator, given the level of wholesale prices charged by the SMP operator. In other words, this approach tests whether the margin between the wholesale and retail price is sufficient for access seekers to compete.

It is worth noting that the two approaches are different insofar as they aim to restrict different types of abusive behaviours.

- An ex-ante margin squeeze test aims to restrict the vertically integrated operator's ability to foreclose its downstream competitors by increasing its wholesale prices and/or decreasing retail prices to a point where it is no longer profitable for alternative operators to participate. Therefore, the margin squeeze test aims to ensure that the gap between wholesale and retail prices is large enough for rival retailers to recover their retail costs plus a reasonable rate of return.
- Cost orientation restricts excessive wholesale pricing by setting prices as close as possible the costs of provision including a reasonable return on investment. This is the outcome that would be expected in an effectively competitive market.

3.1.1 The EC recommendations

While it does not apply in Jersey, the EC recommendations on regulated access to Next Generation Access (NGA) networks provide a useful starting point and precedent for considering the appropriate approach to adopt at this price review.

[21] Both these approaches are set out in the EC Recommendations in 2010.

The EC recommends that when establishing the most appropriate approach to wholesale regulation

"*NRAs should consider whether duplication of the relevant NGA access infrastructure is economically feasible and efficient. Where this is not the case, the overriding aim is to create a genuine level playing field between the downstream arm of the SMP operator and alternative network operators*". [emphasis added]

This is best achieved by imposing cost orientation. Indeed, the EC recommends that *"NRAs should in principle impose cost orientation on mandated wholesale broadband access products … taking into account differences in bandwidth and quality of the various wholesale offer."*[22]

However, the EC also recognises that if there is significant demand uncertainty, pricing flexibility at the wholesale level may be needed to promote further network investment. It its 2013 recommendation, the EC states:

"*Due to current demand uncertainty regarding the provision of very-high speed broadband services it is important in order to promote efficient investment and innovation … to allow those operators investing in NGA networks a certain degree of pricing flexibility to test price points and conduct appropriate penetration pricing*".[23]

If cost orientation is not put in place, the EC further recommends that an ex-ante margin squeeze is appropriate: *"In the absence of cost orientation NRAs should monitor the SMP operator's pricing behaviour by applying a properly specified margin-squeeze test."*[24]

It is worth noting that if wholesale prices are set based on cost-orientation, the risk of a margin squeeze is greatly reduced. Indeed, if wholesale prices are regulated at cost, a margin squeeze implies that an SMP operator charges retail prices below cost, foregoing profits. JT would be still subject to ex-post competition enforcement further mitigating nay risk of margin squeeze.

3.1.2 Considerations in determining the appropriate pricing approach

In line with the EC recommendations, when deciding whether to implement cost-orientated wholesale pricing or a margin squeeze obligation, regulators take into account several key considerations. These include:

- ***Whether there is an objective to facilitate additional network roll-out and/ or to promote network-based competition***, i.e. to incentivise other operators and potential new entrants to invest in their own fibre networks. - If this is the case, cost-based pricing may be less appropriate as it constrains wholesale returns and risks disincentivising further network roll out and network competition.

[22] Ibid, para 35

[23] The EC recommendation on consistent non-discrimination and costing methodologies to promote competition and enhance the broadband investment environment 2013, para 49.

[24] The EC recommendations on regulated access to Next Generation Access (NGA) networks (2010), para 36

- ***The level of predictability of wholesale costs*** – When setting cost-oriented wholesale access prices, regulators need information on demand for these wholesale services and on the cost of building and maintaining the network in order to determine prices. If future demand and costs are uncertain, there is a risk that cost-based pricing could lead to under-recovery or over-recovery of costs by the SMP operator. If there is a risk that SMP operator is unable to recover its efficiently incurred costs, its incentives to invest will be reduced.
- ***The existence of external retail price constraints –*** Regulators also take into account whether there is a price constraint resulting from existing or future infrastructure based competition or cost-oriented legacy wholesale access prices (e.g. copper base services), which act as a constraint on SMP operators' ability to set excessively high prices for next generation access. For example, if there are cable operators or alternative fibre providers competing with the SMP operator in some areas, this would reduce SMP operators' ability to set excessively high prices at the retail level. Similarly, if the SMP operator continues to provide legacy (copper-based) products, which are regulated at cost, it would also act as a constraint on the SMP operators' pricing of its fibre products (as long as customers see these products as sufficiently close substitutes).

3.1.3 Our assessment

Given the specific circumstances of the Jersey market and the Jersey Government's objectives, we consider that it is appropriate to set JT's wholesale prices based on cost-orientation. As a result of that, the ex-ante margin squeeze test, which is currently in place, can be removed.

Cost-oriented pricing for JT is appropriate.

We consider that, given the circumstances in the fixed broadband market in Jersey, it is appropriate to set wholesale access prices based on cost-orientation. This is due to the following considerations:

- **The demand and the cost of JT's network are predicable.** – JT has already achieved island-wide coverage and its FTTH network is fully established. Demand for its network is relatively predictable since all JT's customers (both retail and wholesale) have been migrated to fibre. Moreover, as the network is already built and operational for several years, build costs are known and future maintenance costs are predictable.
- **The Jersey Government's objective is to maximise the use of JT's network rather than to promote infrastructure-based competition** – as explained in Section 1.2 above, the Jersey Government's objective is to promote service-based rather than infrastructure-based competition.

  In light of that, it is appropriate to set regulated prices in a way that allows JT to recover its efficiently incurred costs and to earn an appropriate rate of return, rather than to incentivise access seekers to invest in their own fibre networks. This is achieved through setting cost-oriented wholesale prices.
- **The lack of external price constraints** – As discussed above, NRAs are more likely to allow an SMP operator flexibility to set wholesale prices subject to an

ex-ante margin squeeze test, if there are external price constraints, e.g. alternative high-speed broadband products (e.g. broadband products provided over cable networks) or regulated wholesale products provided over legacy copper networks. However, in Jersey, these constraints do not apply. Indeed, JT has decommissioned its copper network and therefore, there are no alternative regulated wholesale products, which could act as a constraint on JT's pricing of its fibre products.[25] Moreover, alternative infrastructure providers do not provide an effective constraint.[26]

In light of the above, we recommend that JCRA set JT's wholesale prices on cost-orientation principles.

Ex-ante margin squeeze obligation on JT is no longer required.

If JT's wholesale prices are set based on cost-orientation, we recommend that there is no need for the JCRA to further impose an ex-ante margin squeeze obligation. This is because the risk of a margin squeeze under cost-oriented wholesale pricing is significantly reduced.

Indeed, the most likely "mechanism" for a vertically integrated operator to engage in a margin squeeze is by increasing its wholesale prices rather than reducing its retail prices. However, with cost-oriented pricing this mechanism is removed, as JT loses the ability to increase wholesale prices.

In the UK, Ofcom allowed Openreach flexibility to set its wholesale prices during the early stages of the FTTC network deployment, but introduced an ex-ante margin squeeze test. However, when this approach was changed to cost-orientation, the ex-ante margin squeeze test was been removed and our proposed approach is consistent with this.

While the ex-ante margin squeeze is not needed going forward, the JCRA has the power under competition law to investigate whether JT engages in margin squeeze on an ex-post basis. This will help ensure compliance and provides the JCRA with the ability to investigate potential margin squeeze behaviours without a formal ex-ante test.

3.2 Implementing cost-orientation

3.2.1 Top-down vs. bottom-up approach

There are two overarching approaches that can be used to develop a cost model:

1. A "top-down" approach. This models the existing network of the operator. Under this approach the cost-based price would reflect the actual costs incurred by the operator in building and maintaining that network.
2. A "bottom-up" approach. This models the network of a hypothetical operator. This involves forecasting the efficient level of demand, and identify the specific network assets that would need to be deployed by an operator to service that demand. The objective of this approach is to proxy the "competitive level" of

[25] This rules out an "anchor product" approach, such as the approach previously adopted by Ofcom

[26] For example we understand that Homenet has rolled out fibre to a limited number of premises. However, its infrastructure is too limited to provide a constraint on JT's pricing.

prices, which would then send the appropriate "build-or-buy" signals to alternative operators that are choosing to either buy wholesale access or build a parallel network themselves. It can also provide an independent view of the efficient level of costs if there is a reason to believe the operator is inefficient.

The EC recommends that for replicable assets (i.e. those assets that can be duplicated in an economically efficient way), a bottom-up long-run incremental cost plus (BU LRIC+) approach is more appropriate. This is to incentivise alternative operators to invest in their own networks where it is efficient to do so.[27]

For non-replicable assets (e.g. ducts), the EC recommends to use the top-down Regulatory Asset Base (RAB) approach. This involves valuing assets at current costs, taking into consideration the elapsed economic life of the assets and the costs that were already recovered by the operator. This is to avoid an over-recovery of costs. Indeed, an over-recovery of costs would not be justified in this case as the build option is not economically feasible for these non-replicable assets.[28]

3.2.2 Our proposed approach to modelling cost-oriented wholesale prices

For the purposes of informing the cost-based bitstream prices we have chosen to develop a "top-down" model. This is for the following key reasons:

- **This is consistent with the JCRA's and Jersey Government telecoms market objectives** - The key objectives are to incentivise JT to continue investing in its network by ensuring it is able to recover its efficiently incurred costs, and to enable competition in the market through allowing wholesale access to JT's network rather than through encouraging network competition. This means that the overarching focus of the bitstream pricing is on recovery of JT's actual costs, which is more straightforward to achieve under the top-down approach.
- **JT's FTTH network is already well-established, having already been deployed to the vast majority of households in Jersey** - This means that there is data available to implement a top-down approach, i.e. the costs incurred by JT in deploying and maintaining the network, and the demand on that network.
- **A "top-down" model is proportionate to the small size of the jurisdiction** - Developing a bottom-up model is a complex exercise and requires a significant amount of input data and assumptions on demand and costs. A top-down model on the other hand is simpler and can draw on information that JT already collects as part of its annual regulatory accounting exercises and previous analysis of broadband pricing.

However, we recognise that the use of data on JT's actual costs may overestimate efficient level of costs if some of these costs have not been incurred efficiently. We have therefore made adjustments to JT's cost data where appropriate, and taken

[27] This methodology calculates the current costs on a forward-looking basis that an efficient network operator would incur to build a modern network today.

[28] The EC recommendation 2013

into account expected efficiency gains when considering how JT's costs will evolve over time.[29]

We use the current value of JT's assets as it is consistent with the approach taken in Jersey previously. We also draw a distinction between replicable and non-replicable assets:

- For replicable assets (e.g. fibre cables), capital charges are calculated based on principles of economic depreciation/ tilted annuity. This implies that annualised capital costs for an asset should reflect changes in demand and in replacement costs, i.e. to be higher in periods when there is higher demand for a given asset and/ or when the replacement cost is higher, and to be lower in periods when demand for the asset and/or its replacement costs are lower. This is consistent with the approach typically taken in bottom-up LRIC models.
- For non-replicable assets, we implement a RAB-style approach, with the initial value of the asset set at the accounting value, net of the accumulated depreciation, and adjusted by a historical price trend. The forward-looking depreciation charges reflect changes in replacement costs and corresponding adjustments for holding gains and losses. The latter is needed to ensure that an increase (or decrease) in the value of the asset over time does not lead to over/under-recovery of investments through the depreciation charge.[30]

3.2.3 The time period considered

We recommend to set cost-oriented wholesale prices for JT's bitstream product for the years 2021 to 2025. Using a five year charge control period is consistent with the EC recommendations. The EU Directive states:

> *"in the interest of greater stability and predictability of regulatory measures, the maximum period allowed between market analyses should be extended from three to five years, provided market changes in the intervening period do not require a new analysis."*[31]

Similarly, Ofcom has recently extended the duration of its market reviews from three to five years in order "*to provide longer-term regulatory certainty and support for competitive investment in fibre networks*"[32] and similar considerations apply to Jersey.

29 Our proposed efficiency adjustments are discussed in detail in Annex A.

30 More details on the implementation of cost annualisation for replicable and non-replicable assets are provided in Annex A.

31 DIRECTIVE (EU) 2018/1972 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 establishing the European Electronic Communications Code

32 See for example Ofcom (2019) "Promoting competition and investment in fibre networks Consultation" https://www.ofcom.org.uk/__data/assets/pdf_file/0018/142533/consultation-promoting-competition-investment-approach-remedies.pdf

4 COST-ORIENTATED PRICES FOR WHOLESALE BROADBAND PRODUCTS

In this section, we first set out two, mutually exclusive, potential approaches to setting cost-oriented wholesale bitstream prices, we then set out our approach to cost modelling in both cases and the assumptions we have made. We conclude the section with recommended bitstream prices under the two approaches. Further details of the modelling approach adopted are provided in Annex A.

4.1 Potential pricing structures

4.1.1 A fixed fee vs. a two part tariff

As set out in Section 1.2, ensuring that wholesale products allow access seekers to compete effectively and to provide a choice of retail products for consumers is one of Jersey Government's key objectives.

Further, in Section 2, we explain that OLOs' preference is to use the bitstream product as it allows them to offer differentiated speeds for their customers. However, we are concerned that although OLOs have the technical ability to control the speed and to offer retail products with different speeds to their customers, the incentives for them to do so may be limited by the current pricing structure, which does not vary by speed or by data usage.[33]

In order to incentivise OLOs to offer lower speed products (alongside higher speed products) and therefore to provide a wider choice for customers, we consider an alternative pricing structure – a "two-part tariff". This pricing structure implies that the bitstream price consists of two charges:

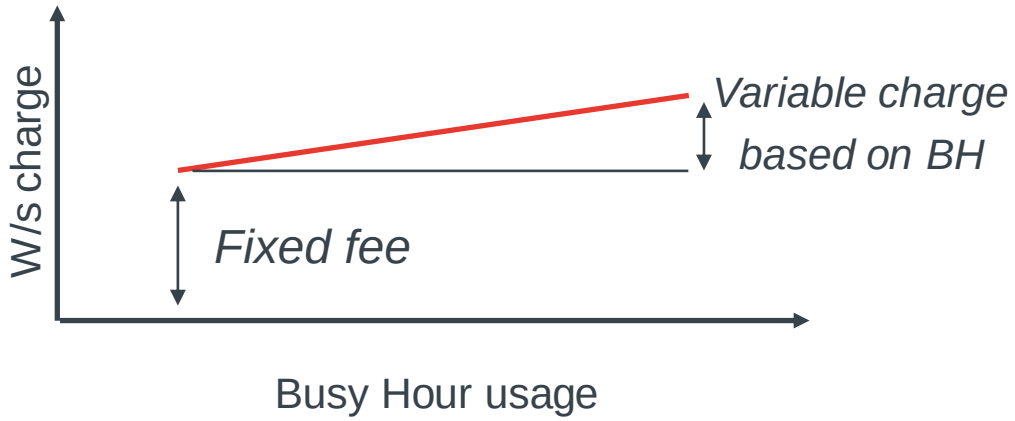
- **A fixed fee** - which is uniform across all customers and does not vary by speed or by data usage; and
- **A variable fee** - which is based on data usage during busy hours (BH usage).[34]

Under this alternative pricing structure, OLOs would pay a lower wholesale charge if they offer lower speed retail products and a higher charge if they offer higher speed products. Indeed, lower speeds would imply lower data usage during the busy hour period and would result in a lower charge overall (this is illustrated by the diagram below).

[33] If OLOs are charged the same price for the bitstream product, irrespective of whether they provide a 1Gb/s service to their retail customers or a 100 Mb/s speed service, their incentives to offer low speed products are likely to be reduced.

[34] We propose to use BH usage rather than data usage overall because BH usage is the key driver of JT's network costs (as networks are dimensioned based on the volume of traffic in peak hours) and because BH usage varies by speed. Busy hour usage is defined as the total combined data usage of an OLO's customers in the busiest hour of a given period (e.g. a month), i.e. the hour where total usage is highest. In practice, this is done by measuring usage in each hour of the month, and ranking the hours from highest to lowest usage. It is common for "outlier" hours with the highest usage to be discarded for the basis of calculating the wholesale charges (for example taking the usage in the 95th percentile of hours after the hours have been ranked).

Figure 9 An illustration of the two-part tariff



Source: Frontier

Our proposal is to define wholesale charges in terms of BH data usage rather than in terms of pre-defined speeds, as it preserves OLOs' ability to set speeds based on their customers' demand (rather than to rely on a set of wholesale products with pre-defined speeds). OLOs are also able to offer different speeds depending on the types of customers they want to target. This would further promote retail product-differentiation and potential competition.

4.1.2 Our assessment of the two approaches

We note that both approaches have their strengths and weaknesses.

A fixed fee

The advantages of this approach are two-fold:

1) it is consistent with the current approach and straightforward to implement; and
2) it minimises the risks of over- or under-recovery of JT's costs, as the wholesale charge does not vary by customer, the main uncertainty is associated with the total number of broadband customers on JT's network. However, given that JT does not face network competition, the total number of customers on JT's network is fairly predictable.

However, as noted above this approach does not incentivise product differentiation and is likely to focus competition on higher speed products. Therefore, a fixed fee may not be fully consistent with Jersey Government's objective to encourage product differentiation at the retail level.

A two-part tariff

The benefit of this approach is that it provides stronger incentives for OLOs to offer differentiated retail products, including lower speed products. It is also expected to increase the fixed broadband take-up, as lower speed products are likely to be more affordable than higher speed products.

However, this approach also has disadvantages:

- It is more complex to implement. In particular, OLOs would need to decide how to price their retail products (differentiated by speed) in light of the wholesale charges, which are based on BH usage.
- Further, the risk of under- or over-recover of JT's costs is greater than under a fixed fee. This is because it is not known at this stage how many customers would migrate to lower speed products, albeit, this can be informed by the evidence from other jurisdictions (which us a similar approach) and by OLOs' projections of customer demand for different speeds.
- Increased data reporting requirements: both JT and OLOs would need to record busy hour usage and ensure that OLOs are billed appropriately.

Given both approaches have their strengths and weaknesses, we have implemented both. Below, we discuss the modelling assumptions used in each case and provide the results for both for the fixed fee and the two-part tariff.

4.2 Specification of the cost model

4.2.1 Scope and methodological approach

The purpose of the cost model is to estimate cost-based monthly rental prices for JT's bitstream service for the years 2021 to 2025, under both the "fixed fee" and "two-part tariff" pricing structures.

The overarching objective of the prices is to ensure JT recovers an appropriate level of costs, including an appropriate return on investment, from the provision of the bitstream service. This is the cost that allows JT to recover the overall cost of its FTTH network, taking into account that a share of those costs should also be recovered from other wholesale broadband charges (such as connection charges), and the other services that JT provides over this network infrastructure (i.e. retail broadband, fixed voice, and leased line services).

As explained in Section 3, we have developed a "top-down" cost model to inform the bitstream prices. This uses the actual costs incurred by JT, but adjusts these for efficiencies that JT would expect to make over the period. These costs include the cost of the FTTH network, including the annualised capital costs and operating costs of the network, as well as other direct costs associated with providing fixed wholesale services (such as JT's wholesaling team). They also include a share of other costs which support the provision of both FTTH and non-FTTH services (such as JT's building stock and billing systems).

The table below summarises the methodological approach that underpins the cost model, including the specific scope of the model. The chosen approach accounts for international best practice in the development of cost models, including the recommended costing approach outlined in the EC's 2013 Costing Recommendation. It has however been tailored to the specific market situation in Jersey, and reflects the JCRA's objective to ensure a proportionate approach. Further detail on each element of the approach is provided in Annex A.

Figure 10 Scope and methodological approach underpinning the cost model

Element	Approach	Rationale
Model scope		
Service scope	W/s broadband (Bitstream), and all other JT services provided using the same network / cost elements (fixed voice, leased lines, retail and mobile services)	The costs for a given network element / cost category should be recovered from all services driving those costs.
Network scope	The existing JT network as of June 2020 *(doesn't reflect the additional cost of serving new-build premises, or demand from these premises)*	▪ Not material: expected Jersey household growth of ~1%/yr. ▪ Conservative: expected cost of serving a new household is similar if not smaller than for an existing household. ▪ Proportionate: Avoids adding significant complexity to the model
Costs considered	Network capital costs (FTTH access network, Core network links and routers, voice platform costs, buildings) Network operating costs (repair and maintenance, service platform costs). Wholesaling costs (JT wholesaling team, operating / billing systems). Does not include potential cost of replacing assets from High Risk Vendors (HRVs)	Reflects costs incurred to support the provision of wholesale broadband services. Cost of HRV equipment not included: ▪ Unclear at this stage what the magnitude of these costs will be (e.g. depends on which HRV equipment needs to be replaced). ▪ It's a policy decision whether these costs should be recovered from broadband customers or from Government. ▪ Can be reflected in prices w/s prices at a later date when decisions on HRVs have been made.
Time period for pricing	2021-2025	Reflects chosen price control period
Key methodological choices		
Price base	Nominal *(cost trends are inclusive of expected inflation)*	Model prices for each year of the price control period without the need to adjust for inflation each year
Model type and cost standard	Top-down Fully Allocated Costs (FAC)	▪ Ensure JT recovers its actual incurred costs. ▪ Proportionate given the small size of the jurisdiction ▪ Consistent with approach to setting the interim bitstream price.
Asset valuation method	Current Cost Accounting (CCA)	▪ Consistent with precedent in Jersey. ▪ Consistent with EC 2013 Costing Recommendation.
Capital cost annualisation approach	Non-replicable assets (ducts, buildings): RAB-type approach, with holding gain (HG) adjustment Replicable assets (fibre cables, ONTs etc): tilted annuity reflecting asset price and demand trends.	▪ Consistent with EC 2013 Costing Recommendation, but proportionate to Jersey. ▪ HG adjustment ensure changes in duct / building asset value doesn't lead to over-recovery of costs. ▪ Tilted annuity approach ensures more costs are recovered in periods when demand and replacement costs are higher.

Element	Approach	Rationale
Efficiency adjustments	Operating cost efficiencies *(Opex trends reflect inflation and efficiency gains)*	▪ Ensures JT recovers only its efficiently-incurred costs. ▪ Consistent with approach in other jurisdictions (e.g. Ofcom in UK)

4.2.2 Proposed prices under the "Fixed fee" structure

Key calculation steps and inputs

Under the "fixed fee" pricing structure, the bitstream rental price is a single monthly price per broadband subscriber in each year over 2021-2025.

To calculate this price, the model therefore calculates a monthly cost per broadband subscriber for the provision of wholesale broadband services. This is done by identifying the appropriate costs to be recovered from these services in each year, and then dividing this cost by the estimated number of broadband subscribers in those years.

Currently, an OLO taking the bitstream product must also take Wholesale Line Rental (WLR)[35], and it is not proposed to change this structure as part of this review. Consistent with this, the new estimated bitstream price is an additional charge on top of the WLR charge set in such a way that the combined WLR and bitstream charges reflect the unit cost of providing wholesale broadband services.

In practice, the model follows four main steps to estimate the monthly bitstream unit cost:

1. The model estimates demand on the JT FTTH network in each year over the modelling period. This includes the number of broadband subscribers on the JT FTTH network, but also fixed voice subscribers.
2. The annual capital and operating costs relating to the FTTH network are then calculated.
3. The share of the costs to be recovered from wholesale fixed broadband rental services is then estimated.
4. The bitstream unit costs are then calculated by dividing the costs in each year from step 3 with the forecast broadband subscriber base from step 1, converting this into a monthly value, and subtracting the expected WLR charge.

The set of key inputs and assumptions used in these calculations is outlined in full Annex A of this report, as well as the evidence to support this. The value of the inputs has been informed by data provided by JT, as well as by OLOs in response to information requests for this review. Where relevant and applicable to Jersey, we have also drawn on data from the UK and other justifications, in particular assumptions used in cost models developed to inform wholesale broadband prices.

[35] The WLR applies both to voice only customers and to broadband customers.

The estimated bitstream charge

Assuming that the WLR charge remains at the current £11.10/month price over the price control period, the bitstream prices and the overall wholesale rental charges (WLR + bitstream price) under the "fixed fee" pricing structure for the period 2021-2025 are presented in Figure 11 below.

The total charge for 2021 is estimated at £✂/month, reducing to £✂/month in 2025. The reduction over time reflects two overarching trends[36]:

- An expected reduction in annual costs for wholesale broadband services, including a reduction in both capital and operating costs over time.
- An expected increase in the number of broadband subscribers, which means these costs are recovered over a larger base of customers.

Figure 11 Estimated wholesale rental unit cost for JT's Bitstream service: 2021-2025

		2021	2022	2023	2024	2025
WLR	£ / BB sub / month	11.10	11.10	11.10	11.10	11.10
Additional bitstream price	£ / BB sub / month	✂	✂	✂	✂	✂
Total bitstream charge (inclusive of WLR)	**£ / BB sub / month**	✂	✂	✂	✂	✂

Source: Frontier

4.2.3 Proposed prices under the "two-part tariff" structure

Key calculation steps and inputs

As explained in Section 4.1, the bitstream price paid by OLOs under this pricing structure would consist of two sets of charges:

- a monthly "fixed fee" paid per broadband subscriber, and
- a "busy hour usage charge", paid per Mbps of busy hour usage in the month across all the OLOs broadband subscribers.

To inform these charges, the model uses the same annual cost of wholesale broadband rental services as calculated in step 3 of the calculations under the "fixed fee" pricing structure. However, the estimated cost-based price for each of the two price elements is then calculated as follows:

- First, the costs in each year are split between those to be recovered from the fixed fee element and those from the busy hour usage fee element, and converted into monthly values.

[36] These are explained in more detail in Annex A of this report.

- The fixed fee element of the charge is then calculated in the same way as under the "fixed fee" pricing structure, by dividing the allocated "fixed fee" costs by the forecast number of broadband subscribers, and netting off the expected WLR charge.
- The busy hour usage charge element is calculated by dividing the total "usage fee" costs by the forecast total monthly busy hour usage in a month across all fixed broadband subscribers.

Given these steps, there are two key additional inputs into the "two-part tariff" calculations: the estimated monthly busy hour usage from fixed broadband customers over 2021-2025, and the percentage of costs to be recovered from the busy hour usage versus fixed fee element of the charge.

Regarding the busy hour usage, this was calculated by multiplying the forecast number of broadband subscribers with the expected monthly busy hour usage per subscriber over 2021-2025. The latter takes into account the expected mix of subscribers across different retail product (download) speeds; and the expected busy hour usage for customers on each of these product speeds (busy hour usage is expected to be larger on products with faster speeds).

Regarding the proportion of costs to be recovered through the busy hour usage charge versus the fixed fee element, 30% of costs was chosen to be recovered through the busy hour usage charge. This ensures that the majority of JT's costs are still recovered through the fixed fee, whilst still ensuring that retailers offering lower speed (lower usage) products will face a materially lower total bitstream charge. This provides certainty to JT over the recovery of their costs (through a large share of costs being recovered through the fixed fee), whist still providing strong incentives for retailers to offer a greater range of product speeds to end customers.[37]

Estimated "fixed fee" and "busy hour usage charges"

The table below summarises the estimated fixed fee and busy hour usage charges under the two-part tariff pricing structure, for the years 2021-2025.

In 2021 the estimated fixed fee is £[redacted]/subscriber/month inclusive of WLR, with a busy hour usage charge of £[redacted]/busy hour Mbps. These decline over time, with a fixed fee and busy hour usage charge of £[redacted] and £[redacted] respectively in 2025.

- The decline in both fees reflects the same trends driving the reduction in the bitstream price under the "fixed fee" pricing structure i.e. the reduction in capital and operating costs and the expected increase in broadband subscribers over time.
- The busy hour usage charge falls more significantly than the fixed fee element over time, driven by the expected growth in busy hour usage for each subscriber over time.[38]

[37] The 30% value was informed by the "gradient" in the wholesale FTTH access prices across product speeds in Ireland. More details on this and on the calculation of busy hour usage is provided in Annex A of this report.

[38] Monthly busy hour usage per subscriber is forecast to increase from 2.5Mbps per subscriber in 2021 to 8.1Mbps in 2025. More details on this are again provided in Annex A.

Figure 12 Estimated fixed fee and busy hour usage charge under the "two-part tariff" pricing structure: 2021-2025

		2021	2022	2023	2024	2025
WLR charge	£ / BB sub / month	11.10	11.10	11.10	11.10	11.10
Additional Bitstream charge - fixed fee	£ / BB sub / month	✂	✂	✂	✂	✂
Total fixed fee (inclusive of WLR)	**£ / BB sub / month**	✂	✂	✂	✂	✂
Bitstream charge - busy hour usage charge	£ / BH Mbps in the month	✂	✂	✂	✂	✂

Source: Frontier

How these charges translate to total bitstream charges in practice

In practice, the actual bitstream charge that would be paid by OLOs would depend on the actual busy our usage across their broadband base in the given month. This will be driven by the actual range of product speeds that they offer, the mix of their base across these products, and the actual usage profile of those customers.

The figure below sets out the total "fixed fee + usage charge" that an OLO would pay on a per subscriber basis in 2021, if all of its customers were on a given product speed and the busy hour usage of those customers reflects the assumed usage profile in the model.

- An OLO with all customers on the 1Gbps product would pay a total price per subscriber of £✂/month (£✂ + £✂ usage charge), larger than the charge of £✂/subscriber/month under the "fixed fee" pricing structure.
- On the other hand, an OLO with all customers on a 50Mbps product would pay a lower price of £✂/month (£✂ + £✂ usage charge).

Figure 13 "Total" bitstream charge per subscriber under the "two-part tariff" – by product speed: 2021

✂

Source: Frontier

5 ASSESSMENT OF OTHER CHARGES

In addition to the monthly rental price for the bitstream product, OLOs also face a range of other charges, which can be split into (i) one-off charges, such as connection charges and customer migration charges, and (ii) CP Broadband Interconnection charges. These are discussed below.

5.1 One-off charges

In addition to the monthly charges, OLOs may incur certain one-off charges, e.g. connection charge of £15.72; change of bandwidth charge of £8.88; and take-over charge of £15.72.

- Change of bandwidth charge - As OLOs transition from the wholesale access products with fixed speeds to the bitstream product, they will be able to control the speed of service they provide to their customers. This means that the "change of bandwidth" charge will no longer be needed.
- Connection and takeover charges - we understand that the JCRA previously assessed these charges in the context of Cable Wireless / JT dispute.[39] In light of that, the JCRA did not require us to review these charges at this stage.

5.2 CP Interconnect charges

In addition to the bitstream services, OLOs also acquire from JT CP Broadband Interconnect services. This is a form of leased lines, which connect JT's layer 2 aggregation network to OLOs' Point of Presence (PoP).[40]

JT offers a number of CP Broadband Interconnect Services with different bandwidth[41]. The prices of these services are set in line with prices of JT's existing wholesale leased line products (as set out in Figure 14 below). For example, JT currently charges £15,096 per annum for a 1Gbit/s fibre link and for a 1Gbit/s CP Interconnect product. Prices for JT's Interconnect products with higher bandwidth are set as: £15,096 * bandwidth^ n, where n=0.61264285.

[39] https://www.jcra.je/media/1739/t589-10-final-notice-proposed-determination-regarding-adsl-broadband-takeover-charges.pdf

[40] Based on JT's response to our data request, we understand that initially OLOs had to purchase a separate CP Broadband Interconnect Service for the wholesale broadband access products they used and for the bitstream product. However, this requirement has been subsequently removed from the wholesale broadband agreement.

[41] Section 1 of the document WBA v4.5 Charges 2020 (CG review)

Figure 14 Prices of JT's CP Interconnect services

Product Name	Speed	Wholesale price (Per annum)
1 Gb/s Fibre Lan Link	1 Gb/s	£15,096
2 Gb/s Fibre Channel	2 Gb/s	£24,144
4 Gb/s Fibre Channel	4 Gb/s	£34,988
1 Gb/s Fibre Broadband Interconnect	1 Gb/s	£15,096
2 Gb/s Fibre Broadband Interconnect	2 Gb/s	£24,144
4 Gb/s Fibre Broadband Interconnect	4 Gb/s	£34,988
6 Gb/s Fibre Broadband Interconnect	6 Gb/s	£45,247
8 Gb/s Fibre Broadband Interconnect	8 Gb/s	£53,968
10 Gb/s Fibre Broadband Interconnect	10 Gb/s	£61,873

Source: JT

Our assessment

We understand that the JCRA is in process of reviewing the Business Connectivity market in Jersey, focusing specifically on the price of leased lines. In its BCMR consultation, the JCRA states that:

"*Retail prices of leased lines on Jersey are high compared with comparator countries. For example, a 1 Gbps AI leased line on Jersey costs approximately twice the equivalent on Iceland and the Isle of Man. This differential is more pronounced when compared to the UK, where a wholesale 1 Gbps leased line costs 6 times less than a similar line on Jersey*."[42]

The JCRA's preliminary finding is that JT has SMP in the wholesale market for leased lines. It proposes to impose a price control for wholesale leased lines, with the main new intervention being to require JT to offer 'dark fibre'. It is expected that access to dark fibre will expose more of the value chain to competition, facilitate product and price innovation, enable greater carrier diversity and support more flexible mobile backhaul.[43]

Assuming that the dark fibre remedy is implemented, as recommended in the Consultation document, the price of leased lines is expected to decrease going forward. In light of that, it is important that JT reviews its prices of the CP Interconnect services and ensures that these prices are also reduced in line with the prices of leased line.

However, we recognise that the impact of the dark fibre remedy might take some time to materialise. Therefore, in order to protect OLOs from any potential price increases in the transition period, we recommend to introduce safeguard caps for the CP Interconnect products (with the caps set at the current level of prices).

[42] https://www.jcra.je/media/598280/t-012-business-connectivity-market-review-draft-decision.pdf

[43] Ibid

ANNEX A COSTING MODEL OVERVIEW

As noted in the main body of the report, we have developed a cost model to inform the cost-based monthly rental prices for JT's Bitstream service. The Bitstream rental price is defined as an additional charge on top of JT's Wholesale Line Rental (WLR) charge, which is charged to OLOs for broadband customers served using the Bitstream service. The estimated prices apply for the years 2021 to 2025, and have been calculated under the two pricing structures described in Section 4.1: the "fixed fee" structure (i.e. a single charge per broadband subscriber), and the "two-part tariff" structure (both a single charge per subscriber and an additional busy hour usage charge).

This annex provides a more detailed description of the cost model. In particular, this annex outlines the following:

- The methodological approach underpinning the cost model and the model scope. This includes the type of model that has been developed, and the set of costs considered in the model. The approach and scope is the same for the pricing under the fixed fee and two-part tariff pricing structures.
- The model calculation steps and key inputs. These are set out separately for each of the two pricing structures.

For each we provide the rationale and evidence for our choice, and outline how these have been implemented in practice.

A.1 Methodological approach underpinning the cost model

The overarching objective of the cost model is to ensure that the Bitstream rental price allows JT to recover an appropriate set of costs from the provision of the Bitstream service. This is the cost that allows JT to recover the total cost of providing services on its FTTH network, taking into account that a share of those costs should also be recovered from other wholesale broadband charges (such as connection charges), and the other services it provides over this network infrastructure (i.e. retail broadband, fixed voice, and leased line services).

In practice, the model calculates monthly unit costs for the provision of wholesale broadband rental services. This is done by identifying the appropriate annual capital and operating costs to be recovered from these services, and then dividing this by the relevant measure of demand. In the case of the "fixed fee" pricing structure, this is a single monthly cost per fixed broadband subscriber; in the case of the "two-part" tariff, this is both a cost per broadband subscriber (the "fixed fee" element), and a cost per unit of busy hour data consumption (in the case of the "busy hour usage charge" element).

In developing the model, there were five key methodological choices that had to be made:

- Model type;
- Cost standard;

- Asset valuation approach;
- Approach to annualising capital costs; and
- The price base for the model.

We discuss our chosen approach in each of these areas below. The specific implementation of the approaches is then explained in Section A.3.

A.1.1 Model type

There are two overarching approaches that can be used to develop a cost model:

1. A "top-down" approach, which considers the actual network of the operator. Under this approach the cost-based price would reflect the actual costs incurred by the operator in building and maintaining that network.
2. A "bottom-up" approach, which models the network of a hypothetical operator. This involves forecasting the efficient level of demand, and identifying the specific network assets that would need to be deployed by an operator to service that demand. The objective of this approach is to proxy the "competitive level" of prices, which would then send the appropriate "build-or-buy" signals to alternative operators that are choosing to either buy wholesale access or build a parallel network themselves. It can also provide an independent view of the efficient level of costs if there is a reason to believe the operator is inefficient.

For the purposes of informing the cost-based bitstream prices we have chosen to develop a "top-down" model. As explained in Section 3 of this report, this approach is consistent with the objectives for the review and the Jersey Government's Telecoms Action Plan, and is proportionate. It is also implementable, given detailed data on the cost of and demand on JT's FTTH network is available.

It is however important to ensure that the costs considered in the model reflect efficiently-incurred costs, and that the model leads to wholesale prices that are efficient. To reflect this:

- The cost trends within the model take account of efficiency gains that JT would expect to make over time.[44]; and
- The approach to annualising capital costs means that the implied profile of recovery of costs reflects the expected change in asset value and demand over time.

A.1.2 Cost standard

The cost standard defines the method of distributing costs between services. This is required because certain costs support the provision of multiple services. In general, there are three main sets of costs that need to be considered.

1. "Direct" costs. These are costs incurred purely for the delivery of an individual service (e.g. voice platform costs for the provision of fixed voice services).
2. Joint and common network costs. These are network costs that support the provision of a number of different services (e.g. duct and trenching in the JT access network);

[44] These efficiency gains are explained in more detail in Section A.3.2 of this annex.

3. “Corporate overheads” (or non-network common costs). These are costs that are not directly associated with the provision of an individual service (e.g. costs associated with the Chief Executive).

There are two main allocation methodologies that can be used to develop a cost model, which differ in how joint and common costs are allocated:

1. Fully Allocated Costs (FAC). This is based on the actual costs incurred by the regulated operator. Under this approach joint and common costs are allocated to each service using allocation keys.
2. Long Run Incremental Average Cost (LRIAC+). This sets the cost of a service equal to the change in the total “long run” cost resulting from a change in the demand to that service, with a portion of joint and common costs then added to this.

The relevant approach depends on the type of model that is implemented, with the FAC approach generally used under the top-down approach, and LRIAC+ used in bottom-up models.

As we have developed a top-down model, we have used the FAC cost standard. The specific approach to allocating costs between services in the model is outlined in Section A.3 below.

A.1.3 Asset valuation approach

There are again two main approaches to valuing assets in developing cost models:

1. Historical Cost Accounting (HCA). Under this approach the value of an asset is set equal to the original cost of the asset when it was purchased and deployed in the network.
2. Current Cost Accounting (CCA). Under this approach assets are valued at the replacement cost of the asset; this is the cost of purchasing the asset today. In top-down models, current costs can be estimated by inflating the historical value of assets to replacement costs based on historic trends in asset prices.

We value all assets on a CCA basis in the cost model, which consistent with the precedent in Jersey.

The specific implementation of this approach is explained in section A.3 below.

A.1.4 Capital cost annualisation approach

As outlined in Section 3 of this report, there are a number of different approaches that can be used to annualise capital costs. As explained in that section, we take a different approach for “non-replicable” and “replicable” assets:

1. For non-replicable assets, i.e. duct/trenching and buildings, we use a RAB-type approach where depreciation charges and asset valuation are based on an accounting approach adjusted to current costs by applying a price index. This ensures the recovery of costs for these long lived assets is consistent with the recovery of costs to date. Under this approach we also adjust the annualised costs for holding gains and losses, which result from changes in the value of these assets over time.
2. For replicable assets, we use an “economic depreciation” approach. We proxy this by using a tilted annuity approach, which “tilts” the recovery of costs based

on the expected trend in asset value over time and on the trends in demand. Given these assets were relatively recently installed this provides a more stable forward looking cost recovery profile that an approach based on accounting valuation and depreciation.

The application of these different approaches for non-replicable and replicable assets is consistent with the EC's 2013 Costing Recommendations. In addition:

- The adjustment for holding gains and losses under the RAB-type approach ensures that an increase (or decrease) in the value of the asset over time does not lead to over/under-recovery of investments.
- The application of both asset price and demand tilts under the titled annuity approach for replicable assets results in an efficient profile of cost recovery for these assets, as it ensures that more costs are recovered in periods when both demand and the replacement cost of the asset is higher.

The specific application of these approaches in practice is again explained in Section A.3 below.

A.1.5 Model price base

In developing costs models, forecasts can either be calculated on a nominal or real basis.

- When calculating costs on a nominal basis, the expected trends in capital and operating costs take into account expected inflation. This results in nominal cost-based prices i.e. prices that do not need to be adjusted for inflation over time.
- In contrast, when calculating costs on a real basis, costs trends do not account for inflation. In this case, the resulting estimated prices need to be adjusted for inflation over time.

We have modelled costs on a nominal basis within the cost model. This is a simpler approach, as it means the implemented prices do not need to be adjusted each year based on the inflation in that year.

Given this, and that we take consideration of potential cost efficiencies, this means that future trends in capital and operating costs reflect expected cost inflation net of expected efficiency gains.

A.2 Model scope

In addition to the overarching methodological approach, decisions also need to be made on the scope of the model.

Under a top-down modelling approach, the scope of the model covers two main areas.

1. Network scope, i.e. the network footprint that the model considers; and
2. Cost scope, i.e. the types of JT costs that are considered in the model.

These are considered in turn below.

A.2.1 Network scope

Although the JT FTTH network has been fully deployed, the footprint of the network will marginally expand over time. This is because the set of households and business premises in Jersey will grow over time, which will require JT to extend its network to these premises.

For the purposes of developing the cost model, we have chosen to model only the existing footprint of the JT network, i.e. we do not consider extensions to the network due to household or business premise growth over time. This impacts both the modelling of costs and demand in the cost model:

- Regarding costs, we do not estimate the additional capital investments needed by JT in order to extend its network to new-build premises, or additional operating costs that would be needed to serve and maintain that extension of the network. This means we only consider the capital costs associated with existing equipment in the JT network, and the operating costs associated with maintaining that network.
- Regarding demand, we only consider how the subscriber base will evolve within the current JT network footprint. In practice, this means that we exclude any growth in the subscriber base that would be generated from the take-up of services in new-build premises.[45]

In making this decision, we balanced the additional complexity that modelling new-build-premises would add to the model, with the benefits this would provide in terms of increases in model accuracy. Given that, we have taken this approach for three main reasons:

1. **The cost of serving an existing household is a reasonable proxy for the cost of serving a newly-built premise.** If anything, we would expect that the cost of serving a new premise to be lower relative to existing premises, as expect new premises to either be in densely-populated new developments, or on spare land along existing roads covered by JT's network.[46] Our approach is therefore, likely to be conservative, i.e. it results in a larger estimated cost-base price than if new-build premises where also considered in the model.
2. **The impact of modelling newly-build premises will be immaterial.** Even if the average cost of serving new-build premises was expected to be significantly different to that of existing premises, this would only have a material impact on the estimated cost-based prices if substantial growth in premises in Jersey is expected. However, premise growth is expected to be small in Jersey over the coming years. For example, the Jersey Government forecasts that the number if private households in the jurisdiction will grow by less than 1.5% per year up to 2025, representing only 3,400 new premises over the price control period (compared to the current base of 47k households)[47]. Modelling the cost of

[45] More details on how this is done in practice is again provided in Section A.3 below.

[46] In both cases, the amount of network equipment that would need to be deployed for each new premise would likely be smaller than the average amount of equipment currently serving existing premises.

[47] Jersey household projections 2016 release (projections under +1000 migration), see https://www.gov.je/SiteCollectionDocuments/Government%20and%20administration/R%20HouseholdProjections%2020161220%20SU.pdf

serving these new households would therefore have little impact on the overall accuracy of the model.

3. **The approach is proportionate to the size of the jurisdiction.** This is because explicitly modelling the cost of new-build premises would add significant complexity to the model. For example, modelling the cost of these premises on a "bottom-up" basis would require developing geo-spatial data on the expected location of new premises, and then estimating the specific volumes of new network equipment that would be needed to extend the network to these premises. Similarly, modelling this on a "top-down" basis would require applying "uplifts" to each of the network and non-network cost items considered in the model, which would needed to be informed by data on how costs would be expected to change due to the extension in the network footprint.[48]

A.2.2 Cost scope

The categories of costs included in the cost model represent all activities and assets that support the provision of services on JT's FTTH network. This includes costs that are specific to the provision of individual services, included fixed voice services.

Given the choice of a top-down modelling approach, the specific categories of costs in the model were based on the cost categories within JT's financial accounts. These cover:

- Network capital costs; and
- Network and non-network operating costs.

Regarding network capital costs, JT's accounts provide the Gross Book Value (GBV) and Net Book Value (NBV) for each category of assets in their fixed and mobile networks.[49] From this, we identified the specific asset categories that support the provision of FTTH services, as summarised in the table below. These include the assets in:

- JT's access network ,i.e. from the Optical Network Terminal (ONT) at the end users premise up to and including the Optical Distribution Frame (ODF) and Optical Line Terminals (OLTs) in JT's exchanges, including passive infrastructure (duct, trenching, manholes);
- JT's core and backhaul network, including core network links and routers as well as associated passive infrastructure;
- The "office building" asset class. We understand that this includes all of JT's buildings in Jersey, including its exchange buildings as well as office buildings holding JT's network and non-network staff; and
- Voice-specific costs i.e. JTs IMS voice platform

[48] The inputs and assumptions needed to implement either approach would also be difficult to inform using data from other countries, given that the dimensions of a network are inherently unique to the specific characteristics of that jurisdiction (e.g. the geographical characteristics of the jurisdiction).

[49] GBV represents the cumulative value of JTs assets as held in their accounts. The NBV is the gross value net of the amount of that gross value that has already been depreciated.

Figure 15 Capital cost categories considered in the cost model

Part of network	Asset categories considered
FTTH access network	■ ONT ■ Drop cable ■ Fibre cable ■ FTTH Access Shelf – ODF ■ FTTH Access Shelf - OLT
Core and backhaul network	■ Core Router ■ 10G Core Link
Other	■ Duct/Trench/Manhole/JB (covering passive infrastructure in both the access and core/backhaul network) ■ Office buildings ■ IMS Voice platform

Source: Frontier based on JT's accounts

Note: Asset category names reflect the names within JT's accounts

Regarding operating costs, JT's accounts also provide a breakdown of JT's network and non-network operating costs by specific cost categories. From this we again identified the categories that represent activities supporting the provision of FTTH services, which are summarised in the table below. These include:

- Network operating costs, include network repair and maintenance, power and cooling for equipment, and the on-going costs of JT's network platforms (e.g. its Cisco SMARTnet system); and
- Non-network operating costs, including the cost of JT's wholesale and regulatory team, and the cost of billing and operating systems including the JT wholesale product portal.

Figure 16 Operating cost categories considered in the cost model

Opex type	Opex categories considered
Network - platforms	■ Cisco TS FTTH (SMARTnet) ■ NETadmin TS ■ Genexis TS
Network - other	■ Repair and Maintenance ■ CPE Equipment / Software, Replacement of damaged / faulty units xx% p.a. ■ Power & Cooling
Non-Network	■ Wholesale on island and regulatory costs ■ IT - BSS&OSS ■ OSS, BSS & GIS

Source: Frontier based on JT's accounts

Note: Opex category names reflect the names within JT's accounts

We note that costs associated with JT "Customer Service" operating cost category have not been included in the model, on understanding that this solely reflects activities to support JT's own retail fixed and mobile customers.

- We understand that this cost category represents the cost of JT's customer support call centre in Jersey.

- However, we understand that OLO customer service issues are not dealt with directly by JT, but instead via the OLO. In particular, if an end customer of an OLO has a service issue, they would first would contact the OLO; if the OLO is unable to sort the issue (e.g. its relating to a network fault), the OLO would then contact JT in order to resolve it.[50]
- Our understanding is that support for OLOs is provided by JT's wholesale and regulatory team, and therefore that it's reasonable to assume that the cost of this support is already including the opex category "Wholesale on island and regulatory costs" within JT's accounts. This is supported by JT's description of the activities within this opex category, which includes *"liaising with other areas of the business to resolve OLO queries".*[51]

In the following sections we outline how the chosen scope and methodological approach has been implemented in practice, separate for the "fixed fee" and "two-part tariff" pricing structure. This provides an overview of the main calculations steps, and the key inputs and assumptions within those calculations.

Additional costs associated with "High Risk Vendors" (HRVs)

As part of the modelling we also considered the need to include potential additional costs associated with assets from "High Risk Vendors" (HRVs). These vendors are those that have been deemed to be a potential security risk by the UK National Cyber Security Centre (NCSC). We understand that the Government of Jersey had signalled an intent to align its approach to HRVs to that of the UK, which would effectively mean banning the use of equipment from HRVs. As we understand JT's network includes some HRV equipment, this ban may therefore require JT to strip out and replace this equipment with equipment from other vendors, which would result in JT incurring additional costs.

We have not included an estimate of these costs within the cost model for the following reasons:

- It is not possible to estimate with any degree of accuracy the additional costs that JT may incur as a result of any policy regarding HRVs, nor the timing of the incurrence of those costs. This is because the Government of Jersey has not yet confirmed its policy regarding HRV equipment, and as part of that, the scope on any ban on this equipment.
- Moreover, it is a policy decision whether these costs should be recovered from broadband customers (i.e. through prices charged to customers), or from Government (e.g. via a direct subsidy to JT). Only if it is decided that these costs should be recovered directly through broadband prices should these costs be included in the model.

Given this, a more prudent approach is to consider how these costs are accounted for when the relevant policy decisions are made.

[50] This process has been confirmed by JT in its responses to the JCRA's information request.

[51] Document "JT response to Frontier Qs 011220", responses to question 4a of Frontier's clarification questions dated 23rd November 2020.

A.3 Calculation steps and inputs – "fixed fee" pricing structure

As outlined above, under the "fixed fee" pricing structure the bitstream rental price is a single monthly price per broadband subscriber in each year over 2021-2025.

To inform this price, the model therefore calculates a monthly cost per broadband subscriber for the provision of wholesale broadband rental services. This is done by identifying the appropriate costs to be recovered from these services in each year, and then divides this by the estimated number of broadband subscribers in those years. As the bitstream price is an additional charge on top of the WLR charge, the expected WLR charge is then netted off the unit cost in order to determine the unit cost for bitstream. This ensures that the combined WLR and bitstream charges reflect the unit cost of providing wholesale broadband rental services.

Figure 17 Overview of the Bitstream unit cost calculation – "fixed fee" pricing structures

Source: Frontier

In practice, the model follows four main steps to estimate the monthly bitstream rental unit cost, as illustrated in the diagram below.

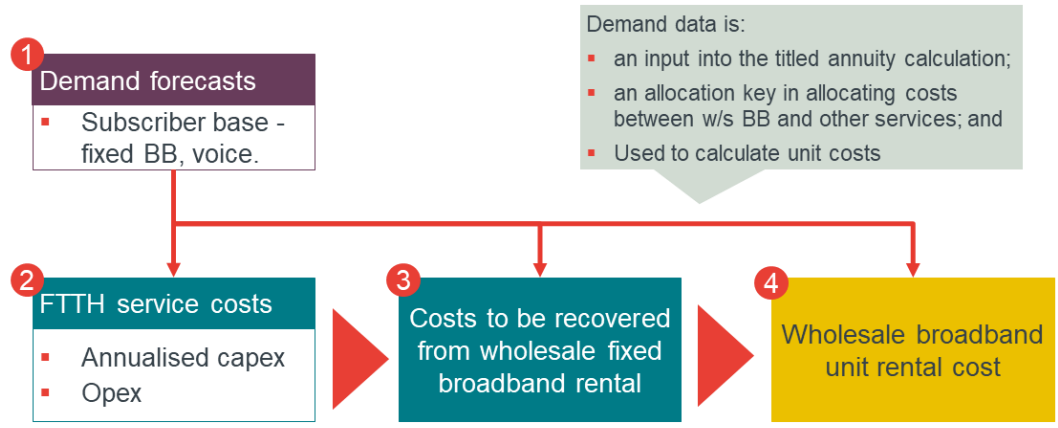
1. **First, the model estimates demand on the JT FTTH network in each year over the modelling period.** This includes the number of broadband subscribers on the JT FTTH network, but also fixed voice subscribers.[52] Subscriber numbers are estimated by applying subscriber growth assumptions to the current base of subscribers on the network.
2. **The annual capital and operating costs relating to the FTTH network are then calculated.** For these the model uses the capital and operating costs in JT's accounts as a starting point. For capital costs, the model takes the GBV and NBV of JT's network assets, and converts these to current costs based on the average age of these assets and historic asset price trends. These costs are then annualised using either the RAB-type or tilted annuity approach, depending on the asset. For operating costs, the opex in JT's accounts is forecast forward based on assumed operating cost trends.
3. **The share of these costs to be recovered from wholesale fixed broadband rental services is then estimated.** This is done by "stripping out" costs that will be recovered from other services and other elements of wholesale broadband charges. In particular, these keys strip out costs to be recovered

[52] Subscriber numbers for fixed voice are used as the basis of allocating costs to these services in Step 3.

from JT's mobile services, other JT fixed services such as wholesale voice only services and leased lines, and wholesale broadband connection charges.[53]

4. **The bitstream unit costs are then calculated.** This is done by calculating the monthly wholesale fixed broadband rental cost per subscriber, by dividing the costs in each year from step 3 with the forecast broadband subscriber base from step 1 and converting into a monthly value. The WLR charge is then subtracted from this to obtain the cost-based price for the bitstream service.

Figure 18 Key calculation steps in the costing model



Source: Frontier

More details on steps 1 to 3 of the calculations is provided below.

A.3.1 Estimation of JT's subscriber base

As noted above, the calculation of cost-based prices requires forecasts of two sets of subscribers on the JT FTTH network over 2021-2025.

- Fixed broadband subscribers, including broadband only subscribers and those taking both broadband and fixed voice services.[54]
- Fixed voice only subscribers. These are subscribers who only take a fixed voice service on the JT network.

The broadband subscriber forecasts are used in step 4 of the calculations to estimate the unit costs, whilst both the broadband and voice only forecasts inform the allocation keys in step 3 of the calculations.

The model generates these forecasts by first estimating the "starting base" broadband and voice only subscribers on the JT network as of 2020, and then forecasting these forward by applying subscriber growth rates. The table below summarises the estimated starting base and the forecasts over 2021-2025.

For the "starting base", the model uses the latest broadband and voice only subscriber data from JT (subscriber numbers as of June 2020). A subset of broadband subscribers are then "re-allocated" from broadband to the voice only

[53] OLOs face a separate charge for customer connections, so the costs recovered through that charge should also be stripped out to avoid "double-counting" of costs.

[54] We understand that currently, all customers taking a fixed broadband services also have a fixed voice services, meaning there are no broadband only subscribers.

base, to reflect that a small number (✂) of broadband customers took up JT's offer of free broadband services during the COVID pandemic. This offer is only temporary and ended in December 2020, so it is reasonable to expect that a subset of those on this offer would cancel their broadband service once the offer was complete and return to taking only the voice only service. We assume that ✂ of the ✂ subscribers would be expected to terminate their broadband service after December 2020, based on estimates provided by JT.

To develop the forecasts for 2021-2025, we first generate forecasts of broadband subscribers and the total number of access lines on the JT network (i.e. broadband plus voice only subscribers), by applying specific growth rates to these bases. The number of voice only lines is then estimated as the difference between these two values.[55] To inform the growth rates, we considered the expected change in subscriber numbers within the existing premises connected to the JT network, i.e. excluding any growth due to take-up in new-build premises.

- For fixed broadband subscriber, the model applies a growth rate of ✂. This rate reflects the broadband subscriber growth rate of November 2018 to November 2019 (✂), net of the expected annual growth in premises in Jersey over 2021-2025 (1.4%). The subscriber growth rate for 2019 was used in order to exclude any increase in the rate of take-up during the COVID pandemic, which we assume would not be sustained beyond 2020.[56] The expected premise growth is then netted off to further exclude any growth accounted for by take-up in new-build premises.[57] The expected growth rate reflects the State of Jersey's latest projections of private household growth for the period 2020-2025.[58] This results in an estimated fixed broadband base of ✂ by 2025, versus the starting base of ✂ in 2020.
- For total access lines, we assume that these will remain constant at 2020 levels until 2025. This is consistent with historical trends, where growth in fixed broadband subscribers on the JT network has offset the reduction in the number of voice only subscribers. This is a conservative assumption, as in general it is also reasonable to expect that the total number of access lines would at least remain stable over time.
- Together, this implies that the number of voice only subscriber on the JT network will fall by approximately 8.5% per year up to 2025, which is again consistent with historical trends in this base.

[55] This continues to assume that all broadband subscribers with continue to take a voice line over the price control period. This is a reasonable assumption, given the past purchasing behaviours in Jersey.

[56] This is a conservative assumption i.e. if anything underestimates the potential growth in broadband subscribers, as it possible that the pandemic will have a lasting impact on the behaviour of consumers.

[57] This is again conservative, as the approach implicitly assumes that all new premises would take up a broadband service from JT.

[58] Jersey household projections 2016 release (projections under +1000 migration), see https://www.gov.je/SiteCollectionDocuments/Government%20and%20administration/R%20HouseholdProjections%2020161220%20SU.pdf

Figure 19 Fixed broadband and voice only subscribers on the JT FTTH network – starting base and forecast over 2021-2025

	Starting base (2020)	2021	2022	2023	2024	2025
Fixed broadband *(including broadband and fixed voice bundles)*	✂	✂	✂	✂	✂	✂
Voice only	✂	✂	✂	✂	✂	✂
Total access lines (BB + voice only)	✂	✂	✂	✂	✂	✂

Source: Frontier analysis

A.3.2 Calculation of annual costs

Capital costs

The second key step in the model calculations is the calculation of annual capital and operating costs over 2021-2025. To calculate annualised capital costs, the model calculations follow two overarching steps:

1. The value of assets in JT's accounts are first inflated to calculate their value at current costs, and
2. They are then converted to annual costs using the appropriate annualisation approach.

The approach aims to be broadly consistent with the recommended approach in the EC's costing recommendations, but adjust this to be proportionate to the small size of Jersey. As noted above, we apply a different approach for "non-replicable" and "replicable" assets in JT's network, so we explain the specific approach for these two sets of assets separately below.

Approach for "non-replicable" assets

The "non-replicable" or "reusable" assets in JT's network are those in the asset categories "Duct/Trench/Manhole/JB" and "Office buildings".

As noted in Section 3, for these assets the EC's 2013 Costing Recommendation recommends the use of indexed "Regulatory Asset Base" (RAB) approach. This uses the value of the assets in an operators accounts as a starting point. In particular, the EC recommends that the approach be applied in the following way:

"the initial RAB… would be set at the regulatory accounting value, net of the accumulated depreciation at the time of calculation and indexed by an appropriate price index… The initial RAB would then be locked-in and rolled forward from one regulatory period to the next."[59]

We have implemented this approach in three main steps, based on the current GBV and NBV of the "Duct/Trench/Manhole/JB" and "Office buildings" asset classes in JT's accounts:

[59] Paragraphs 37 and 38, EC 2013 Costing Recommendation.

1. The starting Gross Replacement Cost (GRC) and Net Replacement Cost (NRC) of the assets is first calculated based on the current GBV and NBV of the assets inflated by a price index and an assumed average asset age.
2. The annualised capital cost in the opening year, consisting of depreciation, a return on capital employed and holding gains/losses is then calculated based on the starting GRC and NRC.
3. The annualised capital cost is then forecasted forward for the period 2021-2025, based on the estimated evolution in GRC and NRC for each asset over time.

To calculate the starting GRC and NRC, we used the closing GBV and NBV for these assets for the year ending 31st December 2019, which is the latest available data from JTs financial accounts. [60] These were then converted to GRC and NRC as of 31st December 2019, based on the average age of the assets at that time and the historical trends in the prices for these assets in Jersey. Both the average age and the historical asset price trends were informed by data provided by JT.

- For "Duct/Trench/Manhole/JB", the average age of the assets in this asset category as of December 2019 was six years, with the duct asset prices estimated to have increased by ✂ per year over this period. The GRC and NRC were therefore calculated by applying six years of inflation to the GBV and NBV at a ✂ inflation rate.
- For "Office buildings", we understand that these assets are already valued at current costs within JT's accounts, meaning the GBV and NBV already represent the GRC and NRC of the assets. No adjustment was therefore made for these assets.

From the GRC and NRC values, we then calculated the annual capital cost of the assets for 2019. This was done using a straight-line depreciation approach, consistent with the approach in JT's accounts. An adjustment is also made for holding gains and losses, resulting from expected changes in the value of the assets in future. The annual capital cost is therefore made up of three components, as shown in the formula below.

As shown in the formula, if the price of an asset is expected to increase over time, the holding gain/loss adjustment represents a downward adjustment to the annual charge. This is to reflect the fact that JT will benefit from the increase in the value of the asset over time (i.e. a holding gain). As explained in Section 3, this adjustment ensures that an increase (or decrease) in the value of the assets over time does not result in an over (under) recovery in costs.

Figure 20 Annual capital charge formula – "non-replicable" assets

$$\text{Annual charge} = \text{Annual depreciation} + \text{Capital charge} - \text{holding gain / loss adjustment}$$
$$= (\text{GRC/asset lifetime}) + (\text{NRC*WACC}) - (\text{NRC*\% annual future asset price trend})$$

Source: Frontier

Finally, the annual capital cost for 2019 was forecasted forward to estimate the appropriate annual capital cost for the years 2021-2025. To do this, the 2019

[60] For the NBV, we use the average NBV as of December 2019 and December 2018, to estimate the average NBV throughout the year (or Mean Capital Employed). This is because in calculating the annualisation of costs outlined below, the capital charge element should be calculated as the WACC multiplied by the MCE.

annual cost is indexed using the expected future changes in prices for each asset over time.

- This approach implicitly assumes that the GRC and NRC of each asset will also change over time in-line with the expected trend in the underlying asset prices.
- This is a reasonable approximation when a network is in a "steady state" i.e. when the footprint of a network remains the same, and investments are just made to replace existing assets in the network once they reach the end of their useful life. This is the case for JT, given the network scope that we have considered in the model i.e. we only model the costs of the existing JT network without any expansion due to premise growth.

Approach for "replicable" assets

All of the other asset categories considered in the model can be considered "replicable" assets.

As noted in Section 3, the EC recommends that the capital costs for these assets be calculated on a bottom-up basis, such that the investments reflect the replacement cost of the assets. Where this approach has been implemented in cost models developed by other European regulators, an "economic depreciation" approach is often used to annualise the investments.[61] The rationale for this approach is that it results in wholesale prices that are more efficient, as it results in a larger share of costs being recovered in periods when both the replacement cost for assets and the demand on the network are higher.[62]

First, we estimate the Gross Replacement Cost as of December 2019. This is calculated in the same way as for "non-replicable" assets, based on the average age and the historical trends in asset prices for each of the assets.

Second, annual capital costs are then calculated by applying a "tilted annuity" annualisation approach, with a "tilt" reflecting both the trends in asset prices and in fixed broadband demand.

- The standard annuity approach identifies a single annual charge which, if received in each year over the lifetime of the asset, would allow JT to recover the GRC of the asset plus the associated financing costs based on an appropriate WACC.
- The tilted annuity then applies a tilt to this single annual charge, so that the charge is larger in years when the replacement cost and demand for the asset is expected to be higher, and lower when replacement costs / demand is lower.

In practice, the annual charge for each asset in 2019 is first calculated using the tilted annuity formula, which uses the GRC of the asset and expected future trends in asset prices and fixed broadband demand. The annual charges for the years up to 2025 are then calculated by indexing the 2019 value based on the asset price and demand trends. The specific formulas for the calculation are set out below:

[61] For example, this approach was using the cost models developed by Ofcom to inform wholesale prices in their 2018 WLA and 2020 WFTMR Decisions.

[62] In practice, the economic depreciation approach creates a profit of cost recovery where the annual charge per unit of demand is the dame in real terms in each year over the lifetime of the asset.

Figure 21 Calculation of annual capital costs – "replicable" assets

$$Annual\ charge\ (2019) = GRC(2019)\ x\ \frac{WACC - p - d}{1 - \left(\frac{1 + p - d}{1 + WACC}\right)^{asset\ lifetime}}$$

$$Annual\ charge\ (2019 + t) = Annual\ charge\ (2019)\ x\ (1 + p + d)^{t}$$

Where:

- p = *annual % trend in asset price for the particular asset*
- d = *annual % trend in fixed broadband subscribers on the JT network*

Source: Frontier

Value of inputs in the calculations

As shown in the calculation steps above, there are six key sets of inputs that feed into the annual capital cost calculations for "non-replicable" and "replicable" assets:

- The GBV and NBV of JT assets as of December 2019 for each asset category;
- Average age of assets as of December 2019 for each asset category;
- The expected economic lifetime for assets in each asset category;
- Annual % change in asset prices for each asset category, both historic and the expected future trends;
- Annual % growth in the fixed broadband base on the JT network; and
- The appropriate WACC for JT.

As noted above, the data on GBV and NBV for each asset is taken from JT's latest accounts. The annual % growth in fixed broadband subscribers is assumed to be 1.5%, consistent with the estimated trends used to inform the broadband subscriber forecasts.

Regarding the average age, expected lifetime, and trend in asset prices for each asset category, the table below summarises the values used in the cost model.

- As noted in the approach for non-replicable assets above, the average age and the historic trends in prices for each asset category have been informed from data provided by JT.
- Regarding the economic lifetime of each asset, these were informed by international precedent on asset lives from recent NGA cost models built in European jurisdictions, including the UK, Belgium, Ireland and Sweden. From this we assume long asset lives for ducts/trenching, cabling, buildings, and ODFs, and shorter lifetimes for active equipment (ONT, OLT, Core Routers, and the IMS Voice platform).
- Regarding the historic asset price trends, these reflect JT's experience of the change in procurement costs for these assets in recent years. Regarding future trends, the trends for duct/trenching, cabling, ODFs and active equipment were again informed by international precedent, using nominal prices trends from recent NGA cost models. From these, we expect that asset prices for

duct/trenching and OLTs will increase over time, and a reduction over time for cabling and active equipment. For the trend in "office building" assets, this was informed by the historic growth in private house prices in Jersey. In particular, we use the house price index produced by Statistics Jersey, which estimates that house prices grew by approximately 4.1% between 2010 and 2020.[63]

Figure 22 Key asset inputs – calculation of annual capital costs

	Economic lifetime (years)	Average age of asset (years)	Annual trend in asset prices - historic (%/yr)	Annual trend in asset prices - future (%/yr)
Duct/Trench	40	✂	✂	2.50%
Office buildings	40	✂	✂	4.07%
ONT	5	✂	✂	-8.00%
ODF	25	✂	✂	1.00%
OLT	7	✂	✂	-8.00%
Drop cable	25	✂	✂	-2.00%
Fibre cable	25	✂	✂	-2.00%
10G Core Link	20	✂	✂	-2.00%
Core Router	7	✂	✂	-8.00%
IMS Voice platform	5	✂	✂	-8.00%

Source: Frontier

Notes: Historic trends for office buildings and the IMS Voice platform are not needed, as we understand the assets in these categories are already valued at current value in JT's accounts

Finally, for the WACC, the model uses a pre-tax nominal WACC of 8.7%. This has been estimated based on our assessment of JT's estimate of its current WACC in its submission to the JCRA in December 2020. More detail on this assessment is provided in Annex B.

Estimated annual capital costs for 2021-2025

The table below summarises the estimated annual capital costs for each asset over 2021-2025, based on the calculations and inputs outlined above. Overall, the annual capital costs fall marginally over the price control period.

- The annual costs for duct/trench, office building and ODFs increase over time, reflecting the expected growth in the asset prices for these assets.
- This is however offset by the reduction in annual costs for cabling and active equipment, where asset prices are expected to fall over time.[64]

[63] See https://www.gov.je/SiteCollectionDocuments/Government%20and%20administration/R%20House%20Price%20Index%20Q3%202020%2020201119%20SJ.pdf

[64] For these assets the negative asset price trends offset the positive trend in fixed broadband subscribers, meaning the "tilt" in the tilted annuity formula still means more costs are recovered in earlier years when asset prices are larger.

Figure 23 Estimated annual capital costs for 2021-2025 (£000s)

		2021	2022	2023	2024	2025
Duct/Trench	Non-replicable	✂	✂	✂	✂	✂
Office buildings	Non-replicable	✂	✂	✂	✂	✂
ONT	Replicable	✂	✂	✂	✂	✂
ODF	Replicable	✂	✂	✂	✂	✂
OLT	Replicable	✂	✂	✂	✂	✂
Drop cable	Replicable	✂	✂	✂	✂	✂
Fibre cable	Replicable	✂	✂	✂	✂	✂
10G Core Link	Replicable	✂	✂	✂	✂	✂
Core Router	Replicable	✂	✂	✂	✂	✂
IMS Voice Platform	Replicable	✂	✂	✂	✂	✂
Total		✂	✂	✂	✂	✂

Source: Frontier

Operating costs

To estimate total annual costs over 2021-2025, we also estimate the total operating costs for each year over this period.

To do this, we use JT's current annual operating costs for the considered opex categories as a starting point, and forecast this forward based on the expected trend in operating costs over time.

Regarding JT current operating costs, we use the annual costs for each category for the year ending December 2019, which are the latest available figures within JT's financial accounts. The exception to this is the operating costs for the "NETadminTS" and "Genexis TS" categories, where we use the annual costs for the year ending December 2018 as the starting point for the forecasts.

- We understand from JT that these categories refer to the central management platforms supporting ONTs at the customer premises.
- For these categories, the operating costs increased significantly in the year to December 2019.
- JT explained that increases in these costs are driven by increases in the subscriber base on the JT network, as the cost of the platforms is made up of a flat platform fee and a management fee per ONT. However, subscriber data from JT indicates that the total fixed broadband and fixed voice base on the JT network actually decreased marginally over 2019, so does not justify the increase in the costs.[65]
- Given the relatively stable base over 2018 and 2019, we therefore considered that the opex for these categories in 2018 was a reasonable starting point for the opex forecasts.

[65] Data provided in "JT response to Frontier Qs 011220" indicates that the total base fell by 1% between November 2018 and November 2019 (✂)

Regarding the expected trends in operating costs over time, we then assume that operating costs will reduce by 2.1% per year over 2020 to 2025. This value reflects expected inflation over this period, net of expected gains in efficiency over this period.

- Annual inflation is estimated to by 2.4% over the period. This assumes that the inflation rate will reflect the historic RPI rate over 2015 to 2020.[66]
- Regarding efficiency gains, we assume that JT is able to make efficiency gains of 4.5% per year over this period. This estimate reflects Ofcom's estimate of achievable efficiency gains in Openreach's fixed network pay and non-pay operating costs, which was calculated as part of its 2020 WFTMR Decision.[67]

Total annual costs

The table below summarises the estimated total capital and operating costs for the period 2021-2025, based on the approach outlined above. The forecast reduction in operating costs, in combination with the reduction in the annual capital costs, means that the total annual costs decline gradually over the price control period.

Figure 24 Estimated annual operating and capital costs for 2021-2025 (£000s)

	2021	2022	2023	2024	2025
Operating costs	✂	✂	✂	✂	✂
Annual Capital costs	✂	✂	✂	✂	✂
Total annual costs	✂	✂	✂	✂	✂

Source: Frontier

A.3.3 Allocation of costs to wholesale broadband rental services

Having estimated the annual costs for the considered cost categories, the next step is to identify the share of these costs that should be recovered from wholesale broadband rental services. As noted above, this is required because a number of the assets and activities within the considered cost categorises support the provision of both wholesale broadband and other services, meaning that a share of these costs should also be recovered from those services. A share of wholesale broadband costs are also recovered through wholesale connection charges, which also need to be excluded from the costs recovered through the rental prices.

To do this, costs for other services are "stripped out" using a set of allocation keys. This is done in three steps within the model, as illustrated in the diagram below.

- **First, a share of capital costs for "10G Core Links" and "Core Routers" is assigned to mobile services.** This is because these links and routers also provide capacity of JT's mobile services. The remaining costs are then to be recovered from wholesale services on JT's FTTH network.
- **Second, a share of the remaining FTTH costs are allocated to JT's other fixed wholesale services, i.e. wholesale voice only and leased line**

[66] This was calculated using the RPI index from the Jersey Government opendata database. https://opendata.gov.je/dataset/rpi-rpi-x-rpi-y-rpi-pensioners-and-rpi-low-income-percentage-changes/resource/0501a918-9e04-4e82-b2f5-87568109660b

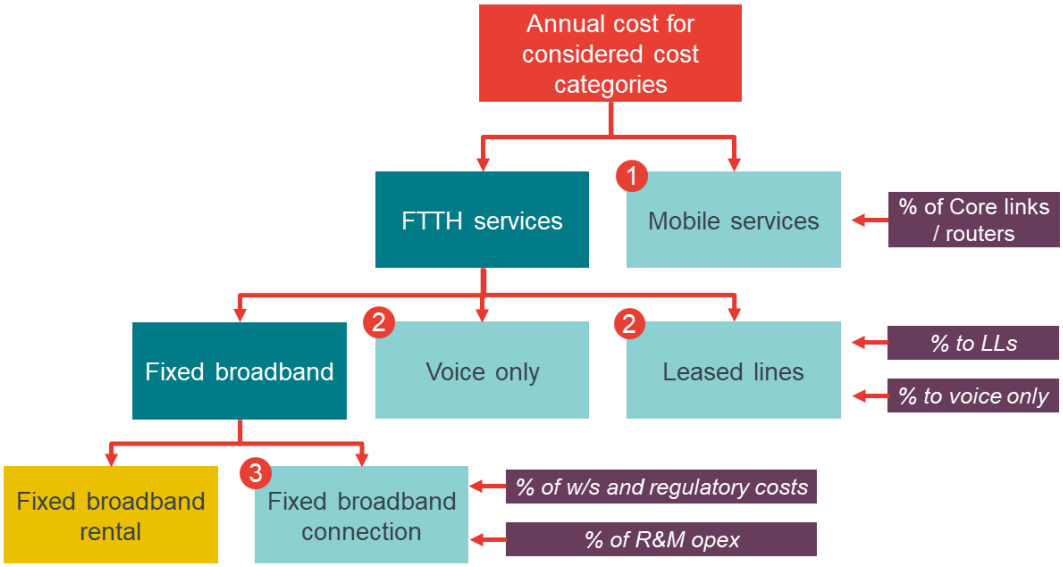
[67] See https://www.ofcom.org.uk/__data/assets/pdf_file/0031/188923/wftmr-annexes-1-23.pdf

services. These use the same network equipment as wholesale broadband services, including the fibre access cabling and equipment, so need to be allocated a share of these costs. The remaining costs are then to be recovered through JT's wholesale broadband services.

- **Finally, a share of wholesale broadband costs are allocated to the wholesale connection charge.** A share of the cost in the opex categories "Repair and Maintenance" and "Wholesale on island and regulatory costs" are recovered through the separate wholesale connection charges, and are therefore also stripped from the cost base.
- The resulting costs are then the costs recovered from wholesale broadband rental services.

A slightly different approach is considered for "Office Building" capital costs, where a certain percentage of these costs are allocated directly to wholesale broadband rental services.

Figure 25 Allocation of annual costs to wholesale broadband rental services



Source: Frontier

Given the above, there are five key inputs that feed into the allocation of costs:

1. % of Core links and router capital costs allocated to mobile services
2. % of FTTH costs that are allocated to wholesale Leased Line services
3. % of FTTH costs are allocated to wholesale voice only services
4. % "Repair and Maintenance" and " Wholesale on island and regulatory costs" operating costs allocated to the wholesale connection charge; and
5. % of "Office building" capital costs allocated to wholesale broadband rental services.

The table below provides a summary of the value of each of these allocation keys, and the approach used to estimate these keys.

Figure 26 Allocation keys for allocating annual costs to the Bitstream service

Element	Value	Basis of allocation key
Core link and router costs to mobile services	17%	Share of JT 19G router ports allocated to mobile vs FTTH
FTTH costs to wholesale Leased Line services	10%	Conservative estimate based on share of Openreach costs accounted for by leased line services.
FTTH costs to wholesale voice only services	£11.10 per voice only subscriber	Consistent with expected wholesale charge for voice only customers (WLR charge)
"Repair and Maintenance" opex to wholesale broadband connection	33%	Share of fixed network-related calls to JT calls centre represented FTTH sales vs service issues.[68]
"w/s and regulatory costs" to wholesale broadband connection	10%	JT estimate of the % of these costs that relate to managing connections for OLOs
"Office building" costs to the Bitstream service	20%	Share of JT revenues in Jersey accounted for by wholesale broadband rental revenues (equi-proportional approach).

Source: Frontier

Regarding the share of FTTH costs that are recovered from Leased Lines, we note that specific cost information to inform this allocation is not available for JT's accounts. This allocation was therefore informed from the share of Openreach's costs in the UK that relates to these services, which we estimate at 14%. This was done calculating the annualised cost of Openreach services in Business Connectivity Market based on its 2020 Regulatory Financial Statements, and dividing this by the total annualised costs across all Openreach services.[69] We take a conservative assumption in the model and assume 10% of JT's FTTH costs should be recovered through Leased Line services.

Regarding voice only services, the allocation of costs reflects JT's wholesale price for this service, which is the price of its Wholesale Line Rental (WLR) service. This approach is reasonable, as the wholesale price represents the amount of costs that JT could expect to recover from those services. In practice, we assume that the WLR charge will remain at £11.10/subscriber/month over the price control period.[70] This is then converted to an annual figure and multiplied by the estimated number of voice only subscribers on the JT network in each year of the price control period.

Regarding the allocation of building costs to the Bitstream service, we again note that sufficient data was not available from JT to inform this allocation. In theory the share of these costs that should be recovered through the Bitstream charge should reflect the office building costs incurred in the provision of wholesale fixed

[68] 14.5% of calls to the call centre were represented by FTTH sales in 2019, vs 28% related to FTTH faults. Whilst we understand these calls relate to JT's retail customers, we consider this a reasonable proxy for the split of wholesale costs.

[69] See page 25 of BT's 202 RFS. Annualised costs were calculated as the sum of opex, annual depreciation and an estimated capital charge (WACC*Mean Capital Employed). https://www.bt.com/bt-plc/assets/documents/about-bt/policy-and-regulation/our-governance-and-strategy/regulatory-financial-statements/2020/bt-regulatory-financial-statements-2019-20.pdf

[70] We note the WLR price has remained unchanged in recent years.

broadband services in Jersey. These office building costs can, for example, reflect office space used to house network equipment needed to provide these services, and to house the JT staff involved in the delivery of these services.

As part of responses to the JRCA's information requests, JT suggested that an allocation of 50% to the bitstream charge was appropriate, on the assumption that JT's buildings were used to support both fixed and mobile services.[71] However, it is not clear that this represents an appropriate allocation of costs, and if anything is likely to overestimate the appropriate share to be recovered through fixed broadband services.[72]

Given this, we have allocated these costs using an "equi-proportional" approach, based on the share of JTs revenues in Jersey accounted for wholesale broadband rental services. This equates to an allocation of 20%. The current revenues from bitstream services was estimated by multiplying the number of fixed broadband customers on the JT network, as of November 2019, by the current wholesale broadband rental charges (i.e. the interim bitstream price plus the WLR charge). Such an "equi-proportionate" approach is similar to approaches used to allocate joint and common costs to services in NGA model developed in other jurisdictions, including in Belgium.[73]

The table below summarises the estimated annual costs to be recovered from wholesale broadband access rental services in each year over 2021-2025, based on the cost allocation approach explained above. Consistent with the trends in total capital and operating costs highlighted in Section A.3.2, the annual costs decline gradually in each year over the price control period.

Figure 27 Estimated annual costs to be recovered from wholesale fixed broadband rental services for 2021-2025 (£000s)

	2021	2022	2023	2024	2025
Total annual costs	✂	✂	✂	✂	✂

Source: Frontier.

A.4 Calculation steps and inputs – "two-part tariff" pricing structure

As explained above, the cost model also calculates cost-based prices under an alternative "two-part tariff" pricing structure. As explained in Section 4.1 of this report, the bitstream price paid under this pricing structure would consist of two sets of charges: a monthly "fixed fee" paid per broadband subscriber, and a "busy

[71] Further information was requested from JT to inform this allocation, such as data on the floor space accounted for by fixed broadband equipment and staff, but this information could not be provided by JT.

[72] For example, even if 50% of JT's buildings were used to support fixed services, a significant share of these costs should be recovered through other FTTH services such as voice only and leased line services.

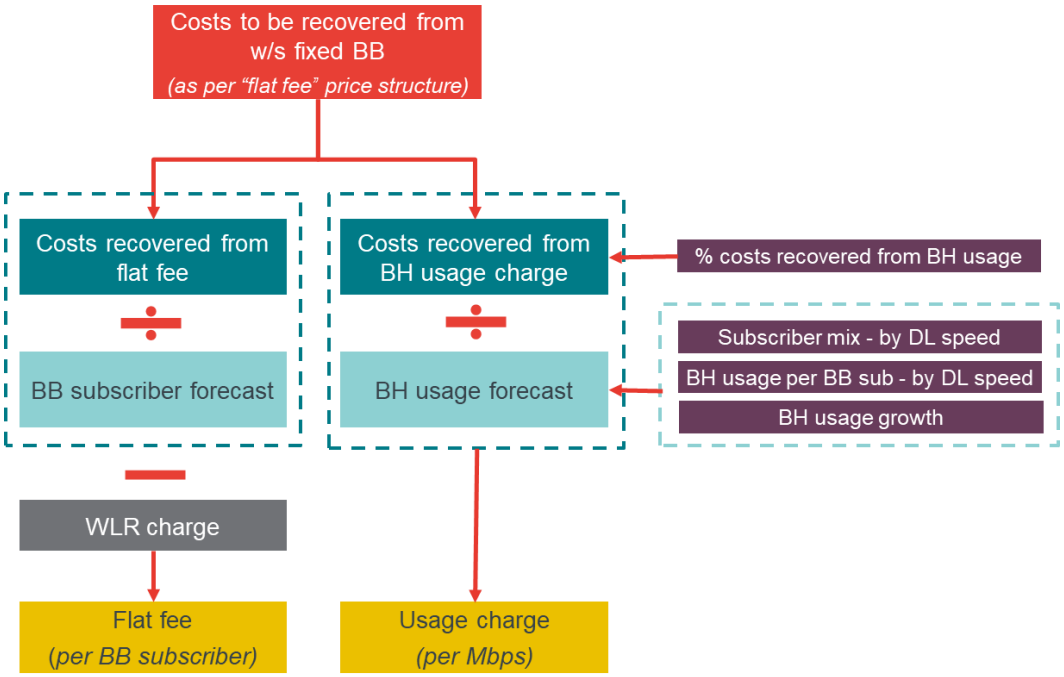
[73] For example, in the model developed to inform FTTH access services in Belgium, common network costs were allocated to services using an "Effective Capacity" approach, which in practice means the split reflects the estimated split of incremental costs of each service. See Section 1.1 of the Description manual for the model "2018-12 Descriptive Manual FTTH FINAL EN". A public version of the model "20181205 - Axon Consulting - Cost model for FTTH - PUBLIC VERSION" is available here: https://www.bipt.be/operators/publication/ftth-cost-model-public-version

hour usage charge", paid per Mbps of busy hour usage in the month across all the OLOs broadband subscribers.[74]

To inform these charges, the model uses the same annual cost of wholesale broadband rental services as calculated in Step 3 of the calculations under the "fixed fee" pricing structure. However, the estimated cost-based price for each of the two price element is then calculated as follows, as illustrated in the diagram below:

- First, the costs in each year are split between those to be recovered from the fixed fee element and those from the busy hour usage fee element, and converted into monthly values.
- The fixed fee element of the charge is then calculated in the same way as under the "fixed fee" pricing structure, by dividing the allocated "fixed fee" costs by the forecast number of broadband subscribers, and netting off the expected WLR charge.
- The busy hour usage charge element is then calculated by dividing the total "usage fee" costs by the forecast total monthly busy hour usage in a month across all fixed broadband subscribers on the JT FTTH network.

Figure 28 Overview of Bitstream price calculation –"two-part tariff" pricing structures



Source: Frontier

Given these steps, there are two key additional elements of the "two-part tariff" calculations:

- the estimated monthly busy hour usage from fixed broadband customers over 2021-2025; and

[74] This busy hour usage is the combined usage of all fixed broadband customers served by the OLO in the busiest hour of the month.

- the % of costs to be recovered from the busy hour usage versus fixed fee element of the charge.

These two elements are discussed in more detail below.

A.4.1 Monthly busy hour usage for all fixed broadband subscribers

To estimate the total monthly busy hour usage in each year, the model combines two forecasts:

1. The total number of fixed broadband subscribers on the JT network, in each year over 2021-2025.
2. The estimated average busy hour usage of a fixed broadband subscriber in each of these years.

For the number of fixed broadband subscribers, the model uses the forecasts already generated in the model for input into the cost-based prices under the "fixed fee" pricing structure.

To estimate the average busy hour usage of a fixed broadband subscriber, we took into account two key factors:

- First is that busy hour usage of a given customer will depend on the specific speed (or bandwidth) of the retail broadband product that this customers uses.[75] For faster speeds, the busy hour usage of the customer is likely to be larger, and similarly, you would expect lower busy hour usage from customers with lower speeds. OLOs responses to the information request indicate they wish to introduce retail products with lower download speeds than the 500Mbps and 1Gbps services that are currently in the market. The introduction and resulting take-up of those products would therefore be expected to impact the busy hour usage per subscriber.
- In addition, the busy hour usage of an individual customer is likely to grow over time, irrespective of the speed of the retail product they purchase This reflects the fact that internet usage is expected to continue to grow over time, as overall internet usage behaviours continue to evolve, and additional use cases for the internet that require greater bandwidths are being developed. Such uses cases include premium audio visual display streaming services, virtual and augmented reality devices and services, and "smart home" devices and applications.[76]

Given this, the forecast of business hour usage from broadband subscriber on the JT network is therefore calculated in the following way:

- We first consider the set of retail products that will be offered using the bitstream service over the price control period, based on download speeds offered.

[75] As noted in Section 3, the Bitstream product allows OLOs to provide any range of speeds to the end customer.

[76] For a detailed explanation of future use cases for fixed broadband, see Section 4 of Frontier's report on the future benefits of broadband networks for the UK National Infrastructure Commission. https://nic.org.uk/app/uploads/Benefits-analysis.pdf

- We then estimate the mix of subscribers across these products, based on the assumed migration of customers from the products currently offered in the market.
- The busy hour usage per subscriber on each of these products is then estimated for each year, based on data on the current usage patterns across different product speeds, and assumptions on how busy hour usage will grow over time.
- These are then combined to calculate the average busy hour usage per subscriber in each year.

We recognise the uncertainty over the future busy hour usage on the network, given the inherent uncertainty over the set of products that will be offered, the extent to which subscribers will migrate to any newly-introduced products, and over how busy hour usage will actually evolve over time. We have however developed a "best estimate" of this, based on information provided by JT and OLOs in responses to information requests, and on published data and studies from other jurisdictions where Jersey-specific data is not available.

Expected set of retail products

To inform the expected set of retail products that will be offered in Jersey, and the resulting mix of subscribers across these products, we have used the responses of JT and OLOs to information requests.

Regarding the set of retail products, we consider the set of products that will be offered by each retailer that is currently in the market (JT retail, Sure, Homenet), as well as Airtel who plan to enter the fixed broadband market using the bitstream service.

Based on responses to the information requests, we assume that retail products with download speeds of 50Mbps, 100Mbps, and 250Mbps, in addition to the 500Mbps and 1Gbps products already in the market. In particular, consistent with the responses to the information request, we assume that:

- Sure will ✂[77];
- Homenet will offer ✂. This reflects Homenet's statement that ✂[78]; and
- Airtel will ✂.
- We assume that these products would be introduced in the first year of the price control period.

In contrast, we assume that JT retail will continue to offer only retail products with 1Gbps download speeds. This reflects JT's responses to the JCRA's information request, where it states that whilst *"✂"*.[79]

[77] See responses to Q4 "2020_09_30 Sure's response to Frontier's data request re Jersey broadband services"

[78] See responses to Q3 "Homenet response to JCRA data request for Homenet – FINAL updated"

[79] Response to Question 2b, "JT response to Frontier Qs 011220".

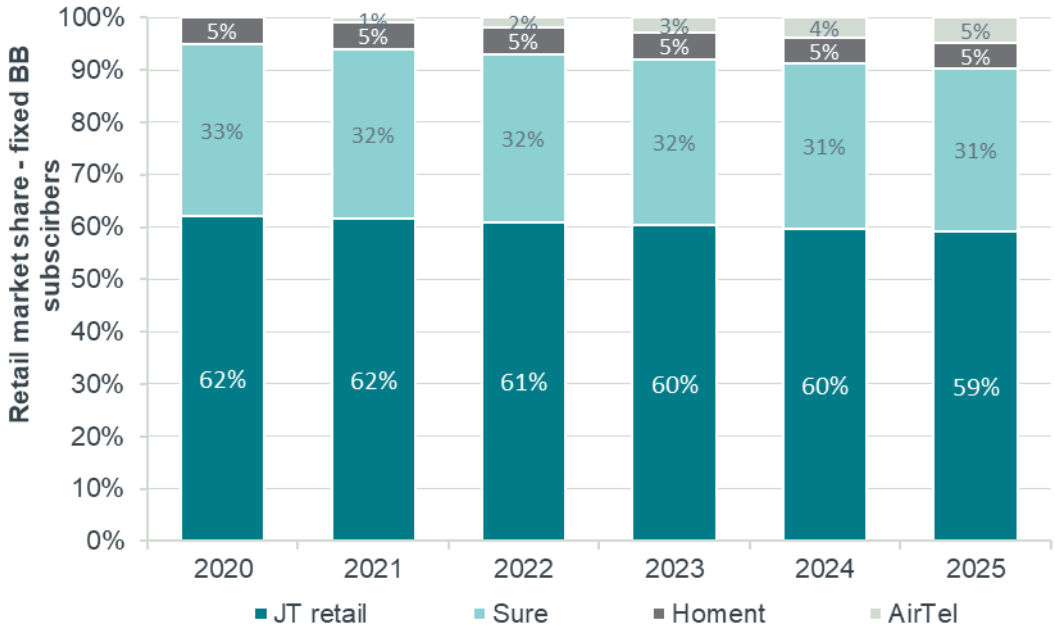
Fixed broadband subscriber mix across retail products

To inform the resulting mix of subscribers across retail products, we consider (i) the mix of subscribers for each of the retailers in each year of the price control period, and (ii) apply this to the expected fixed broadband retail market share of each of the retailers.

- Regarding the subscriber mix of each retailer, this is again informed by responses to the JCRA's information requests
- Regarding market shares, we assume that retail market shares will remain at 2020 levels, except for the impact of market entry by Airtel. For Airtel, we assume that they achieve a market share equivalent to the current share of Homenet by the end of the price control period, and that this share is taken from the other retailers proportionate to the current market shares.

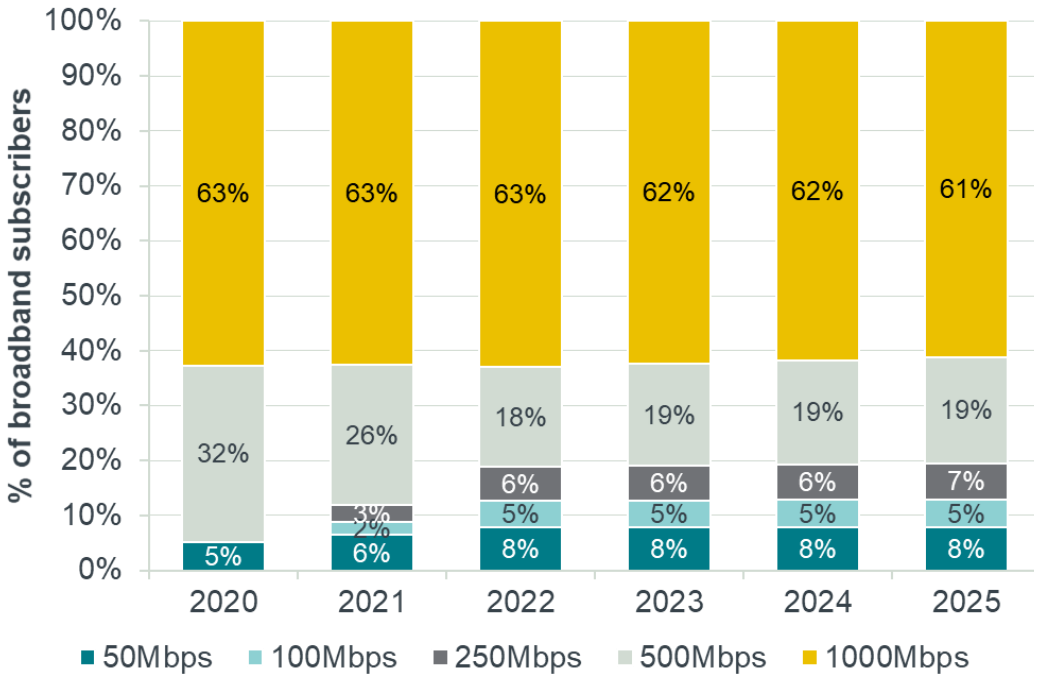
The figures below present the estimated retail market shares over 2020-2025, and the resulting estimate mix in subscribers in Jersey over this period. Together, we estimate that approximately 20% of subscribers will be on lower speed 50-250Mbps products by 2022.

Figure 29 Estimated fixed broadband retail market: 2020-2025



Source: Frontier

Figure 30 Estimated fixed broadband subscriber mix by retail product speed: 2020-2025



Source: Frontier

Busy hour usage per subscriber across retail products

To estimate the busy hour usage per subscriber for each retail product, we first aimed to identify the busy hour usage across products today, and then forecast these forward based on assumed busy hour usage growth.

Regarding the current busy hour usage across products, data from JT is not available to inform this. This is because only 500Mbps and 1Gbps speeds are offered on the JT network, and because historical data on usage is not available for the periods when lower speed products were provided by JT.[80]

As a starting point, we therefore use busy hour consumption per subscriber data from the FTTH cost model developed in Belgium, which relates to the year 2019. This is suitable, as the estimates were developed using a wider range of data sources, and includes busy hour usage figures for a large range of FTTH products speeds.[81] The usage per subscriber for the 500Mbps and 1Gbps products are also in-line with the current usage patterns on the JT network.

To forecast this forward, we then assume that busy hour usage per subscriber will grow by 35% per year up to 2025. This reflects the forecast growth in busy hour

[80] JT only began to collect busy hour usage data in March 2020.

[81] The estimates were informed by data across a number of operators in Belgium. See figure 5.5 of the IBPT consultation document. https://www.ibpt.be/file/cc73d96153bbd5448a56f19d925d05b1379c7f21/9156e3b40155db1d7a14d1689ac3b7f47533fa6a/_2018-12-13_CostModels_Consultation_Document_FR.pdf

Internet traffic in the UK over 2016-2021, as estimated by CISCO in its 2016 VNI Complete Forecasts.[82]

The table below summarises the estimated busy hour usage per subscriber on each of the considered retail products over 2021-2025, and the weighted average usage per subscriber when the forecast subscriber mix is taken into account. We forecast that the average usage per subscriber will be 2.52Mbps in 2021, rising to 8.11Mbps by 2025. The increase of times is driven by the fact that the estimated migration of subscribers to lower-speed lower-usage products over time is offset by the expected growth in busy hour usage across all products.

Figure 31 Estimated busy hour usage per subscriber – by retail product: 2021-2025

Retail product (DL speed)	2021	2022	2023	2024	2025
50Mbps	0.62	0.84	1.13	1.52	2.06
100Mbps	1.15	1.55	2.09	2.82	3.81
250Mbps	1.81	2.45	3.31	4.47	6.03
500Mbps	2.35	3.17	4.28	5.78	7.81
1000Mbps	2.88	3.89	5.25	7.08	9.56
Weighted average	**2.52**	**3.32**	**4.47**	**6.02**	**8.11**

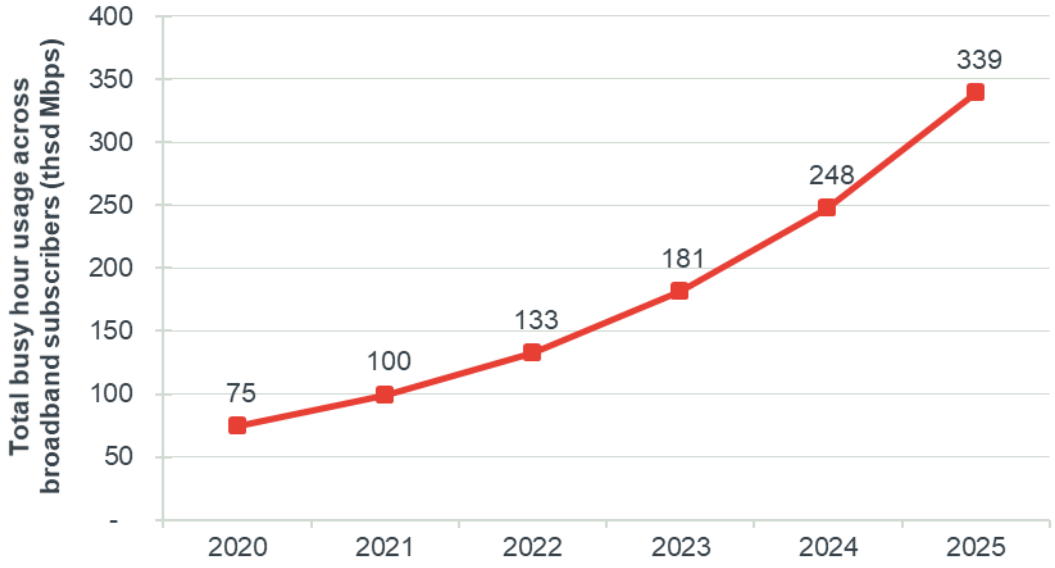
Source: Frontier

Total busy hour usage across fixed broadband subscribers

The chart below outlines the estimated total busy hour usage across fixed broadband subscribers, when the usage per subscriber figures are combined with the estimated number of broadband subscribers on the JT network. Overall, we estimate that total busy hour usage in a month will grow from ~100,000Mbps in 2021 to ~340,000Mbps in 2025.

[82] See https://www.cisco.com/c/dam/m/en_us/solutions/service-provider/vni-forecast-highlights/pdf/United_Kingdom_2021_Forecast_Highlights.pdf

Figure 32 Estimated total busy hour usage across fixed broadband subscribers in a month: 2020-2025



Source: Frontier

A.4.2 Proportion of costs to be recovered through the busy hour usage charge

The other key additional input into the calculation of the cost-based prices under the "two-part" tariff is the proportion of costs to be recovered through the busy hour usage charge, versus the fixed fee element.

As noted in Section 4.1, there is a trade-off between certainty over the recovery of JT's costs, and providing incentives for retailers to provide a greater range of fixed broadband products to end customers. Recovering a larger share of costs from the busy hour usage charge would result in OLO's paying a smaller bitstream charge for lower speed products relative to higher speed products, therefore providing greater incentives to offer a greater range of product speeds. On the other hand, given the inherent uncertainty over the busy hour usage of customers over time, recovering a larger share of these costs from the usage charge creates more uncertainty over JT's cost recovery.[83]

For the purposes of setting the proposed prices under the two-part tariff, 30% of costs was chosen to be recovered through the busy hour usage charge. This ensures that the majority of JT's costs are still recovered through the fixed fee (and therefore provides certainty to JT over cost recovery), whilst also resulting in a material difference in the bitstream charge between lower and higher speed products. This 30% value was informed by the "gradient" in wholesale FTTH

[83] If busy hour usage grows faster (slower) than expected, this will lead to an over (under) recovery of JT's costs.

access prices across product speeds in Ireland, where again a range of FTTH product speeds are available. In particular:

- The incumbent in Ireland offers three FTTH wholesale access products, with 100Mbps, 300Mbps, and 1Gbps download speeds, where the monthly rental fee varies by speed.
- The monthly rental fees for the 100Mbps and 1Gbps products are €29.49 and €39.49 respectively, representing a 1Gbps "premium" of 30% over the 100Gbps.
- Recovering 30% of costs through the busy hour usage charge means that, under the modelled busy hour usage per subscriber at each product speed, the average bitstream charge per subscriber for customers on the 1Gbps product results in a similar premium to the 100Mbps product as that in Ireland.

ANNEX B HIGH-LEVEL ASSESSMENT OF JT'S COST OF CAPITAL

B.1 Framework

The approach to determining the appropriate return to be applied to JT needs to take account of the particular circumstances of Jersey:

- JT is wholly owned by the Jersey Government which may affect the cost of funding JT, both external funding such as debt issues by JT and the cost of funds provided by the Jersey Government as a shareholder;
- The Jersey Government as shareholder, can take account of broader policy objectives when making decisions on investments, whereas private investors will focus on maximising their returns;
- JT has fully rolled out a fibre network in advance of other jurisdictions (presumably in part due to Government ownership); and
- There is no expectation that other operators owned by private investors will roll out competing infrastructure based networks.

This means that some of the considerations taken into account by regulators in other jurisdictions do not apply here:

- The Jersey Government may not require the same return on its investments as private investors;
- There is less need to 'aim up' when setting the return to ensure private investors are suitably incentivised to make socially optimal investments; and
- There is less need to proxy private investors cost of capital to send appropriate build or buy decision to potential investors in alternative infrastructure.

The JCRA has previously set regulated prices for JT based on a weighted average cost of capital (WACC) estimate as if it were a privately owned business and JT has submitted an estimate of its required return based on a WACC for private investors.

In view of this precedent we propose to use a WACC approach to set the required return.

B.2 Previous WACC determinations

The WACC was last determined in 2008, using the Capital Asset Pricing Model (CAPM), which is a standard approach to determining the cost of capital. More specifically, the WACC combines the cost of funding from debt (*Kd*) and equity (*Ke*), each weighted by their relative share of enterprise value (i.e. the sum of the value of debt and equity). The value of outstanding debt relative to enterprise value (gearing) is denoted by *g* in the WACC formula below and the rate of corporation tax is denoted by *t*.

$$WACC = \frac{Ke * (1 - g)}{1 - t} + Kd * g$$

In 2008, the JCRA set JT's WACC at 11.6% (nominal pre-tax).

However, since 2008 many of the parameters that influence WACC have changed, in particular risk-free rates have declined significantly. This has led a reduction in telecoms operators' cost of capital. For example, in 2009, Ofcom set Openreach's WACC at 10.1% (nominal pre-tax)[84]; however, by 2019, it was reduced to 7.1%.[85]

More generally, we observe that national regulators re-assess regulated companies' WACC periodically (every 2-5 years).

In light of the above, it is appropriate to re-assess JT's cost of capital. The JCRA requested JT to provide its own assessment of its WACC. In the remainder of this annex, we first summarise JT's proposal, followed by our comments on the key parameters. This result of this assessment is a recommended WACC of 8.7%, which has been used in the cost model.

B.3 JT's submission

JT commissioned PWC to assess JT's cost of capital. PWC's report "JT's Cost of Capital Assessment" was submitted to the JCRA on December 2nd 2020. PWC in its submission notes that there is inherent uncertainty involved in estimating WACC components and, to reflect that uncertainty, PWC has produced a range values between 7.6% (Lower bound) and 11.5% (Upper bound).

PWC's proposed parameter values and justifications for these values are summarised in Figure 33 below.

84 https://www.ofcom.org.uk/__data/assets/pdf_file/0018/53730/statement.pdf

85 https://www.ofcom.org.uk/__data/assets/pdf_file/0028/154594/pimr-bcmr-llcc-final-statement-annexes-1-25.pdf

Figure 33 PWC's assessment of JT's WACC

Table 1.1: Summary of the WACC for JT (Jersey) Limited in nominal terms

Component	Calculation	Low	High	Comments
Gearing	A	40.0%	55.0%	Low end based on comparators; high end based on historical analysis of JT capital structure
Risk free rate	B	0.80%	1.15%	Low end based on UK government debt and high end based on AAA-rated corporate debt
Total market return	C	8.2%	9.4%	Aligned to UK regulators
Equity market return premium	D = C - B	7.40%	8.25%	Derived using TMR and risk-free rate
Asset beta	E	0.55	0.70	Based on econometric analysis and considering the impact of Covid-19
Debt beta	F	0.15	0.04	Based on regulatory precedent
Equity beta	G = (E - (A * F)) / (1 - A)	0.82	1.51	
Small company premium - Equity	H	0.90%	2.25%	Low end based on the small company premium used in JT's 2003 and 2008 cost of capital. High end is the midpoint between the low end and the Small Cap Premium according to Duff & Phelps.
Cost of equity	I = B + G * D + H	7.7%	15.8%	
Benchmark cost of debt	J	4.50%	4.50%	Based on the interest rate JT is currently paying on its private placement
Issuance and liquidity costs	K	0.10%	0.20%	Based on regulatory precedent
Cost of debt	L = J + K	4.60%	4.70%	
Tax rate	M	20%	20%	Based on Jersey corporate tax rate
Nominal pre-tax WACC	**N = (I / (1 - M)) * (1 - A) + (A * L)**	**7.6%**	**11.5%**	
Point estimate (67th percentile)		**10.2%**		

Source: PwC analysis

PWC recommends setting JT's WACC towards the upper end of the range due to the following reasons:

- The asymmetrical risks associated with setting WACC too low as "*the economic and social costs of underinvestment are greater than the costs of overinvestment*";
- The fact that JT has invested in an island-wide point-to-point fibre network, which does not have many precedents in other jurisdictions. PWC argues that the existing benchmarks might not be representative of the risks faced by JT and consequently its WACC may be higher than suggested by the benchmarks.

As a result, PWC recommends setting JT's WACC at the 67th percentile of the range, at 10.2%.

For a comparison, setting WACC at the mid-point of the estimated range would result in the cost of capital of 9.6%.

B.4 Our assessment of JT's submission

We broadly agree with PWC's assessment of a number of the parameters of the CAPM model. However, we note that for some of the parameters, PWC has taken a conservative approach and excluded some of the lower benchmarks.

For example, for asset betas, the proposed range is between 0.55 and 0.7. However, based on the evidence presented in PWC submission, 37% of the observations in the sample are below 0.55. Taking the excluded observations into account, a more representative range would be between 0.45 and 0.7.

In this case, we do not propose to adjust the range for asset betas. However, we note this generally conservative approach implies that 'aiming up', i.e. choosing the point estimate towards to the upper end of the range, is not appropriate as the range itself is chosen conservatively. We further discuss the issues of 'aiming up' below.

In addition, there are two parameters where the range prosed by PWC is not sufficiently justified. These are:

1. small operator equity premium; and
2. cost of debt.

We discuss these parameters in turn below.

B.4.1 Small operator equity premium

PWC argues that JT is a small operator by international standards and that "*investors that allocate capital to small companies are exposed to additional risks, such as illiquidity and lack of product and geographic diversification risks. In this case, investors would expect a higher return (premia) to compensate them for taking on greater risk*".

PWC uses the evidence from past regulatory determinations by Ofwat (PR09 and PR14) and by Ofgem (2002), and recommends to apply a small operator equity premium ranging between 0.9% (lower bound) and 2.5% (upper bound).

We observe that in the regulatory precedents cited in the report, the premia applied by the regulators were lower than proposed by PWC (0 – 0.9%). Moreover, some of the cited precedents refer to the uplift to the cost of debt rather than to the cost of equity (e.g. the PR19 CMA appeal and the PR14).

We further observe that in recent regulatory decisions Ofwat questioned the existence of a small operator equity premium. In its report for Ofwat, PWC itself stated the following:

"*the academic view, which has now prevailed for a number of years, is that there is significant doubt on whether a small company effect exists. A comprehensive 2011 study that reviewed size effects in equity returns reinforced this doubt, concluding that, on the basis of decades of empirical research, there is not a persuasive answer on whether size is responsible for stock returns*[86]*. This inconclusiveness in the literature confirms the views of Ofwat and the CC that there*

[86] Mathijs A. van Dijk (2011) Is size dead? A review of the size effect in equity returns, *Journal of Banking & Finance*, Volume 35, Issue 12, December 2011

is insufficient evidence for an uplift based purely on the basis of size."[87] (emphasis added).

Consequently, no small operator equity uplift was applied to water companies in PR14 and PR19[88].

In light of the above, we propose to adjust the small operator equity premium to line with the regulatory precedents and use a range between 0% (based on recent decisions in the UK) and 0.9% (based on historic precedents).

B.4.2 Cost of debt

In its assessment, PWC proposes to use the cost of JT's existing ('embedded') debt. In 2012, JT borrowed £51m in two tranches; the first tranche (£31m) expired in 2019 and the second tranche is expiring in 2022. The interest paid on the second tranche is 4.48%.

When forming a view on the appropriate cost of debt, regulators typically consider both the cost of embedded debt and also a forward-looking cost of debt. For example, in the latest assessment of WACC for BT, Ofcom estimated a forward-looking cost of debt of 2.9% and weighted the cost of new and existing debt, which resulted in a range of estimates between 3.5% and 4.5%.[89]

We propose to use a similar approach and take a weighted average of JT's existing and forward-looking cost of debt.

For the forward-looking cost of debt we rely on recent regulatory precedents:

- Ofcom's estimate of the cost of new debt for BT – 2.9%;[90]
- Ofwat's estimate of the cost of new debt for water companies - 3.36% (central estimate of the range 3.2%- 3.57%).[91]

Taking the higher of the two estimates (3.36%) as a proxy of the cost of new debt for JT and weighing the cost of new and existing debt based on the expiration debt of the existing debt (60% : 40%), we estimate the cost of debt for JT to be 3.8%. We use this estimate as the lower bound of the range, keeping the upper bound at its current level of 4.5%.

Overall, this is a conservative approach. PWC in its own submission acknowledges that "*JT's cost of embedded debt is above the current yields available on fixed income indices, such as the iBoxx A/BBB index which is commonly used for regulatory determinations*." PWC attributes this difference to specific risks related to small companies.

87 PWC (2014) "Company specific adjustments to the WACC A report prepared for Ofwat" https://www.ofwat.gov.uk/wp-content/uploads/2015/10/rpt_com1408pwcuplift.pdf

88 We note that Ofwat applied a small operator premium to the cost of debt. This is discussed in the section on cost of debt below.

89 Ofcom (2019) "PIMR and BCMR statement: annexes 1-25" https://www.ofcom.org.uk/__data/assets/pdf_file/0028/154594/pimr-bcmr-llcc-final-statement-annexes-1-25.pdf

90 Ibid

91 https://www.ofwat.gov.uk/wp-content/uploads/2019/07/PR19-draft-determinations-Cost-of-capital-technical-appendix.pdf

However, comparing JT's cost of existing debt with the iBox A/BBB Index in 2012 (at the point of borrowing), we observe that the two were closely aligned. This comparison does not provide any evidence of JT paying a premium over the yields that prevailed at the time.

The choice of the point estimate

PWC proposed to 'aim up', i.e. to set WACC closer to the upper end of the range, due to uncertainty and the risk to future investment if WACC is set too low. As discussed above, the fact that JT is publicly owned means that the risk to future investment if the returns is set too low does not apply in this case as the Jersey Government can influence JT through the Memorandum of Understanding with JT/it's role as shareholder.

Furthermore, as discussed above, ranges for some parameters (e.g. asset betas) have been constructed conservatively. This effectively results in a conservative estimate of WACC even if the mid-point estimate is used.

With the adjustments proposed above, our range of estimates for JT's WACC is between 6.7% and 10.7%. We recommend setting WACC at the mid-point of the range, i.e. at 8.7%.

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