



Schedule 4 – Specification

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Schedule 4 (Specification)

1 Definitions

- 1.1 Capitalised terms in this Schedule that are not defined in Schedule 1 (Definitions and Interpretation) shall have the following meanings:

"Actual Data Speeds"	the download and upload speeds for: (a) Gigabit Capable Connectivity; and (b) Ultrafast Capable Connectivity;
"Antenna Aperture"	a mounting position on a telecom mast or other structure with a sufficient aperture (in azimuth and elevation) to allow effective wireless communications (e.g. for coverage or backhaul, etc.);
"Automated Retail Online Platform"	a range of interfaces, systems and processes which allow Communications Providers to deliver, maintain, cease or transfer an End User's retail broadband service, through the inputs needed to build a broadband access service;
"Bit-stream"	a telecommunications service provided to other providers and/or customers via the transfer of a stream of information bits (representations of 1's and 0's) typically over a standardised interface like Ethernet (IEEE 802.3) or similar, rather than provision of a basic physical, optical, electrical or wireless connection which could support other communication methods in addition to Bit-streams;
"BSS"	business support systems and software that support product management, order management, revenue management and customer management;
"Cabinet"	a free-standing (usually metal) enclosure which is weatherproof with ventilation and cable entry holes, usually placed outdoors and often on the side of the street, and has at least one (1) lockable door that may accommodate powered or house active equipment, electronic and optical telecommunications equipment, power supplies, and possibly air conditioning equipment to keep other equipment cool;
"Communications Provider" ("CP")	a provider of wholesale or retail internet services or other communications services to other communications providers, Retail Service Providers and/or End Users;
"Customer Ready for Service" ("CRFS")	a service can be ordered by a Communications Provider for an End User Premises with no excess construction charges being applied to the CP directly or indirectly, unless and to the extent that such excess construction charges are incurred due to a reason



	directly attributable to the private land of the End User or of any landlord of the End User, in accordance with Paragraph 5.6 (Stage Three (Monitor and Clawback));
"Dark Fibre"	optical telecommunication fibre that is unlit which requires a CP to provide network equipment at both ends in order to light it for use;
"Duct Standards"	<p>comprises:</p> <ul style="list-style-type: none">(a) Duct guidance (for external infrastructure): National Joint Utilities Group – Guidelines on the Positioning and Colour Coding of Utilities' Apparatus – April 2003;(c) the Building Regulations (in England, Wales and Northern Ireland) or the Building Standards (in Scotland) as appropriate. British Standards as appropriate with respect to Electrical Installations and Telecommunications Systems;(d) Highways Agency (or the Scottish Executive in Scotland) standards for man hole covers, man hole frames and ducting under roads for England, Wales and Northern Ireland or the Scottish Executive in Scotland;(e) CP 312-1: 1973 Code of practice for plastics pipe works (thermoplastics material) – General principles and choice of material. Reference to the appropriate guidance for the specifications of conduit systems for cable management. BS EN 50086-2.4 is a particular requirement for conduit systems underground; and(f) data ducting for new homes - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/11496/dataducting.pdf;
"Ducts"	a protective conduit (including joints and junctions between ducts) containing optical fibres, copper wires and/or smaller sub-ducts, installed in accordance with the relevant Duct Standards and excluding any conduit containing any non-communications services (e.g. water, gas, mains electricity etc.);
"Final Drop"	the final optical fibre or wireless connection from the nearest Point of Flexibility, to an End User Premises;



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"Gigabit Gold Standard"	a download Access Line Speed capability of at least 1Gbps, with: (a) a Minimum Download Speed of at least thirty three percent (33%) of this download speed; and (b) an upload speed of at least twenty percent (20)% of Minimum Download Speed;
"Gigabit Capable Technologies"	wholesale infrastructure which will support Gigabit Capable Connectivity for downstream wholesale and retail services directly or via third-party providers without restriction, as defined in the Technology Assessment Form for Gigabit Capable Solutions;
"Industry Standards"	manufacturers', network architecture, industry bodies' standards and industry accepted service levels, whether open or proprietary, as well as all relevant British, European and international standards including NICC, 3GPP, IEEE, IETF, ESTI, ITU, GSMA;
"Lead-to-Cash Process"	process which starts with a sales dialogue between a buyer and supplier which establishes that a product or service will meet the buyer's needs and ends when this need is fulfilled, the service is available to use and the supplier has been paid;
"Legacy Networks"	means any pre-existing broadband networks whether commercial or subsidised;
"MACD"	moves, adds, changes and disconnects;
"Mast"	a free-standing tall structure upon which telecom infrastructure (typically wireless antennae) are mounted including, where present, any co-sited cabinets and other ancillary equipment (powered or unpowered, power supplies, electricity generators, batteries, safety equipment, security equipment and cables) and structures (foundations, steelworks, guylines, cabins, fuel tanks, boundary fencing, gates and purpose-built access roads) etc.;
"Mbps"	megabits per second;
"Minimum Download Speed"	The minimum download speed measured with standard tools, which should be achieved for ninety five percent (95%) of measurements in the Busiest Hours in accordance with standard industry practice which is normal operating procedure, using such measurement methods which exclude degradations caused by factors outside of the Supplier's control, for example bottlenecks in the RSP's network, and/or variable Wi-Fi performance at the End User's site;
"Network Availability"	Ninety-nine point five percent (99.5%) being the percentage of time measured over any period (typically one (1) Month or year) where



	network services are available to a customer or group of customers;
"Network Levels"	means the levels of the Network as described by the Supplier and set out in the Financial Model;
"Network Upgrades"	hardware and/or software upgrades or modification to the Network including to CPE, backhaul and other core and access network components;
"NICC"	NICC Standards Limited, being a technical forum for the UK communications sector that develops interoperability standards for public communications networks and services in the UK. It is an independent organisation owned and run by its members;
"Nodes"	elements of the Network which aggregate or distribute network traffic via network links either to other Nodes and/or to End User Premises and as specified in the Financial Model;
"Open Access"	separation of access to the network from delivery of services, where the owner or operator of the network allows other Communication Providers to make use of the facilities for the provision of Wholesale Access Products and Services on terms which are fair and non-discriminatory in respect of pricing, technical availability, service levels and other commercial terms between the other communication providers and the owner or operator of the Network;
"OSS"	operational support system which comprises software applications (and relevant hardware) that support back-office activities in a telecommunications service provider's network including processes such as maintaining network inventory, provisioning services (the process of preparing and equipping a network to allow it to provide services to its users), configuring network components, and managing faults. The OSS layer contains the infrastructure for technical network management;
"Point of Presence"	a location that exists within a core telecommunications network or backhaul network including data centres, exchanges and similar network aggregation points which would normally provide mains power for use by CPs;
"Points of Flexibility"	points of aggregation, distribution or interconnection (with other providers and/or customers) within a network, including, but not limited to, the following, and equivalents irrespective of the nomenclature used: (a) originating and terminating nodes; (b) points of presence;



	<ul style="list-style-type: none">(g) exchanges;(h) aggregation nodes;(i) splitter nodes;(j) distribution nodes/points;(k) distribution frames;(l) patch panels;(m) cabins/cabinets;(n) chambers;(o) footway boxes;(p) splice pits;(q) joints; and(r) junctions;
"Pole"	a free-standing (e.g. on the ground) or mounted (e.g. on a building) long, usually-cylindrical object upon which telecom infrastructure (typically cables or wireless antennae) are mounted;
"Reasonable Demand"	meaning: <ul style="list-style-type: none">(a) the access seeker provides a coherent business plan which justifies the development of the wholesale product on the funded Network;(s) no comparable wholesale product is already offered in the same geographic area by another Service Provider at equivalent prices to those of more densely populated areas; and(t) the introduction of the new wholesale product should deliver sustainable and effective competition in the downstream market(s);
"Reference Offer"	<p>the following information for each of the Supplier's Wholesale Access Products and Wholesale Access Products and Services:</p> <ul style="list-style-type: none">(a) a basic product description;



	<ul style="list-style-type: none">(b) process and how to order information;(c) functional specifications;(d) contractual details of any agreement between the Supplier and the Service Provider; and(e) pricing information;
"Service Level Agreement"	<p>the Suppliers committed service levels and standards for each of its Wholesale Access Products and Services and Wholesale Passive Products, as suitable for the market in which it operates which describe, including but not limited to the following;</p> <ul style="list-style-type: none">(a) the information provided in a Reference Offer;(b) any obligations on the Service Provider when ordering (i.e. how to order);(c) specification and service quality;(d) availability;(e) performance targets;(f) metrics/measurement methods/reporting;(g) service credits;(h) contract terms (including the responsibilities between the Supplier and Service Providers);(i) pricing;(j) termination conditions; and(k) dispute escalation/resolution;
"Service Levels"	<p>the service levels set out in Paragraph 11 (Service Levels);</p>
"Service Providers"	<p>means each of the following:</p> <ul style="list-style-type: none">(a) a Communications Provider; or(u) Retail Service Provider;



"Shared Antennae Systems"	wireless antennae systems where multiple Service Providers feed radio signals to the same antennas;
"Symmetrical"	the capability of the network devices to transmit and receive data at equal rates;
"Traffic Shaping"	is a bandwidth management technique that delays the flow of certain types of network packets in order to ensure network performance for higher priority applications;
"Ultrafast Capable Connectivity"	ultrafast download speeds of at least 300Mbps delivered across the Network;
"Ultrafast Gold Standard"	a download Access Line Speed capability of at least 300 Mbps with: (a) a Minimum Download Speed of at least thirty three percent (33%) of this download speed; and (b) an upload speed of at least twenty percent (20%) of Minimum Download Speed;
"VULA"	Virtual Unbundled Local Access; and
"Wholesale Access Requirements"	the wholesale access requirements which the Supplier must meet as set out in Paragraphs 6 (General Wholesale Access Requirements) to 8 (General forms of Network access).

2 Authorised Drawdowns

2.1 The requirements set out in the Schedule apply to each Authorised Drawdown.

3 Stage One (Network Detailed Design and Due Diligence)

3.1 Paragraphs 3.2 and 3.3 apply where the Supplier elected in its Supplier ITT Response that it will be carrying out a full Stage One (Network Detailed Design and Due Diligence).

3.2 The overall outcome of Stage One (Network Detailed Design and Due Diligence) is completion of a network detailed design, due diligence, surveying and project planning for Stage Two (Build) in accordance with the Project Plan.

3.3 On or before the Milestone Date for the Stage One (Network Detailed Design and Due Diligence) Complete Milestone, the Supplier shall:

- (a) provide confirmation that it has completed the Network Detailed Design through a Survey of the Works Environment and shall provide Survey documentation that will



evidence Achievement in accordance with the Stage One (Network Detailed Design and Due Diligence) Complete Milestone Milestone Criteria.

- (b) provide a network detailed design which:
 - (i) is capable of providing the required Access Line Speeds to all End User Premises in the Intervention Area in accordance with the Specification and the Supplier Solution;
 - (ii) demonstrates there is sufficient capacity to meet the Supplier's Take-up forecast set out in the Supplier ITT Response and is capable of meeting the future capacity upgrade requirements set out in this Specification;
 - (iii) demonstrates that all Wholesale Access Requirements set out in this Specification will be met;
 - (iv) shall be in a format that is accessible to the Authority and shall comprise a suitably detailed diagrammatic representation of the Network that will be deployed as part of the Works and shall demonstrate that the Network:
 - (A) fully aligns to the Network elements for the corresponding Network Levels set out in the Financial Model;
 - (B) identifies each Node on the Network, with each Node having a corresponding unique Node identifier and Network Level associated with it;
 - (C) demonstrates all End User Premises are connected to Nodes and other Network elements that will be built as part of the Network and are fully aligned to the Financial Model;
 - (D) will provide the relevant Access Line Speeds to all End User Premises in the Intervention Area;
 - (E) has sufficient capacity to meet the Supplier's Take-up forecast;
 - (F) will meet all of the Wholesale Access Requirements; and
 - (G) can be built in accordance with the Project Plan;
- (c) provide all of the information required in accordance with the Stage One Output as set out in Clause 15.1 (Reports); and
- (d) carry out any applicable Planning Activities in accordance with the Project Plan.

3.4 Paragraph 3.5 applies where the Supplier elected in its Supplier ITT Response that it will be carrying out an expedited Stage One (Network Detailed Design and Due Diligence).



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- 3.5 On or before the Milestone Date for the Stage One (Network Detailed Design and Due Diligence) Complete Milestone, the Supplier shall provide written confirmation to the Authority that any relevant network design activities that the Supplier intended to carry out during the expedited Stage One (Network Detailed Design and Due Diligence) are complete and remain in accordance with the Project Plan as at the Effective Date.

4 Stage Two (Build)

- 4.1 The overall outcome of Stage Two (Build) is to complete the Stage Two (Build) Works in accordance with this Specification, the Supplier Solution and the terms of this Contract to deliver an operationally ready Network in respect of all End User Premises in the Intervention Area.
- 4.2 On or before the Milestone Date for the Stage Two (Build) Complete Milestone, the Supplier shall:
- (a) complete the Network and evidence it meets each of the requirements set out in Paragraph 3.3(b) (Stage One (Network Detailed Design and Due Diligence));
 - (b) confirm and evidence that the applicable Tests have been successfully completed in accordance with Schedule 6 (Project Plan and Testing) including Customer Ready for Service (CRFS) for each End User Premises in the Intervention Area;
 - (c) provide test data to sufficiently demonstrate proof of full functionality of the Supplier's OSS and BSS systems including demonstrating that at least one (1) available Wholesale Access Product and Service is available to Retail Service Providers through the OSS and BSS systems;
 - (d) demonstrate that each End User Premises in the Intervention Area is available and visible to Retail Service Providers on the Suppliers' RSP interface systems so that retail services can be sold by RSPs;
 - (e) provide all of the information required in accordance with the Stage Two Progress Report as set out in Clause 15.1 (Reports); and
 - (f) carry out any applicable Planning Activities in accordance with the Project Plan.
- 4.3 The Supplier shall provide upon request of the Authority copies of 'As-built' documentation (including reasonable access to that documentation) for the applicable Network infrastructure. Any such 'As-built' documentation shall contain an updated inventory of Network sub-components and locations sufficient to comply with corresponding Subsidy Control Regime requirements.

5 Stage Three (Monitor and Clawback)

- 5.1 The overall outcome of Stage Three (Monitor and Clawback) is:
- (a) to monitor:



- (i) the Supplier's compliance to the Wholesale Access Requirements;
 - (ii) Take-up of Wholesale Access Products and Services and Wholesale Passive Products; and
 - (iii) the Service Levels; and
 - (b) to calculate any clawback required under and in accordance with the terms of this Contract.
- 5.2 The Supplier shall ensure that Wholesale Access Products and Services and Wholesale Passive Products are made available, operated and maintained for the duration of this Contract, providing Access Line Speeds at the required speeds specified in this Contract to all End User Premises in accordance with the Specification and Supplier Solution.
- 5.3 The Supplier shall maintain operational OSS and BSS systems, providing Service Providers the ability to access all Wholesale Access Products and Services and Wholesale Passive Products.
- 5.4 The Supplier shall ensure that each End User Premises can be provisioned (if a Service Provider orders corresponding Wholesale Access Products and Services) with any Wholesale Access Product and Service as set out in the i.Products and Services table of the Financial Model or subsequent r.Products and Services tables as part of the Stage Two Progress Report and Stage Three Report.
- 5.5 The Supplier shall ensure that the minimum download speeds identified in Paragraphs 9.3 and 9.4 (Wholesale Access Products and Services and Wholesale Passive Products requirements) are maintained for each Wholesale Access Product and Service for the duration of this Contract. In the event that such minimum download speeds are regulated by a new minimum set by the Regulator, or in accordance with Good Industry Practice, such new minimum download speeds shall apply for the duration of this Contract. On becoming aware of the new minimum download speeds, the Supplier shall promptly provide confirmation of such to the Authority for its written approval.
- 5.6 The Supplier shall ensure that no End User Premises will be subject to any excess construction charges, unless and to the extent that such excess construction charges are incurred due to a reason directly attributable to the private land of the End User or of any landlord of the End User, for the provision of Wholesale Access Products and Services, levied by the Supplier upon the Service Provider, such that such Service Provider can provide Gigabit Capable Connectivity, or where applicable Ultrafast Capable Connectivity, to End Users based on its standard installation charges for similar services.
- 5.7 The Supplier shall ensure that Wholesale Passive Products are made available and maintained for the duration of this Contract at the required Service Levels in accordance with the Specification and Supplier Solution.
- 5.8 The Supplier shall ensure that the Wholesale Passive Products meet the Wholesale Access Requirements in perpetuity.



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- 5.9 The Supplier shall ensure that for the duration of this Contract, all Service Levels are maintained for all Wholesale Access Products and Services and Wholesale Passive Products and that the Network is maintained in accordance with the Specification and to the required Industry Standards.
- 5.10 The Supplier shall provide all of the information required in accordance with the Stage Two Progress Report, Stage Three Report and the Wholesale Access Prices Benchmarking Report as set out in Clause 15.1 (Reports).

6 General Wholesale Access Requirements

- 6.1 The Supplier Solution must be compliant with the terms of this Contract and this Specification.
- 6.2 The Supplier Solution must provide a Gigabit Capable Connectivity Network utilising qualifying Gigabit Capable Technologies, or where allowable only where specified by the Authority in this Contract, an Ultrafast Capable Connectivity Network that can deliver broadband services in accordance with the requirements in this Specification.
- 6.3 Subject to Paragraph 7.2, the Supplier shall provide access to all Wholesale Access Products and Services and Wholesale Passive Products across the Network without limitation under fair and non-discriminatory conditions and for any reasonable purpose (for example mobile backhaul, private circuits and CCTV services):
- (a) to all Service Providers who request it without delay or restriction; and
 - (b) to any individual or other organisation who can reasonably demonstrate that it has the necessary competence to utilise the Wholesale Access Products and Services and Wholesale Passive Services requested in a lawful manner.
- 6.4 The Supplier shall provide to Service Providers and any individual or organisation as set out in Paragraph 6.3:
- (a) Wholesale Access Products and Services for at least seven (7) years following Achievement of the Stage Two (Build) Complete Milestone; and
 - (b) Wholesale Passive Products in perpetuity.
- 6.5 If the Network or any part of it is sold or otherwise transferred to the ownership of a third-party, other than the Supplier, then subject to the Change of Control provisions set out at Clauses 5.11 to 5.13 (Change of Control), all obligations in respect of wholesale access must be transferred to the new owner of the Supplier and/or of the Network and shall apply for the required period as set out in this Specification.
- 6.6 Where the Supplier also operates as a Retail Service Provider either directly or through another group or subsidiary company, it shall ensure a Reference Offer is transparently published to the market and made available to Service Providers at least six (6) months prior to its own Retail Service Provider commencing the marketing, sale and installation of retail services to End Users.



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- 6.7 Where Paragraph 6.6 applies, the Supplier and its associated Retail Service Provider shall ensure at all times full accounting separation is in place between each organisation including ensuring the transfer pricing of Wholesale Access Products and Services from the Supplier to its associated Retail Service Provider occurs on a fully transparent and non-discriminatory basis.
- 6.8 The Supplier Solution must deliver a Network which represents a Step Change in terms of broadband availability. This can be achieved by demonstration of all the following:
- (a) Access Line Speeds have to be at least doubled by the intervention and substantially higher upload speeds provided when compared with existing upload and download speeds;
 - (b) significant new investments in the broadband network are undertaken (i.e. investments that must include civil works and installation of new passive elements); and
 - (c) the new infrastructure brings significant new capabilities to the market in terms of broadband service availability, capacity and speeds and / or competition.
- 6.9 The Supplier must provide:
- (a) Open Access to the Network; and
 - (b) Wholesale Access Products and Services and Wholesale Passive Products on an open, fair, reasonable, equal and non-discriminatory basis. The Wholesale Access Prices shall be benchmarked in accordance with Paragraph 5 (Wholesale Access Pricing) of Schedule 3 (Financial Schedule).
- 6.10 The Supplier Solution shall utilise existing infrastructure and facilities where it is technically feasible, cost effective and commercially viable to do so. This can be achieved through:
- (a) use of own infrastructure;
 - (b) use of another supplier's infrastructure; and
 - (c) use of other utilities infrastructure.
- 6.11 The Supplier shall provide the Access to Infrastructure information in each Stage Two Progress Report in accordance with Clause 15.1 (Reports).
- 6.12 The Supplier shall implement and maintain an asset register which provides details of all new and existing infrastructure created or used as part of the funded Network and which therefore becomes subject to the terms of this Contract. The Supplier shall provide public access to such asset register subject to appropriate access controls in perpetuity.



7 Specific forms of Network access

- 7.1 The Supplier shall make Wholesale Access Products and Services and Wholesale Passive Products available to Service Providers with the corresponding Wholesale Access Requirements as required by the specific form of technology deployed, as specified.
- 7.2 All infrastructure used by the Supplier as part of the Network, including both new and existing infrastructure shall be subject to the Wholesale Access Requirements. Existing infrastructure shall support all forms of the Wholesale Access Requirements where:
- (a) technically feasible (e.g. given reasonable loading factors and existing capacity); and
 - (b) legally feasible (e.g. where conditions placed on access to existing infrastructure or other commercial terms imposed by an infrastructure owner would not prevent the Wholesale Access Requirements being met),

except where the Regulator does not oblige the specific form of access to be provided on the Service Providers existing infrastructure and where such access is at the sole discretion of the Service Provider.

- 7.3 The Supplier shall provide a passive network interconnect to any new or existing infrastructure built outside the Intervention Area to the extent such infrastructure is used to deliver services in the Intervention Area. In practical terms, this will mean the Supplier shall provide access between the nearest network access points outside the Intervention Area which is nearest to the infrastructure in the Intervention Area (e.g. the nearest footway box in the case of Duct access).

Ducts

- 7.4 The Supplier shall ensure that:
- (a) any funded physical infrastructure located underground with an individual length of at least 1.0km and deployment costs of fifty thousand pounds sterling (£50,000) or greater deployed as part of the Network shall comply with the relevant Duct Standards and be configured to support at least three (3) competing Service Providers and designed to support alternative technologies (e.g. sub-duct or cabling) with similar sizes and/or physical characteristics as that deployed by the Supplier as part of its Supplier Solution; and
 - (b) access shall be provided to all Points of Flexibility.

Poles

- 7.5 The Supplier shall ensure that:
- (a) any funded physical infrastructure located overhead where the poles will be deployed over a distance of 1.0km and have deployment costs of fifty thousand pounds sterling (£50,000) or greater deployed as part of the Network shall be configured to support at



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least three (3) competing Service Providers to install suspended Duct or Dark Fibre infrastructure including joint, junction and distribution nodes; and

- (b) where active network equipment is installed on Poles then the access requirements applied shall be fully consistent with that required for Masts.

Dark Fibre

7.6 The Supplier shall ensure that:

- (a) new Dark Fibre infrastructure deployed as part of the Network is configured to support at least three (3) competing Service Providers with access made available at appropriate Points of Flexibility in the Network comprising:
 - (i) the telephone exchange, Point of Presence optical distribution frame or equivalent;
 - (ii) Cabinets or similar local distribution points; and
 - (iii) all relevant Points of Flexibility.

7.7 Where Dark Fibre is provided in accordance with Paragraph 7.6, the Supplier shall ensure that access is provided for at least three (3) competing Service Providers to ensure that:

- (a) access is made available to all Network elements, except the Final Drop and where access is not made to the Final Drop then Suppliers must provide an active wholesale access facility as an alternative for other Services Providers to provision services across e.g. via VULA or similar technology;
- (b) in any circumstances where Final Drops or the distance to the last Point of Flexibility is unreasonably long, considering geography and premise density, then Dark Fibre access for three (3) competing Service Providers is required for those Final Drops together with reasonable access to an appropriate Point of Flexibility nearer to the premises;
- (c) there is sufficient space for active and optical equipment of a size and type similar to that used by the Supplier as part of the Network; and
- (d) there is sufficient space for power supplies (metered or unmetered) and equivalent to the Supplier's power supplies in all other respects.

Cabinets

7.8 The Supplier shall ensure that new Cabinet infrastructure deployed as part of the Network is configured to support at least three (3) competing Service Providers with access to a mains power supply and sufficient Cabinet space for co-location of equipment.



- 7.9 Extra-large Cabinets to accommodate at least three (3) competing Service Providers do not need to be provided as part of the Stage Two (Build) Works; however Suppliers are required to develop designs that would comply with local planning regulations and reasonable landowner conditions and shall upgrade Cabinets with sufficient space and capacity or install new Cabinets to meet the competing Service Providers requests where such requests can be provided legally and in accordance with Local Authority planning regulations.

Masts

- 7.10 The Supplier shall ensure that new Mast infrastructure deployed as part of the Network is configured to support at least three (3) competing Service Providers with access to Mast space, Antenna Apertures and an existing mains power supply.
- 7.11 Extra-large Masts to accommodate at least three (3) competing Service Providers do not need to be provided as part of the Stage Two (Build) Works; however Suppliers are required to develop designs that would comply with local planning regulations and reasonable landowner conditions and shall upgrade Masts with sufficient space and capacity or install new Masts to meet the competing Service Providers requests where such requests can be provided legally and in accordance with Local Authority planning regulations.

Antennae

- 7.12 The Supplier shall ensure that Shared Antennae Systems may be deployed as part of the Network where technically feasible, and provide for the sharing of any antennae systems operated by the Supplier, in particular where planning regulations could impede other forms of Mast capacity expansion.

Active Bit-Stream access

- 7.13 The Supplier shall ensure that:
- (a) for all infrastructure deployed as part of the Network, Bit-stream access for broadband and associated Backhaul is provided to Service Providers at appropriate Points of Flexibility such as telephone exchanges, Points of Presence or Cabinets (e.g. for VULA or equivalent);
 - (b) new Network infrastructure is either dimensioned to meet the likely capacity requirements of Service Providers, or must be capable of being upgraded to meet it on demand. Existing infrastructure must support the capacity requirements of Service Providers where technically feasible;
 - (c) Bit-stream access is provided over standardised or fully defined technical interfaces; and
 - (d) where Bit-stream access is requested by Service Providers, the Supplier shall ensure that all other associated equipment access requirements are met in accordance with this Paragraph 7.13.



8 General forms of Network access

The Supplier shall make new forms of Network access over and above the Specific Forms of Network Access set out in Paragraph 7, to both existing and new Network infrastructure used in the Intervention Area where requested by any Service Provider demonstrating Reasonable Demand for a wholesale product that is not already available.

9 Wholesale Access Products and Services and Wholesale Passive Products requirements

- 9.1 The Supplier shall design, deliver, operate and maintain for the duration of the Contract Period an Open Access Network which supports where applicable, Gigabit Capable Connectivity, Ultrafast Capable Connectivity and all Wholesale Access Products and Services and Wholesale Passive Products to downstream Service Providers without restriction.
- 9.2 The Supplier Solution shall provide, where applicable, Gigabit Capable Connectivity, Ultrafast Capable Connectivity and all Wholesale Access Products and Services and all applicable Wholesale Passive Products from the period commencing on the date on which the first (1st) Premises is available for Take-up and ending on the Expiry Date without the need for future Network Upgrades.
- 9.3 The Supplier shall ensure that the Wholesale Access Products and Services and Wholesale Passive Products which are required to meet the Gigabit Capable Connectivity requirements to provide at least one Gigabit Gold Standard Wholesale Access Products and Services, and optionally, other Wholesale Access Products and Services set out in the Supplier ITT Response (all products to be capable of being upgraded, including up to the Gigabit Gold Standard, upon demand).
- 9.4 Where applicable, the Supplier shall ensure that the Wholesale Access Products and Services and Wholesale Passive Products which are required to meet the Ultrafast Capable Connectivity requirements to provide at least one Ultrafast Gold Standard Wholesale Access Product and Service, and optionally, other Wholesale Access Products and Services set out in the Supplier ITT Response (all products to be capable of being upgraded, including up to the Ultrafast Gold Standard, upon demand).
- 9.5 Actual Data Speeds and performance shall not degrade outside of the Busiest Hours below ninety-five percent (95%) of the download Access Line Speed and upload Access Line Speed specified for Gigabit Capable Connectivity as set out in Paragraph 9.3 and for Ultrafast Capable Connectivity as set out in Paragraph 9.4. In the event that such minimum download speeds are regulated by a new minimum set by the Regulator, such new minimum download speeds shall apply for the duration of this Contract. On becoming aware of the new minimum download speeds, the Supplier shall promptly provide confirmation of such to the Authority for its written approval.
- 9.6 Any period where any of the criteria set out in Paragraphs 9.3 and 9.4 are not met shall be recorded as service and/or network non-availability. The Supplier shall proactively monitor



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and measure such criteria and any failure of the Supplier to comply with its obligations under Paragraphs 9.3 and 9.4 shall constitute a Rectification Plan Trigger Event.

- 9.7 The Supplier shall provide Wholesale Access Products and Services and Wholesale Passive Products which support low data latency in accordance with the Regulator's regime or codes of practice and Industry Standards for the requirements of real-time services (or otherwise, in the absence of prevailing standards, 10 ms and below for ninety five percent (95%) of the time).
- 9.8 The Supplier shall ensure the Network supports real-time services (e.g. voice/video calling, telematics, telemedicine etc.) with performance indicators (e.g. jitter, packet loss etc.) in line with recent Industry Standards, or in the absence of Industry Standards, 2ms for jitter, zero point one percent (0.1%) for packet loss for ninety five percent (95%) of the time.
- 9.9 The Supplier's infrastructure shall support Actual Data Speeds and performance that do not degrade below the Gigabit Gold Standard (or where appropriate the Ultrafast Gold Standard) as Take-up of Wholesale Access Products and Services and Wholesale Passive Products approaches one hundred percent (100%) of the Intervention Area (including any part arising from switch-off of Legacy Networks).
- 9.10 The Supplier shall ensure that its Wholesale Access Products and Services are provided on a fair and reasonable basis.
- 9.11 The Supplier shall provide a firm commercial and technical plan which demonstrates that the Actual Data Speeds will not degrade below the minimum requirements including showing the capacity upgrades that will be made to maintain the Actual Data Speeds based on the Supplier's Take-up forecasts for seven (7) years from Achievement of the Stage Two (Build) Complete Milestone.
- 9.12 The Supplier shall provide a suite of Wholesale Access Products and Services that are capable of providing both symmetric and asymmetric services to Service Providers in order to meet the requirements of End Users.
- 9.13 The i.Products and Services table of the Financial Model shall set out the Supplier's range and Wholesale Access Prices which shall be published and made available in a transparent, visible and easily accessible format to Service Providers.
- 9.14 The Supplier shall develop and configure new or existing Wholesale Access Products and Services and Wholesale Passive Products on a regular basis throughout the Contract Period in line with reasonable Service Provider requirements and the goal of maximising Take-up.

Regulatory Framework

- 9.15 The Regulator may mandate a change on the regulatory access requirements for any Communications Provider with Significant Market Power (as defined under the applicable regulatory rules of the Regulator). Where any change places a greater obligation than the wholesale access conditions set out in Paragraphs 6 to 9 of this Specification, any



supplementary or increased regulatory or access requirements shall be deemed automatically included in this Specification, and its terms shall be amended accordingly.

10 Operations

10.1 The Supplier shall provide the same Automated Retail Online Platform (capable of handling volume transactions) for use by all Communications Providers. Where the Supplier is developing new systems and associated processes, these shall align with relevant Industry Standards for the service management.

10.2 The Supplier shall provide a Lead-to-Cash Process to support Communications Providers which, as a minimum, shall include the following:

- (a) order entry;
- (b) order fulfilment such as line testing;
- (c) distribution;
- (d) billing and invoicing; and
- (e) buyer payment/collection.

10.3 The Supplier Solution shall include capabilities so as to be able to service MACDs.

10.4 The Supplier shall provide full OSS facilities to provide high quality and on-going operational management to Communications Providers, and which as a minimum shall include:

- (a) maintaining network inventory (including both physical and logical);
- (b) providing Communications Providers with location-based, capacity management information for all offered products on funded infrastructure;
- (c) provisioning services;
- (d) configuring network components;
- (e) monitoring and managing performance using relevant performance indicators;
- (f) monitoring and managing faults;
- (g) trouble-ticketing; and
- (h) service assurance.

10.5 The Supplier's OSS shall be designed so as to be capable of being scaled to manage increased Take-up delivered by Communications Providers as necessary to a level that at least meets the Supplier's Take-up forecast in the i.Take-up – Connections and i.Take-up –



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Disconnections tables in the Financial Model and can be scaled to one hundred percent (100%) of all End User Premises connected to the Network. All OSS/BSS Supplier systems that are not as at the date of this Contract capable of dealing with the required volumes of operations shall be upgraded as part of the Works so as to become compliant with the NICC business to business specifications or equivalent Industry Standards.

- 10.6 The Supplier shall operate a BSS, which as a minimum shall include the following business to business processes:
- (a) Communications Providers contact service;
 - (b) customer relationship management;
 - (c) order management;
 - (d) order fulfilment;
 - (e) service activation; and
 - (f) billing and invoicing.
- 10.7 The Supplier's BSS shall be designed so as to be capable of being scaled to manage increased Take-up delivered by Communications Providers to the same levels as specified in Paragraph 10.5.
- 10.8 The Supplier shall provide a service management model which describes the processes and communication needed to address disputes with and complaints from Communications Providers, including a dispute escalation procedure.
- 10.9 The Supplier shall have standard OSS and BSS processes and procedures for Communications Providers. These shall, as applicable, comply with the relevant NICC standards, or Industry Standards, or achieve functions/performance levels that are equivalent to or better than those standards.
- 10.10 The Supplier Solution shall enable Communications Providers to adhere to the Regulator's approved code of practice for complaints handling as the same may be amended, updated or replaced from time to time.

11 Service Levels

- 11.1 The Supplier shall include a clear Service Level Agreement for each Wholesale Access Product and Service and Wholesale Passive Product, which as a minimum shall accord with the Supplier's published specifications, Industry Standards or as superseded by the Regulator's prevailing regulation or codes of practice.
- 11.2 The Supplier's Reference Offer shall meet the Actual Data Speed, latency, jitter and packet loss requirements of the Wholesale Access Requirements for each service that is offered.



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- 11.3 The Supplier shall ensure that rectification is completed within typical Industry Standard timescales, supported by demonstrably efficient wholesale service management processes.
- 11.4 The Supplier shall ensure that its Service Level Agreements for appointments, order fulfilment and fault management are completed within typical Industry Standard timescales, supported by demonstrably efficient wholesale service management processes. This shall be supported by the following expected performance standards as a minimum:
- (a) For Wholesale Access Products and Services the Supplier shall maintain and report minimum Service Levels calculated on a monthly basis, in accordance with the Regulator's prevailing relevant regulation or relevant codes of practice or the following:
- (i) completion of eighty eight percent (88%) of fault repairs within two (2) Working Days of being notified;
 - (ii) completion of ninety seven percent (97%) of fault repairs no later than five (5) Working Days after the completion date committed;
 - (iii) provide an appointment for ninety percent (90%) of new service installations with ten (10) Working Days of being requested; and
 - (iv) complete installation of ninety five percent (95%) of connections on the date agreed between the Supplier and the Communications Provider,
- where each of the definition of what constitutes a fault repair, appointments for new service installation and completion of connection installations is in accordance with the Supplier's own standard operating procedures or, where these are not available, in accordance with typical Industry Standards; and
- (b) For Wholesale Passive Products as calculated on a monthly basis based upon the Supplier's corresponding service levels (if different from those set out in Paragraph 11.4(a)) for each Wholesale Passive Product which must as a minimum meet Industry Standards.
- 11.5 The Supplier shall maintain customer Service Levels and Network Availability in line with Industry Standards.
- 11.6 The Supplier shall ensure it does not unfairly discriminate against particular types of Wholesale Access Products and Services and Wholesale Passive Products, Service Providers, End Users or other third parties through, but not limited to Traffic Shaping, Service Level Agreements or other quality of service measures. This shall be set out by the Supplier in each Service Level Agreement.
- 11.7 The Supplier shall proactively monitor and measure Service Levels and Network Availability to Services Providers and/or End Users and shall promptly report any non-conformance to its Service Level Agreements to the Authority (subject to any third party confidentiality obligations).



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- 11.8 The Supplier shall establish a trouble ticketing system which shall be described in each Service Level Agreement for all Wholesale Access Products and Services and Wholesale Passive Products.
- 11.9 The Supplier shall implement and maintain a complaint escalation process which shall be described in each Service Level Agreement for all Wholesale Access Products and Services and Wholesale Passive Products.

12 Project and Contract management

- 12.1 The Supplier shall carry out the Works, and provide the Outputs in accordance with the Project Plan, and shall:
- (a) adopt a standard project management approach; and
 - (b) meet, communicate and cooperate with the Authority as required in accordance with this Contract to allow the Authority to adequately understand progress of the project, Achievement of Milestones and associated issues and risks.
- 12.2 The Supplier shall comply with the Supplier Solution, including:
- (a) its approach to engaging with external stakeholders including:
 - (i) identifying all relevant national, local, community, industrial, environmental and other stakeholders with planned communications for each; and
 - (ii) the complaint handling and escalation procedure for stakeholders;
 - (b) its approach to managing Subcontractors and suppliers in the supply chain, including:
 - (i) identifying which roles and stages are to be undertaken by a Subcontractor; and
 - (ii) ensuring it has an up-to-date overview of its supply-chain and management processes to be used;
 - (c) its approach to cost and quality control measures, including:
 - (i) the processes and procedures for project budget setting and management, and for ongoing cost optimisation and value engineering;
 - (ii) its assumptions used to calculate the level of public sector funding required and the sensitivity of these assumptions;
 - (iii) any contingency included within build costs;
 - (iv) details of the finance management processes, including with respect to audit; and



- (v) quality management process, including standards, tools and key performance indicators used by the Supplier to carry out the Works and/or provide the Outputs;
- (d) its process for maintaining and updating the Risk and Issue Register and method for reporting risks and issues to the Authority;
- (e) its approach to planning, including:
 - (i) the tools, procedures and methods used for programme planning, including any industry-standard frameworks and models to be used e.g. PRINCE 2; and
 - (ii) liaising with local planning authorities, including ensuring compliance with their requirements and co-ordinating street works to avoid unnecessary local disruption. Its approach to wayleaves and contingencies to mitigate against issues such as delays to achieving planning permission, road closure orders etc.; and
- (f) its approach to its contract delivery team, including:
 - (i) maintaining the Key Personnel during the Contract Period; and
 - (ii) ensuring the relevant technical and professional resources are available in the Supplier's organisation to enable the carrying out of the Works and provision of the Outputs (e.g. staff qualifications including details of Supplier Staff training programmes, for each of the following staff groups – back office staff, supervisors, enforcement agents);
- (g) its approach to contract management, including:
 - (i) attendance at the Governance Meetings including delegates, where required; and
 - (ii) timely provision of all meeting slide packs;
- (h) its approach to Reports, including:
 - (i) the timely provision of Reports and any additional requested reports; and
 - (ii) ensuring the relevant technical and professional resources have certified all reports.

12.3 The Supplier shall produce and maintain suitable documentation, information and records such that it can at all times demonstrate to the Authority on request that the Supplier Solution will provide the required Network performance as required by this Specification.



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13 Take-up & marketing

- 13.1 The Supplier shall ensure that the Wholesale Access Products and Services and Wholesale Passive Products support Retail Service Providers in gaining Take-up for the duration of the Contract Period.
- 13.2 The Supplier shall create and deliver within the timescales specified in the Project Plan a detailed marketing strategy (including a programme of activities) which supports the maximum Take-up during the term of this Contract for where applicable, Gigabit Capable Connectivity, Ultrafast Capable Connectivity and all Wholesale Access Products and Services and Wholesale Passive Products.
- 13.3 As a minimum the Supplier's Take-up and marketing strategy shall provide for:
- (a) white label generic unbranded marketing to encourage maximum End User Take-up;
 - (b) white label generic unbranded marketing approaches for where applicable, Gigabit Capable Connectivity and Ultrafast Capable Connectivity campaigns;
 - (c) the establishment of a marketing resources to support Take-up; and
 - (d) a range of marketing communications channels (examples: web, social media, newspaper, radio, brochures, stickers etc.) to ensure maximum coverage of information during the Network deployment.
- 13.4 The Supplier shall propose a methodology for measuring Take-up and also set out how Take-up will be validated and shared with the Authority as part of its Supplier Solution.
- 13.5 The Supplier shall provide reports on the adoption by Service Providers of Wholesale Access Products and Services in accordance with the requirements of the Stage Two Progress Report and the Stage Three Report.
- 13.6 The Supplier shall engage with local businesses, residents and communities to provide information in respect of deployment of the Network and general information relating to the type of services that will be made available by Service Providers in order to stimulate Take-up.

14 Social Value

- 14.1 The Supplier shall comply with the Social Value Plan in accordance with Clause 46 (Social Value).



Annex 1 – Premises and Intervention Areas

1 Initial Scope

i. Build plan - Premises tab of the Financial Model referred to in Schedule 3, Annex 1

2 Deferred Scope

i. Build plan - Premises tab of the Financial Model referred to in Schedule 3, Annex 1

Annex 2 – Average Connection Life

2.1 For the purpose of calculating the Final Active Services Take-up Clawback Amounts and the Final Passive Services Take-up Clawback Amounts, the formula for calculating the Average Connection Life is set out below:

Average Connection Life = (A*B)/C where:

A = Connection Life for each technology

B = Number of Eligible Premises

C = Total Number of Premises

Example 1:

Technology Type	Connection Life	Number of Eligible Premises
Technology Type 1	10 years	1,000
Technology Type 2	20 years	4,000
Technology Type 3	30 years	2,000

$$\text{Average Connection Life} = \frac{10*1,000+20*4,000+30*2,000}{1,000+4,000+2,000} = \frac{150,000}{7,000} = 21.42 \rightarrow 21 \text{ years and 2 quarters}$$

The final step is rounding up to the nearest quarter

Example 2:

Technology Type	Connection Life	Number of Eligible Premises
Technology Type 1	10 years	2,000
Technology Type 2	20 years	0
Technology Type 3	30 years	3,500

$$\text{Average Connection Life} = \frac{10*2,000+20*0+30*3,500}{2,000+0+3,500} = \frac{125,000}{5,500} = 22.72 \rightarrow 22 \text{ years and 3 quarters}$$