FIG Strategic Telecoms Review

Part B – Technical and Regulatory Recommendations

Confidential

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Prepared for:

FIG

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1. Introduction

Background

The Falkland Islands Government (FIG) has engaged Cartesian and Preiskel & Co to conduct a Strategic Review of the telecoms infrastructure and services in the Falkland Islands with the goal of recommending licensing, regulatory and technical options to FIG.

The current incumbent, Sure, is owned by Batelco, which acquired the business from Cable and Wireless in April 2013. Sure holds an exclusive licence to provide telecom services in the Falkland Islands. The licence may be terminated any time after Dec 2019, with the 5-year notification period given from December 2014. FIG is seeking recommendations with respect to both the renewal of Sure's exclusive licence agreement, as well as potential changes that are required to the regulatory framework.

Objectives and Scope

The core objectives of this engagement are to:

- Perform a comprehensive technical appraisal of existing telecommunications infrastructure and services in the Falkland Islands;
- Conduct a critical appraisal of the effectiveness of the current exclusive licence arrangement for the provision of telecommunications services across the Falkland Islands;
- Make an independent appraisal of technical options (both proven and emerging) that may have applications in the Falkland Islands in the future (with due regard to the specific social, economic and political factors in the Islands); and
- Evaluate options and provide recommendations based on the information resulting from the above appraisals.

This assessment is focused on telecommunications provision within FIG's jurisdiction, as outlined in the 1988 Telecoms Ordinance; it does not consider specific telecommunications services and infrastructure being provided to the military and FCO outside of the current exclusive telecoms licence.

This piece of work is separate to the Price Cap review that is currently being undertaken by the economist Chris Doyle. As part of this assessment, we have been requested to provide an opinion as to whether the Price Cap mechanism has achieved its desired outcomes.

Report Format

Based on consultation with FIG, the final version of Cartesian's report has been divided into two sections as follows:

Part A – Landscape Assessment: includes an assessment of the telecommunications infrastructure and services provided by Sure, as well as a review of the current telecoms regulatory situation in the Falkland Islands. It also compares the services provided versus those offered in other benchmarked markets, as well as provides a summary of the key priority market issues which to address.

Part B – Options Identification / Assessment and Final Recommendations: assesses and recommends a number of technical and regulatory enhancements aimed at addressing the key market issues, as well as provides recommendations to support FIG with respect to negotiating the exclusive licence currently in place with Sure.

A redacted version of Part A has been prepared for public distribution, and due to the confidentiality of Part B, this is currently reserved for FIG internal purposes only.

2. Executive Summary

2.1 Context

This document is the second part of the report (Part B) which Cartesian and Preiskel & Co have prepared for the Falkland Islands Government. This executive summary provides the summary for the end to end report (including Part A and Part B), whilst the main body of the report focuses on Options Assessment and Recommendations.

The Falkland Islands telecoms market is served by Sure Falkland Islands under an exclusive licence agreement with FIG. The licence may be terminated any time after Dec 2019, with a 5-year notification period given from December 2014.

The purpose of the strategic review is to undertake an appraisal of telecoms services and infrastructure, as well as the current regulatory environment in order to evaluate and recommend the optimal approach to licencing, regulation and technical investment within the telecoms sector.

2.2 Market Landscape

2.2.1 Telecom Services Overview

The Falklands Islands telecommunications market (considering only the revenues of the telecom incumbent) was estimated at £8.3M in 2013, slightly down from £8.5M in 2012 (based on financial accounts from Sure). Overall total revenue has grown at an annual rate of 7% since 2009, with a dip of 2% in 2013.

Commercially, Sure offers fixed telephony, broadband, mobile services and a range of business services including leased lines. Sure also offers a Wi-Fi service that can be accessed from public hotspots across the Falklands Islands, which is most heavily used by military personnel in MPA.

The two largest revenue streams are internet services and mobile services, driving 34% and 21% of total revenues respectively. In line with markets internationally, fixed telephony revenues have decreased, at approximately 10% year on year since 2009, contributing to 17% of total revenues in 2013.

Inbound roaming (calls made by tourists and temporary residents whilst in the Falkland Islands) and Wi-Fi hotspot usage contributes to 44% and 36% respectively of mobile and broadband revenues, demonstrating the importance of temporary residents, business visitors and tourists to the Falkland Islands' telecommunications market.

Our benchmarking shows that mobile and fixed telephony prices are reasonable and in a number of cases lower than the international benchmarks that Cartesian have reviewed (e.g. domestic calls, local SMS), and in terms of broadband, the key issue is with respect to limited data caps and overage charges, rather than the headline subscription fees. The free night time window (where all internet usage is zero rated

between midnight and 6am) has helped reduce the effective rate paid per MB, however, we have noted significant social implications of the service, particularly with respect to fatigue and children having unmonitored internet usage whilst using the internet late at night.

The B2B services offered in the market are relatively basic compared to markets internationally. Sure has selectively developed custom solutions such as international connectivity access (e.g. oil and gas customers), a Wide Area Network connecting education centres (public sector), and showcased a video conference facility for Stanley hospital. We do believe there is room for further innovation, particularly with respect to broadband billing and pricing propositions.

2.2.2 Infrastructure / Technical Assessment

Given the small market size (less than 5,000 population when including the Falkland Islands' resident military personnel, families and supporting civilian contractors) and the challenging geographic characteristics of the Falklands, Sure has built out a solid fixed and mobile infrastructure. In particular, Sure has taken seriously the commitment to provide communications in Camp even though they are likely to achieve limited, if any returns from customers served in Camp.

For fixed telephony and broadband, 100% of households in the Falkland Islands receive service. Mobile coverage currently stands at 95% of population and 40% of landmass, with the main coverage gaps in West Falkland and Lafonia.

The key concern is associated with the age of both its 2G network, and fixed wireless (WiMAX) network in Camp which are both due for renewal. Added to this, both the current 2G and WiMAX infrastructure vendors have entered into administration, increasing the need to swap out both networks. However, we understand from Sure that they have stockpiled a number of network spares, enabling them to safely provide in Camp voice and broadband for a further 5 – 10 years.

In terms of international capacity, Sure has taken effort to increase capacity which has grown from 25 Mbps to 68 Mbps over the last 15 months. However, it is clear that whilst there has been a significant proportional uplift, in absolute terms the current levels of capacity are insufficient to meet the current and future usage needs of the Falklands Islanders.

2.2.3 Financial Assessment

There is perception in the market that Sure is making "excessive" financial returns which is a common concern amongst the business and residential community in the Falkland Islands. To better understand the financial performance of Sure we have reviewed their financials against a number of benchmarked operators. A range of profitability and investment metrics have been considered based on 2013 data including EBITDA, capital intensity, ROCE and RoA.

Sure's operations in the Falkland Islands have lower rates of capital intensity and higher rates of ROA/ROCE compared to the other benchmarked companies. However,

it needs to be taken into account that the levels of investment for 2013 (and largely for 2014, too) were set by CWC prior to the Batelco acquisition, and it is likely that investment was low in 2013 due to uncertainty with respect to the licence renewal and planned disposal of the business by CWC. Looking forward, we believe the investment ratios will become more aligned with international benchmarks, following new LTE infrastructure roll-out which would be agreed as part of the licence negotiations between FIG and Sure.

Sure's EBITDA margin increased from 44% in 2012 to 48% in 2013, which is significantly higher than the benchmarked operators ranging between 13 and 41% EBITDA margin. Again, a number of similar considerations need to be taken into account when using this comparison, such as CWC's likely intent to minimise OPEX and CAPEX costs prior to the disposal of Sure in order to maximise the valuation of the Falkland Islands' operation, and different characteristics of the benchmarked countries in terms of market size, dynamics and ownership profile of the operators in those markets. Whilst the EBITDA margins are higher than average, the absolute returns generated remain small. Any telecoms operator operating in the Falkland Islands will require a minimum level of absolute returns in order to justify operating in the Falkland Islands.

2.2.4 Regulatory Assessment

The current licence issued to Sure is an "exclusive licence" for the operation and provision of telecommunications services in the Falkland Islands. The Telecommunications Ordinance 1988 (the "Ordinance") is currently the legal basis for the regulation of telecommunications services in the Falkland Islands. Whilst it has been amended on a number of occasions between 2000 and 2013 in order to introduce certain regulatory measures such as the price cap regulation, it is now dated and requires a refresh to ensure it is relevant to the current and future provision of telecommunications services in the Falkland Islands.

The Price Cap Review was set up by FIG in September 2012 to specifically address broadband pricing issues. Whilst the Broadband Service Obligations had initial success in increasing broadband speeds and data caps, the Price Cap formula itself has not achieved the desired impact of reducing broadband pricing and spend. Based on the current formula and higher than anticipated inflation, it has allowed Sure to accumulate a large carry-over factor, meaning that Sure could decide to increase broadband service prices, and still be compliant with the price-cap regulation. Looking forward the price cap formula will need to be reviewed taking into account broadband usage, pricing packages and overage spend currently experienced in the market.

From a regulatory perspective, there are a number of gaps within the current regime which raise uncertainty as to the scope of the licence and the extent of obligations placed on Sure. For example, rules with respect to VSAT supply will need to be clearly defined in the new Ordinance and licence (note, we recommend that VSAT self-supply is not allowed at this stage). Other areas include Universal Services Obligations (USO), where there is reference to the universal services concept with regard to telephony

services, although no commitment with respect to the provision of broadband in Camp. Likewise, there is no clear customer protection framework in place today to address customer billing issues, or provisions with respect to Service Level commitments placed on Sure. Defined policies around co-investment in infrastructure, as well as issuing and managing spectrum are also excluded from the existing regulatory framework. These and other points should be addressed by FIG in a full regulatory review.

2.2.5 Summary of Key Market Issues

Our assessment has identified fixed broadband pricing as the single biggest issue for residential and business customers, with many exceeding their monthly broadband allowances on a regular basis. The current pricing plans are not aligned with customer usage profiles, ultimately resulting in high overage charges for those that exceed their usage bundle. For example, an average broadband subscriber consuming ~8,000 MB per month (this figure includes corporate subscribers) needs to subscribe to a Business grade package. As a result, bill shock is common, with the situation being more akin to mobile roaming in Europe, prior to the introduction of preventative billing policies, which were introduced following regulatory intervention.

Other major issues cited include limited fixed broadband access speeds particularly for Wi-Fi hotspots users, broadband stability concerns noted during the night-time window, limited mobile coverage across Camp and constraints with current international capacity levels. The issues are not standalone. International capacity is a major supply side issue having a detrimental impact on both cost (once overage is taken into account) and user experience, which will be exacerbated once faster mobile broadband is deployed.

The age of both the 2G network across the Falkland Islands, and WiMAX network in Camp are the major infrastructure concerns that need to be addressed. Sure already has plans in place to upgrade the 2G network, as well as deploy LTE in Stanley and MPA once new licence terms are agreed.

2.3 Technical Enhancements and Recommendations

2.3.1 Approach

A number of technical enhancements have been evaluated for potential deployment in the Falkland Islands. The initial list has been filtered according to three criteria: realistic timeframe/maturity of the solution, issues it addresses and cost to implement.

Of the eight short-listed enhancements, we have prepared a detailed financial assessment and evaluation of the most suitable deployment scenarios for two: (1) Wireless Network Upgrade, and (2) International satellite capacity expansion.

Of the remaining four initiatives we have completed a higher level review without building out a business case for each. This applies to: ADSL to ADSL 2+, CDN and

transparent caching, and enhancing traffic management, and enhancing billing and commercial propositions.

2.3.2 Wireless Network Upgrade

We have examined alternatives to enhance wireless access in the Falkland Islands, both for fixed services (e.g. current WiMAX network in Camp) and mobile services (currently 2.75G services in Stanley, MPA and limited parts of Camp).

The 2G network equipment is in urgent need of replacement, as it is already 10 years old and the equipment vendor went into administration. We also recommend that LTE (aka 4G) is deployed in the existing 2G towers to deliver very fast mobile broadband capabilities.

Sure's WiMAX equipment vendor also went into receivership in 2013. As a result, we recommend that the WiMAX network is upgraded to LTE over the next few years. The areas in Camp with WiMAX coverage but no mobile signal would after the upgrade have mobile LTE coverage delivering voice (Voice over LTE, aka VoLTE) and fast mobile broadband. We believe that LTE can deliver equivalent coverage levels to WiMAX, especially if used at relatively low frequencies (e.g. 800 MHz).

We analysed the high level costs of three wireless upgrade scenarios, ranging from a more conservative approach where WiMAX is not replaced until 2019 to an aggressive LTE upgrade scenario, which would see LTE fully deployed by 2017 (which would include two new sites improving coverage in Lafonia and in North Arm). The total costs over 4 years range from GBP2.9M to GBP3.1M depending on the scenario selected. We recommend that Sure provides a detailed cost analysis to validate these findings. We also recommend that LTE is rolled out in Stanley/MPA first and, depending on the number of years that Sure can support WiMAX (equipment available), Sure and FIG should agree on the timescales to roll out LTE in Camp. This will also help push out the CAPEX required for Camp which could potentially be used for other capital projects.

2.3.3 International Capacity Expansion Options

The current international capacity restrictions, resulting in low broadband data caps and high overage charges, are the most critical pain points in the Falkland Islands telecommunications sector. We have evaluated different usage scenarios, as well as current satellite technologies to increase the international bandwidth, and the associated costs over a 4-year period.

C-band is used by Sure's current satellite provider, and it provides the highest levels of signal stability and robustness, even in harsh weather conditions. Additionally, it requires low levels of investment as existing equipment would not need to be replaced. On the downside, it provides lower bandwidth levels than other bands and high latency due to the large distance of the satellites from the Earth.

O3B's satellites operate at Ka-band, with medium-orbit satellites. It offers high capacity, lower transmission unit costs and significantly lower latency due to the satellites' lower orbit. On the other hand, service availability is lower, and significant

levels of capital investment required (new, more complex antennas would have to be built).

We have assessed a combined C-band + Ka-band scenario, due to their complementary characteristics, as well as continuing with a standalone C-band solution. Additionally, we have analysed the cost implications of adding a CDN + transparent caching to the aforementioned satellite options.

We recommend a moderate uplift usage scenario, with 400-500 Mbps capacity by the end of 2019 which would allow dramatic increases to the data caps. A hybrid C-band + Ka-band solution is the optimal satellite option to deliver this usage scenario, delivering significant OPEX cost savings compared to the C-band-only option. C-band alone would be too cost prohibitive to deliver the proposed uplifts in international capacity. Traffic optimisation would potentially deliver some additional OPEX cost savings as well as increase customer satisfaction while providing a new revenue stream. The high level 4-year OPEX estimates for the proposed solutions range between GBP 4M and GBP 4.7M. See section **Error! Reference source not found.** for further details.

FIG should invite Sure to submit a detailed business case for expansion of the international capacity according to the recommended scenarios, as well as any other scenarios that Sure would like to propose. The negotiation regarding licence renewal should be conditional on Sure's commitments to expand the international capacity. As part of this exercise, Sure should also prepare a detailed CDN and transparent caching review to assess the implications for international capacity requirements. See section 2.3.5 for further details.

2.3.4 ADSL to ADSL 2+

Sure's network is already capable of supporting ADSL2+, which can deliver speeds of up to 22 Mbps (the actual speed would depend on the distance of the premise from the exchange). As a result, this enhancement is relatively simple to deploy and has a low initial cost. Depending on the equipment installed there could be a requirement to replace the modems, although again the cost would be relatively small.

This enhancement has a dependency on the international capacity upgrade, as improving the access network speeds without increasing the international capacity would not necessarily deliver the expected speed improvements.

2.3.5 CDN and Transparent Caching

Transparent caching and CDN (Content Delivery Network) are two solutions which could reduce the international traffic requirements. Transparent caching dynamically stores popular content in local servers, while a CDN solution consists of a locally-hosted server which stores the pre-set content (e.g. video), and requires specific partnerships with content owners or third party content distributors. CDN would require zero-rating of the traffic from/to the CDN storage server. Customers would

subscribe to this service, providing Sure with an additional revenue stream while ensuring high degrees of customer satisfaction.

Sure already has some limited caching capabilities, and has arguably implemented a mini-local CDN service in the past to host specific content (e.g. TV footage of the Commonwealth Games). We recommend that Sure initiates discussions with potential transparent caching and CDN providers (e.g. boutique CDN aggregators such as SnapTV and Vubiquity), to assess the viability of these solutions. This should be part of Sure's wider content strategy definition, which would include a detailed traffic profile assessment to estimate the proportion of traffic that could be delivered via transparent caching and CDN services, as well as a cost-benefit assessment, including assessment of likely adoption of potential content services. At this point, Sure will be able to conclude the optimal solutions which to pursue.

2.3.6 Implement Enhanced Data Traffic Management

Data traffic management policies currently enforced by Sure are limited to minimising P2P traffic during the night-time window, ensuring that P2P does not utilise the entire capacity. Sure could potentially implement more advanced traffic management policies where it is able to set different CoS's (Classes of Service) for different application types. For example, VoIP traffic can be prioritised over email traffic and cannot be buffered, as delays in a call severely degrade the customer experience.

As a result, Sure could guarantee a particular Quality of Service (often measured in jitter, packet loss, and latency) for an application or a user while still allowing other traffic to use the remaining bandwidth. This would allow Sure to offer differentiated services such as superior voice and video quality of service, providing a new revenue stream for Sure while increasing customer satisfaction.

2.3.7 Advanced Billing and Pricing Initiatives

There are a number of billing initiatives that Sure could deploy to avoid customer bill shock, especially with fixed broadband as is the key issue observed in the market. Some of these features would also enable Sure to earn incremental revenues through charging a fixed monthly fee, whilst others may encourage incremental spend (resulting from users having greater transparency and control over spend).

We recognise that executing any of the proposed billing initiatives will be determined by the capability of Sure's billing systems. As part of the Price Cap and Customer Protection regulation to reduce bill shock we propose that Sure presents potential solutions to FIG. Select examples are as follows:

- **Cut off service:** Once the cap has been exceeded by a pre-defined level (e.g. £50) the user would be cut off or severely throttled, and would need to opt-in to incur out of bundle overage charges.
- **Add on Bundles**: Data bundles can be opted into upon reaching the monthly allowance such as 0.5 GB, 1 GB or 5 GB) to address different usage needs.

- **Data Booster**: Customers can opt to receive increased usage allowance (as well as potentially guaranteed bandwidth) for a limited period to enable specific high bandwidth consuming activity (e.g. video streaming).
- **VPN-as-a-Service for businesses**: Users are able to access local servers remotely with traffic zero-rated. A monthly charge would be levied for these services.
- **Wi-Fi hotspots differentiated pricing:** We propose that Sure implements a differentiated price plan for regular users which could consist of weekly or monthly bundles, or data-based bundles.

2.4 Regulatory Enhancements and Recommendations

The regulatory options assessment is provided at two levels: firstly at a strategic level assessing the options open to FIG with respect to issuing a new licence to Sure, and secondly at detailed level with recommended regulatory measures to address the key market issues.

2.4.1 Strategic Level Assessment

The strategic assessment addresses the immediate decision whether to serve notice or not to Sure. We have assessed six alternative options open to FIG, three of which are focused on serving notice to Sure, and three options focused on not serving notice and negotiating new licence terms with Sure.

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2.4.2 Regulatory Measures and Enhancements

To achieve a successful outcome to the exclusive licence negotiations with Sure, a number of regulatory principles and commitments should be agreed upon, even if the precise terms and conditions are not finalised as part of the licence award. The main areas are as follows:

Key Licence Terms: We propose a licence period with an initial term of 10 years, with a notice period set at 3 years within the first 10 years, and 2 years thereafter. The licence would be exclusive, subject to satisfactory compliance of Sure with the relevant KPIs and service levels.

Updated Price Cap Review: To enhance and overcome shortcomings with the existing Price Cap, facilitating the reduction in overage charges, increase in broadband usage caps and potentially the launch of new pricing packages. A Satellite Capacity Obligation should also be incorporated into the price cap to ensure a managed increase in international capacity, along with an update to the current formula which should take effect once the current pricing issues are addressed.

Customer Protection Regulation: To force Sure to initiate further notification and billing initiatives to reduce and eliminate bill shock either through the ability to cut or severely throttle service, or for the customer to opt into a data bundle to avoid overage charges.

USO: To define obligations under which Sure would be required to roll out and serve customers with LTE based fixed telephony and broadband services in remote areas. The level of co-investment by FIG would be agreed as part of the USO.

Service Level Regulation: To define a minimum set of standards that Sure should meet with regards to all key services in order to ensure acceptable service levels. Publishing the data and potentially having comparisons with international benchmarks will provide much greater transparency in monitoring Sure's service.

Spectrum Management and Licencing: For FIG to proactively manage spectrum and issue spectrum licences accordingly. This is most relevant for imposing specific coverage and roll-out obligations for LTE (including timeline for deployment) to help address current coverage issues.

VSAT Regulation: To develop a VSAT class licence structure where VSAT licences can be issued if Sure does not meet its licence obligations with respect to broadband pricing. Potential scenarios are as follows: (1) issue VSAT licence to Sure to resell VSAT services at pre-defined price or margin level, and (2) issue VSAT licence to a 3rd party for local VSAT distribution in the Falklands Islands. Note, self-supply would not be permitted under these scenarios unless either option above does not meet its desired aims. Separately, we recommend issuing Special Events VSAT Licences for organisations / businesses that have specific temporary requirements (e.g. live TV broadcasting).

In addition, we also recommend that FIG sets up a range of other policy enablers to ensure the successful implementation of the above stated regulatory measures. These are as follows:

Telecoms Policy Framework: To define FIG's strategic objectives with respect to telecoms services, and establish a regulatory framework for telecommunications. Defining a clear strategy for telecoms will help shape future investments and priorities for the telecoms sector.

Co-Funding Framework: To define a clear and transparent process for the application and award of joint funding for capital investment projects. For example, this is relevant for Sure in preparing an investment case for international capacity expansion, or LTE deployment in Camp, with clear guidelines for ownership of assets

Telecoms Ordinance Refresh: The Ordinance is now outdated and should be refreshed to remove inconsistencies between the new licence and the Ordinance, and to take into account new provisions and regulations set out above, as well as other gaps in the current framework.