1. INTRODUCTION AND SUMMARY

On 10 July 2003, Cable & Wireless (Cayman Islands) Limited (C&W), the Governor in Cabinet of the Cayman Islands, and the Information and Communications Technology Authority (ICTA) entered into an agreement to liberalize the telecommunications sector for the Cayman Islands (the Agreement). Part 4 of Schedule 4 to the Agreement requires the creation of a new costing model to be used for the Cayman Islands that is to be a forward-looking long-run incremental cost (FLLRIC) model. Section 50 of Schedule 4 of the Agreement lays out the process to create the model, including an estimated 10 month proceeding to be conducted by the ICTA (the Proceeding) to be commenced by the filing by C&W of a proposal on FLLRIC principles and parameters. In addition, C&W is to provide in that submission an estimate of the length of time and estimated costs to implement the proposed FLRRIC methodology.

C&W is pleased to provide the ICTA with this proposal for the FLLRIC principles and parameters, as required under Section 50 of Schedule 4 of the Agreement. As required by the Agreement, this document has been prepared by C&W such that it complies with legislation and follows best practice requirements adopted in other regulatory jurisdictions, such as Canada, the USA, UK, EU and Australia. It also includes estimates of the length of time and cost of the modeling based on the proposed methodology.

The three fundamental objectives and outputs of the cost model are to use the FLLRIC cost standard for:

- Interconnection services – as such, the cost modelling should therefore be structured in such a way that the cost of a sufficient set of network elements can be estimated.

- Imputation tests – the cost model needs to cater for an appropriate number of retail service costs such that imputation tests required for retail services can be accurately carried out.

- Quantification of the access deficit – the cost model will estimate costs of different networks, including the access network. Based on the FLLRIC costs of the access network, the regulator will be able to determine the size of the access deficit.

C&W envisages that the list of anticipated outputs will be included in the issues that need to be fleshed out during the consultative period. However, to a great extent, the list is likely to remain open-ended in the sense that no-one can know what services may be the subject of regulatory scrutiny. Moreover, the FLLRIC model might be used for other purposes than those specified above in the future. One attribute of the chosen approach to costing, then, should sufficient flexibility to accommodate diverse applications.

As will be detailed below, C&W proposes a total service incremental costing methodology with a bottom-up approach to capital (retail and network) costs and an activity-based approach to operating costs. We propose a provision for an equi-proportionate mark-up to cover shared fixed and common costs. It is expected that certain areas of detail may be subject to change as the ICTA conducts a public consultation during the next 10 months. Therefore C&W reserves the right to alter its position and proposals throughout the Proceeding. C&W suggests that it may be fruitful as a next step for C&W to meet with the ICTA staff to discuss the procedures for the Proceeding. C&W would be pleased to arrange such a meeting at the ICTA's convenience.

With respect to length of time and cost of the FLLRIC modeling, we set out our best estimate based on proposals from four consulting companies with extensive and recognized experience in such work. We note that two of the consultancies have direct experience with Phase II costing in Canada, which as discussions between ICTA and C&W indicate, may be relied upon for particular aspects of the chosen costing approach.

The time requirements outlined in the consultant's proposals are consistent with the 12-month period envisaged in the Agreement (see section 50(d) of Schedule 4). The estimated costs of the project will vary as to the level of resource available within C&W Cayman and other factors, but can be expected to be around US$550,000. We emphasize that all the consultants assumed that costing the approach is agreed in advance and is carried out without revision over the course of the modeling. Thus, continued negotiation between the regulator and C&W over costing methodology post consultation could result in higher cost and delay.

2. PRINCIPLES

In developing a LRIC cost model, C&W proposes to adopt the following principles:

- **Competitive market standard** – the costing methodology should lead to results that approximate the costs that would arise in an efficient competitive market, rather than reflecting historic costs.
- **Complete accounting** – consistent with the long-run timeframe, the costs associated with provision of a service should reflect all relevant operational expenditure and capital-related costs.
- **Cost causality -** costs are attributed to a service on the basis of underlying cost drivers. This principle has implications for cost allocation: only costs associated with the relevant increment of service provided are included in costing. It also has implications for the structure of cost-based pricing, e.g., time of day, distance

dependent and separation of per-call and per-minute charges will follow from the underlying cost structures.

- **Transparency** - Transparency implies that the processes for generating cost information are clear and understandable, and that the numbers are objective and based on verifiable data.

  - Objectivity implies that that the information is based on facts rather than subjective judgement. Where the information is objective, two reasonable people would produce the same results from the same data. For example, an allocation based on trouble reports is objective – it is based on facts and any two individuals using the same trouble reports would produce the same allocation. A cost allocation based on a management estimate of time is relatively subjective and different individuals may produce different estimates.

  - Verifiable means that the information can be checked against credible evidence. For example, historical costs can usually be checked back to invoices or other purchase documents. In contrast, an estimate of current cost that is based on a verbal quote from a supplier is inherently less reliable.

  Transparency enhances the credibility of the costing information, and therefore its value. Where the processes for producing the costing information are clear and understandable, and the cost information is objective and verifiable, there is a higher level of confidence that the information is free of manipulation.

- **Proportionality and Reasonable Administrative costs** – The effort and resource required to produce the required information should be reasonable. In determining the type of information to be produced, the detail to be provided and the support required for the information, the value of any incremental improvements in the value of the information must be weighed against the associated incremental administrative costs.

3. OVERVIEW OF APPROACH

Consistent with the principles above, our proposed approach incorporates the following attributes.

- a forward-looking view of costs;
- the size of the increment is defined as the total service, and TSLRIC the appropriate cost standard;
- shared fixed and common costs are recovered through equi-proportionate mark-ups;
- bottom-up approach to modelling network and retail capital costs;

- operating costs to associated with retail, wholesale and interconnection service provision, will be derived from current costs allocated from an activity based costing system; and
- the company should be allowed to earn a reasonable return on its investment, equivalent to the weighted average cost of capital (WACC).

The following section deals with each of these attributes or parameters in turn.

4. KEY PARAMETERS

4.1. Definition of forward-looking

If LRIC is to provide efficient price signals to the market then the result must reflect the forward-looking cost of building and operating a modern telecommunications network. Forward-looking costs reflect those which will be incurred in the future to meet future objectives and, as such, some judgment is necessary in estimating them. Forward-looking costs differ from historic costs in a number of ways. Forward looking costs might be expected to differ from historic costs as a result of technological change, price inflation (general and specific), and the fact that historic costs were incurred to meet past objectives and might now diverge from what is currently required in light of current needs.

There are a variety of ways that forward-looking costs can be captured. In an approach taking existing costs as a starting point, e.g. a "top-down" LRIC approach, current cost accounting techniques can be used to "bring forward" historic costs. For example, with respect to network assets, old assets can be indexed to their replacement value. In a "bottom-up" approach, forward-looking costs can be derived from engineering a new network to provide equivalent volumes of services. During the negotiations between C&W and the ICTA leading to the Agreement, a key issue was whether to adopt top down or bottom up modelling. At one point the parties seemed to appreciate that a fair solution may be a hybrid of that approach as reflected in the Phase II methodology used by the Canadian Radio-television and Telecommunications Commission (CRTC) in Canada. That led the parties to include, in section 48 of the Schedule 4 of the Agreement, a reference to the FLLRIC model drawing on elements of the Canadian Phase II approach. In section 4.4 and 4.5 we propose a hybrid approach that we believe capture the intent of Phase II requirements in Canada in this regard.

4.2. Size of the increment and cost standard

Incremental cost is a generic cost concept, defined as the increase in a firm's total costs as a result of an increase in output, or the costs avoided if output falls. LRIC includes all variable (i.e. volume sensitive) costs, as well as the fixed costs specifically relevant to the increment of output under consideration. Fixed costs that are shared between, and common to, a number of services are not included (as they will not be avoided if an increment of output of a particular service is no longer provided).

A fundamental consideration is identifying the relevant increment in any LRIC based approach. The size of the increment can be defined as the incremental cost of the increment of additional volume demanded, e.g., the volume of competitor interconnection traffic for an incumbent conveyance service. We will refer to this as the "Growth Service" increment approach. Alternatively, the increment may be the total volume of the service taking into account the operator's own customer demand as well

as that arising from competitors and other third parties. This is referred to as the "Total Service" increment approach.

For interconnection, we believe that the Total Service increment is the appropriate increment. There are four justifications for adopting a Total Service increment approach. Firstly, defining the size of the increment as additional or new volume (as is done in the Growth Service increment approach) would result in the incumbent operator bearing all service-specific fixed costs associated with bearing that volume. Since service-specific fixed costs are likely to be significant and will include, in the case of traffic termination for example, the fixed costs associated with the local exchange itself and most duct costs on routes used by the transmission network. In this case, using interconnection traffic to measure the size of the increment could lead to under-recovery of the incumbent's costs.

Secondly, the Total Service increment approach does not require an ordering of volume types based on which operator or customer originates the volume. The importance of this consideration is clearest in cases in which services are provided over new facilities or when new services substitute for existing services. If the incumbent establishes new facilities used both by itself and third parties, it is unclear which demand should be treated as incremental. If mobile traffic substitutes for fixed network traffic but both are using the same facilities, the net increment may be low (or even negative) but total traffic costs must still be recovered.

Thirdly, under a Growth Service increment approach, the competitor benefits from all the scale and scope economies associated with the required inputs in the provision of a given service. These are benefits that should be shared among all carriers.

Fourthly, the Total Service increment concept is more consistent with a forward-looking approach. Under a forward-looking approach it is assumed that the network is dimensioned to accommodate forward-looking market traffic irrespective of where the traffic originates or in which order.

Most of the telecommunications regulators in the European Union[1], the regulator in Australia[2], and the state and federal regulators in the United States[3] have, therefore, used the total service as the increment in defining LRIC. As it is widely adopted best international practice, C&W also proposes to adopt Total Service Long Run Incremental Cost (TSLRIC) as the relevant cost standard.

4.3. Treatment of common-fixed and shared fixed costs

There are two types of fixed cost that are not attributable to specific services and therefore require special consideration in cost modelling:

[1] See 8th EC Implementation report, Annex 2, Table 2.

[2] See for example, ACCC, Access Pricing Principles-Telecommunications, 1997.

[3] See, for example, the First Report and Order in the Matter of the Local Competition Provisions in the Telecommunications Act of 1996.

- **Shared fixed costs** – fixed costs associated with the supply of a group of services comprising more than one, but less than all, of a firm's services. Examples include trenches that are shared between the access network and the core network, and transmission link costs in the core network which are shared between leased line and PSTN services.

- **Common fixed costs** – fixed costs associated with the supply of all services produced by a firm. Common fixed costs typically include, for example, the general manager's remuneration.

Strictly speaking, the use of a LRIC model implies that shared fixed costs and common fixed costs are not included in cost estimates for interconnection services. However, these costs must be recovered. If not, the regulated firm will face a shortfall between revenues and (an efficient level of) costs. It is therefore important that where LRIC is used as the basis for setting interconnection prices, a mark-up should be allowed for the provision for the recovery of fixed common and joint costs. Regulators around the world have recognized this and included a mark-up on interconnection charges to recover a proportion of such costs.

Of course, if all such costs are recovered through interconnection charges, they may over-recover revenue in total (depending on how other services are priced). In a competitive market, a given service would recover only a portion of such costs (as would be incurred by an efficient operator), and not all such costs.

There are a number of potential methodologies for calculating the value of the mark-up that have been considered by most regulatory authorities:

- Equi-proportionate mark-up (EPMU)
- Ramsey pricing
- "Judgement" value

EPMU is the most commonly accepted and applied approach, mainly due to its ease of implementation. EPMU is used in Australia and the UK, as well as is the form of mark-up that has been recommended by the EU for its national regulators to implement. EPMU attributes common and shared fixed costs in relative proportion to the underlying LRIC values. Regulators have also accepted Ramsey pricing, particularly with regard to calculating mobile termination rates. The key difficulty in implementing Ramsey pricing is the need to estimate demand elasticities and cross-elasticities, which introduces a degree of subjectivity and uncertainty into the model.

In some cases, such as Canada, the mark-up does not come from a consistent costing exercise, but is arrived at through consideration of information from a number of sources. For example, Phase II costing first contained an allowable mark-up of 25%, which was based on data from an estimate of fixed and common cost and a number of

other factors. This percentage was officially subsequently lowered on the basis from data associated with outside plant, but generalized to a number of other services. In reality, it is generally accepted that the Canadian mark-up was an arbitrary number that has never been properly justified. Clearly such an approach violates a number of the principles C&W has proposed in section 2 including that for Transparency (as it is not objective or verifiable) and Complete Accounting.

As C&W will have the means to develop a consistent model that captures an accurate level of fixed shared and common costs, it believes it can derive a more economically justified value.
As a proportionate and economically based means of arriving at an appropriate mark-up, C&W proposes to adopt the EPMU approach, which is consistent with that used by regulators in the EU and Australia. It is also an approach which uses actual costs and thus is consistent with the intention of the Act.

4.4. Bottom-up approach to network capital costs

The approach we propose to adopt for modelling capital costs is usually described as "bottom-up" modelling. We estimate the cost of re-building C&W's forward looking network(s) using modern equivalent assets, assuming the network must carry projected traffic levels of C&W's own traffic and interconnection traffic at the existing grade of service, and assuming that the network is operated efficiently.

Network topology deserves special attention in this context. Two alternative assumptions exist for the specification of the topology of the network to be modelled under the "bottom-up" approach. These are usually described as "scorched node" and "scorched earth".

The scorched node assumption assumes the current network structure (in terms of the number and location of nodes) is maintained. On the other hand, the scorched earth assumption assumes that the whole network could be redesigned from scratch with the optimal number and location of nodes required to deliver the lower volumes.

Scorched node is preferable to scorched earth for a number of reasons:

- It corresponds to a more appropriate, real-world efficiency standard, rather than the hypothetical, unachievable standard associated with scorched earth.
- Assuming a different network architecture under a scorched earth approach is extremely complex and introduces considerable arbitrariness.
- There are potential difficulties in estimating the correct level of indirect costs under the scorched earth assumption.
- Most European regulators as well as those in Australia have adopted the scorched node assumption as the standard international practice.

For these reasons, C&W recommends the use of the scorched node approach based on realistic engineering assumptions including reasonable operational spare capacity.

4.5. Activity based approach for operating costs

As operating costs (exclusive of depreciation) in accounts are by definition current costs, it is often the case that existing company data is used in FLLRIC modelling. The issue with operational costs is not so much the data itself, but how it is allocated. Activity-based costing (ABC) is widely accepted as the best way to assign costs to products and services and minimize the share of common and fixed costs.

C&W uses an activity-based approach as part of its current Fully Allocated Cost (FAC) model. It proposes to use the same approach to serve as the basis for determining operating cost inputs into the LRIC model. There will undoubtedly be some requirement to refine C&W's current ABC system to address a wider range of services

than is now the case. We have taken this requirement into account in the estimation of the project timeline.

We note that the use of existing operational expenditure allocated through an ABC system as we propose here is consistent with the application of Phase II methodology in Canada.

4.6. Cost of capital

The cost of capital of operators should reflect the opportunity cost of funds invested in network components and other related assets. It conventionally reflects the following:

- The (weighted) average cost of debt for the different forms of debt held by each operator;
- The cost of equity as measured by the returns that shareholders require in order to invest in the network given the associated risks; and
- The values of debt and equity.

This information can then be used to determine the weighted average cost of capital (WACC) using the following formula:

$$WACC = r_e . E/(D+E) + r_d . D/(D+E)$$

where r_e is the cost of equity, r_d is the cost of debt, E is the total value of equity and D is the total value of interest-bearing debt.

C&W proposes to include a WACC of 13.5%, the number that matches that which was agreed in the section 53(f) of Schedule 4 of the Agreement. This will be applied to forward looking capital base, including working capital.

5. IMPLEMENTATION TIMEFRAMES AND COSTS

We welcome the Authority's considered approach to the time requirements for agreeing a methodology and generation of the FLLRIC model(s) to address the interconnection, imputation test and access deficit requirements. C&W Cayman Islands is a small carrier and, as such, has not invested a great deal of its resources into costing systems used for non-business purposes. Regulators in the United States and Canada have generally treated smaller local exchange carriers (LECs) differently from larger ones, understanding there may be modelling requirements and resource constraints that differ from those at larger LECs. For example, although the LRIC methodology for local loops of larger LECs has been set in the United States and Canada, for some years

proceedings continue on the approach to smaller ones. We believe the 12 month timeframe for developing the required modelling is fair.

In order to achieve as complete understanding of possible time requirements and costs involved in this project, C&W invited four well-recognized consultancies to prepare proposals for us. Two of these consultancies were based in North America, and two in Europe. Each of the North American consultancies had experience in costing to meet Canadian requirements. Each were provided a copy of Schedule 4 of the Agreement and some basic data to indicate the size and topology of the network C&W Cayman Islands.

Below we summarize the time requirements and costs found in the proposals. C&W would be pleased to supply the Authority--on a confidential basis--the proposals themselves. C&W would request that the proposals be kept confidential as clearly it would cause it direct harm, and encourage collusion, if C&W was forced to put third party estimates on the public record. Nonetheless, in the interest of transparency with regard to C&W's cost estimate of building the model in the table below, C&W has placed a summary of the key parameters of the proposals on the public record.

Although all of the consultancies have extensive experience with FLLRIC costing in telecommunications, there was a challenge in producing this proposal in light of the fact that the methodology had not been agreed. Clearly the number of services that will be initially required to be costed and the granularity of the costing will be greatly impact the overall costs of the exercise. Another consideration is how much internal resource from C&W Cayman can be contributed the project. Significant as well is will be the degree to which the methodology is "stable" over the modelling period.

The proposals were quite consistent in terms of the costs of the basic modelling, in the US$300-$400k range (excluding travel and other related expenses). Given a stable set of requirements emerging from the consultation we estimate the cost modelling will be around US$550,000. This excludes the internal cost and manpower associated with the project.

Comparative estimates on costing consultancy work

Consultancy	Base modelling costs (US$)	Base time frame	Per day cost of consultant (US)
1	$375k plus $30-60k per additional service	39 weeks plus 3-6 week per additional service	$1120-$3360 depending on experience level of consultant
2	$300k	23 weeks	$2625 composite rate
3	$420k	20 weeks	$1124-$3552 depending on experience level of consultant
4	$550k	40 weeks	$825-$1200 depending on experience level of consultant

Note: these estimates exclude travel and travel related expenses

C&W notes that under section 51 of Schedule 4 of the Agreement, C&W should be entitled to recover the cost reasonable incurred of building the model. As such, C&W is required to make a proposal as to the method and amount to recover these costs. C&W notes it is premature at this stage for such an application, but anticipates making that application at a later date.

In terms of time, the consultants' proposals are consistent with the 12 month timeframe set out in the Agreement. The base requirement for the initial model is between 5 and 10 months. However, this excludes time for gathering required inputs, testing the model for robustness and consistency of results, training internal staff and establishing procedures for regular updates. We therefore suggest that for planning purposes the Authority retain its 12 month time allowance for building the required models.

6. CONCLUSION

C&W trusts that this submission has been of assistance to the ICTA, and looks forward to meeting with the ICTA to discuss the remaining stages of the Proceeding.