Developer Contributions to the Water Corporation

REPORT PREPARED FOR ECONOMIC REGULATION AUTHORITY

April 2008

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Introduction

1 Introduction

Frontier Economics (Frontier) has prepared this report for the Economic Regulation Authority (the Authority) in relation to its Inquiry on Developer Contributions to the Water Corporation (Inquiry).

1.1 SCOPE OF REPORT

Following the release of its October 2007 Issues Paper,[1] the Authority sought advice from Frontier Economics on the appropriate approach to setting developer charges to the Water Corporation, taking into account the economic efficiency and equity implications of a number of alternative approaches. These approaches were:

- Water Corporation's proposed Options set out in section 5.2 of its submission[2] to the Authority's Issues Paper;
- Western Power's distribution headworks scheme;
- The Independent Pricing and Regulatory Tribunal (IPART) approach to developer charges; and
- The Essential Services Commission (ESC) approach to new customer contributions.

1.2 REPORT STRUCTURE

This report is structured as follows:

- Section 2 outlines the role of developer contributions within the context of Water Corporation's overall pricing arrangements;
- Section 3 develops a framework within which to consider developer contributions including assessment criteria for the comparison of the various approaches;
- Section 4 briefly describes the different approaches and evaluates them against the assessment criteria; and
- Section 5 draws together our concluding observations.

[1] Economic Regulation Authority, *Inquiry into Developer Contributions to the Water Corporation: Issues Paper*, 31 October 2007.

[2] Water Corporation, *Submission to the Economic Regulation Authority's Inquiry into Developer Contributions to the Water Corporation*, 14 December 2007.

2 Background

Prior to discussing the assessment criteria for determining the appropriate form and structure of developer contributions, it is useful to identify the potential roles of developer contributions in relation to water infrastructure and the types of water infrastructure to which developer contributions could apply.

2.1 THE ROLE OF DEVELOPER CONTRIBUTIONS

Developer contributions are upfront charges imposed on developers as a condition of connection to the relevant business's water network infrastructure. Developer charges are imposed in relation to water infrastructure assets for a variety of reasons. These are:

- Cost recovery – to assist water businesses to recover their total costs of water infrastructure, and in particular, the costs of servicing new developments;
- Financing – as a source of funds for new investments, reducing the need for utilities to borrow;
- Promoting efficiency – upfront signalling to developers (and ultimately homebuyers) regarding the water infrastructure cost implications of the locational and timing aspects of their investment/purchasing decisions; and
- Risk-sharing – by allocating a proportion of the risk of a development not proceeding on the responsible developer, rather than on the utility's customers more generally.

Importantly, developer charges need to be seen as one element of the overall set of instruments for fulfilling these various roles. As discussed below, other key components include fixed and variable recurrent charges for water, wastewater and drainage; and Government rebates or transfer payments. A key issue for this paper is the appropriate extent and nature of the role of developer contributions in light of these other instruments.

2.2 NATURE OF WATER INFRASTRUCTURE AND COSTS

Given the use of different terminology across different jurisdictions, a common understanding of the nature of water infrastructure and its costs is essential to examining the potential scope and application of developer contributions.

The key purposes of water infrastructure are to safely collect (or manufacture), store and transport water to consumers and then to subsequently transport and treat wastewater after it has been used. Some infrastructure is also required to ensure adequate drainage.

Applying the categorisation used in Water Corporation's submission to the Authority, the key elements of water services infrastructure are as follows:

- Source assets – such as dams, bores, desalination plants and treatment plants;
- Distribution assets – distribution pipes, pump stations and intermediate storages; and
- Reticulation assets – assets within developments specifically to service individual properties within the development.[3]

Water Corporation refers to the first two categories of assets as 'headworks' assets.[4] This description is applied in the remainder of this report.

Wastewater infrastructure also comprises various elements including reticulated works, distribution/branch pipes, sewer/drain mains, and treatment plants.

Figure 1 below illustrates Water Corporation's categorisation of water services assets.

[3] Water Corporation (December 2007), pp.25-26.

[4] Water Corporation (December 2007), p.23.

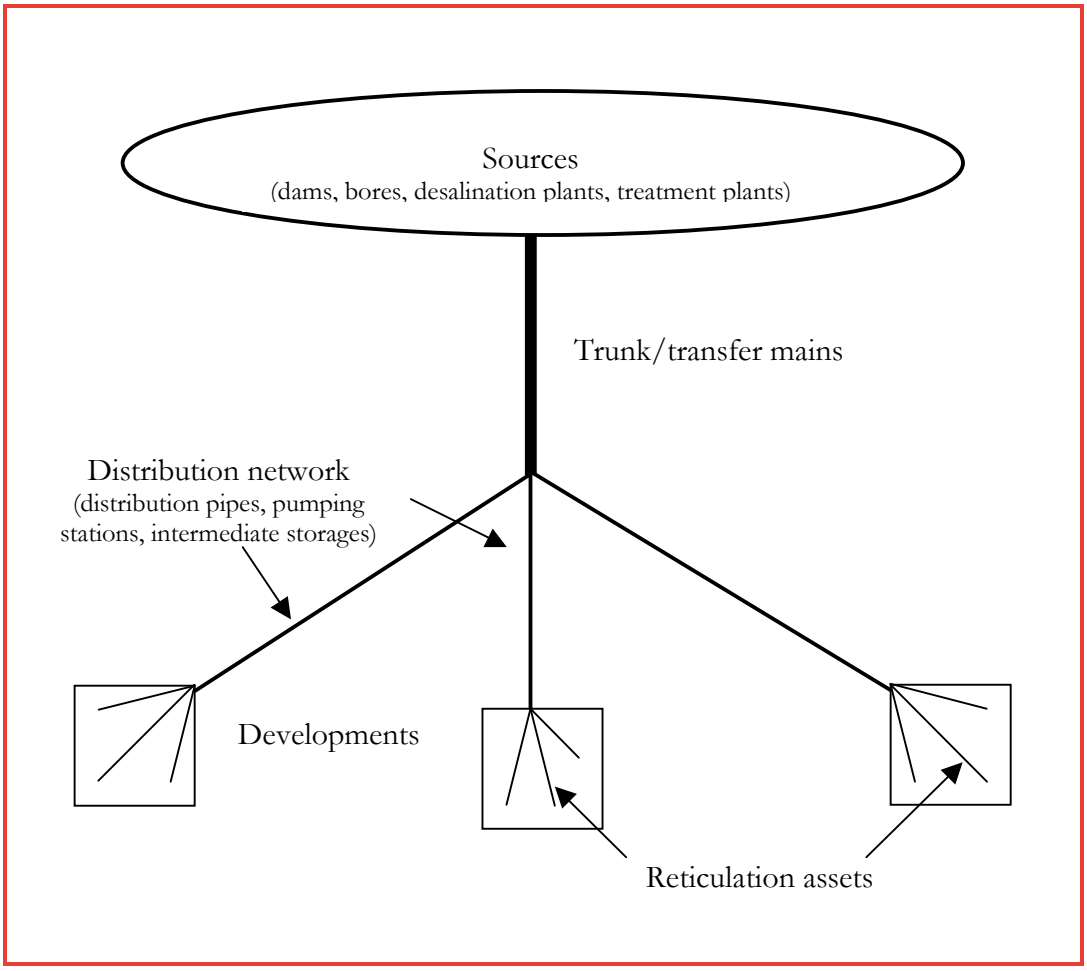

Figure 1: Water services infrastructure

In common with other utilities, the cost structure of the water sector has a number of features that are relevant to considering pricing and cost recovery arrangements (including developer contributions). In particular:

- It tends to be characterised by 'lumpy' fixed assets giving rise to economies of scale – e.g. once a pipe is in the ground, the additional cost of supplying a unit of water is very small, at least until capacity constraints are approached;
- It will therefore typically be efficient in the long run to scale assets to the expected size of ultimate demand (i.e. building in some excess capacity) rather than to incur the costs of subsequently upgrading mains etc;
- Relative to other utilities, a higher proportion of total costs is in the distribution and reticulation assets than in source assets (although in Western Australia, as in other jurisdictions, current major investment programs in supply augmentations could be expected to increase the relative importance of source assets in total assets);

Background

- There is a range of drivers for investment in new assets:
  - the need for new source augmentations is generally driven by general increases in demand due to population growth (against a background of reduced inflows);
  - the need for augmentation in distribution assets may often be linked to growth in particular locations; and
  - the need for new investment in wastewater treatment is often driven by increases in environmental standards.

2.3 INSTRUMENTS FOR PRICING AND COST RECOVERY

The costs of operating, maintaining and expanding water sector infrastructure needs to be recovered in one way or another. In the case of the Water Corporation, the major sources of funding are as set out below.

Type of charge	Form of charge	Percentage revenue
Recurrent charges	Annual service charge	41%
	Annual water usage charge	17%
Community Service Obligation (CSO) payments		22%
Developer contributions	Cash contributions	8%
	Asset contributions	5%
Other		7%

Table 1: Water Corporation sources of revenue

Source: Water Corporation (December 2007), p.6.

Key questions for the current review are the appropriate roles of each of these charging mechanisms. In particular, this review considers the appropriate level and type of costs that should be recovered upfront in the form of developer contributions versus those that are recovered over time through recurrent charges to water users.

As a monopoly service provider, the Water Corporation's overall allowed revenue is regulated by the Authority.

The Authority sets an annual regulated revenue requirement based on an estimate of Water Corporation's efficient costs of providing services while meeting its regulatory and other obligations. These costs of service are calculated according to a building block approach as the sum of:

- a return on capital (Regulatory Asset Base (RAB) * the weighted average cost of capital (WACC);
- a return of capital (regulatory depreciation on the RAB); and
- operating and maintenance expenditure.

Under this approach, investment in new assets is included in the RAB and Water Corporation receives a return on and of that investment over time through recurrent charges.

At one end of the spectrum, Water Corporation's capital and operating costs – including the costs of new investment – could be recovered entirely through recurrent charges.

At the other end of the spectrum, the costs of new assets could be recovered entirely through up-front charges, so that recurrent charge would only need to recover ongoing operating and maintenance costs (as well as a return on and of historical assets not paid for through developer contributions).

These extremes highlight the important interactions between developer contributions and recurrent charges. That is, in order to ensure that there is no "double-dipping" in the recovery of new asset costs, only that proportion of the costs of these assets not recovered via up-front charges should be added to the RAB for subsequent recovery through recurrent charges. Thus, the higher the level of developer contributions, the lower the level of recurrent charges and vice-versa.

In practice, the balance between recurrent charges and up-front contributions in recovery of Australian water businesses' costs sits between these two extremes. However, there is considerable variation in the relative reliance on developer charges and in the nature of the costs they seek to recover.

At a minimum, most water infrastructure pricing regimes require connecting parties (e.g. developers) to install and pay for local reticulation assets and the costs of connection to the existing grid – given that these costs are directly attributable to the development. Beyond this, there is considerable variation in the role of developer charges between jurisdictions, including:

- the extent to which developers are required to contribute to the costs of shared upstream distribution and source assets;
- whether they are based on the recovery of the costs of existing (or 'sunk') assets (e.g. to the extent existing assets have been sized for future growth); and/or the recovery of costs yet to be incurred (i.e. the costs of planned future assets).

The different approaches reflect differences in views on what costs are appropriately attributable to new developments as well as differences placed on the appropriate role of developer contributions.

Background

In order to provide a framework for considering the merits of the alternative approaches, the following section identifies a number of criteria and principles as the basis for the assessment of alternative approaches to developer contributions in section 4.

3 Framework for assessment

In order to systematically analyse alternative approaches to developer contributions, it is necessary to specify a clear set of criteria against which each of the options can be assessed. This Section outlines the criteria that guide the assessment of alternative options, as well as the way in which the criteria can be applied to water developer charges and how the criteria interact with one another. The criteria also reflect the objectives of best practice water pricing specified under the National Water Initiative.

3.1 BACKGROUND

The Authority's Issues Paper discussed the concepts of economic efficiency and equity and how they could be applied to water developer charges.[5] In doing this, the Issues Paper referred to the Productivity Commission's inquiry on First Home Ownership, in which it examined the issue of developer charges, including, but not limited to the water industry.[6] While the Productivity Commission saw upfront developer charges as being one element of an efficient and equitable pricing structure to recover infrastructure costs, it considered that developer charges should be:

- necessary, with the need for the infrastructure concerned clearly demonstrated;
- efficient, justified on a whole-of-life cost basis; consistent with maintaining financial disciplines on service providers by precluding over-recovery of costs; and
- equitable, with a clear nexus between benefits and costs, and only implemented after industry and public input.[7]

The Productivity Commission also recommended that the underlying basis for developer charges should be subject to independent scrutiny to address concerns such as the possible 'gold-plating of infrastructure, the scope for 'double charging' for infrastructure via both recurrent and up-front charges, and the need for accountability for how the money raised from such charges is spent.[8]

Frontier has categorised the relevant criteria as follows:

- Economic efficiency;
- Equity; and
- Good regulatory practice (incorporating practicability, simplicity and transparency).

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[5] Economic Regulation Authority (October 2007), pp.9-14.

[6] Productivity Commission, *First Home Ownership*, Report No.28, 2004, Melbourne.

[7] Productivity Commission (2004), p.155 and p.177.

[8] Productivity Commission (2004), pp.165-166.

3.2 ECONOMIC EFFICIENCY

The Authority's Issues Paper highlights the importance of economic efficiency as a principle for determining how charges for the recovery of water infrastructure costs should be applied.

3.2.1 Dimensions of efficiency

This criterion relates to obtaining the greatest net benefits to the community as a whole from the use and allocation of resources. Key aspects of economic efficiency include:

- **technical or productive efficiency:** operating the required water provision systems including extraction, storage, treatment and transport systems at the least overall cost;
- **allocative efficiency:** ensuring that resources are allocated to their most productive use in the economy through production and consumption decisions that are based on prices that reflect the opportunity cost of the available resources; and
- **dynamic efficiency:** ensuring efficient investment decisions in the long term (i.e. the right combination, location and timing of investment in new assets).

In assessing this criterion, the overarching question is whether the approach to developer contributions, as part of an overall pricing and cost recovery/funding regime, provides appropriate incentives to ensure the efficient allocation, use and provision of water resources and water infrastructure in both the short and long term, as well as for efficient patterns of urban development.

An 'efficient' pricing regime (including developer contributions) would be one that:

- Provides appropriate signals to water users of the short and long-term implications of their water consumption decisions (e.g. the impending need to augment supply if demand continues to grow);
- Provides appropriate signals to developers as to the costs associated with the *location* and *timing* of new development;
- Provides appropriate signals as to the costs associated with the *nature* of new developments (e.g. water sensitive urban design); and
- Ensures that the Water Corporation can recover the efficient costs of providing water and related infrastructure, but cannot exploit its monopoly position as a provider of water services and infrastructure.

3.2.2 Principles of efficient pricing

In order to assess alternative developer contribution approaches against the economic efficiency criterion, it is useful to establish some principles of efficient pricing and define some key concepts that will be referred to throughout this paper.

Economic theory tells us that consumption and production decisions in a particular market will be consistent with efficiency where the price of a good or service equals its marginal cost. The marginal cost of a product can be defined as the increase (decrease) in total costs resulting from the consumption and hence production of one more (less) unit of output[9]. Critically, marginal cost is a forward-looking concept – it looks at what costs will be incurred or avoided from a decision to produce or not produce an extra unit. Past or sunk costs are not relevant to this decision (except to the extent that the past costs of production are a guide to the cost likely to be incurred in the future).

Prices that diverge from marginal cost can lead to a loss of social welfare known as a 'deadweight loss'. If price is below marginal cost, users will place too great a demand on the system and this will result in resources being diverted to provide these services instead of providing a more valuable service elsewhere in the economy. Conversely, if prices exceed marginal cost, consumers will not consume enough of that service having regard to the value of an extra unit of consumption compared to its costs. A requirement of allocative and dynamic efficiency is thus that decision-makers should pay for the costs that are directly attributable to their actions.

Although marginal cost pricing is economically efficient, it can give rise to several complications, which are discussed below.

Revenue adequacy

Setting prices based on marginal cost can lead to a situation where a business's revenues fall short of recovering its total costs. This can occur particularly in utility industries, like water, where a high proportion of firms' costs are fixed and where network expansion and augmentation has non-commercial drivers – in other words, firms are obliged to invest before capacity becomes constrained. In these circumstances, marginal costs are below average costs (i.e. total costs divided by units of output). The challenge then becomes how to ensure that utilities can recover their efficient costs (many of which are both fixed and sunk) of providing services in the manner that least distorts future decisions consistent with economic efficiency.

One of the ways typically used to address the issue of revenue adequacy while maintaining the efficient signals associated with marginal cost pricing is the use of a two-part tariff, consisting of a variable charge and a fixed charge. The variable charge reflects the marginal cost of consumption, enabling the incremental costs associated with water usage to be signalled to customers who can then adjust their consumption accordingly, while the fixed charge ensures revenue adequacy and reduces the variability of water agency revenue. As discussed below, developer contributions can be seen as another pricing instrument to add to this mix.

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[9] For efficient decision making it is important that the marginal cost or price reflects the full cost to society of providing a good or service, including any externalities. Externalities are costs or benefits arising from an individual's economic activity that affects others, for example environmental impacts.

Short and long-run marginal cost

Another key issue in marginal cost pricing is the relevant timeframe. Short run marginal cost (SRMC) can be defined as the additional cost of supplying a unit of output given the existing capacity. By contrast, long run marginal cost (LRMC) can be defined as the cost attributable to an extra permanent unit of consumption of bringing forward the future capital program.

The choice between SRMC and LRMC as a pricing tool depends on the nature of the relevant infrastructure and the signals the price is aiming to send. For example, where infrastructure exhibits strong economies of scale ('lumpiness') such that it is not productively efficient to develop this infrastructure in small increments in line with gradually rising demand, it may be more productively efficient to 'over-build' infrastructure for existing needs in to order to minimise the overall costs of provision over time.

Where such spare capacity exists, the cost of serving an incremental customer often implies little or no opportunity cost. Therefore, the promotion of allocative efficiency would suggest that the price of using under-utilised existing infrastructure ought to be close to zero. However, over time, growing demand could mean that existing infrastructure becomes fully utilised and the opportunity cost of its use rises to reflect its relative scarcity. This may eventually lead to investment to meet that rising demand. A price based on opportunity cost at each instant in time (SRMC) – to promote short-run allocative efficiency – may therefore:

- rise from zero – where existing assets reflect a degree of spare capacity at that point in time;
- to a high level – based on the value of foregone consumption when existing capacity becomes fully utilised;
- back to zero – after new investment has been commissioned creating spare capacity again. This 'price collapse' effect arises as a direct result of the assumed strong economies of scale in the development of the infrastructure.

Although it would be consistent with promoting allocative efficiency at each moment in time, prices based on SRMC will not signal in a smooth fashion the costs associated with bringing forward future investments needed to balance supply and demand. It is therefore common practice to set the volumetric component of water tariffs on the basis of estimates of LRMC.

Alternatively, if infrastructure is constantly developed to maintain a degree of spare capacity to cater for expected future demand, the 'see-saw' effect observed above would be much less pronounced and SRMC and LRMC would converge.

3.2.3 Application of efficient pricing to developer contributions

While the above principles of efficient pricing are generally well-understood in relation to the provision of water and wastewater services to customers and in influencing their consumption decisions, they can be seen as applying equally to new developments and influencing decisions by developers.

While the principle that to promote efficiency, decision-makers (including developers) should be faced with the costs of their decisions (i.e. the costs that they "cause") is broadly accepted, the key issues for debate in considering approaches to developer contributions are largely around how this principle should be applied in practice. In particular, there are differing views on which categories of assets outlined in section 2.2 should be incorporated in the determination of developer contributions, and how the costs of these assets should be valued, in order to send efficient pricing signals.

Assessing the efficiency properties of developer contributions regimes therefore requires forming views on whether developer contributions accurately reflect the costs attributable to the decisions made by developers, and whether any departures are justified in enabling overall cost recovery while entailing minimal efficiency losses (see below).

For some situations, these assessments are quite clear-cut. For example, the costs of providing reticulation within a development and the direct costs of connection would seem clearly attributable to individual developments. Perhaps less clear-cut are judgements about:

- Whether costs of augmentation of upstream distribution and source assets can be seen as attributable to demand growth associated with new developments, or is seen as attributable to growth in demand across the whole system (or somewhere in between);
- Whether any costs of installed (sunk) capacity should be seen as partially attributable to and recoverable from later developments reflecting the sizing of this capacity for future growth, or whether all such sunk cost should be excluded from developer contributions:
    - Under this latter approach, the lumpiness of infrastructure may mean that, at a time of little spare network capacity, the next development is forced to pay a high price reflective of the imminent need for new investment. However, if investment then takes place and prices fall, subsequent developers may be required to pay only minimal charges. In other words, the subsequent developers can 'free-ride' on the decision and payments of the original developer. Knowing this, all developers may defer their investment decisions to avoid being the party who 'triggers' the requirement for more infrastructure and is forced to pay the initial high price. This could create inefficient delays to developments;
    - On the other hand, inclusion of such sunk costs in developer contributions could be seen as inefficiently discouraging development in locations where it would impose minimal additional costs on the existing network (e.g. "infill" development where there is excess capacity within the current network);

- Where infrastructure is sized and developed with a view to future growth, questions arise both as to how the benefits of economies of scale ought to be shared as well as who ought to bear the risk of that future growth not eventuating:
  - Water infrastructure typically exhibits strong economies of scale and scope due in part to the high costs of installing pipelines, which does not vary proportionately with the size of the pipeline. This means that it is productively efficient to 'over-size' infrastructure in anticipation of future growth. An important issue is how the benefits of such efficiencies should be shared between the first developer, subsequent developers and existing customers (see Box 1 below);
  - Over-sizing infrastructure for present needs raises the risk that anticipated future demand may never actually eventuate. An important issue is who ought to bear the risks of such outcomes. Generally speaking, economic efficiency is advanced by allocating risks to those parties best placed to understand and manage them. In this context, it would not be efficient to impose this risk on a particular new developer, who is not responsible for the pattern of future development. Rather, it may be more appropriate for existing customers to bear this risk, given that the regulator, acting on behalf of customers, will need to give its approval for the new investment before it can proceed. This provides existing customers with some control over whether such investment will occur;
- Whether the broad patterns of urban development can be considered as largely driven by whole-of-government planning processes such that, insofar as water developer contributions are concerned, these decisions can be regarded as "sunk", and the only costs attributable to individual development decisions are those arising from "out-of-sequence" development (i.e. the holding cost of infrastructure that has been provided ahead of schedule).

Consider a scenario where a town comprises 1,000 existing properties, each served by a water utility called W-co. Fred, a developer, seeks to build a development of 50 properties at the outskirts of the town. Fred will install the reticulation network for his development and transfer it to W-co, but W-co will still need to invest in distribution infrastructure to supply the development. Such infrastructure would cost $60,000 if it were built to a size to supply only the 50 new properties comprising Fred's development. However, realising that other developers may later seek to locate new estates near Fred's development, W-co decides to augment its distribution infrastructure to enable it to serve 100 new properties. Such an augmentation would cost $80,000. The fact that the cost of an augmentation to serve 100 properties is less than twice the cost of an augmentation to serve 50 properties indicates that there are strong economies of scale in the provision of this distribution infrastructure.

In light of these economies of scale, how much should W-co charge Fred for the new distribution infrastructure?

Clearly, charging Fred more than $60,000 would be inefficient (and may be regarded as unfair) because the cost of a 'right-sized' augmentation to serve his development would only be $60,000. Therefore, Fred should not be charged more than $60,000.

However, it may be reasonable to charge Fred less than $60,000, so that he gets some of the benefits of the efficient over-sizing of distribution infrastructure. For example, Fred could be charged $40,000, being half the cost of the distribution augmentation, given that Fred's development will utilise half the capacity of the augmentation. A subsequent developer of 50 properties could pay the remaining $40,000 in order to avoid 'free-riding' concerns.

A third approach could be to charge Fred and the subsequent developer each $45,000, thereby over-recovering the cost of the augmentation and enabling charges to existing customers to fall. This would effectively share the benefits derived from the economies of scale between Fred, the future developer and existing customers.

Box 1: Efficient over-sizing and developer charges

3.2.4 Implications of departures from efficient pricing principles

It should be noted that deviations from an efficient set of prices may have varying implications for actual economic welfare. In short, the efficiency costs of departures from marginal cost pricing depend on the responsiveness of demand to changes in price, known as the price elasticity of demand.

In an environment where developers and/or ultimate customers are highly sensitive to the magnitude of developer contributions or recurrent charges, the welfare implications of moving away from an efficient set of prices may be substantial. On the other hand, if these parties are relatively unresponsive to water developer contributions and/or recurrent charges, the welfare costs of

such deviations may be quite small. This in itself is an important consideration to bear in mind in assessing the efficiency properties of alternative regimes for developer contributions. Moreover, the efficiency of developer contributions should not be considered in isolation from the efficiency of the overall pricing regime (including recurrent fixed and variable charges).

3.3 EQUITY

Equity is a more subjective concept than efficiency but is commonly seen as encompassing matters such as:

- Universal access and affordability;
- Fair treatment of new customers compared with existing customers;
- Inter-generational fairness, referring to the temporal allocation of costs for long-lived infrastructure assets;
- Similar treatment of parties in similar circumstances and correspondingly different treatment of parties in different circumstances;[10]
- Avoiding major price shocks, especially for lower income customers (e.g. through transitioning to new pricing arrangements); and
- Supporting regional development.

In the present context, we have been asked to consider the implications of the Government's uniform pricing policy in the assessment of equity. The Issues Paper notes that the Authority has interpreted this to mean that all households have access to water for their basic needs at an affordable price, regardless of where they are located.[11]

There are complementarities between some aspects of equity and economic efficiency. In particular, 'sharing' rules to overcome free-riding and hold-out problems (discussed above) may also be regarded as promoting equity between existing and new customers or, similarly, between generations of customers.

3.4 GOOD REGULATORY PRACTICE

The inclusion of good regulatory practice as an assessment criterion is based on the view that the impact of regulation on the achievement of desired outcomes such as efficiency derives not only from the intended *ends* of regulation, but also from the *means* by which regulatory arrangement operate. Hence, good regulatory practice encompasses objectives such as:

- Practicability (and hence cost) of implementation and ongoing management;
- Transparency of the methodology and replicability of the outcomes; and

[10] See, for example, Crase, L., S. O'Keefe and B. Dollery, *Developer Charges: Policy Inconsistencies and Consumer Preferences*, (2007) CUAC, Melbourne Viewed: 8 February 2008, http://www.cuac.org.au/docs/La%20Trobe%20_Crase_%20-%20Developer%20Charges%_20Aust%20Ec%20Review.pdf

[11] Economic Regulation Authority (October 2007), p.14.

- Stability and predictability, so that participants can plan and make long term decisions without the risk of fundamental changes in the regulatory approach.

The Australian Energy Market Commission (AEMC) endorses the use of a good regulatory practice as a decision-making criterion in all of its Rule change decisions. For example, it was used in the AEMC's Final Rule Determination on the pricing of prescribed transmission services.[12]

3.5 WEIGHING THE CRITERIA

There are likely to be conflicts and hence trade-offs to be made between the criteria outlined above. For example, equity considerations and administrative simplicity can affect the efficiency or effectiveness of pricing arrangements. However, consistent with our terms of reference, we would place most emphasis on ensuring approaches to developer contributions are designed to achieve economically efficient outcomes, but are then supplemented by arrangements to achieve equity objectives, rather than vice-versa. These trade-offs are explored in detail in our assessment of the pricing options in the following sections.

12 AEMC, *National Electricity Amendment (Pricing of Prescribed Transmission Services) Rule 2006 No.22, Rule Determination*, 21 December 2006, pp.10-22.

4 Alternative methodologies

4.1 OPTIONS AND APPROACH

4.1.1 Overview

As noted in section 1.1 above, the Authority has asked Frontier to consider and assess a number of alternative approaches to developer contributions against a set of robust assessment criteria.

At the outset, Frontier would note that each option embodies certain trade-offs between the criteria discussed above. The need to make such trade-offs is unavoidable because no regime will satisfy the requirements for all of the dimensions of efficiency, let alone meet all relevant interpretations of equity and good regulatory practice.

Therefore, the comparison and analysis of the various options requires the evaluation of each option 'package' as a whole and a view to be taken on the appropriateness of the trade-offs it makes between the different aspects of the assessment criteria.

In this context, this section seeks to assess and compare each of the potential options for developer contributions by:

- First, providing a brief description of how the option operates; and
- Second, evaluating each option against the assessment criteria.

4.1.2 Stylised example

To assist in illustrating the operation and impact of each option, this chapter utilises a modified version of the stylised diagram from Figure 1 in section 2.2 above.

That diagram is modified below in Figure 2 to show only two distribution pipelines (instead of three), with each pipeline contained within its own "scheme", labelled Scheme A and Scheme B, respectively. Each distribution pipeline travels from the system's source mains to an existing development within that Scheme. Hence, each Scheme contains one existing distribution pipeline and one existing development. The existing source assets and mains serve both schemes and are considered shared assets.

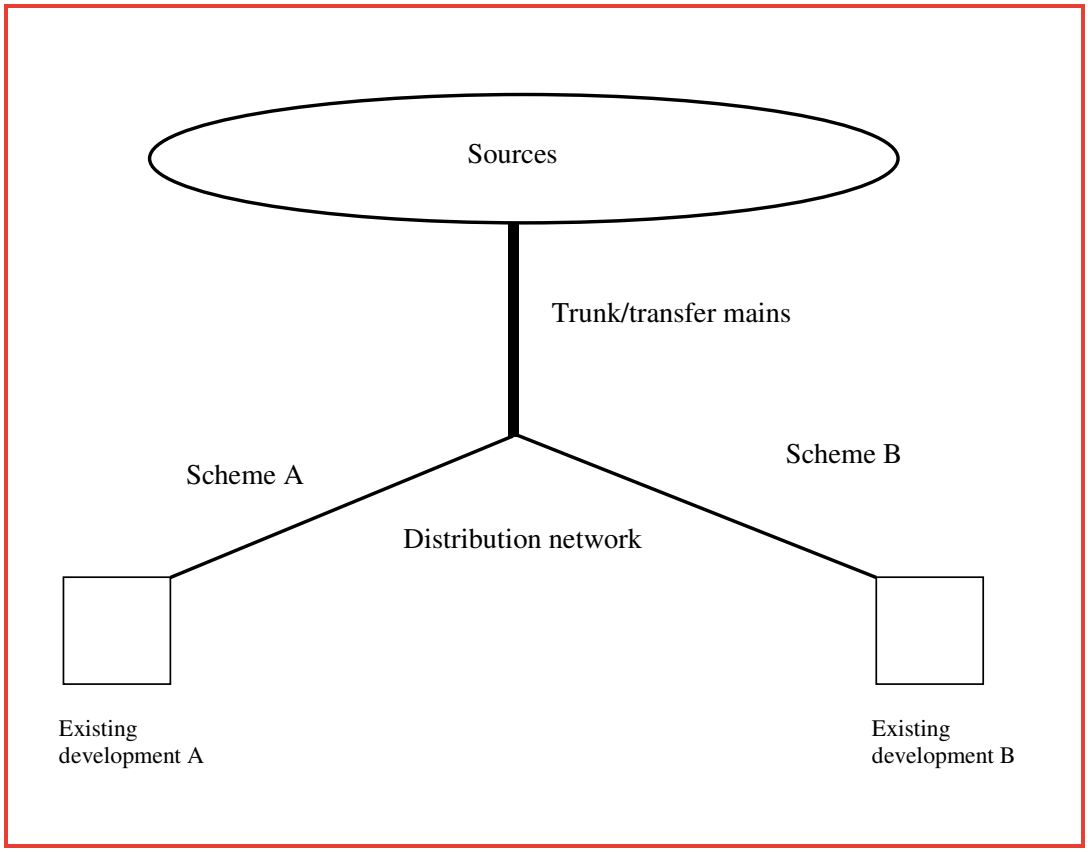

Figure 2: Existing system

The developer charges under each option are then determined on the basis of a proposed new development occurring now (being the start of year 1) to be located near each of the two existing developments (see Figure 3 below). Therefore, one new development is to take place in Scheme A and the other new development is to take place in Scheme B. In the case of Scheme B (only), the new development is deemed to require the bringing forward of the need to augment the relevant shared distribution infrastructure within that Scheme from the end of year 10 (ie 10 years away) to the end of year 2 (ie 2 years away).

It is assumed that in all cases, the developer is to provide reticulation infrastructure within the new development. It is also assumed, for the sake of simplicity, that the developer pays for the direct costs of connecting the development to existing infrastructure. Therefore, the developer charges calculation refers only to the contribution by the developer to the water business for existing and future shared water infrastructure costs.

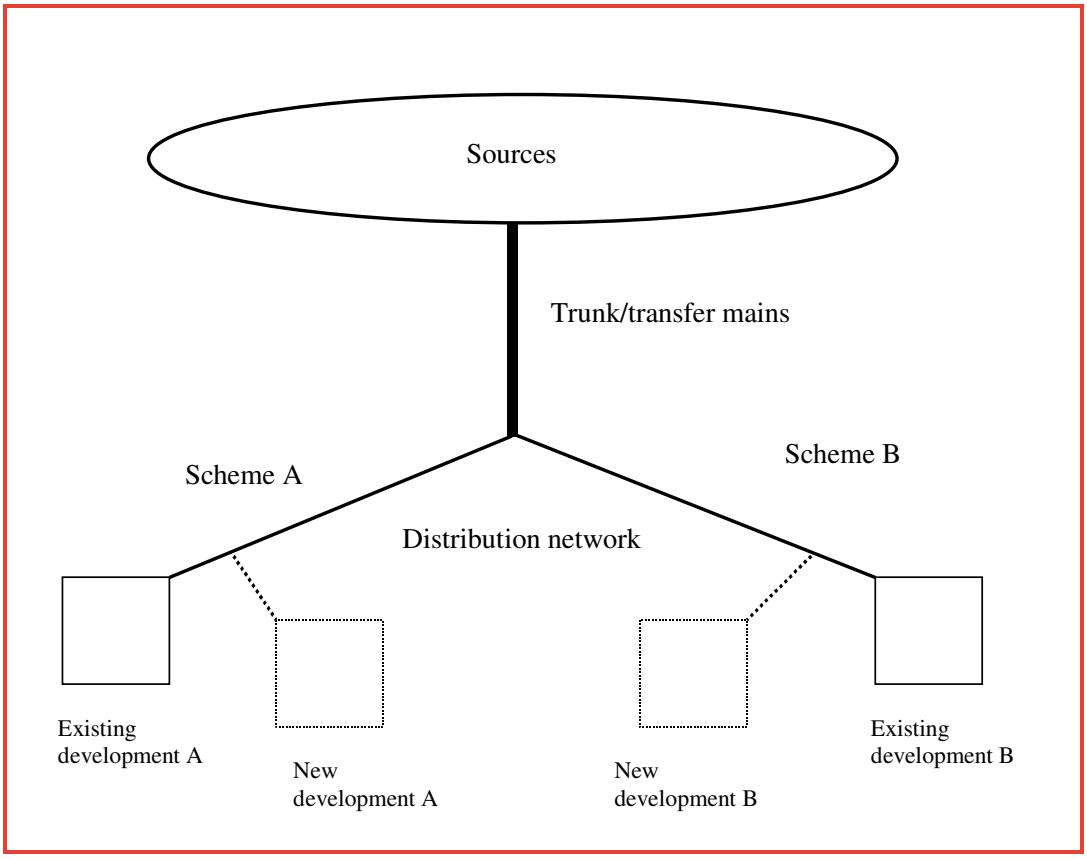

Figure 3: New developments

For the sake of this example, it is assumed that:

- The cost of:
  - Existing source and trunk assets is $2.4 billion;
  - Existing distribution pipeline in Scheme A is $900 million;
  - Existing distribution pipeline in Scheme B is $700 million;
  - Required distribution augmentation is $100 million for Scheme B only;
  - Bringing forward distribution augmentations for Scheme B from year 10 to year 2 is approximately $44 million (based on a discount rate of 10%);
- The number of lots in:
  - Scheme A existing development is 600,000;
  - Scheme B existing development is 200,000;
  - Scheme A new development is 20,000;
  - Scheme B new development is 10,000.

Alternative methodologies

4.2 EXISTING WATER CORPORATION APPROACH

4.2.1 Description

The existing Water Corporation approach to developer contributions embodies a dual approach, comprising a standard headworks charge and a non-standard charge applied in special circumstances.

Standard Headworks Contribution

Most developments are charged a Standard Headworks Contribution (SHC) charge. The SHC is a uniform charge based on 40% of the State-wide averaged per-standard lot share (SRE[13]) of the modern equivalent asset value (MEAV) of Water Corporation's assets across the State (calculated separately for water, wastewater and drainage respectively).[14] The calculation encompasses all headworks assets as well as the distribution network.

The cost of reticulation assets gifted to Water Corporation are borne directly by developers and so are outside the SHC.

The SHC currently applies to urban lots, defined as lots not exceeding 1 hectare in area. It is recalculated every three years based on a fresh MEAV calculation. In the interim period, it is indexed on a quarterly basis according to Water Corporation's Capital Cost Index.[15]

Overall, the SHC represents approximately two-thirds of all developer contributions to Water Corporation.[16]

Box 2 below illustrates the potential application of Option 1 based on the stylised example outlined in section 4.1.2 above.

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[13] "The Single Residential Equivalent (SRE) is deemed to be the basic unit of measure again which consumption of all other properties is compared. An SRE is defined as the basic annual demand for water, wastewater or drainage services for a single residence in a typical urban location. SREs for water and wastewater are based on the size of the meter servicing the property with a 20mm meter representing one SRE. Meter based charges are considered appropriate as changes in meter size reflect changes in service capacity." (Water Corporation (December 2007), p.12)

[14] See Water Corporation (December 2007), pp.9-12.

[15] See Water Corporation (December 2007), p.10. According to Water Corporation, the CCI is a combination of 4 different indices determined by the Australian Bureau of Statistics, which collectively approximate the movements in the cost of construction for typical Water Corporation assets.

[16] Water Corporation (December 2007), p.9.

To illustrate the application of the existing Water Corporation approach it is possible to derive the current SHC on the basis of the stylised example discussed above. Under the current approach, the SHC would be $2000 per lot. This is based on:

- Existing assets (source, trunk and distribution) values of $4 billion;
- Forty percent of $4 billion is $1.6 billion; and
- Existing SREs of 800,000.

Therefore:

$$SHC = (\$4 \text{ billion} \times 40\%)/(800{,}000) = \$2{,}000 \text{ per SRE}$$

Box 2: Water Corporation – current SHC example

Non-standard charges

Non-standard developer contribution charges are applied in a number of cases:

- Special Developer Contribution Areas – Water Corporation imposes higher contributions on developers in certain areas on a case-by-case basis due to the higher expected future costs of serving certain developments. Charges are typically based on the shortfall between the expected forward-looking costs of servicing these developments and the revenue that would be recovered from the ultimate customers through annual rates, recurrent charges and community service obligation payments (CSOs);
- Out-of-sequence developments – developers are required to 'pre-fund' infrastructure costs to service these developments and receive a rebate from Water Corporation after a certain level of development or period of time has elapsed; and
- Major country customers (e.g. mining and industrial customers) also pay a non-standard charge. For customers consuming up to 49 kl per day, the charge is uniform across the State and based on the customer's peak day demand. For customers consuming more than 49 kl per day, the charge is based on the unit cost of augmenting the water supply scheme to their location.[17]

The application of non-standard charges is determined against a number of criteria. However, a key question is whether the new development would increase the total costs of the relevant scheme (broadly referring to town) by more than 15%.[18]

[17] Water Corporation (December 2007), p.14.

[18] Water Corporation (December 2007), p.22.

In addition to headworks charges, developers are expected to themselves lay reticulation assets within their developments and hand over these assets to Water Corporation at the time of connection.[19]

4.2.2 Evaluation against assessment criteria

Efficiency

As discussed in section 3.2 above, assessing the efficiency properties of approaches to developer contributions requires examining the extent to which they accurately reflect the costs attributable to development decisions.

An implication of a State-wide average charge across all developments subject to the SHC is that it provides no locational pricing signals to developers. Nor does it differentiate between standard and water-sensitive developments that may make different calls on the need for upstream network augmentation.

However, the existing Water Corporation approach to the SHC does not purport to maximise economic efficiency. In describing the existing arrangements, Water Corporation emphasised the benefits of the SHC in terms of simplicity, administrative ease and certainty for developers.[20] It also highlighted the scope under the current arrangements for non-standard charges in cases where economic efficiency is the most important consideration.

It is therefore necessary to first identify the key aspects of the current arrangements that may detract from the efficiency of the pricing signals, and then to assess the likely impact of any distorted signals on developers' decisions.

Two key features of the current arrangements are:

- the scope of assets incorporated in developer contributions, including source assets; and
- the use of the value of sunk assets rather than forward-looking costs.

The scope of assets

The current approach to calculating the SHC encompasses all source assets as well as the distribution network.

As noted in section 2.2 above, source assets are those that provide water for all consumers and would need to be augmented as a result of increased demand anywhere in Water Corporation's network.

By contrast, in some cases, distribution assets may need to be augmented as a result of development (and hence rising demand for water and wastewater services) in only certain areas.

The distinction between these two categories is somewhat artificial, as there may be some assets that serve the bulk of (but not all) customers. Nevertheless, we

[19] Water Corporation (December 2007), p.6.

[20] Water Corporation (December 2007), p.19.

believe that conceptually different considerations apply to assets that serve all customers and those that serve a subset of customers only.

With respect to the inclusion of **source asset** costs in the calculation of developer charges, we believe this sends inappropriate price signals. The marginal cost of water consumed by new customers is exactly the same as that of water consumed by existing customers. Therefore, new customers should face the same signal to curb their demand as existing customers. Indeed, this is reflected in the fact that volumetric water usage charges are being designed to reflect the LRMC of future source augmentations. On the basis that the need for source augmentation is attributable to growth in total demand, not just to new developments, source costs should not be included in developer contributions. This position appears to be accepted by Water Corporation in their proposed options (discussed below).

However, in the event that the current approach of including source assets in the calculation of developer contributions is retained, there would seem to be a case on efficiency grounds for better reflecting the costs attributable to developments based on WSUD principles relative to standard developments. This might involve, for example, differentiating between SREs and 'water-sensitive' SREs, but may already be satisfactorily addressed through a smaller pipe capacity and hence a lower SRE for water sensitive developments.

A further issue is that inclusion of all assets in the calculations means that developer contributions reflect the costs of assets installed for reasons other than growth (e.g. assets required to meet environmental standards). As some of these drivers are independent of volumes, it would seem inappropriate to signal the costs of these to developers.

Finally, requiring developers to install reticulation within their developments and pay for connecting those developments to the existing network is consistent with efficient pricing.

Sunk costs

As noted above, the SHC is based on the MEAV of existing assets, rather than on an assessment of forward-looking costs that may need to be incurred to accommodate new developments.

The Water Corporation submission recognised that charges based on future (marginal) costs would deliver the most efficient price signal for a new scheme.[21] Setting a price to developers based on recovery of the costs of existing network assets violates straightforward allocative efficiency requirements because it penalises the use of existing network assets that may have significant excess capacity. The SHC may therefore discourage new development in cases where it could be readily accommodated utilising the existing network. Similarly, the SHC may encourage development in places that are costly to service (although the use of non-standard charges in extreme cases may help to ameliorate this effect).

[21] Water Corporation (December 2007), p.23.

The efficiency costs of the use of standard State-average SHCs will depend on the extent to which the average SHC is likely to depart from the future costs of serving the relevant development. This could only be judged by comparing the SHC to the true forward-looking costs of development at each location. In general, however, there would appear to be little basis for suggesting that the average cost of existing assets is likely to bear a close relationship to the marginal costs of new investment. If the SHC does not provide a reasonable proxy for forward-looking costs, it is not clear that it offers material efficiency advantages over simply recovering those sunk costs through recurrent charges (in particular via the fixed charge).

Special Developer Contribution Areas

As noted by the Water Corporation, the efficiency costs of the current SHC approach based on sunk costs are also likely to be ameliorated by the ability to impose special developer contributions in areas where new developments are expected to impose significantly higher future costs. In these cases, we understand that the application of non-standard contributions is intended to reflect estimates of the forward-looking costs consistent with economic efficiency principles. Water Corporation contends that this feature of the current arrangements ensures that efficient price signals are sent when it is most important to do so, while avoiding the administrative cost of establishing the forward-looking costs for individual developments when in the great majority of cases the additional costs imposed are not large.

In our view this argument has some merit. However, we would note that the current arrangements are asymmetric in that there is no scope for reducing developer contributions in cases where the SHC may significantly exceed the marginal costs imposed by some new developments (e.g. "infill" developments).

Responsiveness to developer contributions

While the current approach has some significant shortcomings in terms of economically efficient price signalling, a key issue is whether these are likely to impose large efficiency costs in practice. As noted in section 0, the efficiency costs of departures from marginal cost pricing depend on the responsiveness of demand to changes in price, known as the price elasticity of demand.

The Water Corporation submission suggested that developer contributions may play little role in decision-making on development patterns in light of the recent rapid increase in the price of metropolitan lots.[22] A report for IPART by PWC found that developer charges will tend not to impact on broad structure planning of the identification of release areas, but may influence decisions about the location, timing, density and nature of development.[23] However, PWC pointed out that to be effective, charges needed to be of a significant quantum to

[22] Water Corporation (December 2007), p.18.

[23] PriceWaterhouseCoopers, Centre for International Economics, "Review of Developer Charges", *IPART Research Paper No.16*, October 1999, pp.5-6.

influence decisions.[24] This suggests that what is important in setting charges is not so much the precise nature of costs that are recovered through developer charges, but the extent to which charges accurately approximate the forward-looking costs of development across locations.

Equity

The Water Corporation's existing approach embodies a user pays-type approach in that developers are required to make upfront contributions for existing assets that they utilise to obtain water-related services. Such an approach may be viewed as promoting inter-generational equity in that new customers cannot simply free-ride on costs borne by previous customers.

However, even if this is considered appropriate, there is a question as to whether requiring an upfront contribution is any fairer than requiring customers in new developments to contribute to the recovery of sunk costs in a similar manner to existing customers – i.e. through recurrent charges. Certainly, the emphasis on upfront charges may raise housing affordability and access issues for new homeowners. This suggests that Water Corporation's existing approach may offer no equity advantages over an approach that places a greater emphasis on recurrent charges.

Good regulatory practice

As noted above, the existing Water Corporation approach places a high priority on simplicity, administrative ease and certainty for developers. Developers in many areas can be confident of the magnitude of charges they would be expected to pay through the SHC. The scope for non-standard charges to apply in those specific cases where forward-looking costs are relatively high suggests an attempt to balance technical efficiency considerations with simplicity, administrative ease and predictability. Therefore, from a good regulatory practice perspective, the existing package of charges offered by Water Corporation has a number of attractive features.

That said, the criteria for the application of non-standard charges are not completely clear. Several references in the Water Corporation submission suggested that they apply where the impact of a development is to increase the total costs of a scheme by at least 15%. Greater clarity on this threshold would be desirable. Even if this interpretation were correct, little information is provided about the methodology used by Water Corporation to determine non-standard charges. These charges are meant to reflect the forward-looking costs specific to a development, but Water Corporation concedes that these are difficult to calculate. At the very least, all of these areas would benefit from clarification.

Finally, unlike other jurisdictions, the existing Water Corporation approach does not appear to offer any scope for developers to appeal either the application of non-standard charges or the manner in which non-standard charges are implemented.

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[24] PriceWaterhouseCoopers (October 1999), p.6.

4.2.3 Conclusion

The Water Corporation's existing approach to developer contributions emphasises simplicity and uniformity of approach for most customers. However, it compromises efficiency signalling and is not fully transparent – particularly in relation to the application of non-standard charges.

4.3 WATER CORPORATION PROPOSALS

4.3.1 Description

In its submission to the Authority, the Water Corporation put forward a number of potential changes to the developer contributions regime. These included two options for modifying the calculation of the SHC, set out as follows:

- Option 1: A State-wide SHC for water and wastewater services based on 100% of the existing cost (MEAV) of the State-wide distribution assets (i.e. excluding source assets); and
- Option 2: A 'scheme-based' standard charge also calculated using 100% of the existing cost (MEAV) of the relevant scheme's distribution assets for water and wastewater services. To put this into perspective, there are over 230 water schemes and over 110 wastewater schemes in Water Corporation's network. For pricing purposes, each scheme would refer to one town. This implies that the entire metropolitan region of Perth is treated as one scheme. In some cases, assets would be shared between schemes and hence some allocation process would be necessary. Scheme-based charges would be recalculated at a minimum of every 5 years. [25]

Both options would continue to reflect 40% of drainage costs, given that virtually all drainage costs relate to distribution assets (i.e. to ensure that these assets are not entirely funded by new customers).

A key rationale for moving the focus of developer contributions to distribution asset costs is the fact that Water Corporation is moving towards signalling the costs of future water sources and mains upgrades through its water usage charge.[26] Therefore, going forward, the water usage charge would seek to reflect the LRMC of source (including trunk assets). As these assets actually come on line, they would be added into the regulatory asset base and recovered through fixed and volumetric tariffs.

In developing both options, Water Corporation acknowledged that economic efficiency requires that developers need to be aware of the future cost implications of caused by their actions. However, Water Corporation argued that ascertaining reliable future costs is difficult. By contrast, it stated that existing costs are known and often represent a good proxy for forward-looking costs due

[25] Water Corporation (December 2007), section 5.2, pp.31-36.

[26] Water Corporation (December 2007), p.25.

to the 'modular' nature of distribution costs – i.e. limited economies of scale and lumpiness characteristics.[27]

Both of Water Corporation's proposed options retain scope for non-standard headworks charges. The proposal to develop scheme-specific headworks charges under Option 2 is only intended to replace the use of State-wide uniform standard headworks charges, which is embodied in the current arrangements (and Option 1).

Water Corporation stated a preference for Option 1 over Option 2, partly for reasons of simplicity and certainty for developers and partly because of what it saw as the Government's preference for uniform charges and its regional development objectives.[28] Box 3 illustrates the potential application of Option 1 based on the stylised example outlined in section 4.1.2.

Under the Option 1 approach, the SHC would also be $2,000 per lot. This is based on:

- Existing distribution assets value of $1.6 billion; and
- Existing SREs of 800,000.

Therefore:

SHC = ($1.6 billion) / 800,000 = $2,000 per SRE

This example shows that the developer contributions under Option 1 are the same as under the existing Water Corporation approach. This is because the value of existing distribution network assets just happens to be 40% of the value of total shared water infrastructure assets in the example. However, if the value of distribution assets were a higher proportion of the value of total assets, the SHC under Option 1 would be higher than under the existing approach. Conversely, the Option 1 charge would be lower than the current SHC if the value of existing distribution assets were less than 40% of total existing assets.

Box 3: Water Corporation proposed Option 1 – Example headworks charge

Water Corporation contended that Option 2 could present a significant barrier to development in high-cost schemes that have a low return on land (e.g. a number of country schemes). It estimated that scheme-based charges for:

- Water – would be $2,400 per metropolitan SRE and between $3,300 and $10,900 per country scheme SRE, although more than 20 country schemes would have charges of $50,000 per SRE; and
- Wastewater – would also be $2,400 per metropolitan SRE and about $2,500 on average per country scheme SRE, although 5 country schemes would have charges in excess of $10,000 per SRE. [29]

[27] Water Corporation (December 2007), pp.31-32.

[28] Water Corporation (December 2007), p.2 and p.32.

[29] Water Corporation (December 2007), pp.33-34.

According to Water Corporation, the reason for the potential variations in these charges is the difficulty of determining a definitive 'cut-off' between source assets and distribution assets in country schemes. Hence, the lower end of figures assumes that all trunk, supply and distribution mains are excluded from the calculation despite the fact that some country customers are connected directly to these assets, whereas the upper end of figures would include those costs in the headworks charge.[30]

Box 4 below illustrates the potential application of Option 1 based on the stylised example outlined in 4.1.2.

Under the Option 2 approach, the SHCs would vary between Schemes A and B. Under Scheme A, the SHC would be $1,500 per SRE. This is based on:

- Existing Scheme distribution assets value of $900 million; and
- Existing Scheme SREs of 600,000.

Therefore:

SHC = ($900 million) / 600,000 = $1,500 per SRE (Scheme A)

Under scheme B, the SHC would be $3,500 per SRE. This is based on:

- Existing Scheme distribution assets value of $700 million; and
- Existing Scheme SREs of 200,000.

Therefore:

SHC = ($700 million) / 200,000 = $3,500 per SRE (Scheme B)

This example shows that the developer contribution in Scheme B is much higher than in Scheme A, due solely to the higher value of existing distribution assets involved in serving Scheme B than Scheme A. This approach takes no account of the impact (if any) of the development on the need for future distribution network augmentation.

Box 4: Water Corporation proposed Option 2 – Example headworks charge

To help attenuate the extremes of these charges, Water Corporation suggested that a cap could be applied for some country schemes as a compromise between locational signalling objectives and equity objectives.[31]

4.3.2 Evaluation against assessment criteria

Efficiency

Water Corporation's proposed options share some similarities with the existing SHC approach, as well as offering some potential improvements.

[30] Water Corporation (December 2007), p.33.

[31] Water Corporation (December 2007), p.35.

Like the existing approach, both options base headworks charges on the value of sunk costs, which is inconsistent with tenets of allocative efficiency.

However, both options offer some advantages over existing arrangements. In particular, unlike the existing approach, charges under both options only relate to distribution costs – source (including trunk) costs are excluded from the developer contribution calculation. Rather, the forward-looking source costs would be signalled through the water usage charge and the investments actually made in these assets ultimately recovered through recurrent charges. This contrasts with the existing SHC, which is based on the costs of all headworks assets (distribution and source). In our view, this represents a clear improvement over the existing approach, because source assets may need to be augmented as a result of either higher demand from existing customers or new demand from new customers.

Consequently, this suggests that:

- to the extent that Water Corporation is accurate in describing current distribution costs as a good proxy for future costs (due to the supposed modularity of such costs); and
- given the scheme-based nature of developer charges under Option 2, as against the State-wide average SHC charge under the existing arrangements,

Option 2 may offer a better locational pricing signal than the existing uniform State-wide SHC.

However, it is unclear in fact whether existing distribution asset costs are always a good proxy for forward-looking distribution costs. While Water Corporation claims that they are because distribution costs tend to be relatively 'modular' in nature, this needs to be compared with Water Corporation's later statement that under a scheme-specific approach, forward-looking costs may be much higher or lower than the existing average:

> For example, the charge may be reduced where schemes have significant existing capacity in the distribution system.[32]

This comment indicates that distribution costs may not always be as modular and lacking in economies of scale as Water Corporation initially suggests. If distribution assets do exhibit reasonable economies of scale in at least some cases, it would imply that existing asset costs would be a poor proxy for likely future costs in those cases, undermining the potential benefits of this approach. Indeed, the deficiencies of using historic average costs rather than forward-looking marginal costs could be substantially magnified under the scheme-based approach proposed under Option 2.

For example, in a sparsely populated regional centre, the average cost of existing assets per SRE may be quite high, reflecting the fact that there is a low number of customers over which to spread the large fixed costs of the supply system. Under Option 2, this would be reflected in a high developer contribution (which

[32] Water Corporation (December 2007), p.35.

could be significantly higher than the current State-wide average SHC). This could strongly discourage new development in that centre, even if there were sufficient excess capacity in the system such that a new development could be easily accommodated at low marginal cost – and which would then reduce average costs for all customers.

In these circumstances, Option 1 may actually be preferable to Option 2, in that Option 1 would at least avoid potentially extreme charges that could be well out of line with true forward-looking distribution costs. This suggests that if there is to be a move toward more disaggregated charging as envisaged under Option 2, it becomes increasingly important than the charges be based on forward-looking costs rather than on current average costs. Alternatively, as with the existing SHC approach, it may be reasonable to recover these costs through recurrent charges instead of through upfront charges.

Equity

Based on Water Corporation's submission, Option 2 would result in a far less uniform structure of developer charges than the present approach or Option 1. This could have negative implications for the affordability of new developments and for regional development priorities. Although Option 1 would maintain a uniform approach, it would still allow for non-standard charges to apply, which could produce very high charges in some cases.

In both cases, it may be more appropriate to address these extremes using CSO payments (as per Western Power's Distribution Headworks Scheme), instead of rejecting the approach outright.

To the extent that source assets are likely to represent an increasing proportion of the Corporation's asset base in the future, the removal of source costs from the developer charge formula should (appropriately) shift more of the costs of these major source augmentations to the broader customer base and away from customers in new developments.

Good regulatory practice

The Option 1 proposal is Water Corporation's preferred modification to the existing SHC and a major advantage would appear to be the ease of its implementation.

The Option 2 proposal is still fairly simple for Water Corporation to apply on a scheme-by-scheme basis. However, it is far more administratively complex overall for Water Corporation due to the very large number of schemes involved.

Both Options require Water Corporation to make judgments on where the line ought to be drawn between source assets (which include trunk mains) and distribution assets. Water Corporation itself did not set out a clear framework for how it would make this distinction – instead acknowledging that drawing the line in different ways could lead to substantial variation in charges for country schemes.

Finally, neither of the Options provides any clearer guidance or criteria for the application of non-standard headworks charges than under the existing arrangements.

4.3.3 Conclusion

Water Corporation's proposed Options offer some potentially useful advantages over the existing arrangements, by limiting the costs recovered by the headworks charge to distribution costs (rather than including source costs). However, neither Option addresses the fundamental issue that charges based on current average costs may be poor proxies for forward-looking marginal costs attributable to new developments.

In addition, we hold concerns about allowing scheme-based variation in charges under Option 2: the appropriateness of the locational signals provided by Option 2 depend on the veracity of Water Corporation's assertion that current distribution infrastructure costs are a reasonable proxy for future costs.

Further, the distributional implications of Option 2 could be quite severe, in the absence of some form of price cap or CSO.

Finally, Option 2 would be likely to involve greater administrative complexity than the existing approach (or Option 1) while not resolving the current transparency issues arising with respect to the application and implementation of non-standard charges.

4.4 WESTERN POWER DISTRIBUTION HEADWORKS POLICY

4.4.1 Description

Western Power imposes upfront charges through the operation of its Distribution Headworks Scheme.[33] 'Headworks' in this context refers to the three-phase distribution network, including power lines, feeders and distributed generation assets.[34] Under the previous approach, the costs for upgrades to the distribution network were paid by the first applicant who 'triggered' the upgrade. In justifying its move to the new arrangements, Western Power noted that upgrade costs are typically significant and could inhibit growth in certain areas.[35]

The Distribution Headworks Scheme applies only to the provision of distribution headworks infrastructure to those parties seeking to connect to the distribution

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[33] See Western Power, *Distribution Headworks Scheme - Policy*, updated 30 January 2008 accessed from http://www.westernpower.com.au/documents/edgeofgrid/TECHNICALDOCUMENTFORPUBLICCONSULTATION.pdf.

[34] Western Power, *Distribution Headworks Scheme – Information Sheet*, updated 30 January 2008, access from: http://www.westernpower.com.au/documents/edgeofgrid/HEADWORKSPOLICYPUBLICCONSULTATIONDOCUMENTSOU.pdf, p.2.

[35] See Western Power, *Distribution Headworks Scheme*, Questions and Answers, answer to question 11, available at: http://www.wpcorp.com.au/documents/edgeofgrid/QA.pdf.

network (under 66 kV) in the rural and regional areas of the South-West Interconnected System (SWIS).

The Scheme does not apply to customers in the following areas:

- The metropolitan area of Perth, including the CBD,
- The Goldfields region; and
- Developments connecting within 25 km of a Western Power zone substation – which tend to be in major towns such as Albany, Bunbury, Geraldton and Narrogin.[36]

The reason for these exclusions is that the recurrent network charges payable by customers in these areas are generally considered sufficient to recover the cost of the required network investments servicing those areas. The corollary of this approach is that in areas where charges under the Scheme do apply, the calculated headworks charge is reduced by the estimated future revenues from network access charges payable by the relevant customers.[37] This approach reflects the new facilities investment test (NFIT) in the Western Australian Electricity Networks Access Code.

Western Power claims that charges under the Scheme reflect the average cost of providing new distribution infrastructure to the relevant parts of the network.[38] However, little detail is provided in the Information Sheet about how such average costs are derived. The actual charges for any given customer is a function of:

- The capacity of connection sought by the applicant (in kVA, with the average household requiring 5 kVA);
- The distance between the closest zone substation (in km) to the applicant's point of connection to the three-phase 'backbone' network; and
- The voltage of the distribution feeder to which the connection is made (either 22 kV or 33 kV). [39]

Different rates apply for residential and commercial subdivisions and prices would be published 12 months ahead with quarterly indexing. Charges are reviewed annually.[40]

In addition, the State Government operates a rebate scheme where headworks charges are imposed. The rebate applies beyond a minimum threshold of charge and covers a proportion of headworks charges up to an upper threshold, beyond which the customer's contribution is capped.[41] The rebate differs for residential

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[36] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, p.3.

[37] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, pp.4-5.

[38] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, p.1.

[39] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, p.3.

[40] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, p.4.

[41] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, p.6.

and commercial/industrial customers. A typical household under the Scheme pays no more than $2,000 in net headworks charge.[42]

It should be noted that it is not possible to derive example charges under the Distribution Headworks Scheme approach based on the example in section 4.1.2 above. This is because, unlike the other options for consideration (ie Water Corporation, IPART and ESC – see below), charges under the Western Power approach are based on a number of variables that could bear no direct relationship to either the cost of existing distribution assets, the cost of required new distribution assets or the existing or new number of customers in the relevant development.

Finally, charges under the Scheme are in addition to:

- the direct costs of connection – which all connecting parties already pay and will continue to pay; and
- the costs of connecting to the existing network or underground reticulation networks for new subdivisions. [43]

4.4.2 Evaluation against assessment criteria

As explained in the previous section, the Western Power Distribution Headworks Scheme applies to certain parties connecting to Western Power's electricity distribution network. Given that both the application of the Scheme and charges under the Scheme are based on a number of electricity-specific variables, this raises the question of how such a scheme could be applied in a water context. Such a 'translation' process needs to be considered in order to meaningfully assess the suitability of the Western Power approach for use by Water Corporation.

On the question of the scope of the Scheme's application in a water context, Western Power notes that the decision to exclude certain parties from the Scheme is based on a view as to whether investment to serve new customers is likely to be covered by recurrent charges. We are unsure as to what proportion or type of customers seeking to connect to Water Corporation's network would fall within this category. Empirical analysis would therefore be required to determine the appropriate way to apply this criterion to Water Corporation's customers.

As for the determination of charges in a water context, one interpretation of the electricity variables used in the Scheme is as set out in Table 2 below.

[42] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*,Table 1, p.7.

[43] Western Power, *Distribution Headworks Scheme – Information Sheet (2008)*, p.1.

Western Power Distribution Headworks Scheme – charge variables	Water developer contribution – potential charging variables
Capacity sought by applicant (in kVA)	Size of meter servicing property?
Distance from zone substation (in km)	Distance (in km) from trunk/source mains?
Voltage of the distribution feeder to which the connection is made (either 22 kV or 33 kV)	Not applicable, given the potential role of meter size above?

Table 2: Potential translation of Western Power Distribution Headworks Scheme to water

Efficiency

From an efficiency perspective, a number of observations can be made.

First, although Western Power claims that charges under the Scheme are intended to reflect the average cost Western Power incurs in providing distribution capacity to the relevant parts of the network, there is no clear explanation for how the variables used to determine the charge relate to such forward-looking costs. Rather, the charge seems to effectively recover a share of existing (sunk) network costs. If so, this would violate strict allocative efficiency principles.

Having said that, given the informational imperfections discussed above, the Scheme may result in a reasonable locational signal for connecting parties of the longer term cost implications of their investment decisions. In fact, one of Western Power's justifications for the Scheme is that it avoids levying the full cost of a network reinforcement on the individual party triggering the upgrade. In doing so, the Scheme approach should avoid the free-riding problems of the previous customer contributions approach.

We also note that charges under the Scheme would be net of expected revenue from recurrent charges. This approach (based on the NFIT) treats developer charges as a residual to be recovered after the costs of future distribution infrastructure have been deducted from future recurrent tariffs in order to ensure revenue adequacy, rather than setting developer charges to reflect future distribution infrastructure costs and leaving recurrent charges as the residual. We submit that the former approach would be preferable as it would promote more efficient cost signalling. Further, distribution tariffs in Western Power's network are uniform for customers with demands up to 1 MVA (all but about 500 customers).[44] This means that some customers to whom the Scheme does not apply may be paying recurrent charges in excess of the LRMC of distribution assets at their location. Although the level of Western Power's recurrent charges is outside of the scope of this report, the point remains that customers face no price signal to favour established properties over new developments within areas

[44] See Western Power, *2007/08 Price List Information*, 7 May 2007, p.42.

not covered by the Scheme. However, whether this would result in material dynamic inefficiencies of investment location is debateable given the relatively small component of distribution costs involved in serving new loads in these excluded areas.

Equity

The Distribution Headworks Scheme imposes charges on new customers in certain areas in recognition of the higher costs of serving customers in those areas. By moving away from a regime that charges a new customer the entire costs of a network reinforcement 'triggered' by that customer, it should help promote equity between presently connecting customers and those customers that may potentially connect in the future.

While the Scheme may yield significantly higher charges in applicable areas, this effect is tempered by a Government rebate that effectively caps the charge (per kVA) at certain rates for both residential and commercial subdivisions.

The overall impact appears to ensure affected customers face a charge that is not disproportionate to the likely costs of serving their development.

Good regulatory practice

The Scheme charging basis is relatively simple and transparent. The charge is based on the three variables explained above and rates are published 12 months ahead, giving developers a reasonable indication of likely future charges. The calculation of the Government rebate also seems fairly straightforward. The fact that the Scheme does not apply to most new developments also simplifies the application.

Overall, the Scheme focuses attention on key areas of concern rather than seeking excessive precision for all customers for whom contributions are likely to have minimal impact.

4.4.3 Conclusion

The Western Power approach seeks to target developer contributions on developers in areas where it considers the future costs of service are likely to be substantial. It includes only distribution costs in the charge, thereby excluding shared transmission and 'source' costs, although it is not clear whether the variables used to determine the charge are more related to future costs than existing sunk costs. If these variables accurately reflect future costs, the Scheme may provide useful locational signals to new developers. One criticism is that the approach treats developer contributions as the residual rather than the recurrent charge being the residual, thereby mitigating the signalling effectiveness of charges for the Scheme.

The approach is also relatively clear and simple for developers to understand and incorporates a transparent CSO element to address distributional concerns.

4.5 ESC APPROACH

4.5.1 Description

In its 2005 Final Decision on the metropolitan and regional water businesses Water Price Review, the ESC endorsed an approach to new customer contributions that would set contributions on a development-specific basis that reflected incremental cost-based pricing principles. Such an approach would exclude sunk and shared costs in any customer contribution, on the basis that the inclusion of such costs would overstate true incremental costs and thus distort developers' locational and investment decisions.[45]

However, the ESC recognised that moving to such an approach may be infeasible in the next regulatory period.[46] Instead, it put forward several options that could be applied as transitional measures for the current period only. The ultimate approach involved:

- An ability for water businesses to seek approval for new customer contribution charges derived in accordance with efficient pricing principles. These would require that the proposed charge:
  - Has been calculated on the basis of development-specific capital costs associated with connecting a customer or group of customers;
  - Does not include the costs of any assets in place prior to the development (including shared network assets, headworks and treatment plants); and
  - May include the financing costs associated with bringing forward the timing of shared distribution assets only (not including reticulation or source 'headworks' assets) required to connect to the existing network; and
- Subject to such approval, a maximum charge of $500 per lot for both residential and non-residential customers and for each of water and wastewater services (i.e. a combined maximum of $1,000 per lot) to minimise administrative costs. This maximum per lot charge would be fixed in January 2006 prices for the current regulatory period and indexed to inflation each year.[47]

This approach was reflected in the ESC's December 2005 Guideline on New Customer Contributions.[48]

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[45] Essential Services Commission, *Water Price Review, Metropolitan and Regional Businesses' Water Plans 2005-06 to 2007-08, Final Decision*, June 2005, p.115.

[46] ESC (2005), p.115.

[47] ESC (2005), pp.126-127.

[48] ESC, *Water Industry New Customer Contributions, Guideline*, December 2005 (updated in August 2006).

In its December 2006 Framework and Approach Consultation Paper on the 2008 Water Price Review, the ESC reaffirmed and elaborated on this approach.[49] In so doing, the ESC noted that:

- new customers are responsible for providing assets that are to be installed specifically to service their property or development (reticulation assets);
- water businesses are responsible for assets that are generally provided to service more than one development (shared assets);
- water businesses may impose a maximum per lot charge of $500 per service for 2005-06;
- water businesses may apply to the ESC to levy a charge above the scheduled charge where shared assets must be constructed ahead of schedule to service a new property or development. In these cases and subject to approval by the ESC, the water business may recover the capital financing costs that are attributable to bringing forward construction of the shared assets. Where the new development would require the commissioning of previously unplanned works, the bring-forward period used for the calculation of the customer contribution is capped at 25 years.[50]

Due to the limited number of applications for higher than scheduled charges, the ESC inferred that administrative and regulatory costs of the arrangements may be too high. As a result, it increased the contributions cap per service to $1,000 (i.e. $2,000 per lot in total) without needing an application to the ESC.[51]

The ESC justified its limitation of contributions in excess of the cap to the bring-forward financing costs of new shared distribution assets on the basis of efficient locational signalling. It contended that setting contributions in such a manner would ensure that prices reflected the marginal costs of connecting at different locations, thereby encouraging optimal locational decisions.[52]

Likewise, the ESC argued that the inclusion of sunk and shared assets in new customer contributions would send distorted signals, as:

- Contributions recovering sunk assets would exceed avoidable costs thereby sending signals inconsistent with the conditions for allocative efficiency; and
- Contributions reflecting shared assets would inefficiently penalise consumption by new customers compared with existing customers, as such costs do not vary by location.[53]

The ESC considered that the need for shared assets – which it defined very broadly to include assets servicing more than one development – was driven

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[49] ESC, *2008 Water Price Review Consultation Paper, Framework and Approach*, December 2006.

[50] ESC (December 2006), p.92.

[51] ESC (December 2006), p.95.

[52] ESC (December 2006), p.88.

[53] ESC (December 2006), p.89.

equally by new and existing customers. Therefore, it argued that shared costs ought to be signalled to all customers through the usage charge.[54]

Subsequently, in its March 2007 Guidance Paper for the 2008 Water Price Review[55], the ESC indicated that it would consider a proposal from the Victorian Water Industry Association that would allow further variation in developer contributions based on the water sensitivity of the development.[56] The proposed approach would allow higher charges to be levied for developments that would be likely to have a greater impact on future water resource demands and the need to upgrade infrastructure sooner than would otherwise be the case. As discussed in the ESC's later Water Plans Issues Paper[57], greenfields developments based on larger lot sizes, with potentially larger outdoor water use and no recycled water would generally fall within the highest-charged category, whereas smaller lot developments using water sensitive designs would fit within the lowest-charged category.[58]

Box 5 below illustrates the potential application of the ESC's approach to calculating customer contributions using the bring-forward approach based on the stylised example outlined in 4.1.2.

[54] ESC (December 2006), p.89.

[55] ESC, *2008 Water Price Review - Guidance Paper*, March 2007.

[56] ESC (March 2007), p.61.

[57] ESC, *2008 Water Price Review, Water Plans – Issues Paper*, December 2007.

[58] ESC (December 2007), p.70.

The ESC approach would yield different contributions for each of the new developments. For the new development in Scheme A, which comprises 20,000 new lots, the required contribution would be only $1,000 per lot (for water). This is because, for the purposes of this example, it is assumed that the development will not necessitate the bringing forward of sufficient water infrastructure investment to justify calculating a charge that accurately reflects the financing cost of bringing forward those future investments.

However, for the new development in Scheme B, which comprises 10,000 new lots, the required contribution would be $4,410 per lot. This is based on:

- New distribution augmentation investment (costing $100 million) to be brought forward from year 10 to year 2. This requires the following calculations:
  - The PV of the required distribution augmentation in year 10 is $38.5 million; and
  - The PV of the required distribution augmentation in year 2 is $82.6 million;
- Hence, the PV cost of bringing forward the augmentation is $44.1 million.

Therefore:

Developer contribution = ($82.6 million - $38.5 million) / 10,000 = $4,410 per new lot in Scheme B.

This example shows that the developer contribution in Scheme B is quite substantial, due to the estimated impact of the Scheme B development on the timing of new distribution infrastructure to serve that Scheme. However, the required contribution for the new Scheme A development is a relatively small fixed sum because the development is considered not to have a major impact on the timing of shared infrastructure investment. This example illustrates the forward-looking nature of the ESC approach.

Box 5: ESC customer contributions approach example

4.5.2 Evaluation against assessment criteria

The ESC's approach to new customer contributions is still in a state of flux during which it appears that ongoing compromises are being made to address competing objectives.

Efficiency

The ESC approach reflects the position that customer contributions should not incorporate any sunk cost recovery and only reflect the direct incremental costs associated solely with a particular development.

As discussed in section 3.2.3, a potential concern with a strict marginal cost pricing approach is that, at a time of little spare network capacity, the next development is forced to pay a high price reflective of the imminent need for

new investment, while subsequent developers may able to 'free-ride' on original developer.

However, the fact that the ESC has adopted a narrow interpretation of the costs that are directly attributable to individual developments (by limiting the inclusion of any assets that are shared with any other developments except to the extent that a development results in the bring-forward of these costs) helps obviate the 'free rider' issue.

However, the strict ESC position that developer contributions should not include any element of sunk cost recovery could be questioned on the basis that it does not recognise the need to ensure overall cost recovery. As noted in section 3.2.2, in utility industries subject to economies of scale, pricing at marginal cost will leave a revenue shortfall that needs to be recovered somehow. The implicit assumption in the ESC position is that the least distorting means of doing so is via fixed recurrent charges. However, the ESC does not appear to have assessed whether recovering at least some of the sunk cost via developer contributions may be a less distortionary means of recovering costs in a manner that has minimal effect on efficient decisions.

More recently, the ESC has indicated it might accept a less purist approach, in which customer contributions reflected the long-term impact of a development on the likely need and timing of future infrastructure investments. The ESC's openness to the VWIA's proposal in the December 2007 Issues Paper appears to contradict its earlier insistence that:

> Efficient locational price signalling requires that customer contributions should not include costs that could be avoided by reducing demand on the part of any existing customers at that location… [59]

Notwithstanding this apparent shift in position, the openness to an up-front signal to promote WSUD could reflect an attempt to address informational problems or 'myopic' decision-making. For example, without such graduated customer contributions based on WSUD, developers may seek to avoid the cost of installing recycled water facilities – which reduce the need for future investment in water infrastructure – even though consumers may ultimately prefer to pay a higher purchase price for their properties than pay higher recurrent water charges due to a less water sensitive development design.

Another issue with the ESC approach is the significant status given to the water businesses' development plans. As noted above, customer contributions may only exceed the prescribed limits where the 'bring-forward' financing costs of a development exceed those amounts. The bring-forward costs, in turn, are largely influenced by the shape of water businesses' upgrade plans. If a development is regarded as bringing forward a required upgrade by a small time period, the costs 'caused' by the development (and hence the required contribution) will be relatively low. However, if the development occurs in an area that was not foreseen, the developer could be liable to pay up to 25 years' of bring-forward costs.

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[59] ESC (December 2006), p.89.

One concern about this approach is that it suggests that land developments that occur completely consistently with the development plans of water businesses do not impose any incremental infrastructure costs – as if the infrastructure provided for in these development plans was already sunk. Presumably the plans themselves would be predicated on a certain level and location of demand growth. Therefore, restricting customer contributions above the caps to bring-forward costs only could mean that plan-consistent developments faced a price that under-signalled their long run impacts on the need for new infrastructure (especially distribution pipelines). Consumers would face no penalty for buying a property in a new development – albeit one that had been anticipated by the relevant water business – compared to buying an established property in an area where no distribution infrastructure upgrades were likely to be necessary.

Equity

The ESC's approach treats new and existing customers fairly similarly, which may be considered equitable in that it facilitates access to water regardless of location. It is also likely to place few obstacles in the way of regional development.

However, the significant shift in revenue from developer contributions to recurrent charges implied by the ESC's approach contributed to prospective increases in tariffs for existing customers that led the Government to suspend the current price review and refer an inquiry to the sector to the Victorian Competition and Efficiency Commission.

Good regulatory practice

The ESC's current approach to customer contributions was developed and amended in light of the perceived administrative costs and regulatory burden imposed by the application of the bring-forward approach to determining customer contributions. The increase in the permitted default contributions cap from $500 per lot per service to $1000 was a specific response to the low number of applications by water authorities for higher customer contributions applying the bring-forward approach. At the least, this implies an acknowledgement by the ESC that applying the bring-forward approach is far from simple.

Further, as noted above, the bring-forward approach confers significant status on the water businesses' development plans. However, to date, water businesses have not faced clear rules regarding the methodology to be applied in formulating their development plans. In its Framework and Approach paper, the ESC suggested that there might be some merit in setting out some high level principles for water development plans to guide the estimation of bring-forward periods. These could include:

- The best estimates of demand/growth available;
- Logical development of land that reflects realistic growth patterns;
- How each new block of land is incrementally serviced and cost effective incremental steps in the extension of infrastructure; and

- The least cost supply solution for the total system.[60]

While such principles could help, there is currently little guidance to businesses regarding their application. This creates a lack of transparency for developers trying to understand – much less dispute – how large a contribution they may be required to make in relation to a development in a particular location at a particular time.

The other feature of the ESC arrangements is that the current regime follows a period in which customer contributions were much higher. The ESC's Framework and Approach paper noted that prior to the 2005 water review decision, most businesses determined contributions nominally based on the IPART approach (see below).[61] This meant that contributions were often many thousands of dollars for both water and sewerage. Application of the current capped approach represents a substantial reduction in most charges. Further, it is quite possible that in the next regulatory period – when the current contributions caps will no longer apply – developer contributions will actually increase once again to reflect the true incremental costs of development. Such instability in prices is unlikely to promote sensible decisions if participants believe that prices will continue to vary substantially.

4.5.3 Conclusion

The ESC approach to developer contributions is currently in a state of flux, having been modified in response to stakeholder concerns. It takes a strict approach against charges that recover sunk costs and, at least in principle, restricts developer charges to the bring-forward costs of new infrastructure attributable to the relevant development. While this has some attractive efficiency properties, it confers significant status on water agencies' future development plans, in that development that proceeds in accordance with such plans is not liable to make any contribution to the cost of future infrastructure.

From an equity perspective, the ESC approach leads to relatively small developer contributions, which should promote water and home affordability while promoting regional development. However, the reduction in developer contributions implied by the current approach compared with previous practice means that new customers make a far smaller contribution to network costs than developers used to be required to make. The cost of this relief is borne by existing customers through higher recurrent charges.

With respect to good regulatory practice, the merits of the ESC approach depend on the level of charges – up to the contribution caps, the ESC's approach is reasonably simple for stakeholders to understand. However, beyond the caps, the approach has proven difficult for water businesses to understand and apply. Further, the instability of the regime means that stakeholders are likely to expend considerable resources attempting to predict how the approach may evolve over

[60] ESC (December 2006), p.99.

[61] ESC (December 2006), pp.89-90.

time. If the result is that developer contributions switch from being relatively high to relatively low to somewhere in between, developers will not face clear and consistent investment signals.

4.6 IPART APPROACH

4.6.1 Description

IPART's approach to developer contributions is described in its recent Issues Paper.[62] This paper updates its last developer charge determination from 1999. The Issues Paper explains that the methodology for calculating developer charges takes the capital cost 'attributable' to the development less the future operating surpluses (or deficits) expected to be earned from recurrent charges paid by customers in the development area using a net present value (NPV) approach (see below).[63]

The basic principle is that each development should pay for the capacity of the existing and future assets that service the development area.

Appendix D of the Issues Paper describes the current IPART approach in detail.

The methodology calculates the developer charge per lot or equivalent tenement as:

- The present value (PV) of the existing and future assets used to service the development area;
- Less the PV of the future net operating profits (or losses) expected from providing the services to the development area (also called the reduction amount);
- Divided by the PV of the number of 'equivalent tenements' in the development area, these being approximately representative of a single residential dwelling.[64]

See Box 6 below.

[62] IPART, *Review of developer charges for metropolitan water agencies, Water – Issues Paper*, November 2007.

[63] IPART (2007), p.3.

[64] IPART (2007), p.4 and pp.39-42.

The developer charge (DC) is calculated as:

$DC = K - NPVr\ (Ri - Ci)$ for i = years 1,……n; $n \leq 30$

Where:

K = a capital charge for the net present value of expenditure on existing and future assets serving the area

Ri = revenue expected to be received by servicing customers in the area in each year (i)

Ci = operating, maintenance and administration costs expected to be spent in servicing customers in the area in each year (i)

r = the cost of capital or the discount rate for deriving the net present value of future revenues and costs

n = the forecast horizon for the assessment of future revenues and costs.

Box 6: IPART developer charge methodology

The determination requires water agencies to publish development servicing plans (DSPs) for each development area that helps define the asset attribution process. DSPs must contain information about the size and boundaries of the area and nominate the assets or parts of assets that service it. In doing so, it must explain where there is overlap or co-usage of assets with other DSPs and apportion those assets accordingly.[65] However, there does not appear to be any clear or established methodology for how that allocation should proceed.

In addition to the apportionment of shared assets, certain assets are excluded from the calculation. These include those assets built prior to 1970, assets transferred by developers to water agencies (e.g. reticulation assets), assets developed to meet non-growth considerations such as environmental legislation and assets that were 'unreasonably oversized' at the time they were developed.[66]

In determining the PV of existing and future assets, agencies are required to value the former at Modern Engineering Equivalent Replacement Asset Value (MEERA) and the latter at efficient market costs.[67]

The Issues Paper raises a number of questions about each of the steps in this process, including the information provided in DSPs, the approach to asset apportionment and assessment of asset costs, the projection of operating costs

[65] IPART (2007), p.16.

[66] IPART (2007), p.18 and p.40.

[67] IPART (2007), p.17.

and revenues, the use of the equivalent tenements concept, discount rates, demographic assumptions regarding growth and dispute resolution.

Box 7 below illustrates the potential application of IPART's approach to calculating developer contributions using the stylised example outlined in 4.1.2.

The IPART approach would yield different contributions for each of the new developments. The allocation of existing asset costs ($2.4 billion) is assumed to be divided between the two Schemes on the basis of the existing PV of the number of ETs in each Scheme.
For the sake of simplicity, the PV of the number of ETs in each Scheme is assumed to be derived by taking a simple average of the number of ETs prior to the development and after the development.
Further, the PV of the annual net operating profit is assumed to be based on charges per ET that recover 10% of the existing asset value (ie $240 million in total per annum).
Therefore, annual net profit per ET is $294.47 (in perpetuity).
For the new development in Scheme A, which comprises 20,000 new lots, the required contribution would be $1,475 per ET. This is based on:

- Existing asset costs of approximately $2.7 billion, comprising:
  - Existing source and trunk asset costs of approximately $1.8 billion; and
  - Existing distribution asset costs of $900 million;
- No need for new distribution augmentation investment as a result of the development;
- Total PV of all assets is the same as the value of existing assets – ie $2.7 billion;
- Annual profits from recurrent charges is approximately $180 million, based on $294.47 multiplied by 610,000 ETs;
- Net PV of all assets less annual profits is approximately $900 million.

Therefore:

Developer contribution = $900 million / 610,000 = $1,475 per new lot in Scheme A.

For the new development in Scheme B, which comprises 10,000 new lots, the required contribution would be $3,818 per ET. This is based on:

- Existing asset costs of approximately $1.3 billion, comprising:
  - Existing source and trunk asset costs of approximately $604 million; and
  - Existing distribution asset costs of $700 million;
- PV of new distribution augmentation investment (costing $100 million) to be undertaken in year 2 – a PV cost of $82.6 million;
- Total PV of all assets is approximately $1.39 billion;
- Annual profits from recurrent charges is approximately $60 million;

- Net PV of all assets less annual profits is approximately $783 million.

Therefore:

Developer contribution = $783 million / 205,000 = $3,818 per new lot in Scheme B.

This example shows that the developer contribution in Scheme B is much higher than in Scheme A, due in part to the higher value of assets involved in serving Scheme B.

Box 7: IPART approach to developer contributions

The IPART approach thus contains elements of both:

- the existing Water Corporation approach – through its inclusion of all existing network asset costs, including source costs; and
- the ESC approach – with its inclusion of forward-looking costs of serving the development.

4.6.2 Evaluation against assessment criteria

Efficiency

Many of the same issues arise in considering the efficiency implications of the IPART approach to developer contributions as arose in the existing Water Corporation approach. These are:

- The inclusion of source asset costs in the NPV calculation sending inappropriate price signals. To reiterate the point made above, the marginal cost of water consumed by new customers is exactly the same as that of water consumed by existing customers and hence it is not clear why only new customers ought to face this price signal through a developer contribution. Such costs ought to be reflected in recurrent charges to all (both existing and new) customers;
- The acknowledgement that there may still be a case for providing signals to developers to consider the water sensitivity of their developments due to the impact that the design of developments can have on the potential need for distribution infrastructure augmentation in the future; and
- The inclusion of sunk distribution assets in the developer contribution calculation appears to reflect a compromise between allocative and dynamic efficiency in that arguably acts as a proxy for the forward-looking costs of locating a development in a certain area.

The key difference between the IPART approach and the existing Water Corporation approach is that under the IPART approach, the value of expected future costs is included in the calculation. Other things being equal, this could be expected to result in a price more closely reflective of the forward-looking costs of water infrastructure than an approach based solely on existing asset costs.

Equity

As with the Water Corporation's existing and proposed approaches, the IPART approach embodies a user pays-type philosophy in that developers are required to make upfront contributions for existing assets that they utilise to obtain water-related services. To the extent that a user pays approach is considered equitable, there is a question as to whether this is any fairer than requiring customers in new developments to contribute to the recovery of sunk costs in a similar manner to existing customers – ie through recurrent charges. Certainly, one implication of the IPART approach is that new developments are faced with relatively high upfront charges, which may raise housing affordability and access issues for new customers.

Good regulatory practice

The IPART approach to developer contributions appears to be very complicated to implement. The methodology for determining the capital charge in particular seems to lack clarity and consistency. While the rationale for the allocation of existing and new assets between DSP areas appears intuitive, little guidance is provided as to the approach to be used. For example, where assets were historically built to serve one DSP area and were later used to serve another area, it is not clear whether the apportionment between the areas should be based on current patterns of usage or the historical drivers for construction. Further, little guidance is provided on a range of matters such as how 'unreasonably oversized' assets should be identified.

That said, IPART makes a point of emphasising that its approach seeks to provide a balance between flexibility and prescription. An overly prescriptive approach could inhibit water agencies from dealing with development applications in a timely manner. Nevertheless, any approach to developer contributions should provide developers with a degree of predictability regarding the charges they are likely to face.

Finally, the IPART approach also incorporates a process for dispute resolution to allow any developer dissatisfied with how an agency has calculated charges to seek review of its complaint and potential arbitration.

4.6.3 Conclusion

The IPART approach involves a much more complex and comprehensive determination of costs attributable to developments. However, by including sunk and source costs in the calculation, it makes important compromises on efficiency. The merits of the approach depend on whether it provides an accurate forward-looking signal for future infrastructure (ie distribution) costs, noting that all customers should face the same signals with respect to future source costs.

The IPART approach may also result in relatively unequal charges. It is also likely to be complicated to apply and the methodology presently lacks transparency for stakeholders, given the large degree of discretion it offers the water agencies.

5 Conclusions

As requested by the Authority, Frontier has assessed a range of alternative approaches to the calculation and application of developer contributions for water. Our assessment criteria have included various dimensions of efficiency as well as different conceptions of equity and broader issues of good regulatory practice.

5.1 EFFICIENCY

On efficiency, the role of developer contributions is ideally to confront developers with the likely incremental costs directly attributable (or 'caused') by their decision to construct a new development in a particular area. As the need for new source and trunk mains assets typically do not vary depending on the location of new developments, developer contributions should not reflect the costs of this infrastructure. However, the need for investment in the distribution network is more likely to vary by the location and type of development, so it would be appropriate for developer contributions to reflect these costs on a forward-looking basis in order to promote dynamic efficiency. This is the principle behind the ESC 'bring-forward' approach. However, several of the options considered in this report (existing SHC, Water Corporation's Option 2 and IPART) base developer contributions in whole or part on the recovery of existing distribution asset costs, on the assumption that these sunk costs are a good proxy for likely future costs. However, it is not clear that this is always the case. To the extent it is not, such approaches could promote inefficiency by discouraging the use of existing networks assets that may have excess capacity and potentially discouraging development that could readily be accommodated.

While the forward-looking costs of the distribution network may theoretically be signalled by recurrent charges instead of developer contributions, this would have several drawbacks. First, capturing the locational differences in future distribution network costs would require recurrent charges to vary on a locational basis. This may contravene regulatory arrangements or create complications in setting charges. Further, relying on recurrent charges could also compromise productive efficiency by misallocating the risks of new developments not proceeding – ideally, developers should be faced with the costs of infrastructure whose development is contingent on their development decision. This would encourage developers to proceed where this was consistent with the efficient development of the network.

5.2 EQUITY

The equity implications of the different options vary according to the degree of locational difference in developer contributions as well as the scope of Government CSOs. For example, the Western Power Distribution Headworks Scheme may produce substantial charges, but these are limited by a Government rebate. On the other hand, Water Corporation's Option 2 may lead to major variations in standard headworks charges, without the offsetting impact of any

rebate or CSO payment. It should be noted that even the Water Corporation's existing approach (and Option 1) may produce non-standard charges that are very high in some locations, depending on the costs that Water Corporation regards as arising due to the development in question. However, once again it would seem appropriate for such disparities in charges to be addressed transparently through a CSO-type mechanism.

By contrast, the ESC's current transitional approach involves relatively small flat developer charges, unless the water business in question has applied to implement a higher charge in accordance with the ESC's pricing principles.

5.3 GOOD REGULATORY PRACTICE

Also important is the means by which a developer contributions policy is implemented and the manner in which it applies. In this respect, the existing and proposed Water Corporation approaches are relatively weak, as they lack transparency regarding how and when non-standard charges apply. There also does not appear to be a clear right of appeal by developers against Water Corporation's decision-making.

The IPART approach also lacks clarity in the application of the capital charge calculation and the allocation of existing asset costs between DSP areas.

The ESC approach to the calculation of bring-forward customers contributions places a great deal of emphasis on the existing development plans of water businesses, and these plans are not presently required to comply with any principles or guidelines. Another aspect of the ESC approach is the instability in the regulatory approach to customer contributions over the last several years.

5.4 OVERALL ASSESSMENT

Preferred approach(es)

Given the degree of uncertainty surrounding the precise implementation of each option, it is difficult to compare the options in a straightforward manner. Nevertheless, Table 3 below makes an attempt at summarising the pros and cons of the different approaches, giving a rating out of three stars (***) for each criterion. In preparing this table, various assumptions had to be made about the options. For example, the two-star dynamic efficiency rating for the Water Corporation's Options was based on the presumption that historical asset costs are a reasonable indicator of likely future augmentation costs. If this is not the case, our assessment of those Options against this criterion would be correspondingly downgraded. Therefore, this table should not be taken to represent a conclusive view, but should be read in the context of the discussion of the options in the previous sections.

	Efficiency			Equity			Good Regulatory Practice
	Productive	Allocative	Dynamic	Affordability	Regional develop-ment	Inter-gen	
Existing	**	*	*	**	***	**	**
Option 1	**	*	**	***	***	**	**
Option 2	**	*	**	**	**	**	**
Western Power DHS	**	**	**	**	**	**	**
ESC	**	**	**	***	***	**	*
IPART	**	*	**	**	**	**	*

Table 3: Summary of assessment

Clearly the overall assessment depends on the weightings placed on by the policy-maker the various criteria. What is clear is that there is no unambiguously superior methodology for the determination of developer contributions.

Having said that, we are of the view that Water Corporation's proposed Option 2 approach and the IPART methodology do not appear to offer significant advantages across any of the assessment criteria. Both approaches could lead to substantial variations in charges in ways that do not reflect the true forward-looking costs of development in different locations. Further, both (particularly the IPART approach) also appear administratively complex to implement and may be difficult for stakeholders to understand and hence accept.

Amongst the remaining approaches, we consider that the appropriate choice of developer contribution methodology comes down to the compromises that policy-makers consider appropriate to make. For example, the key advantage of the ESC approach is that it incorporates a relatively clear economically-based framework for setting developer contributions above the caps based on a forward-looking assessment of the costs 'caused' by a new development. The key drawback of this approach is the subjectivity of the calculation of bring-forward costs and the consequent level of uncertainty faced by developers in predicting what charges may be for investing in particular areas.

Apart from its use of existing asset values as a proxy for forward-looking costs, the Water Corporation's Option 1 approach is similar to the ESC approach in several ways: it provides for a uniform developer contribution in most areas but allows for different non-standard charges in some areas where it can be justified. The main issue with Option 1 is the lack of regulatory predictability regarding

Conclusions

when and how non-standard charges apply and the apparent lack of a review or appeals process to ensure adequate governance controls over its implementation.

By contrast, the Western Power Headworks Scheme approach is relatively clear and simple for developers to understand. Further, its adaptation to water developer contributions would promote regulatory consistency between the approaches applied to both electricity and water. At the same time, charges under the Western Power approach may bear little relation to the actual forward-looking costs of development in a particular fringe location.

All three of these approaches should provide some incremental signal to developers in fringe locations as to the higher future costs of development there relative to infill development close to established areas. The choice between these methodologies would therefore depend on the relative importance of:

- Theoretical economic efficiency signals;
- Administrative ease of calculation and predictability of charges; and
- Regulatory consistency of charging approach across utilities.

Incremental improvements

Putting aside these difficult decisions, there are a number of relatively straightforward changes that could be made to the current Water Corporation arrangements that would in our view represent clear improvements:

- Removal of all (existing and future) source costs from developer contribution calculations (as is proposed by Water Corporation in Options 1 and 2);
- Provision for clearer rules as to when non-standard headworks charges apply and for appeals against charges determined under these provisions;
- Ensure that in future, price reviews of recurrent charges coincide with reviews of developer contributions; and
- To the extent possible, address equity/distributional concerns through transparent CSOs (such as under the Western Power approach) rather than through changes to the charging methodology itself.

Conclusions

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