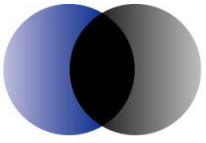
Advice on Water Corporation's Drainage Charges

Prepared for The Economic Regulation Authority

16 February 2009



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Economics Policy Strategy

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1 Introduction

ACIL Tasman was asked by the Economic Regulation Authority to provide advice regarding the Water Corporation's drainage charges. The terms of reference required us to:

- Provide a summary of the current arrangements for the funding of drainage services in Western Australia, and a history of developments in drainage pricing
- Identify the costs of the Water Corporation's drainage services in the Perth metropolitan area that provide private benefits and the costs that provide public benefits
- Provide advice on the appropriate charging method and structure to recover the costs of the Water Corporation's drainage services (in both the Perth metropolitan area and, if considered appropriate, areas outside of the metropolitan area).

This report documents our findings with respect to these terms of reference.

2 History of drainage service provision

2.1 Institutional arrangements

In the very early history of Western Australia drainage service provision was ad hoc and flooding in both Fremantle and Perth was, periodically, an issue. In response to the issue of periodic flooding and wider sanitation concerns, all water service provision functions, including drainage, were taken on by government with the passage of the *Water Supply, Sewerage and Drainage Act 1912*. Subsequently, in 1921, the functions carried out by the State Government Public Works Department (PWD) in relation to drainage were split into country and metropolitan area functions. The country functions remained with the PWD. The metropolitan drainage functions were transferred to the Metropolitan Water Supply, Sewerage and Drainage Department/Board. After the PWD and the Metropolitan Water Authority merged to become the Water Authority of Western Australia in 1985, responsibility for drainage was as shown in Table 1.

Table 1 **Drainage arrangements in 1996**

Agency	Responsibilities
Water Authority of Western Australia	• Planning for drainage at the strategic level, catchment level, sub-catchment level, and local level • Maintain and operate main drainage system across 75 metropolitan urban catchments and six rural areas
Local Government	• Detailed local and site specific planning • Maintain and operate local drainage network
Developers	• Detailed development and specific site planning • Construct and hand over to local government local drains in new developments • Ultimately fund connections/extensions required to any main drains as part of the development
Environmental Protection Authority	• Input as appropriate
Swan River Trust	• Input as appropriate

With the creation of the Water Corporation, the Water and Rivers Commission and an independent economic regulator, the responsibilities previously undertaken by the Water Authority were split three ways, as shown in Table 2.

Table 2 **Drainage arrangements post 1996**

Agency	Responsibilities
Office of Water Regulation/Economic Regulation Authority	• Regulation of water service licence holders (Water Corporation and the Rottnest Island Board) • For drainage regulation, water quantity management is a requirement but water quality management is not a requirement
Water and Rivers Commission/Department of Environment/Department of Water	• Ensuring arterial drainage scheme for metropolitan Perth (as per MWA 1985 s98) • Strategic and environmental planning for drainage statewide
Water Corporation	• Maintain and operate main drainage system across 75 metro urban catchments and six rural areas
Local Government	• Detailed local and site specific planning • Maintain and operate local drainage network
Developers	• Detailed development and specific site planning • Construct and hand over to local government local drains in new developments • Ultimately fund connections/extensions required to any main drains as part of the development
Environmental Protection Authority	• Input as appropriate
Swan River Trust	• Input as appropriate

Note: Where there are multiple agency names listed the names denote the various agencies that have performed these functions post 1996. The final name in the list is the agency that currently performs the corresponding listed functions.

2.2 Current funding arrangements expanded

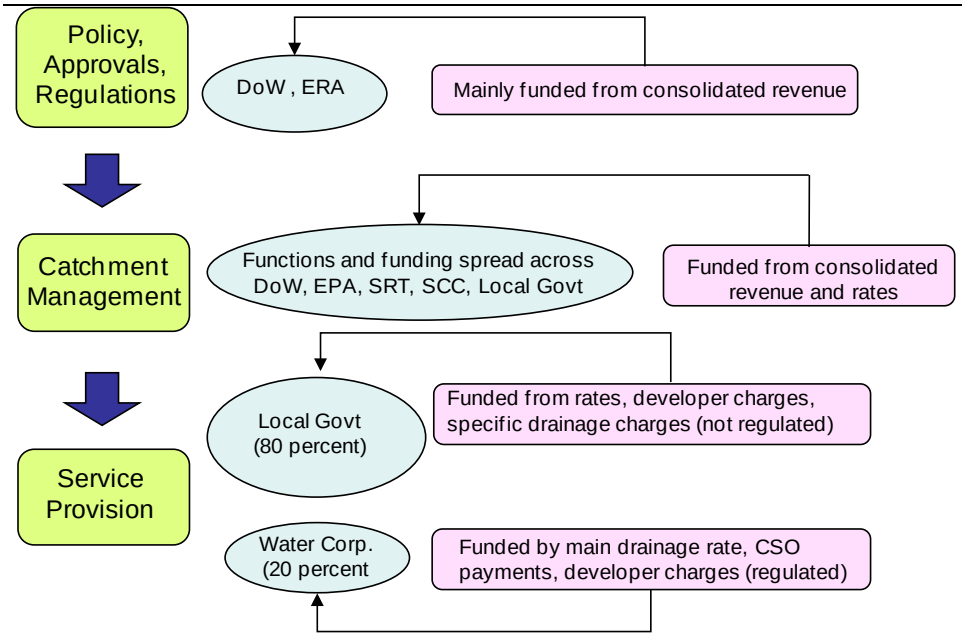
Under section 18 of the *Water Services Licensing Act 1995* service providers for controlled areas are required to hold an operating licence. Section 10 of the Act specifies drainage services to be a controlled area, and so under this provision all drainage service providers, including local government authorities, need to be licensed. However, under section 19 of the Act, all local government drainage service providers have been provided with an exemption from the requirement to hold a licence for drainage services. The Water Corporation and the Rottnest Island Board are the only two licensed drainage service providers in Western Australia[1].

Current arrangements for drainage are shown in Figure 1. In terms of actual service provision, the bulk of the drainage network is maintained by local government, with Water Corporation responsible for approximately 470 kilometres of metropolitan urban main drains and open channels and local

[1]It is understood that new water licensing legislation is a current work in progress and that the target date for new legislation and associated regulations to be passed and become operational is mid 2010. It is further understood that the exemptions would continue to be available under the new regime, and that licensed suppliers would be given the same charging powers as the Water Corporation.

government responsible for approximately 3,000 kilometres of local urban metropolitan drains (ERA 2008a).

Figure 1 **Current drainage structure in Western Australia**



2.2.1 Government and government agencies

Policy and planning activities are undertaken by the Department of Water and the Department of Planning and Infrastructure, supported by Government agencies such as the Swan River Trust, the EPA, and ERA.

As State government agencies, the Swan River Trust, EPA, and ERA receive most of their funding from the State government. In 2007-08 ERA received $2.2 million in user charges and fees and $7.0 million in income from the State government. In 2007-08 the Swan River Trust received a small proportion of its income in the form of user charges ($21,000) and National Heritage Trust funding ($346,000), with the vast majority of funding coming from the State government ($12.6 million).

The Department of Water provides high level drainage planning. The recent creation of the Department of Water means that the current annual report contains income and expense details for the period February 2008 to June 2008 only. For the audited period, $30.4 million[2] in funds was provided by the State government, $3.9 million was provided from Commonwealth grants and contributions, $18,000 was generated in fee revenue, and there was a further

[2] Includes $2.9M in State government grants listed as other revenue.

$3.0 million in miscellaneous other revenue. There are no or minimal user charges levied by the relevant government departments for the planning and management of services provided for drainage services.

2.2.2 Local government

Developers are responsible for the installation of local drainage systems and landscaping in a development. Once completed, these systems are handed over to local government to operate and maintain. Local government also invest in remedial works to upgrade drainage infrastructure as and when required.

The *Local Government Act 1995* provides the basis for the involvement of local government in drainage works. Specifically, the act provides local governments with the power to "Carry out works for the drainage of land" and "Do earth works or other works on land for preventing or reducing flooding."

Local government recover the costs involved in the provision of drainage services through general rates. General rates are struck either on the basis of gross rental value or unimproved value (UV). The unimproved value of the property is used for rating purposes where the land is predominately for rural purposes, and gross rental value (GRV) where the land is predominately for non-rural purposes.

LGAs are required to strike the general rate in the dollar such that revenue is between 110 percent and 90 percent of the budgetary deficit, where the budgetary deficit is calculated by summing expenditure and subtracting non-rate revenue. It could therefore be argued that in the local government sector total rate revenue is expenditure driven rather than cost of service driven. Moreover, budget constraints inevitably mean that the level of expenditures devoted to drainage services will be subjected to a consideration of priorities, including the expenditure needs of other services, and the income available for drainage services in a given year. LGA drainage activities and expenditure are not subject to regulatory review.

Additional to general rate revenue, some LGAs levy an additional "special area" rate to fund drainage works in specific districts if significant works are required. The power to levy a specific area rate is provided for under section 6.37 of the Act. As with general rates, special drainage rates are calculated with reference to the rateable value of the property.

The City of Swan is an example of a local government area that has chosen to implement a special drainage rate across some of the wards in the City. The special area drainage rate has been introduced to cover part of the cost of dealing with specific drainage issues that exist in some specific areas. Details

of the approach taken in the City of Swan relating to the special drainage rate and developer contributions can be seen in Box 1.

Councils also levy developer charges for drainage infrastructure works required for new developments and sub-divisions. Developer charges are generally levied on a per hectare basis.

Box 1 **City of Swan special drainage rate**

That the Council resolve to:

(1) Adopt the revised Midland Drainage Contribution Fund policy increasing the developer contribution to $50,000 per hectare with effect from 1 June 2004.

(2) Implement a Special Area Rate in the Midland District Drainage area (as shown on DWG D 86-4s attached) at the same rate adopted by the Water Corporation for Gross Rental Value properties in the Perth Metropolitan Area per rateable property for the 2003-04 financial year effective from 1 July 2004.

(3) Set the Special Area Rate for the Midland District Drainage Area at the general Water Corporation Drainage rate for the Perth Metropolitan rate adopted for the previous financial year.

(4) As a policy position:

1. Council agrees to allocate all funds raised from developer contributions for drainage in the Midland District Drainage area and included in the capital works budget; and

2. Council contribute an additional 30% of the amount levied in the Special Area Rate to drainage construction works within the Midland District Drainage area in each financial year.

and that a policy be developed to reflect this position.

Data source: Minutes of the Special Meeting of Council, City of Swan, 7 July 2004

2.2.3 Water Corporation

Metropolitan customers of the Water Corporation's main drainage system pay an annual charge. The Water Corporation's declared drainage area, the area subject to annual drainage charges, currently comprises approximately 40 per cent of the metropolitan area, as measured by the number of properties. Water Corporation can recommend to the Minister that an area be designated a declared drainage area if the area contributes to the need for, or benefits from a main drainage service. In the past, Water Corporation typically became involved in providing main drainage services where drainage flows crossed individual local government boundaries, or where the local government requested assistance.

In 75 catchments the local urban metropolitan drainage network consists of main drains, which are responsibility of Water Corporation, and the local drainage network, which is responsibility of local government. Local Government has total responsibility for drainage in all other urban catchments. The local drainage network, comprising road drainage and piped drains, provides the link between properties and the Water Corporation main drains, and is substantially longer than the main drain network. Measured by length it is thought that main drains account for approximately 20 per cent of the piped local drainage network (EPA 2004, p. 5).

Drainage charges are set at a level designed to recover a "revenue requirement", after allowing for CSOs and other income. The level of the drainage revenue requirement is comprised of the standard building block elements of:

- the cost of operating and maintaining Water Corporation's main drainage system
- a return on the regulatory asset value attributed to drainage, and
- depreciation of the drainage RAV.

The regulatory asset value is rolled forward over time by adding new drainage capital expenditure and deducting depreciation. Currently the return on assets component amounts to just under half of the total revenue requirement.

Additional to metropolitan main drainage services, Water Corporation provide rural main drain services to a number of rural districts, namely: Albany, Harvey, Waroona, Roelands, Mundijong, and Busselton. These services are entirely CSO funded. The reason these services are funded by a CSO payment relates to a decision by the Court Coalition government in 1993-94. The Water Corporation also receives CSO payments from the government for concessions provided to pensioners etc.

Water Corporation charges for drainage services are subject to review by ERA. Thus, Water Corporation provides information as to its proposed expenditures on drainage services (operating costs and capital expenditure) and growth in the number of residential, commercial, and vacant land properties within the main drainage declared area.

Water Corporation recovers the cost of its main drainage services through a combination of annual charges and headworks charges.

Annual Charges

With respect to annual drainage charges the key legislation is contained in the:

- *Metropolitan Water Authority Act 1982*
- *Water Agencies (Powers) Act 1984,* and

– *Water Agencies (Charges) By-laws 1987*.

The specific charging schedule used each year is detailed in Schedule 4 of the *Water Agencies (Charges) By-laws 1987*. A different rate in the dollar is struck for residential, commercial, and vacant land customers. For residential properties the current GRV rate in the dollar is 0.501¢, subject to a minimum charge of $63.10. For vacant land the current GRV rate in the dollar is 0.400¢, subject to a minimum charge of $63.10. (For vacant land GRV is generally 5 per cent of the land's capital value). For all other classes of land (ie all non-residential land) in a drainage area, the current GRV rate in the dollar is 0.603¢, subject to a minimum charge of $63.10. In addition a fixed annual charge of $18.95 applies to strata titled caravan bays, and a fixed annual charge of $7.80 applies to strata titled storage units and strata titled parking bays.

Section 28 of the *Water Agencies (Charges) By-laws 2008* defines as exempt land for the purposes of drainage charges lots greater than one hectare comprised of rural land or land that has not been developed.

Water Corporation analysis of actual charges levied in 2004-05 indicated that at the time around 75 percent of residential customers actually paid the minimum charge. For commercial properties the number of properties paying the minimum charge was around 14 percent (Water Corporation 2006). So despite the charging system for residential customers being based on the value of the property, the charge in large measure approximates a fixed annual charge.

Headworks charges

Uniform metropolitan headworks charges for drainage were introduced in 1979, and a Standard Headworks Contribution (SHC) policy was established in 1981. In 1991 the first of what would become triennial reviews of headworks charging was undertaken by Water Corporation, in conjunction with major stakeholders. Following the first review headworks charge recovery rates were raised from 22 per cent to 33 per cent from July 1991, rising further to 40 per cent recovery from July 1992.

Since then there have been numerous minor refinements to the SHC policy, and in 2006 a simplified headworks contributions policy was introduced. The new policy was aimed at more closely linking the headworks contributions to the services provided, and involves a standard contribution at the sub-division stage based on lot size.

Depending on the type and location of the development the Water Corporation charges developers a variety of infrastructure charges. The most significant charges are:

- Standard Headworks Contribution

  - A State-wide, standard contribution for all new urban development
- Pre-funding of development which is beyond the current development front
  - For large urban developments Water Corporation will convert the pre-funding costs into a per lot charge, termed a Special Developer Contribution Area Charge.

The principles underlying development charges are that:

1. the developer should pay for the cost of any local government drainage infrastructure and connection of the proposed development to the main drainage system
2. the SHC pays for the cost of extending the capacity of the main drainage system for the impact of the new development.

Standard Headworks Contributions (SHC) and Special Developer Contribution Area charges are levied only for developments within the catchments of main drains.

The SHC currently covers 40 per cent of the total capital costs of major headworks, for each of water, sewerage, and drainage. The remaining 60 per cent of the cost is funded by the Water Corporation and recouped over time through annual charges. Headworks charges are raised at the sub-division stage and at the building stage when the service demand is determined more accurately.

The SHC is calculated by deriving a total replacement value for all existing headworks infrastructure and dividing this value by the total number of residential units serviced by its network. Thus, the developer contribution is calculated by the average cost per lot of the modern equivalent asset value (MEAV) for existing assets.

The per lot SHC is therefore calculated as:

$$S = \times (M/R) \times 0.40, \text{ where,}$$

S is the standard headworks charge ($); M is the modern equivalent asset value ($); and R is a measure of demand placed on Water Corporation systems by a single residence in a typical urban location called the single residential equivalent value (number). For drainage, as at 30 June 2008, the SHC was $440 per single residential equivalent unit[3].

[3] For drainage, a single residence on a lot between 450m^2 and 700m^2 has a factor value of unity. Smaller residential lots have a factor value less than unity and larger lots have a factor value greater than unity. For commercial applications the factors are higher, and a commercial lot of between 450m^2 and 700m^2 has a factor weight of 2.6 (Water Corporation (undated) cited in ERA (2008c), p. 106).

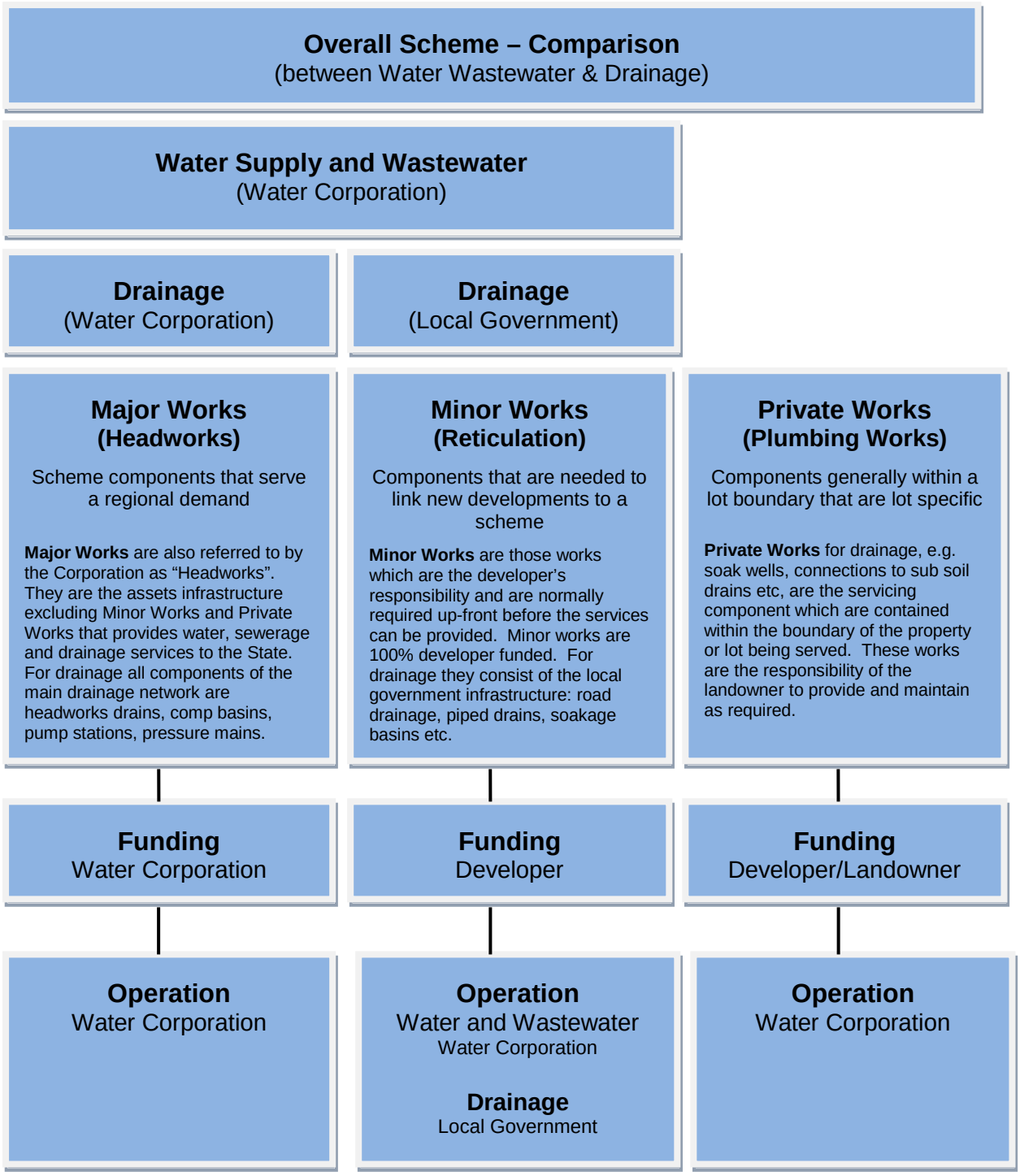
The standard headworks charge is calculated using the modern equivalent asset value of existing capital only. Therefore, unlike some other jurisdictions, the cost of proposed capital works is not explicitly included in the developer charge.

Where developments occur beyond the existing headworks, additional headworks contributions may be applied by the implementation of Special Developer Contribution Area charges or pre-funding of the full cost of the required headworks infrastructure. In practice, however, such charges tend to be levied only for water and sewerage services and not for drainage.

To ensure that Water Corporation is not charging twice to cover the same costs, the combined amount of revenue from headworks charges and annual charges cannot exceed the total revenue requirement, as regulated by ERA. Water Corporation sets the SHC which implies that annual charges are calculated as the residual needed to make up the revenue requirement.

The following figure, provided by Water Corporation, provides a useful summary of the different types of works.

Figure 2 **Infrastructure network model for drainage services provided by Water Corporation**



Note: Applies to Water Corporation urban (metropolitan) drainage catchments only.

Data source: Water Corporation

Future changes to headworks charges

In its recent review of developer contributions, ERA suggested that efficient developer charges should (for water) exclude future source costs but cover the full forward-looking costs of providing distribution services to each new development (ERA June 2008c). In addition, developer charges should cover the costs associated with bringing forward new developments ahead of a development schedule.

Bearing in mind the need to minimise the administrative costs involved, ERA accepted Water Corporation's proposal that average historical distribution costs represented a reasonable proxy for forward looking development costs in most instances. However, the Authority considered that the extent of spare capacity should be taken into account through reduced developer charges where appropriate. In addition, where Water Sensitive Urban Design (WSUD) principles result in permanent savings to Water Corporation in terms of distribution costs, reductions in the charge could be used to provide incentives to developers to undertake best practice.

For drainage services, strict application of these principles would imply a significant increase in the level of standard headworks charges for drainage, since essentially all drainage infrastructure relates to distribution. In the light of such a significant incidence effect, ERA accepted Water Corporation's proposal that the standard headworks charge for drainage continue to recover 40 per cent of the average cost of existing infrastructure, rather than moving to 100 per cent of distributions costs (as recommended for water and sewerage).

2.2.4 Regulatory oversight

ERA is responsible for reviewing the annual drainage charges levied by Water Corporation, and monitoring Water Corporation service standards. ERA has no jurisdiction over headworks charges, although this would change under the proposed Water Services Legislation. ERA has no role in monitoring the prices and services provided by local government.

3 Identification of private and public benefits

3.1 Public and private benefits

The identification of costs that provide public versus private benefits is an important step in determining the appropriate level and structure of drainage charges.

Costs that provide private benefits are those that are incurred to provide services that directly benefit users of the service. In an effectively functioning market, such costs are passed through to customers in prices, ensuring an appropriate allocation of resources.

However, costs which generate public benefits require separate consideration. A service provides public benefits if it is non-exclusive and involves non-rivalrous consumption – ie once it is provided it is provided to all, and enjoyment of the service by one person does not reduce the benefits available to others. Since the market cannot, on its own, allocate these costs efficiently, some method of sharing the costs of activities undertaken to provide public benefits is needed.

Allocating the costs of public benefits

There are two broad approaches commonly used to allocate the costs of activities which generate public benefits. These are the impactor pays approach and the beneficiary pays approach.

Impactor pays approach

An impactor is any individual or group of individuals whose activities generate the costs or the need to incur the costs that are to be allocated. Under the impactor principle, costs are allocated to individuals or groups in proportion to the contribution that each makes to creating the costs, or the need to incur the costs. The economic rationale underlying this approach is that it forces users to face the full costs of their actions by incorporating the costs of previously underpriced resource impacts.

It is however important to make a distinction between the costs that arise from the ongoing activities of impactors, and those that arise from past activities (sometimes called "legacy costs"). Legacy costs include the cost of remedying damage caused in the past, when attitudes and standards of environmental protection were different. Attempting to recover legacy costs from past impactors is impractical. There is also little basis on either efficiency or equity grounds for recovering these costs from current users. Even if current users benefit from some of these past decisions, these expected benefits would have been capitalised into property values in the past, so that purchasers would not

expect to derive a net benefit. This suggests that a beneficiary pays approach, whereby these costs are funded by government on behalf of the broader community, may be more appropriate for legacy costs.

Beneficiary pays approach

A beneficiary is an individual or group of individuals who derive benefits from the activities for which costs are to be allocated. Such benefits may derive directly from the services provided, or from the avoidance or mitigation of damage from the activities of others. Under the beneficiary pays principle, costs are allocated to individuals or groups in proportion to the benefits that each individual or group stands to derive from the costs being incurred.

3.2 Drainage services and nature of their benefits

3.2.1 Description of drainage services

Drainage services are concerned with the management of both water quantity and water quality. Water quantity is concerned with the management of surface water run-off and ground water levels. Water quality is concerned with the management of pollutants, in particular nitrogen and phosphorous nutrients, to prevent the contamination of the receiving waters. To date, attention has focussed on the quantity management side of drainage.

As indicated above, responsibility for providing drainage services in the Perth metropolitan area is divided between local governments and the Water Corporation. All local government authorities are responsible for maintaining the local drainage systems installed by developers, and for undertaking remedial works to improve (local) drainage infrastructure as required. Thus, local governments provide drainage services across all of Perth, regardless of whether or not each local government region is declared as a main drainage area.

Water Corporation provides "main drainage" services to some local councils to collect drainage flows from local drainage systems and channels and transfer these flows to receiving waters (such as the ocean or the Swan River), with some absorption at compensating basins. Traditionally, main drainage services have been provided by the Water Corporation where drainage waters move between local government areas, or where requested by the local government. Thus while local authorities manage the smaller local reticulation drains, Water Corporation is responsible for the larger-sized mains which are required to move and dispose of large flows of drainage waters under potential flood conditions.

Under the *Metropolitan Water Authority Act 1982*, regions served by a main drain can be declared as a main drainage area, provided the Water Corporation considers that the land benefits from or contributes to the need for drainage.

Under The Water Agencies (Charges) By-laws, land in a main drainage area is subject to drainage charges. Again, the requirement is that only areas that derive a benefit from the drainage service or contribute to the need for the service are subject to the charge. Around 40 per cent of the Metropolitan Perth region has been declared for main drainage.

Recently there has been increasing recognition of the need to manage drainage water quality in order to protect the quality of the receiving waters. Under the Urban Drainage Initiative, the Department of Water is looking to promote, improve, and integrate, the planning and management of stormwater in WA.

Improving the quality of drainage discharges can be done in a variety of ways. One such way is to slow the rate at which water is moved along the transmission infrastructure (for example by the establishment of wetlands in local developments) to enable more of the nutrients to be absorbed into the ground. Public education activities can be undertaken to reduce the discharge of pollutants into drainage courseways, and/or additional treatment can be undertaken to improve the quality of water discharged from the drainage system (for example via nitrate removal). Thus, there are a wide range of activities that can be undertaken to improve drainage water quality, and these activities can be undertaken by a range of stakeholders.

Currently Water Corporation's formal functional obligations relate only to water quantity management. There is no clear state-wide consensus as to how best to address water quality management. Water Corporation is very likely to play a role in water quality management in future, and has expressed a preparedness to do so, provided the objectives and approach to drainage water quality management are agreed. In particular, the effectiveness of actions taken in different parts of the water cycle need to be identified in order to ensure allocation of appropriate responsibilities.

3.2.2 The benefits of drainage services

Drainage is the least "visible" of the services provided by the Water Corporation. Typically, it is noticed only when it fails. In addition, the cost drivers of the drainage service are complex and not easily measured.

Private benefits from quantity drainage services

Most properties benefit from drainage services from the viewpoint of both an impactor perspective and a beneficiary perspective.

From the impactor pays perspective, it is the creation of impermeable areas that gives rise for the need for drainage services. Thus it is new development, with its associated creation of pavements, roads, and other hard surfaces that is the key driver for new drainage infrastructure. While the extent of impermeable surface on a property is the key driver for drainage need, other

characteristics such as the incline of the property and elevation will also affect the need for and cost of services. Properties at high elevations or on an incline are more likely to cause run-off problems for others: properties at low elevations are more likely to require drainage service for protection from run-off or to avoid flooding from groundwater.

From a beneficiary point of view, properties benefit from drainage services through the protection of their property from flooding. They also benefit from the fact that the drainage waters that are generated by their property are safely disposed of.

Drainage services are non-exclusionary and involve non rivalrous consumption. For example, once a drainage system is installed, the benefits of the drainage system accrue to everyone in the street including new properties. It could therefore be argued that drainage services represent a public as opposed to a private good. However, the requirement to provide drainage services in metropolitan areas serves to "internalise the externality". All properties are required to contribute towards the cost of drainage services on the grounds that all properties benefit from its provision.

Public benefits from quantity drainage services

It must however also be acknowledged that a significant proportion of the metropolitan land area is public open space, comprising roads, parks, sporting facilities, and other public spaces. In this case it is public land that benefits from drainage services, and the service benefits all who choose to use the roads and public open space. Accordingly, the drainage of public open spaces should be regarded as a public benefit.

In the same way as for privately owned properties, public open spaces benefit from drainage services both from the point of view of impactor and beneficiary. From a beneficiary viewpoint, the benefits from drainage services operate similarly for the different types of open space. Thus roads users benefit from avoided flooding, as do users of parks and sporting grounds. However, the value attributed by beneficiaries could well differ between the types of open space. Roads are likely to be used more intensively by the general public than other forms of open space. For this reason, the value attached to the prevention of flooding is likely to be greater for roads.

From an impactor point of view, there are also potential differences. Roads are a major contributor to impermeable area, and hence contribute a clear need for drainage services. By comparison, parks and sporting ovals are not in general impermeable (although there may be impermeable elements such as associated car parks). Parks and ovals can however contribute to flooding problems if they become water-logged. Since drainage planning is undertaken to manage extreme events, it is likely that these types of open public space contribute something towards the need for drainage services.

Public benefits from quality drainage services

Improving the quality of discharges into the Swan and Canning Rivers helps to improve the quality of the river water and its amenity value to river users and Perth residents in general. Of particular benefit is the reduced likelihood of algal blooms.

The importance of the rivers for Perth has been highlighted by a number of studies. For example, research by Market Equity found that the Swan and Canning Rivers were highly valued by all study participants on the basis of lifestyle, as a city icon, and as part of Perth's identity[4]. It is clear, therefore, that expenditure on improving drainage water quality provides public benefits.

Moreover, a significant element of a future quality program is likely to be dealing with legacy issues. Such quality expenditures are appropriately recovered from the wider community. On the other hand, new developments can create drainage quality issues, which could be recovered from developers under an impactor pays approach.

[4] As reported at the Drainage Management Forum March 2004.

4 Allocation of costs

The purpose of this section of the report is to estimate the cost of service associated with the provision of public, as opposed to private, benefits. The following section identifies the total cost of drainage services, using Water Corporation's expenditure forecasts. Section 4.2 seeks to allocate capital costs between public and private service provision, while section 4.3 examines the likely split of operating costs. Section 4.4 draws together the estimates for the total cost of service for the provision of public and private benefits.

4.1 The total cost of service for drainage

When regulating Water Corporation's charges, ERA identifies the revenue required by Water Corporation to cover the cost of providing its services. The cost of service covers operating and maintenance costs, a return of capital in the form of depreciation, and a return on capital used in the provision of drainage services.

Water Corporation has provided current and forecast estimates for operating and capital expenditure for the metropolitan drainage business. These are shown in the top part of Table 3. The capital expenditure estimates are based on Water Corporation's *2008-09 Strategic Development Plan*. All expenditures have been converted to constant 2008-09 prices. As can be seen by reviewing the detail in Table 3, depreciation and the return on assets make up 60 to 70 per cent of the total cost of service.

Rolling forward the capital value previously determined by ERA by adding new capital expenditure and deducting depreciation enables the gross cost of service for the metropolitan drainage service to be estimated. Standard asset lives of 41 years for the rolled forward initial capital value and 57 years for new capital have been applied to determine the annual depreciation allowance, together with a return on capital of 5.6 per cent (applied to the mid-year capital value).

The above discussion suggests that much of the cost of existing drainage services relates to the provision of private benefits to property owners. However, an element of the existing service could be seen as providing public benefits, through the provision of drainage services to public open spaces. In addition, future expenditure intended to improve drainage water quality would also provide public benefits.

Table 3 **Forecast expenditure and cost of service for Metropolitan drainage service $m 2008-09 prices**

Year ended June	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Expenditure														
Operating expenditure	13.6	11.8	11.7	13.4	14.4	13.4	14.6	13.7	15.6	17.6	19.5	21.5	23.5	25.5
Capital expenditure	3.1	2.2	2.5	4.2	2.9	5.0	4.0	26.4	52.8	46.4	45.2	42.4	41.3	40.6
Cost of service														
Opex	13.6	11.8	11.7	13.4	14.4	13.4	14.6	13.7	15.6	17.6	19.5	21.5	23.5	25.5
Depreciation	8.1	8.1	8.2	8.2	8.3	8.3	8.4	8.5	8.9	9.8	10.6	11.4	12.0	12.7
Return on Assets	18.4	18.1	17.7	17.5	17.2	17.0	16.8	17.1	18.9	21.1	23.1	24.9	26.6	28.2
Total cost of service drainage	40.0	38.0	37.6	39.0	39.9	38.7	39.8	39.3	43.4	48.5	53.2	57.8	62.2	66.5

Data source: Water Corporation, ERA
Note: Opex includes overheads allocated to drainage.

Table 4 **Capital expenditure split between quantity and quality for metro drainage $m 2008-09 prices**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Metro quantity capital expenditure				4.2	2.9	5.0	4.0	3.9	7.5	2.3	2.2	0.6	0.6	0.5
Metro quality capital expenditure				0.0	0.0	0.0	0.0	22.5	45.3	44.1	42.9	41.8	40.7	40.1
Total metro capital expenditure				4.2	2.9	5.0	4.0	26.4	52.8	46.4	45.2	42.4	41.3	40.6

Data source: Water Corporation

We therefore take a two stage approach to allocating costs between those providing public benefits and those providing private benefits. First, we separate out the cost of service attributable to improving the quality of drainage waters, which are regarded as providing public benefits. Then we seek to allocate the costs of providing water quantity management by splitting the costs attributable to public and private benefits according to the different types of land use involved.

4.2 Allocation of capital costs

Split between quality and quantity

Water Corporation provided an analysis which identified the forecast capital expenditures for metropolitan water quantity and water quality management, based on the 2008-09 Strategic Development Plan (SDP). As shown in Table 4, capital expenditures on water quality were not expected to begin until 2013-14.

The quality expenditure forecasts contained in the 2008-09 SDP were for actions that would improve urban water management in the Swan-Canning catchment. However, the amounts represented a provision for future work, recognising the strategic importance of urban water drainage, rather than expenditures based on specific planned projects.

Moreover, the provisions for water quality work have been removed from the Water Corporation's proposals for the 2009-10 SDP. The provision for water quality management capital expenditure was removed on the basis that the water quality management program has yet to be determined by the State Government and this may still be some time off. In addition there is still considerable uncertainty involved in predicting the future scale of drainage quality programs likely to be undertaken by the Water Corporation. Therefore the quality expenditure numbers shown in Table 4 need to be viewed with considerable caution.

Split between public and private benefit

The next step is to determine an appropriate split of the quantity capital expenditure and initial capital value between those providing public benefits and those providing private benefits.

Water Corporation's main drainage assets provide drainage services to a number of local governments. Main drains are not directly connected to individual properties. Nevertheless, by virtue of removing excess drainage water, and hence protecting property from the risk of flooding, main drains provide benefits to a mixture of privately owned and publicly used land areas.

As discussed above, the drivers of the cost of providing drainage services are complex. An earlier Joint Working Party[5] considered alternative bases for allocating the costs of service provision between customer classes. The Working Party concluded that allocating costs and charges on the basis of impermeable area was complex, and at the same time unsatisfactory, since there are other factors that influence run-off but remain too hard to incorporate into a charging scheme (such as gradient and the extent of on-site management). Instead the Working Party favoured an approach which used land use and land area as a proxy for the relative contribution of run-off/benefit from flooding protection.

Land area would appear to provide an appropriate compromise in terms of being broadly cost-related, while remaining administratively tractable.

Table 5 shows the total land area by property type identified by the Working Party.

Table 5 **Land area by property type**

Detail	Land area	Proportion
	(m^2)	(%)
Residential and vacant	239,574,800	58.0
Business	34,411,440	8.3
Public open space	139,073,760	33.7
Total Urban Drainage Declared Area	413,060,000	100.0

Data source: Joint Working Party, 2003, Review of Water Corporation Valuation Based Charges, p. 19

The category of public open space comprises roads, parks, and other public land. There are 11,446 kms of sealed local government roads (WALGA 2006) and approximately 807 kms main roads in metropolitan WA[6]. For local government roads, the average width of the network is thought to be around 7.5 metres to 8.0 metres (excluding the foot/cycle path) and for main roads around 15 metres to 20 meters. As such, roads comprise over 100,000,000 square metres of the public open space category, of which around 41,000,000 square metres will be within main drainage areas.

As indicated above, the public benefits derived from drainage services provided from parks may be somewhat lower than that derived for roads and private property. This might warrant attaching a slightly lower weight to public open space when allocating costs on the basis of land area. As a first cut, however, an equal weighting has been applied to all land types.

[5] Joint Working Party for the Review of Water Corporation Valuation Based Charges.

[6] Main Roads road length information was provided following a data request to Main Roads WA that was run on 8 December 2008.

Table 6 **Allocation of capital expenditure and asset value to public and private benefit provision – full quality program $m 2008-09 prices**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Capital exp allocation														
Capex - private benefit quantity	2.1	1.5	1.8	2.8	1.9	3.3	2.7	2.6	5.0	1.5	1.5	0.4	0.4	0.4
Capex - public benefit quantity	1.0	0.7	0.9	1.4	1.0	1.7	1.4	1.3	2.5	0.8	0.8	0.2	0.2	0.2
Capex - public benefit quality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	45.3	44.1	42.9	41.8	40.7	40.1
Allocation of capital value														
Private benefit closing asset value	216.0	212.1	208.4	205.8	202.2	200.0	197.1	194.0	193.3	189.1	184.9	179.5	174.0	168.6
Public benefit closing asset value	109.6	107.6	105.7	104.3	102.5	101.4	99.9	120.9	165.4	206.2	245.1	281.5	316.1	349.4
Total closing value	325.5	319.6	314.1	310.1	304.7	301.4	297.0	314.9	358.8	395.3	429.9	460.9	490.2	518.1

Table 7 **Allocation of capital expenditure and asset value to public and private benefit provision – no quality program $m 2008-09 prices**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Capital exp allocation														
Capex - private benefit quantity	2.1	1.5	1.8	2.8	1.9	3.3	2.7	2.6	5.0	1.5	1.5	0.4	0.4	0.4
Capex - public benefit quantity	1.0	0.7	0.9	1.4	1.0	1.7	1.4	1.3	2.5	0.8	0.8	0.2	0.2	0.2
Capex - public benefit quality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Allocation of capital value														
Private benefit closing asset value	216.0	212.1	208.4	205.8	202.2	200.0	197.1	194.0	193.3	189.1	184.9	179.5	174.0	168.6
Public benefit closing asset value	109.6	107.6	105.7	104.3	102.5	101.4	99.9	98.4	98.1	95.9	93.8	91.0	88.3	85.5
Total closing value	325.5	319.6	314.1	310.1	304.7	301.4	297.0	292.4	291.4	285.0	278.6	270.5	262.3	254.2

Note: The methodology for allocating capital value between categories involved:

1. Allocating the initial capital base between private and public (quantity) benefits on the basis of land area, with public benefit quality assumed to have an initial capital base of zero.
2. Rolling forward each capital value by adding the capital expenditure attributed to each and deducting depreciation. Depreciation is calculated on the basis of straight line depreciation, assuming asset lives of 41 years for the initial capital base and 57 years for new capital expenditure.

Table 6 shows the allocation of capital expenditure to public and private benefits that results from allocating quantity expenditure on the basis of land area, and quality expenditure entirely to public benefit. The second part of Table 6 also shows the capital asset value rolled forward over time, whereby capital expenditure is added to the initial capital base and depreciation deducted. With the assumption of very significant quality expenditures, there is a rapid increase in the capital asset value attributable to the provision of public benefits in future years.

There has been extensive discussion in several forums regarding the need for significant expenditure on works to improve water quality in the metropolitan region. Should Water Corporation be required to play a role in water quality improvement, it would be reasonable to expect significant water quality capital expenditure in the initial years as remedial work is undertaken. However, the rate of required capital expenditure for water quality improvements would be expected to moderate substantially in later years.

Table 7 shows the expenditure allocations should there be no quality related capital expenditure within the period. On the basis that public open space accounts for around one third of total land area, the capital asset values attributable to providing public benefits remains a stable one third of the total.

4.3 Allocation of operating costs

The metropolitan drainage service incurs $11.35 million of directly allocated operating and maintenance costs, of which 9.25 million represents allocated corporate overheads.

However, given the uncertainty surrounding the nature of the quality related programs anticipated by water Corporation, no operating expenditure was incorporated for quality related work. This means that the operating costs included in Table 3 relates to quantity management only, with additional operating costs likely to be incurred if a quality management program goes ahead.

To allow for this, the modelling makes some assumptions. First, the operating costs identified by Water Corporation and shown in Table 3 are allocated between private benefit and public benefit quantity management in proportion to the capital asset value at year end. Where quality management work is assumed, an additional operating cost allowance is incorporated, using the relationship between operating cost and capital value established for the quantity management side of Water Corporation's activities. Thus the modelling assumed that the level of operating costs will broadly follow the extent of assets involved in providing each type of service.

4.4 Attribution of the cost of services providing public and private benefits

The second part of Table 8 shows the resultant allocation of the total cost of service between public and private benefits. Given the nature of possible works, there remains some uncertainty regarding the appropriate asset life for quality related capital expenditure. In Table 8 depreciation has been determined by applying the asset lives defined previously to the initial capital value/new expenditure allocated to public and private benefits. Similarly the return on capital is calculated by applying a cost of capital of 5.6 per cent to the average capital value for the year.

Table 8 suggests that, with the full quality program, the cost of providing public benefits (including quality improvement) will overtake the cost of providing private benefits by the end of the 20018-19. The cost of providing private benefits rises initially, but then falls as the capital base declines[7].

The extent of the appropriate program of drainage quality improvements is far from certain. Nevertheless, the potential rise in the cost of delivering services which provide public benefits, rather than private benefits attributable to property owners, means it is important to ensure that the charging system accounts for such costs appropriately.

In terms of the amount spent on water quality management, the experience of NSW is informative. In NSW local councils can levy a stormwater management charge of up to $25 for residential properties and $100 for commercial properties. Assuming a population for Sydney of 4.2 million, an average household size of 2.65, and all councils levy the maximum charge, the revenue raised each year from residential households for water quality management would be approximately $40 million. Given the assumed quality expenditure program and associated operating cost implication, the modelling has derived a cost of similar magnitude for Perth. Perth's relatively smaller size indicates the upper-bound nature of the assumed capital program.

Finally, Table 9 shows that without a substantial quality program, the total cost of service of providing public and private benefits would be substantially lower, and would continue to comprise roughly two thirds private and one third public benefit.

[7] The Regulatory Asset Value for private benefits starts to fall because depreciation is greater than new capital expenditure on quantity management.

Table 8 **Allocation of operating costs and total cost of service – with full quality program $m 2008-09 prices**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Operating cost allocation														
Private benefit operating costs	9.0	7.8	7.7	8.9	9.5	8.9	9.7	8.5	8.4	8.4	8.4	8.4	8.3	8.3
Public benefit operating costs	4.6	4.0	3.9	4.5	4.8	4.5	4.9	5.3	7.2	9.2	11.1	13.1	15.1	17.2
Total cost of service - private														
Opex	9.0	7.8	7.7	8.9	9.5	8.9	9.7	8.5	8.4	8.4	8.4	8.4	8.3	8.3
Depreciation	5.3	5.4	5.4	5.4	5.5	5.5	5.6	5.6	5.7	5.7	5.8	5.8	5.8	5.8
Return on Assets	12.2	12.0	11.8	11.6	11.4	11.3	11.1	11.0	10.8	10.7	10.5	10.2	9.9	9.6
Cost of Service - private benefit	26.5	25.2	24.9	25.9	26.4	25.7	26.4	25.0	24.9	24.9	24.6	24.3	24.0	23.7
Total cost of service - public														
Opex	4.6	4.0	3.9	4.5	4.8	4.5	4.9	5.3	7.2	9.2	11.1	13.1	15.1	17.2
Depreciation	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	3.3	4.1	4.9	5.6	6.3	6.9
Return on Assets	6.2	6.1	6.0	5.9	5.8	5.7	5.6	6.2	8.0	10.4	12.6	14.7	16.7	18.6
Cost of Service - public benefit	13.5	12.8	12.6	13.1	13.4	13.0	13.4	14.3	18.5	23.7	28.6	33.4	38.1	42.8

Table 9 **Allocation of operating costs and total cost of service – no quality program $m 2008-09 prices**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Operating cost allocation														
Private benefit operating costs	9.0	7.8	7.7	8.9	9.5	8.9	9.7	8.5	8.4	8.4	8.4	8.4	8.3	8.3
Public benefit operating costs	4.6	4.0	3.9	4.5	4.8	4.5	4.9	4.3	4.3	4.3	4.3	4.2	4.2	4.2
Total cost of service - private														
Opex	9.0	7.8	7.7	8.9	9.5	8.9	9.7	8.5	8.4	8.4	8.4	8.4	8.3	8.3
Depreciation	5.3	5.4	5.4	5.4	5.5	5.5	5.6	5.6	5.7	5.7	5.8	5.8	5.8	5.8
Return on Assets	12.2	12.0	11.8	11.6	11.4	11.3	11.1	11.0	10.8	10.7	10.5	10.2	9.9	9.6
Cost of Service - private benefit	26.5	25.2	24.9	25.9	26.4	25.7	26.4	25.0	24.9	24.9	24.6	24.3	24.0	23.7
Total cost of service - public														
Opex	4.6	4.0	3.9	4.5	4.8	4.5	4.9	4.3	4.3	4.3	4.3	4.2	4.2	4.2
Depreciation	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	2.9	2.9	2.9	2.9	2.9	2.9
Return on Assets	6.2	6.1	6.0	5.9	5.8	5.7	5.6	5.6	5.5	5.4	5.3	5.2	5.0	4.9
Cost of Service - public benefit	13.5	12.8	12.6	13.1	13.4	13.0	13.4	12.7	12.6	12.6	12.5	12.3	12.2	12.0

5 Charging method and structure

5.1 Charging principles

When considering alternative approaches to charging, it is important to be clear on the principles or objectives that underpin pricing decisions. Three principles previously applied by ERA concern efficiency, equity, and best practice in regard to implementation[8].

Efficiency requires that charges encourage outcomes that involve the lowest possible costs to society. Equity requires that outcomes be regarded as fair, and that incidence effects from changes in the structure of prices are taken into account. Best practice in implementation is concerned with transparency and simplicity, and ensuring that processes are appropriate and provide for accountability.

5.1.1 Efficiency

Efficiency concepts

Efficiency encompasses the concepts of allocative, productive, and dynamic efficiency.

Allocative efficiency requires that prices be set in a way that ensures the best use of society's scarce resources. A first-best approach to achieving allocative efficiency is for price to reflect the marginal cost to society of producing the good or service. Such an approach ensures that prices reflect the opportunity cost of the resources involved.

Productive efficiency requires that demand be met at least cost. *Dynamic efficiency* requires that investments are optimal over the long term, requiring appropriate incentives for investment and innovation.

A further consideration is the need to ensure that sufficient revenue is generated to ensure the financing of efficient supply. Where there are significant economies of scale or scope this may require departures from marginal cost pricing in industries and/or the use of two part tariffs.

Issues in the application to drainage

The building block approach to determining a revenue requirement for Water Corporation's drainage activities contributes towards several of the efficiency considerations.

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[8] ERA, June 2008, Inquiry into Developer Contributions to the Water Corporation: Final Report, p. 6.

Revenue sufficiency

First, the building blocks are intended to ensure sufficient revenue to finance the efficient supply of services by Water Corporation. This is in contrast to the local government sector, where there is no formal assessment of required revenues and funding for drainage activities competes with other priorities.

Although Water Corporation costs are fully recovered, the drainage service does not yet achieve full cost recovery since the costs incurred by government when undertaking drainage-related planning functions are not currently passed through to users of the drainage system.

Dynamic efficiency

Dynamic efficiency is encouraged through the provision of an explicit rate of return to new investment. This ensures that there is an appropriate incentive provided to encourage new investment. Again this differs from the approach to funding drainage activities by local government, where investments are not required to earn a return.

Productive efficiency

Incentives for productive efficiency are provided through regulatory scrutiny. The efficiency of both operating and capital expenditures proposed by Water Corporation is assessed by ERA, and only efficient expenditures are incorporated into the revenue requirement that underpins future prices.

Allocative efficiency

For drainage services provided by Water Corporation, the more difficult efficiency issues arise in regard to allocative efficiency. Unlike water and sewerage services, property owners can do relatively little to change their impact on the extent of or need for drainage services once the building and landscaping has been completed. Even where a response is possible (for example by reducing impermeable area) it is not measurable in the sense of being able to be reflected in charges. This implies that annual charges serve relatively little purpose in encouraging efficient outcomes and equity becomes the prime consideration.

The point at which pricing signals can be provided most effectively for drainage is at the initial development stage. Developers undertaking best practice urban design can improve the management of drainage water quantity and quality, for example through the installation of local wetlands.

5.1.2 Equity

Equity encompasses concepts such as fairness and support for the disadvantaged. However, there are many differing concepts as to what is "fair", for example between classes of customers, across customers with differing ability to pay, and inter-generational equity.

One broad concept of equity that is fairly widely accepted is the concept that customers should contribute towards the costs for which they are responsible and/or from which they benefit.

An alternative concept is that all customers should pay the same price for a service, regardless of location and the cost of service. This approach is reflected in the State Government's Uniform Pricing Policy, which requires that all customers be provided with access to affordable water.

Issues in application to drainage

Main drainage services are charged by the Water Corporation on the basis of the GRV of the property, whether residential or non-residential. GRV is acknowledged to be a poor reflection of the need for drainage imposed by properties. Its chief attraction is that GRV, being related to the value of the property, is broadly reflective of ability to pay.

Water Corporation acknowledge that, in terms of costs contributed, high GRV properties cross-subsidise low GRV properties. As three quarters of residential customers pay the minimum charge, cross subsidisation is not seen as a major issue for residential customers. However it is of concern for non-residential customers, both within the non-residential class of customers and between the residential and non-residential classes as a whole.

Main drainage charges are levied only in areas which have been declared as benefiting from Water Corporation's main drain system. To this extent, there is a nexus between the costs incurred and charges levied. However, the extent of main drainage services provided to local government is in fact highly variable, implying a degree of inequality in the levying of a uniform main drainage charge.

Moreover, the current approach does not take account of the provision of public benefits, in terms of the drainage of roads and other public spaces which are enjoyed by the broader community. These costs are paid for only by main drainage customers, despite the wider benefits, and this has been a significant source of complaint to the Water Corporation by its main drainage customers (Water Corporation 2006).

At the same time, we understand that main drainage charges are commonly mis-understood by customers (Water Corporation 2006 p. 5). All property owners pay rates to local government that are intended to cover the cost of local drainage services. Some property owners in main drainage areas believe that they are being double-charged, not understanding that the charges are for the provision of separate infrastructure.

5.1.3 Implementation

ERA's principles related to implementation suggest that a charging regime should be transparent, avoid undue complexity, have appropriate independent scrutiny, and incorporate an appeal mechanism.

Best practice implementation also requires that there be clear assignment of responsibilities, and accountability for expenditure and revenues.

Issues in application to drainage

The above discussion indicates that the current approach to drainage charging is not transparent to customers. In part this is a result of the structure of the industry, and the accident of history and geography as to where main drains have been needed. Moreover, the GRV charging system is itself complex and expensive to maintain.

5.1.4 Consideration of the method and structure of charges

The following sections of the paper consider the appropriate method of charging for Water Corporation's drainage services, including the appropriate basis and structure of charges. In doing so, the discussion takes account of the efficiency, equity, and implementation principles outlined above.

The discussion first considers the allocation of cost recovery between customer groups, addressing the issue of appropriate recovery of costs incurred in providing public benefits and the appropriate balance of cost recovery from the residential and commercial customer classes.

The next section examines options for the structure of charges, in particular the balance between up-front and annual charges. The final section considers alternative options for the basis of levying annual charges.

5.2 Allocation of costs to customer groups

5.2.1 Allocation of costs incurred to provide public benefits

Section 4 above discussed the nature of the benefits provided by drainage services, and concluded that Water Corporation's main drainage service provides a mixture of public and private benefits.

It is appropriate that private benefits are recovered from the impactors/beneficiaries, namely property holders. Accordingly, the current system of charging property owners within main drainage areas represents an appropriate method of recovering the costs incurred for their benefit.

However, the public benefits identified benefit the community in general and not just those located within main drainage areas. Moreover, to the extent that Water Corporation is asked to undertake significant responsibility for drainage water quality improvements, the extent of costs incurred to provide public benefits could become substantial, both relative to the total cost of Water Corporation's drainage services, and in absolute value.

Equity considerations

Equity suggests that the costs incurred for public benefits should be spread more widely than Water Corporation's main drainage customers.

One option would be for government to provide Water Corporation with a CSO for the cost of services that provide public benefits. This would require a substantial contribution from government, equivalent to at least one third of the current cost of providing main drainage services, and potentially significantly more.

Another option would be to extend that element of Water Corporation's charge beyond main drainage areas, to the whole of the Perth Metropolitan region. Main drainage customers would continue to pay a charge which reflects the cost of providing drainage services for their benefit. The main drainage charge would be in addition to a charge levied by Water Corporation on all Perth residents to recover the costs of providing drainage services which benefit the community at large. Overall the total charges paid by customers in main drainage areas would go down, as the public benefit element of the cost would be spread more widely.

Some inequities would inevitably remain, in part due to the division of responsibility between Water Corporation and local governments. For example, residents in local government areas will continue to pay drainage charges to the LGA for services which provide a mixture of public and private benefits. Thus the *local cost component* of drainage services providing a public benefit would continue to lie where they fall. It is only the contribution of *main drainage services* to the public benefit that would be taken into account. However, as all property owners contribute to the local costs of drainage, this would seem to be a reasonable compromise, and more equitable than the current position.

Another potential inequity arises from the division of responsibility between Water Corporation and local governments, and the different nature of the funding arrangements. As a corporatised body, Water Corporation is required to strive for a reasonable return on its capital. In our view, such a return is appropriate, in that it provides appropriate incentives for investment. However, investment undertaken by local government is not subject to the same requirement. As a consequence, the total cost to customers of a project may appear lower if it is undertaken by local government rather than the Water Corporation. The quid pro quo is that the funds for investment are less generally available at the local government level, with worthwhile drainage projects not necessarily being funded. However, this is an issue that results from the current institutional arrangements for drainage within Perth, and is not affected by the proposal to re-allocate the costs of undertaking services that provide public benefits.

Efficiency

The efficiency implications of such a change would be minimal. As discussed above, annual drainage charges have little efficiency impact given the nature of the service.

Implementation

The extension of a drainage charge to all Perth customers would reduce charges to existing main drainage customers by around a third. In addition, all customers – including those in main drainage areas - would pay a new charge (amounting to under 15 per cent of current annual charge revenue).

The extension of a drainage charge to all Perth customers has a clear rationale. In particular, the justification for extending the charging base is reasonably straightforward for the quality element of the costs involved. It is likely to be generally supported provided the need for the investment is agreed, and the approach to improving water quality if seen as effective and efficient.

Work presented at the 2003 Swan Canning Catchment Drainage Forum indicated that in the community:

- people believe water quality management is twice as important as water quantity management
- there is strong support for the water agency (Water Corporation) to be responsible for both water quantity and quality service delivery
- in terms of paying for water quality improvement, the most strongly supported option was the State government, followed by (in descending order) the water agency, major polluters, the Federal government, local government, the community, and then Environment Department[9].

The justification for re-allocating the quantity aspect of the public benefits may be more difficult to communicate effectively, however. It is likely to require improved understanding of the distinction between Water Corporation's services and those provided by local governments.

5.2.2 Allocation of costs between residential and non-residential customers

In broad terms the costs of the main drainage service are allocated between residential and non-residential customers on the basis of the relative GRV of the two groups. However non-residential customers pay a higher rate in the dollar than residential customers. In addition, the minimum fee is more widely applied to residential customers than non-residential customers. For both

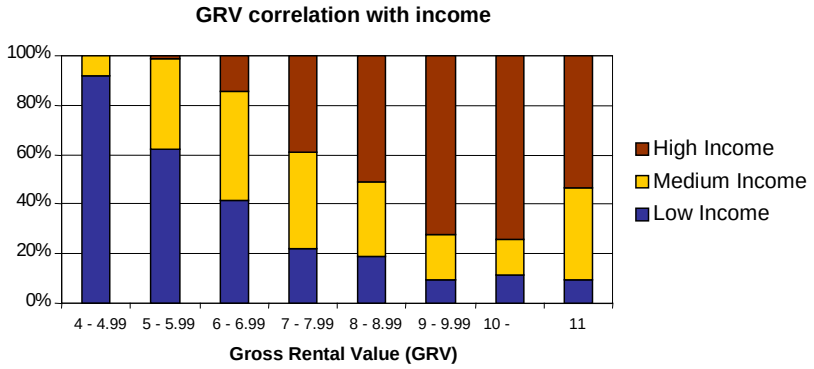
[9] Nancarrow, B. (CSIRO Land and Water) Understanding the System: Where does the Community fit in?, Presentation to the Swan-Canning Catchment Drainage Management Forum November 2003, available: www.epa.wa.gov.au/article.asp?ID=1785&area=EIA&CID=16&Category=EPA+Reports+and+Recommendations [accessed 8 December 2008].

reasons, the allocation will differ somewhat from relative GRV, with the overall outcome being a higher weighting for non-residential customers.

Equity

The perceived advantage of GRV rests in its reflection of ability to pay. Higher GRV properties tend to be in high socio-economic areas and lower GRV properties tend to be in low socio-economic areas. Commercial properties are also regarded as having a relatively greater ability to pay.

Figure 3 **GRV and ability to pay**



Data source: Joint Working Party (2003)

The Joint Working Party (2003) examined the relationship between GRV and income. It concluded that, in general, low income correlates with low GRV, as shown in Figure 3. However, the correlation is not perfect, with some low income families living in above average GRV properties and vice versa.

In addition, GRV may provide a proxy measure of the benefits derived from drainage services. In a strictly commercial sense (in other words not taking account of the emotional distress involved), the cost of the damage done to a flooded property is likely to be greater the higher the GRV of the property. However, given the very high GRV values in Perth's City centre, the relationship between the value of drainage and GRV is likely to be less than proportionate.

From an impactor pays view point, however, it is clear that non-residential customers as a class pay charges which are disproportionate to the costs they impose. Again, this is driven by the very high GRVs attached to city centre commercial properties.

As discussed above, the cost drivers for drainage are complex, but are probably best represented by land area and land use type. Thus an option for re-balancing charges in line with the costs imposed by residential and non-residential customer groups would be to allocate the total cost of service to be recovered in line with land area.

Table 10 shows that a land-area based allocation of costs between the two customer classes would imply a very significant re-distribution of costs away from commercial properties and onto residential properties (and vacant land).

Table 10 **Residential and non-residential characteristics**

Customer class	Revenue in 2007-08	Land area
	(%)	(%)
Residential and vacant	58.7	87.4
Non-residential and exempt	41.3	12.6

Note: Vacant land provided a small proportion of revenue at 2.6 per cent.

Recovering 87 per cent of total costs from residential customers and vacant land would imply a 50 per cent increase in charges to this customer group. Concomitantly, charges to non residential and exempt properties would fall by some 70 per cent. Allowing for a reduction in main drainage charges (to re-allocate the costs of providing public benefits), would mitigate the effect for residential customers somewhat, but would still result in an increase of around 33 per cent in the charges to residential customers.

Efficiency

Re-allocation of costs between residential and non-residential customer classes will influence the reflective balance paid by each customer class in annual charges. As discussed above, given that annual charges are not effective in deriving any response in the demand for drainage services, this change is likely to have minimal impact on efficiency.

Implementation

Adopting an impactor pays (ie land area) approach to the allocation of costs would have very significant incidence effects. These need to weighed against the benefits of altering the allocation of costs between customer groups, which is itself a matter of judgement about the relative merits of alternative concepts of equity. A GRV based allocation reflects ability to pay, whereas a land-based allocation reflects an impactor pays approach.

One option might be to combined elements of the two, to moderate the extent of the influence of GRV in the allocation of costs between customer groups. However, there is a risk that such a "compromise" approach would not have a clear rationale, and would also complicate the choice of charging basis.

The incidence effects of a change to a land area based allocation of costs could be managed by phasing the change in over a reasonable time period. As discussed below, there is some justification for re-balancing charges between annul and headworks charges, which over time would serve to partially offset the increase in residential charges that would be implied by a land based allocation of costs.

Moreover, if the costs involved in providing public benefits were to be re-allocated (ie directly to government via a CSO or to a Perth-wide customer base), this would serve to reduce the impact on residential customers of re-balancing residential and non-residential charges.

5.3 Structure of charges

The costs of Water Corporation's main drainage activities are recovered through a combination of up-front and annual charges.

Up front charges comprise the standard headworks charge levied on developers, which is based on 40 per cent of the average value (per lot) of existing urban drainage infrastructure. Additional charges in the form of prefunding are levied for out-of sequence development, as well as charges for the provision of infrastructure for non-standard services. Typically non-standard infrastructure has related to drainage water quality improvements, eg Ellenbrook and Jandakot.

Annual charges are based on GRV, charged at 0.501 cents in the dollar for residential customers and 0.603 cents in the dollar for non-residential customers. There is a flat rate minimum charge of $63.10 for both residential and non-residential customers.

5.3.1 Headworks charges

The appropriate balance between up-front and annual charges will rest on efficiency and equity considerations. As discussed above, the use of up-front charges at the point of development are likely to be more effective than annual charges in influencing behaviour which affects the quantity or quality of drainage water flows. Moreover, higher up-front charges increase the scope for introducing incentives for best practice design.

ERA review

As discussed above, ERA suggested that efficient developer charges (for water) should exclude future source and transmission costs but cover the full forward-looking costs of providing distribution services to each new development (ERA June 2008c, p. 10). In addition, developer charges should cover the costs associated with bringing forward new developments ahead of a development schedule.

In the case of water, ERA considered that source and transmission costs are better recovered through annual charges than developer charges because all customers contributed towards demand for water sources and transmission capacity, so that all customers (whether existing or new) benefit from augmentation. By contrast, distribution systems tend to be specific to each development. ERA's guiding principle was that the cost of shared assets

should be recovered through annual tariffs, while the direct costs of new developments should be recovered from developers.

This raises the question of whether main drainage services are shared in nature, or specific to developments. In Water Corporations view, drainage services are all essentially distribution assets (ERA June 2008c, p. 42). This is because main drainage services are planned to service particular development regions. Accordingly, this implies that the full costs of providing drainage infrastructure are appropriately recovered through charges to developers.

However, in light of the significant incidence effect such a change in approach would cause, ERA accepted Water Corporation's proposal that the standard headworks charge for drainage continue to recover 40 per cent of the average cost of existing drainage infrastructure, rather than moving to 100 per cent of distributions costs as recommended for water and sewerage.

Melbourne Water

Of the other Australian jurisdictions, Melbourne Water conforms most closely to ERA's identified principles (noting that the approach for drainage developer charges differs to that used for water and sewerage in Victoria).

Melbourne Water's drainage developer charges are intended to recover the full capital cost of the initial infrastructure required for a drainage scheme. Thus developer charges are calculated such that the present value of developer charge income equals the present value of expected future capital costs. (Annual charges are set to recover only the costs of operation, maintenance and renewal of Melbourne Water's drainage infrastructure). In this way, locational cost signals are provided through the developer charge. In addition, capacity expected to be utilised in future is recognised when pricing the cost of the infrastructure for the first developers on the scene.

Melbourne Water also levies a stormwater quality charge. This has two components:

- A scheme stormwater quality charge which is scheme-specific, and recovers the cost of catchment stormwater quality initiatives
- A general stormwater quality charge which applies to developments that cannot achieve the stormwater quality targets (of a 45 per cent reduction in nitrogen disposal compared to the "developed scenario"). Where a development does not meet the minimum standard, charges are applied to the mass of nitrogen discharged relative to the minimum standard.
  - The charge is based on the average cost of the regional stormwater quality improvement program. In 2004 this was assessed to be $800 per kilogram of nitrogen.
  - The assessment of development schemes against water quality performance standards is a significant task, but has been facilitated by the development of stormwater quality modelling software "MUSIC"

by the CRC for Catchment Hydrology. The model predicts the generation of pollutants and the performance of stormwater treatment measures, and has been used to develop a set of simple checking tools which simplify the assessment of development applications.

If a developer exceeds the minimal level of nitrogen removal, they are compensated through an offset (or a future credit). The offset is provided at a rate equal to the average cost of the regional program of nitrogen removal ($800 per kg) and provides an incentive for the developer to introduce water sensitive urban design.

Options for Water Corporation

On the basis of the above discussion, there are a variety of options for adjusting the basis of the standard headworks charges. One would be to increase the level of the charge to 100 per cent of the average historical cost of providing drainage infrastructure. This would continue to provide a proxy for future costs that was averaged geographically. Alternatively a proxy for future infrastructure required could be derived by examining the more recent past, say the last ten years, and determining the average infrastructure cost per lot developed over that period. A third option would be to estimate directly the future capital expenditure requirements of servicing new development areas, on a case-by-case basis. It would also be possible to incorporate a stormwater quality charge, as done in Melbourne.

Efficiency

The approach of charging developers 40 per cent of the average value of existing drainage infrastructure suggests that Water Corporation is under-charging new customers for the cost of new infrastructure. Given that the main driver for drainage infrastructure is new development, an increase in the proportion of costs covered by developer charges would be efficient in terms of signalling the consequences of development decisions.

There is also scope to improve the locational signals provided by developer charges. The current averaged nature of the charge means that there are no locational signals provided by the standard headworks charge, although the additional headworks charges levied for non standard developments means that some of the developments likely to involve significant costs do face a cost penalty.

Moreover, at $440 per residential development lot, the standard drainage headworks charge is low. It is unlikely, on its own, to influence the locational decisions of developers. Cost signalling would be improved if the charge covered the full costs of new drainage infrastructure rather than 40 per cent, and covered the incremental cost of new infrastructure rather than relying past averages.

Water Corporation has calculated the average per lot capital expenditure for the provision of new main drainage assets over the last ten years. This comes

to around $660, which is less than the $1,150 implied by taking 100 per cent of the long term average cost of existing assets. This difference arises because drainage service capacities are planned for up to 50 years, and developments vary in the extent to which they are able to take advantage of spare capacity.

It could be argued that future customers should pay part of the cost of existing services where those existing services were constructed with the future customers in mind. Accordingly, basing charges on only those assets constructed in the last 10 years potentially ignores the considerable upfront capital investment that may have been undertaken before the 10 year period, even though they were originally put in to service new customers for many years to come.

However, encouraging efficient usage of spare capacity suggests that charges should be based on the expenditure involved in providing new drainage services for the specific developments under consideration. Under the Melbourne Water approach this would be achieved by basing developer charges on expected future expenditure.

A higher drainage infrastructure charge would also provide more scope for incorporating incentives for WSUD best practice. Thus, a developer instituting best practice could be offered a discount from the SHC if the works conformed to defined standards, reflecting the benefit to Water Corporation and/or local government in terms of reduced need for drainage quantity and/or quality management.

It may also be possible to identify quality-related works that would be necessitated by specific developments. If so, including these in development-specific SHCs would improve both equity and efficiency.

Equity

A headworks charge which is low relative to the costs of providing new drainage infrastructure implies that new customers are being undercharged, and hence cross-subsidised by existing customers.

Equity across developers is however also relevant. To facilitate the passing-on of the costs to house purchasers, developers are keen for headworks charges to be predictable. Changes to the calculation of headworks charges are unpopular, particularly if they result in the charge varying in what are perceived to be unpredictable ways.

The general principles suggested by ERA for headworks charges imply a rebalancing of charges towards the standard infrastructure charge (and away from annual charges) by reflecting more fully the forward-looking costs involved with providing new drainage infrastructure. By avoiding the cross-subsidisation of new customers, this could be seen as equitable as well as

efficient. However, efficiency would also require headworks charges which vary by location, cutting across the "uniform pricing" approach to equity.

Implementation

Again the impact of incidence effects on customers and the transparency of the current approach are relevant. Changing the basis of the standard headworks charge to cover 100 per cent of the average infrastructure cost per lot would increase the charge levied on developers by some 150 per cent (admittedly from a low base). The increase may be less if 10 year capex history is taken as an approximation.

The increase in charges to developers would be matched by a reduction in the costs recovered through annual charges. However, assuming that the change would not be retrospective, annual charges would continue to recover a return on and of past drainage infrastructure for many years. This implies that the impact on annual charges would be gradual, as the existing capital base is depreciated and new capital expenditure is no longer added to the capital value roll forward.

In its June developer charge review, ERA concluded that the case for modifying the basis of the standard headworks charge was not proven given the significant incidence effects involved. However, given the potential scale of investment required in improving drainage water quality, it may be that improved incentives, including incentives for WSUD, become more important in the future. At that point, the value of providing more cost-reflective pricing signals through the standard headworks charge should be re-assessed.

Further thought would also be required regarding the coverage of developer contributions to Water Corporation. The general principle that developer contributions cover Water Corporation costs specific to the development does not necessarily imply that the charge should continue to be levied only within main drainage areas. On the other hand, capital expenditures associated with legacy costs would not result from new development, and hence should not be included in headworks charges to new developments.

5.3.2 Annual charges

Annual charges for main drainage services recover the balance of the costs involved with service provision. The charge is currently based on the GRV of customers' properties, with a different rate in the dollar charged for residential and non-residential customers. Other options that have been canvassed as possible charging approaches include a flat charge and a charge based on land area.

Equity

One of the main attractions of GRV as a charging base is its correlation with property value and ability to pay. Although income levels are not perfectly

correlated with property value, a move away from GRV is likely to disadvantage lower socio-economic groups. For example, the Joint Working Party identified that charges to pensioners would generally increase with any move away from GRV (Joint Working Party 2003). However the equity implications may be minimal given the presence of the CSO contribution by government for pensioners.

In addition, the concept of ability to pay is not really appropriate for non-residential customers. The emphasis is on ensuring that companies can compete on a level playing field – for which purpose an impactor pays approach is generally regarded as appropriate.

As discussed above, GRV may provide an approximation to another concept of equity discussed, namely beneficiary pays. However, the value of drainage services to customers relative to GRV is in practice likely to be less than proportionate, particularly at the high GRV extreme.

Moreover, GRV is clearly un-related to the costs imposed by customers, as measured by impermeable land area. A change to the basis of charging according to land area (as an approximation to impermeable area) would perform better from an impactor pays' viewpoint.

Water Corporation has considered an option that would place non-residential customers in bands according to land area: for example:

- Less than 1,000 square metres
- 1,000 to 10,000 square metres
- Greater than 10,000 square metres.

Residential properties could be all charged on the basis of the lowest non-residential band, or be subject to a separate (and slightly lower) fixed charged. (This would avoid the problem that would otherwise arise with some large domestic properties on the outskirts of Perth being caught with high charges even though their sandy soils impose low drainage requirements).

The simpler option of charging a flat fee might be a better approximation than GRV to the relative costs imposed by domestic properties. However, it would be difficult to identify an appropriate fixed charge applicable to non-residential customers. Moreover, there would still be an element of cross-subsidisation between smaller and larger properties within a customer class.

The main disadvantage of either a land-area based charge or a flat rate charge is the incidence effect of the change, as discussed below.

Efficiency

As discussed, annual drainage charges have little impact on the demand for drainage services. Once building and landscaping has been completed,

residential property owners can do relatively little to change their impact on the extent or need for drainage services.

This implies that annual charges serve relatively little purpose in encouraging efficient outcomes and equity and implementation are the prime considerations. For example, any change in charging base to land area as a better reflection of impactor pays would bring no improvement in efficiency through improved cost-signalling. It is justified only in terms of improvements in the equity of charges.

Implementation

Water Corporation currently holds land area information, for the calculation of headworks charges. Land area data would also need to be up-dated far less frequently than GRV data – essentially only when a block is sub-divided.

By contrast, a GRV based charging system is expensive to maintain. The Water Corporation pays significant fees (around $3.5M) to Landgate, and a steady stream of alterations and up-grades to properties requires constant up-dating of the charging base.

In addition, Water Corporation has noted that many customer queries and complaints relate to GRV, particularly in a revaluation year. The fact that Water Corporation adjusts the annual charge to avoid "windfall" revenues is not well understood.

However, Water Corporation would realise administrative savings only if GRV was abandoned as the basis of charges for both drainage and sewerage services. In that case, savings would be available from reduced internal administrative costs and the saving of the payment made by Water Corporation to Landgate. However, the Landgate would continue to undertake the valuation exercise for other purposes, so the State-wide cost of maintaining the GRV database would not change. From society's point of view, the net administrative saving of Water Corporation moving away from GRV would comprise the savings achieved by its customer Centre– likely to be of the order of $240,000 to $360,000 pa.

Incidence effects

Moving to either a fixed fee or an area-based charge would however involve unwinding the very significant cross-subsidies implicit in the GRV approach. Thus, while high GRV properties would see large reductions in the annual drainage charges, most residential customers would experience an increase in their bill (other things being equal).

The unwinding of cross subsidies would work in several directions. First, the high GRV of commercial customers relative to the land area (or number of customers) would mean that charges to residential customers would rise relative to non-residential customers, as discussed above in Section 5.2. While high GRV businesses would benefit from a reduction in the annual charge, the

introduction of a land based charge would result in some businesses with large land areas experiencing an increase in charges. Such properties could include factories, nurseries, depots, and caravan parks.

The incidence effects for residential customers would be reduced if the allocation of costs to customer categories retained some link to GRV. However, such an approach would imply a "mixing" of the rationale for allocating costs between customers. For example, costs would be allocated to customer classes on the basis of the benefit received from drainage services with the costs to individual customers being based on an impactor pays approach (under a land-based approach). If an area-based charge was felt to be more equitable, in terms of reflecting costs, it would be awkward to then combine this with a different method of allocating costs between customer classes.

Options to "moderate" GRV

An alternative approach which could be used to balance equity and incidence impacts would be to retain GRV as the basis of annual charges (under a beneficiary pays approach to equity), but to "moderate" the relationship between charges and GRV.

One method of doing so would be to introduce GRV bands for non-residential customers, with the upper bands experiencing a less than proportionate increase in charges. Residential customers could be banded, or designated within a single band - effectively becoming a flat rate charge. The differential rate in the dollar for non-residential properties could be removed at the same time, as this would improve equity between the main customer classes.

Another option could be to impose a maximum bill for non-residential customers, or possibly to incorporate a lower "second tier" GRV rate which applies to high GRV properties. Currently the maximum bill paid by a non residential customer is over $250,000, an amount which is seriously out of line with the costs imposed, or indeed the benefits derived, by the customer from drainage services.

The imposition of a cap or tapered rate would eliminate the very high bills currently experienced by a small percentage of non residential customers. As such, both approaches would serve to reduce the extent of cross subsidies between very high GRV properties and other properties – in particular from city centre high rise buildings which have a relatively small footprint. Removing the differential rate in the dollar for non residential properties would also improve equity between the main customer classes.

Imposing a maximum bill for non residential customers would minimise the incidence effects to customers. Although, with such a change charges to the

remaining customer base would need to increase to maintain revenues. Such an increase would however be more than offset by extending the charge for public benefit services across the Perth Metropolitan region.

Grouping non residential properties into GRV bands will impose additional incident effects. Properties with a GRV close to the lower limit of the band are likely to suffer an increase in bill while properties at the top of the band are likely to enjoy a decrease in bills.

This raises the question whether a banded GRV approach improves the equity of annual charges. It may provide a broad approximation of the value gained by customers from drainage services. However, it moves away from the relationship with ability to pay that has traditionally underpinned the GRV approach; it does not reflect the costs imposed by customers; and it would impose incidence effects. A GRV banded approach would also necessitate the continued maintenance of the GRV database by Water Corporation.

Figure 4 **Incidence effects of alternative annual charges**

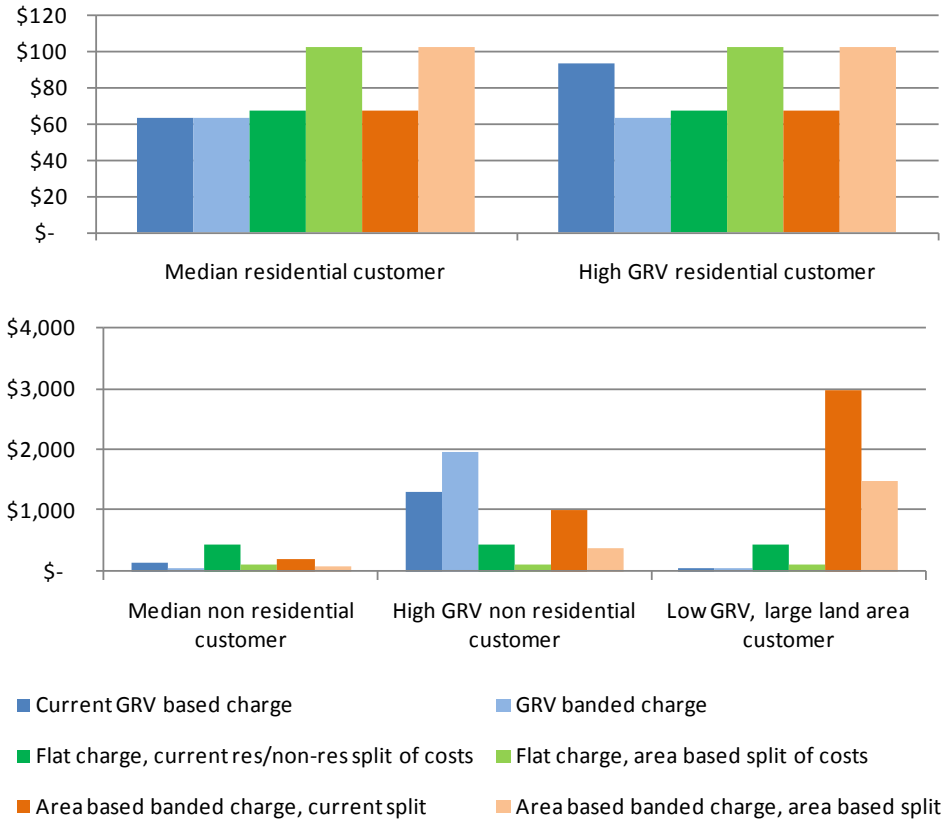


Figure 4 shows the incident effects of moving to alternative regimes for the annual charge for different types of customers. The top part of the figure

shows the impact on the median residential customer and a residential customer with a high GRV property. The lower part of the figure shows the impact on annual charges for different types on non residential customers. Customers on the 90th percentile of GRV were used as the high GRV customers in each customer class and median customers were those on the 50th percentile. The low GRV, large land area non residential customer is a customer with a GRV on the 10th percentile with a 25 hectare property.

The different charging approaches shown on the figure are:

- The current GRV annual charge (dark blue).
- A GRV banded approach, assuming three bands (light blue). Note that the inclusion of four or more bands might serve to reduce the incidence effects of the banding process.
- A flat charge for each of residential and non residential customers, assuming the current allocation of costs between the two customer classes (dark green).
- A flat charge for each customer class with costs allocated between classes on the basis of land area (light green).
- An area based banded charge, assuming the current allocation of costs between the two customer classes (dark orange).
- An area based banded charge, assuming the costs are allocated between the two customer classes on the basis of land area (light orange).

Current GRV charges

Under the current GRV charging basis, the median residential customer pays the minimum charge of $63 and the high GRV residential customer pays around $95 per year. The median non residential customer would pay around $160 per year for drainage, with the high GRV customer paying $1,300, and a low GRV/large land area customer paying just $67.

Banded GRV charges

Introducing a banded GRV charging basis would maintain the level of bill for average residential customers at existing levels. If a single band is used for residential customers, the bill for high GRV residential properties would decline. The adverse incidence effects caused by banding for non residential customers can be seen in the increase in bill for the high GRV non residential customer shown in Figure 4. This particular high GRV customer falls within the top band, and hence pays an increased bill. A banded GRV approach would however result in customers within the top 5 per cent of assessments paying a reduced bill – in some cases enjoying reductions of over $100,000.

Flat charges

For residential customers, the impact of introducing a flat charge depends on whether the current allocation of costs between customer classes in maintained or altered to reflect relative land area. With the current cost allocation residential bills remain similar to existing levels. However, under a land area based cost allocation residential bills increase noticeably.

Unsurprisingly, the introduction of a flat charge for non residential customers would create incidence effects. The bill to high GRV customers would reduce to nearly a third of the current level. The charge to the median customer would nearly triple, while that of low GRV/high land area customers would increase nearly seven-fold.

Coupling a flat charge with an area-based allocation of costs between the customer classes would focus the increase in bills on residential customers. Bills to most non residential customers would decrease, apart from low GRV/high land area customers.

Area based charges

Similarly, the impact of an area-based charge on depends on the method of allocating costs between customer classes. Introducing area based charges with an area-based cost split would increase the median residential customer's bill by 60 percent. High GRV residential customers would also be likely to see an increase in bills. For non residential customers, an area based charge would reduce the charges to high GRV customers and dramatically increase the bills of low GRV/large land area non residential customers. The effect on the median non residential customers would depend on the basis of the cost allocation between customer classes. Using the current split of costs would result in an increased charge to the median non residential customer and a decreased charge under an area-based cost allocation.

Finally, note that any increase in charges to particular customers/customer classes would be mitigated if the proposal to separate the cost of providing public benefits from main drainage charges were adopted. Approximately one third of the current costs would be designated as attributable to public benefits and hence recovered from the wide community, which would serve to "dilute" the bills for customers paying main drainage charges.

Figure 5 **Incidence effects with public benefits recovered more widely**

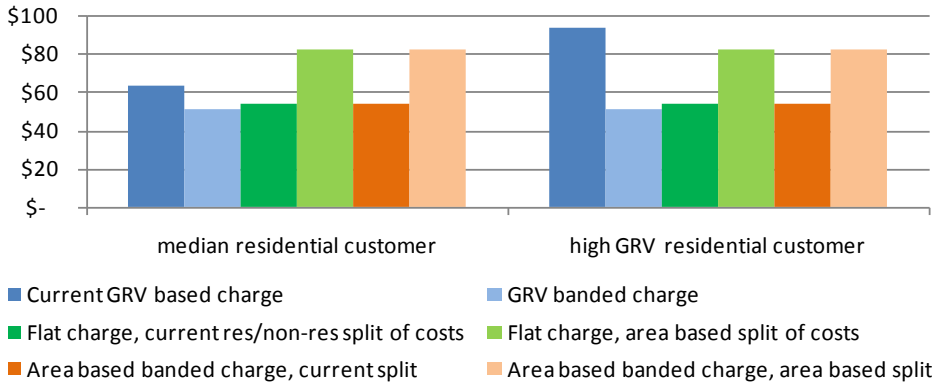


Figure 5 shows the impact on residential customer bills of introducing a Perth-wide charge intended to recover the cost of drainage services that provide public benefits across the same charging structures discussed above. For this purpose, it is assumed that the Perth-wide public benefit charge would be made on the same basis as the charge for main drainage services (ie GRV-based, a flat rate, or area-based).

Overall, the pattern of incidence effects are similar, but with the impact of introducing an area-based split of costs between residential and non residential customers being somewhat muted.

The equivalent analysis for non residential customers requires an understanding of the geographical location of non residential business. Non residential properties are likely to be concentrated within main drainage areas, which include Perth's CBD. As a consequence, it is likely that there would be less of a reduction in non residential charges following the introduction of a broad-based public benefits charge across the whole of Perth.

5.4 Non-metropolitan regions

As with the metropolitan region, decisions on appropriate charges, and (if appropriate) charging structures will involve balancing a number of conflicting considerations. While the nature of the considerations will be the same in country regions it is likely that the appropriate weight to be given to each aspect of the evaluation will differ.

Thus:

- The general principle of identifying the costs of providing private benefits separately from public benefits is equally valid in country regions.
  - Water Corporation's provision for water quality expenditure was aimed at the metropolitan region, so there is no immediate need to identify

appropriate cost allocations for public and private benefits from water quality expenditure.

  - It is not clear that country residents would value the benefits of improved river quality in Perth to the same extent as Perth residents. Accordingly, it may be appropriate to keep any charge for the provision of quality benefits to within the metropolitan region.

- Equity remains the most relevant criteria when considering the allocation of costs between classes of customers and the choice of basis of annual charges. In this context, the considerations of impactor pays and beneficiary pays remain relevant in country regions.
  - This suggests that the most appropriate basis of charging in country regions is likely to be similar to the preferred approach in the metropolitan area, noting that:
  - Country regions will potentially have a mixture of UV and GRV rated properties within the Shire boundaries.
- Incidence effects are a key consideration in both metropolitan and country regions.
  - The fact that annual drainage charges were abolished within country regions and replaced with a CSO payment to Water Corporation makes consideration of incidence effects considerably more difficult. Any attempt to introduce charges for the drainage service will be starting from a position of zero charges.
  - However, there seems no strong rationale for CSO payments replacing the payment of charges by customers.
- The appropriate balance for up-front and annual charges will be subject to similar considerations.
  - However, the smaller size and discrete nature of country drainage system is likely to make State-wide averaging of the SHC less appropriate.

6 Conclusions

6.1 Public and private benefits

Water Corporation's metropolitan drainage service provides a mixture of private benefits to residents and property owners, and public benefits to the wider community. The public benefits currently comprise the benefits provided by main drainage services to public open spaces, including roads and parks. The existing public benefits are substantial, and in the future, should Water Corporation be involved in activities to improve the quality of drainage water, there will be substantial further public benefits from the main drain service.

So that the costs can be recovered from the appropriate beneficiaries, equity considerations support the identification of the costs of providing public and private benefits separately. Public benefits are appropriately recovered from a broader community base, such as taxpayers (through a CSO) or Perth residents (proxied by Water Corporations metropolitan customer base).

6.2 Charging structure

The appropriate balance between up-front (headworks charges) and annual charges reflects a range of considerations. Both equity and efficiency considerations would support increasing the percentage of initial capital costs for the drainage distribution system recovered as part of headworks charges. A higher headworks charge might also facilitate the introduction of incentives for best practice in WSUD by developers. Finally, efficiency would also favour moving towards headworks charges that are calculated on the basis of specific schemes rather than on the basis of widely averaged historical costs.

Such a change would increase the size of the standard headworks charge to new developers. The relatively low level of the current charge means that the charge is nonetheless likely to remain affordable. Over time, the charge would involve a reduction in the level of costs to be recovered through annual charges. This is an advantage from an efficiency point of view, as annual charges are unable to provide any effective cost signalling to customers.

Issues surrounding the appropriate balance between residential and non-residential charges and the appropriate basis of annual charge are dominated by equity and implementation considerations. The use of GRV as the charging basis, and the application of a higher rate to non-residential customers is likely to be penalising non-residential customers disproportionately relative to the costs they impose on the drainage system. On the other hand, it has a

reasonable link to ability to pay. One option to reduce the extent of cross subsidisation from high GRV non residential customers would be to remove the differential rate for non residential customers and imposed a maximum bill.

An impactor pays approach might suggest the use of land area as a basis of charging. By relating charges more closely to the costs imposed by different properties, land area based charging would improve equity. However, it would not improve the efficiency of annual drainage charges as customers are unable to influence the quantity of drainage flows and hence are unable to respond to the pricing signal provided.

Moreover, true use of an impactor pays (land area) approach would involve very significant incidence effects. Residential customers would see drainage charges rise, with non-residential charges falling on average. In addition, customers with large land areas relative to their GRV would experience a substantial increase in charges. Given the subjective nature of equity considerations, it is debateable whether a change to a land area basis for charging is warranted in the light of these substantial incidence effects.

Incidence effects for existing customers are however notably muted if a public benefit charge is introduced at the same time as the change in charging structure.

Table 11 provides a summary assessment of the alternative charging bases discussed above.

Table 11 **Assessment of alternative annual charging bases**

Basis charge	Efficiency	Equity, including incidence effects	Implementation
Current GRV based charge	None	Broad reflection of ability to pay. Ability to pay is less appropriate for non residential customers. High GRV non residential customers pay much more than warranted by beneficiary pays or impactor pays considerations. The same is true for residential customers, albeit to a lesser extent. Equity would be improved by removing the differential GRV rate for non residential customers and imposing a maximum non residential charge.	GRV is expensive to maintain and not well understood by customers. Not using GRV provides no net saving to society as GRVs are still needed for Water Corporation sewerage charges and local government. There would be some minor administration savings to Water Corporation.
GRV banded charge	None	Could be used to abate the bills of high GRV customers. However, the process of banding introduces significant incidence effects. Charges would lose the link to ability to pay, and would not reflect the costs imposed by customers.	Bands for GRV is unlikely to improve transparency for customers, and may introduce complaints over the cut-offs The data required to implement it as a charging base is available.
Flat charge, current res/non-res split of costs	None	For residential customers, a reasonable approximation to costs imposed. Due to heterogeneity a flat charge is less appropriate for non residential customers. No clear rationale for retaining the existing split of costs between residential and non residential, other than minimizing residential incidence effects. Bills to average non residential customers likely to increase.	Easy to implement. Relatively transparent.
Flat charge, area based split of costs	None	For residential customers, a reasonable approximation to costs imposed. Due to heterogeneity a flat charge is less appropriate for non residential customers. Would increase the bills to residential customers, particularly for average customers, although the impact on average customers is mitigated with a public benefit charge.	Easy to implement. The change in basis of cost allocation would require explanation to customers.
Area based banded charge, current split	None	Improved reflection of costs imposed by customers, particularly for non residential customers. Would increase the bills of large land area non residential customers significantly. Average non residential bill likely to increase somewhat. Bills to high GRV residential and non residential customers would be reduced. No clear rationale for retaining the existing split of costs between residential and non residential, other than minimizing residential incidence effects.	Likely to be more transparent to customers. Land area data is held by Water Corporation, but there are anomalies that would require investigation to ensure data integrity.
Area based banded charge, area based split	None	Improved reflection of costs imposed by customers, particularly for non residential customers. Would increase the bills of large land area non residential customers significantly. Bills to residential customers would increase, although with recognition of public benefits the charge to high residential GRV properties falls and the increase to average residential GRV properties is halved.	Likely to be more transparent to customers. Land area data is held by Water Corporation, but there are anomalies that would require investigation to ensure data integrity. The change in basis of cost allocation would require explanation to customers.

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