HUNTER WATER CORPORATION

SUBMISSION TO IPART'S REVIEW OF RECYCLED WATER PRICES

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Summary

Recycling of water within urban centres is attracting increasing pubic attention with the continuation of drought conditions affecting many of Australia's major urban centres and rural towns. Until now, the prices charged for recycled water have been set largely by the water agencies and have not been regulated by the Independent Pricng and Regulatory Tribunal (IPART).

Not only has interest in recycling increased but there are also other emerging drivers for greater use of recycled water. These include new regulatory requirements like the Building Sustainability Index (BASIX) - an initiative to ensure new and renovated (from 1 July 2006) homes are designed and built to use less potable water and produce fewer greenhouse gas emissions.

Hunter Water has been involved in major recycling projects for many years and supplies recycled water for a range of uses throughout the lower Hunter, including one of the largest industrial recycling projects in Australia at Eraring Power Station.

The supply of recycled water often has implications for the investment in traditional water supply and wastewater services and their operation. Supply of recycled water may reduce the need for future investment in water supply and wastewater systems, in developing water sources and in wastewater treatment facilities. Pricing of recycled water needs to recognise these whole-system relationships and the associated avoided costs.

The pricing of recycled water is also made complex by the array of situations under which it can be supplied and the variety of uses for recycled water. Water use can range from irrigation of agricultural crops through to supply for non-potable residential use and high quality industrial process water after additional treatment.

Hunter Water welcomes the involvement of IPART in developing pricing mechanisms for recycled water given the expansion of recycled water use. The following submission outlines Hunter Water's view on issues that IPART has raised and provides other recommendations and observations from the Corporation's experience with supplying and pricing recycled water.

Hunter Water believes it is preferable for prices to continue to be set by agencies with the additional requirement that agencies follow a methodology prescribed by IPART to fix maximum prices. This is a different approach to that currently used for setting water and sewer prices, whereby IPART periodically (currently every 4 years) sets the actual prices. However, water and sewer services are more homogeneous and therefore lend themselves more readily to the current price setting arrangement.

Recycled water opportunities and uses are far more heterogeneous and the use of a methodology would allow agencies to determine prices at any time on a project-by-project basis. A methodology, rather than fixed prices, would therefore provide agencies with the flexibility to deal with the growing demand for recycled water and the different situations applying to various recycled water projects.

The main roles for the methodology would be to ensure all relevant costs are:

- *derived consistently across all agencies, and*
- *properly included in setting prices.*

Hunter Water also sees advantages in the IPART methodology establishing the components of price structure (eg developer/up-front charges and annual charges) and their derivation from relevant costs.

However, the diverse nature of recycled water opportunities and users means that a rigid price structure to be applied across all users and opportunities may not result in optimal or efficient pricing. Two reasons why this might occur are:

- *Traditionally-derived developer charges may be appropriate for new recycled developments because these would not be inherently different from other new developments using potable water. The same may not be true for recycling schemes that propose to substitute recycled water for potable water in existing businesses. Given the short investment horizon of many businesses, large up-front charges (that aim to fully recover recycled water infrastructure costs) levied on existing users of potable water may serve to discourage the switch from potable water to recycled water.*
- *Adherence to the principle that annual charges should cover annual costs (operating and administration costs, return of capital and rate of return) may result in very low annual charges. If this is so, there may be overuse of recycled water (measured by increasing marginal costs for treatment and delivery of recycled water or the cost of providing potable top up for peak demands).*

If the methodology to be set by IPART extends to defining the structure of prices, and derivation of pricing components from specific costs, the methodology may need flexibility to accommodate the issues such as those listed above. For example, there may need to be scope to recover infrastructure capital costs from existing potable water users over time rather that as a single up-front contribution. There also may be a need to consider a range of ways for setting annual charges to include options such as a proportion of the current potable water charge, with the additional revenue from annual charges used to reduce developer charges.

Not all recycling opportunities are suited to traditional pricing models. A particular case is the use of recycled water by small-scale opportunistic users adjacent to remote wastewater treatment plants, where no other recycling opportunities are apparent within foreseeable future. Any methodology for setting prices should be able to accommodate these users.

An important area of focus for the methodology will be the treatment of avoided costs. The avoided costs of recycling initiatives will be reflected in changes to an agency's investment requirements in water distribution systems, water source development, wastewater treatment plants and wastewater transport systems – the last being relevant in the case of sewer mining.

Under the current developer charges methodology, the value of deferring water distribution and source augmentation (ie the avoided cost) could be used to reduce potable water developer charges. There is no formal methodology to

redistribute this avoided cost to the recycling scheme and the "asset nexus" provisions of the current developer charges determination (which require there to be a "close connection" between the development and assets which serve the development) could be interpreted as including such redistribution. However, this interpretation has not prevailed to date.

Similarly any savings in wastewater treatment investment brought about by recycling need to be passed to the recycled water scheme by including some, or all, of the costs of the additional treatment facilities for recycling in the wastewater developer charge. While this already happens when recycling is used to meet a mandated requirement to reduce discharge volumes, it may also be appropriate when recycling is an alternative to discharge if the asset nexus interpretation above is followed.

Hunter Water recommends that the IPART methodology for recycled water pricing endorse the principle that investment in recycled water infrastructure can be included in potable water and wastewater developer charges on the grounds of a nexus through avoided cost.

1. Introduction

1.1 This Submission

This submission provides Hunter Water's views on recycled water pricing and response to the Independent Pricing and Regulatory Tribunal's (IPART) February 2006 Issues Paper outlining the scope of the Tribunal's current review of recycled water pricing.

The pricing of recycled water involves a number of complexities brought about by the array of situations under which it can be supplied and the variety of uses for recycled water. Further complexities arise because the supply of recycled water also can have implications for the investment in traditional water supply and wastewater services. Supply of recycled water may reduce the need for future investment in water supply and wastewater systems, in developing water sources and in wastewater treatment facilities. Pricing of recycled water needs to recognise these whole-system relationships and the associated avoided costs.

This submission is structured as follows:

1. Introduction – including background information on the types of recycling opportunities in the Hunter. Later parts of the submission draw on this information to explain Hunter Water's position on various options for pricing recycled water.
2. General principles and context for pricing recycled water
3. Options for setting prices – the regulatory model.
4. Price structures and applications – specific price structures and developer charges.
5. Sewer Mining

1.2 Hunter Water and Recycled Water in the Hunter

Hunter Water Corporation is a State-owned Corporation and the water and wastewater provider to over 500,000 people in the urban communities in five local government areas in the lower Hunter Valley, New South Wales.

Hunter Water operates 17 wastewater treatment plants. Five of these are large ocean discharge plants. Three other plants discharge to the lower Hunter River or its estuary, one plant discharges via infiltration beds to coastal sand beds and six smaller plants discharge to inland creeks. Treated effluent from the remaining two plants is recycled – at one of these plants all the effluent is supplied to Eraring Power Station while effluent from the other is used to irrigate fodder crops on site. This latter plant uses recycling to meet a mandated requirement for no discharge to local waterways. Average wastewater volumes treated at these plants range from over 20,000 megalitres per year at the largest to around 35 megalitres per year at the smallest.

The number and range of operating environments for these plants creates a complex context which works against adopting a simple or uniform pricing strategy for recycled water from all plants. This is particularly the case for the six plants which discharge to inland creeks. Generally, these treatment plants serve smaller inland communities where opportunities for recycling may be limited.

Much of the community discussion about recycling places emphasis on a perceived need for more recycling to address the issue of adverse externalities, such as river pollution, from wastewater discharges. This discussion is often generic and overlooks the role that environmental regulation has played in "internalising" previous adverse externalities in recent years. Hunter Water has upgraded or rebuilt all its wastewater treatment plants since the

late 1980s. These plants now meet very strict environmental discharge standards set by the Department of Environment and Conservation to the extent that significant adverse environmental impacts have been significantly reduced. As a result, adverse externalities are now largely internalised to Hunter Water's wastewater costs through the investment in modern treatment plants and higher operating costs associated with high standards of treatment.

Hunter Water's involvement in recycled water ranges from very large industrial use of recycled water to very small, opportunistic use by small-scale rural irrigators or golf courses on sites adjoining treatment plants and irrigation use by Hunter Water on treatment plant land. These latter uses have developed because there is no other apparent demand for recycled water in that location and/or as a result of pollution reduction programs which require reductions in discharges to natural waterways. This context is important when considering options for pricing recycled water and is discussed further in Sections 3 and 4 of this submission.

The main current uses for recycled water in the Hunter Region include:

- Irrigation of agricultural land (42% indirect, 5% direct) 47%
- Industrial reuse eg cooling water for power generation 39%
- Irrigation of golf courses, bowling greens & landscape use 7%
- Process water at wastewater treatment plants 4%
- Recycled water enterprises 3%

As can be seen above, irrigation is the largest user and most of this is indirect irrigation in inland areas. Indirect irrigation occurs when treatment plant discharges make up most of the dry weather flows in local creeks and this is extracted by riparian irrigators. Most of this indirect irrigation occurs along Black Creek, downstream of Cessnock wastewater treatment plant.

Hunter Water's approach to recycling has been evolving since the early 1990s. In the mid 1990s, the Corporation established a stretch target within its Environmental Management Plan (EMP) to recycle a percentage of annual dry weather inflows to its wastewater treatment plant. This target has proved elusive due mainly to the major industrial changes that have occurred in the lower Hunter, reducing the opportunities for expanding reuse among large industries. In 2004/05 the quantity of water recycled represented 8.5% of annual dry weather flows of which less than half would represent a substitute for potable supplies.

While the stretch target remains in the Corporation's EMP, the major planning driver for exploring recycling opportunities has moved from the target in the EMP to integrated water resource planning. Hunter Water's operating licence requires the Corporation to maintain an Integrated Water Resources Plan (IWRP) that assesses all water supply options from a community perspective, covering demand management, recycling and traditional source development measures. The move to planning on the basis of an IWRP provides for a far more rigorous and objective approach to assessing the potential for recycling.

The IWRP is currently being reviewed and updated with this review process to be completed by mid 2007. In view or the growing interest in recycling, this update will consider recycling potential in more detail than the current IWRP. In particular, it will pay attention to the benefits recycling can play in reducing capital expenditure on expanding wastewater treatment plants to cater for population growth and the benefits in deferring or reducing the need for future potable water source and distribution system augmentations.

The Corporation is due to commence work on a major recycled water strategy in the coming month to provide input to the IWRP review. The study will identify appropriate strategies, initiatives and processes to maximise recycling opportunities as they arise and/or take advantage of potential to substitute recycled water for potable water in existing industries. The plan will help identify ways to increase water recycling over the next 10 years. However, it should also be recognised that the Corporation is dependent on the customer demand for recycled water.

Growth in demand for potable water in the Hunter will be met through the implementation of a range of supply and demand side measures. Recycled water initiatives will contribute through assisting in conserving existing sources or supplementing them (in the case of indirect potable reuse). Other foreseeable potential uses to be explored in the strategy include: aquifer recharge, aquifer protection, non-potable reuse (eg via dual reticulation) and indirect potable use.

There are also some key external drivers in support of recycled water developments:

- The management of effluent discharges from wastewater treatment plants. Load limits on effluent discharge are applied to the majority of Hunter Water's treatment plants. It is possible that load limits for some plants may not be able to be increased in the future to cater for growth without having a significant impact on receiving waters. In these circumstances, reuse of effluent will be an important strategy to consider for managing effluent disposal.
- The Department of Planning's BASIX program for improved urban water management is an indirect driver for recycled water in new residential development. Dual reticulation systems can be a viable alternative to the requirement for rainwater tanks for new residential developments close to wastewater treatment plants.

  The most recent recycled water initiative under development by the Hunter Water is the Thornton North recycled water scheme. This is a large residential development of 5,000 properties over 20 years in which a reticulated recycled water system will meet the BASIX requirements and avoid the need for rainwater tanks. The dual reticulation approach will also be examined in future residential developments in the lower Hunter in areas such as Gillieston Heights and Cooranbong.
- There is widespread interest in the role recycling can play in providing long-term drought security in the face of the ongoing drought conditions affecting many of Australia's metropolitan centres. This issue too will be addressed in the Corporation's review of its IWRP with the recycling initiatives from the recycled water strategy assessed along side other demand management and supply options. Appropriately considering drought security in conjunction with system yield is a topic attracting significant attention in the Australian water industry today.

2. Principles and Context for Pricing Recycled Water

2.1 General Pricing Principles

As a general principle, Hunter Water approaches recycled water pricing in the same way as it approaches pricing for its water, wastewater and stormwater services. That is, it prices are based on full-cost recovery of capital and operating costs. However, there are interrelationships between investments in recycled water projects and future investments in potable water supply and for the provision of wastewater services. These interrelationships need to be taken into account through identification of joint costs and avoided costs.

The general principles that Hunter Water considers most relevant to setting prices for recycled water are:

- Recycled water projects should be assessed firstly on **economic efficiency** to ensure optimal community decisions about consumption and investment.

  Within the concept of overall economic efficiency, "allocative efficiency" is the product of the IWRP discussed earlier. Exceptions may be considered where there is a single opportunistic use with low economic return concurrent with low supply costs and unquantifiable environmental or community benefits.

- Viable recycled water projects should be assessed as those where the incremental cost, less any avoided cost, is less than users' **willingness to pay**.

- Recycled water price setting should be **project specific**.

- Recycled water prices should be **cost-reflective** by recovering the incremental costs incurred by Hunter Water in establishing and operating the project and should take account of avoided costs. Avoided costs are the explicit link between recycled water pricing and the benefits that recycling provides to potable water supply and wastewater services.

- Prices should be appropriately structured to send **efficient resource allocation signals** to users. Price structures should be **simple and easily understood**.

- Price structures should be robust but sufficiently **flexible** to deal with different project types and commercial circumstances. The components of pricing structures now applied to potable water and wastewater (developer or up-front charges and fixed and variable annual charges) should be available for use in recycled water pricing arrangements. However, the circumstances of some recycled water opportunities may mean that these components should not always be applied in the same ways they are used in water and sewer pricing.

- Price structure may need to include **short-term adjustment mechanisms** where a large recycled water project displaces an existing potable use.

Chapter 5 of the WSAA Occasional Paper No 12, *Pricing for Recycled Water*, contains a good discussion of other pricing concepts and principles. Hunter Water supports those principles and it is not intended to revisit that coverage in detail in this submission.

As mentioned in the introduction to this section, the basic premise for cost-reflective pricing should be full cost recovery of capital and operating costs with mechanisms to take account of benefits to the potable water supply service and wastewater service. In simple terms, the "economic cost" of recycled water involves calculating the cost per kilolitre of recycled water demand in present value terms by including the capital, operating and administrative costs of a recycling project plus any joint system costs and deducting any whole-system avoided costs[1]. Where possible, any quantifiable net environmental benefits should also be deducted.

2.2 The Hunter Water Context

Unlike the traditional water supply and wastewater services, the recycled water market is in its infancy and is far more heterogeneous, with a range of uses and market characteristics. Demand can vary substantially with end use, time and climate and the costs of supply can vary widely with the quality of the recycled water required and the location of the use or user. Hunter Water provides recycled water under a wide range of conditions and circumstances and has adopted a set of pricing structures for supplying recycled under a variety of circumstances. These are outlined further in section 4.

[1] "Whole-system" refers here to the total water supply and wastewater systems of the agency, including potable water, wastewater and recycled water. It recognises that avoided costs from investing in a recycling project may show up as a saving somewhere else in the system, for example by allowing capital expenditure for increasing the capacity of water sources or distribution systems to be deferred.

The extent of reticulated potable water supply is driven largely by a community demand for a reliable supply of fresh clean drinking water. As a result, Hunter Water has a large interconnected water supply distribution system for drinking water across the lower Hunter's urban areas. The supply of recycled water has different drivers – mainly, the availability of treated effluent (determined by the location of source wastewater treatment plants), the ability of recycled water users to accept differing quality[2] than potable water, the cost of alternative sources of water and the costs of delivery and further treatment, if needed.

The scale and costs of water recycling opportunities vary markedly. At this time, supply of recycled water is, in essence, a small component of the Corporation's core wastewater services. Hunter Water does not consciously set out to provide recycled water as a universal service across the whole, or even parts, of its area of operations but rather seeks to find recycling opportunities that can be serviced in a cost-effective way from existing wastewater treatment facilities. However, Hunter Water recognises that recycled water has potential to be a product line in its own right as appropriate markets develop. Currently, recycled water as a product is very much in a development stage and new opportunities, such as reticulated residential recycling are now presenting themselves as new residential subdivisions displace agriculture around some inland treatment plants and drivers such as BASIX strengthen demand.

The costs of providing recycled water are mainly a function of the distance treated effluent has to be transported to the end user. Costs of transport may vary substantially where there is a more than one end user taking effluent from the same plant but at quite different distances from the plant. Costs can also vary with the cost of additional treatment (over and above discharge standards) required by users.

There is also no universal quality requirement for treated wastewater demanded by recycled water users – the quality required by agricultural users is generally quite different to that required by an industrial user. The variations in quality of recycled water required by different users also mean that recycled water is not a homogeneous product line. This makes recycled water quite different from potable water which is supplied at a uniform standard to meet Australian Drinking Water Guidelines.

Some recycled water projects, such as reticulated distribution of recycled water to residential properties, will require strict compliance with recycled water guidelines and uniformity in quality at the customer's point of connection. This places responsibility for final use quality with the agency. In other instances, a large industrial customer operating as the sole user from a single wastewater treatment plant may prefer to further process recycled water on site. This provides the user with a degree of quality and cost control (both initial capital and operating) and generally transfers responsibility for final quality at the time of use to the user.

In some cases, treated effluent from wastewater treatment plants can make a useful contribution to stream flow in inland creeks and this flow can be accessed by users such as irrigators. As mentioned earlier, a lot of attention is being focused on the desirability of increasing the level of recycling, in part to address the issue of externalities. However, it needs to be recognised that in these cases, particularly where wastewater is not discharged directly to the ocean, it may already be performing a valuable role within the water cycle and stream environment. In short, the externalities of returning wastewater to the environment are not always negative. This needs to be considered in the pursuit of new recycling opportunities.

[2] Recycled water is generally supplied at a lower quality than potable water but, for particular industrial purposes, recycled water may be supplied after undergoing a higher level of treatment than potable water– for example to remove minerals and salts.

3. Options for Setting Prices and Price Regulation

3.1 The Regulatory Model

IPART's Issues Paper seeks comment on options for setting prices. The Issues Paper canvasses 3 options:

- The market decides the prices of recycled water services
- The Tribunal sets prices – either scheme-by-scheme or postage stamp
- The water agencies set prices that are consistent with a pricing methodology established by the Tribunal.

3.2 Market Contracts

There are two important distinctions to make about the sale and pricing of recycled water under contract arrangements. These are:

- True market contracts are established by the market conditions of demand for, and availability of, recycled water. As well, to secure a new and large source of revenue, a monopoly provider may use its monopoly power under market conditions to pass some of its recycling project costs (usually its fixed costs) on to its wider customer base and so price recycled water at less than full economic cost. Thus in a market situation, there is no assurance that market contract prices will be based on full cost recovery.
- Under a regulated regime, where the full "economic cost" of recycled water is to be recovered, there may still be a role for agencies to "negotiate" with large one-off customers about how this economic cost is recovered over time. This becomes a negotiation about price structure, rather than about prices set by market conditions.

Contract arrangements have been used by water agencies as the recycled water market developed because of the absence of regulated price setting. As a result contracts have been applied by agencies to all customers, large and small. In Hunter Water's case, these contracts have aimed for full cost recovery.

As mentioned earlier, true market-based contracts pose a risk that recycled water prices may not cover the full economic cost of a recycling project with the result that an agency's general customer base could be required to meet some costs of recycled water projects.

The provision of large-scale recycled water infrastructure (additional treatment and delivery systems) for a single large user may involve a significant element of risk, in particular, that the customer may withdraw before the costs of these investments are recouped and effectively stranding the recycled water assets. In the absence of regulated pricing, potential large-scale buyers of recycled water may not be obliged to meet the capital costs on new recycled water infrastructure through up-front (or developer) charges. Rather, new recycled water infrastructure costs may be recovered over some period through annual charges

This is a very real risk in the Hunter as demonstrated by recent changes in the industrial customer base. Over the last decade, Hunter Water has seen several of its largest potable water customers cease operations. In one case, the customer ceased operations not long after negotiations began between the customer and Hunter Water about replacing a significant proportion of its potable water use with recycled water.

Existing businesses that are potential large-scale users of recycled water also tend to view projects over a shorter time horizon than water agencies, which traditionally develop prices to

match asset lives and a longer investment time horizon. In this context, large up-front charges make recycling schemes unattractive to users as they drive the total cost of recycled water over the user's shorter planning horizon above the cost of potable water. Thus switching from potable water to recycled water may become unattractive under the user's planning horizon.

In this context, a role for contracts is to provide a framework whereby water agencies can encourage large customers to switch from potable to recycled water and to afford the agency's investment in recycled water infrastructure some protection from the risks of the customer withdrawing from the market.

Hunter Water's preference is for IPART to regulate recycled water prices across the full spectrum of its recycled water customers as a means of assuring the full economic cost of recycling is met.

Hunter Water's recommendations for achieving this regulated approach are outlined in the following sections.

3.3 The Tribunal Sets Prices

As outlined in the Issues Paper, there are two main approaches for the Tribunal to set actual prices for recycled water. These are:

- Project specific prices, and
- Postage stamp pricing across all recycled water systems.

3.3.1 Project specific pricing

Hunter Water believes the variability in recycled water market and its continuous development make the option of the Tribunal setting actual prices on a scheme-by-scheme basis administratively complex and expensive. However, as outlined later in this section, the Corporation believes there is a place for water agencies, rather than the Tribunal, to set prices on a project-by-project basis using a methodology established by the Tribunal.

As discussed in section 2, the scale and costs of recycling opportunities can vary markedly. Similarly, the quality of recycled water means that it is not a homogenous product like potable water and quality varies from treatment plant to treatment plant. In some cases, end users may need to provide additional treatment to suit their use.

Another major cost driver is distribution costs. Distribution costs can vary between end users at different locations even when supplied by the same treatment plant because distribution costs are significantly influenced by distance from the treatment plant. While in part this could be overcome by only regulating the ex-treatment plant cost and leaving the transport price component unregulated, this approach is believed to be unduly complex and open to dispute by users.

Recycled water is also a developing product line and, as such, unit costs can change as new users (particularly large users) come on line and any potential economies of size are realised.

Hunter Water considers that these differences in recycling project costs due to product difference, location and time of establishment are most effectively dealt with by setting prices on an individual project basis.

3.3.2 Postage stamp pricing

There is a large degree of uniformity in the supply of drinking water and wastewater services when viewed from the customer's standpoint. Hunter Water's operating licence seeks to provide customers with a uniform service across the Corporation's area of operations and regardless of the type of customer. This is a legitimate objective as drinking water supply and wastewater services are the core service functions of the Corporation. The uniformity of product and service standards across the whole water and sewer customer base has historically been matched by price uniformity.

Hunter Water believes that, as a general principle, the pricing of recycled water should be project specific because recycled water, as a separate product, is a developing product that may not be universally demanded as a core product[3] and not supplied as a uniform product. In other words, it will only be available in some locations, to some customers and be supplied under different conditions.

Generally, recycled water will be demanded for uses where drinking water quality is not required and where it can be delivered at a cost that permits it to be priced at a relative advantage to the price of drinking water. As outlined in the context section earlier, the uses, transport costs and product specification of recycled water will vary with use and users.

In particular, individual industrial recycled water projects may be established under quite different contexts. Each of these projects may have quite different physical transport and further treatment requirements and options and are therefore best priced on a project basis. Postage stamp pricing in the large user context would entail undesirable cross subsidies.

While residential reticulated (third pipe) recycling schemes may have uniformity in service provision, they may still entail significantly different costs and are unlikely to be available to large proportions of the community. Significant drivers of cost differences will be transport distances and the degree of additional treatment (over discharge standards). There will also be varying levels of avoided costs where recycling obviates the need for some other wastewater treatment upgrade or discharge options to meet future environmental standards. These avoided costs will vary from treatment plant to treatment plant and with the scale of the recycling project.

Postage stamp pricing generally embodies some degree of cross subsidy. This is often acceptable to the community when everyone is provided with the same service. It is acceptable when the price for the service is derived from the costs averaged across a large proportion, or all, of the customer base and where new additions to the system are small and thus have little discernable influence on average costs.

This is not likely to be the case with residential reticulated recycling projects. New projects will come on line incrementally but slowly as opportunities present themselves through new residential development occurring close to wastewater treatment facilities and where recycled water can be provided at a price below the potable water price. Each new project will have its own costs and customer base and, for some time, is likely to add significantly to the number of residential customers with access to reticulated recycled water.

Under a postage stamp price regime, each new residential recycling project would become a discrete and lumpy increment to the average cost calculation. Depending on its costs and scale, a new project could significantly change the average costs and hence the calculated postage stamp price. This presents difficulties for agencies in foreshadowing longer-term

[3] There has been recent media discussion of indirect potable reuse whereby recycled water may be contribute to the raw sources for drinking water e.g. through aquifer recharge. Where this occurs, recycled water would become part of the potable water supply system and not a separate product line as is being discussed here.

price expectations to customers and, while price smoothing mechanisms could be devised, they add an element of administrative complexity and obscure pricing transparency.

Hunter Water is now planning its first residential recycling project at Thornton North. The costs and pricing for this project will be discrete to this project. Settlement and residential development projections for the lower Hunter indicate that other residential recycling projects may be possible within the next decade but, at this stage, it is not possible to quantify how the costs and scale of these might influence postage stamp prices. These developments are likely to result in large proportionate increases to the level of residential recycling existing when they come on line. As a result, it is reasonable to presume they will have potential to alter the average cost calculation for the purposes of deriving a postage stamp price.

Such changes to average costs could produce significant variability in the calculation of postage stamp prices over time. Depending on the cost structures of each new incremental scheme, these changes may increase or decrease overall average costs as new schemes are brought on line. This has potential not only for variability in the average cost calculation but upward and downward fluctuations in costs and resultant postage stamp prices. These issues are simply overcome by the agency setting prices on an individual scheme basis.

Hunter Water considers that variations in recycled water products across prospective projects, differing recycled water quality requirements and cost structures and the effect on total average costs of discrete, lumpy increments to the overall level of recycling over time suggest that postage stamp pricing would be inappropriate for the growing recycled water market.

3.3.3 Agencies set prices using Tribunal methodology

As discussed in the previous sections, Hunter Water sees a number of substantial disadvantages in the Tribunal directly setting the actual prices for recycled water projects and in setting a postage stamp price across all schemes or projects.

These disadvantages generally will not apply if the Tribunal allows agencies to set prices according to a methodology set by the Tribunal. Section 4 discusses some pricing structures for various situations under which recycled water is supplied and which may inform the Tribunal's framing of methodologies.

3.4 Options for Setting Prices – the Way Forward

In the discussion so far, Hunter Water has expressed a preference for prices to be set by agencies using a methodology prescribed by IPART to fix maximum prices and that this methodology can be applied at any time (ie not only when there is a price review) on a project-by-project basis.

To this end, the methodology initially should outline the method for calculating the economic cost of recycled water for individual projects to be recovered by prices and the methods for calculating developer charges or up-front charges and annual charges.

In simple terms, the economic cost of water involves calculating the cost of recycled water demand in present value terms by including the capital, operating and administrative costs of the recycling project plus any joint system costs and deducting any system avoided costs. Where possible, any quantifiable net environmental benefits should also be deducted.

The methodology should define the cost components to be covered and set out the protocols for calculating costs to be recovered. The major cost components that require careful definition include:

- Direct costs – capital, operating and administration
- Avoided costs
- Joint costs
- Appropriate marginal costs.

In general, it is also desirable that the methodology set out how different costs should be recovered – eg that developer charges (or up-front charges for existing customers) should be used to recover the cost of new recycled water infrastructure and annual charges for operating costs. The methodology may need to provide some scope for relaxation of this prescription in defined circumstances. This is covered in the following section on *Price Structures and Applications* with regard to application different types of recycling opportunities.

A significant practical issue is how the methodology will link benefits of recycling projects to savings in potable water source augmentation, water distribution systems and wastewater treatment plant upgrades. This will require consideration of how avoided capital costs can be addressed under the present developer charges methodology and development servicing plan model required under the Tribunal's 2000 developer charges determination. The 2000 determination requires that water authorities must demonstrate a strong "nexus" (ie a close connection) between the assets included in the developer charge and the specific development these assets serve. This issue is discussed further in the following section of this submission.

4. Price Structures and Applications

4.1 Pricing Structures

The key principles discussed earlier in this submission and articulated in the *WSAA Occasional Paper No. 12* inform the logical development of prices for recycled water. However, application of these principles is complicated by the nature of the recycled water market and opportunities for recycling. The context for recycled water use in the Hunter varies greatly depending on:

- Demand for recycled water near wastewater treatment plants
- The number of potential users from a source
- The scale and nature of recycled water use
- Regulatory requirements regarding discharge
- The cost of alternative water sources and/or the user's costs associated with recycled water use.

Pricing structures need to robust and flexible enough to deal with this variable context and, at the same time, assure cost recovery from beneficiaries and ensure the equity of pricing arrangements across the whole customer base (so avoiding inefficient cross subsidies). Hunter Water has established a two-level pricing framework to address the heterogeneous nature of the recycled water market. The two levels are:

- A framework to set pricing structures for the diverse range of heterogeneous "one-off" recycling opportunities and projects.

- A framework for pricing recycling projects with a more homogenous customer set. For example, where Hunter Water reticulates recycled water to multiple customers under conditions similar to traditional potable water supply model.

  Essentially, this framework would apply mainly to reticulated residential recycled water systems although it could also apply where recycled water is reticulated for industrial use. No reticulation of recycled water for industrial customers exists or is planned in the Hunter at present. However, as mentioned in section 1, Hunter Water is developing a recycled water strategy and it is possible that opportunities may emerge from this work.

4.1.1 Pricing for heterogeneous opportunities

The starting point for setting prices for these single projects is to apply the pricing principles outlined earlier to ensure prices:

- Are cost reflective and recognise avoided costs
- Send efficient allocation signals and take account of price of substitutes
- Recognise willingness to pay
- Take account of non-economic benefits and costs

Hunter Water has found that it is useful to categorise users to assist in applying these principles and to establish pricing rules for the situations that typically arise with single (or "one-off") recycling projects. The purpose of this classification is to produce an equitable and efficient system of pricing quite different recycled water uses. Hunter Water's approach has been to consider three different consumer groups as shown in the following table.

User	User categories	Typical expected recycled water usage
Type I	Large industrial commercial or irrigation operations eg power stations, mining operations, large scale agriculture based on irrigation	> 300 ML/year
Type II	Small industrial businesses, municipal users, golf clubs and rural irrigators	30 to 300 ML/year
Type III	Small opportunistic users near treatment plant (e.g. local irrigators) and where other recycled water use opportunities do not exist.	< 30 ML/year

The above classification distinguishes between the smaller customers (Type III) who typically use effluent to supplement rainfall with irrigation, and other users who are generally larger and for whom water is an important productive input. Typically, the Type III users would not be irrigators if the treatment plant did not exist nearby and hence their use of recycled water is purely opportunistic. Also, there are generally no other recycling opportunities for that treatment plant. This situation characterises a number of Hunter Water's smaller treatment plants serving inland urban and residential centres.

The larger users can be further distinguished between the large industrial consumers (Type I) and the medium scale municipal and commercial customers (Type II). For both these users, a number of pricing structures could be used. These range from contract arrangements with capital and operating costs recovered by a mixture of developer or up-front payments, annual fixed charges and usage charges.

For Type I and Type II (very large and medium customers), the structure of charges prescribed by a pricing methodology may need to provide some flexibility so that different

models can be used for new and existing operations. Where a new business is establishing at a green-field site, it would be expected to pay developer charges if it is to be supplied with potable only. Similarly, it would be reasonable for the business to pay developer charges for recycled water (to cover recycled water infrastructure costs) if that is the only water to be supplied or for a mix of recycled water and potable water if the business is to be connected to both supply systems. In this situation, it would appear reasonable for the methodology to prescribe that the cost of recycled water infrastructure be met by a developer charge.

The same logic can be applied to existing businesses that wish to use recycled water for new uses (ie for uses for which they had not previously used potable water). This latter example would include users like golf courses that, to date, have not used potable water for irrigation but would do so with lower cost recycled water. The methodology, therefore, should provide for up-front charges where the availability of recycled water allows an existing business to expand its water use to new activities.

However, this logic may not apply to existing businesses that simply seek to switch from potable water to recycled water and more pricing flexibility may be required in these cases. There may be no "development" involved so strict application of developer charges may not be practical. In this case, the methodology may need to prescribe up-front charges to recover the agency's capital investment in recycled water infrastructure. As mentioned earlier, however, such businesses often have a short investment horizon and large up-front charges may significantly increase the unit cost of recycled water to the business over that investment timeframe. Thus having to pay large up-front infrastructure charges may be a disincentive to the business accepting the recycled water option, even when an agency's derivation of the economic cost of recycled water (over a longer horizon) shows recycled water is a least-cost supply option. This situation suggests that the methodology should allow for recovery of infrastructure capital over time, subject to an agency's assessment of risk associated with doing so for the individual business concerned. However, this presents an issue of compatibility with the developer or up-front charges incurred by a similar business on a green-field site and by existing businesses that are expanding overall water use by using recycled water for a new activity.

A number of considerations come into play in setting annual charges for large businesses (both Type I and Type II). Where customers are likely to be irregular uses (eg irrigation users such as Type II golf courses) compared to continuous users (eg industrial processes), more emphasis may be placed on fixed annual charges to assure revenue stability and coverage of annual costs such as administration and return of capital.

While there are merits in having a pricing methodology that is prescriptive in terms of price structure, there is also a need for flexibility within the methodology for recovery of infrastructure costs to take account of the commercial factors that may influence user's decision making.

For the Type III users, further latitude may be required. Community expectations and environmental requirements are generally the key drivers for the Corporation pursuing this type of recycling opportunity, particularly where no other uses or opportunities are apparent. A number of these arrangements have been in place for many years and started when the costs to Hunter Water associated with this type of recycling were negligible. In recent years, the annual costs of maintaining these arrangements has increased due to risk management costs and more frequent water quality monitoring requirements established by more recent recycled water use guidelines.

These Type III opportunities are often not suited to traditional price models of fixed and variable costs. A different price structure is also warranted by consideration of:

- Low user willingness to pay, in part driven by a history of low price access to recycled water
- Price of substitutes or proxies. In some cases, small opportunistic irrigators compare the price with prices that they know nearby surface water irrigators pay to extract water from rivers and creeks. In most cases, this comparison is with unregulated surface water prices, which are generally quite low.
- Small volumes used
- Irregularity of use
- Community perceptions of environmental and "avoidance of waste" benefits
- Minimisation of administration (metering, billing, dispute resolution) costs that might occur under more complex pricing arrangements.

After weighing up all of the above factors, Hunter Water has adopted a policy of charging only a fixed annual fee for Type III customers. It is recommended that, if the Tribunal decides in favour of a methodology, the methodology makes provision for continuation of this pricing arrangement for small opportunistic users.

4.1.2 Reticulated recycling opportunities

A new recycling opportunity in the Hunter is reticulated recycled water to new residential areas via a "third pipe". The first of these schemes is now being planned for new development at Thornton North. Similar systems exist in other major urban areas, the most well-known being the Rouse Hill scheme in Sydney's north-west.

Hunter Water proceeded with developing the Thornton North scheme after initial analysis demonstrated that the scheme could be delivered within the efficient price band. A particular advantage at Thornton is that the mandatory BASIX requirement for new developments can be met at a community cost equal to, or lower than, the cost of most likely alternative of rainwater tanks. This situation will not apply to all new residential developments – the economics of transporting recycled water means that reticulated recycled schemes will generally only be viable where new developments occur close to wastewater treatment plants.

The Hunter's industrial areas also have potential for similar reticulated recycled water schemes to industrial customers although no such scheme is currently planned. However, the nature of some of the Hunter's large industrial areas, where land use is solely or dominantly industrial and much is yet undeveloped, is conducive to extension of the reticulated recycled water concept to these industrial areas. Opportunities for reticulated supply of recycled water to these areas will be explored further in the Corporation's recycled water strategy over the next six months.

As with other schemes discussed throughout this submission, each of these new schemes will have its own cost structure driven by additional location-specific treatment and distribution system capital and operating costs.

Reticulated recycled water schemes operate similarly to conventional water supply with a distribution system serving individual customers. The schemes involve a monopoly supplier selling a consistent product to a large number of residential and/or industrial customers.

The similarity with the conventional water supply suggests that the Tribunal should be involved in the process of setting of prices for reticulated recycled water services for the same reasons that it sets prices for water supply and wastewater services. The Tribunal already sets maximum prices at each price review for reticulated recycled water services at Rouse Hill. This establishes a precedent for such a price setting role and an expectation by future customers that they will be afforded similar regulatory protection on price.

Hunter Water supports the position that the Tribunal should be involved in the process for setting prices for reticulated recycled water supply. However, rather than setting actual prices for recycled water, the Corporation's preference is for the Tribunal to establish a methodology for the Corporation to use in fixing maximum prices in accordance with s13A of the *Independent Pricing and Regulatory Tribunal Act, 1992.*

Hunter Water's preference for a methodology is based on its earlier-stated preference for prices to be location specific – ie developed on a project-by-project basis to reflect the individual cost structures of new recycling schemes. A methodology also allows the Corporation to calculate indicative prices as new projects are being planned and developed between price reviews. Such indicative pricing allows the community, developers and local government to be better informed about water service options at an early stage.

For reticulated recycled water schemes, the methodology could specify the cost basis for developer charges and annual charges. Extending the logic currently applied to potable water and to sewer services, initial capital expenditure to develop the recycled water scheme would be recovered through developer charges while annual capital returns and operating costs would be recovered through annual charges.

A concern here is that strict adherence to this logic may result in low annual charges and may encourage "overuse" of recycled water. It is noted that the Issues Paper (s3.2.1) mentions that this is a concern with the current charge of $0.293 per kilolitre at Rouse Hill.

Low annual volumetric charges may be addressed by having all of the annual charge expressed as a volumetric charge rather than having the traditional two-part tariffs. Even so, annual charges may be still very low where the scheme's operating costs are low. In such cases, there may be merit in permitting annual prices to be set as a proportion of current potable price and using the additional annual charge revenue to reduce developer charges. The reduction in developer charges could be calculated easily as part of the developer charges assessment process which already offsets developer charges by any operating surplus on operating revenues. The methodology would need to be sufficiently flexible to allow fixing annual charges in this way.

One of the unintended consequences of such overuse may be to reduce the effect recycled water has on savings in capital investment on potable water treatment and distribution infrastructure. Reticulated recycled water systems usually require potable water top up/back up to ensure supply is maintained for essential functions such as toilet flushing at peak demand times. "Overuse" of recycled water may mean there is little opportunity for savings in the upgrading of potable distribution systems because of the need for them to provide a substantial backup capacity.

Also, the savings that recycled water use affords potable water treatment and distribution systems may be complicated by the need for these systems to supplement peak demand for recycled water and the impact recycled water supply will have on peak potable water demands. Hence the avoided costs implications for potable water distribution and water treatment will differ with location and recycling scheme.

Nevertheless, recycled water projects may lead to substantial benefits in terms of avoided costs for water distribution and water treatment systems. Where avoided costs for water

distribution and treatment systems can be realised, they need to be incorporated in the assessment of the economic cost of recycled water and pricing of recycled water.

A further practical issue is the treatment of avoided costs, particularly those related to deferring potable water source and wastewater treatment augmentations, under the present developer charges calculation methodology. This issue is outlined more fully in section 4.2 below.

Hunter Water considers that a methodology is the most appropriate price setting option for reticulated recycling schemes because it facilitates setting prices on a scheme-by-scheme basis. When prices are set for individual schemes, a methodology also permits prices to be set at any time. This is an important feature in a market place where population growth is being accommodated by green-field residential developments and where there is with increasing interest in reticulated recycled water opportunities.

4.1.3 Revenue implications of large-scale potable substitution

Recycling can result in a sudden quantum product shift for water agencies - typically, this may occur when an existing large industrial user replaces its current use of large volumes of potable water with recycled water. This can have significant revenue implications for the water agency.

Hunter Water believes that some consideration should be given to softening this revenue shock by incorporating some protection of its net gross margin (potable water gross margin less recycled water gross margin) into the pricing of substantial potable water substitution projects for a period of up to 5 years.

Hunter Water believes that IPART should consider mechanisms to soften any substantial agency revenue shocks from large-scale users switching from potable water to recycled water.

4.2 Developer Charges

In keeping with the conventional charging regimes used by the water industry, the role of developer charges (or up-front charges) in recycling projects would be to recover initial capital expenditure on recycling schemes.

The principal risk in this situation is that the user may cease operations, leaving the agency with unfunded stranded infrastructure. As mentioned earlier, this a conceivable scenario in the Hunter, which has seen several major industry closures over the last decade. However, it is recognised that rigorous risk assessment needs to be part of the evaluation of large one-off recycling projects.

Developer charges paid up-front to cover infrastructure investment may be one vehicle for reducing this risk. However, as discussed earlier in this section, large up-front charges may be a disincentive for large-scale users seeking to switch from potable water to recycled water. In these situations, the price setting methodology needs to provide flexibility to adopt

other price structures to address risk such as significant annual fixed charges and 'take or pay" contracts.

The role of developer charges in reticulated recycling systems is clearer. In the pricing arrangements that apply to conventional water and wastewater systems, developer charges recover both the capital cost of unused capacity in existing infrastructure and the cost of future known additions to capacity. However, as recycling projects will generally be constructed as discrete works to make use of available effluent, recycled water developer charges would be structured to recoup only the additional treatment and distribution capacity needed to service the planned project.

Developer charges also need to take account of avoided costs and some perceived issues in this regard are covered in the following sections.

4.2.1 Equity in the treatment of avoided costs

Section 4.1.4 of the Tribunal's Issues Paper notes that the Tribunal will consider how best how best to deal with avoided costs, particularly where the beneficiaries of the avoided costs differ from the users of recycled water. Passing the benefit of avoided costs back to the users of recycled water is an important principle on both equity grounds and because the resultant effect on prices serves to ensure price signals are correct from an allocative efficiency standpoint (ie it provides the correct incentives for people to invest in and use recycled water).

Recycling projects are increasingly seen and promoted as a means of deferring capital expenditure on water source augmentation. Similarly, recycling projects can defer or eliminate the need for upgrading of water distribution systems and augmentation of further wastewater treatment facilities at the plant from which the recycled water is supplied.

However, under the current developer charges methodology, the value of deferring water source augmentation is redistributed across potable water developer charges as lower potable water developer charges. The benefits of deferring capital expenditure on wastewater treatment upgrades are similarly reflected in wastewater developer charges. This occurs largely because of the requirement in the current developer charges methodology for there to be a nexus between capital expenditure on assets and the specific developments these assets serve.

Calculation of developer charges is based on a discounted cash flow (DCF) analysis of capital works for future water source development and water distribution system augmentation and future treatment plant upgrades for wastewater treatment systems. The nexus provisions mean that any deferral of these works as a result of recycling projects will be taken into account when the DCF models are reviewed (every 5 years) and will thus incorporate the benefit of any avoided costs in revised potable water or wastewater developer charges.

Thus, it would appear adherence to the nexus provisions of the developer charges methodology may conflict with principle outlined earlier in this submission that avoided costs should be taken into account in determining the economic cost of recycled water and the avoided cost taken into account in the pricing of recycled water.

4.2.2 Treating recycling as water or wastewater investment

As outlined in the previous section, under the current developer charges methodology, the avoided costs from recycling projects are redistributed by deferring future investment in augmentation or upgrade of the water supply and wastewater systems. These benefits

materialise as savings in the water and wastewater developer charges. If this occurs, they cannot be legitimately credited to the recycling scheme and taken into account in the pricing of recycled water.

Addressing this issue requires a change from the present strict "supply systems" focus implicit in the nexus provisions of the developer charges methodology to an "outcomes" focus where the outcome is the provision of water and wastewater services.

One mechanism perhaps worthy of consideration is the inclusion of the cost of major recycling assets in the water and wastewater developer charge calculations. For example, if a new recycling project enables some planned water source developments to be deferred, this approach would treat designated recycled water developments as source augmentations and include the costs of these recycled water assets in the calculation of the water source developer charge. The rationale for including the recycling assets is that they effectively serve the same water service function as increasing source capacity because they free up existing source capacity.

In addition, transferring some capital expenditure for the recycled water development to the water and wastewater developer charges would reduce costs to the proponents of recycling schemes, possibly making the recycling schemes more attractive. Above all, this transfer of capital investment to the water and wastewater developer charges would credit the proponents of the recycling project with the avoided cost resulting from recycling.

Hunter Water recommends that the IPART methodology for recycled water pricing endorse the principle that investment in recycled water infrastructure can be included in potable water and wastewater developer charges on the grounds of a nexus through avoided cost.

4.3 Auditing of recycled water prices

The Issues Paper seeks comment from agencies on whether IPART should audit recycled water prices.

Hunter Water will pursue recycling opportunities in accordance with its Integrated Water Resources Plan (IWRP), which is reviewed and updated at intervals of around 5 years. This plan will generally identify recycling options that have an economic cost at or below levelised costs for source augmentation and that are competitive with other demand and supply management options. A major recycling strategy is being developed at present to inform the next update of the IWRP for completion in 2007.

The IWRP is a public document developed with community and stakeholder input. It is also a requirement of the Corporation's operating licence, which is audited annually by IPART. Further, Hunter Water is required to provide IPART with an annual report on the implementation and management of the IWRP. Thus consideration of recycling in the IWRP can be reviewed by IPART as part of the consultation process during the plan's review and in consideration of the annual IWRP report and operating licence audit results.

Not all recycling projects will be assessed in the IWRP at the review stage because recycling opportunities will emerge continuously. However, where new recycling projects emerge in the period between IWRP reviews, these will be reported in the IWRP annual report along with the cost basis and decision making considerations. IPART may then choose to have the operating licence audit review any of the matters included in the IWRP annual report. Thus

the current IWRP reporting and operating licence audit provide adequate audit opportunities for IPART to audit and review Hunter Water's decisions in relation to new recycling projects.

Hunter Water agrees that IPART should also have a role in auditing prices established under an IPART determined methodology. This audit could be carried out as part of the periodic price review process with an audit of application of the recycled water prices to a sample of projects.

Hunter Water believes IPART should audit recycled water prices by:

- *Using the IWRP annual report and operating licence audit to review Hunter Water's decisions in relation to new recycling provisions, and*
- *Reviewing the application of the recycled water prices to a sample of projects at periodic price reviews.*

5. Sewer Mining

The Issues Paper raises questions about appropriate price regulation for sewer mining and whether it is possible to reliably calculate avoided costs that materialise from sewer mining projects.

Hunter Water has limited experience with sewer mining although it has been a party to sewer mining proposals from time to time.

Mostly, sewer mining is not undertaken directly by water agencies. As a result, it is the sewer mining operator, not the agencies, that controls the process and the quality of the recycled water produced. Thus, any sewer mining arrangement needs to be covered by a contract that assigns responsibility for recycled water quality to the sewer mining operator/user, not the agency. Typically, contracts with sewer mining operators would:

- Indemnify the agency for any claims, particularly related to water quality, and provide for the operator to take all risks
- Require the operator to obtain necessary licences from the Department of Environment and Conservation and approvals from local government
- Require the operator to hold satisfactory liability insurance cover, and
- Provide for the agency to terminate supply if the contract is breached, the operation is not in the public interest (eg as a result of odour, noise or health issues) or there is a change of operator or user.

The question of avoided cost can be related, to a large degree, to the scale of the sewer mining project and the handling of the waste stream from the sewer mining operation.

Small-scale sewer mining operations (eg to provide water for golf courses, municipal uses or small industrial processes etc) usually involve returning the waste stream to the same sewer from which the source wastewater was extracted. Where waste streams are returned, there is no effective reduction in loading on the agency's treatment plant. Thus, while there may be a small reduction in the volume of wastewater travelling through the downstream network and treatment plant, the avoided costs are minimal especially where the sewer system operates entirely under gravity.

Therefore, it can be argued that, generally, avoided costs are negligible in small-scale sewer mining operations. However, this needs to be assessed on a case-by-case basis, because in smaller sewerage schemes and where downstream wastewater flows are pumped, sewer

mining operations may reduce flows in the sewer and it may be possible to assess some savings in operating costs.

Avoided costs may be more readily assessable with very large sewer mining operations. Large operations may not return waste streams to the sewer, instead having handling arrangements for inlet screenings and biosolids that are similar to a system wastewater treatment plant. This may reduce loadings on the agency's treatment plant. Also, large mining operations may provide some operating cost savings in the wastewater transport network, if downstream wastewater pumping is avoided. Whether either of these saving is material, however, will depend on the volumes extracted or the relative scale of the sewer mining operations to the agency's sewer flows and treatment plant operations.

Thus, it is not possible to generalise about avoided costs of sewer mining operations other than to suggest savings may be more readily quantifiable for large-scale operations. Avoided costs need to be assessed on a case-by-case basis taking account of:

- The scale of the sewer mining operation
- Whether waste streams are returned to the sewer or independently transported off site and the effect on agency treatment plant loadings
- The volume extracted by the mining operation relative to the volume normally handled by the sewer main or sewer system on which it is located
- Whether there is downstream pumping of wastewater.

References

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Glossary

Term	Meaning
Asset nexus	The 2000 IPART determination require there to be an “asset nexus” (ie a close connection) between the development and the assets which are to serve that asset. These assets should be clearly identified in development servicing plans and the efficient costs should be taken from an asset register or other source acceptable to the Tribunal.
Avoided cost	Cost savings in the total water supply and wastewater system that result from investment in recycled water when compared with total costs for supply via the existing potable water supply only. Avoided costs include deferring or reducing the investment in capital works in the water and/or wastewater systems as a result of supplying recycled water.
BASIX	Building Sustainability Index. BASIX is a NSW Government initiative to ensure new and renovated (from 1 July 2006) homes are designed and built to use less potable water and produce fewer greenhouse gas emissions. The water use requirements are determined by the climate of the dwelling's location, not the type of dwelling. The target ranges from 40% to 0% across NSW.
Developer charges	Developer charges are paid by developers/new entrants at or before the time of development/connection and are levied for the provision, or upgrading, of water supply and sewerage infrastructure required to service new developments.
Discounted cash flow	An investment analysis tool that takes account of the time in the future when specific expenditures and/or receipts occur and uses discount rates to calculate a single present value for total expenditures and/or receipts over a designated investment period.
Environmental Management Plan (EMP)	The EMP sets out Hunter Water’s environmental improvement strategies and objectives and details targets and timeframes for environmental activities to be undertaken over the term of the plan. Preparation of the plan is a requirement of the Corporation’s operating licence.
Externalities	Impacts of the production of goods and services on the welfare of the community or the environment that are not accounted for by the market system and prices of goods and services.
Inland wastewater treatment plants	Hunter Water’s wastewater treatment plants that do not discharge to the ocean but rather to rivers and creeks.
Integrated Water Resource Plan (IWRP)	The IWRP is Hunter water’s blueprint for managing demand and supply over the next decade by balancing available resources in a sustainable manner. It treats both demand management and supply development options equally so that optimal sequencing of demand and supply options is identified. Preparation of the IWRP is a requirement of the Corporation’s operating licence and the current IWRP will be reviewed in 2007.
Opportunistic use	Refers to uses of recycled water that would not occur in the absence of the availability of low cost recycled water at the point of use. A common example is small-scale irrigation immediately adjacent to wastewater treatment plants. The opportunistic nature is typified by the fact that surrounding agriculture is not irrigated.
Reticulated recycled water scheme	Refers to schemes where the water agency provides recycled water to a large number of customers using a distribution system similar to that used for reticulating potable water. These schemes are sometimes called “dual reticulation” schemes because customers can access both reticulated potable water and recycled water from separate pipe networks. They are also called “third pipe” schemes referring to the three pipe networks servicing customers – potable water, recycled water and wastewater service networks.

Term	Meaning
Sewer mining	The practice of extracting water directly from sewer mains upstream of wastewater treatment plants, treating this water and providing it for a use as recycled water. Mostly, the waste stream from the sewer mining treatment process is returned to the sewer from which the source wastewater was extracted.
Stretch targets	Targets set beyond current, or expected, levels of achievement to encourage improvement in performance.
Up-front charges	Up-front charges serve the same purpose as developer charges except that they are not necessarily associated with new development. In the case of recycled water, up-front charges may be levied to cover the provision of recycled water supply infrastructure where an existing water user switches from using potable water to recycled water.