Oakley Greenwood

Calculation of Reasonably Efficient Competitor Costs

prepared for:
Independent Pricing and Regulatory Tribunal

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1. Introduction

The Independent Pricing and Regulatory Tribunal (IPART) is currently conducting a review of the prices that Sydney Water and Hunter Water can charge to wholesale customers. These wholesale customers are a relatively new category of service provider and generally purchase wholesale water and/or sewerage services from an incumbent (e.g. Sydney Water or Hunter Water) and on-supply these services to end-use customers.

As part of this review, IPART released a Discussion Paper[1] earlier this year that set out IPART's preliminary view of its preferred approach for establishing wholesale prices and three different options for calculating prices. IPART's preliminary view was that a retail-minus (plus net facilitation costs) approach is the right pricing approach for wholesale services at this time.

In determining the 'minus' component of the price, IPART considered the costs that a reasonably efficient competitor would incur in delivering water and/or sewerage services from the wholesale connection point to the end-user was its preferred approach. Its reasoning for this was that it would provide greater scope for dynamic efficiency (and hence greater benefits to customers over time) than the retail minus avoidable cost approach which had previously been considered.

IPART identified the following three options for calculating the minus component of the pricing equation:

- **Option 1:** IPART determining system-wide average or typical minus and net facilitation costs to be used for all schemes;
- **Option 2:** IPART determining a methodology that wholesale service providers must use to calculate the minus and net facilitation costs for each scheme; and
- **Option 3:** IPART determining the minus and net facilitation costs for each scheme.

IPART did not identify a preferred option for calculating the costs, and sought feedback from industry participants on the merits of each of the options.

1.1. Scope of the Report

As part of its review of wholesale water and sewerage prices, IPART is looking to calculate system-wide retail minus reasonably efficient competitor (REC) prices ('Option 1' from its Discussion Paper).

IPART's objective for this engagement is to:

- Develop numbers that it could use directly or indirectly in the building block calculation of reticulation and retail costs for a new entrant reasonably efficient competitor (i.e., the 'minus' component of Option 1 retail minus prices); and
- Inform its consideration of the viability of Option 1 (i.e., the extent to which it is feasible to have system-wide retail minus prices).

1 Independent Pricing and Regulatory Tribunal, *Prices for wholesale water and sewerage services - Discussion Paper*, April 2016.

2. Our approach to calculating REC costs

In consultation with IPART, we have approached the concept of a REC as a new entrant that is essentially starting from scratch in terms of water and sewerage service provision – i.e. it does not currently provide water and sewerage services to other service territories. This does not mean that the business itself must be a 'start-up'; it may already be providing other services that may or may not be related to water and sewerage. The services provided by the REC cover all water and sewerage services within its service territory – from the upstream wholesale connection (if any) to the physical connection and retail services of individual customers.

Where the new entrant REC may achieve efficiencies through the provision of other, potentially related services, we have sought to identify these occurrences and quantify their impact where possible.

2.1. Key tasks for the engagement

In addressing the objectives set out be IPART, the engagement was divided into the following key tasks and activities:

- **Task 1: Benchmark unit rates for retail and reticulation assets**
  - 1.a) Identify the assets required for the different services to be provided:
    - Water retail;
    - Water reticulation;
    - Wastewater retail;
    - Wastewater reticulation – gravity; and
    - Wastewater reticulation – pressure.
  - 1.b) Confirm the unit of standardisation for both retail and reticulation;
  - 1.c) Specify characteristics for each identified asset:
    - Asset value per standard unit;
    - Expected asset life; and
    - Lifecycle operating expenditure.
  - 1.d) Consider factors that may influence characteristics and/or cost for each identified asset:
    - Economies of scale;
    - Economies of scope;
    - Topography; and
    - Service delivery (i.e. outsourced v. in-house).
- **Task 2: Calculation of costs for example schemes**
  - 2.a) Identify the asset requirements for the three examples provided by IPART:
    - 2,000 20mm equivalent brownfield development;
    - 2,000 20mm equivalent greenfield development; and
    - 10,000 20mm equivalent greenfield development.

- 2.b) Apply the benchmark unit rates from Task 1 to the assets identified for the three examples to determine estimated costs for a reasonably efficient competitor.

The following sections provide more detail on our approach for each of the key tasks, with further information regarding calculations and assumptions contained within the associated Microsoft Excel Spreadsheet.

3. Task 1: Benchmark unit rates

This section provides a summary of our analysis for Task 1. Further detail on the specific outcomes is contained in the associated Microsoft Excel Spreadsheet titled "*REC Input Spreadsheet*".

3.1. Water retail

In considering the water retail functions, we have separated our analysis into:

- Metering infrastructure; and
- Non-metering infrastructure.

3.1.1. Metering

With regard to metering infrastructure, we have assumed that all residential and non-residential will have individual metering, consistent with the requirements of new multi-level strata buildings in Sydney Water's *Multi-Level Individual Metering Guide*. We have also assumed that each individual meter that is installed will be 20mm on the basis that all residential customers are required to be provided with a 20mm meter and that the non-residential connections of the REC service provider will be small non-residential customers. In determining the installation cost of these meters, we have relied on engineering experience and industry knowledge.

The density (number of meters per km^2) and the overall number of meters in the development, given the sizes being considered in the scenarios specified by IPART, are unlikely to have a material impact on the unit cost of meters and meter installation.

3.1.2. Non-metering

With regard to non-metering infrastructure for water retail activities (such as billing and call centre activities), rather than build-up the costs associated with developing the infrastructure in-house, we have assumed that a new entrant service provider would seek to outsource these aspects of the service delivery. This assumption is driven by:

- The likely significant up-front costs associated with establishing billing systems and call centres for retail activities;
- The fact that there is a nascent market for these services in the water industry given:
  - The experience in the electricity industry has shown that the introduction of competition gives impetus to these service providers (and in-turn enhance competitive entry); and
  - It would be expected that providers of these services in electricity can readily develop service offerings for the water industry.

We have assumed that a 'reasonably efficient competitor' would adopt this approach in order to be able to compete with the incumbent service providers (while not necessarily being able to match the actual costs of the incumbent).

Given this assumption, we approached a company that offers these managed retail services to utilities to get a better understanding of the likely services and potential costs involved:

- **Billing services:** A variety of billing services could be provided (depending on level of integration with the utility), a standard billing service would generally be between $2 and $4 per customer per month. The lower end of the range ($2) would represent a larger customer base, while the upper end of the range ($4) would represent a smaller customer base.
- **Call centre services:** Call centre costs for a water and wastewater service provider would generally be less than for an electricity retailer given the fewer customer interactions generated by water and wastewater service providers compared to electricity. For the same reason, these costs would be even less than for a wastewater-only service provider than for a potable-only or a combined water and wastewater service provider. Unlike the billing services, the call centre costs are unlikely to attract a similar discount for higher customer base. We have estimated $4 per customer per month based on a new entrant providing both water and wastewater services.
- **Customer communications:** These costs would generally equate to approximately $1 per customer per month for a small retailer and $0.50 per customer per month for a larger retailer.

There are a number of other services which may be required of a new entrant retailer, such as:

- Credit and collections;
- Hosting and maintenance; and
- Knowledge management and compliance.

It is expected that the other costs would be relatively small compared to the other services, estimated to be between $0.50 and $1 per customer per month.

Table 1 highlights these estimated costs based on the customer numbers for the examples used in Task 2.

Table 1: Estimated retail cost to serve

Cost item	2,000 customers	10,000 customers
Billing services	$4	$2
Call centre	$4	$4
Outbound customer communications	$1	$0.50
Other	$1	$0.50
$/customer/month	*$10*	*$7*
$/customer/year	*$120*	*$84*

3.2. Water reticulation

In determining benchmark unit rate estimates for water reticulation costs for new entrant water and sewerage service providers, we have relied on the "*NSW Reference Rates Manual - Valuation of water supply, sewerage and stormwater assets*" (NSW Reference Rates Manual) published by the Department of Primary Industries – Office of Water in 2014.

Some of the key assumptions and other sources of information include:

- Escalation of historical information has been based on information from the Australian Bureau of Statistics;[2]
- Estimated asset lives are based on the Water Supply Code of Australia;
- Reticulation pipes are assumed to be installed at a minimum depth as per the Water Supply Code of Australia (typical 600-750mm, laid in roadway);
- Annual operating expenditure is assumed to be relatively low and constant up to when assets would start to require refurbishment/replacement towards the end of their design lives;
- For brownfield installation costs a moderate construction difficulty level has been assumed, the additional cost of which is based on information from the NSW Reference Rates Manual; and
- Operating expenditure estimates are based on median figures provided in the 2014/15 NSW Water Supply and Sewerage Performance Monitoring Report from the Department of Primary Industries.

3.3. Wastewater retail

As with the discussion above regarding non-metering activities for the water service, we have assumed that the new entrant REC would outsource the wastewater retail functions to an external service provider.

3.4. Wastewater reticulation – gravity and pressure

The benchmark unit rates for wastewater reticulation have been separated into gravity-based infrastructure and pressure-based infrastructure.

The approach that we have used in estimating these benchmark unit rates was largely the same as that outlined above in section 3.2 for water reticulation infrastructure. The following highlights the key exceptions in our approach:

- Estimated asset lives for sewage pump stations are based on the Sewage Pumping Station Code of Australia;
- Pressurised wastewater reticulation pipes are assumed to be installed as per the Sewerage Code of Australia (typical 600-750mm, laid in roadway); and
- Gravity-based wastewater reticulation pipes are assumed to be installed as per the Sewerage Code of Australia (typical 1.5m to 3.0m, laid in roadway).

3.5. Variations within the benchmark unit rates

The following provides an overview of potential variations in the benchmark unit rates.

3.5.1. Cost variations from economies of scale

Higher density development may reduce the costs per installation for metering infrastructure, but there are a number of other variables that also impact these costs, and this makes it difficult to be definitive about the full and final effect of increased scale on unit costs across developments of different sizes.

2 *Australian Bureau of Statistics, Publication 6401.0 - Consumer Price Index*, Australia Table 1 - Sydney (a conservative approach to estimating was used through rounding up to 3.5 per cent)

For example, higher density development may reduce the length of reticulation pipe required, but it may also require a larger pipe size which has a higher unit cost. This makes it difficult to quantify any impact of higher density development on reticulation benchmark unit rates.

Conversely, pumping station costs are unlikely to be impacted as the sizing of the pump station will be independent of the density.

Per-customer non-meter retail costs such as billing services, outbound customer communications and other general services by contrast are likely to reduce with increased scale. This is because there is a degree of fixed cost involved in these services which are reduced on a per-customer basis as they can be recovered from a larger total number of customers.

3.5.2. Cost variations from economies of scope

We were advised by the managed service provider that the costs for providing billing services for either water-only, wastewater-only or a combined water and wastewater service would be the same (assuming the same number of customers). Thereby demonstrating economies of scope by being able to purchase billing services for two industries for the price of one. Similarly, there are economies of scope in call centre costs for providing wastewater services in addition to water services as the additional call centre costs for wastewater services would be expected to be lower.

There may also be economies of scope for reticulation infrastructure where a single civil contractor can install multiple service assets (such as water, wastewater, stormwater, etc.). However, as noted above, there are many other factors that would also influence this cost.

3.5.3. Cost variations driven by topography differences

Topography is unlikely to have an impact on meter-related retail costs. Similarly, changes in topography will have no bearing on non-meter retail estimates.

Topography is unlikely to have an impact on the benchmark unit cost for water reticulation or pressure-based wastewater infrastructure. On the assumption that any pumping stations or reservoirs are above-ground structures, variations in topography are unlikely to have an impact on the benchmark unit costs.

Topography is likely to have an impact, however, on the unit cost of gravity-based wastewater reticulation as cost of installation increases with the depth of installation. The sewer gravity main would need to have a deeper average depth in flatter terrain compared to undulating terrain. Depending on the installation depth of the sewer gravity main, the unit cost could be 2 to 3 times higher for a depth of up to 4.5m.

3.5.4. Cost variations driven by geotechnical differences

Geotechnical differences have no bearing on meter or non-meter retail cost estimates.

In terms of reticulation infrastructure, ground conditions such as rock excavation, contaminated soil, water-charged ground and bearing capacity are likely to have an impact on the unit cost. Encountering rock in trench installation can increase the cost by 20 per cent to 5 times, depending on the hardness and level of the rock in the pipe trench.

On the basis that the sewer pump station is a wet well (typically 5m to 10m deep), ground conditions such as rock excavation, contaminated soil, water-charged ground and bearing capacity are also likely to have an impact on the unit cost.

3.5.5. Cost variations by region

In developing these estimates, we considered whether there would be differences in the benchmark unit rates between the Sydney and Hunter regions.

For non-meter retail estimates, we do not consider there would be any material difference in providing the services in either Sydney or Hunter regions. This is because we have adopted an approach that assumes these services are provided by an external service provider and the services do not require this external service provider to be located in any particular region.

In terms of the reticulation and meter-based benchmark unit rates, we consider that the public data that has been relied on to provide the estimates is not accurate enough, or sensitive enough, to distinguish between the Sydney and Hunter regions (i.e. the margin for error in the estimates is greater than the difference between the two regions).

4. Task 2: Example schemes

The second key component for the engagement is to apply the benchmark unit rates identified in Task 1 to a set of example wholesale customer schemes. For the purposes of this exercise we have used three examples that were provided by IPART:

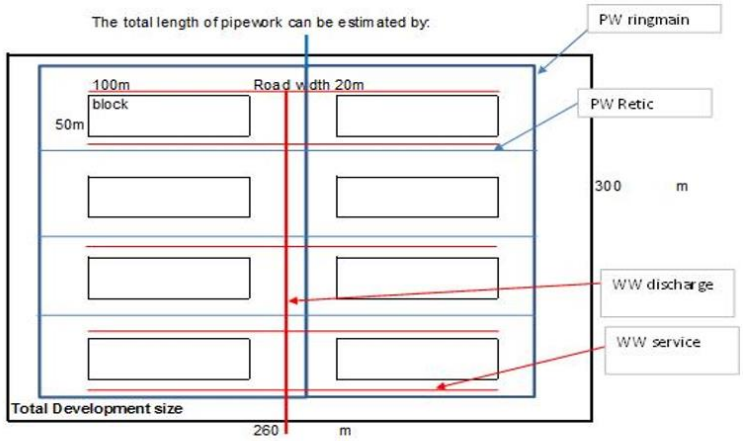
- **Example 1:** 2,000 20mm equivalent brownfield development;
- **Example 2:** 2,000 20mm equivalent greenfield development; and
- **Example 3:** 10,000 20mm equivalent greenfield development.

The following provides a summary of the analysis of these three examples.

4.1. Example 1

In considering a brownfield development, we assumed a lesser land size and a medium to high density zoning to accommodate the proposed development. Figure 1 provides the layout that we have assumed for Example 1.

Figure 1: Assumed layout for Example 1



Requires one of the above typical layout for 2,000 Brownfield properties

Within this layout, we have assumed:

- Quantity of pipework based on:
  - Total development size of 300m by 260m;
  - Total of 8 street blocks, each with 4 service connections;
  - Block sizes of 100m by 50m, with 10 levels of residential units and a ground level for commercial premises (total of 11 levels);
  - Road reserve width at 20m, total road length estimated to be 2,200m; and
  - 50 per cent built-up area per lot (i.e. half of the land area is building infrastructure).

In relation to the **required water infrastructure**, we have assumed:

- A single DN250 feed pipe from the incumbent main to the development site;
- No allowance for water booster pump station (i.e. there is sufficient pressure in the incumbent main to supply the whole development);
- DN250 ring-main allowed around the perimeter of the development site to provide redundancy and security of supply in the event of shut-down for maintenance;

- Minimum DN150 for all water reticulation mains to allow for firewater connection(s) of potable water reticulation network;
- One service connection point per apartment block (with 2x DN80 and 1x DN150 water service connections); and
- Valves, hydrants and associated fittings are accounted for within the unit rates of pipework.

In relation to the **required sewerage infrastructure**, we have assumed:

- Single sewer discharge from development site to incumbent network;
- One service connection point per apartment block (with 1x DN150 sewer connection);
- Manholes and bends are accounted for within the unit rates of pipework; and
- The incumbent's receiving sewer has capacity for flows from development via gravity.

In terms of the required retail activity, we have assumed:

- An external service provider will provide non-meter retail services.

Based on these assumptions, we have estimated the costs of a reasonably efficient competitor to service Example 1 to be:

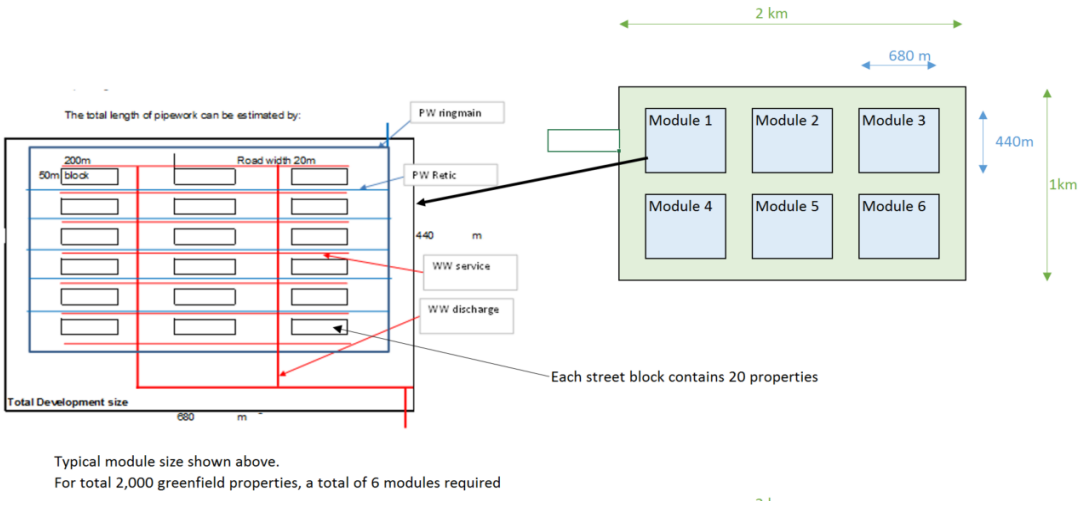
- **Total Capital Expenditure: $2,813,341**
- **Annual Operating Expenditure: $252,080**

For further details on the calculations and assumptions used, please see the associated Excel Spreadsheet.

4.2. Example 2

Example 2 is based on the same volume of connections as Example 1, however it is a greenfield development and therefore we have assumed larger land size and low density zoning. Figure 2 provides the layout that we have assumed for Example 2.

Figure 2: Assumed layout for Example 2



Within this layout, we have assumed:

- Quantity of pipework based on:
  - Total development size of 2km by 1km;

- Total of 36 street blocks, each with 20 service connections;
- Block sizes of 200m by 50m, with 500m^2 land lot per property;
- Road reserve width at 20m, total length estimated to be 39km; and
- Total of 1,800 residential and 200 commercial properties.

- Rates based on there being no existing services within the development; and
- Both pipe size and length may vary depending on water consumption and sewage flow assumed and the layout of the development site.

In relation to the **required water infrastructure**, we have assumed:

- A single DN250 feed pipe from the incumbent main to the development site;
- Total of 1x water pumping station and water reservoir allowed for water supply to the whole development;
- DN250 ring-main allowed around the perimeter of the development site to provide redundancy and security of supply in the event of shut-down for maintenance;
- Minimum DN100 for all water reticulation mains to allow for firewater connection(s) of potable water reticulation network;
- One service connection point per property (with 1x DN20 water service connection); and
- Valves, hydrants and associated fittings are accounted for within the unit rates of pipework.

In relation to the **required sewerage infrastructure**, we have assumed:

- Single sewer discharge from development site to incumbent network;
- One service connection point per property (with 1x DN100 sewer connection);
- Manholes and bends are accounted for within the unit rates of pipework;
- Due to topography and development size, 1x sewerage pumping station allowed;
- All property wastewater will be gravity drained to sewerage pumping station(s); and
- Total of 2x sewerage pumping stations allowed for sewerage discharge from the whole development to the incumbent's mains (assumed 2x sewerage discharge points).

In terms of the required retail activity, we have assumed:

- An external service provider will provide non-meter retail services.

Based on these assumptions, we have estimated the costs of a reasonably efficient competitor to service Example 2 to be:

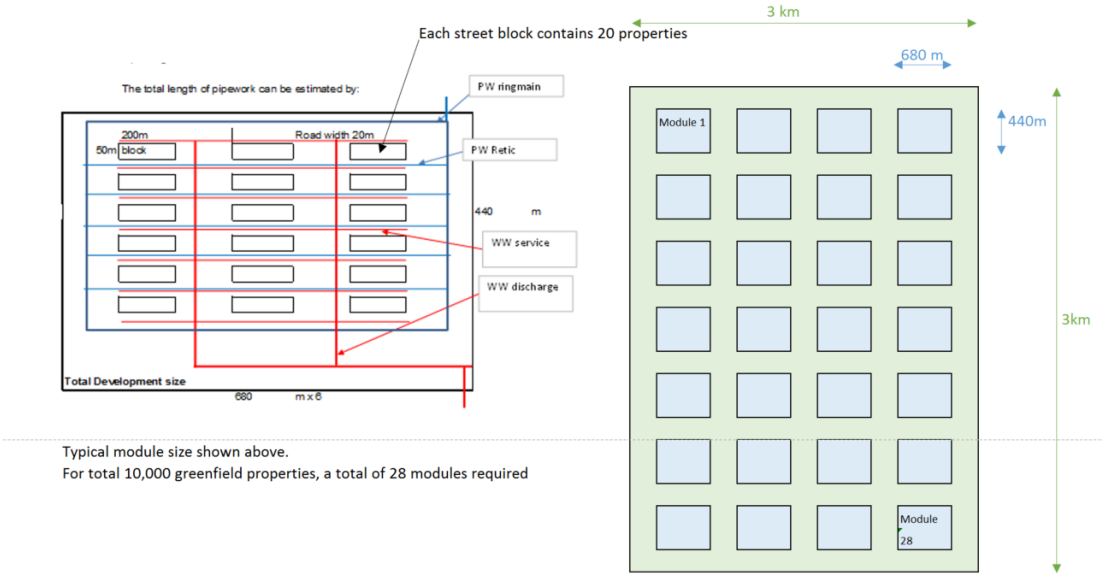
- **Total Capital Expenditure: $31,816,214**
- **Annual Operating Expenditure: $581,880**

For further details on the calculations and assumptions used, please see the associated Excel Spreadsheet.

4.3. Example 3

Example 3 is a larger greenfield development within which we have assumed larger land size and low density zoning. Figure 3 provides the layout that we have assumed for Example 3.

Figure 3: Assumed layout for Example 3



Within this layout, we have assumed:

- Quantity of pipework based on:
  - Total development size of 3km by 3km;
  - Total of 180 street blocks, each with 20 service connections;
  - Block sizes of 200m by 50m, with 500m^2 land lot per property;
  - Road reserve width at 20m, total length estimated to be 180km; and
  - Total of 18,000 residential and 2,000 commercial properties.
- Rates based on there being no existing services within the development; and
- Both pipe size and length may vary depending on water consumption and sewage flow assumed and the layout of the development site.

In relation to the **required water infrastructure**, we have assumed:

- A single DN450 feed pipe from the incumbent main to the development site;
- Total of 2x water pumping station and water reservoir allowed for water supply to the whole development;
- DN450 ring-main allowed around the perimeter of the development site to provide redundancy and security of supply in the event of shut-down for maintenance;
- Minimum DN100 for all water reticulation mains to allow for firewater connection(s) of potable water reticulation network;
- One service connection point per property (with 1x DN20 water service connection); and
- Valves, hydrants and associated fittings are accounted for within the unit rates of pipework.

In relation to the **required sewerage infrastructure**, we have assumed:

- Two sewer discharge from development site to incumbent network;
- One service connection point per property (with 1x DN100 sewer connection);

- Manholes and bends are accounted for within the unit rates of pipework;
- Due to topography and development size, 3x sewerage pumping station allowed;
- All property wastewater will be gravity drained to sewerage pumping station(s); and
- Wastewater will be gravity drained to 2 sewerage pumping stations prior to discharge to incumbent sewer main via sewer rising main.

In terms of the required retail activity, we have assumed:

- An external service provider will provide non-meter retail services.

Based on these assumptions, we have estimated the costs of a reasonably efficient competitor to service Example 3 to be:

- **Total Capital Expenditure: $135,176,670**
- **Annual Operating Expenditure: $2,621,970**

For further details on the calculations and assumptions used, please see the associated Excel Spreadsheet.