New Appointments and Variations

Approach to Charging

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New Appointments and Variations

Charges for bulk supplies and bulk discharges

1. Overview of approach

The New Appointments and Variations (NAV) charge aims to provide a new appointee with sufficient margin to finance and maintain the network on a new development. It is primarily aimed at new appointments made under the "unserved" criterion which are typically new housing developments. NAVs under the other two criteria (large customers using more than 50 Ml/a and variations by consent) are also possible.

To derive the NAV charge, we apply a discount to the standard wholesale rate that we would charge to the customers on site if we served them directly. If there are a mixture of property types (for example, houses and businesses) on the site then this will be reflected in the starting point. The discount is based on the average costs that we consider Hafren Dyfrdwy - or an Equally Efficient Operator (EEO) - would incur in building and maintaining the "last mile" of the network[1]. It is equal to the present value of those costs over the lifetime of the assets.

Our assumptions on costs and other cashflows arising from the local site are reflected within the **NAV cost model** which we have published alongside this document on our website. In previous years (2016-2019) we published outputs from the model for a typical housing development within our Scheme of Charges. We said that where there were exceptional costs at a particular site then we would deal with these by exception. This year we are publishing the model, which should mean that NAV operators will be able to broadly predict the bulk supply charge that will apply[2]. However, one effect of producing a model is that there is in effect no standard charge and the published values within our Scheme of Charges are only *indicative* values based on an average site.

Overall calculation

We calculate the present value of all charges that we would make if serving the customers on site and deduct the present value of all costs that would be incurred. An approach based on present value reflects the amount and the timing of all cashflows. In our view this is better suited to a new development site than one based on the regulatory building blocks that Ofwat would use to set revenue for an incumbent network.

A problem with the building block approach – Pay As You Go, return on capital, depreciation – would be NAVs where the developer pays for any initial investment. This would mean no return on capital and no depreciation. Using discounted cashflows avoids this problem because the return on capital is reflected within the discount rate.

Wholesale charges to the site

These are the costs that we would charge to the customers on site if we served them directly. For example, for water they include any wholesale standing charges that household or non-household customers would pay us.

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[1] Note that in the case of a large user NAV, we would not maintain any customer assets if we were serving the site directly; in this case the NAV charge might provide no discount over and above the large user tariff which would be the starting point for the calculation.

[2] We will consider the wholesale discount to be applied based on the published model, having reviewed a NAV operator's inputs to the model and any other considerations that may not have been captured.

The volumetric rate is weighted to include the effect of any non-households that are not charged at a standard rate.

Site costs - overview

The costs that we would bear if running the local network on a new development would be:

- The initial cost of any new mains, sewers, meters and associated assets that were not directly funded by the property developer;
- Maintenance of these assets over their lifetime;
- Regulatory fees;
- Sampling and testing of water at the tap; and
- Network losses - including leakage, meter under-registration and other causes such as firefighting or theft.

Some sites may have other costs depending on their location – particularly pumping. We make no standard assumption for this as we consider it to be too variable – we will look at the reasonable costs that we would incur for pumping and other items for atypical sites.

The NAV tariff is calculated on the basis of a particular bundle of services from Hafren Dyfrdwy. If the operator requires additional services from us, or is in a position to provide more services itself then we would adjust the tariff accordingly. Some examples are considered in section 3.

New assets - differences between AMP6 and AMP7

In Wales there is (as yet) no difference in approach for NAVs in AMP6 and AMP7. The cost of new assets on site is included within the bulk supply discount. The "income offset" on new developments is provided against mains requisitions. In most instances, 12 years' water charges from a site would exceed the cost of any mains that needed to be laid and therefore Hafren Dyfrdwy would have paid this in full, with no contribution from the developer[3]. This is the position that is reflected in the typical water discount as published in our Wholesale Scheme of Charges but – depending on the length of main and ground conditions – a contribution from the developer might be required.

Developers usually lay their own sewers, with no contribution from Hafren Dyfrdwy. There are rare exceptions where this is not the case (e.g. where a pipe needs to be laid across private land and we are required to use our s98 powers). In terms of the NAV calculation, the cost of new sewers is not reflected within the discount because no sewerage NAVs of this type have arisen. If rules in Wales change to the same approach as England then all new assets (water or wastewater) will be funded by developers; the discount reflects only maintenance and operating costs.

Losses on site

Water would generally be measured at the boundary for the purpose of a bulk supply. This means there would be a difference between this volume and the amount that we could charge to customers on site because of leakage, under-registration on customer meters and other losses caused by – for example – firefighting and theft. The cost is calculated based on the volume that cannot be charged multiplied by the weighted wholesale

[3] In more recent years, changes in Ofwat charging rules have permitted companies to vary their approach in this area and the classic Discounted Aggregate Deficit (DAD) calculation described above has been replaced. Since 2018-19 Hafren Dyfrdwy has applied a 90% income offset against costs (being the average amount over all projects in the region). This factor is applied in the calculation for NAVs starting in 2018-19 or 2019-20.

volumetric rate. Note that this would not include any supply pipe leakage because we would meter at the boundary box and therefore this would be chargeable.

We think the likelihood of a NAV operator wishing to serve a very small development site is low but we do not wish to close off any potential segment of the market. There are some differences when looking at such developments, the main one being that for sites of up to 10 plots we would not meter at the boundary; this would (in the extreme) be double-metering. Volumes for the small sites will therefore be based on customer meters.

We also base wastewater discharge volumes on customer meters; this means that there is no cost for leakage or other losses built into wastewater charges.

Retail costs

All calculations are based on **wholesale charges alone**. There would be a further margin on charges we would make to an end user. This is deemed sufficient to cover Hafren Dyfrdwy's average retail costs such as billing, customer service, credit management and bad debt. It should therefore cover the cost of an Equally Efficient Operator.

2. Volumes and drivers

Number of properties and number of plots

The costs and revenues are based on the number of plots in a development. In the *indicative* charge that we publish in the Scheme of Charges, we assume an average mix of flats, terraces, semi-detached and detached houses based on ONS data for housing sales averaged over 5 years. The mix of properties for actual sites will differ. It is possible to vary this mix within the model.

We assume that the mains laying costs scale with the number of *plots* rather than the number of properties because several flats will be constructed on a single plot and will require only one connecting main to serve them. However, there will be one meter per *property*. We assume that this is installed in a boundary box and that there are no shared meters.

For the purpose of scaling mains length, we assume that there will be more than one flat to each plot. In our *indicative* charge, we strike a conservative balance between: i) the possibility that there could be a very large number of stories; ii) that the size of the plot is likely to be somewhat larger than the average house. It is possible to vary the number of flats to each plot.

Length of mains or sewers

It is also possible to vary the length of pipe per plot within the model. The default is based on the average length that we have observed from recent developments which Hafren Dyfrdwy has connected, but the value is almost certainly different for each and every site. As with any user-defined variables in the model, we would review the information provided before agreeing a bulk supply price.

Consumption

This determines the income received by the NAV and the wholesale charges it would pay to Hafren Dyfrdwy. It is derived by:

- average Per Capita Consumption (PCC) x
- the average occupancy for each type of property x
- number of each type of property.

The default occupancy and consumption figures are based on Hafren Dyfrdwy averages for each type of property collected across our whole region for the purpose of leakage. It is possible to vary these assumptions within the model but – again – we would need to consider why they are expected to be different from regional averages.

3. Costs

Construction of mains

The costs are based on the average costs from a sample of sites where the mains have been installed by Hafren Dyfrdwy. This has been used to derive average unit costs for mains laying:

- Average metres of main required per development plot; and
- Average cost per metre of mains laid.

The assumed number of plots can then be used to generate a cost for the initial installation of the mains and a mains application design agreement fee is also applied.

For sites smaller than 10 plots, we assume that connections are via communication pipes alone and the length is reduced to a typical communication pipe for each. As no mains are being constructed, we assume no design fee.

For timing purposes, we assume that all mains are laid before any properties are constructed.

Infrastructure maintenance - water

Costs are based on Hafren Dyfrdwy data for the number of repairs for bursts and other reactive jobs on pipes in the Hafren Dyfrdwy area by age of pipe. The general trend is for the cost per metre of pipe to increase as pipes age. This data has been converted to a simple econometric model for unit costs, with a linear relationship between rising unit costs and the age of assets.

The intervention data is grouped for pipes installed over 10 year periods (for example, pipes between 2005 and 2015 and for each decade going back over the 20th Century). While there is a rising trend for maintenance on pipes over 10 years old, the number of jobs in the first 10 years is above trend. We judge this to be a result of correcting initial problems on installation. Accordingly, we have front-loaded the average maintenance costs for the first 10 years into the initial 3 year period; we then trend to the modelled rate.

Meter costs

We assume that an average meter and boundary box are installed for each property, with no shared meters. Our model assumes that meters are replaced in line with accounting life (15 years for meters and 60 years for boundary boxes). All costs are based on our metering contract plus overheads.

Efficiency

For the purpose of the discount, we have made a conservative assumption that some continuing efficiency over inflation should be possible over the period – 0.1% per annum. This is significantly lower than the 1.5% productivity gain that Ofwat has assumed for the sector in its PR19 determinations.

Construction of sewers

The construction cost per meter of sewers is based on the project estimator we use to develop business plans. The initial construction costs are higher than water mains due to the depth at which the sewers are laid. However, current industry practice is that this construction cost is borne by developers, as noted in the "overall approach". Should this change in future as a result of Ofwat charging consultations, we would need to revisit the model.

We assume that the length of sewer would be equal to the length of mains and that all sewers are laid before any properties are constructed or occupied.

Maintenance of sewer infrastructure

As noted above, we reviewed our data on water mains and found a relationship between age and maintenance costs. We looked to see whether we could demonstrate a similar relationship for sewer maintenance but from the data available there was no clear link. This was as expected for sewer blockages, but the correlation between age and sewer collapses was also insufficiently strong. We have therefore applied an average unit rate (£/m) for both blockage clearance and collapses.

Regulatory fees

Fees to Ofwat and CCWater are based on their budgets and the site's revenue as a proportion of industry turnover. As we are only considering a discount to wholesale rates, this is based on the site's wholesale revenue only.

Sampling and testing

We diverge slightly from the average position of Hafren Dyfrdwy when calculating sampling costs because the Drinking Water Inspectorate works on population sizes of 5,000, with a set number of samples being required. If we served a site as a stand-alone then we would need to take at least 4 samples for populations of less than 100 or 12 for sites of up to 5,000. For Hafren Dyfrdwy, this cost would generally average out over our entire customer base (c12/5,000) but for small areas of appointment would require 12 samples for populations as low as 101 (say, 40 plots).

Given the disproportionate cost arising from very small sites we have not factored sampling and testing costs into the charge for sites of up to 10 plots. We would offer to provide this service since there would be little or no local network between our own and the customer's meter at the boundary. Depending on the size of sites above the 10 plots level it might also be more practical for Hafren Dyfrdwy to provide this service to a site and to adjust the discount accordingly. In these circumstances there would be no charge for the service (any charges we made would simply have to be reflected in the discount offered).

Resilience

In our view it would be impractical for a small site to provide tankers, bowsers and similar to keep supplies running in an emergency. There are few sites where there would be a viable alternative to getting this kind of service from Hafren Dyfrdwy – if a site was near the border with another water company it might be possible to do so. As with sampling and testing costs, if we were to charge for this service we would simply have to "recycle" it by allowing an amount within the discount. We therefore assume that Hafren Dyfrdwy would provide it as part of the wholesale agreement. If an operator chose an alternative, we would need to adjust the margin accordingly.

Leakage

Our leakage assumptions are based on our analysis of leakage rates, mains material and age data. The leakage deterioration rate, also known as the Natural Rate of Rise, has been derived for use in our assessment from the 265 District Metering Areas where polyethylene pipe was the predominant material (c.8% of the total). Within most of these there is likely to be some pipework in other materials and therefore leakage rates are likely to be somewhat higher than we would achieve if we were to serve the property ourselves. Based on this data, our model takes account of the growth in leakage and the average age of the DMAs.

On average around a quarter of leakage arises on customer supply pipes. While there would be supply pipe leakage on any new site, it would be chargeable and is therefore excluded from the calculation - the discount only needs to take account of the unbilled water.

As noted above, for sites of 10 plots or fewer or wastewater services, leakage is not relevant to the charge because volumes would be based on customer meters.

Meter under-registration

The rate of meter under-registration is based on average company data. As noted above, for the purpose of calculating meter maintenance costs on the new site we err on the side of caution by allowing for replacement at the end of the accounting life (15 years) rather than a fix on fail approach. We assume that under-registration grows from the manufacturer's specification (1% on installation) to typical company rates before replacement.

Water taken unbilled

This is based on company averages from our water balance calculations. It includes use for fire-fighting, theft, unbilled standpipes, mains flushing, mains rehabilitation and other items that are included in annual returns. Since it is based on the whole of the network it is likely to err on the high side as unbilled water is frequently taken for commercial purposes – most new appointees serve housing developments where such activity is less likely to occur.

Other costs

The NAV model includes user-defined inputs for any other costs that may be incurred on an individual site. The most likely item is pumping where water supplies to the site cannot be delivered through the pressure in our main or sewerage cannot be discharged through gravity. No standard value is assigned to these items as the value will depend on the topography of the site.

There are a number of input lines for other costs. When negotiating a bulk supply or discharge agreement, we will review any inputs in these lines and consider what cost we think we would incur for these items if we were serving the site directly.

Bad debt

Since the NAV charge is based upon a wholesale rate, there is no charge for bad debt. There is no bad debt cost allowance within the wholesale control, which implicitly assumes zero risk of default to bulk supplies that are provided to any other appointee, including a NAV operator. In a wholesale-minus approach it is not possible to adjust for bad debt within the charge because we would simply have to compensate for any extra charge with an additional item in the discount calculation.

4. Commuted Sum (Discounted Aggregate Deficit)

The model compares the costs with the income that Hafren Dyfrdwy would expect to receive from the properties on the site over 12 years – the standard DAD calculation. Because this method has been in place since before privatisation, we have not changed the approach for the purpose of this model – for example:

- The income calculated for this purpose is based on end-user revenue (i.e. including retail costs, rather than wholesale alone).
- The discount rate is set per the method which Ofwat previously advised to companies.

Although the DAD calculation may be replaced by new methods at some point, Government guidance is that the balance between developers and other customers should remain the same. Therefore any replacement should produce similar results with regard to the overall level of cost to be borne by an incumbent (or NAV) and any excess where a developer would be required to contribute.

Timing of revenue

The model assumes that properties will be built and occupied over a period of time before all construction is completed. This lowers the level of income that we would expect to receive from the site during the early years. The time taken for the first occupant, and for the site to be full, are user-defined inputs to the model. The model assumes that the properties are occupied evenly over the intervening 12 months. The same assumptions are used for the timing of meter installation and for the calculation of wholesale charges.

Comparison to mains construction costs

If construction costs were greater than the commuted sum, a developer would have to contribute the difference in cost. If costs are less than projected income, Hafren Dyfrdwy would not charge for the mains. To be on an equivalent footing, the NAV charge needs to cover the lesser of the construction cost or the commuted sum.

In our typical housing development (as per the indicative charge we published), the commuted sum is higher than the cost of the mains. Hafren Dyfrdwy would finance the construction cost – therefore an EEO should be able to finance the same amount.

Developments in 2018-19 and 2019-20

The method above fits the approach from privatisation to the present. Following changes in Ofwat rules and guidance, most companies in England moved away from the classic DAD method and applied an average contribution rate to mains requisitions – however, this was not adopted in Wales.

Developments in AMP7

From 1 April 2020, the "income offset" will be applied as a rebate against infrastructure charges in England. The cost of new infrastructure is to be paid by the developer and the calculations above would become redundant. At present this approach has not been applied in Wales.

5. Standard charges

We calculate the standard **wholesale only** charges that we would expect to receive from the properties on site, once occupied. Retail charges are assumed to cover retail costs including billing, customer service, credit management and bad debt in line with the split in Hafren Dyfrdwy's revenue controls.

Water charges

The charges received are based upon the volume that would be registered on customer meters if we served the site directly. Any standing charges are also based upon those that would be received if we provided a direct service to the customers on site.

The model has inputs for non-household customers. The model includes inputs for the number and type of non-households based on the standing charges that would be applied (there are different charges depending on the size of the meter). The model includes a broad-brush guide to the size of the meter that most customers have at a given level of consumption though the actual size will depend on the peak flow requirement. We assume that there is only one meter per customer; within the Hafren Dyfrdwy area there are customers that have multiple meters for historical reasons but this is not something that we would engineer by choice.

In most instances the wholesale volumetric rate is the same as for households but it is possible that a new development could include non-households that would be charged on the Intermediate or Large User Rates (typically those using more than 10,000m^3 and 50,000m^3 per year). Where this occurs, the starting point for the NAV volumetric charge will be the weighted average volumetric rate for all users on site.

The volume charged for the purpose of a bulk supply to sites of more than 10 plots would include leakage and other losses as described above.

Wastewater charges

The charges received are based upon the volume that would be registered on customer meters if we served the site directly. Any standing charges are also based upon those that would be received if we provided a direct service to the customers on site.

Bulk discharge volumes would also be based upon customer meters, so there will be no difference between the volume charged by Hafren Dyfrdwy and that charged to customers on site. This means that the wastewater discount does not need to take account of losses on site, as discussed in section 1. In addition, there is no need to weight the volumes between households and non-households as customer volumes can be used directly in any charges that are applied.

Household standing charges for wastewater will be included in the starting point for the NAV charge; there is no wastewater standing charge for non-households. Where surface water from the site drains to sewers

managed by Hafren Dyfrdwy, surface water charges will also apply. These are based on the type of property for households and the area of non-household properties (i.e. the charges that we would apply if we served the site directly).

If we were to serve the site directly, we would also apply highway drainage charges to the properties on site. NAV operators will also apply this charge and thus it forms part of the starting point for the discount calculation. Highway drainage charges pay for the cost of draining the road network in general rather than a specific stretch of road adjoining a customer's property. Companies are not permitted to charge these costs to highway agencies. It is paid by all customers that have a sewerage connection, irrespective of whether they are connected for surface water drainage.

6. Discount calculation

The calculation is based on comparing the present value of charges for bulk supplies or discharges (as described in 5) to the costs that Hafren Dyfrdwy would incur if we served the site directly. This generates a margin which is sufficient to cover the cost of capital.

Discount rate

If we were serving the area directly, the relevant discount rate would be that of Hafren Dyfrdwy as a whole. However, in its May 2018 guidance on bulk supplies for NAVs, Ofwat determined that there should be a departure from the normal EEO test because it considers that the risk for the operator of a NAV differs from that of the incumbent.

Within the regulatory framework, Ofwat uses a Weighted Average Cost of Capital (WACC) on a post-tax basis because an allowance is made for the tax costs. For the NAV calculation, a pre-tax rate is used with an advised effective rate of 10%. Ofwat also sets WACC for the appointed business, with a deduction for retail in order to arrive at the wholesale WACC. We have started from the implied asset beta for the wholesale business since this is a wholesale only calculation (the retail is implicit within the retail margin which is considered separately).

The May 2018 guidance estimated a 15bps difference in asset beta. This was mainly attributed to the fixed revenue control, which removes revenue uncertainty – typically in the range of +/- 2% within the industry.

The allowed WACC has been updated to take account of Ofwat's Final Determination as published on 16 December 2019. The CPIH-stripped version has been applied on the basis that a new appointee has no existing RCV (it would also have no RPI-linked debt to service). Future charges are also linked to CPIH and the cashflows deflated with the same measure of inflation.

The implied wholesale values from the determination are adjusted as follows:

Weighted Average Cost of Capital	FD Wholesale	NAV	
Risk free rate	-1.39%	-1.39%	
Assumed level of gearing	60.00%	50.00%	10% difference
Assumed rate of tax	19.00%	10.00%	
Inflation	2.00%	2.00%	CPIH
Debt Beta	0.1250	0.1250	
Premium over RFR	3.53%	3.53%	

Weighted Average Cost of Capital	FD Wholesale	NAV	
Real cost of debt (pre-tax)	**2.14%**	**2.14%**	
Real cost of debt (post-tax)	1.93%	1.93%	
Total market return	6.50%	6.50%	
Equity premium	7.90%	7.90%	
Asset Beta adjusted for debt beta	0.3429	0.4929	15 bps difference
Equity Beta	0.6697	0.8608	
Cost of equity (pre-tax)	**4.33%**	**6.01%**	
Cost of equity (post-tax)	3.90%	5.40%	
WACC (Pre-tax)	**3.02%**	**4.07%**	
WACC ("Vanilla")	2.84%	3.77%	

Our calculation assumes that the NAV should earn its cost of capital over the life of the network; allowed levels of infrastructure maintenance for regulated companies actually imply a significantly longer lifespan than the accounting lives as published in the company's accounts.

Discount calculation

The proforma discount calculation is set out below.

Water	£	£	
Charges			
▪ Volumetric charges	X		Volume at boundary
▪ Standing charges for properties on site	X		
▪ Non-household fixed Charges	-		NAV is not an eligible NHH
A. Standard wholesale charges paid		**X**	
Costs			
▪ Distribution losses (leakage)	X		For sites >10 plots
▪ Water taken unbilled	X		
▪ Meter under-registration	X		
▪ Net cost of mains	X		All NAVs in Wales at present
▪ New meter installation cost	X		
▪ Infrastructure Maintenance	X		
▪ Regulatory fees, sampling and testing	X		
▪ Pumping and other non-standard costs	X		
▪ Meter maintenance	X		
B. Total cost of site		**X**	
C. Total discount		**B / A**	

The discount for water is allocated between charges in the following priority order:

1. Standing charges: feedback from NAV operators is strongly against standing charges and therefore we will apply any discount against these first.
2. Volumetric charges: the residual will be applied against the weighted average volumetric charge for the site (where there are only standard users, this will be the standard rate).

Wastewater	£	£	
Charges			
▪ Volumetric charges	X		Volume at boundary
▪ Standing charges for properties on site	X		
▪ Highway drainage charges	X		
▪ Non-household fixed Charges	-		NAV is not an eligible NHH
▪ Sufrace water drainage	X		If connected
A. Standard wholesale charges paid		**X**	
Costs			
▪ Infrastructure Maintenance	X		
▪ Pumping and other non-standard costs	X		
B. Total cost of site		**X**	
C. Total discount			**B / A**

The discount for wastewater is allocated between charges in the following priority order:

1. Highway Drainage.
2. Standing charges: in line with the approach for water, standing charges and other fixed charges such as highway drainage will be removed first.
3. Surface water and volumetric charges: the residual will be applied against surface water (if connected) and volumetric charges for the site. Since wastewater volumes will be based on customer meters, a uniform percentage reduction can be applied to both household and non-household volumes where the rates for these differ.