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<b>Project:</b>	Northumbrian Water PR24		
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<b>Subject:</b>	Asset Health Cost Assurance Methodology		

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# 1 Cost Assurance Process

This note outlines the cost assurance process used in developing the cost estimates for the asset health business case and the benchmarking approach.

## 1.1 Estimating

### 1.1.1 Approach & Systems

The approach for estimating the asset health business case was in line with the overall Northumbrian Water approach, using the iMOD estimating system to utilise actual cost data in a common cost work breakdown structure.

iMOD is an engineering scoping and cost estimating software system, developed for Northumbrian Water, bringing project scope definition, whole life costing and tender evaluation together in one integrated system. It is an estimation package comprising a suite of 50 engineering scoping models and a large and detailed cost database containing many thousands of costing data-points on a range of components and assets.

For the Asset Health business case the two primary costing methods in the business case were as follows: -

- Full Component Replacement – When a full component item was identified in the scoping as being in need of replacement then the full iMOD component cost was used to cost the item (i.e. kiosks, pumps, access covers etc).
- Partial Process Replacement – When a refurbishment of an existing site process was identified in the scoping (i.e. trickling filter), but there were insufficient details of the refurbishment activities, then it was assumed that 25% of the process full replacement costs would account for refurbishment costs.

All estimates produced have been checked and approved by a suitably qualified estimating professional as part of peer review and quality procedure. Checking process includes the following activities:-

- Calculation review
- Verify that all scope elements have been priced
- Confirm appropriate cost data and models used

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- Correct contract and client overheads applied
- Risk and estimating uncertainty suitably applied

### 1.1.2 Scoping and Business Case Development

The scoping and business case development for Asset Health was carried out through a four-step process as follows: -

- Step 1 – Asset Survey
- Step 2 – Intervention scoping and optioneering
- Step 3 – Cost Estimation
- Step 4 – Montecarlo Simulation

#### 1.1.2.1 Step 1 – Asset Survey

A primary survey of Northumbrian Water civil assets across both water and wastewater sites was carried out by consultant Atkins. This survey visually assessed the physical conditions of all accessible assets on the visited sites and reported on the condition assessments, assigning a condition grade for civil structures from 1 to 5. No intrusive surveys or drain down of operational assets were carried out during the surveys.

#### 1.1.2.2 Step 2 – Intervention Scoping and Optioneering

The outcomes of the asset surveys were then reviewed by Stantec, who developed corrective scoping interventions sufficient to return the asset to appropriate health. In line with the overall PR24 approach, optioneering was carried out to ensure Northumbrian Water had assessed a range of possible solutions to demonstrate value. Three levels of interventions were considered as follows: -

- Low – Minimal intervention to repair asset
- High – Substantial interventions required to make asset serviceable
- Most Likely – Using Stantec expert judgement, an assessment of the probable required intervention

#### 1.1.2.3 Step 3 – Cost Estimation

Cost estimates were produced for all three scope levels by Mott MacDonald using the iMOD estimating system as outlined in section 1.1.1.

#### 1.1.2.4 Step 4 – Montecarlo Simulation

The cost estimates for low, high, and most likely solutions were modelled in Montecarlo risk simulation to develop the asset lives programme.

## 1.2 Benchmarking

With the varied nature and the volume of the asset health interventions, it was not practical to complete an asset health-specific third-party benchmarking exercise. Instead, we concluded that the most appropriate benchmarking approach was to align the asset health business case to the pre-benchmarking assessment we carried out on Northumbrian Water's cost data underpinning the iMOD estimating system.

In the third-party pre-benchmarking assessment, Mott MacDonald found Northumbrian Water's overall costs, when considered against a range of common water and wastewater assets to be 2% under the sector average, thus concluding that the use of iMOD cost models in the production of PR24 cost would on average produce fair and efficient costs.

The Asset Health business case covers a similar range of both water and wastewater assets to those considered in the pre-benchmarking assessment. As these models were utilised in the estimation of the business case costs, developed using the iMOD system, we have concluded that these costs should also be in line with sector costs when considered holistically.

### 1.3 Cost Assurance

Cost assurance processes have formed a central part of the estimating work for PR24. In addition to the checking and approval procedures carried out, each iteration of an estimate as it has been developed through the estimating methodology, has been tracked and assessed against the following pillars: -

- Level of Scope Definition
- Quality of Cost Data
- Estimation Method

This assessment has been used to ensure that an estimate is at a sufficient level appropriate to the decision gateway and that schemes going forward into the business plan have met the correct confidence level.

Post completion of the scoping and cost estimation by Stantec and Mott MacDonald for development of the Asset Health business case, Northumbrian Water's Cost Assurance team carried out an independent review of the cost estimates to ensure that the work was carried out correctly to the PR24 methodology.