

Assessing and scoring model confidence

Mark Thompson (Yorkshire Water)

Assessing and scoring Model Confidence

- 1) Contents
- 2) Yorkshire Water
- 3) Background
- 4) Model Health Tool
- 5) Demonstration
- 6) Summary

- Introduction to Yorkshire Water
 - Network
 - Modelling team
 - Modelling history
- Assessing and scoring model confidence
 - Significance
 - Aims of the project
- Model Data Health Check Dashboard
 - How it works
 - Worked example of data output
- Summary
- Questions

Assessing and scoring Model Confidence

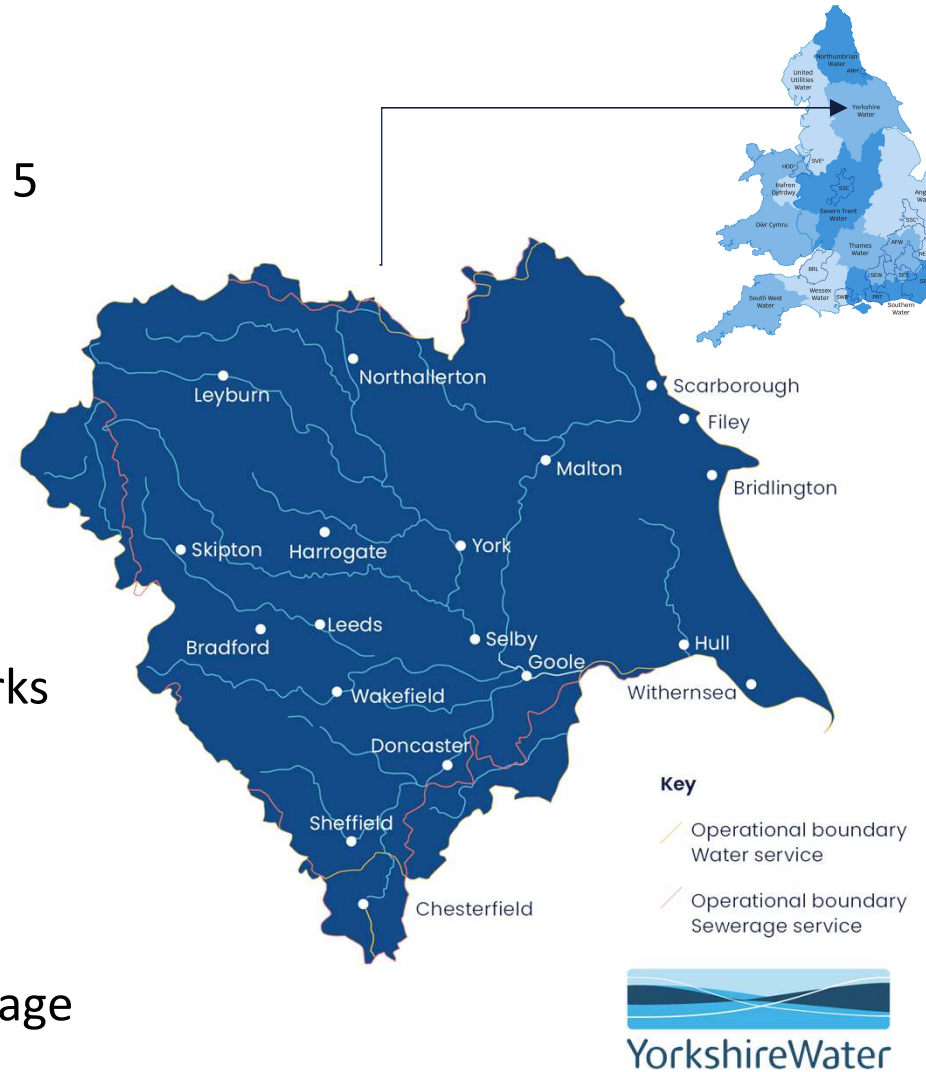
- 1) Contents
- 2) Yorkshire Water
- 3) Background
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Yorkshire Water serves over 5 million people and services 2.2 million properties with around 1.3bn litres of drinking water a day.

The network comprises of approximately.....

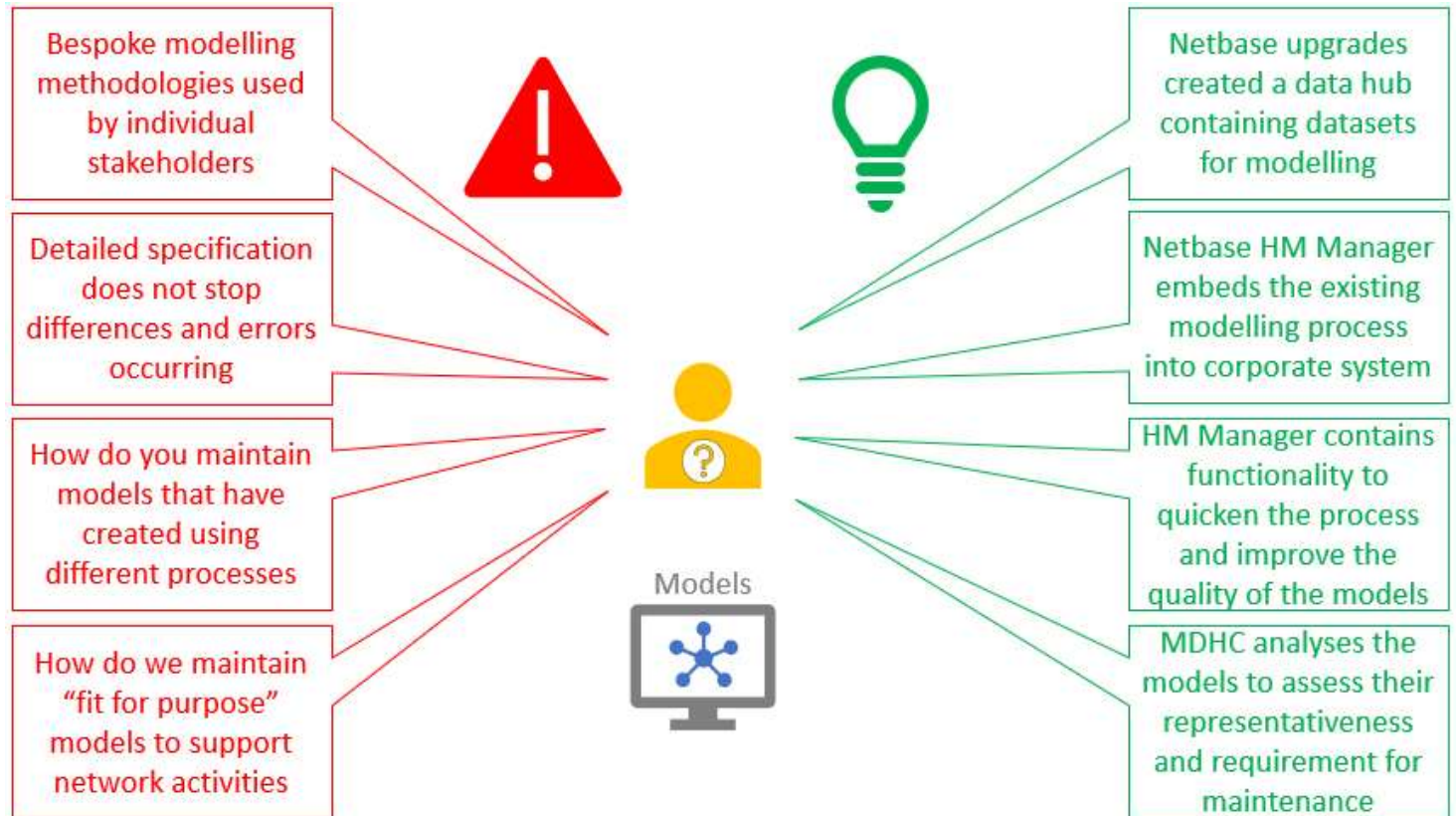
- 50 Water Treatment Works
- 129 Service Reservoirs
- >2000 DMA's
- 32,000 km of main

We have 100% model coverage



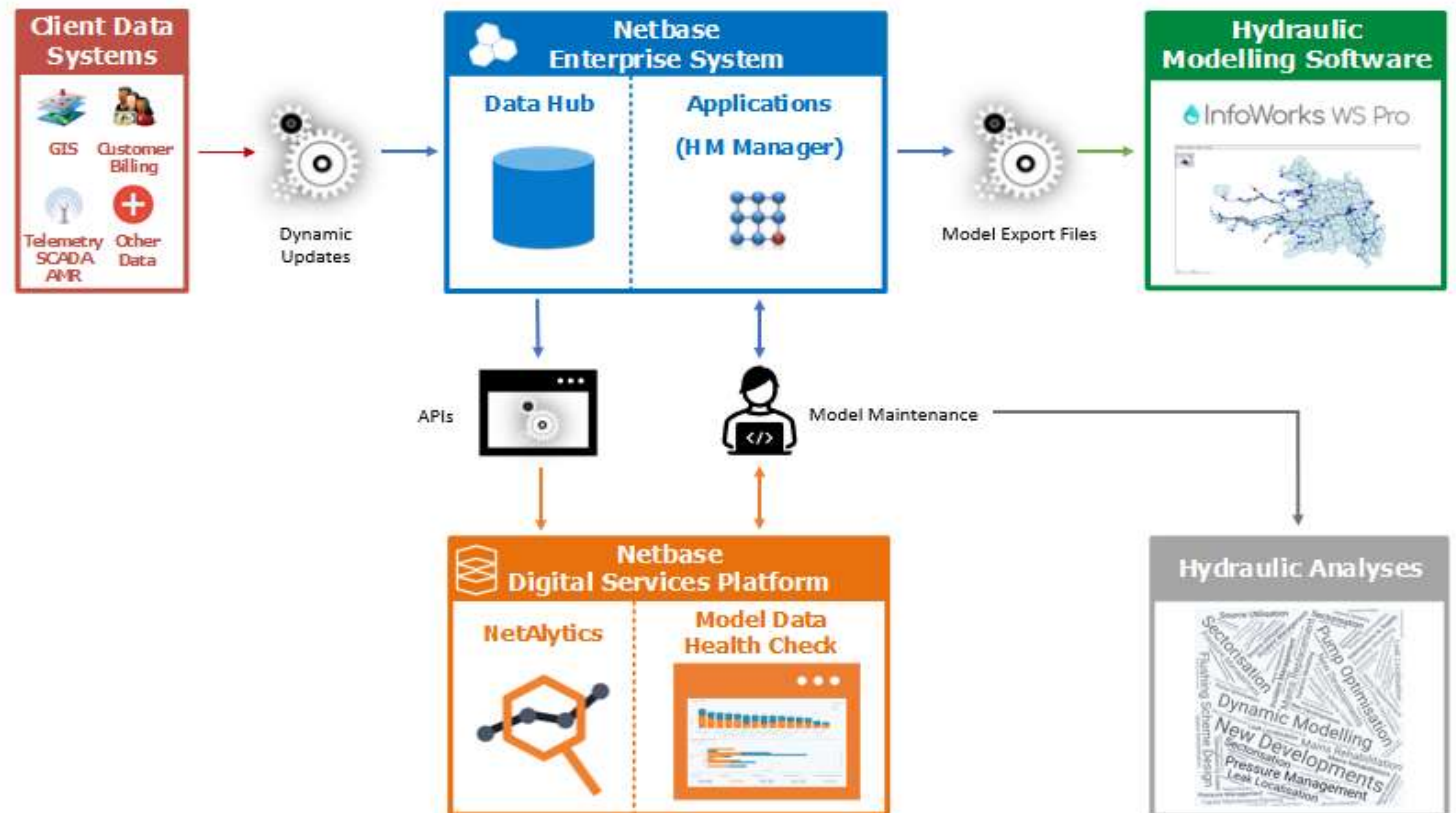
Assessing and scoring Model Confidence

- 1) Contents
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- 3) Background
- 4) Model Health Tool
- 5) Demonstration
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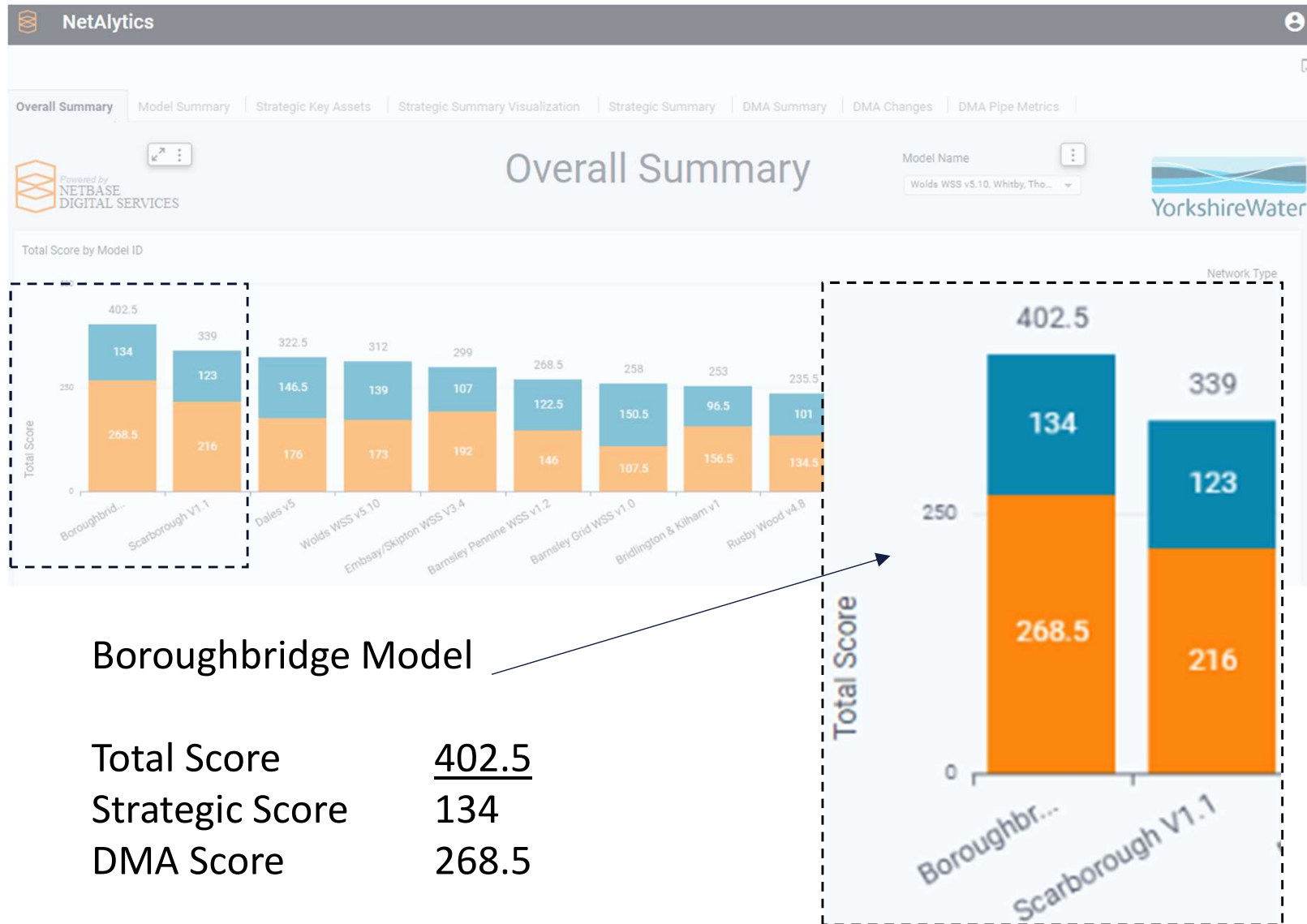
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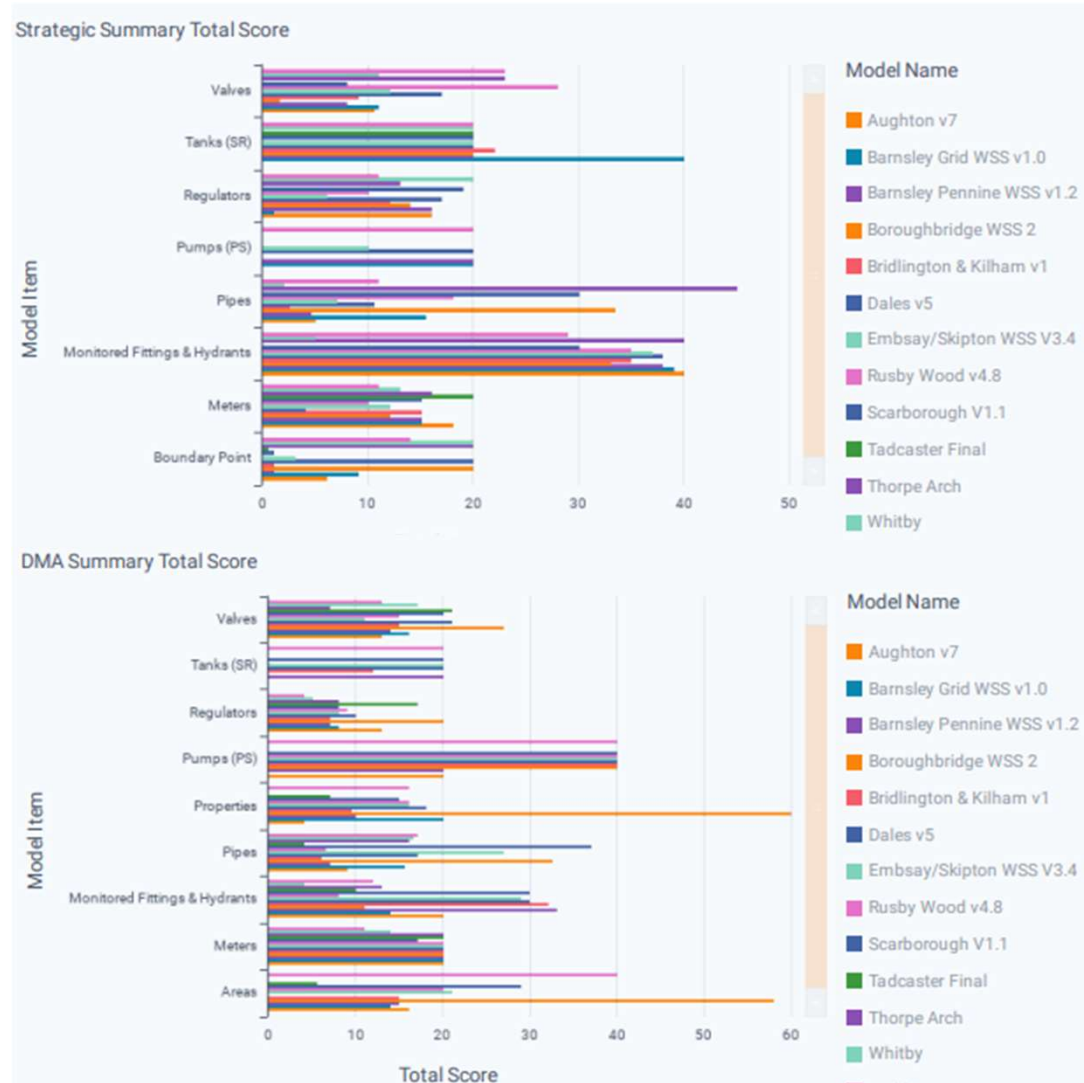
Assessing and scoring Model Confidence

- 1) Contents
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- 4) Model Health Tool
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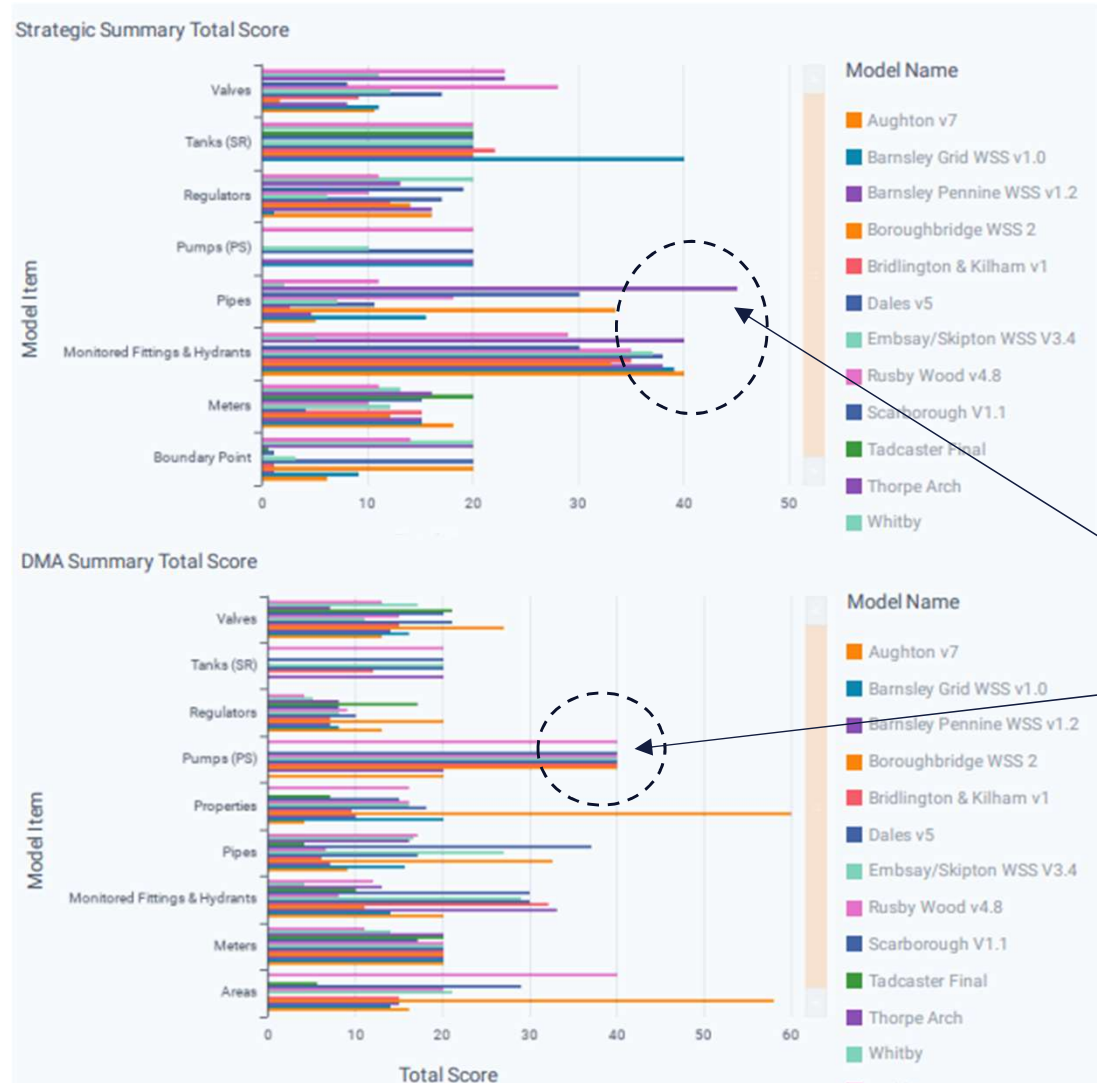
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All Models

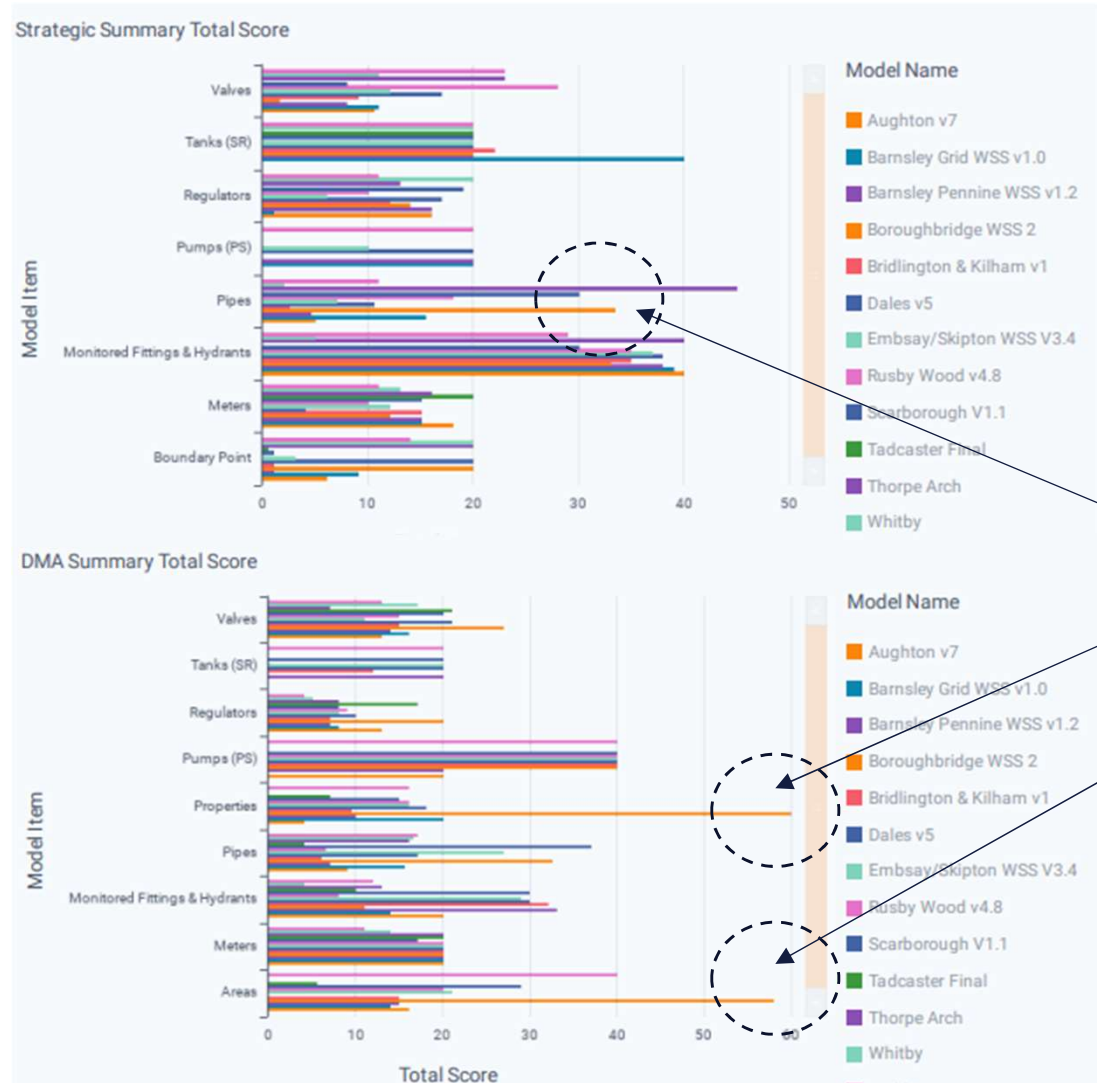
Pipes and Fittings

Pumps



Assessing and scoring Model Confidence

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- 3) Background
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Boroughbridge Model

Pipes

Properties

Areas



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How Score is Calculated

Percentage Change Minimum	Percentage Change Maximum	Assigned Score
0%	1%	0
1%	5%	0.5
5%	10%	1
10%	15%	2
15%	20%	3
20%	25%	4
25%	30%	5
30%	35%	6
35%	40%	7
40%	45%	8
45%	50%	9
50%	55%	10
55%	60%	11
60%	65%	12
65%	70%	13
70%	75%	14
75%	80%	15
80%	85%	16
85%	90%	17
90%	95%	18
95%	100%	19
100%		20

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How Score is Calculated

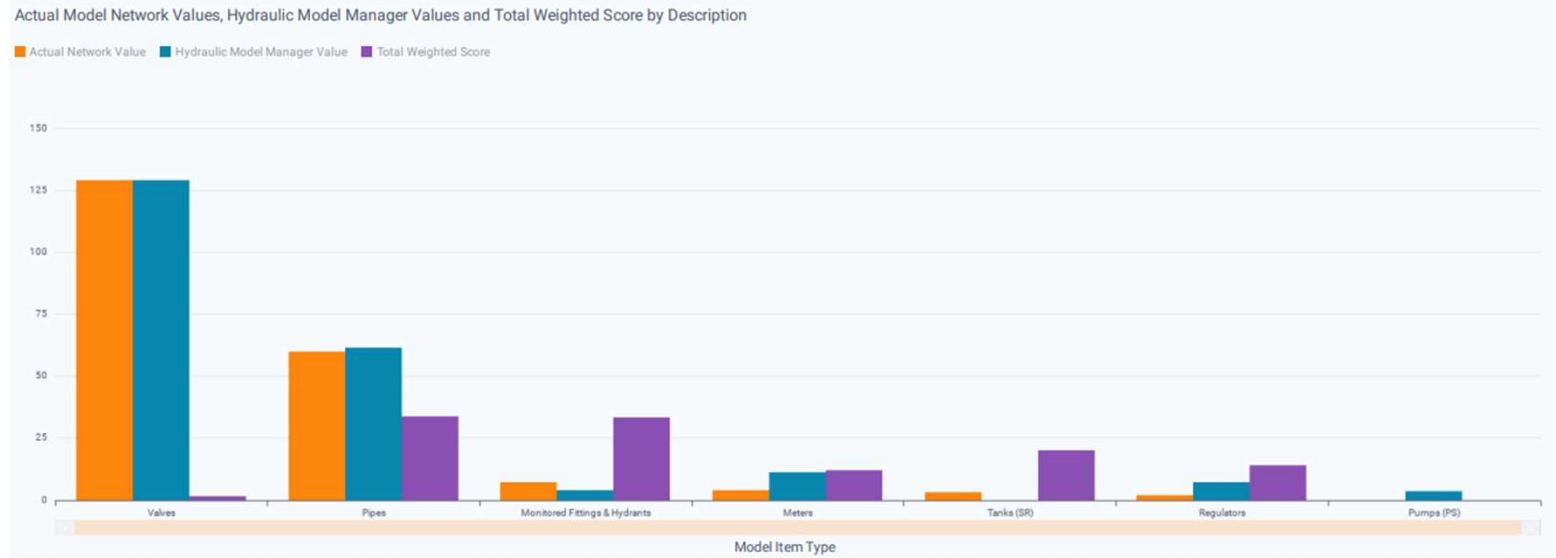
Percentage Change Minimum	Percentage Change Maximum	Assigned Score
0%	1%	0
1%	5%	0.5
5%	10%	1
10%	15%	2
15%	20%	3
20%	25%	4
25%	30%	5
30%	35%	6
35%	40%	7
40%	45%	8
45%	50%	9
50%	55%	10
55%	60%	11
60%	65%	12
65%	70%	13
70%	75%	14
75%	80%	15
80%	85%	16
85%	90%	17
90%	95%	18
95%	100%	19
100%		20

The more variation between the model and current live data, the higher the assigned score



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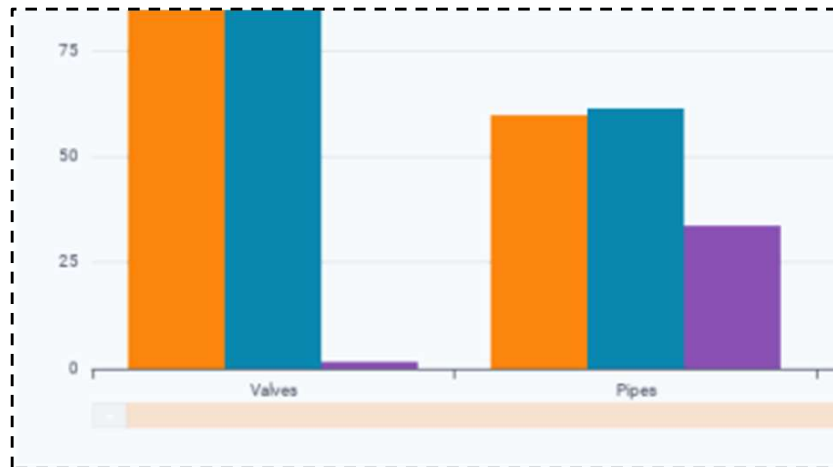
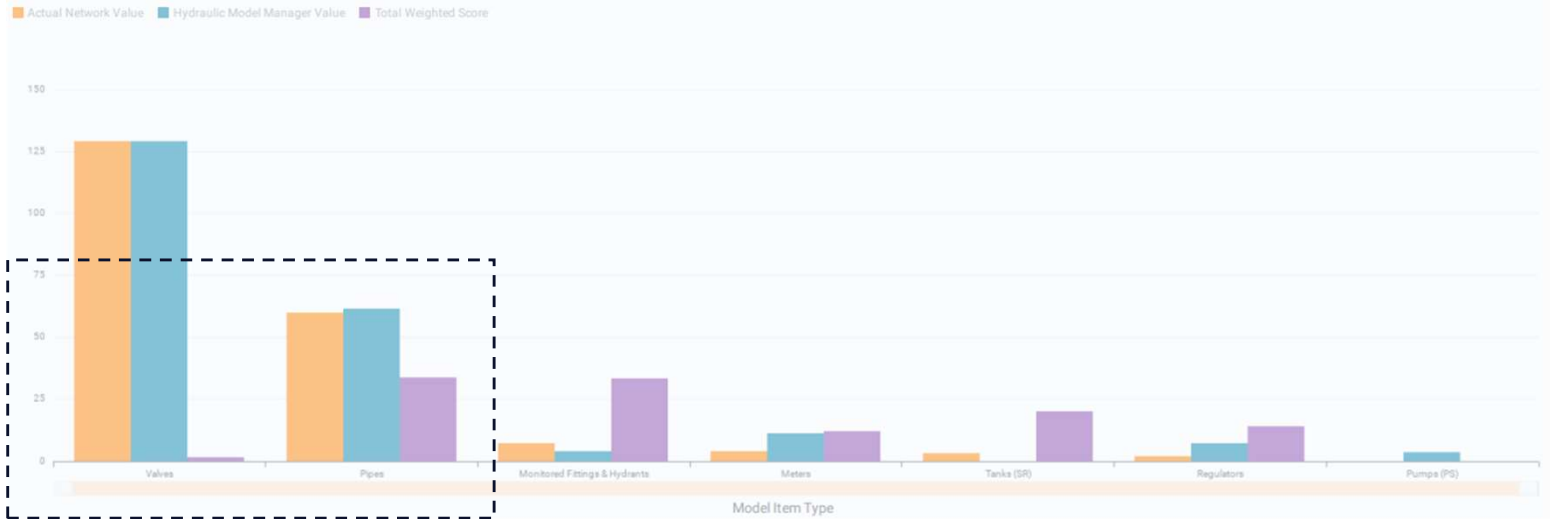
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- 3) Background
- 4) Model Health Tool
- 5) Demonstration
- 6) Summary



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- 3) Background
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Actual Model Network Values, Hydraulic Model Manager Values and Total Weighted Score by Description

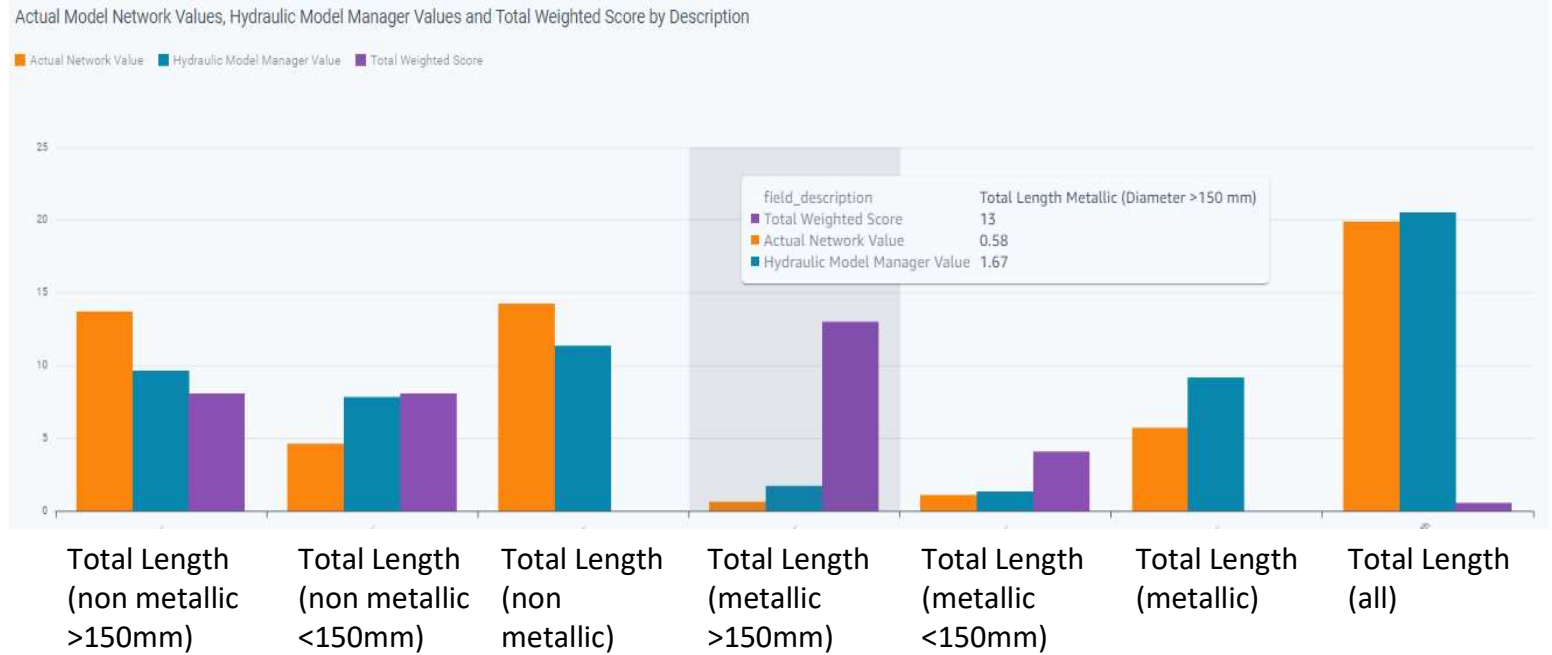


	Pipes (km)
Network Value	59.61
HM Value	61.4
Weighted score	33.5



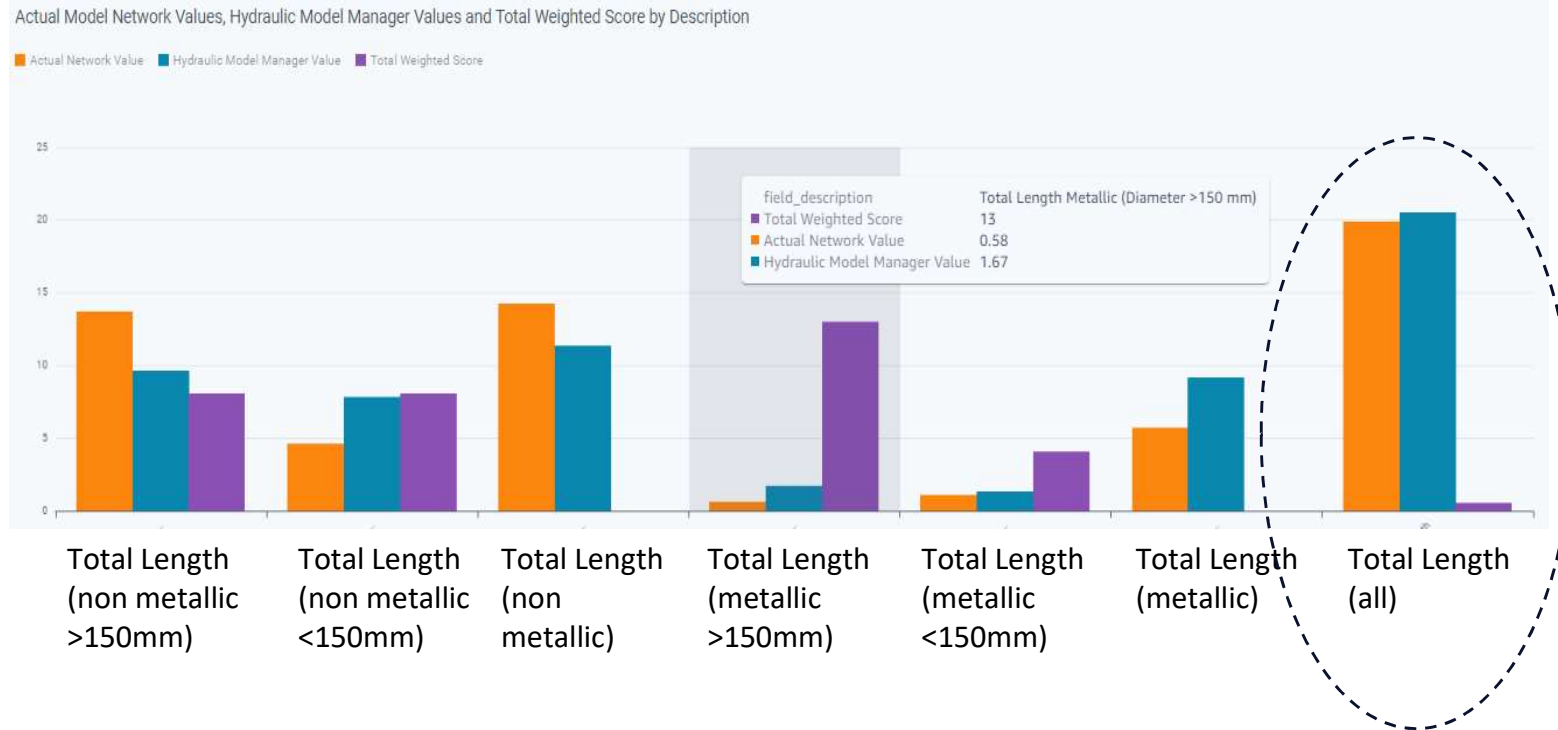
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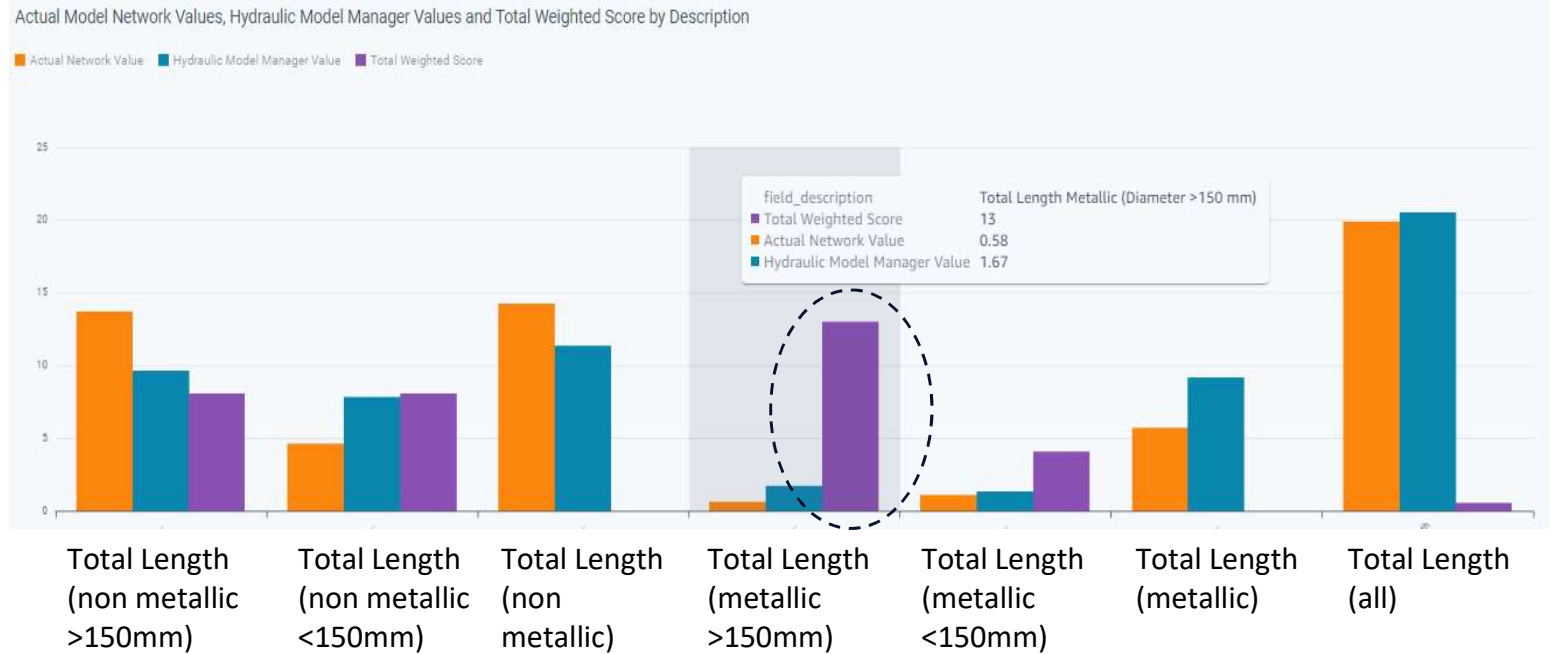
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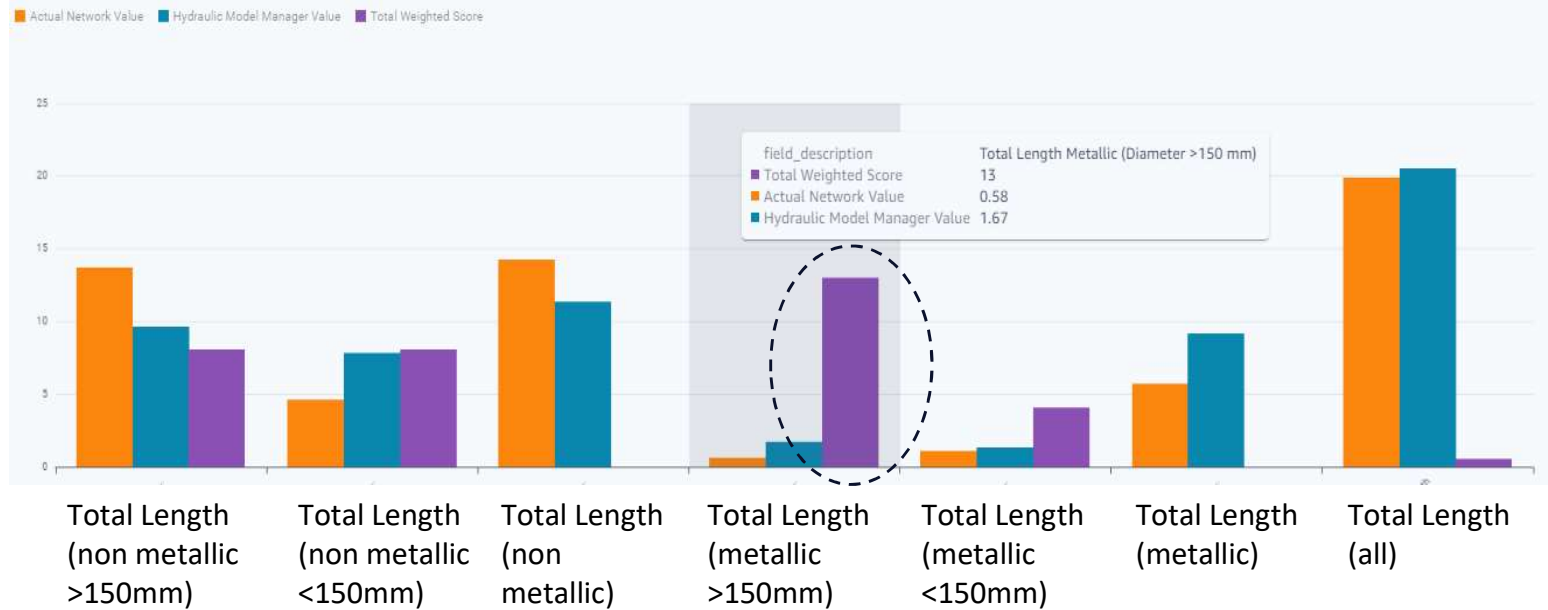
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Actual Model Network Values, Hydraulic Model Manager Values and Total Weighted Score by Description



Infrastructure Or Demand / Calibration (I or D/C)	Model Item	Description	Unit	Value for Network (AMN)	Value for Model (HMM)	Percentage Change	Change Score	Weighting Factor	Final Weighted Score
Infrastructure	Pipes	Total Length	Km	19.87	20.47	2.91	1	1	1
		Total Length Metallic	Km	5.65	9.16	38.31	0	1	0
		Total Length Metallic (Diameter 0-150 mm)	Km	1.06	1.33	20.12	4	1	4
		Total Length Metallic (Diameter >150 mm)	Km	0.58	1.67	65.23	13	1	13
		Total Length Non-Metallic	Km	14.22	11.31	25.77	0	1	0
		Total Length Non-Metallic (Diameter 0-150 mm)	Km	4.59	7.84	41.39	8	1	8
		Total Length Non-Metallic (Diameter >150 mm)	Km	13.64	9.64	41.53	8	1	8

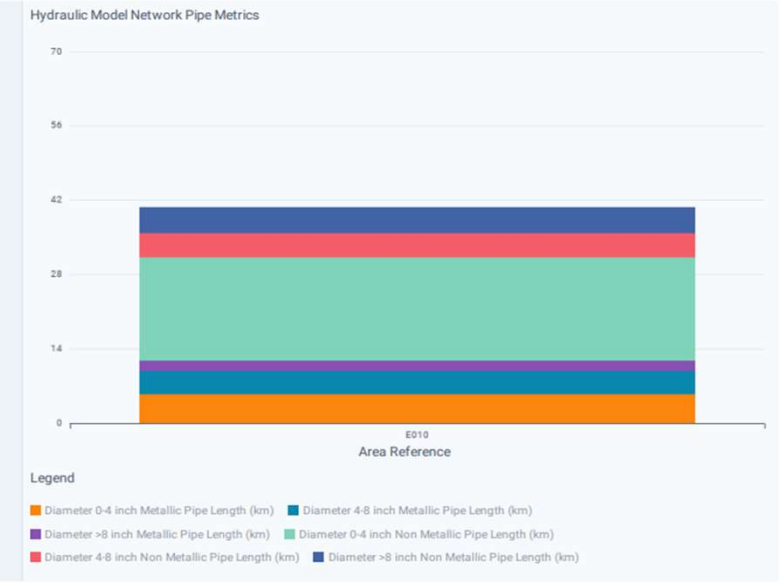
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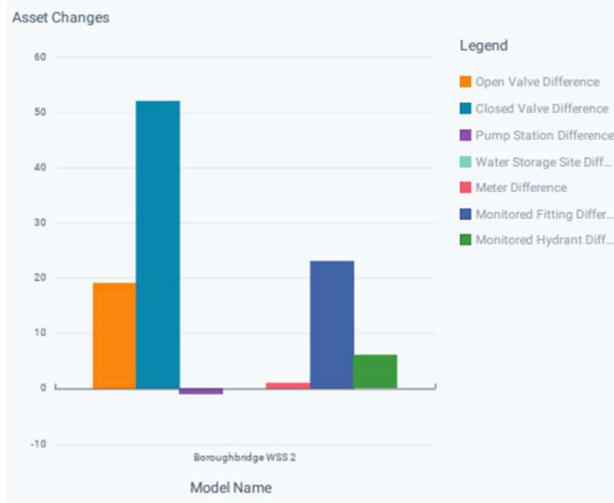
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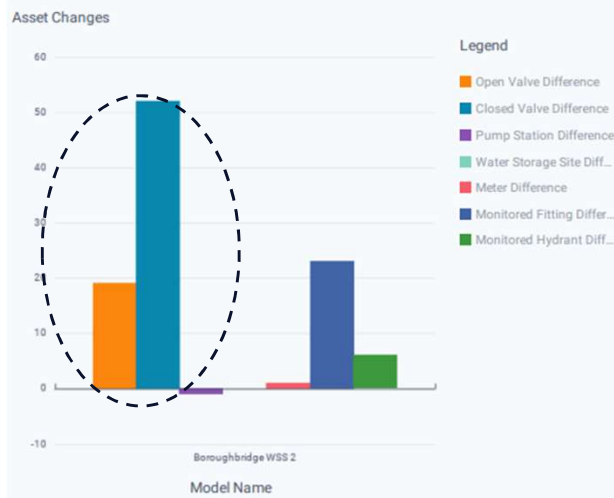
Area Name	Is in Actual Network?	Is in Hydraulic Model Manager?	Changes in No. of Open Valves	Changes in No. of Closed Valves	Changes in No. of Pumping Stations	Changes in No. of Water Storage Sites	Changes in No. of Meters	Changes in No. of Fittings	Changes in No. of Hydrants
CATTAL ...	True	False							
DRUIDS MEADOW (E251) ...	True	False							
MINSKIP (E252) DMA	True	False							
CATTLE HUNTINGORE / ...	False	True							
DUNSFORTH (E083) DMA	True	True	7	2	0	0	1	2	1
KIRBY HILL NO 2 (E027) DMA	True	True	43	5	0	0	1	3	2
MARTON RES 300 ...	True	True	-20	6	0	0	-3	2	0
MARTON RES 7IN ...	True	True	-1	3	0	0	0	2	0
MARTON TOWER (GRAFTO...	True	True	6	2	0	0	0	2	1
MILBY (E082) DMA	True	True	19	1	0	0	1	2	-1
OUSEBURNS (E059) DMA	True	True	13	15	0	0	1	2	0
ROECLIFFE (E081) DMA	True	True	-84	11	0	0	1	2	1
WHIXLEY 5 INCH (E087) ...	True	True	-5	2	-1	0	-1	3	2
WHIXLEY RESERVOIR (E010...	True	True	41	5	0	0	0	3	0



Area Name	Is in Actual Network?	Is in Hydraulic Model Manger?	Changes in No. of Total Properties	Changes in No. of Household Properties	Changes in No. of Non Household Properties	Changes in No. of Continuous Logged User Properties
CATTAL ...	True	False				
DRUIDS MEADOW (E251) DMA	True	False				
MINSKIP (E252) DMA	True	False				
CATTLE HUNTINGORE / ...	False	True				
DUNSFORTH (E083) DMA	True	True	160	132	28	0
KIRBY HILL NO 2 (E027) DMA	True	True	741	721	20	0
MARTON RES 300 ...	True	True	43	42	1	0
MARTON RES 7IN ALDBOROUGH ...	True	True	143	131	12	0
MARTON TOWER (GRAFTON) ...	True	True	116	94	22	0
MILBY (E082) DMA	True	True	219	193	26	0
OUSEBURNS (E059) DMA	True	True	694	615	79	0
ROECLIFFE (E081) DMA	True	True	755	602	153	2
WHIXLEY 5 INCH (E087) DMA	True	True	131	115	16	0
WHIXLEY RESERVOIR (E010) DMA	True	True	1,174	1,023	151	0

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- 4) Model Health Tool
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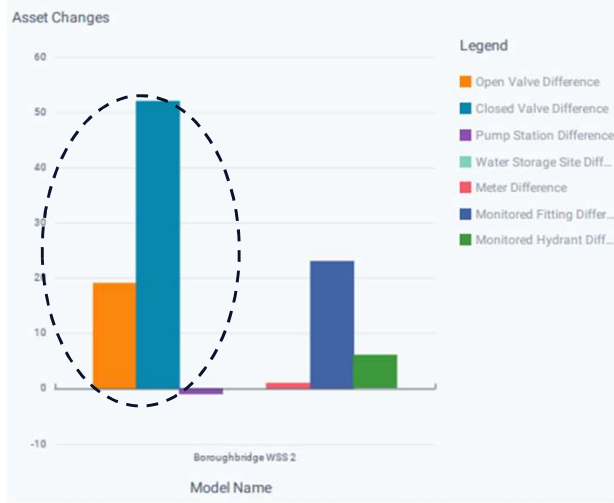
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MARTON RES 300 ...	True	True	20	6	0	0	-3	2	0
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ROECLIFFE (E081) DMA	True	True	84	11	0	0	1	2	1
WHIXLEY 5 INCH (E087) ...	True	True	3	2	-1	0	-1	3	2
WHIXLEY RESERVOIR (E010...	True	True	41	5	0	0	0	3	0



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- Assessing and scoring model confidence can be a challenge
- There is a benefit to a more consistent and robust approach
- The model data health check dashboard is starting to be used by Yorkshire Water to get a metric of confidence when using the models operationally
- As we learn more about how we want to weight the scores across our supply systems, and get more models build in HMM, the health scores will help guide model maintenance and assist in the decision making process around when to get a model rebuilt or recalibrated



Thanks for listening

Any questions?



YorkshireWater