Appendix 1.1.D - Willingness to pay research 1 - Accent

Wessex Water

September 2018

Wessex Water
YTL GROUP

Business plan section		Supporting document	
	Board vision and executive summary		
1	Engaging customers	**1.1**	**Summary of research findings**
		1.2	Communications strategy
		1.3	Customer participation and behavioural engagement strategy
2	Addressing affordability and vulnerability		
3	Delivering outcomes for customers		
4	Securing long term resilience		
5	Markets & innovation: wholesale		
6	Markets & innovation: open systems & DPC		
7	Markets & innovation: retail		
8	Securing cost efficiency		
9	Aligning risk and return		
10	Financeability		
11	Accounting for past delivery		
12	Securing trust, confidence and assurance		
13	Data tables and supporting commentaries		

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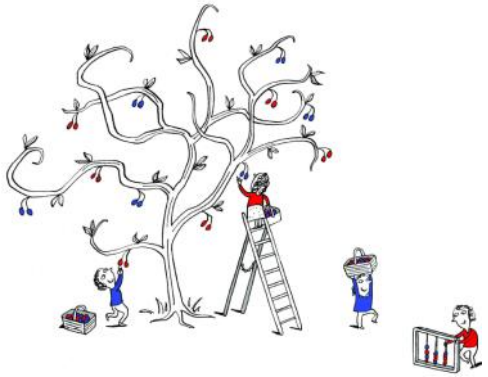

Customer Valuation Research (PR19)

WTP and Stage 2 Results

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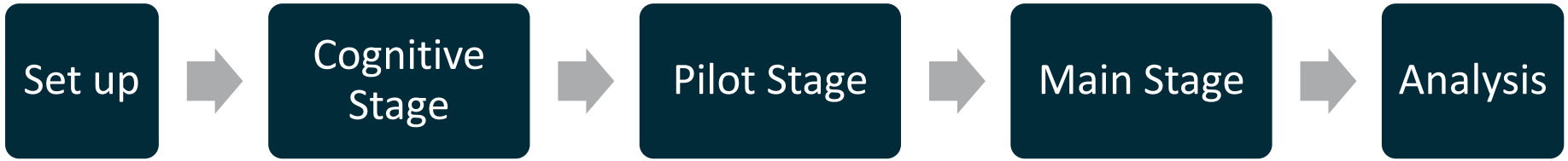
June 2017

1 Stage 1: Willingness to Pay

A mixed-methodology research programme

HH – household NHH – non-household



10 x cognitive depth interviews:

- 5 x HH
- 5 x NHH

PR14 approach:

- 411 x HH (online)

PR19 approach:

- 241 HH (online/F2F)
- 50 x NHH

2,165 x HH interviews (online/F2F):

- 800 x dual supply
- 1,365 x single supply

650 x NHH interviews (CATI):

- 300 x dual supply
- 350 x single supply

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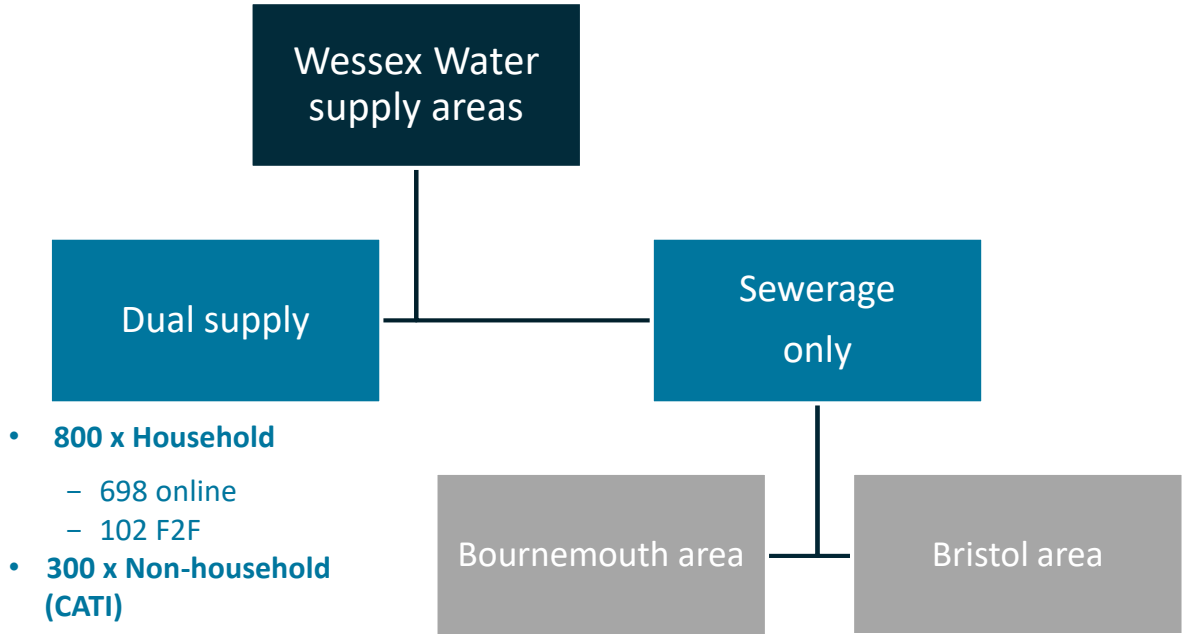
Three supply areas covered



- **800 x Household**
  - 698 online
  - 102 F2F
- **300 x Non-household (CATI)**

- **247 x Household (online)**
- **50 x Non-household (CATI)**

- **1,116 x Household**
  - 1,016 online
  - 100 x F2F
- **300 x Non-household (CATI)**

Weighting was applied to SEG, age and gender variables

		Dual supply		Sewerage only (Bournemouth area)		Sewerage only (Bristol area)	
Variable		**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**
SEG	**AB**	48%	**27%**	50%	**27%**	49%	**27%**
	C1	15%	**26%**	22%	**26%**	20%	**27%**
	C2	8%	**20%**	8%	**19%**	8%	**20%**
	DE	21%	**20%**	13%	**20%**	16%	**20%**
	Prefer not to say	7%	**7%**	8%	**8%**	7%	**7%**
Age	**18-34**	13%	**14%**	19%	**14%**	23%	**15%**
	35-54	32%	**33%**	30%	**30%**	29%	**32%**
	55+	47%	**45%**	42%	**46%**	41%	**46%**
	Prefer not to say	8%	**8%**	9%	**9%**	7%	**7%**
Gender	**Female**	46%	**50%**	46%	**50%**	49%	**50%**
	Male	52%	**48%**	53%	**49%**	49%	**48%**
	Prefer not to say	2%	**2%**	1%	**1%**	2%	**2%**

Vulnerable customers

- Face-to-face interviews were undertaken with vulnerable and harder to reach customer groups:
  1. Customers who are long term unemployed or living on the state pension (social group E) – **very low income**
  2. Customers who do not have access to the Internet (either at home, on a mobile or at work) – **disconnected**
  3. Customers who are 70 years or older and unlikely to be digitally engaged – **age disconnected**
  4. Customers who are unlikely to complete and engage with an online survey due to literacy issues – **literacy**
  5. **Bristol area only:** Customers whose first language is Somali or any other non-English (interview conducted in English) – **language**

Profile of vulnerable customers

	Dual supply	Single supply, Bristol area
Area	**Number of interviews**	
Very low income	44	31
Disconnected	13	14
Age disconnected	27	18
Literacy	18	26
Language	n/a	11
Total	**102**	**100**

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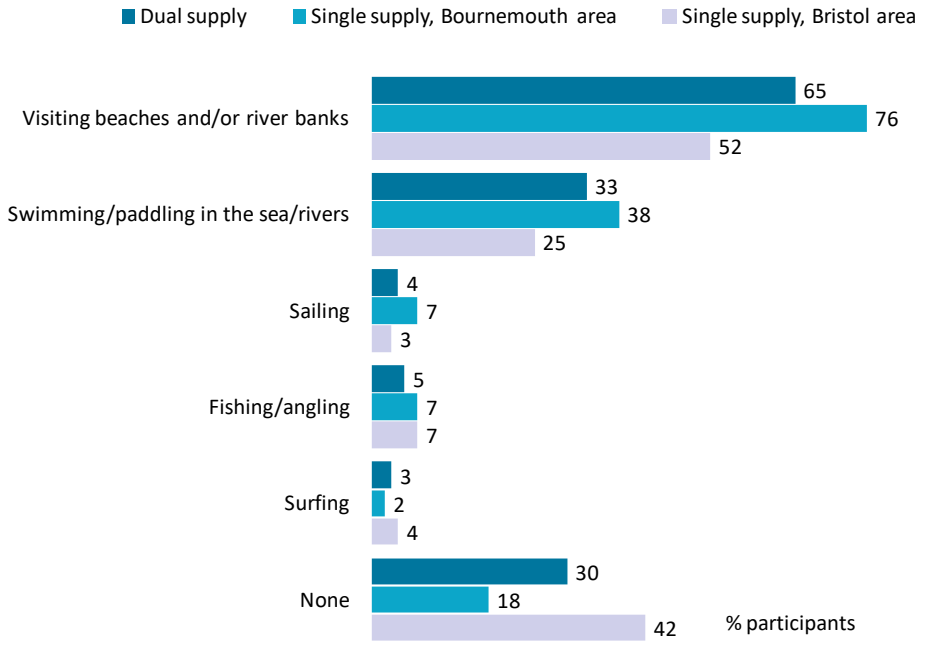
The majority of customers take part in water-related activities; most commonly visiting beaches and/or river banks



Base: All participants (Dual supply=800; Bournemouth=249; Bristol=1,116)

Stated Preference

Our approach to SP design moved forward from PR14

LEARNING FROM PR14	INNOVATION FOR PR19
Questions could be overly complex in customer valuation surveys – trading off very small risks against one another is difficult to do reliably	■ Developed a new simplified question format – MaxDiff (Best Worst Scaling)
Assigning monetary value was complex and time consuming	■ Simplified the way that monetary value is derived, requiring only a limited range of alternatives to be presented using a package approach
Questionnaire formats unfriendly and complex	■ Bespoke questionnaire design including client branding and gamification

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Quantitative innovation

LEARNING FROM PR14

INNOVATION FOR PR19

	OPTION A	OPTION B
AN UNEXPECTED INTERRUPTION to the water supply at your property lasting between 6-12 hours. The chance that this happens at your property in any one year	**5 in 1,000**	**1 in 1,000**
THE WATER AT YOUR PROPERTY HAS A TASTE AND ODOUR that is not ideal for a week at a time, but it is safe to drink. The chance that this happens at your property in any one year	**10 in 1,000**	**8 in 1,000**
THE WATER IS DISCOLOURED AT YOUR PROPERTY for a week at a time, but it is safe to drink. Running the tap for several minutes will not remove the discolouration. The chance that this happens at your property in any one year	**15 in 1,000**	**12 in 1,000**
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL to provide the service quality above. The new bill level will also apply in all later years.	**Increase of £5 each year for 5 years, from £350 in 2015 to £375 by 2020**	**Increase of £10 each year for 5 years, from £350 in 2015 to £400 by 2020**

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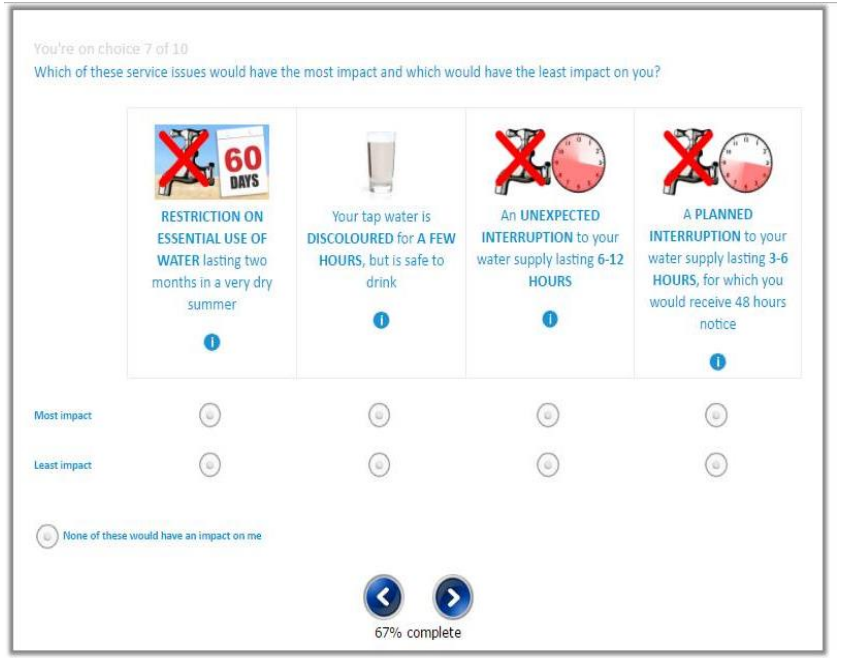
The advantages of MaxDiff

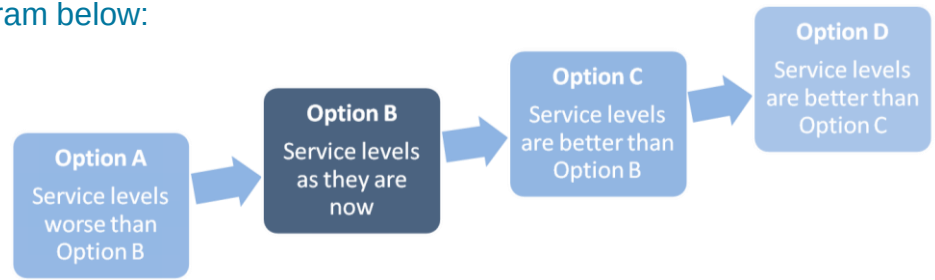
MaxDiff provides a quantitative measure of which 'service failure' types customers feel have most or least impact



- ✓ Extremely well suited to obtaining quantitative measures of relative preference between a list of on-off type features
- ✓ Questions much simpler
- ✓ Can handle large numbers of features
- ✓ Allows fewer SP exercises
- ✓ Allows room for other information
- ✓ Utilities derived for each attribute
- ✓ Improves sensitivity to scope

Example package choice ladder

On the next screen you will be asked to choose between two options at a time. In each option the level of service you receive will differ as outlined in the diagram below:



The level of service you would receive in each option will affect your bill as follows:

- In **Option B** there would be either no change in your bill, a bill decrease or a bill increase
- In **Option A** your bill would be **lower** than in Option B.
- In **Option C** your bill would be **higher** than in Option B.
- Finally, in **Option D** your bill would be **higher** than in Option C.

When making your choices between the different options please bear in mind the following:

- When thinking about the changes in the bill amount please consider this in relation to other things you may want to spend money on and
- That your bill will increase by the same amount each year for the next 5 years and stay the same after that (it will not drop back to the level it is now)

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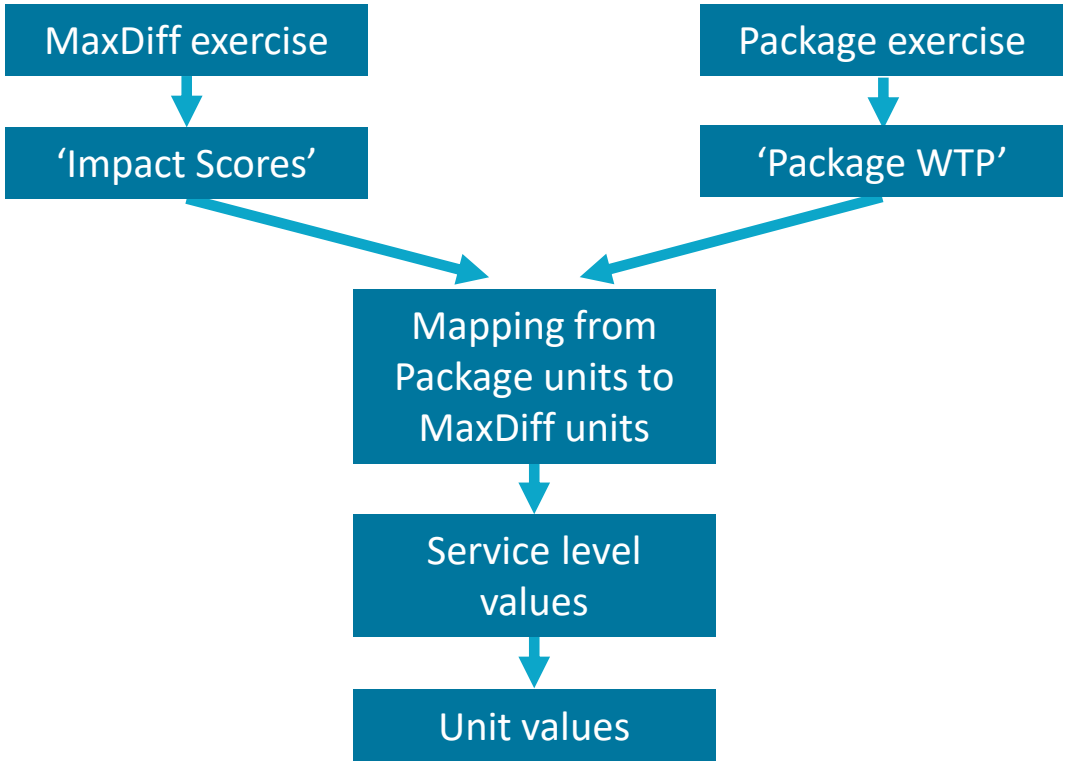
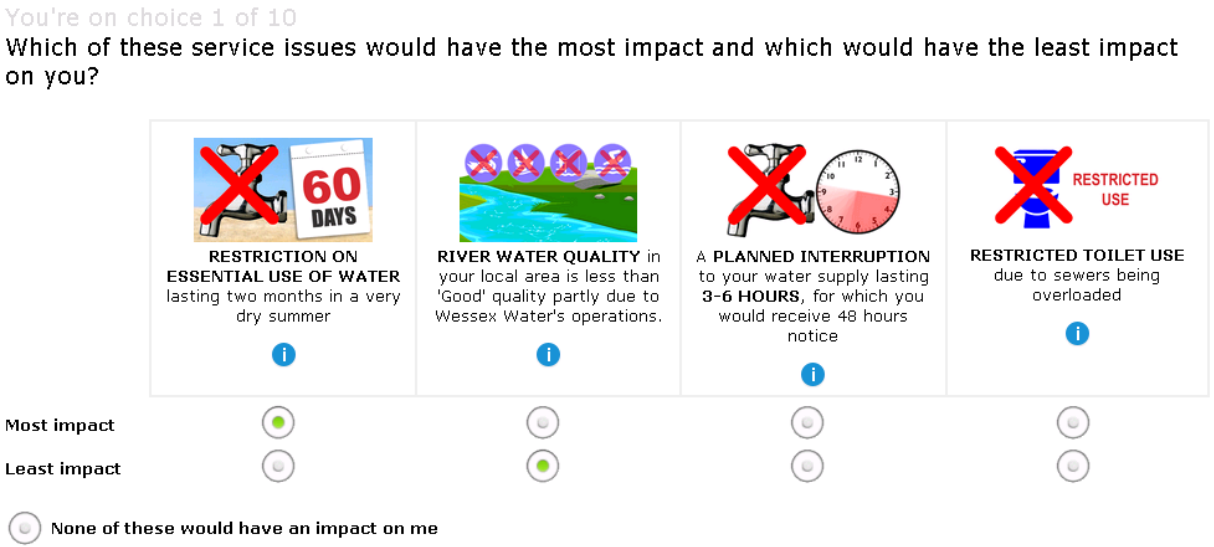
Stage 1 SP Design Overview

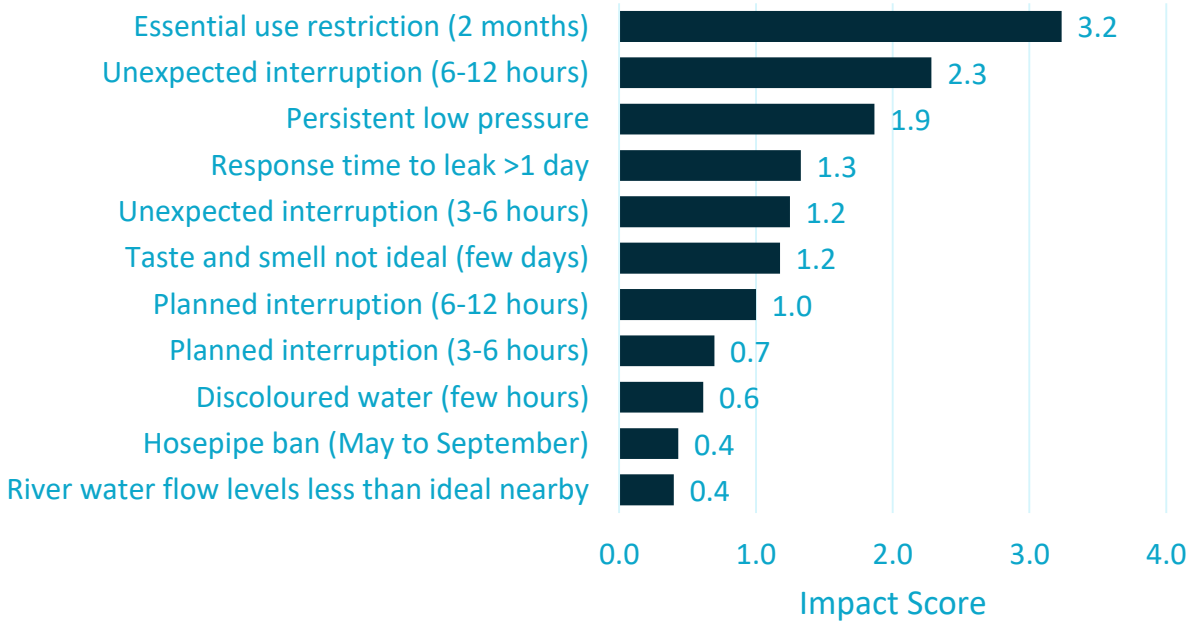


‘MaxDiff’ exercise measures the relative impact on customers of different types of service issue



- 10 choices per person
- Different set of 4 service issues each time
- (i) buttons giving more info about each one.

Across all water service issues, ‘Essential use restrictions (2 months)’ was found to have the highest impact on households…



- … followed by ‘Unexpected interruption (6-12 hours)
- The lowest impact was attributed to ‘River water flow levels less than ideal nearby’

Across wastewater service issues, ‘Sewer flooding inside your property’ was found to have the highest impact on households…

Very similar findings for Bournemouth, Bristol and Dual service customers, although Bournemouth customers value bathing water quality higher and sewer flooding lower.

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‘Package’ exercise measures the trade-off between overall service improvement and bills

In the first set of options, Option B represents current service levels with a bill decrease of £10.33 by 2024 and Option C represents an improvement in every area with a bill decrease of £6.20 by 2024.

Which option do you prefer, B or C?

	Option B (Current)	Option C
Service incidents at customers' properties (number affected per year)		
• Supply interruptions (lasting an average of 6 hours)	34,732	27,786
• Discoloured water (few days)	1,217	1,100
• Non ideal taste and odour (few days)	513	460
• Occasional low water pressure	2,233	2,010
• Restricted toilet use due to sewers being overloaded	1,410	1,269
• Sewer flooding inside customers' properties	180	162
• Sewer flooding outside customers' properties	2,186	1,968
Other service measures		
• Sewer flooding in public areas (no. incidents per year)	1,517 incidents	1,365 incidents
• Hosepipe bans (how often these can be expected)	1 every 15 years	1 every 20 years
• Restrictions on essential use of water (how often can these be expected)	1 every 100 years	1 every 500 years
• Planned and unplanned works which may cause road & traffic disruptions (no. calls/written complaints per year)	262 complaint calls or written complaints	230 complaint calls or written complaints
Environmental measures		
• Miles of river at less than good status (out of 2,429 miles in total)	534 miles	369 miles
• Sites where dilute sewage spills into rivers and estuaries	264 sites	198 sites
• Bathing waters at less than good status (out of 47 in total)	4 bathing waters	3 bathing waters
• Bathing waters at good but not excellent (out of 47 in total)	10 bathing waters	5 bathing waters
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	**Decrease of £10.33 by 2024** **Gradual decrease of £2.07 every year between 2019 and 2024**	**Decrease of £6.20 by 2024** **Gradual decrease of £1.24 every year between 2019 and 2024**

- 4 choices per person:
  - Base vs ‘+1’ improvement
  - Base vs ‘-1’ deterioration
  - ‘+1’ vs ‘+2’ improvements
  - Base vs ‘+2’ improvement
- Bill changes vary across respondents, but don’t change for the same option for the same person across questions.

Package levels – water service

	Option A	Option B (Current)	Option C	Option D
Supply interruptions (lasting an average of 6 hours)	30,500	24,000	17,000	10,000
Discoloured water (few days)	7,560	6,500	5,850	3,900
Non ideal taste and odour (few days)	1,744	1,500	1,350	900
Persistent low water pressure	150	130	50	0
Response time for fixing leaks (proportion fixed within 1 day)	66%	90%	95%	99%
Hosepipe bans (chance per year)	HH: 1 in 50 NHH: 1 in 100	HH: 1 in 100 NHH: 1 in 200	HH: 1 in 200 NHH: 1 in 500	HH: 1 in 500 NHH: 1 in 1000
Restrictions on essential use of water (chance per year)	1 in 100	1 in 200	1 in 500	1 in 1000
Miles of river with less than ideal flow levels (out of 1,641 miles in total)	31 miles	17 miles	7 miles	0 miles

Package levels – water service (Bristol customers)

	Option A	Option B (Current)	Option C	Option D
Supply interruptions (lasting an average of 6 hours)	41,678	34,732	27,786	20,839
Discoloured water (few days)	1,340	1,217	1,100	850
Non ideal taste and odour (few days)	565	513	460	360
Persistent low water pressure	2,456	2,233	2,010	1,563
Hosepipe bans (chance per year)	1 in 10	1 in 15	1 in 20	1 in 25
Restrictions on essential use of water (chance / year)	1 in 100	1 in 100	1 in 500	Never
Planned and unplanned works which may cause road & traffic disruptions	290 instances	262 instances	230 instances	180 instances

Package levels – wastewater service

	Option A	Option B (Current)	Option C	Option D
Restricted toilet use due to sewers being overloaded	1,551	1,410	1,269	1,057
Sewer flooding inside customers' properties	198	180	162	135
Sewer flooding outside customers' properties	2,405	2,186	1,968	1,640
Sewer flooding in public areas	1,668	1,517	1,365	1,137
Miles of river at less than good status (out of 2,429 miles in total)	990 miles	534 miles	369 miles	0 miles
Sites where dilute sewage spills into rivers and estuaries	264 sites	264 sites	198 sites	0 sites
Bathing waters at less than good status (out of 47 in total)	6 bathing waters	4 bathing waters	3 bathing waters	0 bathing waters
Bathing waters at good but not excellent (out of 47 in total)	15 bathing waters	10 bathing waters	5 bathing waters	0 bathing waters

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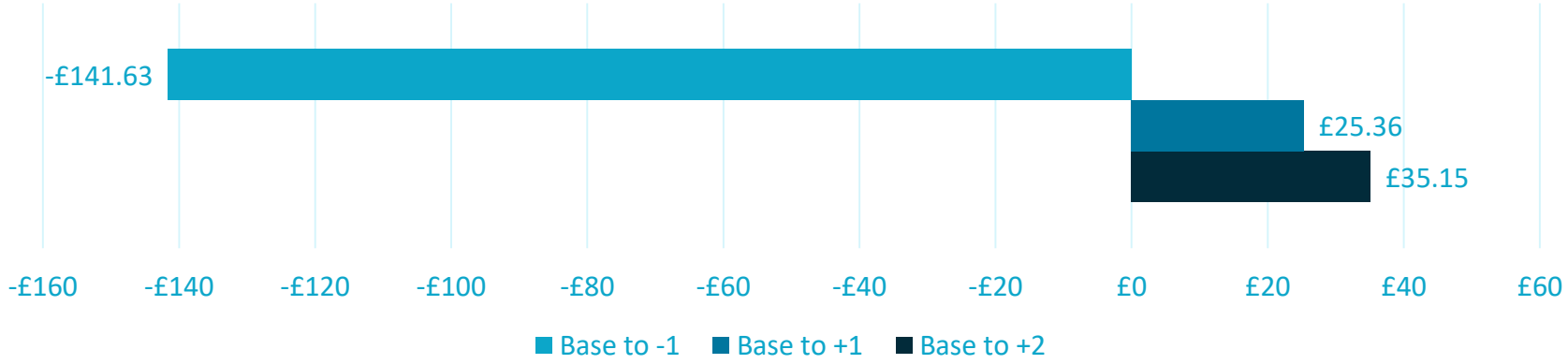
Household package values (£/hh/year) in line with PR14



- Customers highly averse to deteriorations (-£141.63)
- For comparison, PR14 ‘Base to +1’ was £24.01/hh/year for Wessex, and £27.10 on average across sector

Package to MaxDiff mapping (water service)

Package unit (water service)	MaxDiff unit (water service)	Maxdiff units per package unit	
		Dual	Bristol
Response time for fixing leaks (proportion fixed within 1 day)	RESPONSE TIME to fix a leaking water main pipe near your property is longer than than 1 day	24,000(1)	-
Hosepipe bans (chance/year)	A HOSEPIPE BAN lasting from May to September	591,518(2)	550,470(2)
Restrictions on essential use of water (chance/year)	RESTRICTION ON ESSENTIAL USE OF WATER lasting two months in a very dry summer	591,518(2)	550,470(2)
Miles of river with less than ideal flow levels (out of 1,641 miles in total)	RIVER WATER FLOW LEVELS in a nearby river are lower than ideal partly due to Wessex Water's operations.	360(3)	-
Planned and unplanned works which may cause road & traffic disruptions	Planned and unplanned WORKS of any duration in the Bristol Water area which may cause ROAD AND TRAFFIC DISRUPTIONS	-	5,990(4)

Notes on mapping values: *(1) Based on 2000 leaks per year, each affecting 12 properties; (2) No. water customers; (3) Based on 1% of river local to 1% of properties (water area), ie No. customers/River miles in water supply area; (4) Based on one vehicle journey per day on A roads is equivalent to one person affected in total by Bristol Water works.*

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Package to MaxDiff mapping (wastewater service)

Package unit (wastewater service)	MaxDiff unit (wastewater service)	Maxdiff units per package unit
Sewer flooding in public areas (no./year)	SEWER FLOODING IN A NEARBY PUBLIC AREA	4(1)
Sites where dilute sewage spills into rivers and estuaries	DILUTE SEWAGE occasionally spills from a Wessex Water pipe into a nearby river or estuary	305(2)
Bathing waters at less than good status (out of 47 in total)	BATHING WATER QUALITY at your nearest beach is 'Sufficient' but not 'Good' quality partly due to Wessex Water's operations .	25,404(3)
Bathing waters at good but not excellent status (out of 47 in total)	BATHING WATER QUALITY at your nearest beach is 'Good' but not 'Excellent' quality partly due to Wessex Water's operations.	25,404(3)
Miles of river at less than good status (out of 2,429 miles in total)	RIVER WATER QUALITY in your local area is less than 'Good' quality partly due to Wessex Water's operations.	492(4)

Notes on mapping values: *(1) Based on 4 properties affected per incident; (2) Based on 1km of river affected by each incident, and 1% of river local to 1% of properties (wastewater area), ie 1*No. customers/River km in wastewater supply area; (3) Based on 1% bathing waters local to 1% of properties (wastewater area), ie No. customers/No. bathing waters; (4) Based on 1% of river local to 1% of properties (wastewater area), ie No. customers/River miles in wastewater supply area*

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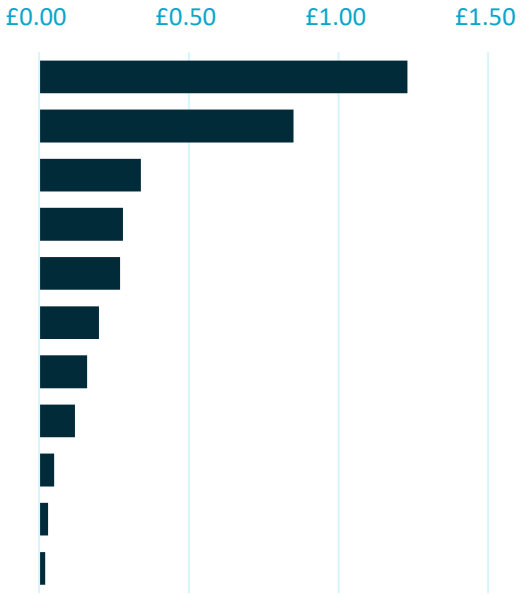
Household service level values (Water service)

Service Attribute	Unit	Level of Service		WTP (£/hh/yr)
		Base	+1	
Restrictions on essential use of water	chance / year	1 in 200	1 in 500	£1.23
Planned interruptions (3-6 hours)	props/yr	14,000	8,250	£0.85
Response time for fixing leaks	% fixed within 1 day	90%	95%	£0.34
Miles of river with less than ideal flow levels	miles	16	7	£0.28
Hosepipe bans	chance / year	1 in 100	1 in 200	£0.27
Unexpected interruptions (3-6 hours)	props/yr	8,000	7,250	£0.20
Discoloured water (few days)	cases/yr	6,500	5,850	£0.16
Unexpected interruptions (6-12 hours)	props/yr	1,000	750	£0.12
Planned interruptions (6-12 hours)	props/yr	1,000	750	£0.05
Persistent low water pressure	props/yr	130	50	£0.03
Non ideal taste and odour (few days)	cases/yr	1,500	1,350	£0.02



Amongst water service Base to '+1' improvements, households valued the reduced chance of 'Restrictions on essential use of water' the highest.

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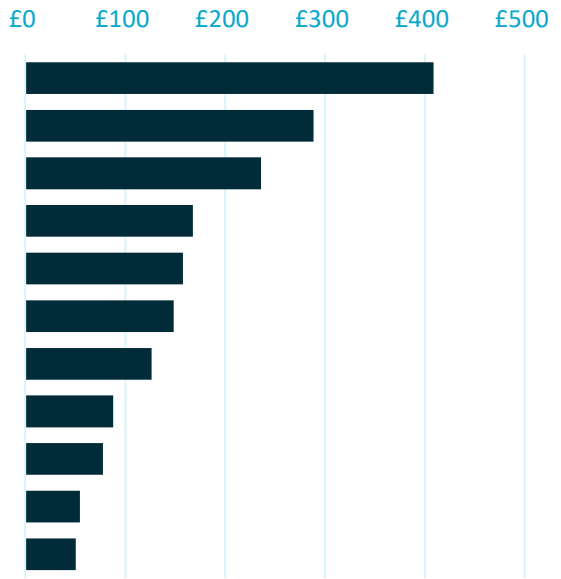
Household unit values (water service)

Service Attribute	Unit	HH WTP (£/year/unit)		
		PR19	PR14 Wessex	PR14 Sector
Essential use restriction (2 months)	property	£408.6		-
Unexpected interruption (6h-12h)	property	£288.4	-	£863.2
Persistent low pressure	property	£235.9	-	£12,375.0
Response time to leak >1 day	1 leak/prop. 'nearby'	£167.9	-	-
Unexpected interruption (3h-6h)	property	£157.8	£83.0	£477.0
Taste and smell not ideal (few days)	property	£148.6	£196.0	£7,977.0
Planned interruption (6h-12h)	property	£126.3	-	£1,360.0
Planned interruption (3h-6h)	property	£87.9	£19.0	£169.0
Discoloured water (few hours)	property	£77.6	£109.0	£2,913.0
Hosepipe ban (May to Sept)	property	£54.6	£5.0	£43.0
River water flows <'ideal' to 'ideal'	1 mile river/prop. 'nearby'	£50.5	£0.1*	



Note: 'Nearby' defined differently, so numbers are not comparable.

Compared to PR14: big increases for hosepipe ban (now closer to PR14 average), moderate increases for supply interruptions, and moderate decreases for discoloured water and taste and smell.

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River water flows values are closer to PR14 sector average

Service Attribute	Unit	HH WTP (£/year/unit)		
		PR19	PR14 Wessex	PR14 Sector
River water flows <'ideal' to 'ideal'	1 mile river/prop. 'nearby'	£50.5	£0.1	
	1 km river	£11,297		£62,225

Note: PR14 Wessex value defines 'nearby' as within 30 miles; PR19 value based on 1% of river local to 1% of properties (in water supply area), which implies 360 properties per mile.

- River water flows values are actually substantially lower than PR14 sector average, despite the apparently large increase over PR14 Wessex values.

The apparent big increase for river water flows actually masks a relatively low value in comparison to the PR14 sector average.

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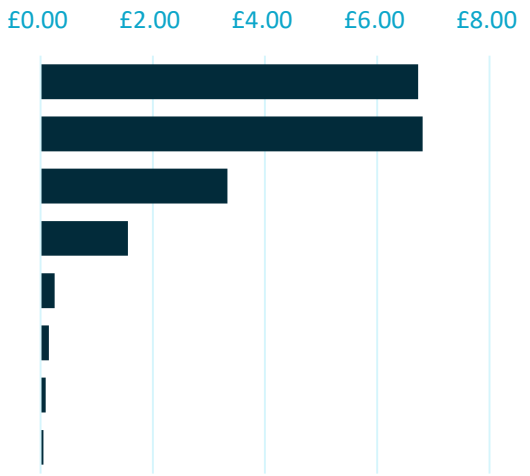
Household service level values (Wastewater service)

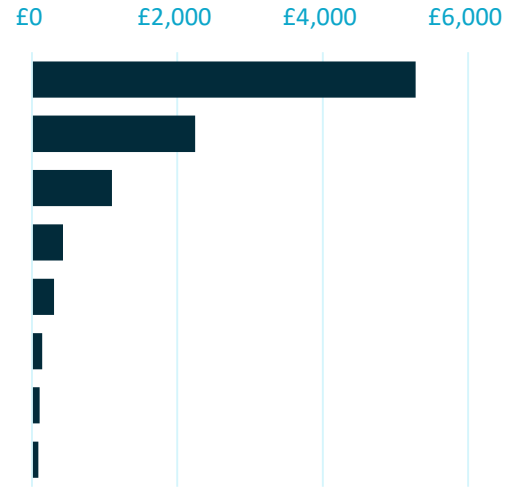
Service Attribute	Unit	Level of Service		WTP (£/hh/yr)
		Base	+1	
Bathing waters at good but not excellent	bathing waters	10	5	£6.81
Miles of river at less than good status	miles	534	369	£6.73
Sites where dilute sewage spills into rivers & estuaries	improved CSOs	0	66	£3.33
Bathing waters at less than good status	bathing waters	4	3	£1.56
Sewer flooding outside customers' properties	incidents/yr	2,186	1,968	£0.25
Sewer flooding in public areas	incidents/yr	1,517	1,365	£0.15
Restricted toilet use due to sewers being overloaded	incidents/yr	1,410	1,269	£0.09
Sewer flooding inside customers' properties	incidents/yr	180	162	£0.05



Amongst wastewater service Base to '+1' improvements, households found to value Bathing water quality the highest followed by River water quality

Household unit values (Wastewater service)

Service Attribute	Unit	HH WTP (£/year/unit)		
		PR19	PR14 Wessex	PR14 Sector
Sewer flooding inside your property	property	£5,280	£367,291	£138,775
Sewer flooding immediately outside	property	£2,243	£12,400	£8,029
Restricted toilet use	property	£1,098		
Sewer flooding in a nearby public area	property 'nearby'	£427		
Dilute sewage occasionally spills nearby	property 'nearby'	£302		
River water quality <'Good' to 'Good'	1 mile/prop 'nearby'*	£138	£0.02	
Bathing water 'Sufficient' to 'Good'	1 beach/prop 'nearby'*	£104	£0.43	
Bathing water 'Good' to 'Excellent'	1 beach/prop 'nearby'	£85		



Note: 'Nearby' defined differently, so numbers are not comparable.

In comparison to PR14, there are big decreases for sewer flooding.

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RWQ and BWQ values aren't so far out of line with PR14 sector averages

Service Attribute	Unit	HH WTP (£/year/unit)		
		PR19	PR14 Wessex	PR14 Sector
River water quality <'Good' to 'Good'	1 mile/prop 'nearby'	£138	£0.02	
	1 km	£42,191		£67,295
Bathing water 'Sufficient' to 'Good'	1 beach/prop 'nearby'	£104	£0.43	
	1 beach	£2,642,016		£513,695
Bathing water 'Good' to 'Excellent'	1 beach/prop 'nearby'	£85		
	1 beach	£2,159,340		£392,142

- River water quality values are actually lower than PR14 sector average (and NWEBS), despite the large apparent increase over PR14 Wessex values.
- Bathing water quality values still look fairly high against PR14 sector average, but by less so than when compared to PR14 Wessex values

In comparison to PR14 sector averages, values for river and bathing water quality seem more reasonable.

Accent

Some considerations regarding the differences from PR14

Key differences from PR14

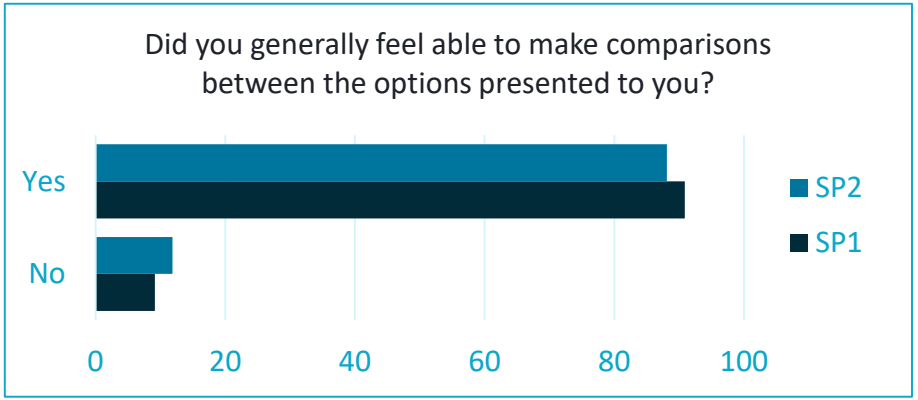
- Big increases in unit values for:
  - Hosepipe bans
  - And, although not directly comparable:
    - River water flows
    - River water quality
    - Bathing water quality
- Big decreases in unit values for:
  - Sewer flooding

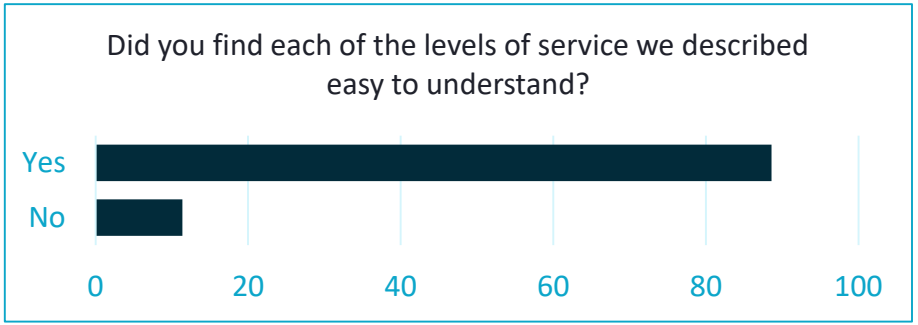
Explanation

- PR19 approach is much more sensitive to scale, by construction.
  - PR14 approach probably:
    - over-valued attributes with small risk reductions (e.g. sewer flooding), and
    - under-valued attributes affecting lots of customers (e.g. environmental)
- Caution:
  - PR19 values are sensitive to the scaling factors used in mapping Package units to MaxDiff units, and these can be debated

Accent

Survey performance statistics were good for an SP survey

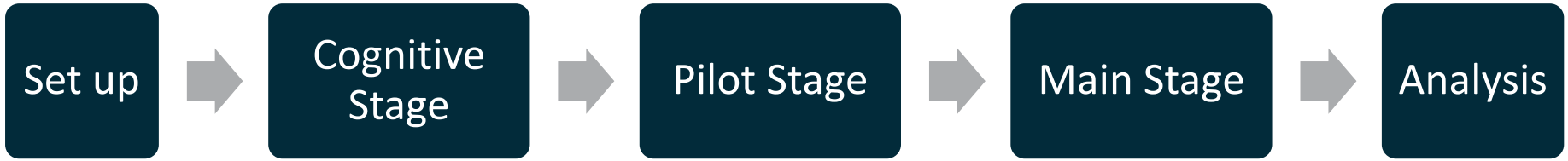




- The vast majority generally felt able to make comparisons in the SP exercises
- The vast majority found each of the levels easy to understand.

2 Stage 2: WRMP

A mixed-methodology research programme



10 x cognitive depth interviews:

- 5 x HH
- 5 x NHH

126 x interviews:

- 76 HH (online/F2F)
- 50 x NHH

- **952 x interviews:**
- 652 x HH interviews (online/F2F)
- 300 x NHH interviews (CATI)

Same weighting principles applied as with Stage 1
And similar results seen for the water activity questions

Accent

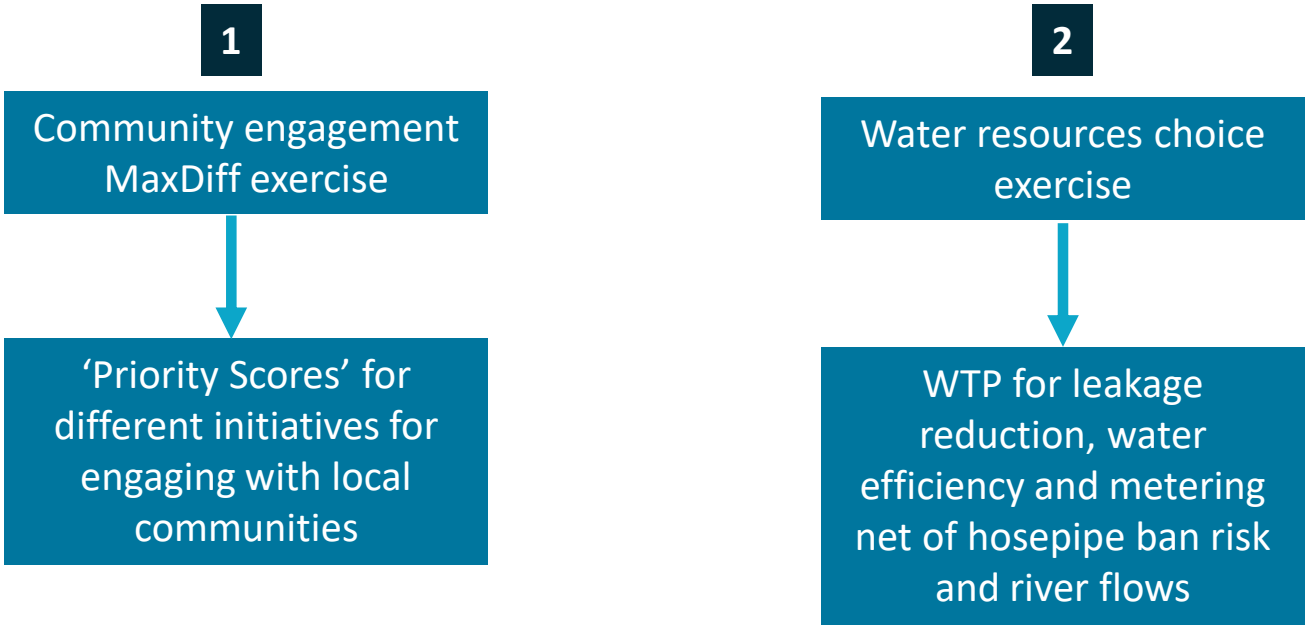
Vulnerable customers

- Face-to-face interviews were undertaken with vulnerable and harder to reach customer groups:
  1. Customers who are long term unemployed or living on the state pension (social group E) – **very low income**
  2. Customers who do not have access to the Internet (either at home, on a mobile or at work) – **disconnected**
  3. Customers who are 70 years or older and unlikely to be digitally engaged – **age disconnected**
  4. Customers who are unlikely to complete and engage with an online survey due to literacy issues – **literacy**

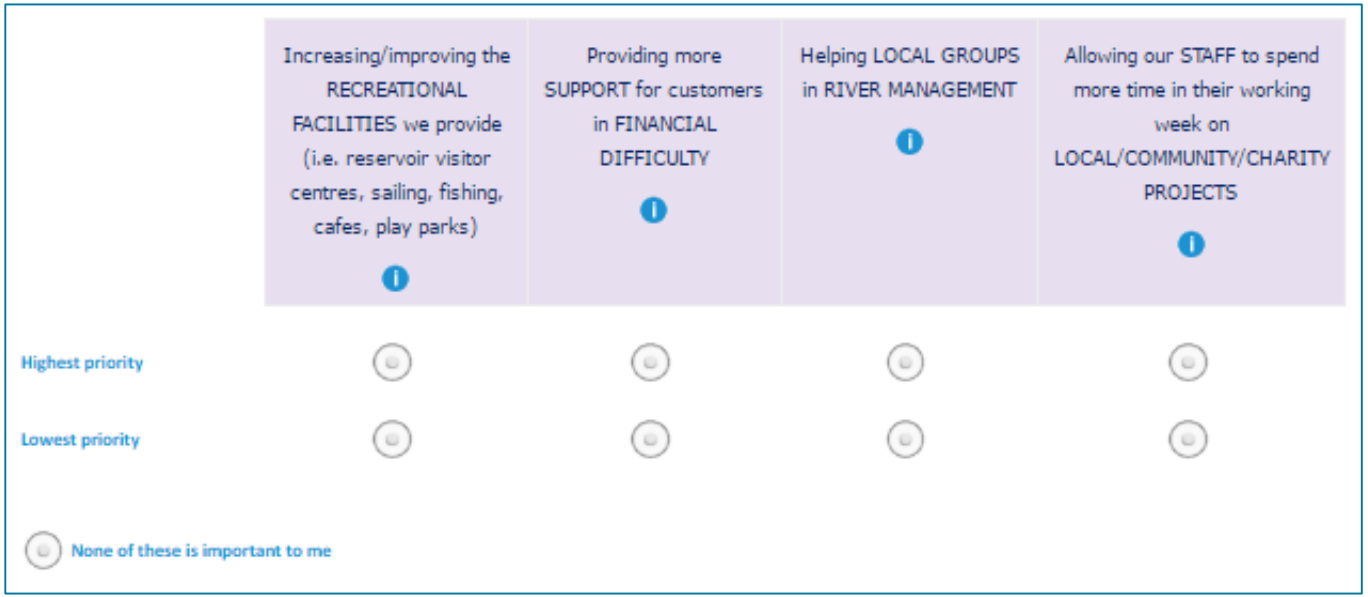
Profile of vulnerable customers

	Dual supply
Very low income	29
Disconnected	12
Age disconnected	28
Literacy	31
Total	**100**

Stage 2 SP Design Overview

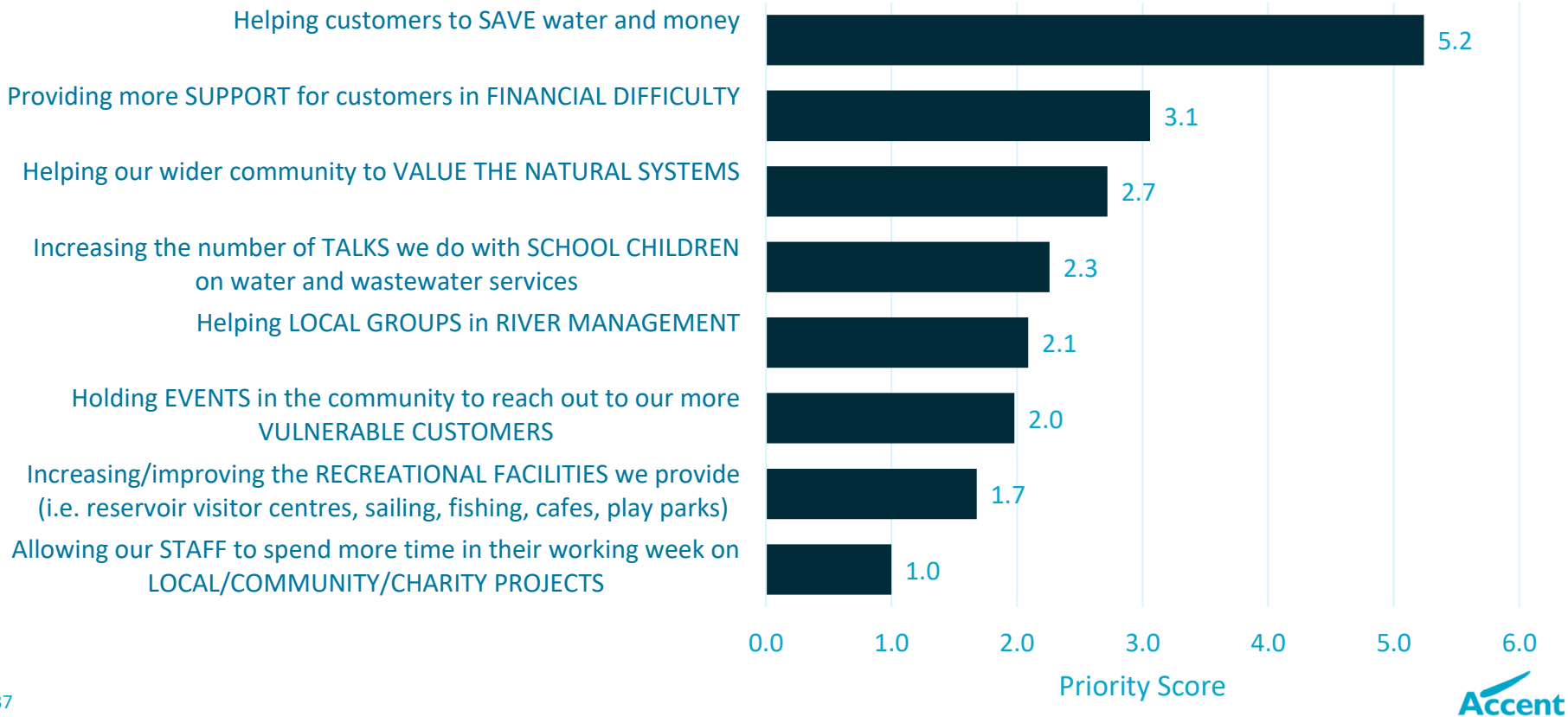


‘MaxDiff’ exercise measures the relative priority customers would give to different community engagement initiatives

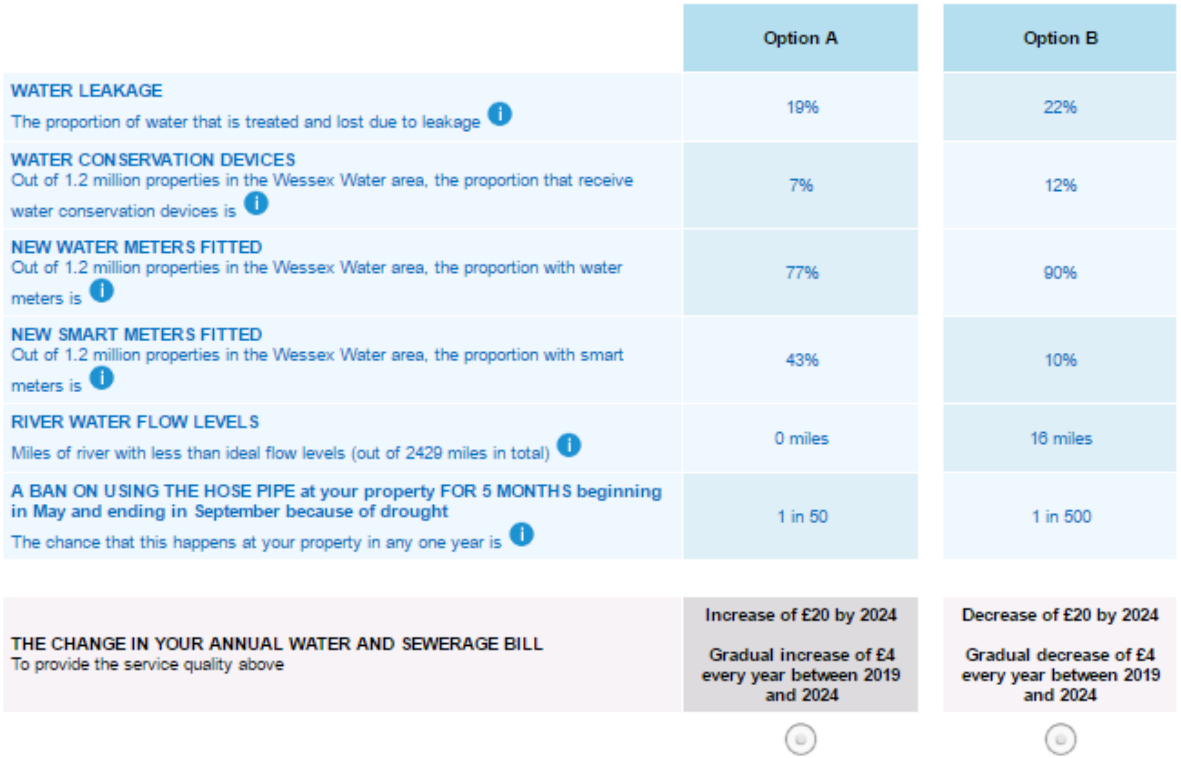


- 6 questions like this per respondent, with different set of 4 each time.
- (i) buttons provide more information on each initiative

Customers wanted highest priority to be ‘Helping customers to save water and money’



Water resources choice exercise measures preferences for different water resource plan attributes



	Option A	Option B
WATER LEAKAGE The proportion of water that is treated and lost due to leakage	19%	22%
WATER CONSERVATION DEVICES Out of 1.2 million properties in the Wessex Water area, the proportion that receive water conservation devices is	7%	12%
NEW WATER METERS FITTED Out of 1.2 million properties in the Wessex Water area, the proportion with water meters is	77%	90%
NEW SMART METERS FITTED Out of 1.2 million properties in the Wessex Water area, the proportion with smart meters is	43%	10%
RIVER WATER FLOW LEVELS Miles of river with less than ideal flow levels (out of 2429 miles in total)	0 miles	16 miles
A BAN ON USING THE HOSE PIPE at your property FOR 5 MONTHS beginning in May and ending in September because of drought The chance that this happens at your property in any one year is	1 in 50	1 in 500
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL To provide the service quality above	Increase of £20 by 2024 Gradual increase of £4 every year between 2019 and 2024	Decrease of £20 by 2024 Gradual decrease of £4 every year between 2019 and 2024

- 6 choices like this
- (i) buttons give more information on each attribute
- River water flows and Hosepipe ban attributes link to Stage 1 survey

Results indicate that customers had significant WTP for all attributes except for Hosepipe bans

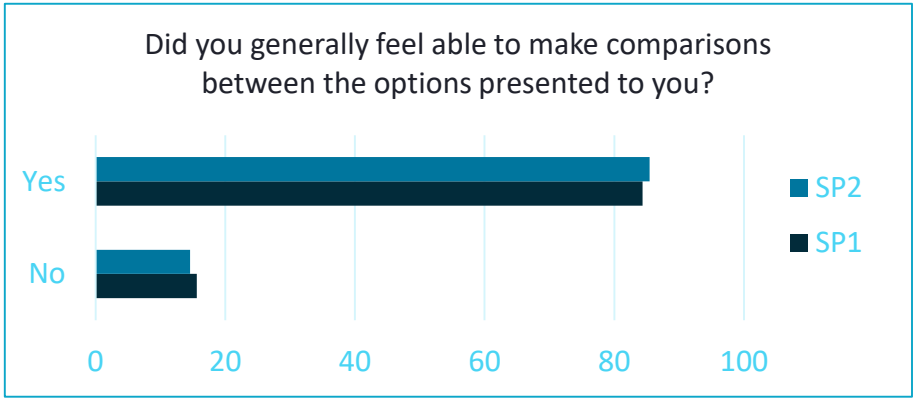
Variable	Unit	Base	+1	WTP (£/hh/yr)
Water leakage	%	21	20	£0.20
Water conservation devices	%	7	10	£0.26
New water meters fitted	%	77	78	£0.03
New smart meters fitted	%	0	10	£0.10
River water flow levels	Miles	16	7	£0.28
Hosepipe ban	Chance	0.01	0.005	£0.00

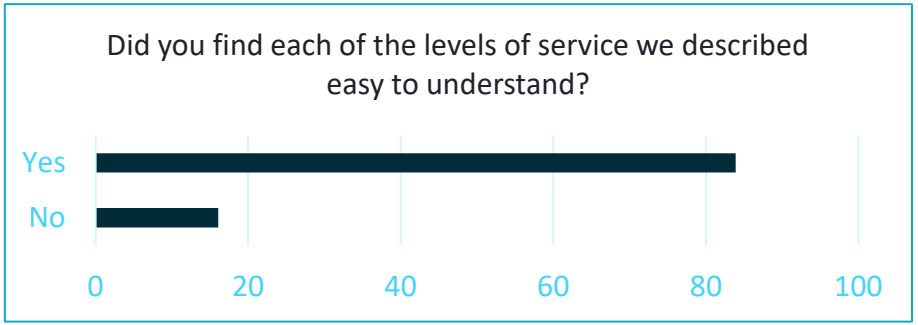
- Improving river water flow levels had the highest value - used as linking attribute.
- Significant values for Leakage reduction, water efficiency and metering, 'for their own sake'

Leakage reduction, water efficiency and metering were valued 'for their own sake'.

Accent

Survey performance statistics also good for an SP survey





- The vast majority generally felt able to make comparisons in the SP exercises
- The vast majority found each of the levels easy to understand.

Overall conclusions so far

- Surveys performed well, providing a robust basis for valuation.
- In comparison to PR14, overall values are at a similar scale but there are some key differences:
  - Environmental values are somewhat higher
  - Sewer flooding values are substantially lower
- From Stage 2 analysis, there continues to be positive WTP for leakage, water efficiency and metering ‘for their own sake’.
- The analysis is still underway, and there remain a number of tasks still to complete.

Wessex Water
PR19 Willingness to Pay Research

Final Report
January 2018

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CONTENTS

EXECUTIVE SUMMARY

Introduction

Wessex Water (WW) commissioned Accent and PJM economics to conduct a programme of research exploring customers' WTP for a range of possible service level changes, and to support the application of the WTP values in cost benefit analysis (CBA). The results from the CBA will ultimately inform the development of the company's 2020-25 business plan and support its legitimacy to the regulators and other stakeholders.

The objectives of the study were to identify, through the use of stated preference (SP) surveys or other appropriate methods, which areas of service were most important to WW customers, and to estimate the value that customers place on different levels of service across WW's service measure framework.

This is our final report on the study.

Survey design and development

The SP survey research conducted for this study was designed and implemented in the context of several sources of focussed guidance, including the UKWIR (2011) report – "Carrying out WTP surveys". Following PR14, however, a number of issues concerning the UKWIR (2011) WTP methodology were raised in industry reviews and discussion papers. Echoing these concerns, Ofwat's Water 2020 consultation[1] proposed that companies consider how SP WTP evidence could be improved and explore what alternative and complementary tools are available to understand their customers' needs and requirements. Overall, it was evident at the outset of the present study that the approach to WTP evidence collection for PR19 would need to evolve from, rather than merely replicate, the PR14 approach.

In developing the design for the present study, we proposed an approach that sought, as far as possible, to remove the need for participants to trade off small risk reductions, which we believed to be the key source of complexity in the PR14 approach. This was achieved by imposing a degree of rationality on the structure of customers' preferences with respect to risk. By so doing, the choices customers were asked to make were much more straightforward and consequently, in our view, more likely to accurately capture their true preferences in a form that can validly be used for WW's investment appraisals.

The research programme was composed of two stages:

- Stage1 looked comprehensively at water and wastewater service measures received by WW's customers' (be they Dual customers, Bournemouth Water customers or Bristol

[1] Ofwat (2015) "Water 2020: Regulatory framework for wholesale markets and the 2019 price review", December 2015

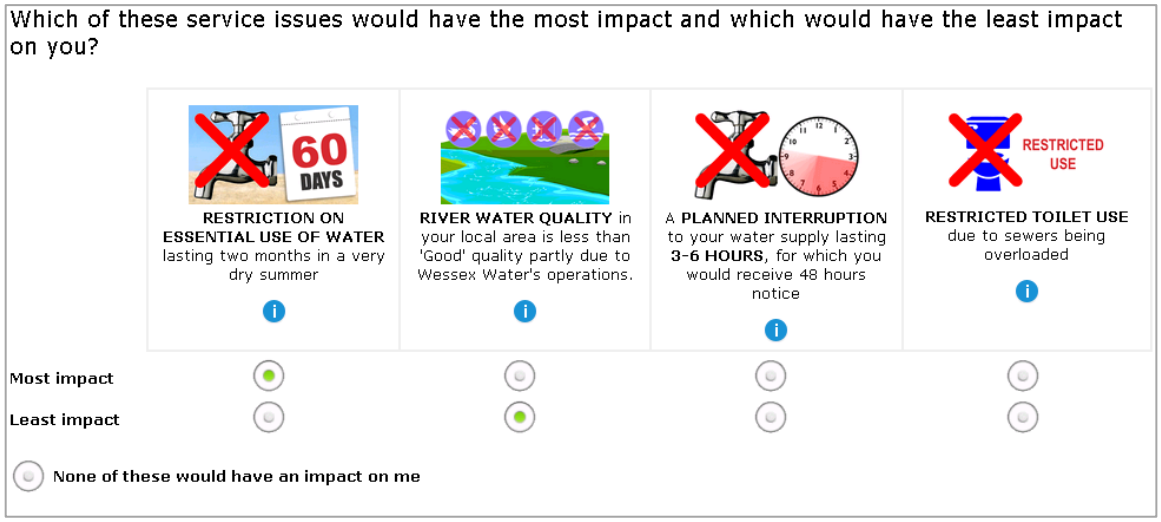
Water customers), and gauged customers' values assigned to the improvement of each these service measures;

- Stage 2 was built around two exercises; (1) the first aimed to understand customers' preferences for various activities that Wessex Water could undertake to engage the community and build a relationship of trust and confidence with its customers, while (2) the second looked into ways of maintaining or improving the water supply-demand balance by gauging customers' preferences for a number of demand management attributes.

Stage 1

Our design was constructed around two linked exercises: a 'MaxDiff' exercise containing questions of the kind shown in Figure 1 below; and a 'Package' exercise containing questions requiring participants to trade off packages of service change and bill changes.

Figure 1 Example choice card form the MaxDiff exercise



The MaxDiff exercise obtained estimates of the relative impact that each type of service issue would have on customers. Table 1 below lists the water service issues that were selected for the study while Table 2 lists the wastewater service issues. This list was arrived at via a process of consultation with WW.

Table 1. Water service measures' definitions and descriptions

Service measure
An UNEXPECTED INTERRUPTION to your water supply lasting 3-6 HOURS
An UNEXPECTED INTERRUPTION to your water supply lasting 6-12 HOURS
A PLANNED INTERRUPTION to your water supply lasting 3-6 HOURS, for which you would receive 48 hours notice
A PLANNED INTERRUPTION to your water supply lasting 6-12 HOURS, for which you would receive 48 hours notice
The TASTE AND SMELL of your tap water is not ideal for A FEW DAYS, but is safe to drink.
Your tap water is DISCOLOURED for A FEW HOURS, but is safe to drink
PERSISTENT LOW WATER PRESSURE at your property
RESPONSE TIME to fix a leaking water main pipe near your property is longer than 1 day
A HOSEPIPE BAN lasting from May to September
RESTRICTION ON ESSENTIAL USE OF WATER lasting two months in a very dry summer
RIVER WATER FLOW LEVELS in a nearby river are lower than ideal partly due to Wessex Water's operations.

Table 2. Wastewater service measures' definitions and descriptions

Service measure
RESTRICTED TOILET USE due to sewers being overloaded
SEWER FLOODING INSIDE YOUR PROPERTY
SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY
SEWER FLOODING IN A NEARBY PUBLIC AREA
DILUTE SEWAGE occasionally spills from a Wessex Water pipe into a nearby river or estuary
BATHING WATER QUALITY at your nearest beach is 'Sufficient' but not 'Good' quality partly due to Wessex Water's operations.
BATHING WATER QUALITY at your nearest beach is 'Good' but not 'Excellent' quality partly due to Wessex Water's operations.
RIVER WATER QUALITY in your local area is less than 'Good' quality partly due to Wessex Water's operations.

Note that for Bristol Water, the water service measures are outside the scope of this report, and as such are not reported herein while, for Bournemouth Water, the questionnaire excluded them from consideration altogether. The wastewater services were common and described exactly the same for all three study areas.

The Package exercise was included in order to obtain evidence on customers' willingness to trade off money for service level changes at the package level.

For the purposes of our analysis, four different packages of service levels were defined as follows:

- -1: all service measures deteriorate. The bill is lower than the SQ package.
- SQ: all service measures at current levels, with the bill either maintained (in real terms), or slightly decreased or increased.
- +1: all service measures improve, and the bill is higher than the SQ package.
- +2: all service measures further improve; the bill is higher than in the +1 package.

Customers were asked to make a sequence of choices between these packages, and the data from this exercise could be used to estimate their WTP for whole packages of service change.

The design approach put forward for this study was new to WW, and to the water sector more widely, and so an extensive programme of testing was designed and implemented to refine the design and provide assurance that the instrument was working effectively. This included three phases of pre-testing of the survey instrument with WW customers.

Throughout the development phase of the study, two different survey designs were tested jointly and in parallel. These included the approach described above (PR19-style survey) and an alternative design based closely on the surveys adopted in practice by NERA-Ipsos for WW at PR14 (PR14-style survey).

The pilot report treated at length this comparison, and described in detail the PR14-style survey design as well as the testing procedures and findings in depth. Overall, the testing conducted on the PR19-style survey instrument was supportive of its use as a replacement to the PR14-style instrument. It had the advantage of being simpler for participants, it could accommodate more attributes within the same survey, and it was more efficient from a fieldwork perspective in that it is associated with a higher conversion rate from recruitment to completion. As per the recommendation of the pilot report, we therefore proceeded to use the PR19-style survey, as described above, for the main Stage 1 survey.

Stage 2

The Stage 2 survey was designed around two core SP exercises.

1. A 'Community engagement MaxDiff exercise' was developed to explore customers' preferences for various activities that Wessex Water could undertake to engage the community and build a relationship of trust and confidence with its customers.

2. A 'Water resources management exercise' was developed to explore customers' preferences with respect to a range of measures that WW could implement to manage its water supply-demand balance, including their willingness to pay for those measures.

The Community engagement MaxDiff exercise generates a quantitative index of 'priority' for each of the initiatives included in the design for the customer population or sub-populations. This measure provides a means of understanding how customers would like to see the initiatives prioritised.

The Water resources management exercise sought to obtain estimates of customers' willingness to pay (WTP) for different options that Wessex Water could implement in its water resources management plan. The questionnaire was developed around the use of discrete choice experiment (DCE) questions as the means of eliciting customer priorities and WTP.

Methodology

The overall main stage comprised a total of 2,815 interviews with household and non-household customers, including dual-supply, Bristol area and Bournemouth area households and non-households. The majority of household interviews were conducted online, but with a face-to-face booster sample focussed on vulnerable groups. Non-household interviews were all conducted by telephone, thereby ensuring that the key account contact was interviewed.

The Stage 2 survey comprised 652 household interviews (552 online and 100 face-to-face in-home with less engaged / vulnerable customers); and 300 non-household telephone interviews.

Main results

Stage 1

The results from the MaxDiff analysis showed, as expected, that sewer flooding inside the customer's property was the highest-impact service issue overall. Moreover, the results on the impacts attributable to each of the different service issues all varied in line with expectation, with longer duration incidents, for example, found to have higher impacts than shorter duration incidents, and more severe types of sewer flooding found to have higher impacts than less severe types.

Our analysis of the Package exercise data found that participants were not willing, on average, to accept service deteriorations in exchange for bill reductions. In fact, in the context of a decreasing bill, in real terms, participants would be unwilling to accept any deterioration in service without very substantial, and unrealistic, bill reductions.

With respect to improvement packages, we found that Dual service households were willing to pay up to a total of £30.15 per year, on average, for an intermediate improvement package. This represents a small increase in WTP over the findings for PR14. We found strong evidence of diminishing marginal WTP, with the same customers willing to pay only an additional £6.59 for the stretch improvement package on average.

Amongst the service improvements offered in the intermediate 'SQ to +1' package, the improvements to river water quality and bathing water quality were estimated to have the highest value. This was driven by the fact that improvements in these areas affected a large number of customers. Thus, despite the fact that the impact of service changes in these areas was less than for other service issues - sewer flooding, for example - the overall derived WTP for these improvements was very substantial.

Our analysis also calculated 'unit values', which are a standardised measure of WTP for a service measure that can be compared across surveys even where the packages of service change offered were different. In comparison with results obtained at PR14, the results

suggest that there are substantially higher values for river water quality and bathing water quality, and lower values for sewer flooding and persistent low pressure.

Although the differences between PR14 and PR19 will, in part, reflect genuine changes in preferences, there are also methodological features of the change in design approach that are also likely to be playing a part. In particular, the findings can be explained by the hypothesis that customers previously over-weighted service measures where the risk change was very small (low pressure and sewer flooding), and correspondingly under-weighted the service measures where the chance of being impacted was relatively large (environmental improvements). By imposing proportionality with respect to the chance of being impacted, these effects will have been reversed.

Stage 2

From the community engagement exercise, 'Helping customers to save water and money' had the highest priority, followed by 'Providing more support for customers in financial difficulty' and 'Helping our wider community to values the natural systems'.

From the water resources management exercise, the results suggest that for households river water flow levels are a top priority, followed by water conservation devices and then reducing water leakage, while this latter is a top priority for non-households, followed by water conservation devices.

Conclusions

Overall, the valuation estimates presented can be considered to be meaningful measures of WW customers' values for the range of services, and service levels, contained within the survey, and we recommend them for use within a triangulation exercise focussed on combining evidence from different sources to support a cost benefit analysis of proposed service changes for PR19.

Confidence in the results reported here can be gained from the following:

- The design of the questionnaire was fully tested via cognitive interviews and pilot tests with households and businesses.
- A clear majority of responses were assessed as valid, taking into account participants' feedback
- Results for the impact scores describing the perceived disutility of each attribute were logically consistent and in line with expectations.

1 INTRODUCTION

1.1 Background

Wessex Water (WW) is the regional Water & Sewerage Company serving an area in the South West of England covering 10,000 square kilometres. The area includes Bristol, Dorset, Somerset, BANES, most of Wiltshire and parts of Gloucestershire, Hampshire & Devon. WW supplies 1.25 million customers with up to 353 million litres of water every day. The water is distributed to properties in the region through a distribution network that includes 100 water sources, 110 water treatment plants, 344 service reservoirs and more than 11,400 kilometres of water mains.

WW formally reviews its investment requirements every five years in response to a review of prices initiated by OFWAT the company's economic regulator. As part of its periodic review submission for the 2019 price review (PR19) WW must engage with its customers to explore and understand their priorities and willingness to pay (WTP) for improvements in service, or willingness to accept (WTA) lower service levels in exchange for lower bills.

Wessex Water (WW) commissioned Accent and PJM to conduct a programme of research exploring customers' willingness to pay (WTP) for a range of possible service level changes, and to support the application of the WTP values in cost benefit analysis (CBA). The results from the CBA will ultimately inform the development of the company's 2020-2025 business plan and support its legitimacy to the regulators and other stakeholders.

The present research is undertaken in the context of the following sources of guidance:

- Ofwat's customer engagement policy for the 2019 price review (PR19);
- UKWIR reports on "Customer involvement in price-setting", "Review of CBA and benefits valuation", and "Carrying out WTP surveys";
- experience and best practice from other sectors; and
- the wider academic literature on CBA and benefits valuation.

1.1 Objectives

The main research objective for the study as a whole was to determine business and household investment priorities and willingness to pay (WTP) for potential programmes of work over the 20200-2025 period.

WW needs to understand the following for both domestic and business customers to help it prepare a customer focused business plan at PR19:

- what do customers believe are the most important areas of service provided by WW;

- what improvements, if any, would customers like to see to these services; and

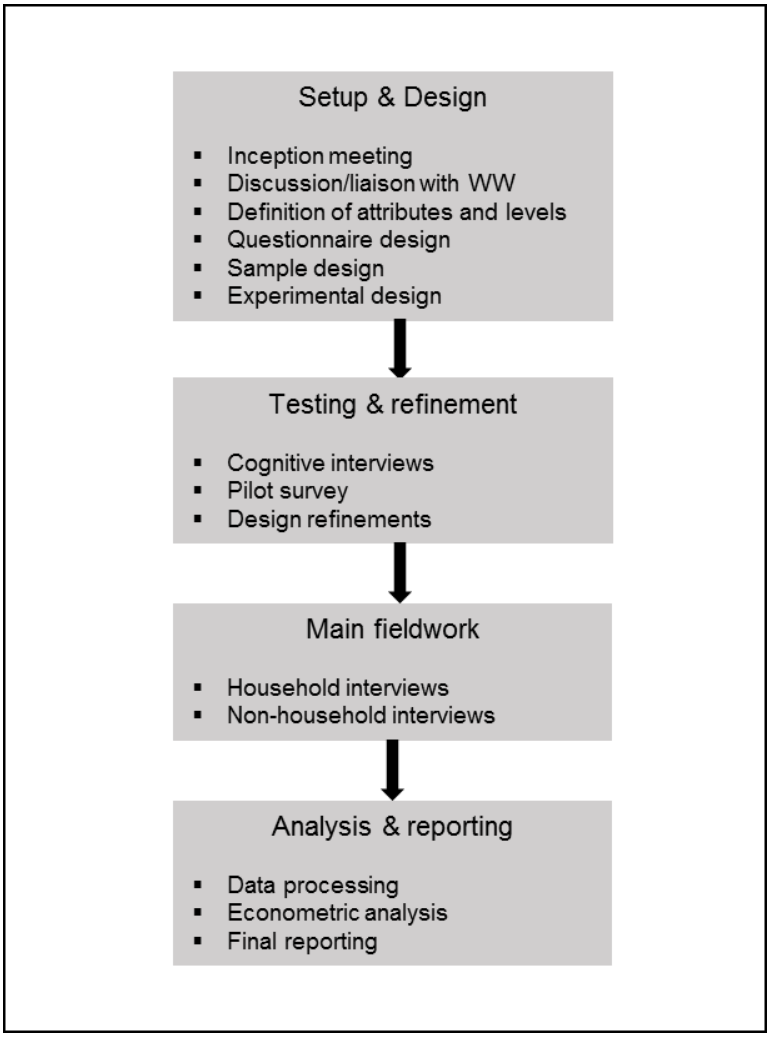
- what is customers willingness to pay (and willingness to accept remuneration for some potential service deteriorations) for specific aspects of the service WW offers.

1.2 Overview of the Study

The stated preference (SP) survey methodology was adopted to achieve the objectives of the study. An SP survey was designed and implemented to obtain estimates of customers' marginal values for a range of service measures.

Figure 2 provides an overview of the research programme.

Figure 2: Overview of the research programme



1.3 Report Structure

This document is our final report on this survey. It provides a full description and explanation of the survey design and methodology, and reports all results including a detailed analysis of WW customers' WTP for service level changes.

The remainder of this report is structured as follows. In section 2, we report on the survey design and development. Section 3 provides details of the survey administration, and a description of the weights applied. In section 4 we present and summarise findings from the sample on all non-SP questions from the survey. This includes information on household and business demographics, current bill levels and attitudes towards them, experiences of water and sewerage service failures and perceptions of the chances of experiencing them, participant and interviewer feedback on various aspects of the survey, participants' views on the most important service measures to improve, and participants' reasons for their SP choices.

Section 5 then presents the valuation results, and section 6 presents our conclusions and recommendations. In summary, we conclude that the values presented are valid measures of customers' WTP for incremental changes to service levels. As such they should be considered legitimate by stakeholders and regulators for use within CBA.

The appendices to this report contain useful supporting documentation. Appendix A contains the detailed econometric analysis for households, and Appendix B contains the econometric analysis for non-households.

2 SURVEY DESIGN AND DEVELOPMENT

2.1 Introduction

The SP survey research conducted for this study was designed and implemented in the context of several sources of focussed guidance, including the UKWIR (2011) report – "Carrying out WTP surveys". Following PR14, however, a number of issues concerning the UKWIR (2011) WTP methodology were raised in industry reviews and discussion papers. Echoing these concerns, Ofwat's Water 2020 consultation[2] proposed that companies consider how SP WTP evidence could be improved and explore what alternative and complementary tools are available to understand their customers' needs and requirements. Overall, it was evident at the outset of the present study that the approach to WTP evidence collection for PR19 would need to evolve from, rather than merely replicate, the PR14 approach.

The key concerns raised with respect to the PR14 approach to WTP measurement included that:

- The choices that customers were asked to make were too complex for them to answer meaningfully
- WTP numbers were too variable across companies to be valid
- WTP measures didn't take account of comparative performance
- WTP measures weren't consistent with how they were applied in ODIs

With regard to the first of these, the fundamental source of complexity was the need for customers to consider trade-offs between very small risk levels of different types of service issue occurring. It is well known in the academic literature that most people have severe difficulties in evaluating small risks on a consistent basis across similar tasks. As a consequence, values derived via trade-offs involving risk reductions tend to be highly sensitive to features of the study design, and can hence vary very substantially across studies without there necessarily being any difference in underlying preferences between study samples.

In developing the design for the present study, we proposed an approach that sought, as far as possible, to remove the need for participants to trade off risk reductions. This was achieved by imposing a degree of rationality on the structure of customers' preferences with respect to risk. By so doing, the choices customers were asked to make were much more straightforward and, consequently, more likely to accurately capture their true preferences in a form that can validly be used for WW's investment appraisals.

The research programme was composed of two stages:

[2] Ofwat (2015) "Water 2020: Regulatory framework for wholesale markets and the 2019 price review", December 2015

- Stage1 looked comprehensively at water and wastewater service measures received by WW's customers' (be they Dual customers, Bournemouth Water customers or Bristol Water customers), and gauged customers' values assigned to the improvement of each these service measures;

- Stage 2 was built around two exercise; (1) the first aimed to understand customers' preferences for various activities that Wessex Water could undertake to engage the community and build a relationship of trust and confidence with its customers, while (2) the second looked into ways of maintaining or improving the water supply-demand balance by gauging customers' preferences for a number of demand management attributes.

In the remainder of this section, we first overview the design of the Stage 1 survey, followed by Stage 2. For each stage, we summarize the core design features of the survey instrument. The remainder of the section then proceeds through the key aspects of the survey instrument and describes how design decisions were reached, taking account of the preliminary qualitative research and testing results along the way.

2.2 Stage 1 Main WTP Survey

Questionnaire Structure

The survey questionnaire was designed around two interlinked exercises: (1) a 'MaxDiff' exercise focussed on which types of service issue would have the most, and least, impact on participants if they were to be affected by them; and (2) a 'Package' exercise focussed on high level trade-offs between service improvements or deteriorations and changes in the level of the bill.

The questionnaire was structured as follows:

1) Screening and recruitment
2) Introduction to main survey
3) Usage, experience and attitude questions
4) Background information, including service measure definitions
5) MaxDiff exercise:
6) Follow-up questions on ability to make comparisons between the service measures
7) Package exercise:
8) Follow-up questions, including reasons for choices, ability to choose, perceived realism of the service levels shown, and understanding of the service measures
9) Demographics

This structure is typical for SP questionnaires, and is consistent with UKWIR (2011) guidelines. Next, we describe in more detail the designs of the MaxDiff and Package exercises.

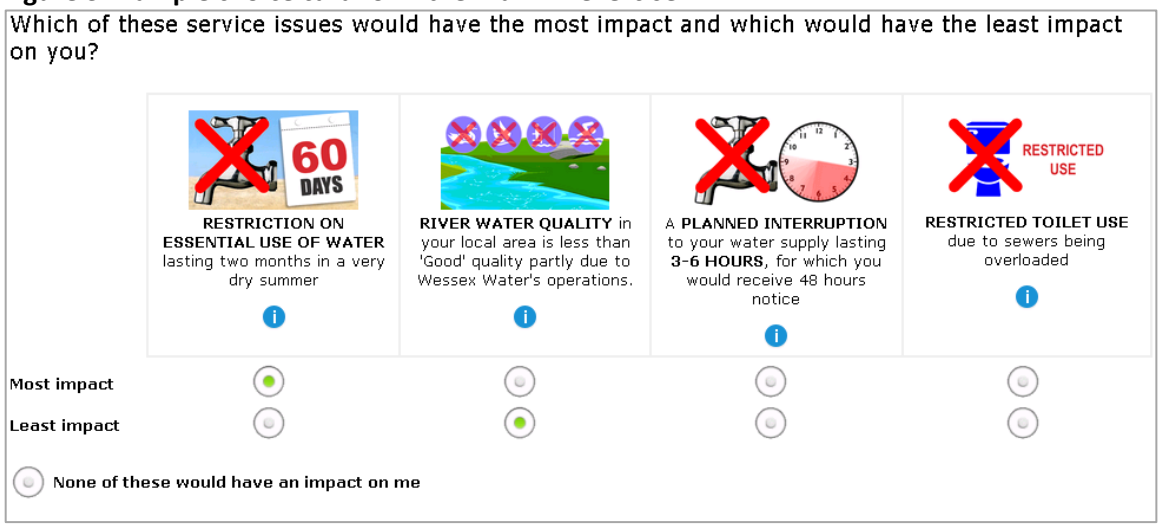
Different versions of this survey questionnaire were administered to customer samples from the three water companies comprising Wessex Water's sewerage supply area, namely dual-service Wessex Water customers, and wastewater only customers supplied water by Bristol Water and Bournemouth Water. The wastewater service measures and levels tested were the same in all versions; the water services tested varied between dual-service and Bristol Water samples, with Bristol Water service measures and levels being provided by Bristol Water. For the Bournemouth Water sample, only wastewater service measures were tested as Bournemouth Water had no role in the present study.

MaxDiff Exercise (SP1)

The MaxDiff exercise presented participants with a sequence of choice cards in which they had to choose the service issue that would have most impact on them and the service issue that would have the least impact on them out of a total of four presented to them each time.

On each card, the service issues shown included an (i) button that the participant could click on to see further information about the service issue in question. An example MaxDiff choice card is found in Figure 1.

Figure 3 Example choice card form the MaxDiff exercise



Overall, around 20-30 attributes could be included robustly within a design, with potentially many more being possible if sample sizes are large and designs are segmented so that different people see different combinations. Table 3 and Table 4 below list the water and wastewater service measures definitions and descriptions, respectively. This list was arrived at via a process of consultation with WW. The descriptions shown are the final ones used in the survey following the development work described later in this section.

Table 3. Water service measures' definitions and descriptions

Service measure	Description on survey show card
An UNEXPECTED INTERRUPTION to your water supply lasting 3-6 HOURS	Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to burst pipes, which can happen at any time, or due to planned maintenance, in which case you would be given at least 48 hours' notice. Interruptions last an average of 6 hours when they occur.
An UNEXPECTED INTERRUPTION to your water supply lasting 6-12 HOURS	
A PLANNED INTERRUPTION to your water supply lasting 3-6 HOURS, for which you would receive 48 hours notice	
A PLANNED INTERRUPTION to your water supply lasting 6-12 HOURS, for which you would receive 48 hours notice	
The TASTE AND SMELL of your tap water is not ideal for A FEW DAYS, but is safe to drink.	Water taste and smell can be less than ideal at your property for a few days at a time because of dissolved minerals and gases, but the water is safe to drink.
Your tap water is DISCOLOURED for A FEW HOURS, but is safe to drink	On rare occasions, your water may be discoloured because of harmless deposits that accumulate over time in water mains, but the water is safe to drink. Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time.
PERSISTENT LOW WATER PRESSURE at your property	Low water pressure means it takes longer to fill the bath or kettle than you would like, and may affect how well a combi boiler works. Persistent means the property is affected every day, though the problem may come and go during the day. It is usually caused by the age, condition and size of the water company's pipes. Properties at the tops of hills and the end of lines are most at risk.
RESPONSE TIME to fix a leaking water main pipe near your property is longer than 1 day	Sometimes, there can be leaks in water mains pipes. Wessex Water aims to get these fixed promptly. Wessex Water measures its performance by showing the percentage of mains leaks that they respond to by fixing them within a day of their being reported
A HOSEPIPE BAN lasting from May to September	As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.
RESTRICTION ON ESSENTIAL USE OF WATER lasting two months in a very dry summer	As an emergency measure in the event of a severe drought, Wessex Water can impose a restriction on essential use of water at your property lasting 2 months. This could involve providing a water supply which was available every other day for a few hours a day at a reduced pressure. This would be likely to cause the water to be discoloured and the quality of the water might be compromised. If this occurred, Wessex Water anticipate that they would provide an alternative source of water for drinking, such as bottled water or drinking water standpipes at selected locations.
RIVER WATER FLOW LEVELS in a nearby river are lower than ideal partly due to Wessex Water's operations.	The flow rates of rivers within in the Wessex Water Area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified either as having 'natural flow' or 'low flow'. A river with 'low flow' may have had some water taken from it to supply customers. It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife.

Table 4. Wastewater service measures' definitions and descriptions

Service measure	Description on survey show card
RESTRICTED TOILET USE due to sewers being overloaded	Sometimes, customers can experience loss of toilet facilities resulting from sewer blockage and/or collapse.
SEWER FLOODING INSIDE YOUR PROPERTY	Flooding from the sewer gets inside properties, causing damage to property and possible illness. The effects of internal sewer flooding include a foul smell, floors and walls would need to be sanitised, flooring and carpets would need replacing and some people may develop diarrhoea, vomiting or skin infections.
SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY	Flooding from the sewer gets close to other people's properties, or gets into their gardens.
SEWER FLOODING IN A NEARBY PUBLIC AREA	Flooding from the sewer gets into public places like parks, footpaths and roads in your area.
DILUTE SEWAGE occasionally spills from a Wessex Water pipe into a nearby river or estuary	Occasionally dilute sewage can spill into rivers and estuaries and may impact water quality. These spills can occur when the sewerage system is overloaded due to heavy rainfall. The majority do not impact on the environment but a few happen frequently, on average every 10 days.
BATHING WATER QUALITY at your nearest beach is 'Sufficient' but not 'Good' quality partly due to Wessex Water's operations.	The cleanliness and quality of coastal bathing water and beaches in your area is classified according to the chances of getting an infection such as an upset stomach, an ear infection or a sore throat after bathing in the sea. There are three classification levels – "Excellent", "Good" and "Sufficient".
BATHING WATER QUALITY at your nearest beach is 'Good' but not 'Excellent' quality partly due to Wessex Water's operations.	
RIVER WATER QUALITY in your local area is less than 'Good' quality partly due to Wessex Water's operations.	*High/Good*: Has a natural range of plants, fish, birds and insects, clear unpolluted water; suitable for contact activities such as rowing. *Medium:* Plants, fish, birds, insects will be present but some species from these groups may be missing; there may be some pollution or murky water; parts may be suitable for contact activities such as rowing. *Poor/Bad*: Has little or no plant and animal life, murky water, some pollution and algae; water not suitable for contact activities such as rowing.

Note that for Bristol Water, the water service measures are outside the scope of this report, and as such are not reported herein, while for Bournemouth Water, the questionnaire excluded them from consideration altogether. The wastewater services were common and described exactly the same for all three study areas.

The experimental design for this exercise was generated using an algorithm which sought to maximise the statistical precision of the estimates, whilst avoiding choice pairs where one option dominated the other one (e.g. two or more identical attributes, or two or more attributes of the same nature but different intensities such as supply interruptions of different durations). For each version of the survey a total of 200 choice cards were generated and grouped in 20 blocks of 10 cards each. Each participant was administered choice cards from a randomly selected block, hence answering 10 MaxDiff choice cards.

The MaxDiff exercise generates a quantitative measure of 'impact', which we interpret as equivalent to disutility, for each of the attributes included in the design for the customer population or sub-populations. This measure provides a means of understanding how bad each type of service failure would be relative to some benchmark.

The use of an 'impact' scale to measure disutility was chosen carefully. We initially considered the alternative question: 'which of these service issues would be worst for you, and which would be least bad?'. However, focus group testing of this form of wording revealed that participants found the concept of 'least bad' confusing, and so the question 'which of these service issues would have the most impact on you, and which would have the least impact?' was chosen instead.

Importantly, in order to avoid bias towards service issues that affect the customer personally, at the expense of those that affect the environment, the following text was included at the start of the choice exercise.

Some of the service failures shown would affect your own property whereas others would affect your local area. When comparing the impact that each would have on you, please consider how you would feel generally about the service failure happening, including any concerns you may have about your local area and the environment.

The intention for customers was therefore that they consider 'impact' in the widest sense, as everything they care about. By so doing, we aimed to arrive at a good approximation for the concept of disutility without use of this unfamiliar concept (amongst the general public) in the survey itself.

Package Exercise (SP2)

In order to generate value estimates per avoided service failure, an additional exercise was needed. This is because the MaxDiff questions only generate relative measures of utility, and these must be scaled to a money metric using evidence on customers' willingness to trade off money for service level changes at the package level.

For the purpose our analysis, four different packages of service levels were defined as follows.

- -1: all service measures in this option deteriorate to '-1' levels. The bill is lower than in SQ.
- SQ all service measures are maintained at their current levels, with the yearly bill either maintained at its current level (in real terms), or slightly decreased or increased.
- +1: all service measures improve to +1 levels, and the bill is higher than in SQ.
- +2: all service measures further improve to +2 levels; the bill is higher than in +1.

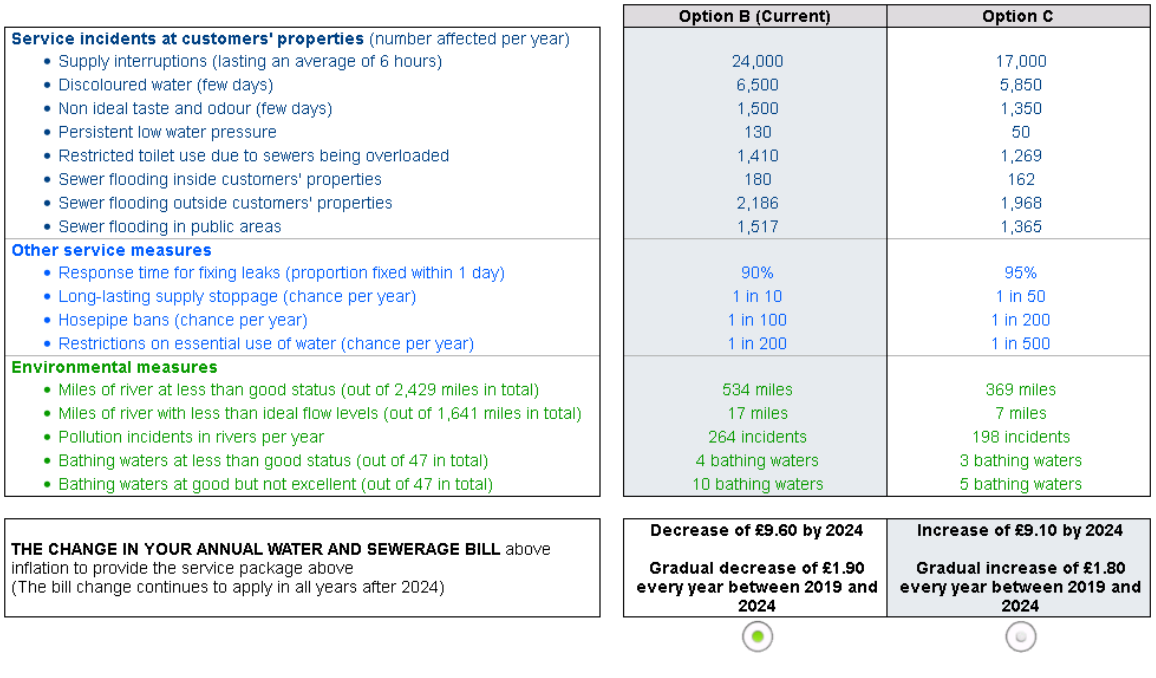
These options were presented to participants in the survey in a series of four pairwise package comparisons.

1. SQ vs. +1 – Yields WTP estimate for a status quo (SQ) to +1 improvement

2. SQ vs. +2- Yields WTP estimate for an SQ to +2 improvement
3. +1 vs. +2 - Yields WTP estimate for a +1 to +2 improvement
4. SQ vs. -1 - Yields WTA estimate for an SQ to -1 deterioration

An example package choice card from the dual-service version of the survey is shown in Figure 4. This format was intended to make it simpler for the participant to make choices that reflect their true WTP/WTA than presenting all four options together.

Figure 4 Example PR19-style Package choice card



	Option B (Current)	Option C
Service incidents at customers' properties (number affected per year)		
• Supply interruptions (lasting an average of 6 hours)	24,000	17,000
• Discoloured water (few days)	6,500	5,850
• Non ideal taste and odour (few days)	1,500	1,350
• Persistent low water pressure	130	50
• Restricted toilet use due to sewers being overloaded	1,410	1,269
• Sewer flooding inside customers' properties	180	162
• Sewer flooding outside customers' properties	2,186	1,968
• Sewer flooding in public areas	1,517	1,365
Other service measures		
• Response time for fixing leaks (proportion fixed within 1 day)	90%	95%
• Long-lasting supply stoppage (chance per year)	1 in 10	1 in 50
• Hosepipe bans (chance per year)	1 in 100	1 in 200
• Restrictions on essential use of water (chance per year)	1 in 200	1 in 500
Environmental measures		
• Miles of river at less than good status (out of 2,429 miles in total)	534 miles	369 miles
• Miles of river with less than ideal flow levels (out of 1,641 miles in total)	17 miles	7 miles
• Pollution incidents in rivers per year	264 incidents	198 incidents
• Bathing waters at less than good status (out of 47 in total)	4 bathing waters	3 bathing waters
• Bathing waters at good but not excellent (out of 47 in total)	10 bathing waters	5 bathing waters
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above (The bill change continues to apply in all years after 2024)	**Decrease of £9.60 by 2024** **Gradual decrease of £1.90 every year between 2019 and 2024**	**Increase of £9.10 by 2024** **Gradual increase of £1.80 every year between 2019 and 2024**

Table 5 and Table 6 present the water service measures and their levels for Dual-service customers, and the wastewater service measures and their levels common to all three water company areas, respectively.

Table 5 PR19 Package water service attributes and levels for Dual-service customers

Service measure	Option A	Option B (Current)	Option C	Option D
Service incidents at customers' properties (No. properties where these happen per year)				
Supply interruptions (lasting an average of 6 hours)	30,500	24,000	17,000	10,000
Discoloured water (few days)	7,560	6,500	5,850	3,900
Non ideal taste and odour (few days)	1,744	1,500	1,350	900
Persistent low water pressure	150	130	50	0
Other service measures				

Response time for fixing leaks (proportion fixed within 1 day)	66%	90%	95%	99%
Hosepipe bans (chance per year)	1 in 50	1 in 100	1 in 200	1 in 500
Restrictions on essential use of water (chance per year)	1 in 100	1 in 200	1 in 500	1 in 1000
Environmental measures				
Miles of river with less than ideal flow levels (out of 1,641 miles in total)	31 miles	17 miles	7 miles	0 miles

Table 6 PR19 Package wastewater service attributes and levels for Dual-service, Bournemouth and Bristol Water customers

Service measure	Option A	Option B (Current)	Option C	Option D
Service incidents at customers' properties (No. properties where these happen per year)				
Restricted toilet use due to sewers being overloaded	1,551	1,410	1,269	1,057
Sewer flooding inside customers' properties	198	180	162	135
Sewer flooding outside customers' properties	2,405	2,186	1,968	1,640
Other service measures				
Sewer flooding in public areas	1668 incidents	1517 incidents	1365 incidents	1137 incidents
Environmental measures				
Miles of river at less than good status (out of 2,429 miles in total)	990 miles	534 miles	369 miles	0 miles
Sites where dilute sewage spills into rivers and estuaries	264 sites	264 sites	198 sites	0 sites
Bathing waters at less than good status (out of 47 in total)	6 bathing waters	4 bathing waters	3 bathing waters	0 bathing waters
Bathing waters at good but not excellent (out of 47 in total)	15 bathing waters	10 bathing waters	5 bathing waters	0 bathing waters

Table 7 shows the possible bill changes for each of the four options. The bill changes attached to the presented option were drawn as percentages from the levels shown and translated into monetary bill changes for households by multiplying by the current bill. For non-households, percentage changes were shown, in line with UKWIR (2011) guidance.

Table 7 PR19 Package % bill change levels

Package	Definition	Levels
-1	% change over and above SQ bill change from 2020 to 2024	-2.5%, -5%, -10%
SQ	% change of SQ bill from 2020 to 2024	-2.5%, 0%, +2.5%
+1	% change over SQ bill change from 2020 to 2024	+5%, +10%, +15%
+2	% change over and above SQ plus +1 bill changes from 2020 to 2024	+2.5%, +5%, +10%

Consistent with UKWIR (2011) guidelines, the cost amounts were developed to be expressed in real terms, as a phased change over the five year price control period, and remaining constant thereafter.

Stage 1 Survey Development

The design approach put forward for this study was new to WW, and to the water sector more widely, and so an extensive programme of testing was designed and implemented to refine the design and provide assurance that the instrument was working effectively. This included three phases of pre-testing of the survey instrument with WW customers.

Throughout the development phase of the study, two different survey designs were tested jointly and in parallel. These included the approach described above (PR19-style survey) and an alternative design based closely on the surveys adopted in practice by NERA-Ipsos for WW at PR14 (PR14-style survey).

The pilot report treated at length this comparison, and described in detail the PR14-style survey design as well as the testing procedures and findings in depth.

In summary, two phases of pre-testing were carried out prior to the main fieldwork for the Stage 1 survey. The first phase consisted of 10 cognitive depth interviews, five with household customers and five with non-household customers. All interviews followed the same process and were conducted using the computer-assisted telephone interviewing (CATI) method. Participants were taken through the survey instruments as they would in the main fieldwork, but with further questions were inserted throughout the interview to probe and test levels of understanding and where improvements could be made.

The pre-testing findings showed strong support for the PR19-style approach from a cognitive perspective. The instrument was understandable to customers across all the different ages and social grades included in this phase of work. The small number of recommendations resulting from the cognitive testing phase were predominantly about the wording of questions and the layout of showcards, rather than SP design. For the main stage, all these minor changes were made to the questionnaire.

The second phase of pre-testing consisted of a pilot comprised a total of 702 interviews with household and non-household customers, using both PR14 and PR19 SP approaches. The questionnaire was pilot tested via online and face-to-face interviews.

The pilot survey was conducted in order to test:

- the recruitment process
- the clarity and flow of the questionnaire
- the appropriateness of the language used
- the accuracy of all routings
- ease of use of the show material
- the stated preference design and understanding of the stated preference and contingent valuation exercises
- the interview duration
- the survey hit rate.

Feedback from interviewers supported the use of the PR19-style survey insofar as they found a much better conversion rate from recruitment to completion of the survey, and there were far fewer issues reported with regard to ease of comprehension of the PR19-style materials than the corresponding PR14-style materials. Additionally, the mean enjoyment experienced while responding to the PR19-style survey was higher than either the Water or Sewerage PR14-style surveys. There were therefore good reasons to support the continuing use of the PR19-style survey for the main stage. Indeed, no difficulties were encountered by participants regarding the two exercises composing the PR19-style survey.

For both survey approaches, good-fitting and plausible econometric models were estimated for households and non-households, resulting in the derivation of plausible estimates of WTP for service improvements and estimates of willingness to accept (WTA) lower bills for service deteriorations.

Overall, the testing conducted on the PR19-style survey instrument was supportive of its use as a replacement to the PR14-style instrument. It had the advantage of being simpler for participants, it could accommodate more attributes within the same survey, and it was more efficient from a fieldwork perspective in that it is associated with a higher conversion rate from recruitment to completion. As per the recommendation of the pilot report, we therefore proceeded to use the PR19-style survey, as described above, for the main Stage 1 survey.

2.3 Stage 2 Customer Engagement and Water Resource Management Survey

The Stage 2 survey was designed around two core SP exercises.

1. A 'Community engagement MaxDiff exercise' was developed to explore customers' preferences for various activities that Wessex Water could undertake to engage the community and build a relationship of trust and confidence with its customers.

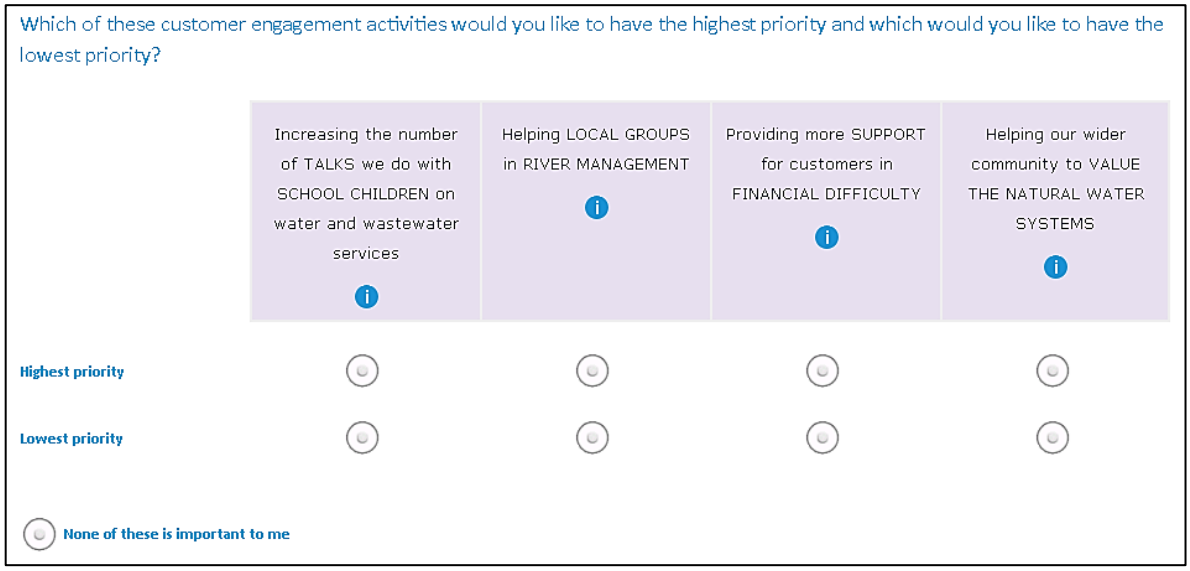
2. A ‘Water resources management exercise’ was developed to explore customers’ preferences with respect to a range of measures that WW could implement to manage its water supply-demand balance, including their willingness to pay for those measures.

The questionnaire was structured similarly to the Stage 1’s. In the following, we focus on the design of each SP exercise in turn.

Community Engagement MaxDiff Exercise

The Community Engagement component of the survey was based on a ‘MaxDiff’ exercise, similar to the one designed in the Stage 1 survey. Participants were presented with repeated choice cards in which they had to choose the initiative that they would like to have the highest priority, and the one they would like to have the lowest priority out of a total of four presented each time. An example MaxDiff choice card is shown in Figure 5.

Figure 5. Example choice card from the Community Engagement MaxDiff exercise



The (i) icons in the above figure indicate a button that participants could click on to see more information about the initiative in question.

The Community Engagement MaxDiff exercise consisted of eight initiatives altogether. These initiatives, and the descriptions supporting them, are shown in Table 8.

As in the Stage 1 MaxDiff exercise, the Stage 2 exercise presented participants with repeated choice sets that each assorted 4 out the 8 attributes and recorded the highest and lowest priority for the participant. The experimental design for this exercise was generated using an algorithm which sought to maximise the statistical precision of the estimates. A total of 120 choice cards were generated and grouped in 20 blocks of 6 cards each. Each participant was administered choice cards from a randomly selected block, hence answering 6 MaxDiff choice cards.

Again, as in Stage 1, the Stage 2 exercise generates a quantitative index of 'priority' for each of the initiatives included in the design for the customer population or sub-populations. This measure provides a means of understanding how customers would like to see the initiatives ordered in terms of priority.

Table 8 Initiatives included in the Community Engagement MaxDiff exercise

Service measure	Description on survey show card
Helping customers to SAVE water and money if they're METERED	Wessex Water can help its customers save water and money through the provision of better information on how they could use less water. Wessex Water could do this by means of awareness campaigns, water efficiency advice and by supplying free water meters to its customers.
Increasing the number of TALKS we do with SCHOOL CHILDREN on water and wastewater services	Wessex Water can reach out to younger generations by increasing the number of talks it does with schoolchildren on water and wastewater services, and providing more educational resources for teachers.
Allowing our STAFF to spend more time in their working week on LOCAL/COMMUNITY/CHARITY PROJECTS	Wessex Water can increase the amount of support it offers to customers in financial hardship such as low rate tariffs and debt repayment schemes.
Providing more SUPPORT for customers in FINANCIAL DIFFICULTY	Wessex Water can encourage its staff to get more involved with the local communities they are serving by allowing them to spend more time in the working week on local community projects and charity activities.
Helping LOCAL GROUPS in RIVER MANAGEMENT	Wessex Water can encourage river stewardship by working with and involving local customer groups in the management of the waterways near to where they live or work. This could include activities such as hosting regular volunteer days improving conditions on river banks, providing education on river protection, and offering vocational trainings and work placements to help develop river management skills.
Increasing/improving the RECREATIONAL FACILITIES we provide (i.e. reservoir visitor centres, sailing, fishing, cafes, play parks)	Wessex Water can increase the provision of recreational facilities or improve the quality of existing ones such as reservoir visitor centres, sailing sites, fishing sites, cafés, play parks etc.
Helping our wider community to VALUE THE NATURAL SYSTEMS	Wessex Water can help the wider community to value the natural water system by increasing its expenditure on campaigns aimed at raising the awareness of the wider public about water resources and ecosystems through various media (TV, radio, print, social media etc).
Holding EVENTS in the community to reach out to our more VULNERABLE CUSTOMERS	Wessex Water can attend or hold more events in the local community to reach out to customers who are more vulnerable (including senior citizens and customers in financial hardship).

Water Resources Management Exercise

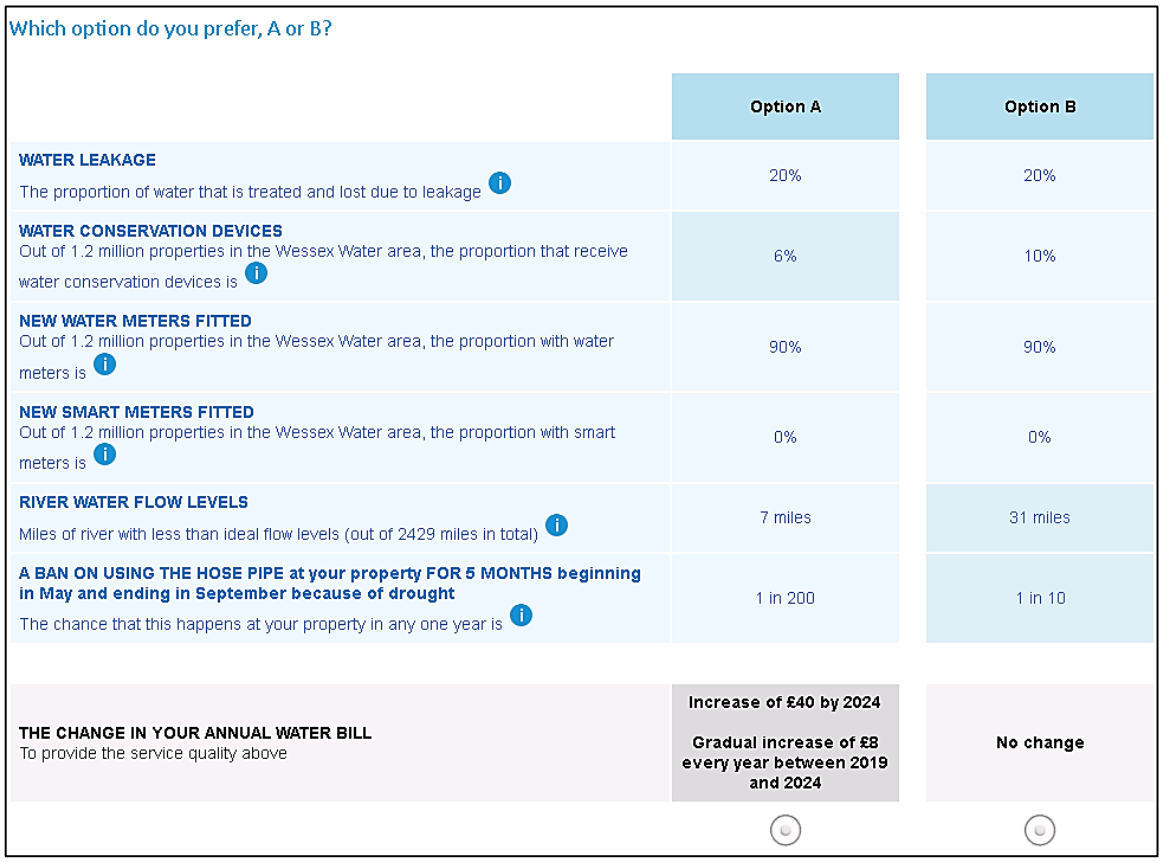
The purpose of the Water Resources Management survey was to obtain estimates of customers' willingness to pay (WTP) for different options that Wessex Water could implement in its water resources management plan. The questionnaire was developed around the use of discrete choice experiment (DCE) questions as the means of eliciting customer priorities and WTP.

The DCE questions offered participants a series of choices between two alternative packages of service levels. The questions required the participant to make a trade-off, with some service measures better in one alternative and some better in the other. The choices

made by the participants indicate how they value each of the service measures in relation to one another, in accordance with established principles of random utility theory[3].

An example choice card from the Water Resources Management survey is presented in Figure 6.

Figure 6 Example of a choice card from the Water Resource Management DCE



The full set of attributes used in the Water Resources Management survey, and the descriptions for each of them again accessed via the (i) buttons in the above choice format, are shown in Table 9. These service measures were proposed by Wessex Water.

Importantly, two of the service measures in the above table (river water flow levels and hosepipe bans) were also included within the Stage 1 WTP survey. This allowed the results for the two surveys to be compared against one another, and potentially linked in order to make them consistent.

[3] See for example Train, K. (2003) "Discrete Choice Methods with Simulation", Cambridge University Press.

Also included in the exercise was the change in the customer's annual bill from Wessex Water. The bill was presented as a monetary amount for household customers and as a percentage deviation from current bills for business customers.

The experimental designs for the Water Resources Management exercise were generated using an algorithm which sought to maximise the statistical precision of the estimates, whilst avoiding choice pairs where one option dominated the other one (i.e. was better on all service aspects). For each of the lower level exercises as well as the package exercise, a total of 30 choice cards were generated and grouped in 6 blocks of 5 cards each. Each participant was administered 5 choice cards from a randomly selected block for each exercise.

Table 9. Water Resource Management DCE attributes, levels and descriptions

Attribute	Units	Levels	Description
Water leakage	%	22% (-1), 21% (0), 20% (+1) and 19% (+2)	Wessex Water can undertake infrastructural works to reduce the extent of leakage from water mains.
Water conservation devices	% of properties	6% (-1), 7% (0), 10% (+1) and 12% (+2)	Wessex Water can provide water conservation devices to more of its customers. Such devices include high-efficiency kitchen and bath aerators which are more water efficient. By mixing the water with air, they control the amount of water that flows through the tap without affecting the water pressure. Wessex Water could also provide high-efficiency shower heads which affect water consumption by controlling the flow and spray pattern of the water.
New water meters fitted	% of properties	73% (-1), 77% (0), 78% (+1) and 90% (+2)	Wessex Water can fit water meters to more unmetered properties.
New smart meters fitted	% of properties	0% (-1), 0% (0), 10% (+1) and 43% (+2)	Wessex Water can fit smart meters to properties that can digitally send meter readings to the company. This can ensure more accurate water bills. Smart meters also come with in home monitors, so you can better understand your water usage.
River water flow levels	Miles with less than ideal flow levels	31 miles (-1), 16 miles (0), 7 miles (+1) and 0 miles (+2)	The flow rates of rivers in the Wessex Water area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified either as having 'natural flow' or 'low flow'. A river with 'low flow' may have had some water taken from it to supply customers. It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife.
A ban on using the hose pipe for 5 months from May-September because of drought	Chance	1 in 10 (-1), 1 in 100 (0), 1 in 200 (+1) and 1 in 500 (+2)	As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.

Stage 2 Survey Development

Similarly to Stage 1, the Stage 2 survey consisted of two phases of pre-testing: 10 cognitive depth interviews (5 households + 5 non-households) followed by a pilot comprised a total of 126 interviews with the following breakdown:

- 76 x household (HH) online interviews
- 50 x non-household (NHH) CATI interviews.

Cognitive interviews

As in Stage1, all cognitive depth interviews were conducted using a computer-assisted telephone interviewing (CATI) method. Participants were taken through the survey instruments as they would in the main fieldwork. However, further questions were inserted throughout the interview to probe and test levels of understanding and where improvements could be made.

The results of the cognitive interviews were very satisfactory from a survey design perspective. Both stated preference exercises were generally found to be clear, and we received no complaints about its length or complexity.

There was some very useful feedback from both household and non-household participants. The recommendations made were predominantly about the wording of attribute descriptions. Based on the feedback, we revised the text for pilot stage to increase comprehension.

Pilot surveys

The same process as in Stage 1 was followed to conduct the pilot interviews for the Stage 2 survey. In summary, we were able to estimate good-fitting and plausible econometric models for the households and non-household samples for the Community Engagement exercise. However, there were a number of comments from participants that the exercise was repetitive and that the choice questions were similar. On the basis of both sets of findings, we recommended shortening the exercise significantly from ten questions per person to six. On the basis of the econometric model performance, and given that there were only eight attributes in this exercise, we believed this would improve the enjoyment of the survey, and reduce its length, while still providing sufficient choice data with which to estimate a statistically robust model of customer priorities.

As for the Water Resources Management exercise, results were broadly encouraging. Expected signs were obtained for water leakage, river flows and bill levels, and with good statistical precision. Three of the measures were not statistically significant – water conservation devices, ordinary meters and smart meters. However, this was likely to be a consequence, in our view, of these measures leading to only very small external costs/benefits once the impact on the supply-demand balance and the bill are controlled for. It was hence not surprising that the resulting values from a small sample were insignificant.

However, the results from the econometric model for the Water Resources Management exercise suggested that customers prefer more frequent hosepipe bans all else equal. Whilst this could be seen as counter-intuitive, we recommended an approach which would ensure that the value taken forward from the research for improved level of service would be positive, as expected, while fully reflecting customers' views and priorities. This approach is discussed further in Section 5.

3 SURVEY ADMINISTRATION

3.1 Stage 1 Survey

Survey Modes and Sample Sizes

The overall main stage comprised a total of 2,815 interviews with household and non-household customers. The breakdown of achieved interviews by supply area, survey mode and customer type was as follows:

- **2,165 x household (HH)** interviews
    - **800 with dual supply customers**
        - 698 x online
        - 102 x face-to-face in-home with less engaged and/or vulnerable customers
    - **1,365 with single supply customers** (sewerage only)
        - 249 x Bournemouth area
        - 1,116 x Bristol area
            - 1,016 x online
            - 100 x face-to-face in-home with less engaged and/or vulnerable customers
- **650 x non-household (NHH) CATI** interviews
    - **300 with dual supply customers**
    - **350 with single supply customers** (sewerage only)
        - 50 x Bournemouth area
        - 300 x Bristol area

Interview Length

The average interview length for all surveys is shown in Table 17 below.

Table 10: Stage 1 survey - average interview length

	Dual supply			Bournemouth		Bristol		
	HH Online	HH CAPI	NHH CATI	HH Online	NHH CATI	HH Online	HH CAPI	NHH CATI
Average interview length	24 min	30 min	26 min	22 min	18 min	24 min	41 min	26 min

Sampling and Recruitment

The sample for online household and CATI non-household surveys with both single and dual supply customers was provided by Wessex Water. Customers' postcodes were checked against a lookup list to confirm their supply area.

In the CATI survey, 677 non-household customers were recruited to achieve 300 completed interviews in the dual supply area, 119 were recruited for 50 interviews in the Bournemouth area, and 626 were recruited for 300 interviews in the Bristol area.

For the online surveys, invitations were sent to a total of 30,214 customers across the three surveys. Table 18 shows the number of invitations sent, number of invalid emails and number of completed interviews for each survey, as well as the corresponding response rate.

Table 11: Stage 1 survey - online response rates

	Dual supply	Bournemouth	Bristol
Number of invitations sent	8,223	5,992	15,999
Number of invalid email addresses	693	560	1,382
Number of completed interviews	698	249	1,016
Response rate	**9.3%**	**4.6%**	**7.0%**

Table 12 shows the breakdown of those who entered the survey but did not complete. This includes those who were not in scope for the survey ("screen outs") and those who stopped filling in the survey after opening the link ("drop outs").

Table 12: Stage 1 survey - online drop outs and screen outs

	Dual supply	Bournemouth	Bristol
Screen outs	141	53	265
Drop outs	491	260	815
Final completes	**698**	**249**	**1,016**

Participants for the in-home CAPI surveys were recruited face-to-face. The locations and the number of interviews achieved is shown in Table 13.

Table 13: Location of Face-to-Face Interviews

Area	Frequency
Dual-supply area	
Warminster	15
Poole	10
Crewkerne or Chard	10
Salisbury	10
Taunton/Bridgewater	10
Yeovil	10
Minehead	10
Trowbridge	10
Devizes	10
Dorchester	4
Taunton	3
Total	**102**
Bristol area	
Bristol	63
Highbridge	27
Street	7
Taunton	1
Bridgwater	1
Banwell	1
Total	**100**

All participants for the face-to-face surveys were from vulnerable and harder to reach customer groups who are unlikely to respond to either online or telephone surveys. In agreement with Wessex Water and Bristol Water, a criteria framework was developed comprising the following customer subgroups:

1. **Very low income:** Long term unemployed or living on the state pension (SEG E)
2. **Disconnected:** No access to the Internet (either at home, on a mobile or at work)
3. **Age disconnected:** 70 years or older and unlikely to be digitally engaged
4. **Literacy:** Unlikely to complete and engage with an online survey due to literacy issues
5. **Language:** First language is Somali or any other non-English (interview conducted in English, Bristol area only)

Table 14 shows the breakdown of face-to-face interviews by the four vulnerable subgroups.

Table 14: Breakdown of face-to-face interviews by vulnerability subgroup

Vulnerability group	Dual supply	Bristol
Very low income	44	31
Disconnected	13	14
Age disconnected	27	18
Literacy	18	26
Language	n/a	11
Total	**102**	**100**

Sample Characteristics and Weighting

Household

The target and achieved sample profiles were as shown in Table 15. To correct for the divergences between the population target profile and the achieved sample proportions, we performed iterative proportional fitting, or raking, to produce a set of calibrated survey weights such that the sample weighted totals of control variables matched the known population totals.

Table 15. Stage 1 survey - target and achieved household sample profiles

Demographic	Target	Achieved		
		Dual	Bristol	Bournemouth
SEG				
AB	27%	52%	52%	54%
C1	29%	16%	22%	24%
C2	22%	9%	9%	8%
DE	22%	23%	17%	14%
Age				
18-34	16%	14%	25%	21%
35-54	35%	35%	32%	33%
55+	49%	51%	44%	46%
Gender				
Male	49%	53%	50%	53%
Female	51%	47%	50%	47%

Non-household

A detailed breakdown of non-household sample characteristics is given in Section 4. No weights were applied to the non-household data.

Survey Enjoyment

All participants were asked to rate their enjoyment in completing the survey using a scale of 1 to 10 where 1 means 'low enjoyment' and 10 means 'high enjoyment'.

Table 16 shows mean ratings given by household participants by survey type[4].

Table 16: Stage 1 survey - enjoyment ratings

Survey enjoyment	Dual supply			Bournemouth		Bristol		
	HH Online	HH CAPI	NHH CATI	HH Online	NHH CATI	HH Online	HH CAPI	NHH CATI
Mean rating	4.8	6.8	7.0	4.8	6.6	4.9	7.7	6.8
Base size	698	102	300	249	50	1,016	100	300

[4] Unweighted data

3.2 Stage 2 Survey

Survey Modes and Sample Sizes

The overall Stage 2 survey comprised a total of 952 interviews with household and non-household customers. The breakdown of achieved interviews by supply area, survey mode and customer type was as follows:

- **652 x household (HH)** interviews
  - 552 x online
  - 100 x face-to-face in-home with less engaged and/or vulnerable customers
- **300 x non-household (NHH) CATI** interviews

Interview Length

The average interview length for all three surveys is shown in Table 17 below.

Table 17. Stage 2 survey - average interview length

	HH Online	HH CAPI	NHH CATI
Average interview length	19 minutes	34 minutes	22 minutes

Sampling and Recruitment Method

The sample for online household and CATI non-household surveys was provided by Wessex Water. Customers' postcodes were checked against a lookup list to confirm their supply area.

In the CATI survey, 717 non-household customers were recruited to achieve 300 completed interviews.

For the online survey, invitations were sent to a total of 8,000 customers. Table 18 shows the number of invitations sent, number of invalid emails and number of final completed interviews, as well as the corresponding response rate.

Table 18. Stage 2 survey - online response rates

	HH Online
Number of invitations sent	8,000
Number of invalid email addresses	676
Number of completed interviews	552
Response rate	**7.5%**

Table 19 shows the breakdown of those household customers who entered the online survey but did not complete. This includes those who were screened out due to their answers ("screen outs") and those who stopped filling in the survey after opening the link ("drop outs").

Table 19: Stage 2 survey - online drop outs and screen outs

	Frequency
Screen outs	97
Drop outs	454
Final completes	**552**

Participants for the in-home CAPI survey were recruited face-to-face. The locations and the number of interviewers achieved in each are shown in Table 20.

Table 20: Stage 2 survey - location of face-to-face interviews

Area	Frequency
Bath	35
Taunton	15
Langport	14
Warminster	13
Chippenham	12
Crewkerne	6
Poole	3
Dorchester	2
Total	**100**

All participants in the face-to-face survey were from vulnerable and harder to reach customer groups who are unlikely to respond to either online or telephone surveys. Table 14 shows the breakdown of face-to-face interviews by the four vulnerable subgroups.

Table 21: Stage 2 survey - frequency of face-to-face interviews by vulnerability subgroup

Vulnerability group	Interviews
Very low income	29
Disconnected	12
Age disconnected	28
Literacy	31
Total	**100**

Sample Characteristics and Weighting

Households

The target and achieved sample profiles were as shown in Table 15. To correct for the divergences between the population target profile and the achieved sample proportions,

we again performed iterative proportional fitting, or raking, to produce a set of calibrated survey weights such that the sample weighted totals of control variables matched the known population totals.

Table 22. Stage 2 survey - target and achieved household sample profiles

Demographic	Target	Achieved
SEG		
AB	27%	50%
C1	29%	17%
C2	22%	9%
DE	22%	24%
Age		
18-34	16%	16%
35-54	35%	34%
55+	49%	50%
Gender		
Male	49%	53%
Female	51%	47%

Non-households

A detailed breakdown of non-household sample characteristics is given in Section 4. No weights were applied to the non-household data.

Survey Enjoyment

All participants were asked to rate their enjoyment in completing the survey using a scale of 1 to 10 where 1 means 'low enjoyment' and 10 means 'high enjoyment'. Table 16 shows mean ratings given by participants by survey type[5].

Table 23: Stage 2 survey - enjoyment ratings

Survey enjoyment	HH Online	HH CAPI	NHH CATI
Mean rating	4.8	6.8	6.4
Base size	552	100	299

[5] Unweighted data

4 SAMPLE CHARACTERISTICS

4.1 Introduction

This section presents descriptive charts and statistics from all the non-SP questions in the survey for both the Stage 1 and Stage 2 surveys. This includes information on: household and business demographics; current bill levels; experiences of water service failures; 'simple' priorities for service improvement, and participant feedback on the survey.

4.2 Household Demographics

Over half of participants in all four samples were economically active (employed full- or part-time). At least 43% were educated to at least degree level in all 4 samples; and at most 10.4% had no qualifications.

Table 24. Employment status

Employment status	Dual	Bristol	B'mouth	Stage 2
Working full-time (30+ hours a week)	42.5%	45.9%	49.0%	41.1%
Working part-time (8-29 hours a week)	8.3%	11.0%	7.2%	9.2%
Not working - looking for work	1.8%	1.3%	0.4%	2.5%
Not working - not looking for work	3.0%	3.0%	1.6%	4.9%
Full-time student	0.8%	1.7%	1.6%	0.2%
Part-time student	0.1%	0.1%	0.0%	0.0%
Retired	33.6%	26.9%	31.7%	34.2%
Retired unpaid voluntary work	2.8%	2.1%	1.6%	3.2%
Looking after family/home	3.1%	3.0%	1.2%	1.8%
Other	2.5%	3.1%	2.8%	2.0%
Prefer not to say	1.6%	2.0%	2.8%	0.9%

Table 25. Level of education

Level of education	Dual	Bristol	B'mouth	Stage 2
No qualifications	8.3%	5.6%	3.2%	10.4%
Level 1: 1-4 O Levels/CSE/GCSEs (any grades) etc	8.5%	7.1%	6.0%	7.2%
Level 2: 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), etc	11.0%	13.0%	12.9%	11.2%
Apprenticeship	1.8%	1.8%	3.2%	2.0%
Level 3: 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, etc	13.4%	14.2%	12.9%	15.2%
Level 4 and above: Degree (for example BA, BSc), Higher Degree etc	43.1%	48.7%	47.4%	44.2%
Other qualifications: Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown)	6.3%	4.2%	8.8%	4.9%
Prefer not to say	7.8%	5.5%	5.6%	4.9%

4.3 Non-household Demographics

The main business activity in all four samples was wholesale and retail trade, ranging from 16.7% in Stage 2 to 20% in the Bournemouth Water area.

Table 26. Business activity

Business activity	Dual	Bristol	B'mouth	Stage 2
Agriculture, Forestry and Fishing	2.7%	0.0%	0.0%	4.3%
Mining and Quarrying	0.0%	0.3%	0.0%	0.0%
Manufacturing	8.3%	5.3%	8.0%	8.7%
Energy or water service & supply	0.7%	1.0%	0.0%	0.3%
Construction	5.7%	5.7%	8.0%	4.3%
Wholesale and retail trade (incl motor vehicles repair)	18.7%	19.3%	20.0%	16.7%
Transport and storage	1.3%	2.3%	2.0%	0.7%
Hotels & catering	8.3%	9.3%	18.0%	10.7%
IT and Communication	3.0%	2.3%	2.0%	2.7%
Finance and insurance activities (incl real estate activities)	4.7%	6.0%	8.0%	3.0%
Business services	3.7%	4.7%	6.0%	4.7%
Government, health & education	14.0%	7.7%	0.0%	12.0%
Arts, entertainment and recreation	5.3%	5.7%	6.0%	4.3%
Other service activities	3.3%	7.7%	4.0%	6.7%
Other	20.3%	22.7%	18.0%	21.0%

The majority of business - between 46% and 56% across the four samples - were medium-sized with 4 to 49 employees.

Table 27. Number of employees at the business premises

Number of employees	Dual	Bristol	B'mouth	Stage 2
None, sole trader	11.7%	10.7%	10.0%	14.0%
Less than 4 employees	24.0%	23.0%	14.0%	24.0%
4 to 49 employees	46.3%	50.7%	56.0%	48.0%
50 to 249 employees	10.7%	11.0%	14.0%	8.0%
Over 250 employees	7.3%	4.7%	6.0%	6.0%

4.4 Current Bill Levels

All household participants were asked to indicate the size of their water bill, if they knew it. They were able to provide figures on a weekly, monthly or annual basis, whichever they felt appropriate, and a total annual figure was calculated from this. Between 22% (Bristol) and 46% (Bournemouth) of customers were not able to provide a figure for their bill. Table 28

shows the values of the annual water services bill for all participants as the mean annual bill size for each sample.

Table 28. Annual bill – Household participants

Annual bill size	Dual	Bristol	B'mouth	Stage 2
0 to £100	0.3%	1.0%	6.4%	0.5%
£101 to £200	6.9%	7.1%	27.7%	7.2%
£201 to £300	13.0%	15.1%	56.6%	13.3%
£301 to £400	14.8%	17.4%	6.4%	13.5%
£401 to £500	40.6%	39.0%	2.0%	38.0%
£501 +	24.5%	20.4%	0.8%	27.5%
Mean annual bill (£.hh.year)	*£476.9*	*£418.8*	*£218.7*	*£467.6*

As for households' perception of bill, Table 29 shows that the majority (more than 50%) across all samples think they pay about right by way of water and wastewater bill.

Table 29. Household perceptions of bill

Annual bill size	Dual	Bristol	B'mouth	Stage 2
Far too little	0.3%	0.2%	0.0%	0.0%
Slightly too little	0.0%	0.4%	1.6%	0.8%
About right	53.5%	50.8%	58.2%	52.5%
Slightly too much	32.1%	36.0%	32.1%	33.4%
Far too much	14.1%	12.5%	8.0%	13.3%

Turning to non-domestic bills, Table 30 shows that nearly two thirds of non-household customers have bills less that £1,000 per year. As for perceptions of bill, roughly quarters of non-household customers think that the amount they pay is 'about right'.

Table 30. Annual bill – Non-household participants

Annual bill size	Dual	Bristol	B'mouth	Stage 2
Less than £1,000	62.3%	63.3%	62.0%	62.0%
£1,000 - £5,000	9.0%	6.0%	32.0%	5.0%
£5,001 - £20,000	28.0%	30.3%	6.0%	32.3%
£20, 001 - £100,000	0.7%	0.3%	0.0%	0.7%
Over £100,000	0.0%	0.0%	0.0%	0.0%
Mean annual bill	*£4,185.3*	*£4,058.8*	*£2,424.2*	*£4,322.6*

Table 31. Non-household perceptions of bill

Annual bill size	Dual	Bristol	B'mouth	Stage 2
Far too little	0.3%	0.0%	2.0%	0.3%
Slightly too little	2.0%	1.7%	0.0%	1.0%
About right	72.3%	74.7%	78.0%	71.0%

Slightly too much	17.7%	14.0%	12.0%	21.0%
Far too much	7.7%	9.7%	8.0%	6.7%

4.5 Experience of Water and Sewerage Service Failures

Table 32 and Table 33 present the proportions of household and non-household customers that reported having experienced service failures of various kinds. Results for households show that for water service failures, Dual-service customers had experienced supply interruptions, taste and smell problems and low water pressure the most (14.5%, 13% and 10.1%). Moreover, 42% Bristol Water customers had experienced road and traffic disruptions due to water works causing traffic disruption.

In respect of the wastewater service measures, loss of toilet facilities was the most commonly reported problem across the three water company areas. Similar observations can be made for non-households, which also seem to have frequently encountered sewer flooding problems.

Table 32. Service issues experienced by household customers

Water service failure	Dual	Bristol	B'mouth
Unplanned interruptions to water	14.5%	11.1%	-
Planned interruptions to water		8.1%	-
Restriction on essential use of water lasting 2 months	0.6%	0.4%	-
Hosepipe ban	1.0%	1.1%	-
Discoloured water	8.4%	8.8%	-
Water taste & smell not ideal	13.0%	13.7%	-
Occasional low water pressure	10.1%	18.5%	-
Poor response time to fixing mains leaks	2.0%	-	-
Road and traffic disruptions caused by water company	-	42.0%	-
Low river flow	1.3%	-	-
Loss of toilet facilities	2.4%	5.1%	6.4%
Sewer flooding inside your property	0.3%	1.3%	1.2%
Sewer flooding outside your property	3.0%	3.5%	4.0%
Sewer flooding in public areas	2.9%	3.7%	3.6%
Sites where dilute sewage spills into rivers and estuaries	0.6%	2.2%	2.0%
Poor bathing water quality	1.1%	3.8%	2.4%
Poor river water quality	1.4%	4.1%	3.2%

Table 33. Service failures experienced by non-household customers

Water service failure	Dual	Bristol	B'mouth
Unplanned interruptions to water	10.3%	12.0%	-
Planned interruptions to water		9.7%	-
Restriction on essential use of water lasting 2 months	0.0%	0.3%	-
Hosepipe ban	0.3%	0.7%	-
Discoloured water	7.3%	9.0%	-
Water taste & smell not ideal	10.0%	14.0%	-
Occasional low water pressure	7.3%	16.7%	-
Poor response time to fixing mains leaks	2.3%	-	-
Road and traffic disruptions caused by water	-	43.7%	-
Low river flow	4.0%	-	-
Loss of toilet facilities	5.7%	4.7%	12.0%
Sewer flooding inside your property	3.0%	5.0%	4.0%
Sewer flooding outside your property	6.3%	8.3%	12.0%
Sewer flooding in public areas	6.0%	7.7%	6.0%
Sites where dilute sewage spills into rivers and estuaries	1.3%	2.7%	2.0%
Poor bathing water quality	1.0%	6.3%	2.0%
Poor river water quality	2.0%	9.0%	4.0%

4.6 Priorities for Service Improvements

After learning about the different service measures and the current levels of service, but before moving into the first choice exercise, participants were asked: "*Which of these service failures on the card, if any, would you most like to see improved in the future?*". Participants could give multiple responses if they chose to, or could say "None" if they would rather not see any improvements.

As shown in Table 34 and Table 35, 'poor river quality' was indicated as a priority for improvement by more households in the Dual-service and Bristol Water areas than any other service measure (19% and 28.3%, respectively), while 'poor bathing quality was a top priority for most Bournemouth Water customers. In contrast, loss of toilet facilities and sewer flooding inside properties was chosen by the fewest customers as top priority across all three water company areas.

For businesses, the most popular response was water taste and smell not ideal and sewer flooding in public areas (and road traffic disruptions caused by water works for Bristol Water customers), while the least commonly chosen responses were restriction on essential use of water lasting 2 months and hosepipe ban (and Sites where dilute sewage spills into rivers and estuaries for Bournemouth Water customers).

We refer to the results as participants' 'simple priorities', which distinguishes them from the truer priorities that will emerge from application of CBA using the main WTP results obtained from the choice responses. These simple priorities do not factor in the extent of any improvement, the cost of that improvement, or the context in which the improvement

is to be applied with respect to the overall package composition and cost. All of these factors are accounted for when applying CBA with the main WTP results obtained from the choice responses.

The most useful application of these results is as a means of cross-checking the answers that emerge from the main choice exercise analysis. This is done by introducing the answers to these simple priority questions as explanatory factors in the econometric models based on the choice data to verify that they are correlated in the expected way, namely that those choosing a particular service measure as the most important to improve tend to give that measure a greater weight than other participants when making their choices. This analysis is reported on in Appendix A for household customers.

Table 34. Service improvement priorities for household customers

Service issue	Dual	Bristol	B'mouth
Poor river water quality	19.0%	28.3%	18.9%
Road and traffic disruptions caused by water works	-	23.7%	-
Water taste & smell not ideal	18.4%	22.5%	-
Low river flow	14.0%	-	15.7%
Occasional low water pressure	12.1%	14.5%	-
Sites where dilute sewage spills into rivers and estuaries	11.8%	17.3%	26.9%
Poor bathing water quality	11.0%	16.9%	34.5%
Planned interruptions to water	8.0%	7.9%	-
Unplanned interruptions to water		12.1%	-
Discoloured water	8.0%	13.3%	-
Sewer flooding in public areas	7.3%	9.9%	28.5%
Poor response time to fixing mains leaks	6.9%	-	-
Sewer flooding outside your property	4.6%	8.0%	16.9%
Restriction on essential use of water lasting 2 months	4.3%	5.6%	-
Hosepipe ban	4.0%	10.8%	-
Sewer flooding inside your property	3.9%	7.6%	10.4%
Loss of toilet facilities	3.5%	8.1%	9.2%

Table 35. Service improvement priorities for non-household customers

Service issue	Dual	Bristol	B'mouth
Road and traffic disruptions caused by water works	-	22.7%	-
Water taste & smell not ideal	12.3%	13.0%	-
Sewer flooding in public areas	10.0%	11.0%	16.0%
Unplanned interruptions to water	8.7%	5.7%	-
Planned interruptions to water	8.7%	5.7%	-
Occasional low water pressure	8.7%	5.3%	-
Poor river water quality	7.7%	16.7%	16.0%
Loss of toilet facilities	7.3%	4.3%	14.0%
Sewer flooding outside your property	7.3%	10.3%	20.0%
Poor response time to fixing mains leaks	6.7%	-	-
Sewer flooding inside your property	6.3%	8.3%	18.0%
Discoloured water	6.0%	6.0%	-
Low river flow	5.7%	-	-
Poor bathing water quality	5.7%	9.7%	16.0%
Sites where dilute sewage spills into rivers and estuaries	4.7%	10.0%	10.0%
Restriction on essential use of water lasting 2 months	4.0%	4.3%	-
Hosepipe ban	3.0%	2.3%	-

4.7 Participant Feedback

The SP element of the survey was fairly complex, in that there were a number of service measures being valued and some of them will have been unfamiliar to participants. It is therefore important to carry out validity checks on participants' understanding and ability to make comparisons.

Table 36 shows results from four participant feedback questions; the first relates to the ability to make comparisons in the MaxDiff exercise in both Stage 1 and Stage 2 exercises, and the remaining relate to the ability to make comparisons, ease in understanding and implausibility of the Stage 1 and Stage 2 DCE exercise. The results show that the overwhelming majority was able to make comparisons in both MaxDiff and DCE exercises with no problems; found the levels in the DCE questions easy to understand and did not find any of the service levels implausible.

Table 36. Participant feedback to Stage 1 survey, by customer type and sample

Question	Household			Non-household		
	Dual	Bristol	B'mouth	Dual	Bristol	B'mouth
MaxDiff exercise Did you generally feel able to make comparisons between the two options presented to you?	90.9%	91.5%	86.3%	91.3%	97.7%	86.0%
Package exercise Did you generally feel able to make comparisons between the options I presented to you?	88.1%	90.3%	91.6%	96.3%	94.3%	98.0%
Did you find each of the levels of service we described easy to understand?	88.6%	88.7%	90.0%	94.3%	96.7%	98.0%
Were any of the service levels so low or so high that they were implausible?	21.5%	21.1%	19.3%	31.3%	21.7%	12.0%

Table 37. Participant feedback to Stage 2 survey, by customer type

Feedback question	Households	Non-households
MaxDiff exercise Did you generally feel able to make comparisons between the two options presented to you?	84.4%	84.0%
Water resources exercise Did you generally feel able to make comparisons between the options I presented to you?	85.4%	88.7%
Did you find each of the levels of service we described easy to understand?	83.9%	92.0%
Were any of the service levels so low or so high that they were implausible?	11.5%	13.0%

5 MAIN RESULTS

5.1 Introduction

Our approach to estimating WTP involved extensive use of econometric analysis. This analysis is presented in detail in Appendix A for households and Appendix B for non-households. In summary, our methodology involved the following steps.

From the Stage 1 survey:

- First, impact scores were estimated, via econometric modelling of responses to the MaxDiff exercise. These show the relative impacts of each service issue in relation to one another.

- Next, 'package values' were estimated via econometric modelling of responses to the Package exercise. These represented values for the full range of service change for each package valued: status quo (SQ) to +1, +1 to +2 and the deterioration package SQ to -1.

- Individual service measure weights were then derived for each package level change (e.g. SQ to +1) by multiplying the impact scores derived in the first stage by the change in the chance that the service issue in question would happen given the package level change in service, and scaling to sum to 100% over service measures.

  This stage involved imposing assumptions on the chance of being affected by the environmental service issues. The assumptions are discussed in 5.2 below.

- Each package value was then divided between each service measure change in proportion to the service measure weights to derive our main WTP/WTA estimates for changes in individual service levels.

From the Stage 2 survey:

- WTP values were estimated for water supply-demand measures using data from the water resources SP exercise.

- These values were then scaled using results from the Stage 1 survey analysis to obtain consistency in values across the two surveys.

Additionally, we have conducted an analysis of variation in customers' preferences for households and non-households. This included traditional segmentation analysis with respect to demographic variables plus, in addition, an exploration of the impact of experience and attitudes on preferences.

The remainder of this section presents the valuation results in three parts. Section 5.2 focusses on the Stage 1 survey analysis and includes estimates of the Impact scores pertaining to the range of service issues explored, our estimates of customers' WTP for service level changes between, for example, SQ and Level +1, for each of the service measures, and a sensitivity analysis around these main estimates. Section 5.3 then presents the MaxDiff impact scores and WTP values from the Stage 2 Customer Engagement and Water Resource Management exercises, respectively. The final part of this section summarises the results from our multivariate analyses of the variation in values across participants. This part reports on the extent to which choices were consistent with expectation across the surveys.

Full technical details of how the Stage 1 and Stage 2 results were derived, including all supporting results, are contained in Appendix A for households and Appendix B for non-households.

5.2 Stage 1 Survey

MaxDiff Impact Scores

The MaxDiff model estimates are presented and briefly discussed in terms of model fit in Appendix A (households) and Appendix B (Non-households). The impact scores (exponents of the coefficients) for the household and non-household samples are presented in Table 38 and Table 39 below.

Results for both the household and non-household samples show that the rankings of the impact scores are broadly consistent for the dual-service, Bournemouth and Bristol Water customers, giving us confidence in the validity of the data and analyses. The results show that 'Sewer flooding inside your property' was estimated to have the highest relative impact, and 'Bathing water at your local beach is Good but not Excellent' was estimated to have the lowest relative impact across the three companies. Note here that as a result of Bournemouth Water customers being in coastal areas to a larger extent than customers of the other two areas, they are expected to have a higher appreciation for bathing waters. This explains the fact that Bournemouth Water impact scores are 'shrunk', as it were, as they seem to have gravitated towards 'Bathing water quality good but not excellent', the baseline, which in Bournemouth.

Table 38. MaxDiff impact scores for the household sample

Service measure	Dual	B'mouth	Bristol
Sewer flooding inside customers' properties	62.09	23.28	59.68
Sewer flooding outside customers' properties	26.38	7.74	24.03
Restricted toilet use due to overloaded sewers	12.92	6.04	15.52
Restrictions on essential use of water	9.70	-	19.99
Unexpected supply interruption lasting >24 hours	-	-	11.19
Unexpected supply interruption lasting 12-24 hours	-	-	9.86
Unexpected supply interruption lasting 6-12 hours	6.84	-	9.68
Planned supply interruption lasting 12-24 hours	-	-	5.89
Persistent low water pressure	5.60	-	2.70
Sewer flooding in public areas	5.02	2.43	5.23
Planned supply interruption lasting >24 hours	-	-	5.17
Response time	3.99	-	-
Unexpected supply interruption lasting 3-6 hours	3.75	-	4.59
Pollution incidents	3.55	1.52	3.73
Water taste & smell not ideal	3.53	-	4.97
Planned supply interruption lasting 6-12 hours	3.00	-	4.08
Planned supply interruption lasting 3-6 hours	2.09	-	3.07
Planned and unplanned works causing traffic disruption	-	-	2.25
Discoloured water	1.84	-	2.03
River water quality less than good	1.63	1.13	1.79
Hosepipe ban	1.30	-	1.28
Bathing water quality sufficient but not good	1.22	1.01	1.05
River water flow lower than ideal	1.20	-	-
Bathing water quality good but not excellent	1.00	1.00	1.00

Table 39. MaxDiff impact scores for the non-household sample

Service measure	Dual	B'mouth	Bristol
Sewer flooding inside customers' properties	65.76	44.81	108.16
Sewer flooding outside customers' properties	44.70	43.97	50.49
Restricted toilet use due to overloaded sewers	26.05	22.07	29.95
Restrictions on essential use of water	18.30	-	32.16
Unexpected supply interruption lasting >24 hours	-	-	25.54
Unexpected supply interruption lasting 12-24 hours	-	-	19.62
Unexpected supply interruption lasting 6-12 hours	17.48	-	14.31
Unexpected supply interruption lasting 3-6 hours	15.71	-	11.54
Planned supply interruption lasting >24 hours	-	-	9.90
Planned supply interruption lasting 12-24 hours	-	-	8.39
Response time	10.57	-	-
Sewer flooding in public areas	8.55	5.90	6.29
Planned supply interruption lasting 6-12 hours	6.97	-	7.43
Water taste & smell not ideal	6.11	-	5.93
Planned and unplanned works causing traffic disruption	-	-	5.42
Persistent low water pressure	6.08	-	2.49
Planned supply interruption lasting 3-6 hours	5.90	-	5.21
Pollution incidents	4.29	2.49	4.93
Discoloured water	3.55	-	2.61
River water quality less than good	2.14	1.86	2.33
River water flow lower than ideal	1.69	-	-
Hosepipe ban	1.27	-	1.56
Bathing water quality good but not excellent	1.00	1.00	1.00
Bathing water quality sufficient but not good	0.87	1.25	0.95

Package values

This section begins by presenting descriptive statistics from the package responses, in the form of a chart showing the proportions of household and business customers choosing the Level +2 package instead of status quo package at varying levels of cost. We then present our main estimates of the values of packages of service change, as derived from the econometric analysis reported in Appendix A for households and Appendix B for businesses.

Descriptive Statistics

Figure 7, Figure 8 and Figure 9 and the corresponding Table 40 beneath show the proportions of household and business participants choosing the maximum +2 improvement package, rather than the status quo package, when asked directly via the Package exercise. The proportions are calculated such that if a participant said "yes" to, say "20%", s/he is also included in the proportion shown as being willing to pay all amounts less than 20%. Likewise, if a participant said "no" to, say "10%", s/he is also included in the proportion shown as being unwilling to pay all amounts greater than 10%.

All three charts show that customers attached a high value to the range of service level changes spanned by the whole package, and that non-households and households are willing to pay similar amounts. The median WTP (WTP at 50% proportion) for households and non-households are very similar in magnitude across all three companies.

If the numbers seem somewhat higher than might have been expected, then this may be influenced by the fact that costs appeared in the survey as cumulative changes; for example 10% (that is, £30 for a current bill of, say, £300) would appear as "Increase of £30 by 2024 Gradual increase of £6 every year between 2019 and 2024". It is likely that this form of presentation makes bill impacts appear less onerous to customers than a one-off change in bills, and so might have caused customers to be willing to pay more, with respect to the total cumulative change.

Furthermore, this "whole package" corresponds to the range from status quo to Level +2 (maximum improvement) for all service areas. It is therefore, importantly, likely to be of significantly greater scope than any service change under consideration by WW. This approach is conservative, in that, by construction, cost-benefit analysis (CBA) of feasible schemes should never result in a package of changes that exceeds participants' total willingness to pay.

Figure 7. Proportions of dual-service customers choosing '+2' over the status quo option, by customer type and cost difference

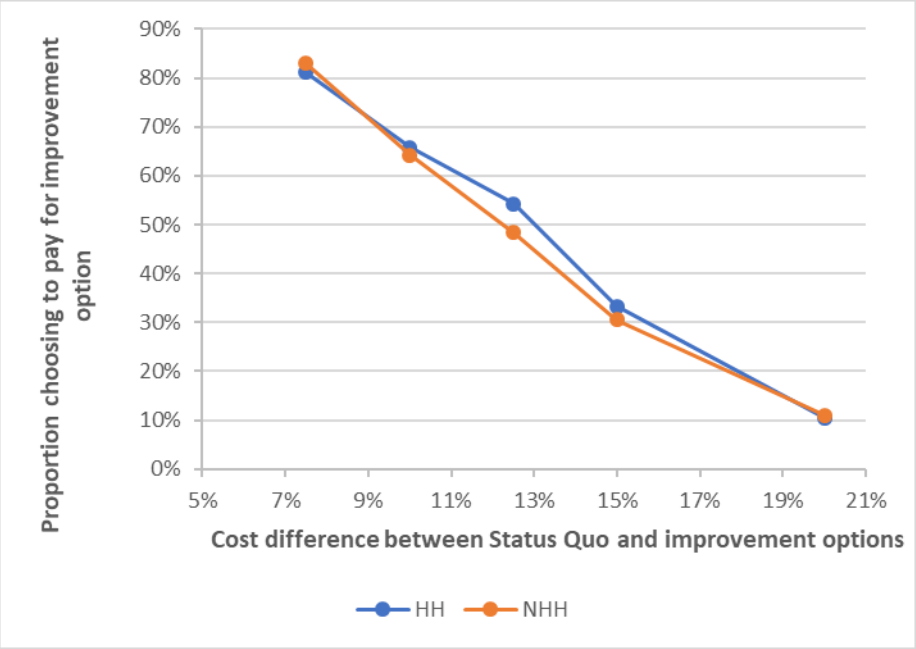


Figure 8. Proportions of Bristol Water customers choosing '+2' over the status quo option, by customer type and cost difference

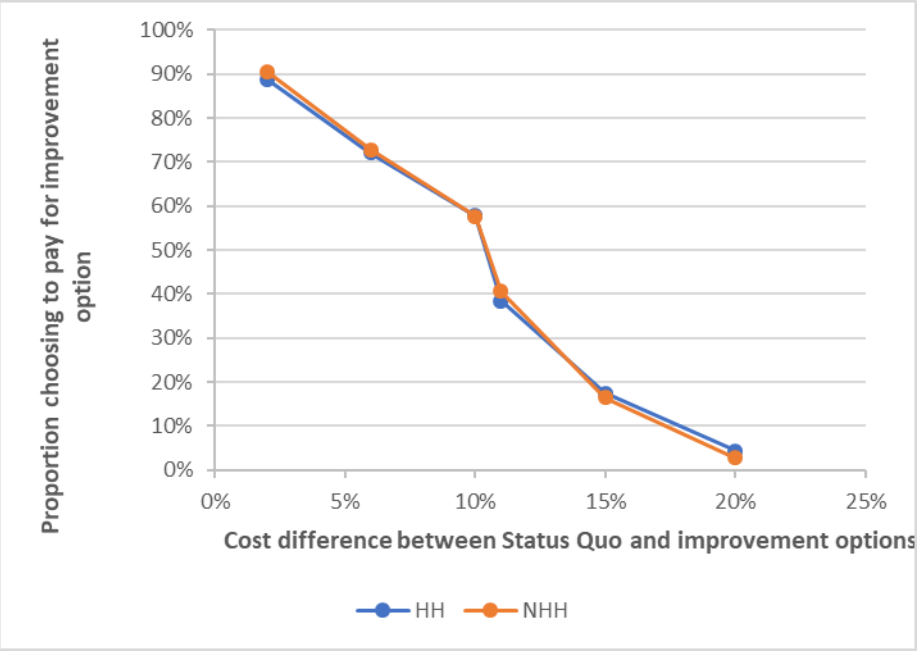


Figure 9. Proportions of Bournemouth Water choosing '+2' over status quo option, by customer type and cost difference

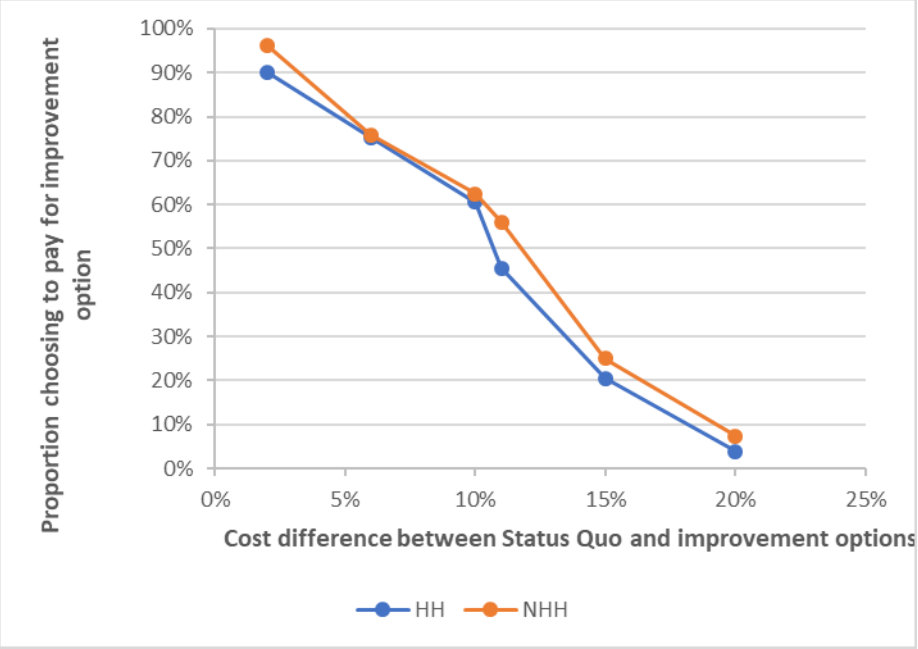


Table 40: Proportions choosing '+2' improvement over status quo option, by customer type and cost difference for the three supply areas

Cost difference[1]	Proportions choosing +2 improvement over status quo option[2]					
	Dual		Bristol		B'mouth	
	Households (N=800)	Non-Households (N=300)	Households (N=1116)	Non-Households (N=300)	Households (N=249)	Non-Households (N=50)
2%	-	-	88.9%	90.6%	90.1%	96.2%
6%	-	-	72.1%	72.8%	75.2%	75.9%
7.5%	81.1%	83.0%	-	-	-	-
10%	65.8%	64.2%	57.8%	57.6%	60.5%	62.5%
11%	-	-	38.4%	40.6%	45.5%	56.0%
12.5%	54.3%	48.3%	-	-	-	-
15%	33.3%	30.5%	17.5%	16.5%	20.5%	25.0%
20%	10.5%	11.0%	4.3%	2.8%	3.9%	7.4%
25%	1.1%	4.8%	-	-	-	-

The symbol "-" indicates that participants were not offered a choice at the corresponding cost difference between the status quo and +2 improvement options in the package questions, expressed as a percentage of the participant's 2017/18 water and sewerage bill amount. (2) Figures are calculated as the number choosing the improvement option at the cost difference shown, or any amount higher than this, divided by this plus the number choosing the status quo option at the cost difference shown or any amount lower.

Econometric Estimates

The choice data were analysed using conditional logit models for the Package data and rank-ordered logit models for the MaxDiff data. Details of the modelling methodology and all interim findings are reported in Appendices A and B for households and non-households respectively.

The models estimated on the Package responses allowed different values to be obtained, in absolute terms, for improvements in services in comparison to deteriorations of the same degree. There is a substantial literature suggesting that people might be less willing to accept reductions in service in exchange for reduced bills, than they would be willing to pay for the same service change in reverse. We would therefore expect willingness to accept (WTA, the value of a deterioration) to be greater, if not virtually infinite, in absolute terms, than WTP (the value of an equivalent improvement).

Our findings from this modelling showed clearly that this was the case. Participants' choices were much less sensitive to the size of a bill reduction on average than they were to the size of a bill increase. In the case of Bristol household customers, and Dual and Bristol Water non-household customers, customers seemed to be opposed to the idea of bill reduction altogether (as attested by the positive sign obtained for the bill change coefficient when the bill change was negative). Overall, no realistic bill reduction would lead households or non-households, on average, to prefer a widespread service deterioration.

Table 41 and Table 42 present whole package WTP results for household and non-household customers of the three companies under study, respectively. These WTP values

are for all the service measure under study moving from their base service level to +1 improvement or -1 deterioration, or from a +1 to a +2 improvement. The figures in these tables show the maximum extra from 2024/25 that customers were willing to pay, on average, for the package shown, where the actual cost gradually adjusts over five annual increments. For example, a value of £10 would correspond to a £2 increment per year for five years from 2020/21 to 2024/25 inclusive, leading to a total change of +£10 from 2024/25 onwards.

The tables show "central" estimates as well as a sensitivity range around these estimates. The central estimates are based on the full sample for each customer type. The ranges around the central values are based on the lower and upper bounds of the 95% confidence intervals of the WTP estimates.

Table 41. Household WTP for whole package improvements/deterioration by company (£/hh/year)

Variable	WTP/WTA (range)		
	Dual	Bristol	B'mouth
SQ to -1	-£229.69	-	-£96.56
	(-£571.31 ; £111.93)	-	(-£287.46 ; £94.34)
SQ to +1	£30.15	£20.94	£32.62
	(£25.18 ; £35.12)	(£17.65 ; £24.24)	(£20.75 ; £44.50)
+1 to +2	£6.60	£12.15	£15.70
	(£2.99 ; £10.21)	(£9.52 ; £14.78)	(£8.08 ; £23.31)

Table 42. Non-household WTP for whole package improvements/deterioration by company (£/nhh/year)

Variable	WTP/WTA (range)		
	Dual	Bristol	B'mouth
SQ to -1	-	-	-£469.75
	-	-	(-£2034.75 ; £1095.26)
SQ to +1	£148.52	£151.61	£99.92
	(£105.61 ; £191.42)	(£124.49 ; £178.73)	(£55.81 ; £144.03)
+1 to +2	£89.15	£68.46	£60.73
	(£8.31 ; £169.99)	(£14.78 ; £122.14)	(£32.10 ; £89.36)

The household results in Table 41 show that the central estimates of maximum value that household customers would be prepared to pay by 2024/25 for the service package where all measures improve to Level +1 would be increments of £30.15, £20.94, £32.62 to the annual bills of Dual-service, Bristol Water and Bournemouth Water customers, respectively, and maximum they would be prepared to pay for an additional improvement package from level +1 to +2 would be extra increments of £6.60, £12.15 and £15.70 per year on to their respective bills over and above the +1 improvement increments. For non-household customers, the comparable estimates for Dual-service, Bristol Water and Bournemouth Water customers are £148.52, £151.61 and £99.92, respectively, for +1 improvements, and additional increments £89.15, £68.46 and £60.73 for +1 to +2 improvements. These figures

are in real terms, i.e., excluding inflation, which participants were made aware would be added on top.

Mapping Packages to MaxDiff Units

Following the approach outlined in 5.1, we required a mapping from the service change represented in the Package exercise to units of service issues as presented in the MaxDiff exercise in order to apportion the package values into amounts corresponding to each service measure. Essentially, the proportion of the package value that is assigned to an individual service level change is the product of two components: the change in the chance that an individual is affected by the corresponding MaxDiff service issue(s) and the relative impact of that/those service issue(s) if they were to occur. Here we are focussed on the first part: mapping the package service level changes in units of change in the chances that MaxDiff service issues occur.

For the majority of the service measures explored, the mapping from Package unit to Maxdiff unit(s) was straightforward. In the simplest case – temporary use bans and non-essential use bans – the mapping was one-to-one because the Package unit was already expressed as the chance that an average property will be affected.

Additionally, in many cases the Package service measures are in units of 'properties affected'. In this case, the mapping to MaxDiff units is simply to divide the number of package units by the number of customers in the corresponding service area (water or wastewater). By so doing, a 1 property reduction in the Package service measure is translated into a 1/N change in the risk of an average individual experiencing the MaxDiff service issue in question.

Table 43 shows all the service measure mappings from Package units to MaxDiff units.

The assumptions underlying the conversion factors shown in this table were all agreed with Wessex Water.

Table 43: Mapping from Package measures to MaxDiff units

Package service measure	Package unit	MaxDiff service issue	Scaling factor
Water service			
Supply interruptions (lasting an average of 6 hours	No./year	Unexp. interruption (3-6 hours)	p_{U36}/N_Water(1)
		Unexp. interruption (6-12 hours)	p_{U612}/N_Water(1)
		Plan. interruption (3-6 hours)	p_{P36}/N_Water(1)
		Plan. interruption (6-12 hours)	p_{P612}/N_Water(1)
Non-ideal taste & odour (few days)	No./year	Non-ideal taste & odour (few days)	1/N_Water(1)
Discoloured water (few hours)	No./year	Discoloured water (few hours)	1/N_Water(1)
Persistent low water pressure	No./year	Persistent low water pressure	1/N_Water(1)
Response time for fixing leaks	% fixed<1 day	Response time for fixing nearby leak > 1 day	2000*12/ N_Water(2)
Temporary use bans (5 months)	Chance/year	Temporary use ban	1(3)
Non-essential use bans	Chance/year	Non-essential use ban	1(3)
Restrictions on essential use of water	Chance/year	Restrictions on essential use of water	1(3)
River with less than ideal flow levels	Miles	River with less than ideal flow levels	kmpermile/ riverkm_Water(4)
Wastewater service			
Restricted toilet use due to sewers being overloaded	No./year	Restricted toilet use	1/N_Waste(5)
Sewer flooding inside customers' properties (no./year)	No./year	Sewer flooding inside your property	1/N_Waste(5)
Sewer flooding outside customers' properties (no./year)	No./year	Sewer flooding immediately outside your property	4/N_Waste(6)
Sewer flooding in public areas (no./year)	No./year	Sewer flooding in a nearby public area	1/N_Waste(5)
Sites where dilute sewage spills into rivers and estuaries	Sites	Dilute sewage occasionally spills nearby	1 / riverkm_Waste(7)
Bathing waters at less than good status (out of 47 in total)	Sites	Bathing water quality at nearest beach Sufficient but not Good	1/beaches(8)
Bathing waters at good but not excellent status (out of 47 in total)	Sites	Bathing water quality at nearest beach Good but not Excellent	1/beaches(8)
River at less than good status (out of 2,429 miles in total)	Miles	River water quality in your local area less than Good	kmpermile / riverkm_Waste(9)

(1) 'p_{U36}' represents the proportion of interruptions that are unexpexted and last 3-6 hours; `N_Water' represents the number of water customers, hence p_{U36}/N_Water represents the change in the chance of a water customer being affected by an unexp. 3-6h interruption if there are 1 fewer properties affected by supply interruptions overall; p_{U36}+ p_{U612}+ p_{P36}+ p_{P612} =1. (2) Based on 2000 leaks per year and 12 properties affected per leak (WW data). (3) The Package unit is already the chance of being affected so the mapping is 1:1 in this case. (4) 'riverkm_Water' represents the length of river in WW's water supply area. This scaling factor is based on the assumption that 1% of the river is considered local by 1% of customers, or equivalently that an improvement to 1% of the river network benefits 1% of customers. (5) 'N_Waste' represents the number of wastewater customers, hence 1/N_Waste represents the change in the chance of a wastewater customer being affected by a service issue if there are 1 fewer properties affected overall; (6) based on the (WW) assumption of 4 properties affected per incident. (7) Based on the assumption, as above, that an improvement to 1% of the river network benefits 1% of customers; and also that each CSO affects 1km of river. (8) As with rivers, this is based on the assumption that an improvement to 1% of coastal bathing waters affects 1% of customers, and hence that the chance of experiencing the service issue falls by 1%. (9) As above, based on the assumption that 1% of the river is considered local by 1% of customers, or equivalently that an improvement to 1% of the river network benefits 1% of customers.

Importantly, the conversion factors embed the following assumptions:

- Leaks: There are 2,000 leaks per year in the WW supply area, and each affects 12 properties.

- River water flows: 1% of river local to 1% of properties (water area)

- Restricted toilet use; Sewer flooding inside your property; Sewer flooding immediately outside your property: For each property affected in the wastewater supply area, 0.46 properties are affected in Dual-service area, 0.13 in the Bournemouth area and 0.41 in the Bristol area

- Sewer flooding in public areas: for each sewer flooding incident in a public area, four wastewater properties are affected

- CSO spills affecting rivers: Each CSO is assumed to affect 1km of river, and 1% of river is assumed to be local to 1% of properties (wastewater area)

- Bathing water quality: 1% of bathing waters are assumed to be local to 1% of properties (wastewater area)

- River water quality: 1% of river local to 1% of properties (wastewater area)

Given the dependency of the wastewater service values to scaling factors used in the mapping of Bristol Water's water service measures, the following additional assumption - agreed with Bristol Water - is pertinent to WW.

- Planned and unplanned works: 784 households and non-households are impacted by Bristol Water works on roads in the Bristol area for every complaint received by the company. This assumption is based on an analysis of the number of complaints received in the past year as a proportion of the Bristol Water customer base in comparison to the proportion of the Bristol Water WTP survey sample who said they had experienced roadworks caused by Bristol Water in the past year.

With respect to the environmental measures, the scaling factors used to map the Package measures to the chance of experiencing the corresponding MaxDiff service issue were based on two assumptions:

i) that CSO spills affect 1km of river on average, and
ii) that 1% of the river is considered local by 1% of customers, or equivalently that an improvement to 1% of the river network benefits 1% of customers. (This equates to 305 properties per km improved in the wastewater area and 207 properties per km improved in the water area)

The first of these assumptions is based on FWR descriptions of Category 2 and Category 3 pollution incidents, as shown below. Clearly pollution incidents vary in length, but 1km was considered to be a reasonable average figure to use in the absence of hard data.

Cat 2	Significant but normally localised effect on water quality which has a significant impact on the quality or use of that water. § For surface waters, examples of Category 2 impacts include silt or soil, low dissolved oxygen or high ammonia levels along an extensive stretch of a water body. Impacts may be up to a couple of hundred metres in a larger water body or effects over several kilometres (such as a heavy rainbow coloured oil film).
Cat 3	Limited and localised effect on water quality which has a minimal impact on the quality or use of that water. § For surface waters, impacts are normally localised around the point of discharge, but could include an impact extending over a few kilometres of a stream (such as a thin oil sheen).

Source: Foundation for Water Research (http://www.fwr.org/WQreg/Appendices/Common_incident_classification_system_04_01.pdf)

With regard to the second assumption, that 1% of the river is considered local by 1% of customers, or equivalently that an improvement to 1% of the river network benefits 1% of customers, the basis for this is twofold: firstly, it is a simple linear interpolation from the end-points that no improvement will affect no-one, and a 100% improvement will affect everyone. Although it is possible that over any particular range of improvement there may be a more than proportional, or less than proportional, number of customers affected, overall this assumption again seems as accurate as possible in the absence of further data or research.

The second basis on which to support the assumption that 1% of the river network benefits 1% of customers comes from two additional supporting studies commissioned by Wessex Water to explore these assumptions. The first of these involved a literature review focused on any evidence that might contribute towards a judicious assumption, or range, for the area to be defined as 'local' for the purposes of setting scaling factors for the service issues affecting rivers. This review concluded that the "local area" used for the purposes of aggregation of unit values of willingness to pay for improvements in river water quality and other river attributes should be no wider than 2 km around the river. This distance is broadly consistent with the assumption that there are 207-305 properties affected per km of river improved. (See Accent-PJM,2017a.)[6]

An additional supporting study involved a hall-test methodology to interview 30 in-depth interviews with customers to explore their views on why they chose the options they did when asked the relevant SP questions from the main WTP survey, and how they were interpreting 'local area' in this context. The findings from this research were also supportive of the idea that 'local' meant very local, ie within 2km around the river, rather than further afield, but also with the idea that the likelihood of visiting was also an important factor in which rivers they were thinking about. (See Accent-PJM,2017b.)[7]

[6] Accent-PJM (2017a) Literature Review on the Public's Understanding of 'Local' in the Context of Rivers

[7] Accent-PJM (2017b) Water valuation assumptions testing: results of qualitative research.

Similar considerations to the above were the basis for our assumptions concerning bathing water quality. In this case, the mapping to MaxDiff units was based on the assumption that an improvement to 1% of the set of bathing waters in the WW wastewater supply area benefits 1% of customers in this area; hence the chance of experiencing 'Less than Good' locally falls by 1% given a 1% reduction in the proportion of bathing waters at Less than Good status. This assumption is consistent with the definition of the MaxDiff attributes, in that they specifically mentioned the 'nearest' beach rather than the more ambiguous 'nearby' or 'local area'. If everyone did consider their nearest beach, as was supported by the follow-up hall test research findings, then the assumption that an improvement to 1% of the set of bathing waters in the WW wastewater supply area benefits 1% of customers in this area must be true on average for the WW customer base.

WTP for Service Level Changes

Using the methodology described above, and in Appendix A, we apportion these whole package values to the individual service levels examined in the MaxDiff exercise. The main results are presented for (dual-customers') water services in Table 44. As for wastewater services, results are tabulated for the SQ to -1 deterioration and the SQ to +1 and +1 to +2 improvements, in Table 45, Table 46 and Table 47 respectively.

All service measures commanded some willingness to pay, but the variation was large. In terms of the water service measures, Restrictions on essential use of water and 3-6 hour planned interruptions commanded the highest WTP values among both household and non-household customers. In contrast, taste and smell and persistent low pressure commanded the lowest WTP values for both household and non-household customers.

Moving to the wastewater service measures, the environmental river and bathing water improvement attributes generally commanded the highest WTPs for improvements (namely miles of river water at less than good status, CSO spills influencing bathing water that is good but not excellent, and CSO spills impacting on river water quality), while WTP values for the sewerage service attributes (sewer flooding and restricted toilet usage) had the lowest WTP associated to them.

Table 44. Willingness to pay for water service level changes, by customer type and service change package

Service measure	Unit	Willingness to pay (£/customer/year)					
		SQ to -1		SQ to +1		+1 to +2	
		Central	Range	Central	Range	Central	Range
Households							
Unexpected interruption 3-6 hours	props/yr	-£4.97	(-£12.37 ; £2.42)	£0.39	(£0.32 ; £0.45)	£0.05	(£0.02 ; £0.08)
Unexpected interruption 6-12 hours	props/yr	-£2.27	(-£5.65 ; £1.11)	£0.24	(£0.20 ; £0.27)	£0.03	(£0.01 ; £0.05)
Planned interruption 3-6 hours	props/yr	-£4.85	(-£12.06 ; £2.36)	£1.65	(£1.38 ; £1.92)	£0.21	(£0.09 ; £0.32)
Planned interruption 6-12 hours	props/yr	-£0.99	(-£2.47 ; £0.48)	£0.10	(£0.09 ; £0.12)	£0.01	(£0.01 ; £0.02)
Discoloured water	cases/yr	-£2.48	(-£6.17 ; £1.21)	£0.32	(£0.26 ; £0.37)	£0.12	(£0.05 ; £0.18)
Taste and smell	cases/yr	-£0.30	(-£0.74 ; £0.15)	£0.04	(£0.03 ; £0.04)	£0.01	(£0.01 ; £0.02)
Persistent low pressure	props/yr	-£0.07	(-£0.18 ; £0.04)	£0.06	(£0.05 ; £0.07)	£0.00	(£0.00 ; £0.01)
Mains leaks fixed within a day	%	-£15.24	(-£37.91 ; £7.43)	£0.66	(£0.55 ; £0.77)	£0.07	(£0.03 ; £0.10)
Temporary Use Ban for 5 months	chance per year	-£4.71	(-£11.71 ; £2.29)	£0.49	(£0.41 ; £0.57)	£0.04	(£0.02 ; £0.06)
Restrictions on essential use of water	chance per year	-£17.62	(-£43.84 ; £8.59)	£2.19	(£1.83 ; £2.55)	£0.09	(£0.04 ; £0.14)
Length of river with less than ideal flow levels	miles	-£3.98	(-£9.90 ; £1.94)	£0.49	(£0.41 ; £0.58)	£0.05	(£0.02 ; £0.07)
All service measures		*-£57.49*		*£6.62*		*£0.68*	
Non-Households							
Unexpected interruption 3-6 hours	props/yr	-	-	£5.79	(£4.11 ; £7.46)	£2.13	(£0.20 ; £4.07)
Unexpected interruption 6-12 hours	props/yr	-	-	£2.15	(£1.53 ; £2.76)	£0.79	(£0.07 ; £1.51)
Planned interruption 3-6 hours	props/yr	-	-	£16.66	(£11.85 ; £21.47)	£6.15	(£0.57 ; £11.73)
Planned interruption 6-12 hours	props/yr	-	-	£0.86	(£0.61 ; £1.10)	£0.32	(£0.03 ; £0.60)
Discoloured water	cases/yr	-	-	£1.95	(£1.39 ; £2.51)	£2.16	(£0.20 ; £4.12)
Taste and smell	cases/yr	-	-	£0.26	(£0.19 ; £0.34)	£0.29	(£0.03 ; £0.55)
Persistent low pressure	props/yr	-	-	£0.24	(£0.17 ; £0.31)	£0.06	(£0.01 ; £0.11)
Mains leaks fixed within a day	%	-	-	£6.23	(£4.43 ; £8.03)	£1.84	(£0.17 ; £3.51)
Temporary Use Ban for 5 months	chance per year	-	-	£0.57	(£0.41 ; £0.73)	£0.50	(£0.05 ; £0.96)
Restrictions on essential use of water	chance per year	-	-	£14.77	(£10.50 ; £19.04)	£1.82	(£0.17 ; £3.47)
Length of river with less than ideal flow levels	miles	-	-	£2.48	(£1.77 ; £3.20)	£0.71	(£0.07 ; £1.36)
All service measures		-	-	*£51.95*		*£16.76*	

Table 45. Willingness to accept 'SQ to -1' packages of wastewater service level deterioriations, by customer type and area

Service measure	Unit	Willingness to pay (£/customer/year)					
		Dual		Bristol		Bournemouth	
		Central	Range	Central	Range	Central	Range
Households							
Internal sewer flooding	incidents/yr	-£0.55	(-£1.38 ; £0.27)	-	-	-£0.19	(-£0.56 ; £0.18)
External sewer flooding (inside boundary of property)	incidents/yr	-£0.34	(-£0.85 ; £0.17)	-	-	-£0.09	(-£0.28 ; £0.09)
External sewer flooding (outside boundary of property)	incidents/yr	-£1.76	(-£4.37 ; £0.86)	-	-	-£0.38	(-£1.12 ; £0.37)
Restricted Toilet Use (RTU)	incidents/yr	-£0.92	(-£2.30 ; £0.45)	-	-	-£0.33	(-£0.97 ; £0.32)
CSO Spills impacting on river water quality	No. of Improved CSOs	-	-	-	-	-	-
CSO spills influencing bathing water that is poor or sufficient but not good	Number of bathing waters	-£18.91	(-£47.03 ; £9.21)	-	-	-£11.33	(-£33.74 ; £11.07)
CSO spills influencing bathing water that is good but not excellent	Number of bathing waters	-£38.66	(-£96.18 ; £18.84)	-	-	-£28.17	(-£83.86 ; £27.52)
Miles of river at less than good status	miles	-£111.04	(-£276.21 ; £54.11)	-	-	-£56.07	(-£166.93 ; £54.79)
All service measures		*-£172.18*		-	-	*-£96.56*	
Non-Households							
Internal sewer flooding	incidents/yr	-	-	-	-	-£2.34	(-£10.15 ; £5.46)
External sewer flooding (inside boundary of property)	incidents/yr	-	-	-	-	-£0.61	(-£2.63 ; £1.42)
External sewer flooding (outside boundary of property)	incidents/yr	-	-	-	-	-£7.25	(-£31.40 ; £16.90)
Restricted Toilet Use (RTU)	incidents/yr	-	-	-	-	-£2.68	(-£11.61 ; £6.25)
CSO Spills impacting on river water quality	No. of Improved CSOs	-	-	-	-	-	-
CSO spills influencing bathing water that is poor or sufficient but not good	Number of bathing waters	-	-	-	-	-£47.61	(-£206.23 ; £111.01)
CSO spills influencing bathing water that is good but not excellent	Number of bathing waters	-	-	-	-	-£95.62	(-£414.17 ; £222.94)
Miles of river at less than good status	miles	-	-	-	-	-£313.66	(-£1,358.56 ; £731.28)
All service measures		-	-	-	-	*-£469.77*	

Table 46 Willingness to pay for 'SQ to +1' packages of wastewater service level improvements, by customer type and area

Service measure	Unit	Willingness to pay (£/customer/year)					
		Dual		Bristol		Bournemouth	
		Central	Range	Central	Range	Central	Range
Households							
Internal sewer flooding	incidents/yr	£0.07	(£0.06 ; £0.08)	£0.03	(£0.02 ; £0.03)	£0.05	(£0.03 ; £0.07)
External sewer flooding (inside boundary of property)	incidents/yr	£0.36	(£0.30 ; £0.42)	£0.13	(£0.11 ; £0.15)	£0.20	(£0.13 ; £0.27)
External sewer flooding (outside boundary of property)	incidents/yr	£0.19	(£0.16 ; £0.22)	£0.08	(£0.07 ; £0.09)	£0.17	(£0.11 ; £0.24)
Restricted Toilet Use (RTU)	incidents/yr	£0.11	(£0.10 ; £0.13)	£0.05	(£0.05 ; £0.06)	£0.10	(£0.06 ; £0.14)
CSO Spills impacting on river water quality	No. of Improved CSOs	£4.51	(£3.76 ; £5.25)	£1.87	(£1.58 ; £2.16)	£3.58	(£2.28 ; £4.89)
CSO spills influencing bathing water that is poor or sufficient but not good	Number of bathing waters	£1.96	(£1.64 ; £2.28)	£0.67	(£0.56 ; £0.77)	£2.99	(£1.90 ; £4.07)
CSO spills influencing bathing water that is good but not excellent	Number of bathing waters	£8.01	(£6.69 ; £9.33)	£3.16	(£2.66 ; £3.65)	£14.84	(£9.44 ; £20.25)
Miles of river at less than good status	miles	£8.32	(£6.95 ; £9.69)	£3.62	(£3.05 ; £4.18)	£10.69	(£6.80 ; £14.58)
All service measures		*£23.53*		*£9.60*		*£32.62*	
Non-Households							
Internal sewer flooding	incidents/yr	£0.83	(£0.59 ; £1.07)	£0.22	(£0.18 ; £0.26)	£0.83	(£0.46 ; £1.19)
External sewer flooding (inside boundary of property)	incidents/yr	£0.27	(£0.19 ; £0.34)	£1.25	(£1.03 ; £1.47)	£0.21	(£0.12 ; £0.31)
External sewer flooding (outside boundary of property)	incidents/yr	£2.20	(£1.56 ; £2.83)	£0.43	(£0.36 ; £0.51)	£2.54	(£1.42 ; £3.67)
Restricted Toilet Use (RTU)	incidents/yr	£1.17	(£0.83 ; £1.51)	£0.48	(£0.39 ; £0.57)	£0.95	(£0.53 ; £1.37)
CSO Spills impacting on river water quality	No. of Improved CSOs	£19.50	(£13.87 ; £25.13)	£11.30	(£9.27 ; £13.31)	£13.29	(£7.43 ; £19.16)
CSO spills influencing bathing water that is poor or sufficient but not good	Number of bathing waters	£5.00	(£3.55 ; £6.44)	£2.73	(£2.24 ; £3.22)	£8.39	(£4.69 ; £12.09)
CSO spills influencing bathing water that is good but not excellent	Number of bathing waters	£28.61	(£20.34 ; £36.87)	£14.43	(£11.84 ; £17.01)	£33.70	(£18.83 ; £48.58)
Miles of river at less than good status	miles	£39.01	(£27.74 ; £50.28)	£21.44	(£17.60 ; £25.27)	£40.00	(£22.34 ; £57.66)
All service measures		*£96.57*		*£52.28*		*£99.92*	

Table 47. Willingness to pay for +1 to +2 packages of wastewater service level improvements, by customer type and area

Service measure	Unit	Willingness to pay (£/customer/year)					
		Dual		Bristol		Bournemouth	
		Central	Range	Central	Range	Central	Range
Households							
Internal sewer flooding	incidents/yr	£0.02	(£0.01 ; £0.03)	£0.02	(£0.01 ; £0.02)	£0.04	(£0.02 ; £0.06)
External sewer flooding (inside boundary of property)	incidents/yr	£0.01	(£0.01 ; £0.02)	£0.08	(£0.06 ; £0.10)	£0.02	(£0.01 ; £0.03)
External sewer flooding (outside boundary of property)	incidents/yr	£0.07	(£0.03 ; £0.11)	£0.05	(£0.04 ; £0.06)	£0.08	(£0.04 ; £0.12)
Restricted Toilet Use (RTU)	incidents/yr	£0.04	(£0.02 ; £0.06)	£0.03	(£0.03 ; £0.04)	£0.07	(£0.04 ; £0.10)
CSO Spills impacting on river water quality	No. of Improved CSOs	£1.70	(£0.77 ; £2.63)	£2.37	(£1.85 ; £2.88)	£2.85	(£1.47 ; £4.23)
CSO spills influencing bathing water that is poor or sufficient but not good	Number of bathing waters	£0.74	(£0.33 ; £1.14)	£0.84	(£0.66 ; £1.02)	£2.37	(£1.22 ; £3.53)
CSO spills influencing bathing water that is good but not excellent	Number of bathing waters	£1.01	(£0.46 ; £1.56)	£1.33	(£1.04 ; £1.62)	£3.93	(£2.02 ; £5.84)
Miles of river at less than good status	miles	£2.34	(£1.06 ; £3.62)	£3.41	(£2.67 ; £4.15)	£6.33	(£3.26 ; £9.41)
All service measures		*£5.91*		*£8.14*		*£15.70*	
Non-Households							
Internal sewer flooding	incidents/yr	£0.46	(£0.04 ; £0.88)	£0.11	(£0.02 ; £0.20)	£0.39	(£0.20 ; £0.57)
External sewer flooding (inside boundary of property)	incidents/yr	£0.15	(£0.01 ; £0.28)	£0.64	(£0.14 ; £1.14)	£0.10	(£0.05 ; £0.15)
External sewer flooding (outside boundary of property)	incidents/yr	£1.22	(£0.11 ; £2.33)	£0.22	(£0.05 ; £0.40)	£1.19	(£0.63 ; £1.75)
Restricted Toilet Use (RTU)	incidents/yr	£0.65	(£0.06 ; £1.24)	£0.25	(£0.05 ; £0.44)	£0.44	(£0.23 ; £0.65)
CSO Spills impacting on river water quality	No. of Improved CSOs	£21.58	(£2.01 ; £41.18)	£11.53	(£2.49 ; £20.55)	£12.43	(£6.56 ; £18.27)
CSO spills influencing bathing water that is poor or sufficient but not good	Number of bathing waters	£5.53	(£0.52 ; £10.55)	£2.79	(£0.60 ; £4.97)	£7.84	(£4.14 ; £11.53)
CSO spills influencing bathing water that is good but not excellent	Number of bathing waters	£10.55	(£0.98 ; £20.14)	£4.91	(£1.06 ; £8.75)	£10.50	(£5.55 ; £15.44)
Miles of river at less than good status	miles	£32.19	(£3.00 ; £61.42)	£16.31	(£3.52 ; £29.09)	£27.88	(£14.73 ; £40.99)
All service measures		*£72.34*		*£36.76*		*£60.77*	

Use of WTP for service level changes

The main results presented above are meaningful measures of customers' WTP for the packages of service level change that WW identified as being feasible for each service measure. The scope of change is unequal across service measures, however, and so the service measure values cannot validly be compared as if they represent the relative cost to customers of each type of service failure. For example, we cannot infer from Table 46 that a having CSO spills in rivers is worse for customers than internal sewer flooding. To compare incidents on a like-for-like basis, it is necessary to look at unit values, which show, for example, the value per property of avoiding both types of events. These values are shown below.

It is also not valid to expect these WTP estimates in themselves to dictate the types of improvement that WW should focus on in its PR19 business plan. This is because the values only indicate the benefits of the improvements and do not take account of costs. The CBA work undertaken by WW will incorporate the cost estimates alongside the benefits estimates shown here.

Unit Values

Unit values represent the value of a one-unit change in the level affecting one property of each service measure; for example, the value on interruption or one discoloured water incident avoided at one property.

Table 46, Table 49, and Table 50 show unit values for the Dual-customer, Bristol Water and Bournemouth Water areas, respectively, and for each service measure contained in the Stage 1 survey for all households, all businesses and all customers (see Appendices A and B for details of how unit WTP's are obtained).

The table shows "central" estimates as well as a sensitivity range around these estimates. The central estimates are based on the same central case assumptions described in the context of the package value results above; and likewise, the lower and upper bounds of the range are also defined on the same basis. We would recommend that the central estimate be applied in the first instance when performing CBA on business plan proposals. The sensitivity range should be later applied as a means of testing the sensitivity of the proposals deriving from the CBA in relation to the inevitable uncertainty surrounding the valuation estimates used.

In comparison with results obtained at PR14, the results suggest that there are substantially higher values for river water quality and bathing water quality, and lower values for sewer flooding and persistent low pressure.

Table 48. Dual-customer unit WTP values, by customer type

Service measure	Unit	Willingness to pay (£/year)			
		Household		Non-Household	
		Central	Range	Central	Range
Water					
Unexpected interruption lasting 3-6 hours	1 incident/prop.	£282	(£235 ; £328)	£4,224	(£3,004 ; £5,444)
Unexpected interruption 6-12 hours	1 incident/prop.	£515	(£430 ; £600)	£4,699	(£3,341 ; £6,056)
Planned interruption lasting 3-6 hours, 48 hours notice would be given	1 incident/prop.	£157	(£131 ; £183)	£1,586	(£1,128 ; £2,045)
Planned interruption lasting 6-12 hours, 48 hours notice would be given	1 incident/prop.	£226	(£188 ; £263)	£1,875	(£1,334 ; £2,417)
Taste and smell of tap water not ideal for a few days, but is safe to drink.	1 incident/prop.	£266	(£222 ; £309)	£1,643	(£1,168 ; £2,117)
Discoloured water for a few hours, but is safe to drink	1 incident/prop.	£139	(£116 ; £161)	£953	(£678 ; £1,229)
Persistent low water pressure	1 incident/prop.	£421	(£352 ; £491)	£1,635	(£1,162 ; £2,107)
Response time to fix a leaking water main pipe >1day	1 incident/prop.	£300	(£251 ; £349)	£2,843	(£2,022 ; £3,664)
TUB/NEUB lasting from May to September	1 incident/prop.	£97	(£162 ; £49)	£342	(£142 ; £85)
Restriction on essential use of water lasting two months in a very dry summer	1 incident/prop.	£730	(£610 ; £850)	£4,923	(£3,501 ; £6,345)
River water flow levels: improvement from 'lower than ideal' to 'ideal'	1 mile improved per property 'nearby'	£90	(£75 ; £105)	£453	(£322 ; £584)
Wastewater					
Internal sewer flooding	1 incident/prop.	£4,673	(£3,903; £5,443)	£17,678	(£12,571;£22,785)
External sewer flooding (inside boundary of property)	1 incident/prop.	£1,985	(£1,658; £2,312)	£12,022	(£8,549; £15,496)
External sewer flooding (outside boundary of property)	1 incident/prop nearby	£378	(£315; £440)	£2,300	(£1,635; £2,964)
Restricted Toilet Use (RTU)	1 incident/prop.	£972	(£812; £1,132)	£7,003	(£4,980; £9,026)
CSO Spills impacting on river water quality	1 CSO/prop nearby	£267	(£223; £311)	£1,155	(£821; £1,488)
CSO spills influencing bathing water that is poor or sufficient but not good	1 beach improvement / prop nearby	£92	(£77; £107)	£235	(£167; £303)
CSO spills influencing bathing water that is good but not excellent	1 beach improvement / prop nearby	£75	(£63; £88)	£269	(£191; £347)
Miles of river at less than good status	1 mile of river improved/prop nearby	£122	(£102; £143)	£574	(£408; £740)

Table 49. Bristol Water-customer unit WTP values, by customer type

Service measure	Unit	Willingness to pay (£/year)			
		Household		Non-Household	
		Central	Range	Central	Range
Internal sewer flooding	1 incident/prop.	£1,772	(£1,493; £2,050)	£14,670	(£12,043; £17,290)
External sewer flooding (inside boundary of property)	1 incident/prop.	£714	(£601; £825)	£6,847	(£5,621; £8,070)
External sewer flooding (outside boundary of property)	1 incident/prop nearby	£155	(£131; £180)	£854	(£701; £1,006)
Restricted Toilet Use (RTU)	1 incident/prop.	£461	(£388; £533)	£4,062	(£3,335; £4,788)
CSO Spills impacting on river water quality	1 incident/prop nearby	£111	(£93; £128)	£669	(£549; £788)
CSO spills influencing bathing water that is poor or sufficient but not good	1 beach improvement / prop nearby	£31	(£26; £36)	£128	(£105; £151)
CSO spills influencing bathing water that is good but not excellent	1 beach improvement / prop nearby	£30	(£25; £34)	£136	(£111; £160)
Miles of river at less than good status	1 mile of river improved/prop nearby	£53	(£45; £62)	£316	(£259; £372)

Table 50. Bournemouth Water-customer unit WTP values, by customer type

Service measure	Unit	Willingness to pay (£/year)			
		Household		Non-Household	
		Central	Range	Central	Range
Internal sewer flooding	1 incident/prop.	£24,702	(£15,709; £33,695)	£107,960	(£60,304; £155,619)
External sewer flooding (inside boundary of property)	1 incident/prop.	£8,211	(£5,222; £11,200)	£105,925	(£59,168; £152,687)
External sewer flooding (outside boundary of property)	1 incident/prop nearby	£2,575	(£1,637; £3,512)	£14,202	(£7,933; £20,472)
Restricted Toilet Use (RTU)	1 incident/prop.	£6,412	(£4,078; £8,747)	£53,174	(£29,702; £76,648)
CSO Spills impacting on river water quality	1 incident/prop nearby	£1,614	(£1,026; £2,201)	£5,987	(£3,344 £8,630)
CSO spills influencing bathing water that is poor or sufficient but not good	1 beach improvement / prop nearby	£1,067	(£679; £1,456)	£2,999	(£1,675; £4,323)
CSO spills influencing bathing water that is good but not excellent	1 beach improvement / prop nearby	£1,061	(£675; £1,447)	£2,409	(£1,346; £3,473)
Miles of river at less than good status	1 mile of river improved/prop nearby	£1,197	(£761; £1,633)	£4,478	(£2,501; £6,455)

Summary of Covariates Findings

As a means of exploring the validity of the results obtained, a suite of econometric models have been estimated to explore the variation of household results by customer segments; their sensitivity to participants' experience in answering the questionnaire; and the effects of engagement with water-related activities, priorities for improvement and attitudes to bills. The findings from these analyses, which are reported in detail in Appendices A and B, are strongly supportive of the consistency of the results with expectation. In summary, we have found:

- In the segmentation analysis, MaxDiff results are in many aspects robust to SEGs, age groups, gender and engagement in water-related activities; where variation in in impact scores occur, they do so in a plausible fashion. As for Package results, as expected, WTP values generally tend to increase with SEG and females and engagement in water-related activities, and are highest for the youngest age group.

- In the analysis of the effect of experience of service failures, the MaxDiff water results show a decrease in the sensitivity to 'Unexpected interruption lasting 3-6 hours', and an increase in sensitivity when the interruption of the same duration is planned. Moreover, the impact assigned to 'non-ideal taste and smell of tap water' increased significantly with experiences. As for the wastewater services, the impact of experience seems to be strongest with respect to bathing and river water quality, significantly increasing sensitivity to them among participants;

- The analysis of the effect of engagement in water-related activities suggests an across-the-board increase in the magnitude of MaxDiff impact scores of river and bathing water related service measures;

- The analysis of the effects of priorities for improvement shows that, in line with expectations, considering a service measure as priority for improvement invariably increases the impact score of corresponding service measures across all water service issues.

- The analysis of bill attitudes indicates, as expected, a drop in WTP when customers think that what they currently pay is too much;

- Finally, the sensitivity analysis indicates that results are generally robust to ability to make comparisons, understanding of package exercise options, and the general level of enjoyment of the questionnaire.

Overall, the results from the explanatory models are uniformly supportive of the validity of the main findings obtained.

5.3 Stage 2 Survey

The econometric results of the Stage 2 survey have been overviewed in some detail in Appendices A and B. This section will briefly discuss the results of the Customer Engagement MaxDiff exercise in terms of priority scores, followed by a discussion of the implications of the WTP estimates of the Water Resource Management DCE exercise

Customer Engagement MaxDiff Exercise

The priority scores, obtained by exponentiating the estimated rank-ordered coefficients, are presented in Table 51. The magnitudes of the coefficients broadly make intuitive sense. For example, we find that for the household sample:

- 'Helping customers to save water and money' had the highest coefficient, followed by 'Providing more support for customers in financial difficulty', as would be expected from customers who would highly value water use efficiency and financial assistance to customers in need.

- Also towards the top of the priority list were 'Increasing the number of talks we do with school children on water and wastewater services' and 'Helping our wider community to value the natural water system'. This suggests that Wessex Water's customers are keen on seeing their water provider getting in closer touch with local communities and engaging them around water, wastewater and environmental issues.

In the non-household sample, as in the household sample, the magnitudes of the coefficients broadly also make intuitive sense, and have broadly the same ordering as them. For example, we find that:

- 'Helping customers to save water and money' also had the highest coefficient, but is now followed by 'Helping our wider community to value the natural systems'. This is intuitive in that it suggests that non-household customers would, like households, appreciate help and advice on how to save water and achieve efficiency in the use of water resources, and also on how to contribute to enhancing natural systems.

- Also towards the top of the priority list were 'Providing more support for customers in financial difficulty' and 'Helping local groups in river management'. This suggests that Wessex Water's non-household customers may be keen on seeing a more compassionate and inclusive style in management and organization being adopted by their water and wastewater company, although this exercise did not explore willingness to pay for these initiatives.

Table 51. Customer Engagement priority scores, by customer type

Initiative	Household		Non-household	
	Central	Range	Central	Range
Helping customers to SAVE water and money if they're METERED	5.24	(4.69; 5.79)	7.92	(6.54; 9.30)
Providing more SUPPORT for customers in FINANCIAL DIFFICULTY	3.06	(2.77; 3.36)	3.36	(2.83; 3.90)
Helping our wider community to VALUE THE NATURAL SYSTEMS	2.72	(2.47; 2.98)	5.00	(4.20; 5.80)
Increasing the number of TALKS we do with SCHOOL CHILDREN on water and wastewater services	2.26	(2.05; 2.47)	3.28	(2.78; 3.79)
Helping LOCAL GROUPS in RIVER MANAGEMENT	2.09	(1.89; 2.28)	3.32	(2.79; 3.84)
Holding EVENTS in the community to reach out to our more VULNERABLE CUSTOMERS	1.99	(1.80; 2.17)	2.08	(1.75; 2.41)
Increasing/improving the RECREATIONAL FACILITIES we provide (i.e. reservoir visitor centres, sailing, fishing, cafes, play parks)	1.68	(1.52; 1.84)	1.72	(1.44; 1.99)
Allowing our STAFF to spend more time in their working week on LOCAL/COMMUNITY/CHARITY PROJECTS	1.00	-	1.00	-

Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as highest priority', 4 'least priority', and the remaining two attributes were equally ranked at 2; household estimates all based on data weighted reflect the population composition in gender, age and SEG

Water Resource Management Exercise

Table 52 presents the unit, -1 to SQ, SQ to +1 and +1 to +2 improvement WTP values for each attribute considered in the survey, along with their 95% confidence intervals). The WTP values for status quo (SQ) to +1 improvements show that improvements to river water flow levels were valued the highest by households, followed by water conservation devices and then reducing water leakage, while this latter measure was valued the highest by non-households, followed by water conservation devices. For -1 to SQ changes, the highest WTP value obtained for the household sample remains that associated with river water flow levels, with water leakage now becoming ranked second, while in the non-household sample water leakage still commands the highest WTP. Finally, with +1 to +2 improvements, installing new smart meters now commands the highest WTP (following the large magnitude of improvement envisage in the study design) while in the non-household sample water leakage remains the most valued.

Overall, households were willing to pay more than non-households in absolute terms for programmes to enhance water resources. Indeed they were willing to pay 79% more than non-households for a package that improves all the attributes from SQ to +1 levels (£17.17 for the former vs. £9.61 per customer per year for the latter), while this percentage rises to 82% and 112% for -1 to SQ and +1 to +2 changes, respectively.

Table 52. Water Resource Management exercise unit, -1 to SQ, SQ to +1 and +1 to +2 WTP values, by customer type (95% confidence intervals between parentheses)

Variable	Unit	-1	SQ	+1	+2	Household				Non-household			
						Unit WTP (£/unit/hh/yr)	-1 to SQ WTP (£/hh/yr)	SQ to +1 WTP (£/hh/yr)	+1 to +2 WTP (£/hh/yr)	unit WTP (£/unit/nhh/yr)	-1 to SQ WTP (£/hh/yr)	SQ to +1 WTP (£/hh/yr)	+1 to +2 WTP (£/hh/yr)
Water leakage	%	22	21	20	19	-£3.96 (-£6.28 ; - £1.64)	£3.96 (£1.64 ; £6.28)	£3.96 (£1.64 ; £6.28)	£3.96 (£1.64 ; £6.28)	-£4.15 (-£5.46;- £2.84)	£4.15 (£2.84 ; £5.46)	£4.15 (£2.84 ; £5.46)	£4.15 (£2.84 ; £5.46)
Water conservation devices	%	6	7	10	12	£1.73 (£0.70 ; £2.75)	£1.73 (£0.70 ; £2.75)	£5.19 (£2.10 ; £8.25)	£3.46 (£1.40 ; £5.50)	£0.95 (£0.46; £1.43)	£0.95 (£0.46 ; £1.43)	£2.85 (£1.38 ; £4.29)	£1.90 (£0.92 ; £2.86)
New water meters fitted	%	73	77	78	90	£0.53 (£0.20 ; £0.86)	£2.12 (£0.80 ; £3.44)	£0.53 (£0.20 ; £0.86)	£6.36 (£2.40 ; £10.32)	£0.21 (£0.05; £0.37)	£0.84 (£0.20 ; £1.48)	£0.21 (£0.05 ; £0.37)	£2.52 (£0.60 ; £4.44)
New smart meters fitted	%	0	0	10	43	£0.20 (£0.07 ; £0.33)	- -	£2.00 (£0.70 ; £3.30)	£6.60 (£2.31 ; £10.89)	£0.05 (-£0.03; £0.12)	- -	£0.50 (-£0.30 ; £1.20)	£1.65 (-£0.99 ; £3.96)
River water flow levels	Miles	31	16	7	0	-£0.59 (-£0.82 ; -£0.35)	£8.85 (£5.25 ; £12.30)	£5.31 (£3.15 ; £7.38)	£4.13 (£2.45 ; £5.74)	-£0.14 (-£0.24; -£0.04)	£2.10 (£0.60 ; £3.60)	£1.26 (£0.36 ; £2.16)	£0.98 (£0.28 ; £1.68)
Hosepipe ban	Chance	0.02	0.01	0.005	0.002	-£36.02 (-£201.46 ; £129.42)	£0.36 (-£1.29 ; £2.01)	£0.18 (-£0.65 ; £1.01)	£0.11 (-£0.39 ; £0.60)	-£128.50 (-£290.10; £33.10)	£1.29 (-£0.33 ; £2.90)	£0.64 (-£0.17 ; £1.45)	£0.39 (-£0.10 ; £0.87)
Total							**£17.02**	**£17.17**	**£24.62**		**£9.33**	**£9.61**	**£11.59**

Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data

Covariate Analysis

Similarly, to Stage 1, we have explored the variation of Customer Engagement MaxDiff household results across customer segments. The findings from these analyses are reported in detail in Appendix A.

6 CONCLUSIONS AND RECOMMENDATIONS

This study has sought to estimate WW customers' WTP for service improvements and their WTA for service deteriorations. The research covered dual-service households and non-households, and wastewater only household customers from Bristol and Bournemouth areas.

The design approach implemented for this study was novel to WW, and the water sector generally, in that it sought to avoid, as far as possible, the need for customers to make trade-offs between small risk reductions. This was done by deriving estimates of WTP for whole packages of service level changes, and then apportioning these values to the various component service measure changes via an impact-weighted measure of the service change included in the package.

The key advantage of the new design approach is that it was simpler for participants, and thereby able to obtain more meaningful expressions of preference for customers. Additional advantages include that it was able to accommodate a greater number of service measures than the previous PR14 approach, and that fewer SP exercises were needed within the survey to obtain the required data.

The results from the MaxDiff analysis showed, as expected, that sewer flooding inside the customer's property was the highest-impact service issue overall. Moreover, the results on the impacts attributable to each of the different service issues all varied in line with expectation, with longer duration incidents, for example, found to have higher impacts than shorter duration incidents, and more severe types of sewer flooding found to have higher impacts than less severe types.

Our analysis of the Package exercise data found that participants were not willing, on average, to accept service deteriorations in exchange for bill reductions. In fact, in the context of a decreasing bill, in real terms, participants would be unwilling to accept any deterioration in service without very substantial, and unrealistic, bill reductions.

With respect to improvement packages, we found that Dual service households were willing to pay up to a total of £30.15 per year, on average, for an intermediate improvement package. This represents a small increase in WTP over the findings for PR14. We found strong evidence of diminishing marginal WTP, with the same customers willing to pay only an additional £6.59 for the stretch improvement package on average.

Amongst the service improvements offered in the intermediate 'SQ to +1' package, the improvements to river water quality and bathing water quality were estimated to have the highest value. This was driven by the fact that improvements in these areas affected a large number of customers. Thus, despite the fact that the impact of service changes in these areas was less than for other service issues - sewer flooding, for example - the overall derived WTP for these improvements was very substantial.

Our analysis also calculated 'unit values', which are a standardised measure of WTP for a service measure that can be compared across surveys even where the packages of service change offered were different. In comparison with results obtained at PR14, the results suggest that there are substantially higher values for river water quality and bathing water quality, and lower values for sewer flooding and persistent low pressure.

Although the differences between PR14 and PR19 will, in part, reflect genuine changes in preferences, there are also methodological features of the change in design approach that are also likely to be playing a part. In particular, the findings can be explained by the hypothesis that customers previously over-weighted service measures where the risk change was very small (low pressure and sewer flooding), and correspondingly under-weighted the service measures where the chance of being impacted was relatively large (environmental improvements). By imposing proportionality with respect to the chance of being impacted, these effects will have been reversed.

Overall, the valuation estimates presented can be considered to be meaningful measures of WW customers' values for the range of services, and service levels, contained within the survey, and we recommend them for use in cost benefit analysis of proposed service changes for PR19.

Confidence in the results reported here can be gained from the following:

- The design of the questionnaire was fully tested via cognitive interviews and pilot tests with households and businesses.
- A clear majority of responses were assessed as valid, taking into account participants' feedback
- Results for the impact scores describing the perceived disutility of each attribute were logically consistent and in line with expectations.

APPENDIX A ECONOMETRIC ANALYSIS - HOUSEHOLDS

Introduction

The main valuation estimates presented in this report are derived by combining estimates from econometric models based on the MaxDiff ranking exercise, with estimates from a separate econometric model based on responses to the Package exercise, along with data on the customer base to aggregate to the population. This appendix reports in full how these estimates are obtained including all intermediate results.

An additional objective of our econometric analysis was to explore the determinants of participants' choices as a means of establishing the extent to which they vary in line with expectation. For example, we would expect households with higher socioeconomic grade (SEG) to be willing to pay more than lower SEG households. This appendix also reports on this component of our analysis.

The appendix is structured as follows. First, we explain our approach for obtaining the main valuation estimates presented in this report. Then, we proceed to report on each of the intermediate components of this approach in turn. Finally, we report on our analysis of the determinants of participants' MaxDiff ranking and Package choices, show how impact scores and WTP varies by household segments, and finally, report on the Stage2 Customer Engagement and Water Resource Management exercises.

Methodology for Obtaining Core Valuation Estimates

The PR19-style survey was designed to simplify the experience for participants by avoiding the need for them to make trade-offs between different levels of service for lots of service measures at a time. This simplification was achieved by focusing on only the service issue itself at the lower level stage, rather than on the change in service levels for each type of issue. A further benefit of the PR19-style survey was that all service measures could be included in a single survey rather than them needing to be split into separate water and sewerage surveys.

The PR19-style survey was constructed around two linked exercises. The first 'MaxDiff' exercise required participants to choose which of the service issues shown to them would have the most impact on them and which would have the least impact. From this exercise we obtained a quantitative index of 'Impact', which we interpret as 'disutility' for the purposes of cost-benefit analysis. For example, we obtain estimates of how much a sewer flooding incident would impact a customer in relation to a 6-12 hour unexpected supply interruption.

The second exercise in the PR19-style survey was a Package exercise, which required participants to choose their preferred package of service levels and bill change. This exercise

included all the same service measures as in the PR14-style survey but, importantly, was made easier to answer by virtue of the fact that all service levels moved together across the options. Thus, in one option all services were at SQ level, in another they were all at Level +1, and so on.

Additionally, for many of the service measures associated with small risk improvements, the service levels were shown as the number of properties experiencing the incident in question rather than as a risk level. This approach was again designed to avoid the use of small risks, and also to encourage participants to see the measures presented less abstractly and on a comparable basis rather than having different denominators for the different risk levels as was necessary under the PR14-style approach.

Figure 10 illustrates the way in which the components of our analysis are combined to obtain WTP values for *SQ* to +1 improvements (or indeed any other level changes) as well as unit values. From the Package exercise analysis, we obtained estimates of customers' WTP for each service level change when all service measures moved together. The next part of the analysis involved apportioning the customer WTP value for the SQ to +1 package (or the WTP for any other level change) using the Impact index derived from analysis of the MaxDiff exercise.

The first step towards this required developing a mapping between the units of the MaxDiff exercise and the units of the Package exercise. For many of the service measures the mapping was one-to-one. This included all the cases where the Package service measure was defined in terms of the number of properties affected by a given type of incident. In other cases, however, including all of the environmental measures, a conversion factor was needed to capture the number of MaxDiff-measured incidents per Package-measured unit of service change.

Table 53 shows all the service measure mappings from Package units to MaxDiff units. The assumptions underlying the conversion factors shown in this table were all agreed with Wessex Water. Importantly, the conversion factors embed the following assumptions:

- Leaks: There are 2,000 leaks per year in the WW supply area, and each affects 12 properties.

- River water flows: 1% of river local to 1% of properties (water area)

- Planned and unplanned works: 42% of customers say they've experienced road and traffic disruptions caused by water works within the past year. There are 489,349 customers altogether, and a base level of 262 complaints. Therefore, this translates into 42%*489349/262 =784 customers impacted per complaint.

- Restricted toilet use; Sewer flooding inside your property; Sewer flooding immediately outside your property: For each property affected in the wastewater supply area, 0.46

properties are affected in Dual-service area, 0.13 in the Bournemouth area and 0.41 in the Bristol area.

- Sewer flooding in public areas: For each sewer flooding incident in a public area, four wastewater properties are affected

- CSO spills affecting rivers: Each CSO is assumed to affect 1km of river, and 1% of river is assumed to be local to 1% of properties (wastewater area)

- Bathing water quality: 1% of bathing waters are assumed to be local to 1% of properties (wastewater area),

- River water quality: 1% of river local to 1% of properties (wastewater area)

Figure 10: Formulae for calculating *SQ* to +1 unit values for service level changes

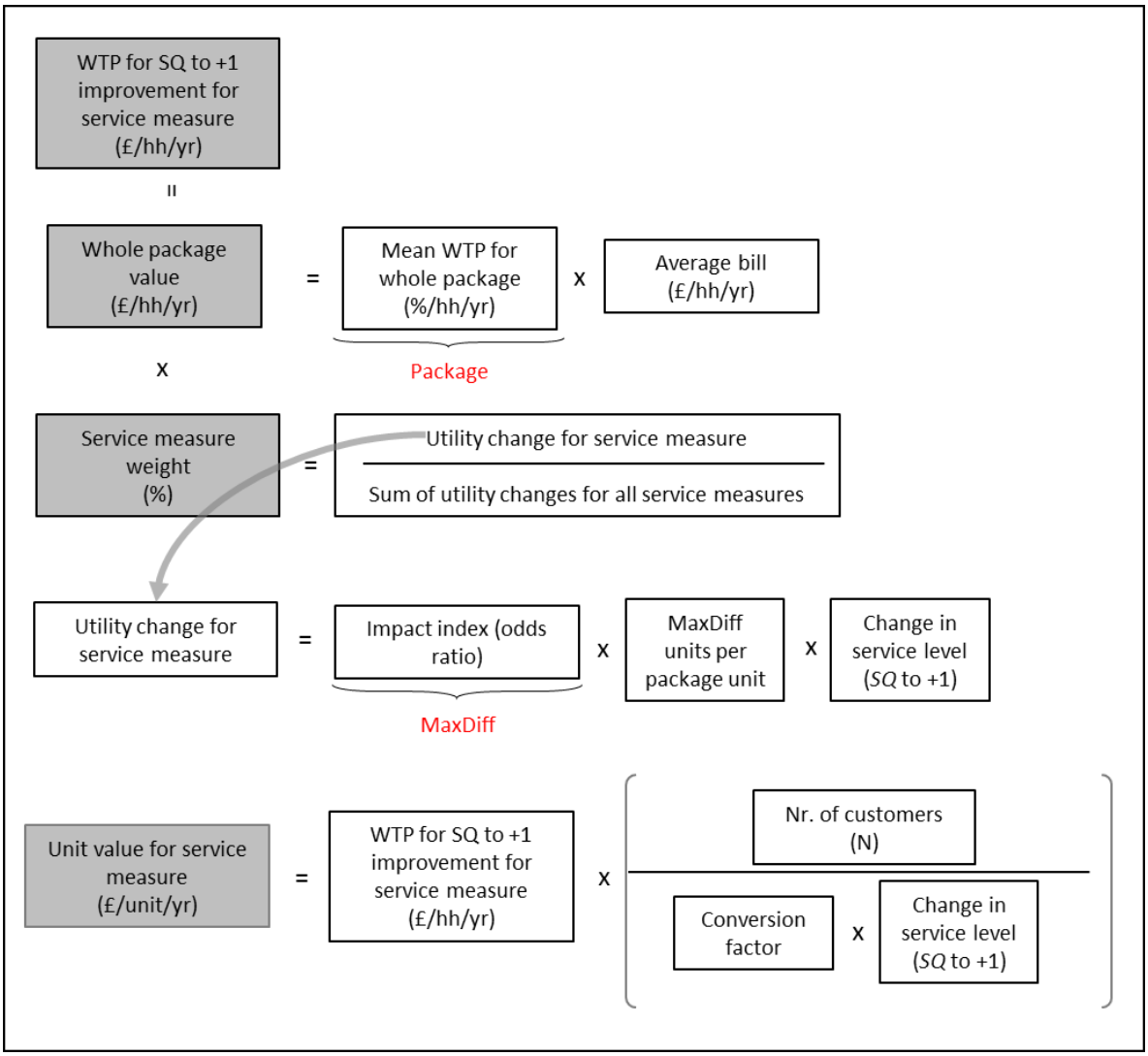


Table 53: PR19-style MaxDiff units per Package unit

Package unit	MaxDiff unit	Maxdiff units per package unit		
		Dual	B'mouth	Bristol
Response time for fixing leaks (proportion fixed within 1 day)	RESPONSE TIME to fix a leaking water main pipe near your property is longer than 1 day	24,000[1]	-	-
Hosepipe bans (chance/year)	A HOSEPIPE BAN lasting from May to September	547,615[2]	-	489,349[2]
Restrictions on essential use of water (chance/year)	RESTRICTION ON ESSENTIAL USE OF WATER lasting two months in a very dry summer	547,615[2]	-	489,349[2]
Miles of river with less than ideal flow levels (out of 1,641 miles in total)	RIVER WATER FLOW LEVELS in a nearby river are lower than ideal partly due to Wessex Water's operations.	334[3]	-	-
Planned and unplanned works which may cause road & traffic disruptions	Planned and unplanned WORKS of any duration in the Bristol Water area which may cause ROAD AND TRAFFIC DISRUPTIONS	-	-	784[4]
Restricted toilet use (no/year)	RESTRICTED TOILET USE due to sewers being overloaded	0.46[5]	0.13[5]	0.41[5]
Sewer flooding inside your property(no/year)	SEWER FLOODING INSIDE **YOUR PROPERTY**	0.46[5]	0.13[5]	0.41[5]
Sewer flooding immediately outside your property (no/year)	SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY	0.46[5]	0.13[5]	0.41[5]
Sewer flooding in public areas (no./year)	SEWER FLOODING IN A NEARBY PUBLIC AREA	1.83[6]	0.53[6]	1.64[6]
Sites where dilute sewage spills into rivers and estuaries	DILUTE SEWAGE occasionally spills from a Wessex Water pipe into a nearby river or estuary	140[7]	40[7]	125[7]
Bathing waters at less than good status (out of 47 in total)	BATHING WATER QUALITY at your nearest beach is 'Sufficient' but not 'Good' quality partly due to Wessex Water's operations .	11,651[8]	3,341[8]	10,412[8]
Bathing waters at good but not excellent status (out of 47 in total)	BATHING WATER QUALITY at your nearest beach is 'Good' but not 'Excellent' quality partly due to Wessex Water's operations.	11,651[8]	3,341[8]	10,412[8]
Miles of river at less than good status (out of 2,429 miles in total)	RIVER WATER QUALITY in your local area is less than 'Good' quality partly due to Wessex Water's operations.	225[9]	65[9]	201[9]

Notes on mapping values: *(1) Based on 2000 leaks per year, each affecting 12 properties; (2) No. customers; (3) Based on 1% of river local to 1% of properties; (4) Based on 42% of customers who say they've experienced road and traffic disruptions caused by water works within the past year; there are 489,349 customers and 262 complaints, this translates in to 42%x489349/262 =784 customers impacted per complaint; (5) Proportion of wastewater customers; (6) Based on 4 wastewater properties affected per incident; (7) Based on 1km of river in wastewater area affected by each incident, and 1% of river local to 1% of properties; (8) Based on 1% bathing waters (wastewater area) local to 1% of properties; (9) Based on 1% of river local to 1% of properties.*

Given the MaxDiff units per Package units, we then calculated the change in the number of MaxDiff units corresponding to the SQ to +1 service level change for each MaxDiff attribute.

These units were then multiplied by the Impact index from the MaxDiff econometric analysis to derive a measure of the utility change associated with each SQ to +1 service level change for each MaxDiff attribute.

Given these utility values, MaxDiff attribute weights were calculated equal to the utility change for the attribute in question divided by the total utility change for the SQ to +1 service change over all MaxDiff attributes.

The Package SQ to +1 value was multiplied by each of the MaxDiff attribute weights to derive our main WTP estimates for the SQ to +1 service change for each MaxDiff attribute.

Finally, the unit values for service measures were obtained by multiplying the Package SQ to +1 value by the number of customers and dividing by the MaxDiff units to Package unit and the change in service level.

MaxDiff Analysis

Core models

Table 54 below presents the results for the core rank-ordered logit models estimated based on the data from the Stage 1 MaxDiff exercise for dual customers, Bournemouth Water customers and Bristol Water customers. Though only the wastewater service measures for Bristol Water are considered in this report, we report the full set of estimates for this company, including the water service measures, for completion. Note that impact scores are obtained simply by exponentiating the coefficients. Indeed all three models fit the data very well as evidenced by the precision of the coefficients.

Service measure weights

Deriving preference weights for each service measure is based on the calculation of its utility change to the customer corresponding to a SQ to +1 level change. This utility change is the product of three components: (1) the impact score, (2) MaxDiff units per package unit, and (3) the change in service level from SQ to +1. These are tabulated in Table 55 for all three companies. In addition, the derived utility changes are tabulated. These are then divided each by the sum total of the utility changes (displayed in the bottom row) to derive the service measures' preference weights which are also tabulated.

Table 54. Household MaxDiff rank-ordered logit estimates

Service measure	Dual	Bristol	Bournemouth
Unexpected supply interruption lasting 3-6 hours	1.321 (0.060)***	1.525 (0.060)***	- -
Unexpected supply interruption lasting 6-12 hours	1.924 (0.063)***	2.270 (0.060)***	- -
Unexpected supply interruption lasting 12-24 hours	- -	2.289 (0.060)***	- -
Unexpected supply interruption lasting >24 hours	- -	2.415 (0.062)***	- -
Planned supply interruption lasting 3-6 hours	0.736 (0.059)***	1.122 (0.060)***	- -
Planned supply interruption lasting 6-12 hours	1.098 (0.062)***	1.406 (0.058)***	- -
Planned supply interruption lasting 12-24 hours	- -	1.774 (0.059)***	- -
Planned supply interruption lasting >24 hours	- -	1.644 (0.058)***	- -
Water taste & smell not ideal	1.261 (0.057)***	1.603 (0.053)***	- -
Discoloured water	0.611 (0.059)***	0.708 (0.052)***	- -
Persistent low water pressure	1.723 (0.058)***	0.993 (0.052)***	- -
Response time	1.383 (0.059)***	- -	- -
Hosepipe ban	0.259 (0.059)***	0.244 (0.055)***	- -
Restrictions on essential use of water	2.272 (0.062)***	2.995 (0.055)***	- -
Planned and unplanned works causing traffic disruption	- -	0.812 (0.051)***	- -
Restricted toilet use due to overloaded sewers	2.558 (0.065)***	2.742 (0.055)***	1.799 (0.067)***
Sewer flooding inside customers' properties	4.129 (0.086)***	4.089 (0.067)***	3.148 (0.099)***
Sewer flooding outside customers' properties	3.273 (0.070)***	3.179 (0.064)***	2.046 (0.082)***
Sewer flooding in public areas	1.613 (0.061)***	1.655 (0.054)***	0.886 (0.073)***
Pollution incidents	1.266 (0.060)***	1.317 (0.054)***	0.419 (0.057)***
Bathing water quality sufficient but not good	0.201 (0.061)***	0.053 (0.054)	0.006 (0.072)
Bathing water quality good but not excellent	0.000 -	0.000 -	0.000 -
River water quality less than good	0.487 (0.056)***	0.584 (0.050)***	0.120 (0.058)**
River water flow lower than ideal	0.181 (0.056)***	- -	- -
Observations LL	23,385 -15475.33	32,697 -22850.566	7,164 -4501.905

*Standard errors in brackets. Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as 'most impact', 4 'least impact', and the remaining two attributes were equally ranked at 2; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%; (1) All variables are dummies, equal to 1 when the attribute present is in the ranking set, and 0 otherwise.*

Table 55. Household service measure preference weights

Service measure	Dual					Bristol					Bournemouth				
	Impact score	MaxDiff units per Package unit	Level change (abs. value)	Utility change	Pref. weight (%)	Impact score	MaxDiff units per Package unit	Level change (abs. value)	Utility change	Pref. weight (%)	Impact score	MaxDiff units per Package unit	Level change (abs. value)	Utility change	Pref. weight (%)
Unexpected supply interruption lasting 3-6 hours	3.75	1	750	2809.2	1.28%	4.59	1	1000	4594.4	1.33%	-	-	-	-	-
Unexpected supply interruption lasting 6-12 hours	6.84	1	250	1711.2	0.78%	9.68	1	300	2904.4	0.84%	-	-	-	-	-
Unexpected supply interruption lasting 12-24 hours	-	-	-	-	-	9.86	1	740	7299.9	2.11%	-	-	-	-	-
Unexpected supply interruption lasting >24 hours	-	-	-	-	-	11.19	1	1100	12304.5	3.56%	-	-	-	-	-
Planned supply interruption lasting 3-6 hours	2.09	1	5750	11998.5	5.47%	3.07	1	1800	5529.5	1.60%	-	-	-	-	-
Planned supply interruption lasting 6-12 hours	3.00	1	250	749.5	0.34%	4.08	1	2000	8157.7	2.36%	-	-	-	-	-
Planned supply interruption lasting 12-24 hours	-	-	-	-	-	5.89	1	6	35.4	0.01%	-	-	-	-	-
Planned supply interruption lasting >24 hours	-	-	-	-	-	5.17	1	0.4	2.1	0.00%	-	-	-	-	-
Water taste & smell not ideal	3.53	1	650	2292.8	1.05%	4.97	1	53	263.2	0.08%	-	-	-	-	-
Discoloured water	1.84	1	150	276.3	0.13%	2.03	1	117	237.5	0.07%	-	-	-	-	-
Persistent low water pressure	5.60	1	80	448.0	0.20%	2.70	1	223	601.7	0.17%	-	-	-	-	-
Response time	3.99	24,000	0.05	4783.3	2.18%	-	-	-	-	-	-	-	-	-	-
Hosepipe ban	1.30	547,615	0.005	3546.8	1.62%	1.28	489,349	0.017	10414.3	3.02%	-	-	-	-	-
Restrictions on essential use of water	9.70	547,615	0.003	15932.8	7.26%	19.99	489,349	0.008	78262.5	22.66%	-	-	-	-	-
Planned and unplanned works causing traffic disruption	-	-	-	-	-	2.25	784	32	56530.8	16.37%	-	-	-	-	-
River water flow lower than ideal	1.20	333.699	9	3597.5	1.64%	-	-	-	0.0	0.00%	-	-	-	-	-
Sewer flooding inside customers' properties	62.09	0.459	18	512.6	0.23%	59.68	0.410	18	440.3	0.13%	23.28	0.132	18	55.1	0.15%
Sewer flooding outside customers' properties	26.38	0.459	218	2637.4	1.20%	24.03	0.410	218	2146.9	0.62%	7.74	0.132	218	221.8	0.60%
Sewer flooding in public areas	5.02	1.835	152	1399.5	0.64%	5.23	1.639	152	1303.8	0.38%	2.43	0.526	152	194.0	0.53%
Restricted toilet use due to overloaded sewers	12.92	0.459	141	835.2	0.38%	15.52	0.410	141	896.7	0.26%	6.04	0.132	141	112.1	0.31%
Pollution incidents	3.55	140.091	66	32782.8	14.95%	3.73	125.185	66	30830.8	8.93%	1.52	40.166	66	4032.1	10.98%
Bathing water quality sufficient but not good	1.22	11,651	1	14244.6	6.49%	1.05	10,412	1	10982.6	3.18%	1.01	3,340.638	1	3360.6	9.15%
Bathing water quality good but not excellent	1.00	11,651	5	58256.9	26.56%	1.00	10,412	5	52058.4	15.07%	1.00	3,340.638	5	16703.2	45.50%
River water quality less than good	1.63	225.454	165	60537.6	27.60%	1.79	201.466	165	59587.56	17.25%	1.13	64.641	165	12030.9	32.77%
Total	-	-	-	*219352.6*	*100.00%*	-	-	-	*345385.0*	*100.00%*	-	-	-	*36709.8*	*100.00%*

Package Exercise Analysis

A key aspect of our approach to obtaining values for service level changes by service measure is the use of an estimated 'whole package value'. This value is apportioned to the individual service measures and service measure level changes via the preference weights derived above.

The data were analysed by means of a conditional logit (CL) model. For all three companies, the SQ option was taken as baseline and was dropped from the model to avoid the dummy variable trap.

A first CL model estimated (dis)utility coefficients for 2 alternative-specific constants (ASC): (1) A -1 ASC representing the deterioration option, and (2) a +1 or +2 ASC pooling together the +1 and +2 improvements, assuming there is no additional WTP for the +2 package beyond the WTP for the +1 package (and hence both packages would have the same total WTP relative to the status quo). The reason for the restriction in (2) was a recurring problem encountered in the pilot phase in which unrestricted models more often than not returned a coefficient for the +2 improvement package that was lower than for +1, if not negative altogether. This suggested, against expectations, that the +1 option is preferred to the +2 option.

In order to derive +1 to +2 utility and WTP values, we estimated a second binary logit model on the restricted sample of participants that excluded those who previously chose the SQ package in the 'SQ vs. +1' scenario, on the grounds that they would in large part fail to evaluate the +2 package in the following '+1 vs. +2' scenario even if offered at a relatively small premium. We therefore estimated the '+1 vs. +2' model for each of the water companies on a restricted-sample model in which choice data pertaining only to '+1 choosers' in the 'SQ vs. +1' scenario were considered. This model was used to derive the '+1 to +2' WTP that was scaled by the proportion of '+1 choosers' out of the whole sample.

Moreover, models were also fitted with a linear spline for bill change coefficients, such that different coefficients were estimated for bill change depending on whether it was in the positive or negative domain. This accommodates discrepancies in marginal willingness to pay (WTP) for improvements (+1 and +2) and willingness to accept compensation (WTA) for deterioration (-1). In the Bristol Water data, the negative bill change coefficient in the originally estimated spline model was positive, contra to expectations. This lead to us to estimate a restricted model for this data set in which only a coefficient for positive bill change was estimated. This model assumes that participants derive zero utility from bill reductions associated with service deteriorations, and hence have infinite WTA for these latter.

Core models

The CL Package DCE and '+1 vs. +2' model estimates for the three companies are presented in Table 56 and Table 57 respectively. Both sets of models exhibit satisfactory results in which package alternative-specific constants (ASC's) all have highly significant coefficients of the right sign (positive for +1 and +2; negative for -1), and in which all bill coefficients have the expected negative signs, and highly significantly so except for the negative bill change coefficients in the Dual customers and Bristol data.

Table 56. Household Package DCE models

Variable	Coefficient (std. err.)		
	Dual	Bristol	B'mouth
Package -1	-1.565 (0.197)***	-1.135 (0.070)***	-1.574 (0.299)***
Package SQ (base)	(omitted) -	(omitted) -	(omitted) -
Package +1 or +2	0.815 (0.109)***	0.593 (0.069)***	0.682 (0.135)***
Negative bill change (%)	-0.031 (0.027)	(omitted) -	-0.037 (0.043)
Positive bill change (%)	-0.125 (0.008)***	-0.113 (0.007)***	-0.047 (0.013)***
Observations	3200	4464	996
LL	-1847.08	-2757.01	-630.24
Pseudo-R2	0.167	0.109	0.087

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 57. Household Package '+1 vs. +2' DCE models

Variable	Coefficient (std. err.)		
	Dual	Bristol	B'mouth
Package +1	(omitted) -	(omitted) -	(omitted) -
Package +2	0.515 (0.247)***	0.812 (0.164)***	1.167 (0.310)***
Bill change (%)	-0.145 (0.037)***	-0.129 (0.024)***	-0.107 (0.046)***
Observations LL Pseudo-R2	346 -211.09 0.120	578 -359.77 0.102	156 -101.50 0.061
Proportion of +1 choosers in the 'SQ vs. +1' scenarios	40.36%	48.46%	64.12%

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%*

Whole package WTP Values

The mean WTP to move from *SQ* for any improved package *i* (either +1 or +2) was derived as follows:

$$WTP_i\ (\%/hh/year) = -\frac{\alpha_i}{\beta_{positive}}$$

Where α_i is the coefficient for the improvement package, and $\beta_{positive}$ to bill coefficient over the positive bill change domain. Similarly, the WTA for deterioration is derived as follows:

$$WTA_i\ (\%/hh/year) = -\frac{\alpha_i}{\beta_{negative}}$$

Where $\beta_{positive}$ is the bill coefficient over the negative bill change domain. Standard errors allowing for hypothesis testing were then derived using the Delta method. Table 58 presents the whole package WTP/WTA values along with their standard errors. Results show that all values have the right signs (WTP values are positive and WTA values are negative), with all WTP figures being highly positive across all three companies.

Table 58. Household Package WTP/WTA estimates

Variable	WTP/WTA (std. err.)		
	Dual	Bristol	B'mouth
SQ to -1	-49.82 (37.81)	- -	-42.91 (43.29)
SQ to +1	6.54 (0.55)***	5.24 (0.42)***	14.50 (2.69)***
+1 to +2	1.43 (0.40)***	3.04 (0.34)***	6.98 (1.73)***

** significant at 10%; ** significant at 5%; *** significant at 1%*

Covariate Analysis

As a means of exploring the validity of the results obtained, we have developed econometric models to explore the effects of various covariates on importance scores and/or the choices that participants made. The following econometric validity tests were conducted:

1. Variation of customer segments by the following covariates:
    a. Region (MaxDiff + Package models; only wastewater
    b. Socioeconomic grade (SEG) (MaxDiff + Package models)
    c. Age (MaxDiff + Package models)
    d. Gender (MaxDiff + Package models)
    e. Engagement with water-related activities (MaxDiff + Package models)

-

2. The effects of service failure experience, water-related activities and bill attitudes, specifically:
    a. Effect of experience of service failures on service importance scores (MaxDiff models only)
    b. Effect of engagement in water-related activities on service importance scores (MaxDiff models only)
    c. Effect of priority for improvement on service importance scores (MaxDiff models only)
    d. Effect of attitudes to bill increases on WTP values (Package models only)

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3. Sensitivity analysis by:
    a. Ability to make comparisons between options (MaxDiff + Package models)
    b. Understanding of options (Package models only)
    c. Level of enjoyment in completing the survey (MaxDiff + Package models)

In what follows we present the econometric results of our covariate analyses.

Variation over customer segments

Our approach to the segmentation analysis was to look at how our MaxDiff estimates and SQ to +1 Package WTP estimates vary across segments of the following variables:

- Region (only for wastewater services)
- Socioeconomic group (SEG)
- Age
- Gender
- Engagement with water-related activities

Specifically, the segments examined are detailed in Table 59 along with their respective sample sizes.

Table 59. Segmentation variables, segments and sample sizes

Variable	Segments	Sample size
Region	Dual customers (Du)	800
	Bournemouth (Bo)	249
	Bristol (Br)	1,116
	Bournemouth + Bristol (Bo+Br)	1,365
	All	2,165
SEG	A & B	1,052
	C1	402
	C2	178
	D & E	381
Age	18 to 34	410
	35 to 54	662
	55 or more	933
Gender	Male	1,098
	Female	1,025
Water-related activities	Any (one or more)	1,450
	None	715

As previously mentioned, segmentation by region was limited to the wastewater services and presented the MaxDiff and Package WTP results for the types of customers, as well as Bristol and Bournemouth Water combined, and finally all three regions combined. Combining across regions was performed by means of a weighted average of the regional MaxDiff/Package WTP estimates, using the regions' numbers of household and non-household customers as weights.

The remaining segmentations were undertaken for both the water and wastewater services. For water service issues, the MaxDiff and Package models were re-estimated for Dual customers at the level of each segment. As for wastewater service issues, models were similarly re-estimated at the level of each segment for each of the three regions, and then

combined across regions, again, by means of a weighted average in which regions' numbers of customers are used as weights.

The results from the segmentation analysis of the MaxDiff data are first presented for the water service issues, followed by the wastewater service issues. The results from the Package WTP segmentation are then presented. It is worth noting that scores in this and subsequent tables are sorted in decreasing order and normalized to the median attribute.

MaxDiff – Wastewater

The MaxDiff impact scores across regions are presented in Table 60. First, overall ('All') results suggest that internal and external sewer flooding have the highest impacts, followed by restricted toilet use, with river and bathing water quality ranking last. This ranking pattern prevails more or less intact across all segmentations.

Looking at cross-regional differences, the key difference is for the two bathing water quality service issues, for which Bournemouth customers have more than twice the impact score of dual and Bristol customers. In all other respects, the impact scores are in harmony and their orders of magnitudes are similar.

Table 60. Household MaxDiff wastewater impact scores by region

Service Issue	Du N=800	Bo N=249	Br N=1116	Bo+Br N=1365	All N=2165
Sewer flooding inside customers' properties	17.5	15.3	16.7	16.5	17.0
Sewer flooding outside customers' properties	7.4	5.1	6.7	6.5	7.0
Restricted toilet use due to sewers being overloaded	3.6	4.0	4.4	4.3	4.0
Sewer flooding in public areas	1.4	1.6	1.5	1.5	1.4
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0	1.0	1.0	1.0
Miles of river at less than good status	0.5	0.7	0.5	0.5	0.5
Bathing waters at less than good status	0.3	0.7	0.3	0.3	0.3
Bathing waters at good but not excellent	0.3	0.7	0.3	0.3	0.3

Moving to SEG (Table 61), the key differences include that C2 has a lower impact associated with 'Sewer flooding inside customers' properties' than other groups. In all other respects, the impact scores are similar across SEGs.

Table 61. Household MaxDiff wastewater impact scores by SEG

	SEG			
	AB	C1	C2	DE
Service Attribute	N=1052	N=402	N=178	N=381
Sewer flooding inside customers' properties	21.7	24.6	10.2	17.7
Sewer flooding outside customers' properties	8.4	7.2	6.6	6.8
Restricted toilet use due to sewers being overloaded	4.4	4.1	3.1	4.5
Sewer flooding in public areas	1.5	1.2	1.5	1.6
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0	1.0	1.0
Miles of river at less than good status	0.5	0.5	0.5	0.4
Bathing waters at less than good status	0.3	0.3	0.4	0.2
Bathing waters at good but not excellent	0.3	0.2	0.3	0.2

As for age (Table 62), results show that the 55+ group have a greater sensitivity to 'Sewer flooding outside customers' properties', 'Restricted toilet use, and 'Sewer flooding in public areas', and a correspondingly lower sensitivity to bathing water quality service issues than their younger counterparts.

Table 62. Household MaxDiff wastewater impact scores by age group

	18-34	35-54	55+
Service Issue	N=410	N=662	N=933
Sewer flooding inside customers' properties	16.4	20.0	17.4
Sewer flooding outside customers' properties	5.5	7.4	7.9
Restricted toilet use due to sewers being overloaded	3.4	3.5	5.1
Sewer flooding in public areas	1.0	1.3	1.7
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0	1.0
Miles of river at less than good status	0.4	0.5	0.4
Bathing waters at less than good status	0.4	0.3	0.2
Bathing waters at good but not excellent	0.3	0.3	0.2

In the case of gender (Table 63), results indicate very similar findings for females and males.

Table 63. Household MaxDiff wastewater impact scores by gender

Service Issue	Male N=1098	Female N=1025
Sewer flooding inside customers' properties	17.1	18.3
Sewer flooding outside customers' properties	7.3	7.3
Restricted toilet use due to sewers being overloaded	4.0	4.4
Sewer flooding in public areas	1.6	1.3
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0
Miles of river at less than good status	0.5	0.4
Bathing waters at less than good status	0.3	0.3
Bathing waters at good but not excellent	0.3	0.2

Finally, segmentation by engagement in water-related activities (Table 64) shows similar sensitivities across the segment that engages in at least one type of activity and that which engages in none.

Table 64. Household MaxDiff wastewater impact scores by use of water for activities

Service Issue	Any N=1450	None N=715
Sewer flooding inside customers' properties	18.3	15.9
Sewer flooding outside customers' properties	7.0	7.6
Restricted toilet use due to sewers being overloaded	3.8	5.3
Sewer flooding in public areas	1.4	1.4
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0
Miles of river at less than good status	0.5	0.5
Bathing waters at less than good status	0.3	0.2
Bathing waters at good but not excellent	0.3	0.2

MaxDiff – Water

With respect to SEG (Table 65), the AB and C1 groups have impact scores that are similarly ranked, and with fairly similar magnitudes, although AB had a substantially higher impact associated with hosepipe bans and a somewhat higher impact associated with 'Unexpected interruption lasting 3-6 hours'.

However, the C2 and DE groups had different orderings of the service issues, and substantially different magnitudes in some cases. For example, in the case of C2, 'Persistent low water pressure' was given a higher impact score, placing it above 'Unexpected interruption lasting 6-12 hours' for this group only. This group also assigned higher impacts to 'Water discolouration' and 'Low flows' in comparison with the other SEG groups.

In the case of the DE group, 'Non-ideal taste and smell of tap water' was assigned a higher impact in relative terms, as indicated by the fact that many of the other service issues are found to have a lower impact score in comparison with other SEG groups. This includes

'Restriction on essential use of water', 'Unexpected interruption lasting 6-12 hours', 'Persistent low water pressure', 'Response time >1 day to fix a leaking pipe'.

Table 65. Household MaxDiff water impact scores by SEG

Service Issue	AB N=384	C1 N=122	C2 N=66	DE N=169
Restriction on essential use of water	3.1	2.8	3.8	1.9
Unexpected interruption lasting 6-12 hours	2.2	2.2	1.9	1.3
Persistent low water pressure	1.9	1.8	2.4	0.8
Response time >1 day to fix a leaking pipe	1.3	1.2	1.3	0.9
Unexpected interruption lasting 3-6 hours	1.4	1.0	0.9	0.9
Non-ideal taste and smell of tap water	1.0	1.0	1.0	1.0
Planned interruption lasting 6-12 hours	0.9	0.7	0.9	0.7
Planned interruption lasting 3-6 hours	0.6	0.5	0.5	0.5
Water discoloration	0.4	0.4	0.7	0.4
Hosepipe ban	0.5	0.3	0.3	0.2
Low river water flow levels	0.2	0.2	0.5	0.2

With age groups, key differences include that: the 18-34 group assigned a higher impact to 'Planned interruption lasting 6-12 hours', and a lower impact to 'Persistent low water pressure'; the 35-54 group assigned lower impact scores to 'Restriction on essential use of water' and 'Unexpected interruption lasting 3-6 hours'; and, the 55+ group assigned the highest impact to 'Persistent low water pressure'.

Table 66. Household MaxDiff water impact scores by age group

Service Issue	18-34 N=106	35-54 N=259	55+ N=374
Restriction on essential use of water	3.3	2.0	3.3
Unexpected interruption lasting 6-12 hours	1.8	2.0	2.0
Persistent low water pressure	1.1	1.5	1.7
Response time >1 day to fix a leaking pipe	1.1	1.3	1.1
Unexpected interruption lasting 3-6 hours	1.4	1.0	1.4
Non-ideal taste and smell of tap water	1.0	1.0	1.0
Planned interruption lasting 6-12 hours	1.4	0.8	0.8
Planned interruption lasting 3-6 hours	0.4	0.5	0.6
Water discoloration	0.5	0.4	0.5
Hosepipe ban	0.2	0.3	0.4
Low river water flow levels	0.2	0.3	0.3

Moving to gender, the key difference is that females assigned higher relative impacts to 'Restriction on essential use of water' and 'Unexpected interruption lasting 6-12 hours'.

Table 67. Household MaxDiff water impact scores by gender

Service Issue	Male N=415	Female N=367
Restriction on essential use of water	2.2	3.5
Unexpected interruption lasting 6-12 hours	1.6	2.5
Persistent low water pressure	1.6	1.4
Response time >1 day to fix a leaking pipe	1.2	1.1
Unexpected interruption lasting 3-6 hours	1.1	1.4
Non-ideal taste and smell of tap water	1.0	1.0
Planned interruption lasting 6-12 hours	0.7	1.0
Planned interruption lasting 3-6 hours	0.6	0.5
Water discoloration	0.5	0.4
Hosepipe ban	0.4	0.3
Low river water flow levels	0.3	0.3

Finally, not much difference is observed between the segment that engages in water-related activities and that which engages in none.

Table 68. Household MaxDiff water impact scores by use of water for activities

Service Issue	Any N=571	None N=229
Restriction on essential use of water	2.9	2.4
Unexpected interruption lasting 6-12 hours	1.9	2.0
Persistent low water pressure	1.6	1.5
Response time >1 day to fix a leaking pipe	1.2	1.2
Unexpected interruption lasting 3-6 hours	1.1	1.5
Non-ideal taste and smell of tap water	1.0	1.0
Planned interruption lasting 6-12 hours	0.7	1.1
Planned interruption lasting 3-6 hours	0.5	0.6
Water discoloration	0.4	0.6
Hosepipe ban	0.4	0.4
Low river water flow levels	0.3	0.3

Package WTP

Table 69 presents the segmentation results of the SQ to +1 WTP estimates for each region. The overall ('All') estimates are presented for reference. It is worth highlighting here that the substantially smaller size of the Bournemouth sample (N=249) compared to Dual customers and Bristol's (N=800 and 1116, respectively) has resulted in less stable estimates in some case that will become clear later in the discussion of the results.

Starting with SEG, the results indicate an increasing WTP with higher SEG, especially for the AB group, as expected, although the Bournemouth results do not seem to be reliable for this comparison.

Moving to age, WTP seems to be highest for the younger 18 to 34 group, noting again the instability of the Bournemouth results.

As for gender, while female and male dual customers have similar WTP's, Bournemouth and Bristol Water female customers have higher WTP than males.

Finally, with water-related activities, all regions indicate that customers who engage in one or more water-related activities are WTP more that those who engage in none.

Table 69. SQ to +1 household package WTP's (£/hh/yr) across various segments, by region

Segment	Dual	Bristol	Bournemouth
All	£30.1	£21.0	£26.8
SEG			
AB	£42.1	£35.7	£23.0
C1	£24.4	£22.8	£37.5
C2	£30.2	£18.8	-
DE	£28.8	£7.7	£26.9
Age			
18-34	£35.7	£30.9	£33.1
35-54	£26.4	£21.7	£237.7
55+	£33.9	£20.2	£34.3
Gender			
Male	£31.2	£19.0	£29.9
Female	£30.2	£22.8	£44.9
Activity			
Any	£32.5	£24.0	£37.9
None	£26.0	£16.9	£17.5

Effects of service failure experience, water-related activities, priority for improvement and bill attitudes

In this part of the validity analysis, we looked at the following:

- Effect of experience of service failures on service importance scores (MaxDiff models only)
- Effect of engagement in water-related activities on service importance scores (MaxDiff models only)
- Effect of priority for improvement on service importance scores (MaxDiff models only)
- Effect of attitudes to bill increases on WTP values (Package models only)

Experience of service failure

The analysis of experience proceeded by looking at the effect of participants' experience of service failure on the relative impact they assigned to the corresponding service issue in comparison to the others, as captured by the MaxDiff models. To this end, for each region, an indicator variable was constructed for each service issue that equalled 1 if the participant experienced a failure in it any time in the past, and 0 otherwise. These indicator variables were interacted with their corresponding MaxDiff service issues in order to identify the effect in question. The rank-ordered logit model was therefore extended to estimate, for each service measure, a base coefficient representing relative impact under no experience, and an interaction term representing the change in relative impact with experience.

Results of the analysis of past service failure experience on MaxDiff impact scores are presented in Table 70 and Table 71 for the water and wastewater service issues, respectively. Rather than present the interaction 'shifter' terms that account for the multiplicative change of impact scores from the 'No Experience' to the 'Experience' groups, we have multiplied these shifters by their corresponding base 'No Experience' impact scores to construct the 'Experience' impact scores as presented in the tables below. This affords the reader a direct feel of the magnitudes of impact scores across groups. The shifters' p-values can also be used as is to test the significance of the differences between the 'Experience' and 'No Experience' groups.

Starting with the water service issues, results suggest that experience decreases the sensitivity to 'Unexpected interruption lasting 3-6 hours', while it increases it significantly when the interruption of the same duration is planned. Moreover, the impact assigned to 'non-ideal taste and smell of tap water' increase significantly with experiences. In none of the other service issues is experience found to have any significant impact.

Table 70. Effect of experience on household MaxDiff water impact scores

Service Issue	No Experience	Experience	P-value
Unexpected interruption lasting 3-6 hours	4.7	3.2	0.000
Unexpected interruption lasting 6-12 hours	7.9	8.2	0.754
Planned interruption lasting 3-6 hours	2.1	2.8	0.009
Planned interruption lasting 6-12 hours	3.3	3.0	0.480
Non-ideal taste and smell of tap water	3.6	5.7	0.000
Water discoloration	1.9	2.0	0.342
Persistent low water pressure	6.6	7.2	0.402
Response time longer than 1 day to fix a leaking pipe	4.6	4.7	0.860
Hosepipe ban	1.3	1.2	0.521
Restriction on essential use of water	11.3	14.8	0.529
Low river water flow levels	1.2	1.0	0.580

P-values indicate the statistical significance of the difference; for example, a p-value less than 0.05 indicates statistical significance at the 5% level. The lower the p-value, the more statistically significant is the difference.

Turning to wastewater service issues, results indicate that experience significantly increases the impact score of 'Restricted toilet use' among Bournemouth and Bristol Water

customers, as it does with 'Sewer flooding in public areas' and 'Sites where dilute sewage spills into rivers and estuaries' among Bristol Water and Dual-service customers, respectively.

The impact of experience seems to be strongest with respect to bathing and river water quality. Impact scores for 'Bathing waters at less than good status' increase significantly across all three regions with experience, and impact scores for 'Bathing waters at good but not excellent status' increase significantly with experience for Bournemouth and Bristol Water. Finally, experience of river water quality problems increases significantly the impact score of 'Miles of river at less than status' across all three regions.

Engagement with water-related activities

The analysis of the effect taking part in water-related leisure activities proceeded by looking at the effect of participants' engagement in at least one of the following activities on the relative impact they assigned to the relevant service issue in comparison to the others, as captured by the MaxDiff models:

- fishing/angling,
- swimming/paddling in the sea,
- sailing,
- visiting beaches and/or river banks, and/or
- surfing

To this end, an indicator variable was constructed for each region that equalled 1 if the participant reported engaging in at least one of these activities, and 0 if s/he engaged in none. This variable was then interacted with the relevant MaxDiff wastewater service issues in order to identify the effect in question. These relevant service measures were:

- Sites where dilute sewage spills into rivers and estuaries
- Bathing waters at less than good status
- Bathing waters at good but not excellent status
- Miles of river at less than good status

The rank-ordered logit model was therefore extended to estimate for the above service measures a base coefficient representing relative impact under no engagement in water-related activities, and an interaction term representing the change in relative impact when the customer engages in at least one these activities.

The results of the analysis on MaxDiff impact scores are presented in Table 72 for the relevant wastewater service issues only. As in the experience analysis, interaction terms were multiplied with the base 'No Activity' scores to construct 'Activity' impact scores.

Table 71. Effect of experience on household MaxDiff wastewater impact scores

Service Issue	Dual			Bournemouth			Bristol		
	No Experience	Experience	P-value	No Experi-ence	Experi-ence	P-value	No Experi-ence	Experi-ence	P-value
Restricted toilet use due to sewers being overloaded	15.9	16.6	0.817	6.9	14.4	0.000	15.4	21.8	0.001
Sewer flooding inside customers' properties	68.2	34.7	0.091	21.9	180.2	0.171	61.6	82.6	0.316
Sewer flooding outside customers' properties	31.4	27.6	0.519	8.2	12.5	0.176	24.2	35.5	0.053
Sewer flooding in public areas	6.1	5.3	0.392	3.0	3.1	0.779	5.1	8.3	0.000
Sites where dilute sewage spills into rivers and estuaries	4.1	8.0	0.037	1.7	2.0	0.322	3.8	4.0	0.815
Bathing waters at less than good status	1.2	1.9	0.015	0.8	1.7	0.000	1.0	1.5	0.004
Bathing waters at good but not excellent status	1.0	1.5	0.084	1.0	1.4	0.047	1.0	1.7	0.000
Miles of river at less than good status	1.6	3.4	0.000	1.1	1.9	0.000	1.8	2.5	0.002

P-values indicate the statistical significance of the difference; for example, a p-value less than 0.05 indicates statistical significance at the 5% level. The lower the p-value, the more statistically significant is the difference.

Table 72. Effect of engagement in water-related on household MaxDiff wastewater impact scores

Service Attribute	Dual			Bournemouth			Bristol		
	No Activity	Activity	P-value	No Activity	Activity	P-value	No Activity	Activity	P-value
Sites where dilute sewage spills into rivers and estuaries	4.4	5.3	0.038	3.5	4.0	0.344	3.5	4.1	0.042
Bathing waters at less than good status	1.0	1.8	0.000	1.3	2.4	0.000	0.9	1.3	0.000
Bathing waters at good but not excellent status	1.0	1.3	0.003	1.0	2.5	0.000	1.0	1.2	0.065
Miles of river at less than good status	1.8	2.1	0.046	3.5	2.7	0.043	2.0	2.0	0.970

P-values indicate the statistical significance of the difference; for example, a p-value less than 0.05 indicates statistical significance at the 5% level. The lower the p-value, the more statistically significant is the difference.

Results suggest an across-the-board increase in the magnitude of impact scores for participants engaged in at least one kind of water-related activity compared to those engaged in none. The one exception was for 'Miles of river at less than good status' for which the impact score significantly decreased for the Bournemouth Water 'Activity' customers compared to 'No Activity', possibly because these customers are more interested in bathing waters being mostly in coastal areas. Indeed, of the three companies, Bournemouth Water customers showed the largest increases in impact scores for the two bathing water services. Finally, it is worth noting that the effect of engagement in water-related activities was significant at least at the 10 percent level for all services except 'Sites where dilute sewage spills into rivers and estuaries' in the Bournemouth Water area and 'Miles of river at less than good status' in the Bristol Water area.

Priority for improvement

The analysis of priority for improvement proceeded similarly to that used for experience of service failure. That is, we looked at the effect of participants' stated priorities for improvement of service measures on the relative impact score they assigned to the corresponding service issue in comparison to the others, as captured by the MaxDiff models. Indicator variables were therefore constructed for each service issue that equalled 1 if the participant liked to see this issue improved the most, and 0 otherwise, and interacted with their corresponding MaxDiff service issues. The results of the analysis of priority for improvement on MaxDiff impact scores are presented in Table 73 and Table 74 for the water and wastewater service issues, respectively. As before, we directly present the 'Experience' impact scores rather than their corresponding interaction terms.

Starting with the water service issues, results suggest that, in line with expectations, considering as service measure a priority for improvement invariably increases the impact score of corresponding service measures across all water service issues. Moreover, this increase is significant for all water service measures except 'Response time longer than 1 day to fix a leaking pipe' and 'Restrictions on essential use of water'. Similar effects were observed for the wastewater service issues, whereby all impact scores increased if the service issue was perceived as priority for improvement except for 'Sewer flooding inside customers' properties', although the decrease here was insignificant. In addition, all the impact score increases were significant at least at the 10 percent level except for 'Restricted toilet use' and 'Sewer flooding outside customers' properties' for Dual customers, and 'Sewer flooding inside customers' properties' and 'Sewer flooding in public areas' for Bournemouth Water customers.

Table 73. Effect of priority for improvement on household MaxDiff water impact scores

Service issue	Not priority	Priority	P-value
Unexpected interruption lasting 3-6 hours	4.6	10.2	0.000
Unexpected interruption lasting 6-12 hours	8.3	18.0	0.000
Planned interruption lasting 3-6 hours	2.3	4.6	0.000
Planned interruption lasting 6-12 hours	3.5	5.3	0.015
Non-ideal taste and smell of tap water	4.2	6.2	0.000
Water discoloration	2.0	3.8	0.000
Persistent low water pressure	6.9	11.8	0.000
Response time longer than 1 day to fix a leaking pipe	5.2	5.6	0.625
Hosepipe ban	1.4	3.6	0.000
Restriction on essential use of water	12.3	14.9	0.361
Low river water flow levels	1.2	2.2	0.000

P-values indicate the statistical significance of the difference; for example, a p-value less than 0.05 indicates statistical significance at the 5% level. The lower the p-value, the more statistically significant is the difference.

Attitudes to bill increases

To gauge the effects of bill attitudes on WTP and WTA values, we created a dummy variable that equalled 1 if participants thought the amount they paid for their water and wastewater services was 'slightly too much' or 'far too much', and 0 if 'about right', 'slightly too little' or 'far too little'. This indicator variable was then interacted with each of the package alternative-specific constants (ASCs) in both the Package and '+1 to +2' models to capture the change in (dis)utilities as a result of bill attitudes. In line with the core models, WTP and WTA values for the 'Too little/About right' group were derived as follows:

$$WTP_i\ (£/hh/year) = -\frac{\alpha_i}{\beta_{positive}} \times Average\ bill\ (£/hh/year)$$

$$WTA_i\ (£/hh/year) = -\frac{\alpha_i}{\beta_{negative}} \times Average\ bill\ (£/hh/year)$$

while for the 'Too much' group, these values were derived as follows:

$$WTP_i\ (£/hh/year) = -\frac{\alpha_i + \alpha_{i\times too\ much}}{\beta_{positive}} \times Average\ bill\ (£/hh/year)$$

$$WTA_i\ (£/hh/year) = -\frac{\alpha_i + \alpha_{i\times too\ much}}{\beta_{negative}} \times Average\ bill\ (£/hh/year)$$

where *i* denotes the ASC in question.

Table 74. Effect of priority for improvement on household MaxDiff wastewater impact scores

Service Issue	Dual			Bournemouth			Bristol		
	Not priority	Priority	P-value	Not priority	Priority	P-value	Not priority	Priority	P-value
Restricted toilet use due to sewers being overloaded	17.3	19.9	0.566	9.4	15.6	0.000	16.4	38.2	0.000
Sewer flooding inside customers' properties	74.8	68.9	0.811	27.8	46.9	0.101	65.2	92.2	0.099
Sewer flooding outside customers' properties	34.0	44.7	0.311	10.6	15.8	0.095	24.7	79.6	0.000
Sewer flooding in public areas	6.2	8.9	0.022	4.0	5.0	0.113	5.4	9.1	0.000
Sites where dilute sewage spills into rivers and estuaries	4.2	8.3	0.000	2.0	2.7	0.001	3.8	5.9	0.000
Bathing waters at less than good status	1.2	2.3	0.000	0.9	2.4	0.000	1.0	1.9	0.000
Bathing waters at good but not excellent status	1.0	2.4	0.000	1.0	2.3	0.000	1.0	1.5	0.000
Miles of river at less than good status	1.6	3.2	0.000	1.3	2.2	0.000	1.7	3.0	0.000

P-values indicate the statistical significance of the difference; for example, a p-value less than 0.05 indicates statistical significance at the 5% level. The lower the p-value, the more statistically significant is the difference.

Table 75. Effect of bill attitudes on Household Package and '+1 to +2' WTP/WTA values (£/hh/yr)

Service change	Dual			Bristol			Bournemouth		
	Too little / About right	Too much	P-value	Too little / About right	Too much	P-value	Too little / About right	Too much	P-value
SQ to +1	£45.17	£13.21	0.000	£36.61	£4.25	0.000	£55.97	-£3.16	0.001
SQ to -1	-£324.78	-£182.65	0.313	-	-	-	-£215.16	-£91.58	0.639
+1 to +2	£6.97	£6.02	0.760	£14.85	£7.21	0.004	£17.69	£11.78	0.318

P-values indicate the statistical significance of the difference; for example, a p-value less than 0.05 indicates statistical significance at the 5% level. The lower the p-value, the more statistically significant is the difference.

The derived WTP values derived for the 'SQ to -1', 'SQ to +1' and '+1 to +2' service changes for the two bill attitude groups are presented in Table 75. As expected, They show that in the case of 'SQ to +1' WTP values, the bill value significantly drops for all three companies. The result is similar for '+1 to +2" WTP values, which decreases for all three companies, though only significantly so for Bristol Water customers. Finally, WTA values also declined in absolute values for the Dual and Bournemouth Water customers where they were accommodated in the models, but insignificantly so in both cases.

Sensitivity analysis

In gauge to gauge the robustness of our results, we tested the sensitivity of our model MaxDiff and Package WTP estimates to the following factors:

- Ability to make comparisons between options (MaxDiff + Package models)
- Understanding of options (Package models only)
- Level of enjoyment in completing the survey (MaxDiff + Package models)

The sensitivity segments examined are detailed in Table 76 along with their respective sample sizes.

The sensitivity analysis proceeded similarly to the segmentation analysis. For water service issues, the MaxDiff and Package models were re-estimated for Dual customers at the level of each segment of the relevant variables. As for wastewater service issues, models were similarly re-estimated at the level of each segment for each of the three regions. Again, is is worth noting that MaxDiff impact scores were sorted in decreasing order and normalized to the median.

Table 76. Sensitivity variables, segments and sample sizes

Variable	Exercise	Segments	Sample Size		
			Dual	B'mouth	Bristol
Ability to make comparisons	MaxDiff	No	73	34	95
		Yes	727	215	108
	Package	No	95	21	1021
		Yes	705	228	1008
Level of understanding (participant found each of the levels easy)	Package	No	91	25	126
		Yes	709	224	990
Level of enjoyment	MaxDiff + Package	Low	210	80	306
		Medium	471	130	608
		High	119	39	202

Starting with the MaxDiff water attributes, sensitivity results with respect to 'Ability to make comparisons across choices' and 'Enjoyment levels' are presented in Table 77. These results suggest that results are robust to both factors, with little variation in the magnitudes of impact scores across segments.

Table 77. Sensitivity of household water MaxDiff impact scores to 'Ability to make comparisons' and 'Enjoyment levels'

Service attribute	Ability to make comparisons		Enjoyment levels		
	No	Yes	Low	Medium	High
Restriction on essential use of water	2.8	2.6	3.2	2.4	2.9
Unexpected interruption to your water supply lasting 6-12 hours	1.6	1.9	2.1	1.7	2.1
Persistent low water pressure	1.2	1.6	1.5	1.6	1.4
Unexpected interruption to your water supply lasting 3-6 hours	0.7	1.2	0.9	1.2	1.3
Response time longer than 1 day to fix a leaking water main pipe	0.8	1.2	1.0	1.1	1.6
Non-ideal taste and smell of tap water	1.0	1.0	1.0	1.0	1.0
Planned interruption to your water supply lasting 6-12 hours	0.8	0.8	0.8	0.8	0.9
Planned interruption to your water supply lasting 3-6 hours	0.4	0.6	0.5	0.6	0.6
Water discoloration	0.4	0.4	0.5	0.4	0.5
Hosepipe ban	0.4	0.3	0.4	0.3	0.3
Low river water flow levels	0.3	0.3	0.2	0.3	0.3

Similarly, in Table 78 and Table 79 which present sensitivity results with respect to 'Ability to make comparisons' and 'Enjoyment levels' among wastewater MaxDiff service measures,

respectively, little variation is exhibited across segments for the three companies, suggesting that overall, estimated MaxDiff impact scores are robust to these factors.

Table 78. Sensitivity of household wastewater MaxDiff impact scores to 'Ability to make comparisons'

Service attribute	Dual		Bournemouth		Bristol	
	No	Yes	No	Yes	No	Yes
Sewer flooding inside customers' properties	11.9	17.7	14.7	16.9	16.1	18.8
Sewer flooding outside customers' properties	3.4	8.4	4.4	6.0	6.9	7.0
Restricted toilet use due to sewers being overloaded	2.6	4.2	6.8	4.2	4.6	4.4
Sewer flooding in public areas	0.9	1.5	1.0	1.9	1.0	1.4
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0	1.0	1.0	1.0	1.0
Miles of river at less than good status	0.4	0.4	0.6	0.7	0.7	0.5
Bathing waters at less than good status	0.3	0.3	0.5	0.6	0.4	0.3
Bathing waters at good but not excellent	0.4	0.2	0.4	0.6	0.3	0.3

Table 79. Sensitivity of household wastewater MaxDiff impact scores to Enjoyment levels

Service attribute	Dual			B'mouth			Bristol		
	Low	Med	High	Low	Med	High	Low	Med	High
Sewer flooding inside customers' properties	14.2	18.6	18.2	25.4	16.3	8.8	18.0	20.9	14.7
Sewer flooding outside customers' properties	7.8	7.4	8.5	6.7	5.8	4.4	7.9	7.4	5.2
Restricted toilet use due to sewers being overloaded	3.8	4.0	4.5	6.1	4.4	2.7	4.9	4.4	3.9
Sewer flooding in public areas	1.5	1.4	1.6	1.6	2.2	1.1	1.0	1.6	1.3
Sites where dilute sewage spills into rivers and estuaries	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Miles of river at less than good status	0.4	0.4	0.4	0.6	0.8	0.9	0.5	0.5	0.4
Bathing waters at less than good status	0.3	0.3	0.3	0.6	0.6	0.6	0.3	0.3	0.2
Bathing waters at good but not excellent	0.3	0.2	0.2	0.5	0.6	0.6	0.2	0.3	0.2

Finally, the results of the sensitivity analysis with respect to 'Ability to make comparisons', 'Level of understanding' and 'Level of enjoyment' are presented in Table 80. Results show that for both 'Ability to make comparisons' and 'Level of understanding', WTP is higher for those who state 'Yes' compared to those who state 'No' (except for 'Level of understanding in Bournemouth'). Yet this result is not statistically robust, due to the small sample size among 'No' participants compared to 'Yes'. On the other hand, results for 'Level of enjoyment' show a robust increase in WTP values between participants with 'Low' enjoyment' and those with 'Medium'. These WTP values seem to stabilise in the move

between 'Medium' and 'High' enjoyment, except for Bournemouth, where the insignificant WTP for 'High' enjoyment customers seems to be primarily due to the small sample size (n=39).

Table 80. Sensitivity of household Package SQ to +1 WTP values to 'Ability to make comparisons', 'Level of understanding' and 'Level of enjoyment'

Segment	Dual	Bournemouth	Bristol
Ability to make comparisons			
No	£8.1	-£7.0	£3.1
Yes	£34.6***	£44.2***	£23.8***
Level of understanding			
No	£11.4	£478.5	-£1.7
Yes	£33.7***	£39.8***	£24.9***
Level of Enjoyment			
Low (1-3)	£9.6	£18.8***	£18.5***
Medium (4-7)	£38.9***	£51.5***	£22.0***
High (8-9)	£35.6***	-£2.8	£21.3***

** significant at 10%; ** significant at 5%; *** significant at 1%*

Community Engagement and Water Resources Research (Stage 2) analysis

The Stage 2 survey was constructed around two exercises. The first 'MaxDiff' exercise required participants to choose which of the customer engagement initiatives shown to them would like to have the highest priority, and which the lowest priority. The MaxDiff exercise generates a quantitative index of 'priority' for each of the initiatives included in the design for the customer population or sub-populations. This measure provides a means of understanding how customers would like to see the initiatives ordered in terms of priority.

The second exercise aims to obtain estimates of customers' willingness to pay (WTP) for different options that Wessex Water could implement in its water resources management plan. The questionnaire was developed around the use of discrete choice experiment (DCE) questions as a means of eliciting customer priorities and WTP.

The DCE questions offered participants a series of choices between two alternative packages of service levels. The questions required the participant to make a trade-off, with some service measures better in one alternative and some better in the other. The choices made by the participants indicate how they value each of the service measures in relation to one another, in accordance with established principles of random utility theory. Also included in the exercise was the change in the customer's annual bill from Wessex Water. The bill was presented as a monetary amount for household customers (and as a percentage deviation from current bills for business customers) and enabled us to derive WTP values from the mixed logit (MXL) model used to analyse the DCE data.

Results of the Community Engagement MaxDiff Exercise

For the Community Engagement exercise, Table 81 below presents the coefficients for the rank-ordered logit estimates. All coefficients are highly significant, giving us confidence in the priority scores derived.

Table 81. Household model estimates from the Community Engagement MaxDiff exercise

Initiative	Coeff. (std. err.)
Helping customers to SAVE water and money if they're METERED	1.656 (0.054)***
Increasing the number of TALKS we do with SCHOOL CHILDREN on water and wastewater services	0.815 (0.047)***
Allowing our STAFF to spend more time in their working week on LOCAL/COMMUNITY/CHARITY PROJECTS	0.000 -
Providing more SUPPORT for customers in FINANCIAL DIFFICULTY	1.120 (0.049)***
Helping LOCAL GROUPS in RIVER MANAGEMENT	0.737 (0.048)***
Increasing/improving the RECREATIONAL FACILITIES we provide (i.e. reservoir visitor centres, sailing, fishing, cafes, play parks)	0.520 (0.048)***
Helping our wider community to VALUE THE NATURAL SYSTEMS	1.002 (0.048)***
Holding EVENTS in the community to reach out to our more VULNERABLE CUSTOMERS	0.686 (0.048)***
Observations LL	14,835 -8940.53

*Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as highest priority', 4 'least priority', and the remaining two attributes were equally ranked at 2; estimates all based on data weighted to reflect the population composition in gender, age and SEG; * significant at 10%; ** significant at 5%; *** significant at 1%; (1) All variables are dummies, equal to 1 when the attribute present is in the ranking set, and 0 otherwise.*

Results of the Water Resources Management Exercise

For the Water Resource Management exercise, the model and unit WTP estimates derived from the DCE models are presented in Table 82 and Table 83 respectively.

Results show that the MXL model yields satisfactory and highly significant coefficient and unit WTP values for all attributes and of the expected sign. In the case of hosepipe bans, the variable entered was the interaction between an indicator for those who said a hosepipe ban would have a big impact on them (3.85% of the sample), and the hosepipe ban chance itself. This approach effectively imposes the assumption that those who said a hosepipe ban would not have a big impact on them would have zero value on average for reducing the chance of one. It was adopted because including hosepipe ban on its own led to a positive coefficient which is unreasonable for a model to be used in appraisal.

To derive WTP from the models we divide the coefficient on each measure by the coefficient on the bill. In the case of hosepipe ban risk, we further weight the value for the proportion of people who said a hosepipe ban would have a big impact on them (3.85%).

Table 82. Household Water Resource Management DCE Model estimates

Variable	Coefficient (std. err.)	
	Mean	Std. dev,
Water leakage	-0.087 (0.029)***	0.006 (0.085)
Water conservation devices	0.038 (0.012)***	0.077 (0.036)***
New water meters fitted	0.012 (0.004)***	0.000 (0.013)
New smart meters fitted	0.004 (0.002)***	0.000 (0.004)
River water flow levels	-0.013 (0.003)***	0.040 (0.004)***
Hosepipe ban * Big impact	-20.770 (48.680)	204.814 (79.178)***
Bill change (£/hh/yr)	-0.022 (0.002)***	(fixed) -
Observations LL Pseudo-R2	3260 -2097.88 0.072	

*Model = Mixed logit; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 83. Household Water Resource Management DCE WTP estimates (standard errors in parentheses)

Variable	Unit	Per unit WTP (£/unit/hh/yr)
Water leakage	%	-3.94 (1.25)***
Water conservation devices	%	1.69 (0.54)***
New water meters fitted	%	0.49 (0.18)***
New smart meters fitted	%	0.20 (0.07)***
River water flow levels	Miles	-0.60 (0.12)***
Hosepipe ban	Chance	166.63 (201.68)

** significant at 10%; ** significant at 5%; *** significant at 1%*

Variation of the Community Engagement MaxDiff Exercise Results Over Customer Segments

Similarly to the Stage 1 segmentation analysis, we examined the variation in MaxDiff estimates across segments of the following variables:

- Socioeconomic group (SEG)
- Age
- Gender
- Engagement with water-related activities

Specifically, the segments examined are detailed in Table 84 along with their respective sample sizes.

Table 84. Segmentation variables, segments and sample sizes

Variable	Segments	Sample size
Overall	-	652
SEG	A & B	309
	C1	101
	C2	56
	D & E	146
Age	18 to 34	95
	35 to 54	207
	55 or more	299
Gender	Male	340
	Female	307
Water-related activities	Any (one or more)	416
	None	236

The Customer Engagement MaxDiff model was re-estimated for at the level of each segment. The results from the segmentation analysis of the MaxDiff data are presented below. It is worth noting that scores in this and subsequent tables are sorted in decreasing order and normalized to the median (reaching out to school children) of the overall model.

Starting with SEG (Table 85), the impact scores are generally similar and ordered more or less consistently across SEGs. Exceptions are 'Helping customers to save water and money' which impact score is substantially higher for the A/B and C1 group compared to the C2 and D/E groups; 'Helping local groups in river management' which impact score is considerable lower for the C2 group compared to the other groups; 'Reaching out to more vulnerable customers' which score is substantially lower compared to the remaining groups; and 'Increased staff engagement with the local community' which score is considerably higher for the D/E groups compared to the rest.

Table 85. Household Customer Engagement MaxDiff impact scores by SEG

Priority area	Overall (N=652)	AB N=309	C1 N=101	C2 N=56	DE N=146
Helping customers to save water and money	2.32	3.64	3.16	1.81	1.51
Providing more support for customers in financial difficulty	1.35	1.07	1.58	1.29	1.69
Helping our wider community to value the natural water system	1.20	1.47	1.27	0.96	1.15
Reaching out to school children	1.00	1.00	1.00	1.00	1.00
Helping local groups in river management	0.92	1.22	0.85	0.54	1.22
Reaching out to more vulnerable customers	0.88	0.68	0.79	0.73	1.31
Increasing/improving the provision of recreational facilities	0.74	0.89	0.60	0.49	0.98
Increased staff engagement with the local community	0.44	0.38	0.34	0.37	0.68

As for age (Table 86), results show a general decrease in impact scores as age increases.

Table 86. Household Customer Engagement MaxDiff impact scores by age group

Priority area	Overall (N=652)	18-34 (N=95)	35-54 (N=207)	55+ (N=299)
Helping customers to save water and money	2.32	3.64	3.16	1.81
Providing more support for customers in financial difficulty	1.35	1.07	1.58	1.29
Helping our wider community to value the natural water system	1.20	1.47	1.27	0.96
Reaching out to school children	1.00	1.00	1.00	1.00
Helping local groups in river management	0.92	1.22	0.85	0.54
Reaching out to more vulnerable customers	0.88	0.68	0.79	0.73
Increasing/improving the provision of recreational facilities	0.74	0.89	0.60	0.49
Increased staff engagement with the local community	0.44	0.38	0.34	0.37

Moving to gender (Table 87), males show generally higher impact scores than females except for 'Providing more support for customers in financial difficulty'.

Table 87. Household Customer Engagement MaxDiff impact scores by gender

Priority area	Overall (N=652)	Male (N=340)	Female (N=307)
Helping customers to save water and money	2.32	5.36	3.99
Providing more support for customers in financial difficulty	1.35	1.57	1.99
Helping our wider community to value the natural water system	1.20	2.17	1.61
Reaching out to school children	1.00	1.00	1.00
Helping local groups in river management	0.92	1.79	1.08
Reaching out to more vulnerable customers	0.88	1.47	1.26
Increasing/improving the provision of recreational facilities	0.74	1.31	0.76
Increased staff engagement with the local community	0.44	0.56	0.43

Finally, with water-related activities (Table 88), we notice that participants who report practising any water-related activities show generally higher impact scores than people who practise none, except for 'Providing more support for customers in financial difficulty'.

Table 88. Household Customer Engagement MaxDiff impact scores by water-related activities

Priority area	Overall (N=652)	Any (N=416)	None (N=236)
Helping customers to save water and money	2.32	5.36	3.99
Providing more support for customers in financial difficulty	1.35	1.57	1.99
Helping our wider community to value the natural water system	1.20	2.17	1.61
Reaching out to school children	1.00	1.00	1.00
Helping local groups in river management	0.92	1.79	1.08
Reaching out to more vulnerable customers	0.88	1.47	1.26
Increasing/improving the provision of recreational facilities	0.74	1.31	0.76
Increased staff engagement with the local community	0.44	0.56	0.43

APPENDIX B – NON-HOUSEHOLD ECONOMETRIC ANALYSIS

Introduction

This appendix contains all the models and interim calculations used to derive the core non-household valuation results presented in the main body of this report. It follows a similar structure to Appendix A, in terms of the econometric analyses of the MaxDiff and Package exercises, willingness to pay calculations, and Stage 2 results. Much of the methodological discussion is left out of this section and the reader is referred to the household section in Appendix A for further details.

MaxDiff Analysis

Core models

Table 89 below presents the results for the core rank-ordered logit models estimated based on the data from the Stage 1 MaxDiff exercise for dual-service customers, Bournemouth Water customers and Bristol Water customers. Recall that impact scores are obtained simply by exponentiating the coefficients. Indeed all three models fit the data very well as evidenced by the precision of the coefficients.

Service measure weights

We then derive the preference weights for each service measure based on the calculation of its utility change to the customer corresponding to a SQ to +1 level change. Results are tabulated in Table 90 for all three companies, along with the derived utility changes and the resulting service measures' preference weights.

Table 89. Non-household MaxDiff rank-ordered logit estimates

Service measure	Dual	Bristol	Bournemouth
Unexpected supply interruption lasting 3-6 hours	2.754 (0.109)***	2.446 (0.132)***	- -
Unexpected supply interruption lasting 6-12 hours	2.861 (0.112)***	2.661 (0.128)***	- -
Unexpected supply interruption lasting 12-24 hours	- -	2.977 (0.130)***	- -
Unexpected supply interruption lasting >24 hours	- -	3.240 (0.130)***	- -
Planned supply interruption lasting 3-6 hours	1.775 (0.107)***	1.650 (0.131)***	- -
Planned supply interruption lasting 6-12 hours	1.942 (0.111)***	2.005 (0.125)***	- -
Planned supply interruption lasting 12-24 hours	- -	2.127 (0.124)***	- -
Planned supply interruption lasting >24 hours	- -	2.292 (0.123)***	- -
Water taste & smell not ideal	1.810 (0.102)***	1.780 (0.114)***	- -
Discoloured water	1.266 (0.106)***	0.957 (0.112)***	- -
Persistent low water pressure	1.805 (0.101)***	0.913 (0.113)***	- -
Response time	2.358 (0.105)***	- -	- -
Hosepipe ban	0.240 (0.105)**	0.443 (0.118)***	- -
Restrictions on essential use of water	2.907 (0.109)***	3.471 (0.118)***	- -
Planned and unplanned works causing traffic disruption	- -	1.690 (0.111)***	- -
Restricted toilet use due to overloaded sewers	3.260 (0.113)***	3.400 (0.119)***	3.094 (0.194)***
Sewer flooding inside customers' properties	4.186 (0.131)***	4.684 (0.140)***	3.803 (0.243)***
Sewer flooding outside customers' properties	3.800 (0.120)***	3.922 (0.133)***	3.784 (0.235)***
Sewer flooding in public areas	2.146 (0.106)***	1.840 (0.118)***	1.774 (0.193)***
Pollution incidents	1.457 (0.106)***	1.596 (0.118)***	0.910 (0.142)***
Bathing water quality sufficient but not good	-0.135 (0.115)	-0.055 (0.121)	0.219 (0.181)
Bathing water quality good but not excellent	0.000 -	0.000 -	0.000 -
River water quality less than good	0.759 (0.100)***	0.845 (0.110)***	0.620 (0.141)***
River water flow lower than ideal	0.522 (0.094)***	- -	- -
Observations LL	8,892 -5,859.33	8,907 -5,720.88	1,425 -750.78

*Standard errors in brackets. Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as 'most impact', 4 'least impact', and the remaining two attributes were equally ranked at 2; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%; (1) All variables are dummies, equal to 1 when the attribute present is in the ranking set, and 0 otherwise.*

Table 90. Non-household service measure preference weights

	Dual					Bristol					Bournemouth				
Service measure	Impact score	MaxDiff units per Package unit	Level change (abs. value)	Utility change	Pref. weight (%)	Impact score	MaxDiff units per Package unit	Level change (abs. value)	Utility change	Pref. weight (%)	Impact score	MaxDiff units per Package unit	Level change (abs. value)	Utility change	Pref. weight (%)
Unexpected supply interruption lasting 3-6 hours	15.71	1	750	11781.8	3.90%	11.54	1	1000	11541.7	2.11%	-	-	-	-	-
Unexpected supply interruption lasting 6-12 hours	17.47	1	250	4368.7	1.44%	14.31	1	300	4294.2	0.78%	-	-	-	-	-
Unexpected supply interruption lasting 12-24 hours	-	-	-	-	-	19.62	1	740	14520.9	2.65%	-	-	-	-	-
Unexpected supply interruption lasting >24 hours	-	-	-	-	-	25.54	1	1100	28097.4	5.14%	-	-	-	-	-
Planned supply interruption lasting 3-6 hours	5.90	1	5750	33924.9	11.22%	5.21	1	1800	9370.1	1.71%	-	-	-	-	-
Planned supply interruption lasting 6-12 hours	6.97	1	250	1743.5	0.58%	7.43	1	2000	14853.4	2.71%	-	-	-	-	-
Planned supply interruption lasting 12-24 hours	-	-	-	-	-	8.39	1	6	50.3	0.01%	-	-	-	-	-
Planned supply interruption lasting >24 hours	-	-	-	-	-	9.90	1	0.4	4.0	0.00%	-	-	-	-	-
Water taste & smell not ideal	6.11	1	650	3970.6	1.31%	5.93	1	53	314.3	0.06%	-	-	-	-	-
Discoloured water	3.55	1	150	531.9	0.18%	2.60	1	117	304.8	0.06%	-	-	-	-	-
Persistent low water pressure	6.08	1	80	486.3	0.16%	2.49	1	223	555.8	0.10%	-	-	-	-	-
Response time	10.57	24,000	0.05	12687.7	4.19%	-	-	-	-	-	-	-	-	-	-
Hosepipe ban	1.27	547,615	0.002	1160.5	0.38%	1.56	489,349	0.017	12698.2	2.32%	-	-	-	-	-
Restrictions on essential use of water	18.31	547,615	0.003	30077.8	9.94%	32.15	489,349	0.008	125879.9	23.01%	-	-	-	-	-
Planned and unplanned works causing traffic disruption	-	-	-	-	-	5.42	784	32	136011.1	24.86%	-	-	-	-	-
River water flow lower than ideal	1.68	333.699	9	5059.5	1.67%	-	-	-	0.0	0.00%	-	-	-	-	-
Sewer flooding inside customers' properties	65.74	0.459	18	542.8	0.18%	108.16	0.410	18	798.0	0.15%	44.81	0.132	18	106.1	0.21%
Sewer flooding outside customers' properties	44.71	0.459	218	4470.5	1.48%	50.48	0.410	218	4510.6	0.82%	43.97	0.132	218	1260.5	2.55%
Sewer flooding in public areas	8.55	1.835	152	2384.9	0.79%	6.29	1.639	152	1568.5	0.29%	5.90	0.526	152	471.4	0.95%
Restricted toilet use due to overloaded sewers	26.04	0.459	141	1684.2	0.56%	29.95	0.410	141	1730.9	0.32%	22.07	0.132	141	409.3	0.83%
Pollution incidents	4.29	140.091	66	39708.4	13.13%	4.93	125.185	66	40754.6	7.45%	2.49	40.166	66	6588.3	13.30%
Bathing water quality sufficient but not good	0.87	11,651	1	10175.8	3.36%	0.95	10,412	1	9855.7	1.80%	1.24	3,340.638	1	4158.6	8.40%
Bathing water quality good but not excellent	1.00	11,651	5	58256.9	19.26%	1.00	10,412	5	52058.4	9.51%	1.00	3,340.638	5	16703.2	33.73%
River water quality less than good	2.14	225.454	165	79454.7	26.27%	2.33	201.466	165	77367.82	14.14%	1.86	64.641	165	19825.4	40.03%
Total	-	-	-	*302471.4*	*100.00%*	-	-	-	*547140.6*	*100.00%*	-	-	-	*49522.7*	*100.00%*

Package Exercise Analysis

Core models

The CL Package DCE and '+1 vs. +2' model estimates for the three companies are presented in Table 91 and Table 92, respectively. Both sets of models exhibit satisfactory results in which package alternative-specific constants (ASC's) all have highly significant coefficients of the right sign (positive for +1 and +2; negative for -1), and in which all bill coefficients have the expected negative signs, and highly significantly so except for the negative bill change coefficients in the Dual customers and Bristol data. Note that the models for Dual customers and Bristol Water customers were estimated with only a coefficient for positive bill changes, as original models that also included negative bill change coefficients returned positive signs for the latter. As in the case of the household models, this specification assumes that no monetary sum would compensate for the disutility resulting from service deterioration.

Table 91. Non-household Package DCE models

Variable	Coefficient (std. err.)		
	Dual	Bristol	B'mouth
Package -1	-1.788	-1.901	-3.242
	(0.165)***	(0.172)***	(1.227)***
Package SQ (base)	(omitted)	(omitted)	(omitted)
	-	-	-
Package +1 or +2	0.758	0.934	0.920
	(0.179)***	(0.130)***	(0.343)***
Negative bill change (%)	(omitted)	(omitted)	-0.077
	-	-	(0.155)
Positive bill change (%)	-0.112	-0.111	-0.102
	(0.013)***	(0.013)***	(0.032)***
Observations	1200	1200	200
LL	-677.27	-696.79	-109.59
Pseudo-R2	0.186	0.162	0.209

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 92. Non-household Package '+1 vs. +2' DCE models

Variable	Coefficient (std. err.)		
	Dual	Bristol	B'mouth
Package +1	(omitted)	(omitted)	(omitted)
	-	-	-
Package +2	0.482	0.434	1.996
	(0.402)	(0.285)	(0.856)**
Bill change (%)	-0.119	-0.114	-0.364
	(0.057)**	(0.042)***	(0.143)**
Observations	125	184	26
LL	-83.26	-122.32	-13.51
Pseudo-R2	0.039	0.041	0.251
Proportion of +1 choosers in the 'SQ vs. +1' scenarios	41.67%	61.33%	52.00%

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%*

Package WTP values

Table 93 presents the whole package WTP/WTA values along with their standard errors. Results show that all values have the right signs (WTP values are positive and WTA values, where available, are negative), with all WTP figures being highly positive across all three companies.

Table 93. Non-household Package WTP/WTA estimates

Variable	WTP/WTA (std. err.)		
	Dual	Bristol	B'mouth
SQ to -1	-	-	-42.36
	-	-	(72.00)
SQ to +1	6.75	8.39	9.01
	(1.00)***	(0.77)***	(2.03)***
+1 to +2	4.05	3.79	5.48
	(1.87)**	(1.52)**	(1.32)***

** significant at 10%; ** significant at 5%; *** significant at 1%*

Community Engagement and Water Resources Research (Stage 2) analysis

Results of the Community Engagement MaxDiff Exercise

For the Community Engagement exercise, Table 94 below presents the coefficients for the rank-ordered logit estimates. All coefficients are highly significant, giving us confidence in the priority scores derived.

Table 94. Non-household model estimates from the Community Engagement MaxDiff exercise

Initiative	Coeff. (std. err.)
Helping customers to SAVE water and money if they're METERED	2.070 (0.089)***
Increasing the number of TALKS we do with SCHOOL CHILDREN on water and wastewater services	1.189 (0.079)***
Allowing our STAFF to spend more time in their working week on LOCAL/COMMUNITY/CHARITY PROJECTS	0.000 -
Providing more SUPPORT for customers in FINANCIAL DIFFICULTY	1.213 (0.082)***
Helping LOCAL GROUPS in RIVER MANAGEMENT	1.199 (0.080)***
Increasing/improving the RECREATIONAL FACILITIES we provide (i.e. reservoir visitor centres, sailing, fishing, cafes, play parks)	0.541 (0.081)***
Helping our wider community to VALUE THE NATURAL SYSTEMS	1.610 (0.081)***
Holding EVENTS in the community to reach out to our more VULNERABLE CUSTOMERS	0.732 (0.080)***
Observations LL	11,130 -6076.42

*Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as highest priority', 4 'least priority', and the remaining two attributes were equally ranked at 2; estimates all based on data weighted reflect the population composition in gender, age and SEG; * significant at 10%; ** significant at 5%; *** significant at 1%; (1) All variables are dummies, equal to 1 when the attribute present is in the ranking set, and 0 otherwise.*

Results of the Water Resources Management Exercise

For the Water Resource Management exercise, the model and unit WTP estimates derived from the DCE models are presented in Table 95 and Table 96, respectively.

Results show that the MXL model yields satisfactory and highly significant coefficient and unit WTP values for all attributes and of the expected sign except for new smart meters and hosepipe ban. Yet unlike in the household sample, here the hosepipe ban attribute has the expected negative coefficient sign.

Table 95. Non-household water resource management DCE model estimates

Variable	Coefficient (std. err.)	
	Mean	Std. dev,
Water leakage	-0.465 (0.080)***	0.689 (0.118)***
Water conservation devices	0.106 (0.028)***	0.165 (0.056)***
New water meters fitted	0.023 (0.009)**	0.050 (0.022)**
New smart meters fitted	0.005 (0.004)	0.050 (0.009)***
River water flow levels	-0.016 (0.006)***	0.046 (0.013)***
Hosepipe ban	-14.402 (9.264)	67.132 (21.995)***
Bill change (%/nhh/yr)	-0.112 (0.014)***	(fixed) -
Observations LL Pseudo-R2	1495 -912.60 0.119	

*Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 96. Non-household water resource management DCE WTP estimates

Variable	Unit	Per unit WTP (%/unit/nhh/yr)
Water leakage	%	-4.151 (0.670)***
Water conservation devices	%	0.949 (0.248)***
New water meters fitted	%	0.207 (0.081)***
New smart meters fitted	%	0.046 (0.039)
River water flow levels	Miles	-0.140 (0.053)***
Hosepipe ban	Chance	-128.502 (82.449)

*Standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%*

SYSTEM INFORMATION:
Interviewer number
Interviewer name
Date:
Time interview started:

NOTE: Questions used in the pilot and cognitive testing have been included for information. This text has been highlighted and struck through.

Introduction

CAPI: GO TO MAIN QUESTIONNAIRE

ONLINE: Thank you very much for agreeing to complete this online survey which is being conducted by Accent on behalf of Wessex Water. The closing date for completion of this survey is **Friday 7th April**.

Wessex Water, the company that supplies water and looks after the sewerage in your area, wants to talk to customers about options for water and sewerage services from 2019 to 2024, and the impact on their bills.

The research is being conducted under the terms of the Market Research Society (MRS) code of conduct and is completely confidential. If you would like to confirm Accent's credentials please call the MRS free on 0500 396999.

The questionnaire will take about 20 minutes to complete.

All participants will be entered into a prize draw with a prize of an iPad Air 2.

You do not have to answer questions you do not wish to and you can terminate the interview at any point. For convenience you can stop and return to complete the questionnaire as many times as you wish, although once submitted you will not be able to enter again.

IF MOBILE DEVICE SHOW: This survey is best undertaken on a tablet or a PC. If you do use a smartphone you can switch between desktop mode and mobile mode at any time by clicking the button at the bottom of the screen.

Please use the [DP ADD IMAGE OF FORWARD BUTTON BUT MAKE A BIT SMALLER THAN ORIGINAL] at the bottom of the page to go forward. As soon as you do this your answer is saved.

If you need to go back, please use the [DP ADD IMAGE OF BACK BUTTON BUT MAKE A BIT SMALLER THAN ORIGINAL] button.

If you leave the survey idle for 30 minutes, you will be logged out but don't worry, you can go straight back to the point you left off by clicking on the link in the email we sent you.

We will first ask you a few questions to check that you are eligible to take part in this research.

Scoping questions

Q1. **ONLINE:** Do you or any of your close family work or have worked in the past in market research or the water industry (including working for Wessex Water)? **Please click on one of the answers below.**

1. Yes **THANK & CLOSE**
2. No

Q2. **ONLINE:** Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?

1. Yes
2. No **THANK & CLOSE**

Q3. **ONLINE:** Does your property have a septic tank or cesspit?

If you do have one, this would mean that your property is not connected to the main sewer and you would periodically arrange to have the septic tank emptied.

1. Yes **THANK & CLOSE**
2. No
3. Don't know

Q4. **ONLINE:** We need to check that we are speaking to residents in specific parts of the Wessex Water area. Please can you tell us the first part of your postcode? For example, if your full postcode is BS2 2EN, please just tell us the first part ie BS2.

Please click on the dropdown menu below and select the letters in the first part of the postcode. Then click on the box and type in the number(s) from the first part of your postcode.

DP: Please create drop down look up for postcode check using postcodes shown in column A sheet '3031lookupclient' of ..\DP\Stage 1\PR19\Domestic\Cogs\3031 postcode lookup from client (DP).xlsx. Do not create box for 2nd half of postcode.

Prefer not to answer	**THANK AND CLOSE – NOT WITH ANY OTHER CODE**
None of the above letters	**THANK AND CLOSE – NOT WITH ANY OTHER CODE**

Q4a **ONLINE:** Just to check, this makes your postcode **[DP: insert drop down PC area and PC district from Q4].** Is this correct?

1. Yes
2. No, I would like to go back to the previous question and amend **GO BACK TO Q4**

CHECK QUOTA.

Q5. **ONLINE: ASK IF CONFIRMED POSTCODE MATCHES LOOK UP:** According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?

1. Yes
2. No **THANK & CLOSE**
3. Don't know **THANK & CLOSE**

Q5a **ONLINE: ASK IF CONFIRMED POSTCODE DOES NOT MATCH LOOK UP:** Who supplies your water and sewerage services?

1. Wessex Water supplies both my water and sewerage services
2. Wessex Water supplies sewerage only, another company supplies my water – **THANK AND CLOSE**
3. Wessex Water supplies my water services only, another company supplies my sewerage – **THANK AND CLOSE**
4. Other supplier for both water and sewerage service– **THANK AND CLOSE**
5. Don't know **THANK AND CLOSE**

Q6. **ONLINE:** Which of the following best describes your household?

1. Owner Occupier (with or without mortgage)	HOMEOWNER
2. Shared Ownership or Keyworker	HOMEOWNER
3. Private Rented	TENANT
4. Social Housing rented (Council Housing, Housing Association or similar)	TENANT
5. Prefer not to say	

Q7. **ONLINE: IF Q6=3 OR 4 (TENANT) ASK, OTHERS GO TO Q8:** Is your water and sewerage bill included in your rental payment, or do you pay directly to Wessex Water?

1. Included in rent **THANK & CLOSE**
2. Pay directly to Wessex Water
3. Don't know **THANK & CLOSE**

Q8. **ONLINE:** Do you currently have any on-going complaints or issues with Wessex Water?

1. Yes
2. No **GO TO Q9**

Q8a **ONLINE:** What is the nature of your complaint?

Please write in:

Q9. **ONLINE: APPROX. SEG** How would you describe the occupation type of the chief income earner in your household?

1. Senior managerial or professional
2. Intermediate managerial, administrative or professional
3. Supervisor; clerical; junior managerial, administrative or professional
4. Manual worker (with industry qualifications)
5. Manual worker (with no qualifications)
6. Unemployed
7. Retired
8. Student
9. Prefer not to say **SKIP TO SEG**

Q10. **ONLINE: ASK IF Q9=7 (RETIRED), ELSE SKIP:** Does the chief income earner have a state pension, a private pension or both?

1. State only
2. Private only
3. Both
4. Prefer not to say **SKIP TO SEG**

Q11. **ONLINE: ASK IF Q10= PRIVATE OR BOTH, ELSE SKIP** How would you describe the chief income earner's occupation type before retirement?

1. Senior managerial or professional
2. Intermediate managerial, administrative or professional
3. Supervisor; clerical; junior managerial, administrative or professional
4. Manual worker (with industry qualifications)
5. Manual worker (with no qualifications)
6. None of these

SEG CODE AS FOLLOWS:

IF **Q9**= 1 or 2; SEG = AB
IF **Q9** = 3 or 4; SEG = C1/C2
IF **Q9**= 5; SEG = DE
IF **Q9**= 6; SEG = DE
IF **Q9**= 8; SEG = C1/C2

IF **Q9** = 7 and **Q8a** = State only; SEG = DE

IF **Q9**= 7 and **Q8a** = Private only OR Both and **Q8b** = 1; SEG = AB
IF **Q9**= 7 and **Q8a** = Private only OR Both and **Q8b** = 2; SEG = AB
IF **Q9**= 7 and **Q8a** = Private only OR Both and **Q8b** = 3; SEG = C1/C2
IF **Q9**= 7 and **Q8a** = Private only OR Both and **Q8b** = 4; SEG = C1/C2
IF **Q9**= 7 and **Q8a** = Private only OR Both and **Q8b** = 5; SEG = DE
IF **Q9** = 7 and **Q8a** = Private only OR Both and **Q8b**= 6; SEG = DE

IF **Q9**= 9 OR Q10 = 4; SEG = Not stated

CHECK QUOTAS

Q12. **ONLINE:** What is your age? **Please click on the box below and type your answer.**

WRITE IN

Prefer not to say

DP: PROGRAMME INTO BANDS

18-24
25-34
35-44
45-54
55-64
65-74
75 or older
Prefer not to say

CHECK QUOTAS

Q13. **ONLINE:** Are you….

1. Male
2. Female
3. Prefer not to say

CHECK QUOTAS

Q14. **ONLINE:** Do you have a water meter?

1. Yes
2. No
3. Don't Know

Q15. **ONLINE:** How much is your bill from Wessex Water? You can give this as either a weekly, monthly or annual figure, whichever is easier for you. If you do not know exactly, please try and give your best estimate.

1. £ per week
2. £ per month
3. £ per year

Don't know

Q15a **Hidden question:** Calculate annual BILL from Q15Q15

£ per year
If DK, code as £462

~~Q16. **ONLINE: ASK IF Q15 = A FIGURE. IF 'DON'T KNOW' GO TO RECRUITMENT STATEMENT** Please say if that is an estimate or not~~

~~1. Estimate~~
~~2. Exact amount~~

Main Questionnaire

CAPI: Thank you for agreeing to take part in this survey. As I said previously, we are conducting research for Wessex Water looking at areas you think they should improve on in the future.

Please be assured that any answer you give will be treated in complete confidence in accordance with the Code of Conduct of the UK Market Research Society. You will not be personally identified and we can assure you that this is not a sales exercise.

The questionnaire will take a further [**ONLINE:**18 minutes; **CAPI:** 20-25 minutes], depending on your answers. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

ONLINE: Thank you, you are eligible to take part in this survey.

The questionnaire will take a further 18 minutes to complete, depending on your answers.

You do not have to answer questions you do not wish to and you can terminate the interview at any point. For convenience you can stop and return to complete the questionnaire as many times as you wish, although once submitted you will not be able to enter again.

Background Questions

Q16a **CAPI:** How much is your bill from Wessex Water? You can give this as either a weekly, monthly or annual figure, whichever is easier for you. If you do not know exactly, please try and give your best estimate.

1. £ per week
2. £ per month
3. £ per year

Don't know

Q16b **Hidden question:** Calculate annual BILL from Q16a

£ per year
If DK, code as £462

~~Q17. **CAPI/ONLINE:** What do you typically use **water** for on a daily basis? Please think about all of the areas in your life where you use water or where waste water is taken away from your home.~~
~~**ONLINE:** PLEASE TICK ALL OPTIONS THAT APPLY TO YOU. **CAPI:** TICK ALL THAT APPLY~~

~~Cleaning teeth~~
~~Preparing food~~
~~Cooking food~~
~~Making a hot drink~~
~~Taking a bath~~
~~Taking a shower~~
~~Drinking water~~
~~Drinking water for pets~~
~~Cleaning~~
~~Using washing machine~~
~~Using dishwasher~~
~~Gardening~~
~~Cleaning car~~
~~Flushing the toilet~~
~~Other, please specify~~

~~Q18. **CAPI/ONLINE:** What would be the impact of not having access to **clean water** for 24 hours?~~
~~**ONLINE:** PLEASE CLICK ON THE BOX AND TYPE IN YOUR ANSWER. **CAPI:** WRITE IN~~

~~Q19. **CAPI/ONLINE:** What would be the impact of **waste water** not being collected for a day?~~

~~**CAPI:** WRITE IN~~

Q20. **CAPI/ONLINE:** Together with other organisations Wessex Water is responsible for the quality of river and coastal bathing waters. It would be useful to understand some of your responses to this survey by also understanding whether you spend any of your leisure time in or around rivers or beaches. Do you take part in any of the following leisure activities? **ONLINE: Please tick all options that apply to you.**

1. Fishing/angling
2. Swimming/paddling in the sea/rivers
3. Sailing
4. Visiting beaches and/or river banks

5. Surfing
6. None **NOT WITH ANY OTHER CODE**

Q21. **CAPI/ONLINE:** How informed do you feel about the quality of the environment?

1. Very uninformed
2. Uninformed
3. Neither uninformed nor informed
4. Informed
5. Very informed

Q22. **DO NOT READ OUT:** Bill size **[ONLINE INPUT FROM: Q15a; CAPI: Q16a]**

Q23. **CAPI: IF Q16a= 4 (DON'T KNOW):** Currently, the average annual household water and sewerage bill in your area is £462. **ONLINE: IF Q15a= 4 (DON'T KNOW):** Currently, the average annual household water and sewerage bill in your area is £462.

ELSE: Previously you told [**ONLINE:** us; **CAPI:** me] that your bill from Wessex Water is **[CAPI: INPUT FROM Q16a**; **ONLINE: INPUT FROM Q15a; please include per week/per month/per year]. IF Q15a/Q16a=1 ADD:** This calculates as **[INPUT FROM Q15b/Q16b]** per year. **IF Q15a/Q16a=2 ADD:** This calculates as **[INPUT FROM Q15b/Q16b]** per year.

ASK ALL: How do you feel about the amount that you pay Wessex Water for water and sewerage services? Is it**:**

1. Far too little
2. Too little
3. About right
4. Slightly too much
5. Far too much

~~Q24. **FOR COGNITIVE TESTING ASK:** The national average annual household water and sewerage bill is £389. Does this information change how you feel about the amount you pay for water?~~

~~1. Yes~~
~~2. No~~

~~Q25. **FOR COGNITIVE TESTING ASK: ASK IF Q24=1:** How do you now feel about the amount you pay?~~

~~1. Far too little~~
~~2. Too little~~
~~3. About right~~
~~4. Slightly too much~~
~~5. Far too much~~

Choice Experiment Introduction

CAPI/ONLINE: You are now going to be shown information about service levels that you could experience from Wessex Water.

CAPI: Please now look at Show Card C (Service Measures).

This is about various types of water and sewerage service failures and the environmental measures attached to them. We'll now look at each of these in a little more detail.

ONLINE: The list below shows various types of water and sewerage failures and the environmental measures attached to them. If you would like to see more information please click on the "**[DP: ADD IMAGE OF BUTTON]**" button.

- **Supply interruptions** at your property lasting an average of 6 hours
- **Non-ideal taste and smell of your tap water** for a few days
- **Discoloured water** at your property for a few hours
- **Persistent low water pressure** at your property
- **Poor response time to fix a leaking water main pipe** near your property
- **Hosepipe ban** in your area from May to September (5 months)
- **Restriction on essential water use** lasting 2 months
- **Restricted toilet use due to overloaded sewers**
- **Sewer flooding inside your property**
- **Sewer flooding immediately outside your property**
- **Sewer flooding in a public area**
- **Sites where sewage spills into rivers and bathing water**
- **Poor bathing water quality**
- **Poor river water quality**
- **Poor river water flow levels** making it less suitable for activities such as fishing

DP: HOVER BUTTON TEXT FOR EACH SERVICE MEASURE IS SHOWN BELOW:

Supply interruptions: Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to burst pipes, which can happen at any time, or due to planned maintenance, in which case you would be given at least 48 hours' notice.

Interruptions last an average of 6 hours when they occur.

Non ideal taste and smell of your tap water: Water taste and smell can be less than ideal at your property for a few days at a time because of dissolved minerals and gases, but the water is safe to drink.

Discoloured water: On rare occasions, your water may be discoloured because of harmless deposits that accumulate over time in water mains, but the water is safe to drink. We wouldn't expect anyone to drink it when it looks unpleasant. Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time.

Persistent low water pressure: Low water pressure means it takes longer to fill the bath or kettle than you would like, and may affect how well a combi boiler works. Persistent means the property is affected every day, though the problem may come and go during the day. It is usually caused by the age, condition and size of the water company's pipes. Properties at the tops of hills and the end of lines are most at risk.

If you don't currently suffer, or have never suffered from persistent low water pressure, then your property is not at risk.

Poor response time to fix a leaking water main pipe: Sometimes there can be leaks in water mains pipes. Wessex Water aims to get these fixed promptly. Wessex Water measures its performance by showing the percentage of mains leaks that they respond to by fixing them within a day of their happening.

Hosepipe ban: As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.
Restriction on essential water use: As an emergency measure in the event of a severe drought, Wessex Water can impose a restriction on essential use of water at your property lasting 2 months. This could involve providing a water supply which was available every other day for a few hours a day at a reduced pressure. This would be likely to cause the water to be discoloured and the quality of the water might be compromised. If this occurred, Wessex Water anticipate that they would provide an alternative source of water for drinking, such as bottled water or drinking water standpipes at selected locations.

Restricted toilet use due to overload sewers: Sometimes, customers can experience loss of toilet facilities resulting from sewer blockage and/or collapse.

Sewer flooding inside your property: Flooding from the sewer gets inside properties, causing damage to property and possible illness. The effects of internal sewer flooding include a foul smell, floors and walls would need to be sanitised, flooring and carpets would need replacing and some people may develop diarrhoea, vomiting or skin infections.

Sewer Flooding immediately outside your property: Flooding from the sewer gets close to other people's properties, or gets into their gardens.
Sewer flooding in a public area: Flooding from the sewer gets into public places like parks, footpaths and roads in your area.

Sites where sewage spills into rivers and bathing water: Occasionally dilute sewage can spill into rivers and estuaries and may impact water quality. These spills can occur when the sewerage system is overloaded due to heavy rainfall. The majority do not impact on the environment but a few happen frequently, on average every 10 days.

Poor bathing water quality: The cleanliness and quality of coastal bathing water and beaches in your area is classified according to the chances of getting an infection such as an upset stomach, an ear infection or a sore throat after bathing in the sea.

Excellent: Up to 3 people out of 100 have a chance of getting an infection after bathing in the sea

Good: Between 3 and 8 people out of 100 have a chance of getting an infection after bathing in the sea

Sufficient: 8 or more people out of 100 have a chance of getting an infection after bathing in the sea

Poor river water quality: The quality of river water in your area is classified as:

High/Good: Has a natural range of plants, fish, birds and insects, clear unpolluted water; suitable for contact activities such as rowing.

Medium: Plants, fish, birds, insects will be present but some species from these groups may be missing; there may be some pollution or murky water; parts may be suitable for contact activities such as rowing

Low/Poor: Has little or no plant and animal life, murky water, some pollution and algae; water not suitable for contact activities such as rowing

Poor river water flow levels: The flow rates of rivers within in the Wessex Water Area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified either as having 'natural flow' or 'low flow'. A river with 'low flow' may have had some water taken from it to supply customers. It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife.
[NEXT SCREEN]

CAPI: First, please turn to Show Card D1 "**Supply Interruptions (lasting an average of 6 hours).**" This tells you about possible interruptions to your water supply, please take a moment to read through this.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q26. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: The next service area on Show Card D2 is **"Non Ideal Taste and Smell of Your Tap Water".** Again, please take a moment to read this information.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q27. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: Please now look at Show Card D3 **"Discoloured Water".** This tells you about possible discolouration of your tap water.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q28. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

~~Q29. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: Now turn to Show Card D5 which tells you about persistent low water pressure. **IF NECESSARY:** it is labelled **"Persistent Low Water Pressure".**

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q30. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: Please now read the information on Show Card D6 **"Response Time to Fix a Leaking Water Main Pipe Near Your Property"**.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q31. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: On the next page you will find Show Card D7 Show Card D7 which tells you about hosepipe bans. **IF NECESSARY:** it is labelled **"Hosepipe Bans".**

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q32. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

~~Q32a **FOR COGNITIVE TESTING ASK:** Instead of saying "Currently, there is a 1 in 100 risk that this happens to a property in the Wessex Water area in any year", we could have said "Currently, there is a 22% chance that your property will experience this problem over the course of our 25 year plan" to mean exactly the same thing. Which way of expressing this risk would make more sense to you?~~

~~1. 1 in 100~~
~~2. 22% chance~~
~~3. Don't know~~

CAPI: And the final water service failure we will look at is on Show Card D8, **"Restrictions on Essential Use of Water"**. This tells you why and when Wessex Water may have to impose a restriction on essential use of water lasting 2 months.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q33. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~RECORD VERBATIM~~

~~Q33a **FOR COGNITIVE TESTING ASK:** Instead of saying "Currently, there is a 1 in 200 risk that this happens to a property in the Wessex Water area in any year", we could have said "Currently, there is a 12% chance that your property will experience this problem over the course of our 25 year plan" to mean exactly the same thing. Which way of expressing this risk would make more sense to you?~~

~~1. 1 in 200~~
~~2. 12% chance~~
~~3. Don't know~~

Q34. To your knowledge, have you or any of your relatives or friends experienced, noticed or been aware of any of these problems? If so, was that in the past year, or more than a year ago? **CAPI: READ OUT ONLINE: Please select below as appropriate.**

DP: ADD HOVER BUTTONS

CAPI: INTERVIEWER: FOR EACH SERVICE AREA, THERE IS A HOVER BUTTON WITH A BRIEF DESCRIPTION. IF A PARTICIPANT HAS ANY QUESTIONS OR IS UNSURE ABOUT WHAT ANY OF THE SERVICE FAILURES REFER TO, PLEASE USE THESE TO EXPLAIN.

	Within past year	More than a year ago	Never	Don't know
Water supply interruptions				
Water taste & smell not ideal				
Discoloured water				
Persistent low water pressure				
Poor response time to fixing mains leaks				
Hosepipe bans				
Cut to your water supply lasting 2 months				

[NEXT SCREEN]

CAPI: We will now talk about your sewerage service. Please look at Show Card D9 **"Restricted Toilet Use Due to Overloaded Sewers".** This tells you about possible loss of toilet facilities, and the number of properties that are affected by this in any year. Please take a moment to read through it.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

[NEXT SCREEN]

~~Q35. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on these show cards unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~RECORD VERBATIM~~

CAPI: Please now look at Show Card D10 **"Sewer Flooding Inside Customers' Properties"**, D10.1 **"Sewer Flooding Outside Customers' Properties"** and D10.2 **"Sewer Flooding in Public Areas."** These three show

cards tell you about possible flooding. Again, please let me know once you're read through this information.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q36. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on these show cards unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: And finally, we will look at four different environmental measures. Now turn to Show Card D11 to read about sites where sewage may spill into rivers and bathing water.

IF NECESSARY: it is labelled **"Sites where sewage spills into rivers and bathing water".**

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

[NEXT SCREEN]

~~Q37. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: Show Card D12 tells you how the cleanliness and quality of bathing water in your area is classified, and the number of beaches that fall into each category. Again, please take a moment to read this information.

IF NECESSARY: it is labelled **"Bathing Water Quality"**.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q38. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: Now please look at Show Card D13 **"River Water Quality".** This tells you how the quality of river water is classified.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q39. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

CAPI: And finally, Show Card D14 shows how rivers are classified in terms of their flow rates, and how many miles of river currently fall into each category.

IF NECESSARY: it is labelled **"River Water Flow Levels"**.

INTERVIEWER: CHECK IF RESPONDENT NEEDS MORE TIME BEFORE PROCEEDING.

~~Q40. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on this show card unclear to you, or difficult to understand? What was unclear or difficult to understand?~~

~~**RECORD VERBATIM**~~

Q41. **CAPI/ONLINE:** And to your knowledge, have you or any of your relatives or close friends experienced, noticed or been aware of any of the following problems in the past year or more than a year ago? **CAPI: READ OUT ONLINE: Please select below as appropriate.**

DP: ADD HOVER BUTTONS

CAPI: INTERVIEWER: USE HOVER BUTTONS IF A PARTICIPANT HAS ANY QUESTIONS OR IS UNSURE ABOUT WHAT ANY OF THE SERVICE FAILURES REFER TO.

	Within past year	More than a year ago	Never	Don't know
Loss of toilet facilities resulting from sewer blockage and/or collapse				
Sewer flooding inside your property				
Sewer flooding outside your property				
Sewer flooding in public areas				
Sites where sewage spills into rivers and bathing water				
Poor bathing water quality				
Poor river water quality				
Low river flow making it less suitable for activities such as fishing				

Q42. **CAPI:** On the next page, you will find Showcard C which we looked at before. Which of these service areas, if any, would you most like to see improved in the future? **ONLINE:** Of all the service areas you have just read about, which, if any, would you most like to see improved in the future? **MULTI CODE**

DP: ADD HOVER BUTTONS

Supply interruptions
Non-ideal taste and smell of your tap water
Discoloured water
Persistent low water pressure
Poor response time to fix a leaking water main pipe
Hosepipe ban
Restriction on essential water use
Restricted toilet use
Sewer flooding inside your property
Sewer flooding immediately outside your property
Sewer flooding in a public area
Sites where sewage spills into rivers and bathing water
Poor bathing water quality

Poor river water quality
Poor river water flow levels
None **CAPI: DO NOT READ OUT**
Don't know/not sure **CAPI: DO NOT READ OUT**

~~Q43. **FOR COGNITIVE TESTING ASK:** Why did you say that?~~

~~**RECORD VERBATIM**~~

Q44. **CAPI/ONLINE:** Would you be willing to pay a higher bill so that better service levels would be provided to other customers' properties?

CAPI: INTERVIEWER: IF QUERIED, SAY THAT: Some people are willing to pay a higher bill to improve service at other properties because they think no property should have especially poor service, or because they think some other people cannot or will not pay enough to get the service they should have).

1. Yes
2. No
3. Don't know **GO TO NEXT SECTION**

Q45. **ASK IF Q44=1, ELSE SKIP: CAPI/ONLINE:** What was your main reason for this? **CAPI: CODE MAIN REASON BELOW. PROBE IF NECESSARY**

No property should experience sewer flooding inside the property
No property should experience sewer flooding in the garden or close by
I thought the effect might happen at my property
I thought the effect could happen where I move to next
I want to contribute when other people cannot pay
I want to contribute when other people will not pay
I want the people at the affected properties to be happier due to better service
I know someone in an affected property and want to help them
I am not sure the people in the affected properties understand the service or would make good choices about it
Other **Please specify**

Q45a **ASK IF Q44=2, ELSE SKIP:** Why would you not be willing to pay a higher bill?

Impact of Service Failures

ONLINE: For the next ten questions you will be shown four service failures which will be presented like the example shown below:

ADD: ..\..\..\..\..\DP\Stage 1\screenshoots for CH\Main stage\MaxDiff - bubble.png

CAPI: Please now turn to Show Card X1, "Instructions for the first choice exercise". For the next ten questions you will be shown four service failures, presented like the example shown here.

For each [**CAPI:** I; **ONLINE:** we] would like you to select **one** service failure that would have the **most impact** and **one** service failure that would have the **least impact** on you.

Some of the service failures shown would affect your own property whereas others would affect your local area. When comparing the impact that each would have on you, please consider how you would feel generally about the service failure happening, including any concerns you may have about your local area and the environment.

CAPI: INTERVIEWER: FOR THE NEXT TEN QUESTIONS, SHOW PARTICIPANTS THE CHOICE SETS ON SCREEN.

DP – PLEASE USE THE FOLLOWING FOR THE HOVER BUTTONS:

Supply interruptions: Interruptions last an average of 6 hours when they occur.

Non ideal taste/smell: Water taste and smell less than ideal at your property but is safe to drink.

Discoloured water: Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time.

Low pressure: Low water pressure is usually caused by the age, condition and size of the water company's pipes. If you don't currently suffer, or have never suffered from persistent low water pressure, then your property is not at risk.

Leakage: Wessex Water measures its performance in fixing leaks by showing the percentage of mains leaks that they respond to by fixing them within a day of their happening.

Hosepipe ban: As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months).

Essential use ban: As an emergency measure in the event of a severe drought, Wessex Water can impose a restriction on essential use of water at your property lasting 2 months.

Sewer flooding inside customers' properties: Flooding from the sewer gets inside properties, causing damage to property and possible illness.

Sewer flooding outside customers' properties: Flooding from the sewer gets close to other people's properties, or gets into their gardens.

Sewer flooding in public areas: Flooding from the sewer gets into public places like parks, footpaths and roads in your area.

Sites where sewage spills into rivers and bathing water: Occasionally dilute sewage can spill into rivers and estuaries and may impact water quality. These spills can occur when the sewerage system is overloaded due to heavy rainfall. The majority do not impact on the environment but a few happen frequently, on average every 10 days.

Q46. Max/diff 1

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q47. Max/diff 2

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q48. Max/diff 3

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q49. Max/diff 4

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q50. Max/diff 5

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q51. Max/diff 6

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q52. Max/diff 7

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q53. Max/diff 8

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q54. Max/diff 9

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

Q55. Max/diff 10

CAPI/ONLINE: Which of these service issues would have the most impact and which would have the least impact on you?

[**CAPI:** I; **ONLINE:** We] would now like to ask you about the choices you have just made.

Q56. Did you generally feel able to make comparisons between the options presented to you?

1. Yes **GO TO NEXT SECTION**
2. No

Q57. Why weren't you able to make the comparisons in the choices?

CAPI: RECORD VERBATIM

Changes to service and bill levels

In the next exercise [**CAPI:** I; **ONLINE:** we] would like you to consider the service areas that [**CAPI:** I; **ONLINE:** we] have shown you in the previous exercise, but this time you will also see the associated change in your annual water and waste bill from Wessex Water from 2019 to 2024.

CAPI: Please look at Show Card E1. This explains the next exercise, and the choices you will be asked to make. I will go through these with you now.

CAPI/ONLINE: Wessex Water can invest your money to improve service levels across all the areas shown. Alternatively, by spending less in some areas, Wessex Water will be able to spend more in others, or reduce bills.

The next four questions will each ask you to choose between different service levels. The aim of this exercise is to encourage you to consider your preferences carefully and decide which option is best for you. You may like some parts more and some parts less but please decide overall which one you would prefer.

There are 16 different service areas in total grouped into the following three categories:

- Service incidents at customers' properties
- Other service measures
- Environmental measures

In addition we will show the associated change in your annual water and waste bill.

[NEXT SCREEN]

ONLINE: The options will be presented in the following format.

DP INSERT: ..\..\..\..\..\DP\Stage 1\screenshoots for CH\Main stage\Package - one bubble.png

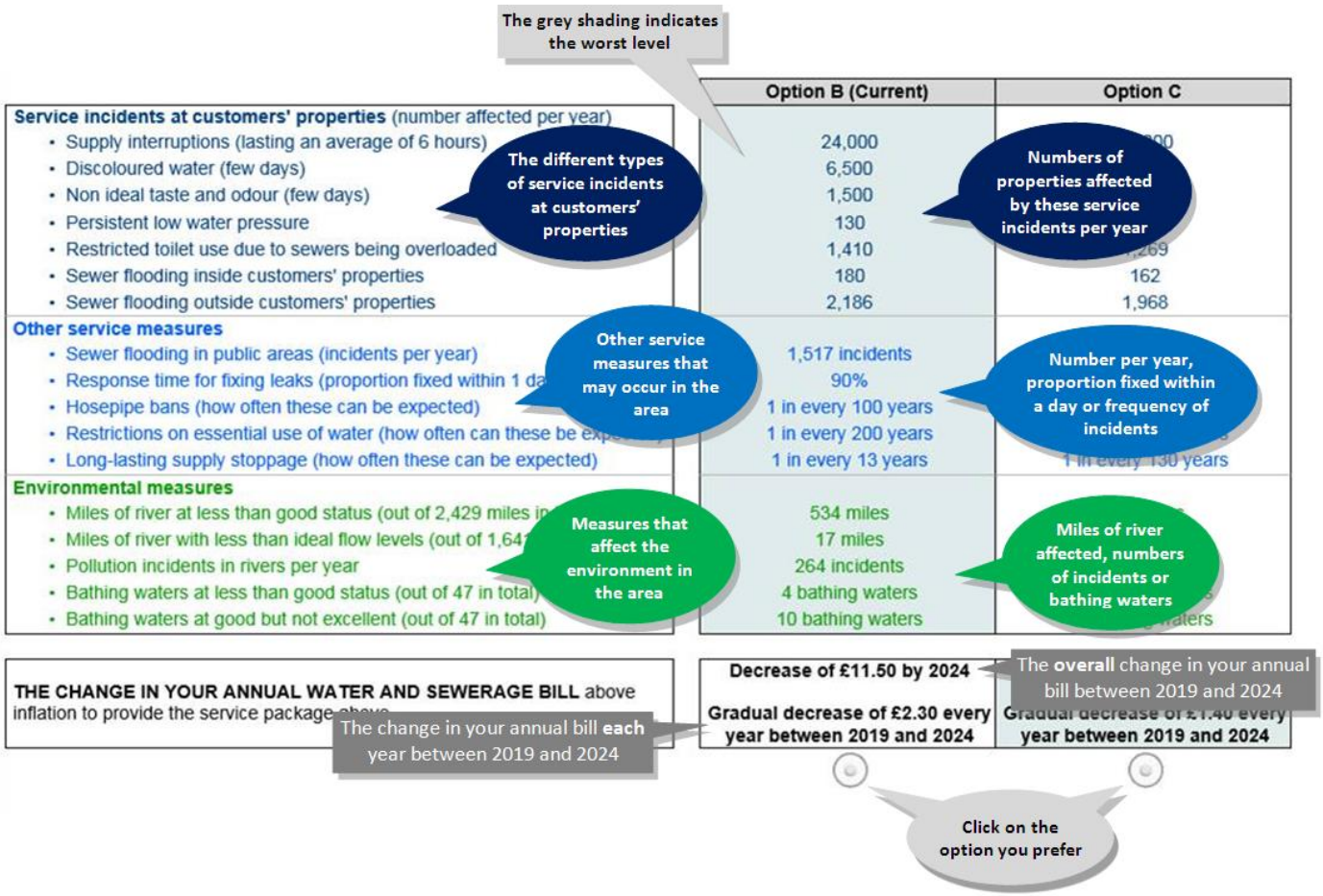
	Option B (Current)	Option C
Service incidents at customers' properties (number affected per year)		
• Supply interruptions (lasting an average of 6 hours)	24,000	17,000
• Discoloured water (few days)	6,500	5,850
• Non ideal taste and odour (few days)	1,500	1,350
• Persistent low water pressure	130	50
• Restricted toilet use due to sewers being overloaded	1,410	1,269
• Sewer flooding inside customers' properties	180	162
• Sewer flooding outside customers' properties	2,186	1,968
Other service measures		
• Sewer flooding in public areas (incidents per year)	1,517 incidents	1,365 incidents
• Response time for fixing leaks (proportion fixed within 1 day)	90%	95%
• Hosepipe bans (how often these can be expected)	1 in every 100 years	1 in every 200 years
• Restrictions on essential use of water (how often can these be expected)	1 in every 200 years	1 in every 500 years
• Long-lasting supply stoppage (how often these can be expected)	1 in every 13 years	1 in every 130 years
Environmental measures		
• Miles of river at less than good status (out of 2,429 miles in total)	534 miles	369 miles
• Miles of river with less than ideal flow levels (out of 1,641 miles in total)	17 miles	7 miles
• Pollution incidents in rivers per year	264 incidents	198 incidents
• Bathing waters at less than good status (out of 47 in total)	4 bathing waters	3 bathing waters
• Bathing waters at good but not excellent (out of 47 in total)	10 bathing waters	5 bathing waters
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	**Decrease of £11.50 by 2024** **Gradual decrease of £2.30 every year between 2019 and 2024**	**Decrease of £7.00 by 2024** **Gradual decrease of £1.40 every year between 2019 and 2024**

The next screen explains what the different parts of this mean.

[NEXT SCREEN]

CAPI: Now look at the next show card, E2. This shows the format the options will be presented in. Please take a moment to review this. **INTERVIEWER: CHECK IF THEY HAVE ANY QUESTIONS ABOUT THIS BEFORE PROCEEDING**

DP INSERT: ..\..\..\..\..\DP\Stage 1\screenshoots for CH\Main stage\Package - bubbles.png



ONLINE: The example on the previous screen showed two options: B and C.

CAPI: The example you've just looked at showed two options: B and C. Please now turn to Show Card E3 which explains all of the options you will be shown.

CAPI/ONLINE: There are four options in total but you will only be asked to choose between two options at a time. In each option the level of service you receive will differ as outlined in the diagram below:

DP INSERT: ..\DP\Stage 1\screenshoots for CH\Package intro.png

CAPI/ONLINE: The level of service you would receive in each option will affect your bill as follows:

- In **Option B** there would be **[DP SHOW AS APPLICABLE: "no change in your bill"/"a bill decrease of £[INSERT] by 2024"/"a bill increase of £[INSERT] by 2024"]**
- In **Option A** your bill would be **lower** than in Option B.
- In **Option C** your bill would be **higher** than in Option B.
- Finally, in **Option D** your bill would be **higher** than in Option C.

And finally, turn to E4. When making your choices between the different options please bear in mind the following:

- that your bill would also increase by the rate of inflation each year. To give you an example of the impact that inflation would have, if inflation was 2% per year the average Wessex Water bill would increase by £52 from £496 in 2019 to £548 in 2024.

- that any money you would pay for better service levels here will not be available for you to spend on other things, and
- that the new bill level will gradually adjust over five years and stay the same after that. Your Wessex Water bill will not drop back to the level it was prior to changes in service levels.

[NEXT SCREEN]

CAPI: INTERVIEWER: FOR THE NEXT SIX QUESTIONS, SHOW PARTICIPANTS THE CHOICE SETS ON SCREEN.

Q58. **CAPI/ONLINE:** In the first set of options, Option B represents current service levels with a bill **[INSERT BILL LEVEL FROM OPTION B FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: DECREASE OF £13.00 BY 2024]** and Option C represents an improvement in every area with a bill **[INSERT BILL LEVEL FROM OPTION C FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: DECREASE OF £7.93 BY 2024].CAPI/ONLINE:** Which option do you prefer, B or C?

1. B
2. C

Q59. **CAPI/ONLINE:** Why did you choose the option you did?

CAPI: RECORD VERBATIM

Q60. **CAPI/ONLINE:** Did you understand that for the option you selected [your annual bill would increase by £X each and every year for five years. This would mean at the end of that five years your annual bill would be £xx more than your current bill] OR [your annual bill would decrease by £X each and every year for five years. This would mean at the end of the five years your annual bill would be £XX less than your current bill] OR [this would mean no change to your bill between 2019 and 2024].

1. Yes
2. No, I would like to go back and amend my answer **CAPI: INTERVIEWER EXPLAIN THAT YOU WILL GO BACK TO Q58 AND ASK AGAIN**
3. Not sure, I would like to go back and amend my answer **CAPI: INTERVIEWER EXPLAIN THAT YOU WILL GO BACK TO Q58 AND ASK AGAIN**

Q61. **CAPI/ONLINE:** Here Option B represents current service levels with a bill **[INSERT BILL LEVEL FROM OPTION B FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: DECREASE OF £13.00 BY 2024]** and Option A represents a reduction in service levels and would allow for a bill **[INSERT BILL LEVEL FROM OPTION A FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: DECREASE OF £38.25 BY 2024]**. Which option do you prefer, B or A?

1. B
2. A

Q62. **CAPI/ONLINE:** In this question, Options C and D are as previously shown. Both represent an improvement over current service levels, and Option D represents the greater of the two improvements. In Option C, there would be a bill **[INSERT BILL LEVEL FROM OPTION C FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: DECREASE OF £7.93 BY 2024]** and in Option D, a bill **[INSERT BILL LEVEL FROM OPTION D FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: INCREASE OF £43.28 BY 2024].** Which option do you prefer, C or D?

1. C

2. D

Q63. **CAPI/ONLINE:** In this final set of options, Option B represents current service levels again with a bill **[INSERT BILL LEVEL FROM OPTION B FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: DECREASE OF £13.00 BY 2024]** and Option D represents a greater improvement in every area with a bill **[INSERT BILL LEVEL FROM OPTION D FROM RESPONDENT SHOWCARD AS PER THE INTRODUCTION IE: INCREASE OF £43.28 BY 2024]**. Which option do you prefer, B or D?

1. B
2. D

~~Game 3 – Choice Experiment – Future Benefits~~

~~**CAPI:** Please now turn to Game 3. **CAPI/ONLINE:** In the next exercise [**CAPI** I; **ONLINE:** we] would like you to consider some of the service areas that [**CAPI:** I; **ONLINE:** we] have shown you in the previous two exercises. You will be asked to choose between three options described in terms of river water quality, bathing water quality and pollution incidents levels.~~

~~Each option will show possible improvements in each of these environmental services resulting from Wessex Water investments to achieve long-term environmental improvements. These improvements would be paid for by means of gradual bill increases between 2019 and 2024, but their benefits will only be delivered from 2024 onwards.~~

~~In Option A, all service levels after 2024 will be as now in return for no change in your bill. In Options B and C, river water quality, bathing water quality may improve and pollution incidents may be reduced, but only after 2024. This would be in return for a bill increase each year for 5 years between 2019 and 2024.~~

~~Q64. **CAPI/ONLINE:** Which option do you prefer, A, B or C?~~

~~1. A~~
~~2. B~~
~~3. C~~

~~Q65. **CAPI/ONLINE:** Which option do you prefer, A, B or C?~~

~~1. A~~
~~2. B~~
~~3. C~~

~~Q66. **CAPI/ONLINE:** Which option do you prefer, A, B or C?~~

~~1. A~~
~~2. B~~
~~3. C~~

~~Q67. **CAPI/ONLINE:** Which option do you prefer, A, B or C?~~

~~1. A~~
~~2. B~~
~~3. C~~

~~Q68. CAPI/ONLINE: Which option do you prefer, A, B or C?~~

~~1. A~~
~~2. B~~
~~3. C~~

~~Q69. This question is intentionally blank~~

Follow-up Questions

[CAPI: I; ONLINE: We] would now like to ask you a few questions about the choices you have just made.

Q70. CAPI/ONLINE: Did you generally feel able to make comparisons between the options presented to you?

1. Yes **GO TO Q72**
2. No

Q71. CAPI/ONLINE: Why weren't you able to make the comparisons in the choices? CAPI: RECORD VERBATIM

Q72. CAPI/ONLINE: Did you find each of the levels of service we described easy to understand?

1. Yes **GO TO Q74**
2. No

Q73. CAPI/ONLINE: Which levels did you feel were not easy to understand and why? CAPI: RECORD VERBATIM

Q74. CAPI/ONLINE: Were any of the service levels so low or so high that they were implausible?

1. Yes
2. No **GO TO NEXT SECTION**

Q75. CAPI/ONLINE: Which levels did you feel were not plausible? CAPI: RECORD VERBATIM

~~Q76. CAPI: Thinking about the show material that you were sent, did you read the upfront information about Wessex Water either before or during the interview?~~

~~1. Yes~~
~~2. No~~

Properties with private water supply

[CAPI: I; ONLINE: We] would now like to ask you about an investment scenario which Wessex Water could make. [CAPI: I; ONLINE: We] would like to know whether or not you would choose to make this investment. CAPI: Please look at Showcard Q.

Q77. CAPI/ONLINE: Currently around 10,000 properties in the Wessex Water region (particularly west Somerset and west Dorset) have private water supplies, and the quality of private supplies may be

much worse than public supplies. Some of these private supplies feed tourist facilities (e.g. cafes, bed & breakfasts, etc) used by the general public.

There is the potential to connect some of these properties to the mains water network in order to improve their water supplies. However, this will require investment that will lead to an increase in all customers' bills.

IF BILL SIZE GIVEN AT Q15: If Wessex Water were to make the investment required to connect 1,000 of these properties, your bill would increase by £1.80 each year for 5 years from [insert bill size from Q15a/Q16b] in 2019 to [insert bill size from Q15a/Q16b+£9] in 2024. This would be in addition to bill increases due to the other improvements Wessex Water could make, which we have asked about previously.

IF DK AT Q15/Q16a: If Wessex Water were to make the investment required to connect 1,000 of these properties, your bill would increase by £1.80 each year for 5 years. This means that the average household bill in your area would increase from £462 in 2019 to £470 in 2024. This would be in addition to bill increases due to the other improvements Wessex Water could make, which we have asked about previously.

ASK ALL: Do you think Wessex Water should make this investment or not make this investment?

1. Yes – should make this investment
2. No – should NOT make this investment
3. Don't know

Classification Questions

[**CAPI:** I; **ONLINE:** We] now need to ask you a few final questions about you and your household. These will only be used to ensure we have spoken to a wide range of customers. All responses you give will be kept strictly confidential.

Q78. **CAPI:** First of all, could you tell me what your employment status is? **ONLINE:** What is your employment status?

1. Working full-time (30+ hours a week)
2. Working part-time (8-29 hours a week)
3. Not working – looking for work
4. Not working – not looking for work
5. Full-time student
6. Part-time student
7. Retired
8. Retired unpaid voluntary work
9. Looking after family/home
10. Other **Please specify**
11. Prefer not to say **CAPI: DO NOT READ OUT**

Q79. **CAPI:** Please look at Showcard R. **CAPI/ONLINE:** Which of these best describes the highest level of education that you have completed?

1. **No qualifications**
2. **Level 1:** 1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills;

3. **Level 2:** 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma;
4. **Apprenticeship**
5. **Level 3:** 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma;
6. **Level 4** and above: Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (for example teaching, nursing, accountancy);
7. **Other qualifications:** Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown)
8. Prefer not to say

~~Q80. CAPI/ONLINE: What is your annual household income, before tax and other deductions?~~

	~~Per Week~~	~~Per Year~~
~~A~~	~~Up to £300~~	~~Under £15,600~~
~~B~~	~~£301-£1000~~	~~£15,601 - £52,000~~
~~C~~	~~£1001+~~	~~£52,001+~~
~~D~~	~~Prefer not to say~~	

Q81. **CAPI/ONLINE:** Do you receive any of the following benefits? **MULTICODE**

1. Attendance Allowance
2. Carer's Allowance
3. Child Tax Credit
4. Council Tax Benefit
5. Disability Living Allowance
6. Housing Benefit
7. Income Support (or similar)
8. Jobseeker's Allowance
9. Pension Credit
10. Universal Credit
11. Working tax credit
12. None of these **NOT WITH ANY OTHER CODE**
13. Prefer not to say **CAPI: DO NOT READ OUT**

Q82. To which of these ethnic groups do you consider you belong to?

WHITE
1. British
2. Irish
3. Any other White background

MIXED
4. White and Black Caribbean
5. White and Black African
6. White and Asian
7. Any other Mixed background

ASIAN OR ASIAN BRITISH
8. Indian
9. Pakistani
10. Bangladeshi
11. Any other Asian background

BLACK OR BLACK BRITISH

12. Caribbean
13. African
14. Any other Black background

CHINESE OR OTHER ETHNIC GROUP

15. Chinese
16. Any other ethnic group

17. Prefer not to say **CAPI: DO NOT READ OUT**

Q83. **CAPI/ONLINE:** Thinking about all the people in your household, including yourself, how many people live here for each of the age groups shown below: **ONLINE: For each age group, please select the option that applies to you. If there are no people in your household belonging to a certain age group, please select 'zero' for it.**

DP PLEASE PREVENT 4 0'S BEING ENTERED. SINGLE CODE ON EACH ROW.

Up to 5 years	0	1	2	3	4	5+
6 to 15 years	0	1	2	3	4	5+
16 to 65 years	0	1	2	3	4	5+
Over 65 years	0	1	2	3	4	5+

Prefer not to say **NOT WITH ANY OTHER CODE CAPI: DO NOT READ OUT**

DP: THE ERROR MESSAGE THEY SEE IF THEY HAVEN'T ANSWERED SHOULD SAY: This question must be answered. If there are no people in your household belonging to a certain age group, please select 'zero' for it.

Q84. **CAPI/ONLINE:** And finally, what type of property do you live in?

1. Flat
2. Terraced house
3. Semi-detached house
4. Detached house
5. Bungalow
6. Prefer not to say **CAPI: DO NOT READ OUT**

Q84a In order to receive entry into the **prize draw**, you will need to enter your e-mail address in the box below. Should you not wish to be give us your email address and consequently not be entered into the prize draw, please select "Do not wish to be entered into the prize draw"

Click here for the terms and conditions of the prize draw.

[Enter e-mail address]
Do not wish to be entered into the prize draw

Q85. How would you rate your enjoyment in completing this survey? Please use a scale of 1 to 10 where 1 means 'low level of enjoyment' and 10 means 'high level of enjoyment'.

ONLINE: DP ADD SLIDER
CAPI: DP ADD HORIZONTAL GRID LIKE BELOW

Low level of enjoyment	1	2	3	4	5	6	7	8	9	10	High level of enjoyment

Q86. **CAPI/ONLINE:** We really appreciate the time that you have given us today. Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for Wessex Water?

1. Yes, for both clarification and further research
2. Yes, for clarification only
3. Yes, for further research only
4. No

Q87. **CAPI:** Finally please look at Showcard S. **CAPI/ONLINE:** Wessex Water likes to hear what their customers think of their service. They have been running an online customer panel called Wessex Water 'Have Your Say' for nearly 4 years and have over 2,000 members. They would now like to invite you to join their panel. As a panel member you will be asked to take part in a short survey roughly every 3 months.

The surveys are about Wessex Water and things that matter to you as customers. The information is used to help Wessex Water provide you with a better service now and in the future.

If you want to find out more, visit www.wessexwater.co.uk/haveyoursay

If you sign up, you are under no obligation and can leave the panel at any time.

ONLINE: If you are interested in joining the panel please click **here**.

ONLINE: Thank you. This research was conducted under the terms of the MRS code of conduct and is completely confidential.

Please press the submit button at the bottom of the page to exit the survey.

CAPI: Thank you. This research was conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm my credentials or those of Accent please call the MRS free on 0500 396999.

Please can I take a note of your name and where we can contact you for quality control purposes?

Respondent name: [**CATI:** DP, IMPORT FROM ID]

Telephone: [**CATI:** DP, IMPORT FROM TELNUMBER]

HAND OVER THE INCENTIVE If you have any queries about your incentive please contact us on 020 8742 2211. Thank you.

Interviewer Confirmation

CAPI: I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Yes
No

SYSTEM INFORMATION
Time interview completed:

INTERNAL USE ONLY: Click here

Online only	[x]			
CATI only	[ ]	(DP: add QAX)		
CAPI/Tablet	[x]	(BCQs:	) Q8	Paper showcard? Y [x] N [x]
CATI recruit for online/field	[ ]	(BCQs:	) Q9	
Field recruit for online/CATI	[ ]	(BCQs:	) Q12	
Recruit only (ie for qual)	[ ]			

Prize draw terms and conditions

1. Entries must be received by **xxx**.
2. All entrants must be over the age of 16.
3. No purchase is necessary.
4. The prize draw will take place on **xxx**. The winner will be selected at random from all eligible entries received.
5. The winner will be notified within a reasonable time after the Draw Date or any subsequent draw either by email, mail or telephone. The prize is awarded conditionally upon acceptance and if a winner is unable to be contacted after a reasonable period or if any prize is unclaimed or declined within a reasonable period, the prize shall be deemed as unclaimed or unaccepted and a supplementary winner may be drawn.
6. Prize winner will be notified within 28 days of the draw date.
7. The name of the prize winner will be made available after the closing date to those sending an email to kadriann.pikkat@accent-mr.com marked '**3031prizedraw**'.
8. The draw will be made by an independent person.
9. This prize draw is conducted in compliance with the Market Research Society Rules and Regulations for administering Prize Draws (updated May 2007).
10. English law applies

Wessex Water
PR19 Willingness to Pay Research

Stage 1 Pilot Report (Final)
March 2017

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CONTENTS

EXECUTIVE SUMMARY

Overview

Accent and PJM Economics are conducting a willingness to pay (WTP) research study for Wessex Water (WW), which aims to understand customers' priorities across a wide range of potential service improvements, and their willingness to pay for them.

Accent has designed two survey instruments for a primary SP study following extensive discussions with Wessex Water and qualitative research with household and non-household customers. The first survey instrument follows closely the approach adopted for PR14 (PR14-style survey hereafter), and the second is a novel, simpler, approach we have developed for this price review (PR19-style survey hereafter).

The key innovation introduced in the PR19-style survey is a new 'MaxDiff' SP exercise to measure customers' relative aversion to different types of service issue. Previously, and in the PR14-style survey, relative priorities were measured by asking customers to trade off packages of service levels, where these were measured in terms of the risks of each type of service issue affecting them. Often these risk levels were very small and varied quite considerably across the different types of service issue examined. Customers therefore needed to be able to trade off small risks against one another as well as trade off how bad each issue would be for them if it were to affect them.

The new MaxDiff exercise, by contrast, simply asked people to focus on the service issues themselves and decide which one, from a set of four shown at a time, would have the most impact on them and which would have the least impact. Different sets of four service issues were shown across the sequence of choice situations put to a respondent, and different sequences were distributed across the sample according to an experimental design which was capable of measuring in quantitative terms an index of the relative impact sizes covering all service measures in the design.

The principal advantage of the new MaxDiff exercise is that it is much simpler for respondents to answer. It was therefore expected to result in more meaningful preference expressions and values. A further advantage is that more service issues could be evaluated robustly within a single survey design, thereby allowing, for example, the relative impact of different durations of supply interruption rather than valuing only a single interruption duration.

An additional innovation introduced in the PR19-style survey was a revised 'Package exercise', to measure WTP for packages of service improvements. Here, as in the PR14-style survey, respondents were asked to trade off packages of service levels against one another, and against varied bill sizes, and choose their preferred option. The revisions introduced in the PR19-style survey were twofold. Firstly, service levels were all uniformly better in one package than in the alternative package in any choice pair, rather than having some service levels better in one package and some service levels better in the alternative option. This revision was again aimed at making it easier for respondents to answer. The second revision was to convert risk levels into

numbers of properties affected, out of the 590 thousand and 1.2 million water and sewerage properties respectively in Wessex Water's service area. This revision was aimed at making the service levels appear more meaningful and easier to compare across service areas.

The first phase of pre-testing consisted of ten cognitive depth interviews, five with household customers and five with non-household customers, were undertaken with the purpose of informing the pilot and main stage of this research.

The second phase consisted of the pilot stated preference study that comprised a total of 702 interviews with household and non-household customers, using both PR14 (N=411) and PR19 (N=291) SP approaches.

This document is our report on the full testing phase for this study. It describes the survey designs, our pre-testing methodology and key findings, and outlines recommendations on how to progress the main survey.

Key Findings and Recommendations

Findings from the cognitive interviews were very encouraging, and provided strong support for the PR19-style approach from a cognitive perspective. The instrument was understandable to customers across all the different ages and social grades included in this phase of work. The few recommendations resulting from the cognitive testing phase were predominantly about the wording of questions and the layout of showcards, rather than SP design. For the main stage, all these minor changes (suggested throughout Section 4) will be made to the questionnaire.

From the pilot surveys, feedback from interviewers supported the use of the PR19-style survey insofar as they found a much better conversion rate from recruitment to completion of the survey, and there were far fewer issues reported with regard to ease of comprehension of the PR19-style materials than the corresponding PR14-style materials.

In terms of timing, the PR19-style survey took substantially less time to complete than the PR14-style Water and Sewerage surveys combined, although was somewhat longer than each of them individually due to the fact that the PR19-style survey included all water and sewerage service measures.

Additionally, the mean enjoyment experienced while responding to the PR19-style survey was higher than either the Water or Sewage PR14-style survey. Indeed no difficulties were encountered by respondents regarding the MaxDiff exercise nor the Package exercise.

For both the MaxDiff and Package exercises, we were able to estimate good-fitting and plausible econometric models for households and non-households, and to derive plausible estimates of WTP for service improvements and estimates of willingness to accept (WTA) lower bills for service deteriorations.

There were therefore good reasons to support the continuing use of the PR19-style survey for the main stage.

Willingness to pay

Package WTP values were estimated for both PR14 and PR19-style surveys. Comparing values for the two surveys for the household sample, the PR14-style WTP values were generally larger than the PR19-style values. This is likely to be due to the fact that the PR14-style survey captured values separately for Water and Sewerage components, rather than valuing them jointly as in the PR19-style survey. As for the non-household PR19-style WTP values, no major issues are to be noted as package values seem to be plausible.

Conclusions

Overall, the testing that has been conducted so far on the PR19-style survey instrument is supportive of its use as a replacement to the PR14-style instrument. It has the advantage of being simpler for respondents, it can accommodate more attributes within the same survey, and it is more efficient from a fieldwork perspective.

1 INTRODUCTION

1.1 Background

Accent and PJM Economics are conducting a willingness to pay (WTP) research study for Wessex Water (WW), which aims to understand customers' priorities across a wide range of potential service improvements, and their willingness to pay for them.

Accent has designed two survey instruments for a primary SP study following extensive discussions with WW and qualitative research with household and non-household customers. The first survey instrument follows closely the approach adopted for PR14 (PR14-style survey hereafter), and a novel, simpler, approach adopted for this price review phase (PR19-style survey hereafter).

To date, the pre-testing of the survey instruments with WW's customers consisted of a pilot phase in which the following number of were undertaken:

- **PR19-style survey**
  - Household: 236 interviews
  - Non-household: 50 interviews

- **PR14-style survey**
  - Water:
    - Household: 206 interviews
  - Sewerage:
    - Household: 205 interviews

1.2 Objectives

This document is an extended pilot report for this study. It summarises the survey instrument, our pre-testing methodology and key findings from our econometric model and WTP estimations from both the PR14 and PR19-style surveys, and outlines recommendations on how to progress with the main survey.

1.3 Structure of the Report

The remainder of this note is structured as follows. Section 2 describes the survey designs; Section 3 describes the pre-testing methodology, and size and characteristics of the achieved samples. Section 4 discussed the cognitive interviews feedback; Section 5 contains our pilot findings, including respondent and interviewer feedback on various aspects of the questionnaire, results from stated preference (SP) models estimated on the pilot data, and descriptive results on customers' willingness to pay for improvements. Section 6 summarises all the findings and recommendations.

2 SURVEY DESIGNS

This section describes the design approaches to both the PR14-style and versions A and B of the PR19-style survey tools. It also compares the PR19-style and PR14-style survey tools by highlighting the limitations behind the PR14-style format and how the PR19-style format is intended to overcome them.

2.1 PR14-style Survey

The PR14-style questionnaires were designed to be very similar to the questionnaires actually used at PR14 for WW. In line with UKWIR (2011) guidelines, they were developed around the use of discrete choice experiment (DCE) questions as the means of eliciting customer priorities and willingness to pay.

DCE questions offer respondents a series of choices between two or more alternative packages of service levels. The questions require the respondent to make a trade-off, with some service measures better in one alternative and some better in the other. In comparison with more traditional and well-known methods of market research, such as importance ratings and proposition agreement scales, DCE methods have the advantage that they are explicitly theoretically consistent with the use of CBA as a means of decision making. The choices made by the respondents indicate how they value each of the service measures in relation to one another, in accordance with established principles of random utility theory[1].

One of the key tasks in the development of the research was to select and define the service measures to be valued. At the outset of the study, a selection of service measures was put forward by WW for cognitive testing. This service measure selection was based on UKWIR (2011) recommendations, and WW's Service Valuation Framework.

The final set of service measures used in the PR14-style survey, along with their show card descriptions, are shown in Table 1.

[1] See for example Train, K. (2003) "Discrete Choice Methods with Simulation", Cambridge University Press.

Table 1: Service measures - definitions and descriptions

Attribute	Description
Supply interruptions	Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to burst pipes, which can happen at any time, or due to planned maintenance, in which case you would be given at least 48 hours' notice. Interruptions last an average of 6 hours when they occur. Currently, the number of properties affected by this in the Wessex Water area in any year is around 9,000 (1.5% of total) for unexpected interruptions and 15,000 (2.5% of total) for planned interruptions. That's out of a total of 590,000 water properties
Non ideal taste and smell	Water taste and smell can be less than ideal at your property for a few days at a time because of dissolved minerals and gases, but the water is safe to drink. Currently, 1,500 properties are affected by this in the Wessex Water area in any year out of 590,000 water properties (that's 0.25% of the total or 1 in every 400).
Discoloured water	On rare occasions, your water may be discoloured because of harmless deposits that accumulate over time in water mains, but the water is safe to drink. We wouldn't expect anyone to drink it when it looks unpleasant. Your water would look like the water below:  Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time. Currently, 6,500 properties (1.1% of total) in the Wessex Water area are affected by this in any year out of 590,000 water properties.

Attribute	Description
Long-lasting supply stoppage	A long-lasting stoppage to the water supply at your property lasting for more than 2 weeks. Currently, 42,000 properties are affected by this in the Wessex Water area in any year out of 590,000 water properties (that's 7% of the total).
Persistent low water pressure	Low water pressure means it takes longer to fill the bath or kettle than you would like, and may affect how well a combi boiler works. Persistent means the property is affected every day, though the problem may come and go during the day. It is usually caused by the age, condition and size of the water company's pipes. Properties at the tops of hills and the end of lines are most at risk. If you don't currently suffer, or have never suffered from persistent low water pressure, then your property is not at risk. Currently, 150 properties suffer from persistent low water pressure in the Wessex Water area in any year out of 590,000 water properties (that's 0.02% of total or 1 in every 5,000 properties).
Response time	Sometimes, there can be leaks in water mains pipes. Wessex Water aims to get these fixed promptly and measures its performance by showing the percentage of mains leaks that they respond to by fixing them within a day of their happening. Currently, 90% of mains leaks are fixed within a day in the Wessex Water area in any year.
Hosepipe ban	As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one. Currently, there is a 1 in 100 risk that this happens to a property in the Wessex Water area in any year. An alternative way of explaining this is that there is a 22% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.

Attribute	Description
Restrictions on essential use of water	As an emergency measure in the event of a severe drought, Wessex Water can impose a restriction on essential use of water at your property lasting 2 months. This could involve providing a water supply which was available every other day for a few hours a day at a reduced pressure. This would be likely to cause the water to be discoloured and the quality of the water might be compromised. If this occurred, Wessex Water anticipate that they would provide an alternative source of water for drinking, such as bottled water or drinking water standpipes at selected locations. Currently, there is a 1 in 200 risk that this happens to a property in the Wessex Water area in any year. An alternative way of explaining this is that there is a 12% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.
Restricted toilet use due to overloaded sewers	Sometimes, customers can experience loss of toilet facilities resulting from sewer blockage and/or collapse. Currently, 1,410 properties are affected by this in any year in the Wessex Water area out of 1,200,000 sewerage properties (that's 12 in every 10,000 properties) . 

Attribute	Description
Sewer flooding inside customers' properties	Flooding from the sewer gets inside properties, causing damage to property and possible illness. The effects of internal sewer flooding include a foul smell, floors and walls would need to be sanitised, flooring and carpets would need replacing and some people may develop diarrhoea, vomiting or skin infections. Currently, 180 properties are affected by this in any year in the Wessex Water area out of 1,200,000 sewerage properties (that's 0.02% of total or 1 in every 5,000 properties). 
Sewer flooding outside customers' properties	Flooding from the sewer gets close to other people's properties, or gets into their gardens. Currently, around 2,186 properties are affected by this in any year in the Wessex Water area out of 1,200,000 sewerage properties (that's 0.2% of total or 1 in every 500 properties). 

<table>
<tr><th>Attribute</th><th>Description</th></tr>
<tr><td>Sewer flooding in public areas</td><td>Flooding from the sewer gets into public places like parks, footpaths and roads in your area.

Currently, around 1,517 properties are affected by this in any year in the Wessex Water area (that’s 0.1% of total or 1 in every 1,000 properties) .

  </td></tr>
<tr><td>Pollution incidents</td><td>Overflows within the public sewerage network can occasionally impact on river and bathing water quality. There are currently around 264 overflows.

The majority do not impact on the environment but a few happen frequently, on average every 10 days.</td></tr>
<tr><td>Bathing water quality</td><td>The cleanliness and quality of coastal bathing water and beaches in your area is classified according to the chances of getting an infection such as an upset stomach, an ear infection or a sore throat after bathing in the sea.

There are three classification levels – “Excellent”, “Good” and “Sufficient”. The table shows the chances of getting an infection and the current number of beaches in Wessex area that fall into each classification.

<table>
<tr><th>Quality classification</th><th>Chance of an Infection such as an Upset Stomach, Ear Infection or Sore Throat after Bathing in the Sea</th><th>Current Number of Beaches in Wessex Area out of a Total of 47</th></tr>
<tr><td>Excellent</td><td>Up to 3 out of 100 people</td><td>33 beaches</td></tr>
<tr><td>Good</td><td>In between 3 and 8 out of 100 people</td><td>10 beaches</td></tr>
<tr><td>Sufficient</td><td>8 or more out of 100 people</td><td>4 beaches</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Attribute</th><th>Description</th></tr>
<tr><td>River water quality</td><td>The quality of river water in your area is classified as:

<table>
<tr><th>Quality of River Water</th><th>Description</th><th>Current Number of Miles of River, out of 2,429 Miles of River within the Wessex Water area</th></tr>
<tr><td>High/Good</td><td>Has a natural range of plants, fish, birds and insects, clear unpolluted water; suitable for contact activities such as rowing.</td><td>413</td></tr>
<tr><td>Medium</td><td>Plants, fish, birds, insects will be present but some species from these groups may be missing; there may be some pollution or murky water; parts may be suitable for contact activities such as rowing</td><td>1,482</td></tr>
<tr><td>Poor/Bad</td><td>Has little or no plant and animal life, murky water, some pollution and algae; water not suitable for contact activities such as rowing</td><td>534</td></tr>
</table>
</td></tr>
<tr><td>River water flow levels</td><td>The flow rates of rivers within in the Wessex Water Area depend partly on the amount of water taken from the environment to supply customers.

Rivers are classified either as having ‘natural flow’ or ‘low flow’. A river with ‘low flow’ may have had some water taken from it to supply customers.

It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife.

Currently, out of 1,641 miles of river in your area, 1,624 miles have ‘natural flow’ and 17 miles have ‘low flow’.</td></tr>
</table>

Each of the water and sewerage surveys was composed of two lower level exercises and a package exercise. The lower level exercises were as follows:

Water survey – Exercise 1

- Taste and odour
- Discolouration
- Unexpected supply interruption
- Planned supply interruption
- Supply stoppage

Water survey – Exercise 2

- Low pressure
- Hosepipe bans
- Rota cuts
- Leakage response time
- River water flow levels

Sewerage survey – Exercise 1

- Restricted toilet use
- Sewer flooding inside property
- Sewer flooding in gardens/close to other properties
- Sewer flooding in public places

Sewerage survey – *Exercise* 2

- Pollution incidents
- River miles of bad quality
- Bathing water quality

Also included in the lower level games was a service measure representing the customer's annual bill from WW. Consistent with UKWIR guidelines, the bill was presented as a monetary amount for household customers and as a percentage deviation from current bills for business customers. Each choice question offered the respondent two alternative packages of service levels. The service level for each service measure in each alternative was either at its current level (Level 0), a decrement level (Level -1), an intermediate improvement level (Level +1), or at a stretch target improvement level (Level +2).

The choice questions all required the respondent to make a trade-off, with some service measures better in one alternative and some better in the other. The choices made by the respondents were treated as indicating how he/she valued the service measures in relation to one another, in accordance with established principles of random utility theory. Example choice cards from lower level Exercise 1 of the Water and Sewerage surveys can be found in Figure 1 and Figure 2, respectively.

Figure 1 Example choice card from lower level Exercise 1 of the Water survey

		PACKAGE A	PACKAGE B
1	The **TASTE AND ODOUR** of water at your property is not ideal for a **FEW DAYS AT A TIME**, but is safe to drink. The chance that this happens at your property in any one year is	1 in 650	1 in 350
2	The water is **DISCOLOURED** at your property for a **FEW HOURS** at a time, but is safe to drink. Running the tap for several minutes will not remove the discolouration. The chance that this happens at your property in any one year is	1 in 150	1 in 80
3	An **UNEXPECTED INTERRUPTION** to the water supply at your property lasting an average of **6 HOURS** The chance that this happens at your property in any one year is	1 in 65	1 in 85
4	An **INTERRUPTION** to the water supply at your property lasting an average of **6 HOURS**, for which you would receive **48 HOURS NOTICE** The chance that this happens at your property in any one year is	1 in 195	1 in 40
5	Prolonged **SUPPLY STOPPAGE** for up to **2 WEEKS** The chance that this happens at your property in any one year is	1 in 5	1 in 100
6	The **CHANGE IN YOUR ANNUAL WATER BILL** above inflation to provide the service quality above is (This change is added to a £5 increase in your bill by 2024 due to other factors affecting your water supply and sewerage service. The bill change continues to apply in all years after 2024.)	Decrease of £20 by 2024 Gradual decrease of £4 every year between 2019 and 2024	Increase of £20 by 2024 Gradual increase of £4 every year between 2019 and 2024
		A ◉	B ○

Figure 2 Example choice card from lower level Exercise 1 of the Sewerage survey

		PACKAGE A	PACKAGE B
1	**RESTRICTED TOILET USE DUE TO OVERLOADED SEWERS** The chance that this happens at your property in any one year is	13 in 10,000	9 in 10,000
2	**FLOODING FROM THE SEWER GETS INSIDE YOUR PROPERTY** The chance that this happens at your property in any one year is	17 in 100,000	11 in 100,000
3	**FLOODING FROM THE SEWER GETS INTO YOUR GARDEN OR CLOSE TO YOUR PROPERTY** The chance that this happens at your property in any one year is	20 in 10,000	14 in 10,000
4	**FLOODING FROM THE SEWER GETS INTO PUBLIC PLACES LIKE ROADS AND PARKS** The chance that this happens at your property in any one year is	9 in 10,000	14 in 10,000
5	The **CHANGE IN YOUR ANNUAL WATER BILL** above inflation to provide the service quality above is (This change is added to a £5 increase in your bill by 2024 due to other factors affecting your water supply and sewerage service. The bill change continues to apply in all years after 2024.)	Decrease of £20 by 2024 Gradual decrease of £4 every year between 2019 and 2024	Increase of £40 by 2024 Gradual increase of £8 every year between 2019 and 2024
		A ◉	B ○

In each of the two surveys, a package exercise was included after the two lower level exercises which contained all the service measures shown, but where each exercise was treated as a single combined service measure. This meant that there were effectively two service measures that varied between options and across choice situations: (i) Exercise 1 services and (ii) Exercise 2 services. The package exercise was included to understand the relative worth of each lower level block of service measure changes as a whole. Also included in the package exercise was a service measure representing the customer's annual bill from WW. As in the lower level exercises, the bill was presented as a monetary amount for household customers and as a percentage deviation from current bills for

business customers. Examples of the PR14-style package exercises for the water and sewerage surveys can be found in Figure 3 and Figure 4, respectively.

Figure 3 Example of a PR14-style water package choice card

			PACKAGE A	PACKAGE B
GAME 1	1	**TASTE AND ODOUR of water not ideal for a FEW DAYS, but safe to drink** The chance that this happens at your property in any one year is	1 in 350	1 in 650
	2	**Water DISCOLOURED for a FEW HOURS at a time, but safe to drink** Running tap for several minutes will not remove discolouration. The chance that this happens at your property in any one year is	1 in 80	1 in 150
	3	**UNEXPEXTED INTERRUPTION to water supply lasting an average 6 HRS** The chance that this happens at your property in any one year is	1 in 50	1 in 85
	4	**INTERRUPTION to water supply lasting an average 6 HRS with 48-HR NOTICE** The chance that this happens at your property in any one year is	1 in 30	1 in 195
	5	**Prolonged SUPPLY STOPPAGE for up to 2 WEEKS** The chance that this happens at your property in any one year is	1 in 5	1 in 100
GAME 2	6	**PERSISTENT LOW WATER PRESSURE** The chance that this happens at your property in any one year is	Never	1 in 4,000
	7	**A BAN ON USING HOSE PIPE FOR 5 MONTHS in May-Sept. due to drought** The chance that this happens at your property in any one year is	1 in 500	1 in 10
	8	**ROTA CUTS lasting 2 MONTHS** The chance that this happens at your property in any one year is	1 in 1000	1 in 100
	9	**LEAKAGE reponse time** % mains leaks fixed within a day	99%	66%
	10	**RIVER WATER FLOW LEVELS** Miles of river with less than ideal flow levels (out of 1,641 miles in total)	0 miles	31 miles
	11	**The CHANGE IN YOUR ANNUAL WATER BILL above inflation** (This change is added to a £5 increase in your bill by 2024 due to other factors affecting your water supply and sewerage service. The bill change continues to apply in all years after 2024.)	Increase of £30 by 2024 Gradual increase of £6 every year between 2019 and 2024	Decrease of £30 by 2024 Gradual decrease of £6 every year between 2019 and 2024
			A ◉	B ○

Figure 4 Example of a PR14-style sewerage package choice card

			PACKAGE A	PACKAGE B
GAME 1	1	**RESTRICTED TOILET USE DUE TO OVERLOADED SEWERS** The chance that this happens at your property in any one year is	13 in 10,000	9 in 10,000
	2	**FLOODING FROM THE SEWER GETS INSIDE YOUR PROPERTY** The chance that this happens at your property in any one year is	17 in 100,000	11 in 100,000
	3	**FLOODING FROM SEWER GETS INTO GARDEN OR CLOSE TO PROPERTY** The chance that this happens at your property in any one year is	20 in 10,000	14 in 10,000
	4	**FLOODING FROM SEWER GETS INTO PUBLIC PLACES LIKE ROADS AND PARKS** The chance that this happens at your property in any one year is	14 in 10,000	9 in 10,000
GAME 2	5	**POLLUTION INCIDENTS** on **RIVERS AND STREAMS** from sewage network escapes Number of pollution incidents in the Wessex Water area in any one year	0 incidents	264 incidents
	6	**RIVER WATER QUALITY** Miles of river at less than good status (out of 2429 miles in total) in any one year	0 miles	990 miles
	7	**BATHING WATER QUALITY** Number of beaches in each quality category (out of 47 beaches in total) in any one year High Sufficient Poor		
	8	**The CHANGE IN YOUR ANNUAL WATER BILL above inflation** (This change is added to a £5 increase in your bill by 2024 due to other factors affecting your water supply and sewerage service. The bill change continues to apply in all years after 2024.)	Increase of £30 by 2024 Gradual increase of £6 every year between 2019 and 2024	Decrease of £30 by 2024 Gradual decrease of £6 every year between 2019 and 2024
			A ◉	B ○

Inclusion of the bill attribute allowed us to obtain estimates of WTP for improvements or decrements to each of the service measure blocks as a whole. This WTP value could then be split between the individual service measures making up the service block using the

choice data from the lower level experiments to obtain values for unit improvements or decrements to service levels for each service measure.

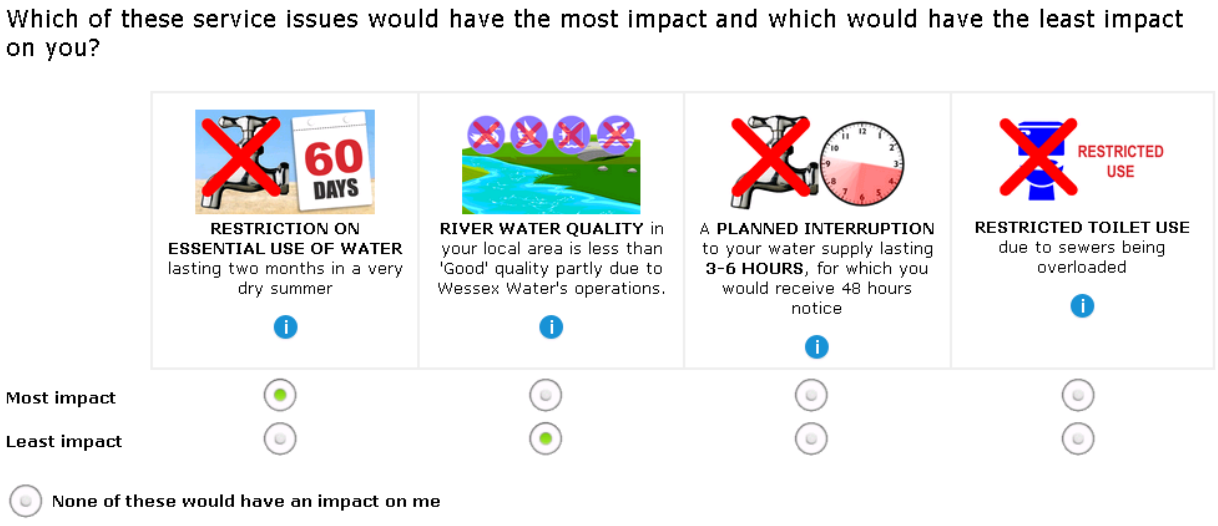
The experimental designs for each of the exercises were generated using an algorithm which sought to maximise the statistical precision of the estimates, whilst avoiding choice pairs where one option dominated the other one (i.e. was better on all service aspects). For each of the lower level exercises as well as the package exercise, a total of 30 choice cards were generated and grouped in 6 blocks of 5 cards each. Each respondent was administered choice cards from a randomly selected block for each exercise, hence answering 15 choice cards in total.

2.2 PR19-style Survey

In response to the key criticism that the PR14 approach was too complex, we developed a new form of choice question for PR19 based on the MaxDiff, or Best-Worst Scaling, technique, which is an established and robust alternative to the use of discrete choice experiments (DCE), whilst still being based on the same underlying theory (Random Utility Theory).[2]

Respondents were presented with repeated choice cards in which they had to choose the service measures that would have most and least impact on them out of a total of four presented them. An example MaxDiff choice card is found in Figure 5.

Figure 5 Example choice card form the MaxDiff exercise



Overall, around 20 attributes (as in our case) could be included robustly within a design, with potentially many more being possible if sample sizes are large and designs are segmented so that different people see different combinations. The experimental design

[2] Louviere, J., Flynn, T., and Marley, A. (2015) Best-Worst Scaling: Theory, Methods and Applications, Cambridge University Press

for this exercise was generated using an algorithm which sought to maximise the statistical precision of the estimates, whilst avoiding choice pairs where one option dominated the other one (e.g. two or more identical attributes, or two or more attributes of the same nature but different intensities such as supply interruptions of different durations). A total of 200 choice cards were generated and grouped in 20 blocks of 10 cards each. Each respondent was administered choice cards from a randomly selected block, hence answering 10 MaxDiff choice cards.

The MaxDiff exercise generates a quantitative measure of 'impact', which we interpret as equivalent to disutility, for each of the attributes included in the design for the customer population or sub-populations. This measure provides a means of understanding how bad each type of service failure would be relative to some benchmark.

In order to generate value estimates per avoided service failure an additional exercise was needed. This is because the MaxDiff questions only generate relative measures of utility, and these must be scaled to a money metric using evidence on customers' willingness to trade off money for service level changes at the package level.

This package exercise was based on pairwise combinations of the below four options:

- Option A: all attributes in this option will deteriorate to -1 levels. In addition, the yearly bill will decrease over and above the 'Current' option's bill change.

- Option B (Current): this option will see its attributes maintained at their respective current levels, with the yearly bill either maintained at its current reported level, or slightly decreased or increased.

- Option C: all attributes in this option will see improve to +1 levels, with the yearly bill increasing over and above the 'Current' option's bill change.

- Option D: all attributes in this option will further increase to +2 levels, with yearly bill further increasing over and above the bill increase of Option B.

The bill change levels for each option were randomly drawn as percentages from and translated into overall bill change from current bill expressed in GBP for household respondents and percentages for the non-household respondents. Each respondent was administered four choice cards to answer.

Table 2 PR19 Package % bill change levels

Attribute	Definition	Levels
dBill_B	% change in bill if Option B is implemented	-2.5%, 0%, +2.5%
dBill_A	% change in bill from Option B to Option A	-1%, -5%, -10%
dBill_C	% change in bill from Option B to Option C	+1%, +5%, +10%
dBill_D	% change in bill from Option C to Option D	+1%, +5%, +10%

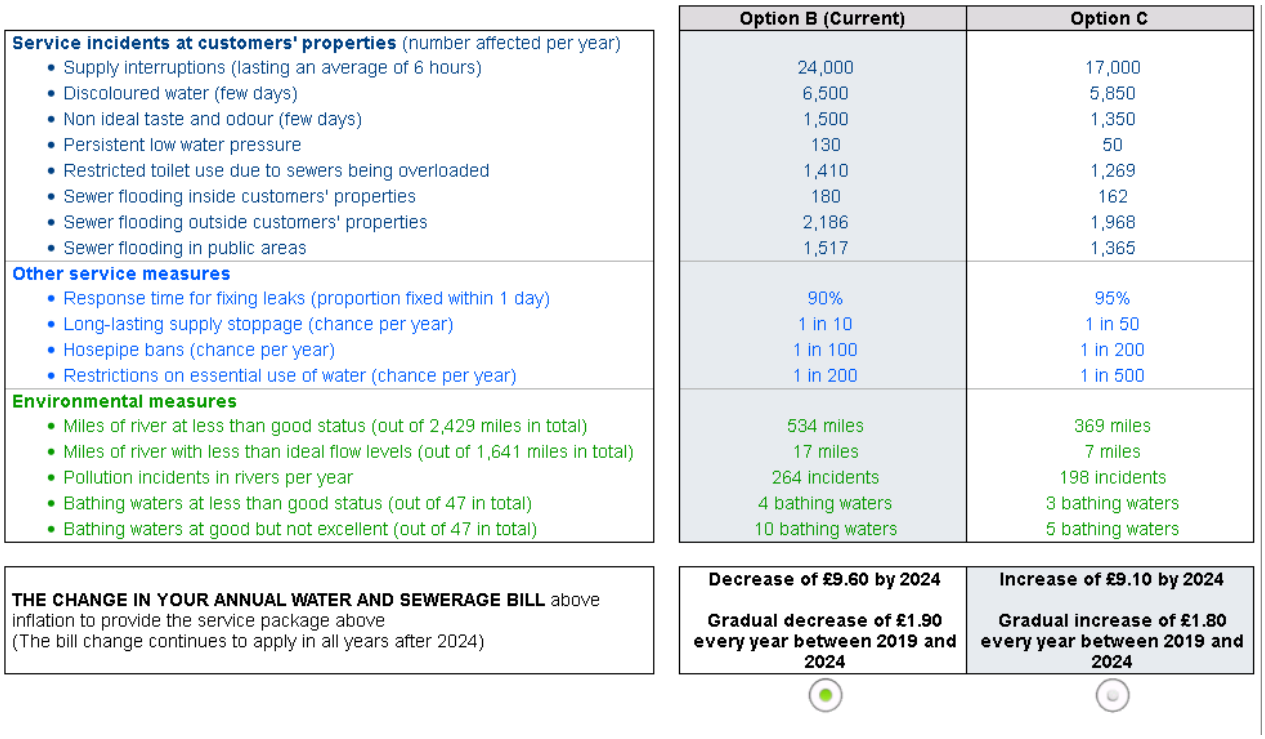
To ease the burden to respondents associated with evaluating all four options at once in one choice card, the task was simplified to a series of four pairwise package comparisons.

The four pairwise comparisons included were the following:

1. Option B vs. C – Yields WTP estimate for an across-the-board Base to +1 improvement
2. Option B vs. D - Yields WTP estimate for a Base to +2 improvement
3. Option C vs. D - Yields WTP estimate for a +1 to +2 improvement
4. Option B vs. A - Yields WTA estimate for a 0 to -1 deterioration

An example package choice card from this survey version is shown in Figure 6. This format was intended to make it simpler for the respondent to make choices that reflect their true WTP/WTA than presenting all four options in one package.

Figure 6 Example PR19-style Package Choice Card



	Option B (Current)	Option C
Service incidents at customers' properties (number affected per year)		
• Supply interruptions (lasting an average of 6 hours)	24,000	17,000
• Discoloured water (few days)	6,500	5,850
• Non ideal taste and odour (few days)	1,500	1,350
• Persistent low water pressure	130	50
• Restricted toilet use due to sewers being overloaded	1,410	1,269
• Sewer flooding inside customers' properties	180	162
• Sewer flooding outside customers' properties	2,186	1,968
• Sewer flooding in public areas	1,517	1,365
Other service measures		
• Response time for fixing leaks (proportion fixed within 1 day)	90%	95%
• Long-lasting supply stoppage (chance per year)	1 in 10	1 in 50
• Hosepipe bans (chance per year)	1 in 100	1 in 200
• Restrictions on essential use of water (chance per year)	1 in 200	1 in 500
Environmental measures		
• Miles of river at less than good status (out of 2,429 miles in total)	534 miles	369 miles
• Miles of river with less than ideal flow levels (out of 1,641 miles in total)	17 miles	7 miles
• Pollution incidents in rivers per year	264 incidents	198 incidents
• Bathing waters at less than good status (out of 47 in total)	4 bathing waters	3 bathing waters
• Bathing waters at good but not excellent (out of 47 in total)	10 bathing waters	5 bathing waters
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above (The bill change continues to apply in all years after 2024)	**Decrease of £9.60 by 2024** **Gradual decrease of £1.90 every year between 2019 and 2024**	**Increase of £9.10 by 2024** **Gradual increase of £1.80 every year between 2019 and 2024**

3 METHODOLOGY

3.1 Cognitive Depth Interviews

Ten cognitive depth interviews, five with household customers and five with non-household customers, were undertaken with the purpose of informing the pilot and main stage of this research, in particular:

- testing that respondents were able to understand what was being asked
- ensuring the information given was sufficient for respondents to feel they were able to provide an informed response.

Cognitive interviewing was only used to test the PR19 style survey.

All cognitive depth interviews were conducted using a computer-assisted telephone interviewing (CATI) method. Fieldwork was undertaken by our Telephone Unit in Edinburgh. Given the qualitative nature of the approach, all interviews were undertaken by our senior interviewers with extensive probing experience.

Interview Length

The average length was 70 minutes for the household interviews and 46 minutes for the non-household interviews.

Sampling and Recruitment Method

The sample for both household and non-household interviews was provided by Wessex Water and comprised their dual supply customers.

To confirm customers' supply area, they were asked for the first part of their postcode which was then checked against the postcode list supplied by Wessex Water. If their postcode matched the lookup, customers were asked to confirm that both their water and waste water services are supplied by Wessex Water. If it did not match, they were asked who provided their water and sewerage services; only dual supply customers were allowed to proceed.

Household customers were defined as those who are either solely or jointly responsible for their household's water and waste bill. Business customers were defined as those who are either solely or jointly responsible for their organisation's water and waste bill and/or liaising with their water and sewerage provider.

To achieve ten completed interviews, six household customers and five non-household customers were recruited.

Households

The breakdown of household interviews by gender, age, SEG and water meter status is shown in Table 3.

Table 3: Breakdown of Household Cognitive Depth Interviews

Characteristic	Value	Frequency
Gender	Male Female	1 4
Age	18-24 45-54 75+	1 3 1
SEG	AB C1C2	3 2
Water Meter Status	No water meter	5
Total		5

Non-households

Table 4 shows the breakdown of non-household interviews by bill size, annual water consumption, number of sites operated from, number of employees, business sector and water meter status.

Table 4: Breakdown of Non-household Cognitive Depth Interviews

Characteristic	Value	Frequency
Bill size	Small (less than £1,000) Medium (£1,000-19,999)	4 1
Annual water consumption	<5Ml	5
Number of sites	1 2	4 1
Number of employees	Sole trader 4 to 49	1 4
Business sector	IT and communication Government, health & education Other	1 1 3
Water Meter Status	Water meter Don't know	3 2
Total		5

3.2 Pilot interviews

The overall pilot comprised a total of 702 interviews with household and non-household customers, using both PR14 and PR19 SP approaches. The breakdown of achieved interviews by approach, survey mode and customer type was as follows:

PR14-style

- 411 x household (HH) online interviews
  - 206 x about water supply
  - 205 x about sewerage service

PR19-style

- 236 x household (HH) online interviews
- 5 x household (HH) face-to-face in-home interviews with less engaged and/or vulnerable customers
- 50 x non-household (NHH) CATI interviews

Interview Length

The average interview length for all five pilot surveys is shown in Table 5 below.

Table 5: Average Interview Length

	PR14 HH Water Online	PR14 HH Sewerage Online	PR19 HH Online	PR19 HH CAPI	PR19 NHH CATI
Average interview length	21 minutes	19 minutes	25 minutes	30 minutes	27 minutes

Sampling and Recruitment Method

The sample for the online household and CATI non-household pilot was provided by Wessex Water and comprised their dual supply customers. Again, customers' postcodes were checked against a lookup list to confirm their supply area.

In the CATI survey, 76 non-household customers were recruited to achieve 50 completed interviews.

For the online pilot, invites were sent to a total of 14,000 customers across the three surveys. Table 6 shows the number of invites sent, number of invalid emails and number of final completes for each survey, as well as the corresponding response rate.

Table 6: Online Response Rates

	PR14 Water	PR14 Sewerage	PR19
Number of invites sent	4,500	4,500	5,000
Number of invalid email addresses	429	419	427
Number of completes	206	205	236
Response rate	**5.1%**	**5.0%**	**5.2%**

Participants for the in-home CAPI survey were recruited face-to-face in Bath. All participants were from vulnerable and harder to reach customer groups who are unlikely to respond to either online or telephone surveys. In agreement with Wessex Water, a criteria framework was developed comprising four customer subgroups:

1. Customers who are long term unemployed or living on the state pension (social group E) – **very low income**
2. Customers who do not have access to the Internet (either at home, on a mobile or at work) – **disconnected**
3. Customers who are 70 years or older and unlikely to be digitally engaged – **age disconnected**
4. Customers who are unlikely to complete and engage with an online survey due to literacy issues – **literacy**

Sample Characteristics

Household

The breakdown of online household interviews by key characteristics – gender, age, SEG and water meter status – and by survey type is shown in Table 7 below.

Table 7: Breakdown of Household Pilot Interviews by Key Indicators

Characteristic	Value	PR14 Water	PR14 Sewerage	PR19 Online	PR19 CAPI
		Frequency			
Gender	Male	99	113	121	1
	Female	102	87	109	4
	Refused	5	5	6	
Age	18-24	5	3	5	
	25-34	19	29	18	
	35-44	25	29	32	
	45-54	31	27	30	
	55-64	40	46	42	
	65-74	44	36	73	
	75+	11	18	13	5
	Refused	31	17	23	
SEG	AB	120	129	142	
	C1C2	56	49	51	
	DE	18	24	30	5
	Refused	12	3	13	
Water Meter Status	Water meter	142	152	177	-
	No water meter	56	43	50	-
	Don't know	8	10	9	-
Total		206	205	236	5

Error! Reference source not found. shows the breakdown of all household interviews by working status, highest level of qualifications, benefits and property type.

Table 8: Breakdown of Household Pilot Interviews by Other Indicators

Characteristic	Value	PR14 Water	PR14 Sewerage	PR19 Online	PR19 CAPI
		Frequency			
Working status	Working full-time (30+ hours a week)	78	91	78	
	Working part-time (8-29 hours a week)	19	23	27	
	Not working – looking for work	3	5	1	
	Not working – not looking for work	3	2	6	
	Full-time student	2		1	
	Retired	70	66	96	5
	Retired unpaid voluntary work	9	6	8	
	Looking after family/home	6	2	3	
	Other	4	6	10	
	Refused	12	4	6	
Highest level of qualifications[3]	No qualifications	5	2	13	5
	Level 1	6	12	10	
	Level 2	26	28	34	
	Apprenticeship	5	6	7	
	Level 3	27	29	34	
	Level 4 and above	119	115	115	
	Other qualifications	18	13	23	
Benefits	Attendance allowance		1	1	2
	Carer's allowance	1	2	2	1
	Child tax credit	17	21	10	
	Council tax benefit	11	12	8	2
	Disability living allowance	7	4	10	1
	Housing benefit	11	11	8	3
	Income support (or similar)	1	3	4	
	Jobseeker's allowance	1		1	
	Pension credit	5	2	4	
	Universal credit		1	1	
	Working tax credit	4	6	2	
	None of these	159	162	195	1
	Refused	15	10	11	1
Property type	Flat	29	35	25	

[3] **Level 1:** 1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills;
Level 2: 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma;
Level 3: 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma;
Level 4 and above: Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (for example teaching, nursing, accountancy);
Other qualifications: Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown)

	Terraced house	55	36	50	
	Semi-detached house	49	51	64	1
	Detached house	34	60	67	
	Bungalow	30	22	27	4
	Refused	9	1	3	
Total		206	205	236	5

Table 9 shows the breakdown of face-to-face interviews by the four vulnerable subgroups; all five participants fell into more than one category.

Table 9: Breakdown of Face-to-Face Pilot Interviews by Customer Subgroups

Quota group	PR19 HH CAPI
	Frequency
Very low income	3
Disconnected	5
Age disconnected	5
Literacy	2
Total	5

Non-household

A breakdown of non-household interviews by bill size, annual water consumption, number of sites operated from, number of employees, business sector and water meter status is provided in Table 10 below.

Table 10: Breakdown of Non-household Pilot Interviews

Characteristic	Value	Frequency
Bill size	Small (less than £1,000)	31
	Medium (£1,000-19,999)	17
	Large (£20,000 and over)	2
Annual water consumption	<5 megalitres	50
Number of sites	1	40
	2	4
	3	3
	4+	3
Number of employees	Sole trader	6
	Less than 4	15
	4 to 49	23
	50 to 249	5
	250 +	1
Business sector	Manufacturing	8
	Energy or water service & supply	1
	Construction	1
	Wholesale and retail trade (incl motor vehicles repair)	9
	Transport and storage	1
	Hotels and catering	7
	IT and communication	2
	Finance and insurance activities	3
	Business services	4
	Government, health & education	3
	Arts, entertainment and recreation	4
	Other service activities	3
	Other	4
Water Meter Status	Water meter	34
	No water meter	9
	Don't know	7
Total		50

Survey Enjoyment

Household participants, both online and in-home, were asked to rate their enjoyment in completing the survey using a scale of 1 to 10 where 1 means 'low enjoyment' and 10 means 'high enjoyment'.

Table 11 shows mean ratings given by household participants by survey type.

Table 11: Household Survey Enjoyment Mean Ratings

Survey enjoyment	PR14 HH Water Online	PR14 HH Sewerage Online	PR19 HH Online	PR19 HH CAPI
Mean rating	4.4	4.3	4.6	7.8
Base size	206	205	167	5

This question was an addition requested by Wessex Water after CATI fieldwork had finished. Non-household ratings, therefore, are not available.

Drop Out and Screen Out Analysis

Table 12 shows the breakdown of those who entered the survey but did not complete. This includes those who were screened out due to their answers ("screen outs") and those who stopped filling in the survey after opening the link ("drop outs").

Table 12: Online Survey Drop Outs & Screen Outs

	PR14 HH Water Online	PR14 HH Sewerage Online	PR19 HH Online
Entered survey	574	537	603
Screen outs	45	53	101
Drop outs	322	278	266
Final completes	**207**	**206**	**236**

PR14 Water Survey

Table 13 below shows the breakdown of those who were screened out of the PR14-style water survey, and Table 14 shows which screen participants were on when they stopped filling in the survey.

Table 13: PR14 Water Online Survey Screen Outs

Reason for screening out	Frequency
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	
Yes	15
Q2: "Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?"	
No	6
Q3: "Does your property have a septic tank or cess pit?"	
Yes	3
Q4: "Please can you tell us the first part of your postcode?"	
Prefer not to answer	9
None of the above letters	3
Q6 (if postcode matches lookup): "According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?"	
No	2
Don't know	3
Q6a (if postcode does not match lookup): "Who supplies your water and sewerage services?"	

Wessex Water supplies sewerage services only, another company supplies my water	1
Don't know	2
Total	**45**

Table 14: PR14 Water Online Survey Drop Outs

Screen where stopped filling in the survey	Frequency
Introduction screen	73
Screening section	
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	18
Q4: "Could you please tell us the first part of your postcode?"	13
Q5: "Just to check, this makes your postcode [postcode from Q4]. Is this correct?"	3
Q6: "According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?"	1
Q7: "Which of the following best describes your household?"	1
Q10: "How would you describe the occupation type of the chief income earner in your household?"	2
Q10A: "Does the chief income earner have a state pension, a private pension or both?"	4
Q10B: "How would you describe the chief income earner's occupation type before retirement?"	3
Q11: "What was your age at your last birthday?"	4
Q12A: "Do you have a water meter?"	11
Q14: "Do you practice any of the following leisure activities?"	15
Main questionnaire	
Main questionnaire introduction screen	3
Q21: "How do you feel about the amount that you pay for the water supply that you receive? Is it…"	6
SP Choice exercise 1	
SP1 1st introduction screen	5
SP1 2nd introduction screen	2
SP1 3rd introduction screen	19
SP1 4th introduction screen	17
SP1 5th introduction screen	5
SP1 1st choice set	23
SP1 2nd choice set	10
SP1 3rd choice set	4
SP1 4th choice set	6
SP1 5th choice set	6
SP Choice exercise 2	
SP2 1st introduction screen	5
SP2 2nd introduction screen	2
SP2 3rd introduction screen	13
SP2 1st choice set	3

SP2 2nd choice set	2
SP2 4th choice set	3
SP2 5th choice set	2
SP Choice exercise 3	
SP3 introduction screen	7
SP3 2nd choice set	1
SP3 3rd choice set	1
SP3 4th choice set	2
SP3 5th choice set	1
Follow-up questions	
Q42: "Were any of the service levels so low or so high that they were implausible?"	1
Q42A: "Which levels did you feel were not plausible?"	4
Classification section	
Q43: "What is your employment status?"	1
Q46: "Do you receive any of the following benefits?	15
Q48A: "How would you rate your enjoyment in completing this survey?"	5
Total	**322**

PR14 Sewerage Survey

Table 15 and Table 16 show the breakdown of screen outs and drop outs, respectively, for the PR14-style sewerage survey.

Table 15: PR14 Sewerage Online Survey Screen Outs

Reason for screening out	Frequency
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	
Yes	20
Q2: "Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?"	
No	4
Q2a: "Does your property have a septic tank or cess pit?"	
Yes	6
Q3: "Please can you tell us the first part of your postcode?"	
Prefer not to answer	10
None of the above letters	2
Q5 (if postcode matches lookup): "According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?"	
Don't know	5
Q7: "Is your sewerage bill included in your rental payment, or do you pay directly to Wessex Water?"	
Included in rent	1
Don't know	5

Total	**53**

Table 16: PR14 Water Online Survey Drop Outs

Screen where stopped filling in the survey	Frequency
Introduction screen	73
Screening section	
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	10
Q3: "Could you please tell us the first part of your postcode?"	11
Q6: "Which of the following best describes your household?"	2
Q9: "How would you describe the occupation type of the chief income earner in your household?"	1
Q9A: "Does the chief income earner have a state pension, a private pension or both?"	2
Q9B: "How would you describe the chief income earner's occupation type before retirement?"	2
Q10: "What was your age at your last birthday?"	1
Q11A: "Do you have a water meter?"	12
Main questionnaire	
Main questionnaire introduction screen	3
Q13: "Do you practice any of the following leisure activities?"	12
Q17: "How do you feel about the amount that you pay for the sewerage service? Is it…"	3
SP Choice exercise 1	
SP1 1st introduction screen	8
SP1 2nd introduction screen	3
SP1 3rd introduction screen	16
SP1 4th introduction screen	13
SP1 5th introduction screen	4
SP1 1st choice set	21
SP1 2nd choice set	7
SP1 3rd choice set	7
SP1 4th choice set	3
SP1 5th choice set	4
SP Choice exercise 2	
SP2 1st introduction screen	3
SP2 2nd introduction screen	3
SP2 4th introduction screen	14
SP2 1st choice set	8
SP2 2nd choice set	3
SP2 4th choice set	1
SP Choice exercise 3	
SP3 introduction screen	3
SP3 1st introduction screen	6

SP3 3rd introduction screen	1
Follow-up questions	
Q33: "Did you generally feel able to make comparisons between the options presented to you?"	1
Q34: "Why weren't you able to make the comparisons in the choices?"	1
Q35: "Did you find each of the levels of service we described easy to understand?"	1
Q37: "Were any of the service levels so low or so high that they were implausible?"	1
Classification section	
Q41: "Do you receive any of the following benefits?"	7
Q43A: "How would you rate your enjoyment in completing this survey?"	7
Total	**278**

PR19 Survey

Table 17 and Table 18 show the breakdown of screen outs and drop outs, respectively, for the P19-style survey.

Table 17: PR19 Online Survey Screen Outs

Reason for screening out	Frequency
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	
Yes	72
Q2: "Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?"	
No	4
Q3: "Does your property have a septic tank or cess pit?"	
Yes	1
Q4: "Please can you tell us the first part of your postcode?"	
Prefer not to answer	13
None of the above letters	3
Q5 (if postcode matches lookup): "According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?"	
No	2
Don't know	1
Q5a (if postcode does not match lookup): "Who supplies your water and sewerage services?"	
Wessex Water supplies my water services only, another company supplies my sewerage	2
Don't know	3
Total	**101**

Table 18: PR19 Online Survey Drop Outs

Screen where stopped filling in the survey	Frequency
Introduction screen	79

Screening section	
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	23
Q4: "Please can you tell us the first part of your postcode?"	12
Q5: "According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?"	1
Q10: "Does the chief income earner have a state pension, a private pension or both?"	5
Q11: "How would you describe the chief income earner's occupation type before retirement?"	1
Q12: "What was your age at your last birthday?"	3
Q14: "Do you have a water meter?"	17
Main questionnaire	
Main questionnaire introduction screen	3
Q20: "Do you practice any of the following leisure activities?"	7
Q23: "How do you feel about the amount that you pay Wessex Water for water and sewerage services?"	4
Choice experiment introduction: Screen with list of attributes	3
Choice experiment introduction: Screen with bathing water quality chart	3
Choice experiment introduction: Screen with river water quality and river water flow levels charts	2
Q34: "To your knowledge, have you or any of your relatives or friends experienced any of these problems? If so, was that in the past year, or more than a year ago?"	11
Q41: "And to your knowledge, have you or any of your relatives or close friends experienced, noticed or been aware of any of the following problems in the past year or more than a year ago?"	1
Q42: "Of all the service areas you have just read about, which, if any, would you most like to see improved in the future?"	7
SP Choice exercise 1: Max/Diff	
Max/Diff introduction screen	16
Max/Diff 1st choice set	7
Max/Diff 2nd choice set	1
Max/Diff 3rd choice set	2
Max/Diff 5th choice set	2
Max/Diff 6th choice set	2
Max/Diff 8th choice set	3
Q57: "Why weren't you able to make the comparisons in the choices?"	1
SP Choice exercise 2: Package	
Package 1st introduction screen	1
Package 2nd introduction screen	2
Package 3rd introduction screen	2
Package 4th introduction screen	1
Package 1st choice set	13
Q59: "Why did you choose the option you did?"	7
Package 2nd choice set	5
Q60: "Did you understand that for the option you selected [your annual bill would increase	1

by £X each and every year for five years. This would mean at the end of that five years your annual bill would be £xx more than your current bill] OR [your annual bill would decrease by £X each and every year for five years. This would mean at the end of the five years your annual bill would be £XX less than your current bill] OR [this would mean no change to your bill between 2019 and 2024].”	
Package 3rd choice set	5
Follow-up questions	
Q70: “Did you generally feel able to make comparisons between the options presented to you?”	2
Q74: “Were any of the service levels so low or so high that they were implausible?”	2
Q75: “Which levels did you feel were not plausible?”	1
Classification section	
Q81: “Do you receive any of the following benefits?”	2
Q84A: “How would you rate your enjoyment in completing this survey?”	4
Q85: “Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for Wessex Water?”	2
Total	**266**

4 COGNITIVE FEEDBACK

4.1 Household Interviews

General Feedback

Five household interviews were completed and there were no major problems with any of them. All five participants found the choice cards easy to understand.

Routing

The routing worked correctly in all interviews.

Interview length

The average interview length for the five cognitive interviews was 70 minutes (ranging from 40 minutes to 80 minutes). It is estimated that the interview would last between 20 and 35 minutes without the cognitive elements.

General comments

The Future Benefits exercise adds a fair amount of time to the survey and this section had to be re-explained to all five participants. The interviewer had to re-read the introduction page to it. In addition, one participant did not accept that in a hypothetical situation a water company would ignore crucial service requirements for the environment.

Background Questions (Q17-Q25)

No comments were made about this section.

Choice Experiments Introduction (Q26-Q45)

All show cards were generally felt to be clear, but there were some minor text changes recommended.
All show cards were generally felt to be clear, but there were some minor text changes recommended.

Recommendation: Add a full stop at the end of the first sentence on Show Card D1 ("Supply Interruptions (lasting an average of 6 hours"). This has been amended.

Recommendation: Should be "Fix *a* Leaking…" not "Fix *A* Leaking…" on Show Card D6 ("Response Time to Fix a Leaking Water Main Pipe Near Your Property"). This has been amended.

Recommendation: On Show Card D12 ("Bathing Water Quality"), it was suggested that the statistics in the table need to be clarified to show it is clear what "3 out of 100" refers to. This has now been amended to say… "3 out of 100 *people*". This has been amended.

Recommendation: On Show Card D13 ("River Water Quality"), it was recommended to add "species from these groups" in "Plants, fish, birds, insects will be present but some *species from these groups* may be missing; there may be some pollution or murky water; parts may be suitable for contact activities such as rowing." This has been amended.

One participant mentioned that the three colours in the table of D13 ("River Water Quality") might be difficult to distinguish for participants who are colour blind but they did not have a problem with it.

Preference of Presenting Figures (Q32a, Q33a)

For hosepipe bans and restrictions on essential use of water, participants were asked whether they preferred saying "1 in xxx" or "xx%" to show the level of risk:

- Q32a (Hosepipe Bans): "Instead of saying "Currently, there is a 1 in 100 risk that this happens to a property in the Wessex Water area in any year", we could have said "Currently, there is a 22% chance that your property will experience this problem over the course of our 25 year plan" to mean exactly the same thing. Which way of expressing this risk would make more sense to you?"

- Q33a (Restrictions on Essential Use of Water): "Instead of saying "Currently, there is a 1 in 200 risk that this happens to a property in the Wessex Water area in any year", we could have said "Currently, there is a 12% chance that your property will experience this problem over the course of our 25 year plan" to mean exactly the same thing. Which way of expressing this risk would make more sense to you?"

All five participants preferred a "1 in xxx" measure to "xx%".

Exercise 1 – Choice Experiment – MaxDiff Exercise – Choice Cards D (Q46-57)

No comments were made about this section.

Exercise 2 – Choice Experiment – Package – Choice Cards P (Q58-Q63)

It was suggested that horizontal lines or a grid would help participants better understand and compare the choices they are presented with. One participant suggested having a pie chart showing the statistics.

"It is a bit confusing, needs lines across or a grid to help me understand."

Recommendation: Include a grid/horizontal lines in all P cards. In addition the attribute types have been colour coded as follows: one for service incidents, another for other service measures and finally one for environmental measures. Colours used are light blue, dark blue and purple. Finally, shading has been added to highlight which option is "worse" than the other. Shading applied as follows: B vs C – shaded B, B vs A – shaded A and C vs D – shaded C.

In all cases, it is the service levels that are shaded as above, with the bill level for the opposite option being shaded, ie Option C in the B vs C question, etc.

"Nice and easy to go through"
"Very clear and easy to understand"

Exercise 3 – Choice Experiments – Future Benefits – Choice Cards F (Q64-Q68)

It was generally felt that the Future Benefits exercise adds a fair amount of time to the survey and this section had to be re-explained to all five participants.

One participant had initial difficulties with the F Cards where the service failure is presented as a "0" (zero). They suggested it would be easier to understand if it said "nil failure(s)" or "nil mile(s)" etc.

Recommendation: Use "nil failure(s)" or "nil mile(s)" instead of "0 miles"

Follow-up Questions (Q70-Q76)

Three out of five participants said they were able to make comparisons between the choices. Of the two who disagreed, one participant again referred to the use of "0" instead of "nil":

"I still the find the zero confusing perhaps the word 'nil incidents' or 'nil miles affected' would be a lot clearer."

The other participant did not accept that in a hypothetical situation a water company would ignore crucial service requirements for the environment.

"I don't see myself as a customer wanting to choose [whether] to have clean rivers or not."

All five participants found the service levels easy to understand.

However, two participants felt that some of the service levels, in particular those at zero, were implausible:

"I never have a zero as a realistic level."

"I still the find the zero confusing…"

None of the five participants read the upfront information about Wessex Water either before or during the interview. However, it will still be included for the online pilot.

4.2 Business Interviews

General Feedback

Five non-household interviews were completed and there were no major problems with any of them. Again, all five participants found the exercise/choice cards easy to understand.

Routing

The routing worked correctly in all interviews.

Interview length

The average interview length for the five cognitive interviews was 46 minutes. It is estimated that the interview would last between 25 and 30 minutes without the cognitive elements.

Background Questions (Q17a-Q23)

No comments were made about this section.

Choice Experiments Introduction (Q26-Q45)

All participants found the service descriptions easy to understand. There were some small recommendations:

Recommendation: On Show Card D9 ("Restricted Toilet Use Due to Overloaded Sewers"), only show one photo of a blocked toilet instead of four:

"One photo of a blocked loo is all we need, not four as it's a bit of a shock!"

"We only need one photograph of a blocked loo, not four, and only one photographs of sewerage flooding inside and outside as this would make it quicker to view and the file size is smaller."

Recommendation: Again, on Show Card D12 ("Bathing Water Quality"), it was suggested that the statistics in the table need to be clarified to show it is clear what "3 out of 100" refers to. This has now been amended to say… "3 out of 100 *people*."

Preference of Presenting Figures (Q32a, Q33a)

Again, all five participants preferred "1 in xxx" to a percentage figure, for both hosepipe bans and restrictions on essential use of water.

Exercise 1 – Choice Experiment – MaxDiff Exercise – Choice Cards D (Q46-57)

No comments were made about this section.

Exercise 2 – Choice Experiment – Package – Choice Cards P (Q58-Q63)

No comments were made about this section.

Exercise 3 – Choice Experiments – Future Benefits – Choice Cards F (Q64-Q68)

Again, it was suggested that the Future Benefits exercise is quite long:

"Thought there were too many choice cards in the F section. And why is the environmental section already presented in the P cards and now separately in the F cards?"

Follow-up Questions (Q70-Q76)

Four out of five participants felt they were able to make comparisons between the choices; one was not:

"A bit more time needed looking at, and I would expect my water company to address all environmental issue without an increase in bills."

All five participants found the service levels easy to understand.

One participant felt that some of the service levels were implausible; again, this was said about the zero level:

"I don't believe anything would go down to zero."

Additional Valuation Question (Q77)

Recommendation: Add a follow-up question to ask for reasons why they would and would not want to make this investment.

4.3 Summary

The results above and the positive comments we received are very encouraging from a survey design perspective. We are, therefore, confident that the PR19 approach survey is understandable to customers across the different ages and social grades included in this phase of work.

The few recommendations we received were predominantly about the wording of questions. For the pilot stage, we have made all the minor changes to the questionnaire as outlined above.

There were also comments about the Future Benefits exercise being too long. All five household participants needed to have this section re-explained to them. Further, a couple of participants would expect Wessex Water to make essential environmental investments without an increase in bills, and without consulting its customers. (Note: this exercise was dropped prior to the pilot survey).

5 PILOT FINDINGS

5.1 Respondent feedback

Table 19 summarises various statistics concerning respondents' feedback to the PR14-style and PR19-style surveys for household and business samples:

- In the household sample, both the MaxDiff and Package exercises in the PR19-style survey scored a higher percentage of respondents who felt able to make comparisons between choice options compared to the Water and Sewage PR14-style surveys.

- Moreover, the PR19-style package exercise scored a higher percentage of respondents who found each service level realistic and understandable compared to both PR14-style surveys.

- Finally, the non-household sample scored percentages that were higher on all counts than their household counterparts for the PR19-style survey.

This provides further evidence that the PR19-style survey compares positively with the PR14-style instrument, and gives us more confidence in going forward with it for the main survey stage.

Table 19: Respondent Feedback to SP Exercises

	Household				Non-Household	
	PR14-style		PR19-style		PR19-style	
	Water	Sewerage	MaxDiff	Package	MaxDiff	Package
Did you feel able to make comparisons between the choices presented to you?	79.6%	79.0%	86.9%	87.7%	92.0%	92.0%
Did you find each of the levels of service we described realistic & easy to understand?	82.5%	77.6%		83.5%		100.0%

5.2 Econometric Models

We have estimated econometric models using the pilot stated preference (SP) data in order to check that the models are theoretically consistent, as well as to be able to derive WTP results to compare between versions, and against the main results obtained at PR14. To this end, we are looking to see whether the coefficients of the most basic models have the correct signs and are reasonably precisely estimated, given that the precision will

improve with more data. In addition, the results from this analysis allow us to calibrate the cost levels and the experimental design.

PR14-style Survey

The PR14-style Water Exercise 1 and Exercise 2 model results are shown in Table 20 and Table 21. The coefficients in both exercises have the expected signs, except 'unexpected supply interruption' in Exercise 1. As for the levels of precision, only 'supply stoppage' and 'bill change' are significant (at the 1% significance level) in Exercise 1, while all attributes except 'hosepipe ban' in Exercise 2 are significant at the 1% significance level.

It is worth noting that all the insignificant attributes in Exercise 1 tend to have narrow ranges between their -1 and +2 levels, possibly making it difficult for respondents to discern changes in the choice cards. Note in contrast that where this range is broad, as for 'supply stoppage', the coefficient becomes highly significant. Indeed where the range is intermediate, as for 'planned supply interruptions', the standard error becomes close in magnitude to the coefficient. All this suggests that the range of attribute variation needs to be broadened for all attributes except 'supply stoppage' in Exercise1.

Overall, the lower level water SP models are working reasonably well, although the levels of precision are not as good as one would hope for given the sample sizes. Nonetheless, we would expect the designs to result in statistically reliable results when estimated on the full main sample.

Table 20 PR14-style 'Exercise 1' Water DCE model

Variable	Unit	Household
Taste and odour	chance	-17.678
		(73.626)
Discolouration	chance	-5.957
		(15.104)
Unexpected supply interruption	chance	3.604
		(12.227)
Planned supply interruption	chance	-2.195
		(3.518)
Supply stoppage	chance	-4.101
		(0.515) ***
Bill change	£/hh/yr	-0.012
		(0.002) ***
Observations		1030
LL		-656.026
Pseudo R2		0.081

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 21 PR14-style 'Exercise 2' Water DCE model

Variable	Unit	Household
Low pressure	chance	-1118.748
		(414.407)***
Hosepipe bans	chance	-0.277
		(0.882)
Rota cuts	chance	-51.167
		(11.284)***
Leakage response time	%	0.010
		(0.003)***
River water flow levels	miles	-0.012
		(0.003)***
Bill change	£/hh/yr	-0.015
		(0.002)***
Observations		1030
LL		-644.555
Pseudo R2		0.097

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 22 gives the results of the package DCE models. The results of the model are consistent with prior expectations, as the coefficients of the variables of service blocks are positive and the coefficient of the bill variable is negative.

Table 22 PR14-style 'Package' Water DCE model

Variable	Unit	Household
Exercise 1	-	0.431
		(0.077)***
Exercise 2	-	0.406
		(0.076)***
Bill change	£/hh/yr	-0.008
		(0.001)***
Observations		1030
LL		-685.157
Pseudo R2		0.040

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Moving to the Sewerage Exercise 1 and Exercise 2 model results, these are shown in Table 23 and Table 24. Again, all attributes (including bill) in both exercises are of the expected

sign. Moreover, all attributes are significant at least at the 5% significant level in both exercises except 'sewer flooding in public areas' in Exercise 1 and Bathing water quality (Excellent) and 'bill change' in Exercise 2. Note however, that in all these cases, standard errors are of a similar magnitude to their respective coefficients, suggesting that there should be no problem achieving significance for these attributes moving to the main stage in which the sample size is much larger. The only issue is in Exercise 1 is with the coefficient of bathing water quality – nr. excellent beaches. Here the expected sign should be positive, reflecting a preference for this type of beach relative to the omitted baseline quality, namely beaches of 'good' quality.

Table 23 PR14-style 'Exercise 1' Sewerage DCE model

Variable	Unit	Household
Restricted toilet use	chance	-770.366
		(183.098) ***
Sewer flooding inside property	chance	-8054.095
		(1259.362) ***
Sewer flooding in gardens/close to other properties	chance	-292.294
		(124.410) **
Sewer flooding in public places	chance	-159.171
		(144.138)
Bill change	£/hh/yr	-0.011
		(0.001) ***
Observations		1025
LL		-644.929
Pseudo R2		0.092

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 24 PR14-style 'Exercise 2' Sewerage DCE model

Variable	Unit	Household
Pollution incidents	incidents	-0.0027
		(0.0003) ***
River miles of bad quality	chance	-0.0004
		(0.0001) ***
Bathing water quality	Nr. 'Sufficient' out of 47	-0.4251
		(0.1820) **
Bathing water quality	Nr. 'Excellent' out of 47	-0.0981
		(0.0511) *
Bill change	£/hh/yr	-0.0017
		(0.0015)
Observations		1025
LL		-656.890
Pseudo R2		0.075

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Finally, Table 25 gives the results of the package DCE models. As in Exercise 1, the results of the model are consistent with prior expectations, as the coefficients of the variables of service blocks are positive and the coefficient of the bill variable is negative.

Table 25 PR14-style 'Package' Sewerage DCE model

Variable	Unit	Household
Exercise 1		0.2388
		(0.0775) ***
Exercise 2		0.6799
		(0.0797) ***
Bill change	£/hh/yr	-0.0050
		(0.0012) ***
Observations		1025
LL		-671.433
Pseudo R2		0.055

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

5.3 PR19-style Survey

The lower level MaxDiff data were analysed using a rank-ordered logit model which is equivalent to a conditional logit analysis on derived data constructed by 'exploding' the rankings into choices. In our exercise, 3 choices were derived for each ranking set as

follows: (1) the 'most impact' option was treated as being chosen over the remaining three service attributes in the ranking set, and (2) each of the two attributes that were neither ranked as 'most impact' or 'least impact' was each considered to have been chosen from a choice set that is composed of the attribute in question and the 'least impact' attribute.

The modelling methodology requires that one attribute be omitted so as to be treated as the base category. We chose the 'Coastal bathing water quality sufficient but not good' attribute for this purpose. For the remaining attributes, coefficients and Impact scores are presented. The Impact score for a given attribute is the relative impact attributable to the service issue in question in comparison to the baseline attribute (i.e. 'Bathing water quality good but not excellent'). The Impact score is considered as a measure of the disutility of each type of service failure relative to the baseline, and by implication, to all other attributes, with a higher Impact score indicating a higher disutility for the attribute. Impact scores therefore can be used as weights to apportion package WTPs to individual service measures.

The below results (Table 26) are satisfactory for both samples, with most coefficients being highly significant and their magnitudes broadly corresponding to expectations. For example, we find:

- increasing Impact scores for the interruptions (and stoppage) attributes with the duration of the interruption, and with the unexpected type compared to planned;

- sewer flooding inside customers' properties has a higher Impact score than sewer flooding outside customers' properties, and both of these have higher Impact scores than sewer flooding in public areas; and

- Sewer flooding inside customers' properties has the highest Impact score, as would be expected given the disruptive and traumatizing nature of this type of incident.

All of these findings indicate that the MaxDiff exercise is working as expected.

Table 26. MaxDiff Rank-ordered Logit Models

Variable	Household		Non-Household	
	Coeff.	Impact score	Coeff.	Impact score
(1) Unexpected supply interruption lasting 3-6 hours	1.416***	4.12	2.480***	11.94
(2) Unexpected supply interruption lasting 6-12 hours	1.864***	6.45	2.492***	12.09
(3) Planned supply interruption lasting 3-6 hours	0.584***	1.79	1.531***	4.62
(4) Planned supply interruption lasting 6-12 hours	0.983***	2.67	1.463***	4.32
(5) Water taste & smell not ideal	1.276***	3.58	1.598***	4.94
(6) Discoloured water	0.588***	1.80	1.255***	3.51
(7) Long-lasting stoppage	3.730***	41.69	3.768***	43.30
(8) Persistent low water pressure	1.504***	4.50	1.427***	4.17
(9) Response time	1.749***	5.75	2.190***	8.94
(10) Hosepipe ban	0.223*	1.25	0.368	1.44
(11) Restrictions on essential use of water	2.425***	11.31	2.431***	11.37
(12) Restricted toilet use due to overloaded sewers	2.774***	16.02	3.033***	20.76
(13) Sewer flooding inside customers' properties	4.676***	107.36	4.442***	84.94
(14) Sewer flooding outside customers' properties	3.291***	26.86	3.524***	33.92
(15) Sewer flooding in public areas	1.841***	6.31	2.318***	10.15
(16) Pollution incidents	1.039***	2.83	1.165***	3.21
(17) Bathing water quality sufficient but not good	0.107	1.11	0.058	1.06
(18) Bathing water quality good but not excellent	(omitted)	1.00	(omitted)	1.00
(19) River water quality less than good	0.287**	1.33	0.516*	1.67
(20) River water flow lower than ideal	0.175	1.19	0.284	1.33
Observations	2297		499	
LL	-4034.18		-853.86	

*Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as 'most impact', 4 'least impact', and the remaining two attributes were equally ranked at 2; estimates all based on unweighted data; * significant at 10%; ** significant at 5%; *** significant at 1%; (1) All variables are dummies, equal to 1 when the attribute present is in the ranking set, and 0 otherwise.*

As for the PR19 package exercise, the data was analysed by means of a conditional logit model. Table 27 presents results for both the household and non-household samples. In order to account for possible insensitivity to additional (+2) improvements relative to the +1 level, we estimated a restricted model that pools both packages in addition to an unrestricted model that treats them as distinct.

All models show highly significant and negative coefficient for the -1 (deterioration level) coefficient. All bill coefficients show the right sign (negative) and are significant except in the case of the non-household unrestricted (though a p-value lower than 0.20 indicates that this issue would be resolved with a larger sample size).

Coefficients for the +1 improvement package were positive in both samples, again in line with expectations, with the household coefficient highly significant.

However, only the household unrestricted model returned a positive coefficient for the +2 improvement package while in the non-household model the coefficient was negative. Yet even in the household model, the coefficient was lower than the +1 packaage, suggesting against expectations that the latter is preferred to the former.

The restricted models in both samples address this issue, but at the cost of assuming that there is no additional WTP for the +2 package beyond the WTP for the +1 package (and hence both packages would have the same total WTP relative to the status quo).

Table 27 PR19 Package DCE Models

	Coefficients			
	Household		Non-household	
Variable	Unrestricted	Restricted	Unrestricted	Restricted
Package -1	-2.260***	-2.513***	-1.723***	-2.327***
Package SQ (base)	(omitted)	(omitted)	(omitted)	(omitted)
Package +1	0.771***	-	0.530	-
Package +2	0.300	-	-0.760	-
Package +1 or +2	-	1.009***	-	1.193***
Bill (%)	-0.085***	-0.122***	-0.058	-0.155***
Observations	944	944	200	200
LL	-525.060	-529.320	-102.720	-109.000
Pseudo-R2	0.198	0.191	0.259	0.214

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; * significant at 10%; ** significant at 5%; *** significant at 1%*

We further investigated the issue of apparent aversion to stretch improvements from +1 to +2 by looking at the '+1 vs. +2' scenarios from which one can gauge the added value of the +2 package relative to the +1 package. We suspected that respondents who previously chose the SQ package SQ in the 'SQ vs. +1' scenario would in large part fail to evaluate the +2 package in the following '+1 vs. +2' scenario even if offered at a relatively small premium. We therefore further estimated two '+1 vs. +2' models for each sample: (1) a full-sample model, and (2) a restricted-sample model in which choice data pertaining only to '+1 choosers' in the 'SQ vs. +1' scenario were considered.

Our results showed that in the household sample, the unrestricted model returned a negative coefficient for the +2 package, while this coefficient became positive in the restricted sample model. Both non-household models returned a positive coefficient, yet only in the restricted sample model did this coefficient become significant (at the 10% significance level). This seems to confirm our hypothesis, insofar as there are positive marginal values for the improvement from +1 to +2, but only for a subset of the population.

Table 28 PR19 Package '+1 vs. +2' DCE models

Variable	Coefficients			
	Household		Non-household	
	Unrestricted sample	Restricted sample	Unrestricted sample	Restricted sample
Package C (base)	(omitted)	(omitted)	(omitted)	(omitted)
Package D	-0.527*	0.305	1.469	3.060*
Bill (%)	-0.109**	-0.134**	-0.747*	-0.912**
Observations	236	106	50	24
LL	-124.096	-67.931	-16.435	-8.242
Pseudo-R2	0.241	0.075	0.526	0.505

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

The above results indicate that overall the package models are well-behaved overall for both samples. We derive our WTP/WTA estimates using the restricted models in Table 27 for the +1 and -1 packages, and the restricted sample models in Table 28 for the +1 to +2 service improvement values, weighted by the proportion of respondents eligible for this restricted sample, (ie 106/236 in the case of households, and 24/50 in the case of non-households).

5.4 Willingness to Pay

In terms of the overall WTP for a SQ to +1 improvement, they are presented in Table 29.

Table 29 PR14 and PR19-style Package WTP values (£/customer/year)

Variable	Household		Non-Household
	PR14-style	PR19-style	PR19-style
SQ to +1	£72.34*	£38.13	£124.61
+1 to +2	-	£4.71	£26.07
SQ to -1	-	-£94.96	-£243.06
-1 to +2	£290.08	£137.80	£393.74

** Apportioned from the -1 to +2 WTP using utility changes as weights*

In the case of the household sample, the PR14-style WTP values were generally larger than the PR19-style values. This is partially a result of the fact that the PR14-style survey captured WTP via two separate surveys whereas the PR19-style approach captured WTP for water and sewerage service measures within a single survey. Additionally, the PR14-style survey expressed attribute levels in terms of the chances of service failure which are notoriously difficult to evaluate by respondents and are prone to overvaluation, compared to the PR19-style values which are based on numbers of properties instead. As for the non-household PR19-style WTP values, no issues were noted for the WTP values which seem to be plausible.

6 CONCLUSIONS AND RECOMMENDATIONS

Findings from the cognitive interviews were very encouraging, and provided strong support for the PR19-style approach from a cognitive perspective. The instrument was understandable to customers across all the different ages and social grades included in this phase of work. The few recommendations resulting from the cognitive testing phase were predominantly about the wording of questions and the layout of showcards, rather than SP design. For the main stage, all these minor changes (suggested throughout Section 4) will be made to the questionnaire.

From the pilot surveys, feedback from interviewers supported the use of the PR19-style survey insofar as they found a much better conversion rate from recruitment to completion of the survey, and there were far fewer issues reported with regard to ease of comprehension of the PR19-style materials than the corresponding PR14-style materials. In terms of timing, the PR19-style survey took substantially less time to complete than the PR14-style Water and Sewerage surveys combined. Also, the mean enjoyment experienced while responding to the PR19-style survey was higher than either the Water or Sewage PR14-style survey. There were therefore good reasons to support the continuing use of the PR19-style survey for the main stage. Indeed no difficulties were encountered by respondents regarding the MaxDiff exercise not the Package exercise.

For both the MaxDiff and PR19 Package exercises, we were able to estimate good-fitting and plausible econometric models for households and non-households, and to derive plausible estimates of WTP for service improvements and estimates of willingness to accept (WTA) lower bills for service deteriorations.

Overall, the testing that has been conducted so far on the PR19-style survey instrument is supportive of its use as a replacement to the PR14-style instrument. It has the advantage of being simpler for respondents, it can accommodate more attributes within the same survey, and it is more efficient from a fieldwork perspective in that it is associated with a higher conversion rate from recruitment to completion. We would therefore recommend the use of the PR19-style survey for the main stage.

APPENDIX A

Show Material

About Wessex Water

- Wessex Water is a regional water and sewerage business serving 2.8 million customers across South West England including Dorset, Somerset, Bristol, most of Wiltshire and parts of Gloucestershire and Hampshire.
- We treat and supply 280 million litres of water a day to 1.3 million customers (approximately a tonne of water to every customer weekly.
- We take away and treat 480 million litres of sewage from 2.8 million customers every day.
- We continue to engage on a day to day basis with our customers through a variety of channels. In any one year we talk to around 60,000 customers as part of this routine engagement and their voice does make a difference to the services we offer and the communications we provide.
- We aim to provide our customers with the highest levels of service and give them the best possible experience when dealing with us. We are required by law to maintain certain standards and we aim to go beyond these by offering our customers one of the best overall guarantees in the industry.

Our regulators B

Every aspect of Wessex Water's performance is tightly monitored and regulated. The list below sets out the roles and responsibilities of our Regulators:

Ofwat is our economic regulator. It ensures that the Company provide good quality service at a fair price by: setting price limits; ensuring that it properly carry out our statutory responsibilities; protecting customer standards of service; and encouraging efficiency

The Drinking Water Inspectorate ensures that the Company supply water that is safe to drink and meets standards set out in Water Quality Regulations. It also investigates consumer complaints and incidents that affect, or could affect, drinking water quality.

The Environment Agency (EA) seeks to maintain and improve the quality of 'raw' water in England and Wales, and is responsible for issuing water companies with abstraction licences. The EA is concerned with the quality of fresh surface and underground water, marine and estuarial waters, and strives to prevent/reduce the threat of water contamination.

Consumer Council for Water promotes and represents the interests of our customers in respect of prices, service and value for money. It also investigates customer complaints.

C

Service Measures

- SUPPLY INTERRUPTIONS at your property lasting an average of 6 hours
- NON-IDEAL TASTE AND SMELL OF YOUR TAP WATER for a few days
- DISCOLOURED WATER at your property for a few hours
- LONG-LASTING SUPPLY STOPPAGE lasting more than 2 weeks
- PERSISTENT LOW WATER PRESSURE at your property
- POOR RESPONSE TIME TO FIX A LEAKING WATER MAIN PIPE near your property
- HOSEPIPE BAN in your area from May to September (5 months)
- RESTRICTION ON ESSENTIAL WATER USE lasting 2 months
- RESTRICTED TOILET USE DUE TO OVERLOADED SEWERS
- SEWER FLOODING INSIDE YOUR PROPERTY
- SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY
- SEWER FLOODING IN A PUBLIC AREA
- POLLUTION INCIDENTS resulting from overflows within the sewerage network
- POOR BATHING WATER QUALITY
- POOR RIVER WATER QUALITY
- POOR RIVER WATER FLOW LEVELS making it less suitable for activities such as fishing

D1

Supply Interruptions (lasting an average of 6 hours)

Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent.

The water supply at your property can be interrupted due to burst pipes, which can happen at any time, or due to planned maintenance, in which case you would be given at least 48 hours' notice.

Interruptions last an average of 6 hours when they occur.

Currently the number of properties affected by this in the Wessex Water area in any year is around 9,000 (1.5% of total) for unexpected interruptions and 15,000 (2.5% of total) for planned interruptions. That's out of a total of 590,000 water properties.

D2

Non-Ideal Taste and Smell of Your Tap Water

Water taste and smell can be less than ideal at your property for a few days at a time because of dissolved minerals and gases, but the water is safe to drink.

1,500 properties are affected by this in the Wessex Water area in any year out of 590,000 water properties (that's 0.25% of the total or 1 in every 400 properties).

D3

Discoloured Water

On rare occasions, your water may be discoloured because of harmless deposits that accumulate over time in water mains, but the water is safe to drink.

We wouldn't expect anyone to drink it when it looks unpleasant. Your water would look like the water below:

Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time.

Currently 6,500 properties (1.1% of total) in the Wessex Water area are affected by this in any year out of 590,000 water properties.

D4

Long-lasting Supply Stoppage

A long-lasting stoppage to the water supply at your property lasting for more than 2 weeks.

Currently there is a 1 in 10 risk that this happens to a property in the Wessex Water area in any year.

An alternative way of explaining this is that there is a 93% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.

D5

Persistent Low Water Pressure

Low water pressure means it takes longer to fill the bath or kettle than you would like, and may affect how well a combi boiler works.

Persistent means the property is affected every day, though the problem may come and go during the day.

It is usually caused by the age, condition and size of the water company's pipes. Properties at the tops of hills and the end of lines are most at risk.

If you don't currently suffer, or have never suffered from persistent low water pressure, then your property is not at risk.

Currently 150 out of 590,000 water properties suffer from persistent low water pressure in the Wessex Water area in any year (that's 0.02% of the total or 1 in every 5,000 properties).

D6

Response Time to Fix a Leaking Water Main Pipe Near Your Property

Sometimes there can be leaks in water mains pipes. Wessex Water aims to get these fixed promptly.

Wessex Water measures its performance by showing the percentage of mains leaks that they respond to by fixing them within a day of their happening.

Currently 90% of mains leaks are fixed within a day in the Wessex Water area in any year.

D7

Hosepipe Bans

As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months).

For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.

Currently there is a 1 in 100 risk that this happens to a property in the Wessex Water area in any year.

An alternative way of explaining this is that there is a 22% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.

D8

Restrictions on Essential Use of Water

As an emergency measure in the event of a severe drought, Wessex Water can impose a restriction on essential use of water at your property lasting 2 months.

This could involve providing a water supply which was available every other day for a few hours a day at a reduced pressure. This would be likely to cause the water to be discoloured and the quality of the water might be compromised.

If this occurred, Wessex Water anticipate that they would provide an alternative source of water for drinking, such as bottled water or drinking water standpipes at selected locations.

Currently there is a 1 in 200 risk that this happens to a property in the Wessex Water area in any year.

An alternative way of explaining this is that there is a 12% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.

D9

Restricted Toilet Use Due to Overloaded Sewers

Sometimes, customers can experience loss of toilet facilities resulting from sewer blockage and/or collapse.

Currently 1,410 properties are affected by this in any year in the Wessex Water area out of 1,200,000 sewerage properties (that's 0.12% of total or 12 in every 10,000 properties).

D10

Sewer Flooding Inside Customers' Properties

Flooding from the sewer gets inside properties, causing damage to property and possible illness.

The effects of internal sewer flooding include a foul smell, floors and walls would need to be sanitised, flooring and carpets would need replacing and some people may develop diarrhoea, vomiting or skin infections.

Currently 180 properties are affected by this in any year in the Wessex Water area out of 1,200,000 sewerage properties (that's **0.02%** of total or 1 in every 5,000 properties).




D10.1

Sewer Flooding Outside Customers' Properties

Flooding from the sewer gets close to other people's properties, or gets into their gardens.

Currently around 2,186 properties are affected by this in any year in the Wessex Water area out of 1,200,000 sewerage properties (that's **0.2%** of total or 1 in every 500 properties).



D10.2

Sewer Flooding in Public Areas

Flooding from the sewer gets into public places like parks, footpaths and roads in your area.

Currently around 1,517 properties are affected by this in any year in the Wessex Water area (that's 0.1% of total or 1 in every 1,000 properties).

D11

Pollution Incidents

Overflows within the public sewerage network can occasionally impact on river and bathing water quality.

There are currently around 264 overflows. The majority do not impact on the environment but a few happen frequently, on average every 10 days.

D12

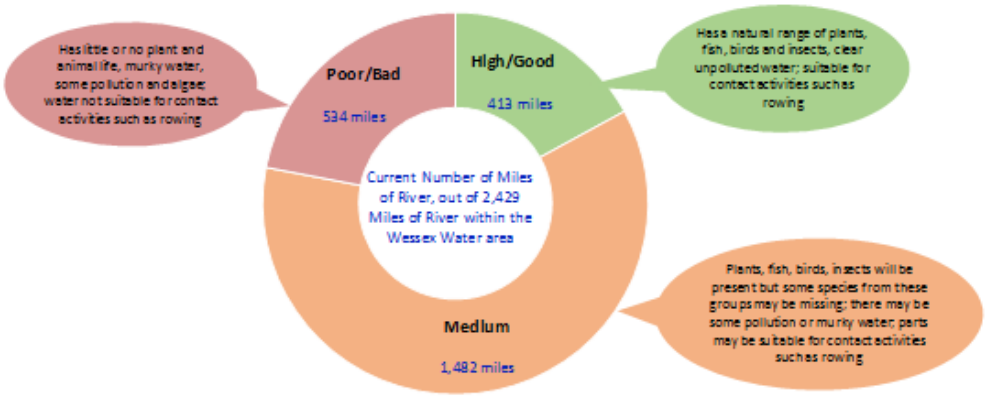
Bathing Water Quality

The cleanliness and quality of coastal bathing water and beaches in your area is classified as:

D13

River Water Quality

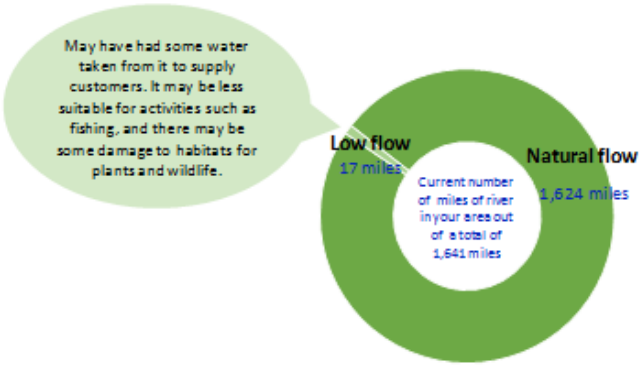
The quality of river water in your area is classified as:



D14

River Water Flow Levels

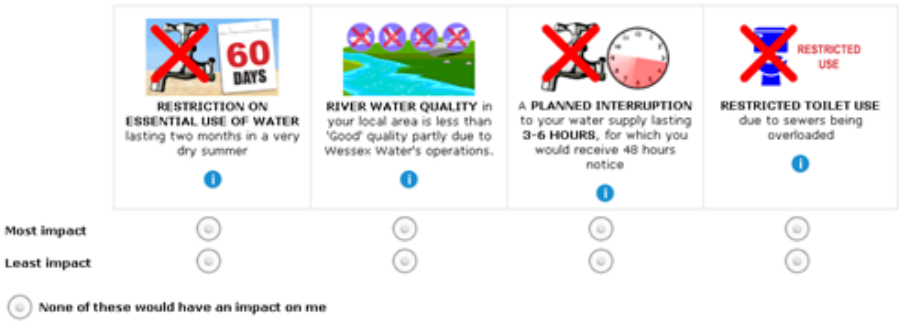
The flow rates of rivers in the Wessex Water area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified as:



X1

Instructions for the first choice exercise

For the next ten questions you will be shown four service failures which will be presented like the example shown below:



For each set of options, we would like you to select **one** service failure that would have the **most impact** and **one** service failure that would have the **least impact** on you.

E1

Instructions for the second choice exercise

Wessex Water can invest your money to improve service levels across all service areas. Alternatively, by spending less in some areas, Wessex Water will be able to spend more in others, or reduce bills.

The next four questions will each ask you to choose between different service levels. The aim of this exercise is to encourage you to consider your preferences carefully and decide which option is best for you. You may not like all the parts of an option but please decide overall which one you would prefer.

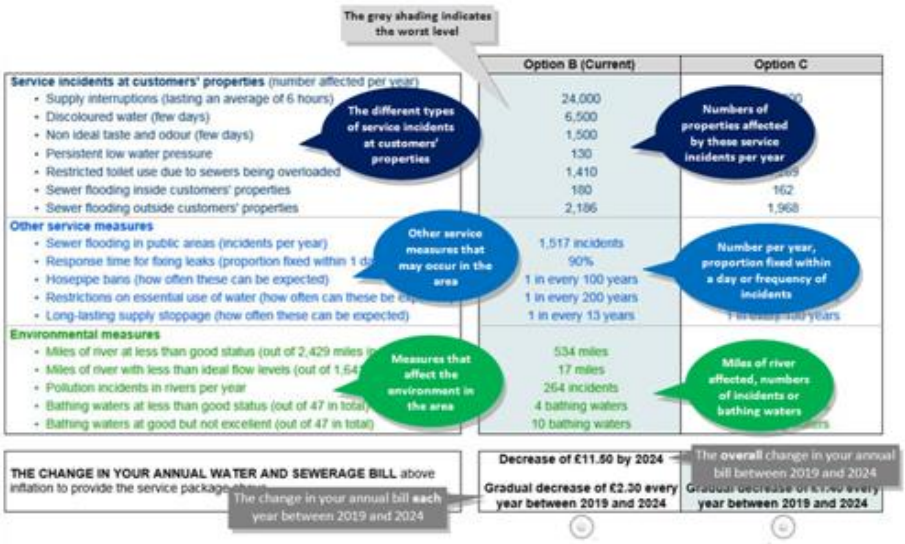
There are 17 different service areas in total grouped into the following three categories:

1. Service incidents at customers' properties
2. Other service measures
3. Environmental measures

In addition we will show the associated change in your organisation's annual water bill. The next show card shows the format the options will be presented in.

E2

Instructions for the second choice exercise

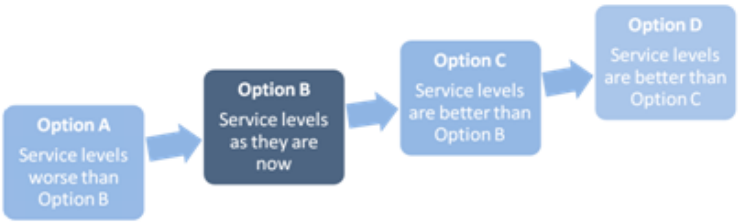


E3

Instructions for the second choice exercise

The previous example shows two options: B and C. There are four different options in total but you will only be asked to choose between two options at a time.

In each option the level of service you receive will differ as outlined in the diagram below:



- In **Option B** your bill may be the **same, lower or higher** than the current bill that you pay
- In **Option A** your bill would be **lower** than in Option B.
- In **Option C** your bill would be **higher** than in Option B.
- Finally, in **Option D** your bill would be **higher** than in Option C.

E4

Instructions for the second choice exercise

Sometimes a Package may say "NO CHANGE" in the bill, but still include a change in the service levels.

When making your choices between the different service packages please bear in mind the following:

• that your bill would also increase by the rate of inflation each year;

• that any money you would pay for better service levels here will not be available for you to spend on other things; and

• that the new bill level will gradually adjust over five years and stay the same after that. To maintain the service levels, your Wessex Water bill will not drop back to the level it was prior to changes in service levels.

Q

Additional Valuation Question

Currently around 10,000 properties in the Wessex Water region (particularly west Somerset and west Dorset) have private water supplies, and the quality of private supplies may be much worse than public supplies. Some of these private supplies feed tourist facilities e.g. cafes, bed & breakfasts used by the general public.

There is the potential to connect some of these properties to the mains water network in order to improve their water supplies. However, this will require investment that will lead to an increase in all customers' bills.

If Wessex Water were to make the investment required to connect 1,000 of these properties, your bill would increase by £1.80 each year for 5 years. This would be in addition to bill increases due to the other improvements Wessex Water could make, which we have asked about previously.

Do you think Wessex Water should make this investment or not make this investment?

For household customers only:

R

Highest Level of Qualifications

1. No qualifications	
2. Level 1	1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills
3. Level 2	5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma
4. Apprenticeship	
5. Level 3	2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3, Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma
6. Level 4 and above	Degree (e.g. BA, BSc), Higher Degree (e.g. MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (e.g. teaching, nursing, accountancy)
7. Other qualifications	Vocational/Work-related Qualifications, Foreign Qualifications

For household customers only:

S

Wessex Water 'Have Your Say'

Wessex Water likes to hear what their customers think of their service. They have been running an online customer panel called Wessex Water 'Have Your Say' for nearly 4 years and have over 2,000 members. They would now like to invite you to join their panel. As a panel member you will be asked to take part in a short survey roughly every 3 months.

The surveys are about Wessex Water and things that matter to you as customers. The information is used to help Wessex Water provide you with a better service now and in the future.

If you want to find out more, visit www.wessexwater.co.uk/haveyoursay

If you sign up, you are under no obligation and can leave the panel at any time.

Wessex Water

PR19 Willingness-To-Pay Research
Pilot Report (Version 4)

Review by

Ken Willis,
Newcastle University

18th April 2017

Comments

The purpose of this initial research and pilot survey is to

- Pre-test the survey instrument, in terms of the customers' ability to understand the questionnaire and show card material, and respond to the questions;
- Test the survey instrument in terms of how well the choice experiment method works; and assess the likely accuracy and reliability of estimates produced.

Research Methodology

'Accent and PMJ Economics' have followed good practice in testing the survey instrument, by conducting cognitive testing in terms of depth interviews, with household and non-household customers in the PR19 maxdiff survey. These interviews tested customers' understanding of the information presented, and how well the customer was able to respond to survey questions.

The pilot survey tests two methods to estimate customer's preferences and willingness-to-Pay (WTP) for changes in water supply, water quality, sewerage, and environmental service attributes, namely a stated discrete choice experiment (DCE) as previously used in PR14 and a more innovative MaxDiff methodology proposed for PR19.

DCE assume that each attribute (service measure) is important to customers, who can make trade-offs between these attributes. However, some attributes may be unimportant to some respondents; and these attributes may be disregarded or discounted by the respondent in the DCE, which in turn affects the DCE estimates. Economists have devoted a considerable amount of effort to developing models to allow for attribute non-attendance to account for these unimportant or discounted attributes. MaxDiff methodology circumvents this DCE attribute non-attendance issue by allowing customers to indicate which attributes are more important and which are of lesser importance in their preference ranking. Thus, in principle, MaxDiff ought to result in more meaningful preference expressions and values, and hence produce more robust and reliable estimates of WTP vales for each service measure.

The PR14 style exercise comprises two discrete choice experiments plus a package DCE, for both water supply and sewerage attributes. The pilot survey comprised a sample of 206 households who received the water supply choice experiments; and 205 households who received the sewerage choice experiments. These sample sizes are more than adequate for a pilot survey to test the methodology, questionnaire, and survey instrument. Each respondent answered 15 choice cards: 5 choice cards in each of two water supply DCEs and 5 choice cards in the package DCE. This will provide a sufficient number of observations without encountering respondent fatigue.

The only concern about the PR14 style exercise is the possibility of part-whole bias arising in the WTP estimates. This would occur, for example, if respondent A was willing to pay 10% bill increase for water supply attributes moving to level +1, and respondent B was willing to pay 10% bill increase for sewerage attributes moving to level +1, but neither respondent A or respondent B was willing to pay a 20% bill increase for both water supply and sewerage attributes to move to level +1. This possibility purely arises because of the separation of the DCEs into water supply and sewerage exercises instead of combining all attributes into one exercise.

In the PR19 maxdiff exercise each respondent completed 10 maxdiff choice cards, plus a package experiment of 4 options (option A decrease in all service measures; option B current situation; option C increase in all service measures to level +1; option D increase in all service measures to level +2). The pilot sample of 241 households is adequate to test the PR19 maxdiff methodology and survey instrument. It is commendable that Accent included 5 face to face interviews with households unlikely to respond to telephone or on-line surveys. It is important to sample this Wessex customer segment. The PR19 maxdiff pilot also sampled 50 non-household customers. The non-household pilot sample provided a reasonable coverage of business customers across a range of industry categories, and in terms of amount of water usage, and number of employees.

Three possible issues with the maxdiff DCE approach, as specified in the Pilot Report (Version 4) are tied choices, dominated choice sets, and customers being forced to choose between attribute changes across all services measures in the package experiment.

Figure 5 of the Pilot Report (version 4) shows restriction on essential water use as having the most important impact, and river water quality as having the least impact, on the respondent. This implies that a planned interruption of 3 to 6 hours and restricted toilet use have equal impacts on the customer, and the impact of these would lie between restriction on essential water use and river water quality. Some customers may not regard a planned interruption of 3 to 6 hours and restricted toilet use as having equal impacts.

The example provided in Figure 6 of the Pilot Report (version 4) is a dominated choice set: option C is an improvement on option B (current situation) across all attributes and at a lower bill cost per household. Presumably dominated choice sets ought to be removed from the experimental design.

The package experiment does not permit customers to express preferences for service measures changes between customers' properties, other service measures, and environmental measures. For example, some customers might prefer an improvement in service measures at the customer's property and an improvement in other service measures, but would be happy to see environmental service measures maintained at their current level.

It is difficult to know to what extent these issues will affect the econometric results and the WTP values.

Cognitive Depth Interviews

Five depth interviews is about the minimum acceptable number cognitive depth interviews to derive useful information on household customers' understanding of the tasks required in the questionnaire. An additional five depth interviews were used to explore non-household understanding of the tasks required by the maxdiff methodology

Some sensible suggestions for improvements to wording on the questionnaire and to the presentation of information were derived. But generally the survey instrument seemed to work well; and the small number of depth interviews subsequently proved to be justified given the credible results obtained from the econometric modelling of the pilot data.

Pilot Survey Results

The PR14 style DCE models worked reasonably well, but as the Report states one would have expected more service measures in the water supply model (other than supply stoppage and bill change) to be statistically significant in Exercise 1 (Table 13) given the pilot sample size. Exercise 2 worked best, with a better model goodness-of-fit (pseudo R^2) and more service measures being statistically significant. I would agree with PJM Economics that the problem in Exercise 1 might lie in the range of the attribute levels.

The PR19 maxdiff model worked well, with all the service measures, apart from two, being statistically significant in the household customer model (Table 19). And the vast majority of the service measures were also statistically significant in the non-household model despite many fewer observations because of the smaller non-household pilot sample size.

The goodness-of-fit for the PR19 package DCE is a particularly good, although there is the issue of identifying customers' preference for the package of level +2 service measure improvements. It seems entirely reasonable that as service measures improve from the current situation (SQ) to level +1, and from level +1 to level +2, fewer customers will have a preference for the improvement. That is, the proportion of customers demanding an improvement in service measures and WTP will decrease with increasing improvement in service measures.

Willingness-to-Pay

In experiments with market goods which can be bought, stated preference (SP) surveys tend to over-estimate WTP compared actual payments or donations. Economists therefore tend

to urge discretion and use of the most conservative estimates of WTP in valuing non-market goods. The PR19 style maxdiff estimates of WTP (Table 22) provide the more conservative estimates of WTP compared to PR14 style estimates for service improvements from the current situation (SQ) to level +1 to and from level -1 to level +1. The PR19 WTP values also conform to *a priori* economic theoretical expectations, that WTP for an improvement from level +1 to level +2 should be less than WTP for an improvement from SQ to level +1. This may be because the PR19 maxdiff is less prone to part-whole bias than the PR14 style DCE.

The fact that the PR19 maxdiff econometric models provide a better fit to the data than the PR14 style DCE models, with more service measures being statistically significant, suggests that the PR19 maxdiff approach should be used for the main survey.

Conclusion

The research by Accent & PMJ Economics in terms of cognitive interviews, methodological approach, and pilot survey, and econometric analysis of the pilot data is commendable. Wessex Water can be assured of the pilot research study has been meticulously and skilfully developed.

The PR19 Willingness to Pay Research Pilot Report (Version 4) report by Accent & PMJ Economics rightly concludes that the PR19-style maxdiff approach should be adopted for the main survey, based in cognitive feedback, ease of comprehension of the survey materials, and the econometric results.

Overall, Wessex Water can be assured that the pilot survey worked well. Wessex Water can be confident in moving onto the main surveys for both household and non-household customers. There is every expectation that applying the pilot questionnaire and show card material, proposed by Accent & PJM Economics, to the main survey will deliver accurate, reliable, and robust estimates of customers' preferences and WTP value for water service improvements.

Annex

13th March 2017

Derivation of Willingness-To-Pay Values from Stated Preference Research:
A note by PJM Economics & Accent

A comment

PJM Economics & Accent outline how WTP values are derived from the PR14 style and PR19 maxdiff methodologies. The method used to derive WTP values from the PR14 style econometric analysis has been employed in other studies. It is an established and proven

approach. It essentially derives WTP values from the package DCE for changes in all service measures, and apportions these by the utility of each service measure change as estimated in each of the lower level DCEs. The WTP values for a change from SQ to level +1 were calculated as the ratio of the service level change from (SQ to Level +1) / the service measure change level -1 to level +2).

The only other way of calculating the WTP values for each service measure would have been to use the coefficient values for each service measure in the lower level exercises (water exercise 1, water exercise 2, sewerage exercise 1, and sewerage exercise 2) and the bill change coefficients in each of these exercises. But such an approach would, most likely, lead to an over-estimate of the true WTP because of the part-whole bias issue.

An Appendix – Example of SQ to +1 Derivation For Any Given Attribute in the PR19 Style Survey provides an easy to follow numerical calculation of WTP for a particular attribute ('main leaks fixed within a day'). Thus the derivation of the WTP values for each attribute indicated in Table 6 [of *Derivation of Willingness-To-Pay Values from Stated Preference Research: A note by PJM Economics & Accent*] can be easily understood.

An issue with the PR19 maxdiff WTP calculations is the assumptions in the calculation of the number of maxdiff units per package unit. Presumably some service measures such as the number of properties affected by the average leak, can estimated from Wessex Water company data. But the precision of other assumptions, such as 1% of bathing waters assumed to be local to 1% of properties, might be more questionable and more difficult to establish with any degree of certainty.

The scaling should not affect the total values. Since the total value for the move from SQ to Level +1 is set in the package exercise. What the scaling does is it essentially distributes these values across the attributes as I understand it. So altering the scaling factors will alter the relative value of one service measure viz a viz another.

The PR19 WTP value (£38.13) for the change from SQ to level +1 across all attributes looks reasonable amount that customers would be willing to pay. It is significantly different from the PR14 style total value for this change (£72.34), and the WTP values for many of the individual service measures are also significantly different between the PR14 style and PR19 maxdiff approaches. There is an argument for adopting the more conservative of the two estimates, especially if the cost of implementing the service measure improvements from SQ to level +1 are less than the lower amount.

SYSTEM INFORMATION:
Interviewer number
Interviewer name
Date:
Time interview started:

Introduction

CAPI: GO TO MAIN QUESTIONNAIRE

ONLINE: Thank you very much for agreeing to complete this online survey which is being conducted by Accent on behalf of Wessex Water. The closing date for completion of this survey is **xxx**.

Wessex Water, the company that supplies water and looks after the sewerage in your area, wants to talk to customers about options for water and sewerage services from 2019 to 2024, and the impact on their bills.

The research is being conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm Accent's credentials please call the MRS free on 0500 396999.

The questionnaire will take about 20 minutes to complete.

You do not have to answer questions you do not wish to and you can terminate the interview at any point. For convenience you can stop and return to complete the questionnaire as many times as you wish, although once submitted you will not be able to enter again.

IF MOBILE DEVICE SHOW: This survey is best undertaken on a tablet or a PC. If you do use a smartphone you can switch between desktop mode and mobile mode at any time by clicking the button at the bottom of the screen.

Please use the [DP ADD IMAGE OF FORWARD BUTTON BUT MAKE A BIT SMALLER THAN ORIGINAL] at the bottom of the page to go forward. As soon as you do this your answer is saved.

If you need to go back, please use the [DP ADD IMAGE OF BACK BUTTON BUT MAKE A BIT SMALLER THAN ORIGINAL] button.

If you leave the survey idle for 30 minutes, you will be logged out but don't worry, you can go straight back to the point you left off by clicking on the link in the email we sent you.

We will first ask you a few questions to check that you are eligible to take part in this research.

Scoping questions

Q1. **ONLINE:** Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)? **Please click on one of the answers below.**

1. Yes **THANK & CLOSE**
2. No

Q2. **ONLINE:** Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?

1. Yes
2. No **THANK & CLOSE**

Q3. **ONLINE:** Does your property have a septic tank or cesspit?

If you do have one, this would mean that your property is not connected to the main sewer and you would periodically arrange to have the septic tank emptied.

1. Yes
2. No
3. Don't know

Q4. **ONLINE:** We need to check that we are speaking to residents in specific parts of the Wessex Water area. Please can you tell us the first part of your postcode? For example, if your full postcode is BS2 2EN, please just tell us the first part ie BS2.

Please click on the dropdown menu below and select the letters in the first part of the postcode. Then click on the box and type in the number(s) from the first part of your postcode.

DP: please create drop down look up for postcode check using postcodes shown in column A sheet '3031lookupclient' of ..\DP\PR19\Domestic\Cogs\3031 postcode lookup from client (DP).xlsx. Do not create box for 2nd half of postcode.

Prefer not to answer	**THANK AND CLOSE – NOT WITH ANY OTHER CODE**
None of the above letter combinations	**THANK AND CLOSE – NOT WITH ANY OTHER CODE**

Q4a **ONLINE:** Just to check, this makes your postcode **[DP: insert drop down PC area and PC district from Q4].** Is this correct?

1. Yes
2. No, I would like to go back to the previous question and amend **GO BACK TO Q4**

CHECK QUOTA.

Q5. **ONLINE: ASK IF CONFIRMED POSTCODE MATCHES LOOK UP:** According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?

1. Yes
2. No
3. Don't know **THANK & CLOSE**

Q5a **ONLINE: ASK IF CONFIRMED POSTCODE DOES NOT MATCH LOOK UP:** Who supplies your water and sewerage services?

1. Wessex Water supplies both my water and sewerage services
2. Wessex Water supplies sewerage only, another company supplies my water – **THANK AND CLOSE**
3. Wessex Water supplies my water services only, another company supplies my sewerage
4. Other supplier for both water and sewerage service– **THANK AND CLOSE**
5. Don't know **THANK AND CLOSE**

Q6. **ONLINE:** Which of the following best describes your household?

1.	Owner Occupier (with or without mortgage)	HOMEOWNER
2.	Shared Ownership or Keyworker	HOMEOWNER
3.	Private Rented	TENANT
4.	Social Housing rented (Council Housing, Housing Association or similar)	TENANT
5.	Prefer not to say	

Q7. **ONLINE: IF Q6=3 OR 4 (TENANT) ASK, OTHERS GO TO Q8:** Is your water and sewerage bill included in your rental payment, or do you pay directly to Wessex Water?

1. Included in rent **THANK & CLOSE**
2. Pay directly to Wessex Water
3. Don't know **THANK & CLOSE**

Q8. **ONLINE:** Do you currently have any on-going complaints or issues with Wessex Water?

1. Yes
2. No **GO TO Q9**

Q8a **ONLINE:** What is the nature of your complaint?

Please write in:

Q9. **ONLINE: APPROX. SEG** How would you describe the occupation type of the chief income earner in your household?

1. Senior managerial or professional
2. Intermediate managerial, administrative or professional
3. Supervisor; clerical; junior managerial, administrative or professional
4. Manual worker (with industry qualifications)
5. Manual worker (with no qualifications)
6. Unemployed
7. Retired
8. Student
9. Prefer not to say **SKIP TO SEG**

Q10. **ONLINE: IF Q9=7 (RETIRED), ASK else SKIP** Does the chief income earner have a state pension, a private pension or both?

1. State only
2. Private only
3. Both
4. Prefer not to say **SKIP TO SEG**

Q11. **ONLINE: IF Q10= PRIVATE OR BOTH, ASK else SKIP** How would you describe the chief income earner's occupation type before retirement?

1. Senior managerial or professional
2. Intermediate managerial, administrative or professional
3. Supervisor; clerical; junior managerial, administrative or professional
4. Manual worker (with industry qualifications)
5. Manual worker (with no qualifications)

6. None of these

SEG CODE AS FOLLOWS:

IF **Q9**= 1 or 2; SEG = AB
IF **Q9** = 3 or 4; SEG = C1/C2
IF **Q9**= 5; SEG = DE
IF **Q9**= 6; SEG = DE
IF **Q9**= 8; SEG = C1/C2

IF **Q9** = 7 and **Q10** = State only; SEG = DE

IF **Q9**= 7 and **Q10** = Private only OR Both and **Q11**= 1; SEG = AB
IF **Q9**= 7 and **Q10** = Private only OR Both and **Q11** = 2; SEG = AB
IF **Q9**= 7 and **Q10** = Private only OR Both and **Q11** = 3; SEG = C1/C2
IF **Q9**= 7 and **Q10** = Private only OR Both and **Q11** = 4; SEG = C1/C2
IF **Q9**= 7 and **Q10** = Private only OR Both and **Q11** = 5; SEG = DE
IF **Q9** = 7 and **Q10** = Private only OR Both and **Q11**= 6; SEG = DE

IF **Q9**= 9 OR **Q10**=4; SEG = Not stated

CHECK QUOTAS

Q12. **ONLINE:** What is your age? **Please click on the box below and type your answer**

Prefer not to say

DP: PROGRAMME INTO BANDS

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65-74
7. 75 or older
8. Prefer not to say

CHECK QUOTAS

Q13. **ONLINE:** Are you…

1. Male
2. Female
3. Prefer not to say

CHECK QUOTAS

Q14. **ONLINE:** Do you have a water meter?

1. Yes
2. No
3. Don't Know

Q15. **ONLINE:** How much is your bill from Wessex Water? You can give this as either a weekly, monthly or annual figure, whichever is easier for you. If you do not know exactly, please try and give your best estimate.

1. £ per week
2. £ per month
3. £ per year
4. Don't know

Q15a **ONLINE: Hidden question:** Calculate annual BILL from Q15

£ per year
If DK, code as £462

Main Questionnaire

CAPI: Thank you, I can confirm you are in scope for the survey. As I said previously, we are conducting research for Wessex Water looking at areas you think they should improve on in the future.

Please be assured that any answer you give will be treated in complete confidence in accordance with the Code of Conduct of the UK Market Research Society. You will not be personally identified and we can assure you that this is not a sales exercise.

The questionnaire will take 20-25 minutes, depending on your answers. You do not have to answer questions you do not wish to and you can terminate the interview at any point. If you complete this full interview, I will give you a £5 Boots voucher to thank you for your time.

INTERVIEWER: HAND OVER THE SHOW MATERIAL IF THEY AGREE TO COMPLETE THE SURVEY.

ONLINE: Thank you, you are eligible to take part in this survey.

The questionnaire will take a further 18 minutes to complete, depending on your answers.

You do not have to answer questions you do not wish to and you can terminate the interview at any point. For convenience you can stop and return to complete the questionnaire as many times as you wish, although once submitted you will not be able to enter again.

Background Questions

Q16a **CAPI:** How much is your bill from Wessex Water? You can give this as either a weekly, monthly or annual figure, whichever is easier for you. If you do not know exactly, please try and give your best estimate.

1. £ per week
2. £ per month
3. £ per year

Don't know

Q16b **CAPI: Hidden question:** Calculate annual BILL from 16a**Error! Reference source not found.**

£ per year
If DK, code as £462

Q16c **CAPI:** Do you have a water meter?

1. Yes
2. No
3. Don't Know

Q16d **CAPI:** Do you currently have any on-going complaints or issues with Wessex Water?

1. Yes
2. No **GO TO Q16**

Q16e **CAPI:** What is the nature of your complaint? **RECORD VERBATIM**

Q16. **CAPI/ONLINE:** Do you practice any of the following leisure activities? **ONLINE: Please tick all options that apply to you.**

1. Fishing/angling
2. Swimming/paddling in the sea/rivers
3. Sailing
4. Visiting beaches and/or river banks
5. Surfing
6. None **NOT WITH ANY OTHER CODE**

Q17. **CAPI/ONLINE:** How informed do you feel about the quality of the environment?

1. Very uninformed
2. Uninformed
3. Neither uninformed nor informed
4. Informed
5. Very informed

Q18. **HIDDEN QUESTION** Bill size **[ONLINE INPUT FROM Q15; CAPI: Q16a]**

Q19. **CAPI: IF Q16a=4 (DON'T KNOW):** Currently, the average annual household water and sewerage bill in your area is £462. **ONLINE: IF Q15=4 (DON'T KNOW):** Currently, the average annual household water and sewerage bill in your area is £462.

ELSE: Previously you told me that your bill from Wessex Water is **[ONLINE: INPUT FROM Q15; CAPI: Q16a; please include per week/per month/per year]. IF Q15/Q16a=1 ADD:** This calculates as **[INPUT FROM Q15a/Q16b]** per year. **IF Q15/Q16a=2 ADD:** This calculates as **[INPUT FROM Q15a/Q16b]** per year.

ASK ALL: How do you feel about the amount that you pay Wessex Water for water and sewerage services? Is it**:**

1. Far too little
2. Too little
3. About right

4. Slightly too much
5. Far too much

Community Engagement Activities

CAPI/ONLINE: Aside from providing water and sewerage services, Wessex Water engages in a range of different areas.

CAPI: Please look at Show Card D (Community Engagement Activities). **INTERVIEWER: CHECK THAT RESPONDENT HAS SHOW CARD D IN FRONT OF THEM**

CAPI: This is about various types of activities of which the organisation could do more, and we would like to know how important those are to you. We'll now look at each of these in a little more detail.

ONLINE: The list below shows various types of activities of which the organisation could do more.

If you would like to see more information please click on the '**[DP: INSERT IMAGE OF BUTTON]**' button.

- Helping customers to save water and money
- Reaching out to school children
- Providing more support for customers in financial difficulty
- Increased staff engagement with the local community
- Helping local groups in river management
- Increasing/improving the provision of recreational facilities
- Helping our wider community to value the natural water system
- Reaching out to more vulnerable customers

DP: HOVER BUTTON TEXT FOR EACH SERVICE MEASURE IS SHOWN BELOW:

Helping customers to save water and money: Wessex Water can help its customers save water and money by providing better information on how they can use less water. Wessex Water can do this by means of awareness campaigns, water efficiency advice and by supplying free water meters to its customers.

Reaching out to school children: Wessex Water can reach out to younger generations by increasing the number of talks it does with schoolchildren on water and wastewater services, and providing more educational resources for teachers.

Providing more support for customers in financial difficulty: Wessex Water can increase the amount of support it offers to customers in financial hardship such as low rate tariffs and debt repayment schemes.

Increased staff engagement with the local community: Wessex Water can encourage its staff to get more involved in the local community by allowing them to spend more time in the working week on local community projects and charity activities.

Helping local groups in river management: Wessex Water can encourage river stewardship by working with and involving local customer groups in the management of the waterways near to where they live or work. This could include hosting regular volunteer days improving conditions on river banks, providing

education on river protection, and offering vocational trainings and work placements to help develop river management skills.

Increasing or improving the provision of recreational facilities: Wessex Water can increase the provision of recreational facilities or improve the quality of existing ones such as reservoir visitor centres, sailing sites, fishing sites, cafés, play parks etc.

Helping our wider community to value the natural water system: Wessex Water can help the wider community to value the natural water system by increasing its expenditure on campaigns aimed at raising the awareness of the wider public about water resources and ecosystems through various media (TV, radio, print, social media etc).

Reaching out to more vulnerable customers: Wessex Water can attend or hold more events in the local community to reach out to customers who are more vulnerable (including senior citizens and those in financial hardship).

[NEXT SCREEN]

CAPI: First, please turn to Show Card D1 "**Helping customers to save water and money.**" Please take a moment to read through this.

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Now look at Show Card D2 "**Reaching out to school children.**" Again, please take a moment to read this information.

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Now turn to Show Card D3 "**Providing more support for customers in financial difficulty.**" This tells you about how Wessex Water can provide support to customers in financial hardship.

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Next, show Card D4 shows "**Increased staff engagement with the local community.**" Again, please let me know once you've read through this.

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Now please turn to Show Card D5 which tells you about how Wessex Water can help local groups in river management.

IF NECESSARY: it is labelled "**Helping local groups in river management.**"

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: On the next page you will find Show Card D6 "**Increasing or improving the provision of recreational facilities**"

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Please now read the information on Show Card D7 "**Helping our wider community to value the natural water system**"

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: And finally, Show Card D8 describes how Wessex Water can reach out to its vulnerable customers.

IF NECESSARY: it is labelled **"Reaching out to more vulnerable customers"**

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

Q20. **CAPI:** On the next page, you will find Showcard D which we looked at before. Which of these service areas, if any, would you most like to see improved in the future? **ONLINE:** Of all the service areas you have just read about, which, if any, would you most like to see improved in the future? **DP: ADD HOVER BUTTONS**

INTERVIEWER: FOR EACH ACTIVITY, THERE IS A HOVER BUTTON WITH A BRIEF DESCRIPTION. IF A PARTICIPANT HAS ANY QUESTIONS OR IS UNSURE ABOUT WHAT ANY OF THE ACTIVITIES REFER TO, PLEASE USE THESE TO EXPLAIN.

1. Helping customers to save water and money
2. Reaching out to school children
3. Providing more support for customers in financial difficulty
4. Increased staff engagement with the local community
5. Helping local groups in river management
6. Increasing/improving the provision of recreational facilities
7. Helping our wider community to value the natural water system
8. Reaching out to more vulnerable customers
9. None **CAPI: DO NOT READ**
10. Don't know/not sure **CAPI: DO NOT READ**

Community Engagement

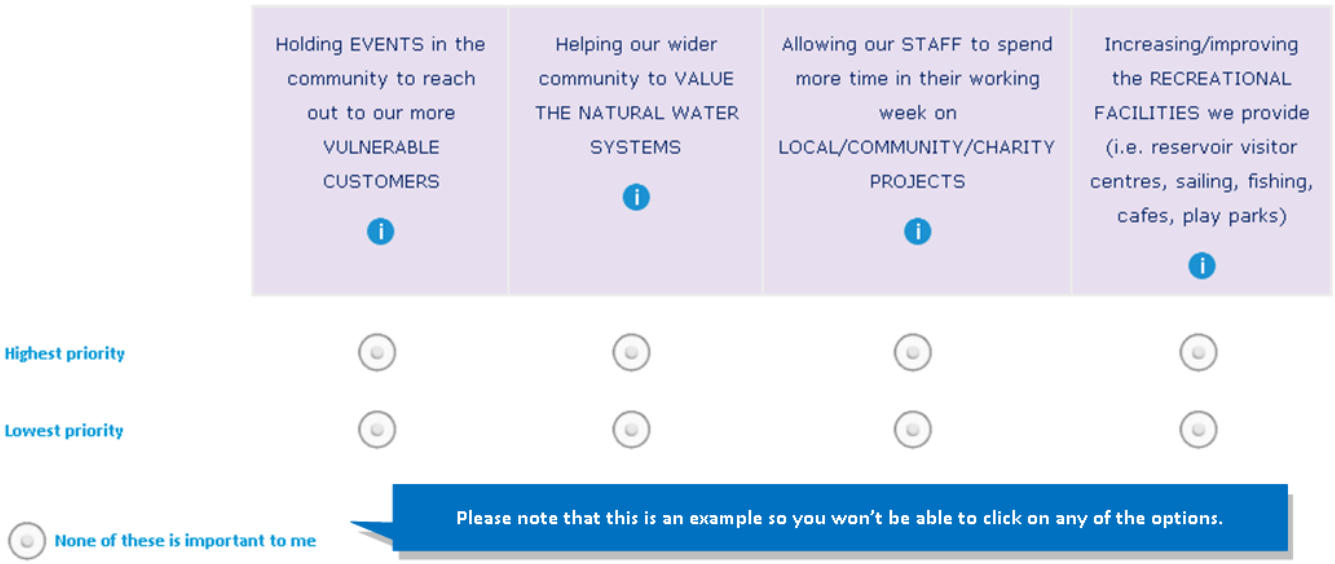
CAPI: The next six questions will include four community activities we just spoke about. Please now turn to Show Card E, labelled "Instructions for the first choice exercise". This shows an example of how these questions will be presented.

CAPI: For each set of activities, I would like you to select **one** activity that you would like to have the **highest priority** and **one** that you would like to have the **lowest priority**.

CAPI: INTERVIEWER: USE HOVER BUTTONS IF A PARTICIPANT HAS ANY QUESTIONS OR IS UNSURE ABOUT WHAT ANY OF THE ACTIVITIES REFER TO.

CAPI: INTERVIEWER: FOR THE NEXT TEN QUESTIONS, SHOW PARTICIPANTS THE CHOICE SETS ON SCREEN.

ONLINE: The next six questions will include a set of four community activities you have just read about. These will be presented like the example shown below:



ONLINE: For each set of activities, we would like you to select **one** activity that you would like to have the **highest priority** and **one** that you would like to have the **lowest priority**.

ONLINE: If you would like to see more information please click on the '**[DP: INSERT IMAGE OF BUTTON]**' button.

DP: ADD HOVER BUTTONS IN EACH MAXDIFF CHOICE SET

Q21. Max/diff 1

CAPI/ONLINE: Which of these customer engagement activities would you like to have the highest priority and which would you like to have the lowest priority?

Q22. Max/diff 2

CAPI/ONLINE: Which of these customer engagement activities would you like to have the highest priority and which would you like to have the lowest priority?

Q23. Max/diff 3

CAPI/ONLINE: Which of these customer engagement activities would you like to have the highest priority and which would you like to have the lowest priority?

Q24. Max/diff 4

CAPI/ONLINE: Which of these customer engagement activities would you like to have the highest priority and which would you like to have the lowest priority?

Q25. Max/diff 5

CAPI/ONLINE: Which of these customer engagement activities would you like to have the highest priority and which would you like to have the lowest priority?

Q26. Max/diff 6

CAPI/ONLINE: Which of these customer engagement activities would you like to have the highest priority and which would you like to have the lowest priority?

[**CAPI:** I; **ONLINE:** We] would now like to ask you about the choices you have just made.

Q27. **CAPI/ONLINE:** Did you generally feel able to make comparisons between the options presented to you?

Yes **GO TO NEXT SECTION**
No

Q28. **CAPI/ONLINE:** Why weren't you able to make the comparisons in the choices? **CAPI:** RECORD VERBATIM

Water Resources

CAPI/ONLINE: We will now [**CAPI:** talk about; **ONLINE:** look at] water resources and how Wessex Water can balance water supplies with water demands to protect the environment. This includes any investments that might be required in order to make improvements to the availability of water.

CAPI: Please look at Show Card W (Water Resources). **INTERVIEWER: CHECK THAT RESPONDENT HAS SHOW CARD W IN FRONT OF THEM**

CAPI: This is about various aspects of water resource management. We would then like you to consider which areas you would like to see improvements in. As before, we'll now look at each of these in a little more detail.

ONLINE: The list below shows various aspects of water resource management. We would then like you to consider which areas you would like to see improvements in. As before, if you would like to see more information please click on the '**[DP INSERT IMAGE OF BUTTON]**' button.

- Water leakage
- Water conservation devices
- New water meters fitted
- New smart meters fitted
- River water flow levels
- Hosepipe bans

[NEXT SCREEN]

DP: HOVER BUTTON TEXT FOR EACH SERVICE MEASURE IS SHOWN BELOW:

Water leakage: Wessex Water can undertake infrastructural works to reduce the extent of leakage from water mains.

Water conservation devices: Wessex Water can provide water conservation devices to more of its customers. Such devices include high-efficiency kitchen and bath aerators which are more water efficient. By mixing the water with air, they control the amount of water that flows through the tap without affecting the water pressure. Wessex Water could also provide high-efficiency shower heads which affect water consumption by controlling the flow and spray pattern of the water.

New water meters fitted: Wessex Water can fit water meters to more unmetered properties.

New smart meters fitted: Wessex Water can fit smart meters to properties that can digitally send meter readings to the company. This can ensure more accurate water bills. Smart meters also come with in home monitors, so you can better understand your water usage.

River water flow levels: The flow rates of rivers in the Wessex Water area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified either as having 'natural flow' or 'low flow'. A river with 'low flow' may have had some water taken from it to supply customers. It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife.

Hosepipe bans: As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water your garden or clean your car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.

CAPI: First, please look at Show Card W1 "**Water Leakage**". Take a moment to read this information.

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Now please turn to Show Card W2 which tells you about the different water conservation devices Wessex Water can provide its customers. Again, please let me know once you've finished reading this.

IF NECESSARY: It is labelled "**Water Conservation Devices**".

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Next, Show Card W3 tells you about water meters.

IF NECESSARY: It is labelled "**New Water Meters Fitted**".

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: On the next page, you will find Show Card W4 which is about smart meters.

IF NECESSARY: It is labelled **"New Smart Meters Fitted".**

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: Now look at Show Card W5 which shows how rivers are classified in terms of their flow rates, and how many miles of river currently fall into each category.

IF NECESSARY: It is labelled "**River Water Flow Levels**".

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

CAPI: And finally, Show Card W6 tells you about hosepipe bans.

IF NECESSARY: It is labelled **"Hosepipe Bans".**

INTERVIEWER: CHECK IF PARTICIPANT NEEDS MORE TIME BEFORE PROCEEDING.

Q29. **CAPI:** On the next page, you will find Showcard D which we looked at before. Which of these community engagement activities, if any, would you most like Wessex Water to do more of in the future? **ONLINE:** Of all the community engagement activities you have just read about, which, if any, would you most like Wessex Water to do more of in the future? **DP: ADD HOVER BUTTONS**

Please tick all options that apply to you

1. Water leakage
2. Water conservation devices
3. New water meters fitted
4. New smart meters fitted
5. River water flow levels
6. Risk of hosepipe bans
7. None **NOT WITH ANY OTHER CODE CAPI: DO NOT READ**
8. Don't know/not sure **NOT WITH ANY OTHER CODE CAPI: DO NOT READ**

Q54a What impact would a hosepipe ban have on you?

1. No impact
2. Some impact
3. High impact

Water Resources

CAPI: In the next exercise I would like you to consider the aspects of water resource management that we have just looked at. Please look at Show Card X1, labeled "Instructions for the second choice exercise". This explains the next exercise, and the choices you will be asked to make. I will go through these with you now.

ONLINE: In the next exercise we would like you to consider the aspects of water resource management that you have just read about.

CAPI/ONLINE: Wessex Water can invest your money to improve service levels across all the areas shown. Alternatively, by spending less in some areas, Wessex Water will be able to spend more in others, or reduce bills.

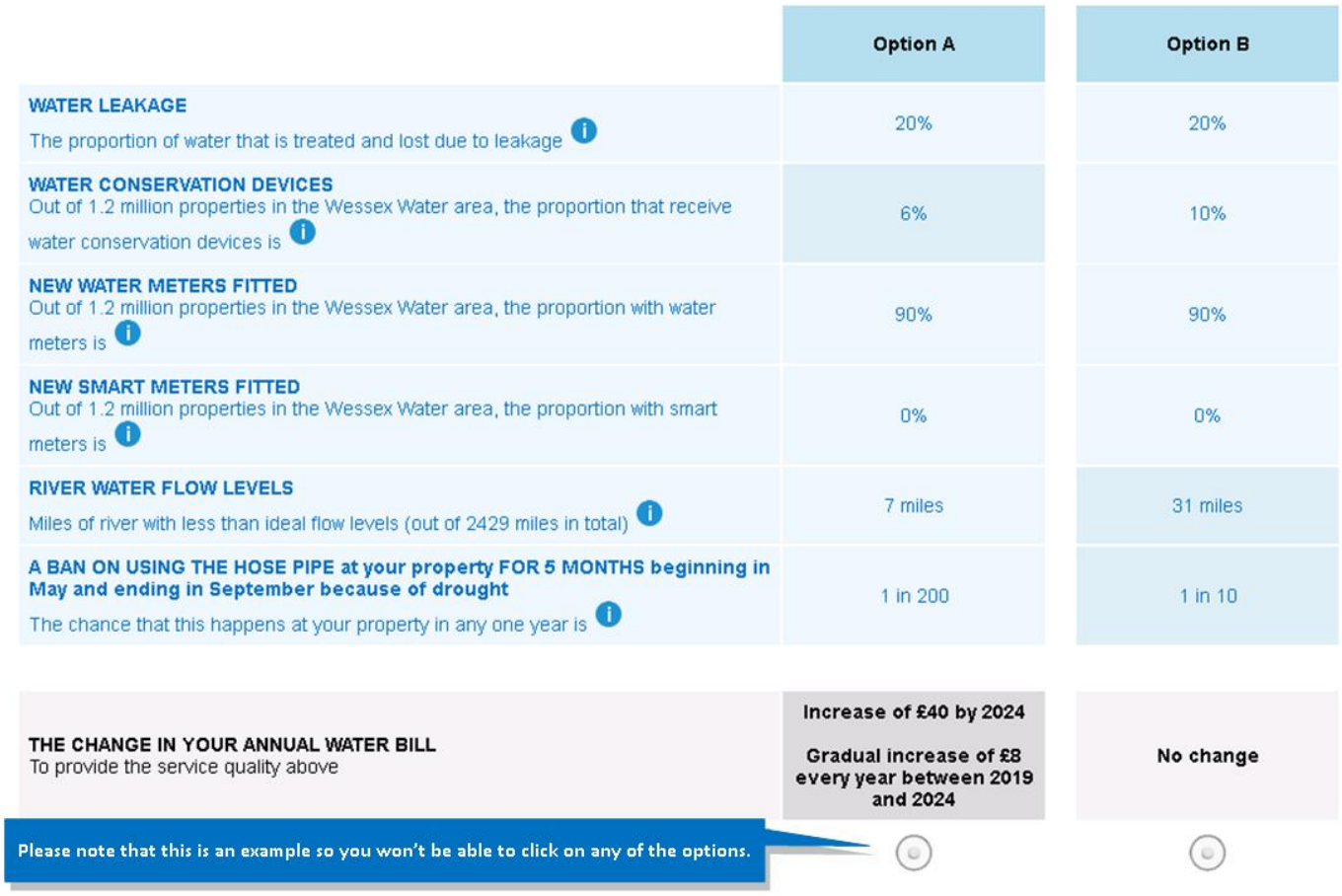
CAPI/ONLINE: The next five questions will each present you with two options of service aspects, and ask you to choose between them. You will also see the associated change in your annual water bill from Wessex Water from 2019 to 2024.

CAPI/ONLINE: This set of choices is only about the water resources element of your bill, and no changes to other aspects of your water supply or to your sewerage service are considered in this survey.

CAPI/ONLINE: The aim of this exercise is to encourage you to consider your preferences carefully and decide which option you would prefer. You may like some parts more and some parts less but please decide overall which one you would prefer.

[NEXT SCREEN]

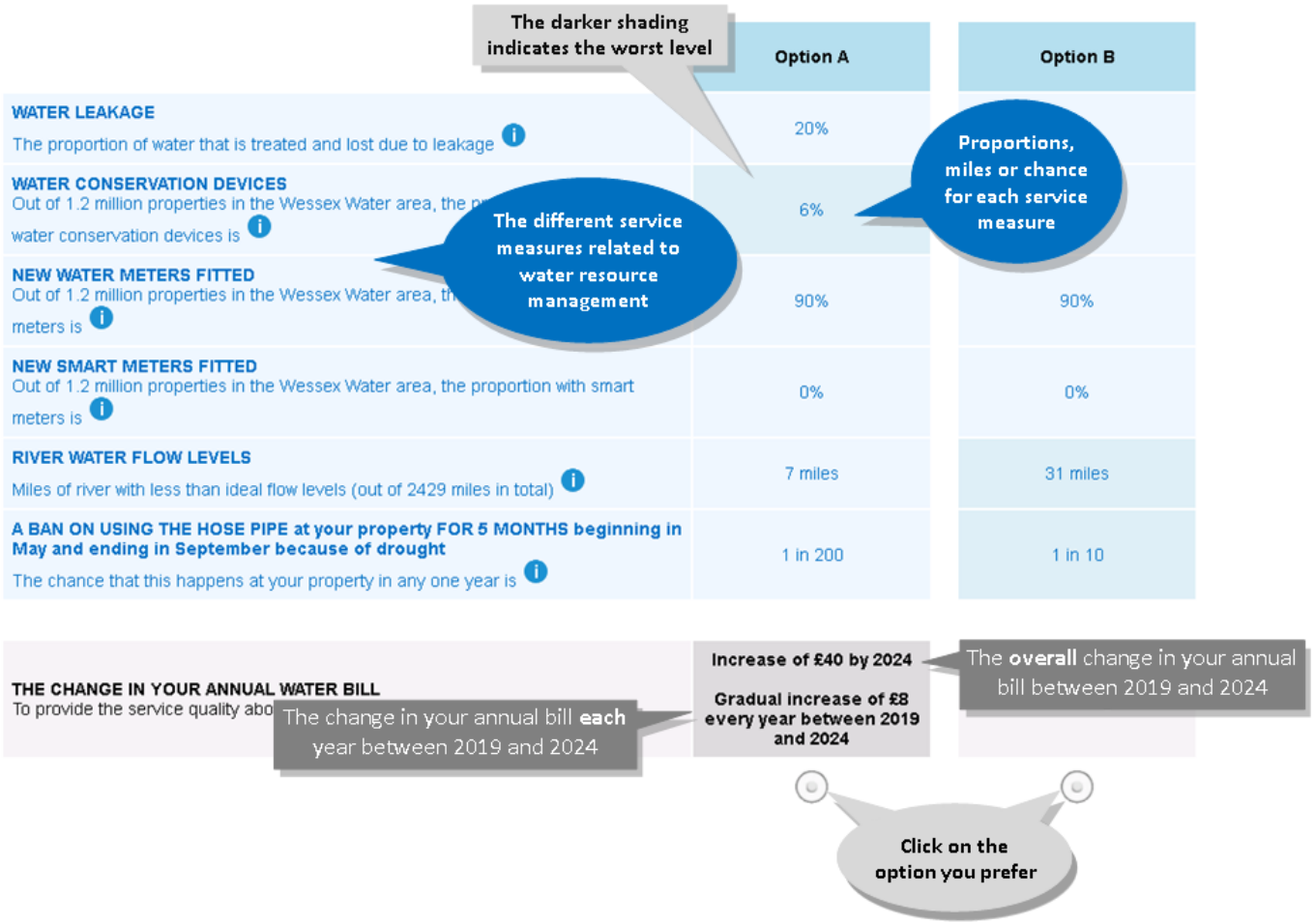
ONLINE: The options will be presented in the following format.



ONLINE: The next screen explains what the different parts of this mean.

[NEXT SCREEN]

CAPI: Now look at the next show card, X2. This shows the format the options will be presented in.
INTERVIEWER: CHECK IF THEY HAVE ANY QUESTIONS ABOUT THIS BEFORE PROCEEDING



[NEXT SCREEN]

CAPI: And finally, turn to Show Card X3. **CAPI/ONLINE:** Sometimes a Package may say "NO CHANGE" in the bill, but still include a change in the service levels.

When making your choices between the different service packages please bear in mind the following:

- that your bill would also increase by the rate of inflation each year. To give you an example of the impact that inflation would have, if inflation was 2% per year the average Wessex Water bill would increase by £52 from £496 in 2019 to £548 in 2024.
- that any money you would pay for better service levels here will not be available for you to spend on other things; and
- that the new bill level will gradually adjust over five years and stay the same after that. To maintain the service levels, your Wessex Water bill will not drop back to the level it was prior to changes in service levels.

CAPI: INTERVIEWER: FOR THE NEXT SEVEN QUESTIONS, SHOW PARTICIPANTS THE CHOICE SETS ON SCREEN.

DP: ADD HOVER BUTTONS IN ALL PACKAGE CHOICE CARDS.

Q30. **CAPI/ONLINE:** In the first set of options, the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A: "no change in your bill"/ "an associated bill increase**

of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which option do you prefer, A or B?

1. A
2. B

Q31. **CAPI/ONLINE:** Why did you choose the option you did?

CAPI: RECORD VERBATIM

Q32. **CAPI/ONLINE:** Did you understand that for the option you selected [your annual bill would increase by £X each and every year for five years. This would mean at the end of that five years your annual bill would be £xx more than your current bill] OR [your annual bill would decrease by £X each and every year for five years. This would mean at the end of the five years your annual bill would be £XX less than your current bill] OR [this would mean no change to your bill between 2019 and 2024]

1. Yes
2. No, I would like to go back and amend my answer **CAPI: INTERVIEWER EXPLAIN THAT YOU WILL GO BACK TO Q30 AND ASK AGAIN**
3. Not sure, I would like to go back and amend my answer **CAPI: INTERVIEWER EXPLAIN THAT YOU WILL GO BACK TO Q30 AND ASK AGAIN**

Q33. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A: "no change in your bill"/ "a bill increase of £[INSERT] by 2024" /"a bill decrease of £[INSERT] by 2024"]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which option do you prefer, A or B?

1. A
2. B

Q34. In this question, in Option A there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**, and in Option B **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which option do you prefer, A or B?

1. A
2. B

Q35. Here, in Option A there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**, and in Option B **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]]**. Now turn to Choice Card W4. Which option do you prefer, A or B?

1. A
2. B

Q36. In this final set of options, Option A has **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B: "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which option do you prefer, A or B?

1. A
2. B

Follow-up Questions

[**CAPI:** I; **ONLINE:** We] would now like to ask you a few questions about the choices you have just made.

Q37. **CAPI/ONLINE:** Did you generally feel able to make comparisons between the options presented to you?

1. Yes **GO TO Q39**
2. No

Q38. **CAPI/ONLINE:** Why weren't you able to make the comparisons in the choices? **CAPI:** RECORD VERBATIM

Q39. **CAPI/ONLINE:** Did you find each of the levels of service we described easy to understand?

1. Yes **GO TO Q41**
2. No

Q40. **CAPI/ONLINE:** Which levels did you feel were not easy to understand and why? **CAPI:** RECORD VERBATIM

Q41. **CAPI/ONLINE:** Were any of the service levels so low or so high that they were implausible?

1. Yes
2. No **GO TO Q43**

Q42. **CAPI/ONLINE:** Which levels did you feel were not plausible? **CAPI:** RECORD VERBATIM

Classification Questions

[**CAPI:** I; **ONLINE:** We] now need to ask you a few questions about you and your household. These will only be used to ensure we have spoken to a wide range of customers. All responses you give will be kept strictly confidential.

Q43. **CAPI:** First of all, could you tell me what your employment status is? **ONLINE:** What is your employment status? **SINGLE CODE**

1. Working full-time (30+ hours a week)
2. Working part-time (8-29 hours a week)

3. Not working – looking for work
4. Not working – not looking for work
5. Full-time student
6. Part-time student
7. Retired
8. Retired unpaid voluntary work
9. Looking after family/home
10. Other **Please specify**
11. Prefer not to say

Q44. **CAPI:** Please look at Showcard R. **CAPI/ONLINE:** Which of these best describes the highest level of education that you have completed?

1. **No qualifications**
2. **Level 1:** 1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills
3. **Level 2:** 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma
4. **Apprenticeship**
5. **Level 3:** 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma
6. **Level 4** and above: Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (for example teaching, nursing, accountancy)
7. **Other qualifications:** Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown)
8. Prefer not to say

Q45. **CAPI/ONLINE:** Do you receive any of the following benefits? **Please tick all options that apply to you. MULTICODE**

1. Attendance Allowance
2. Carer's Allowance
3. Child Tax Credit
4. Council Tax Benefit
5. Disability Living Allowance
6. Housing Benefit
7. Income Support (or similar)
8. Jobseeker's Allowance
9. Pension Credit
10. Universal Credit
11. Working tax credit
12. None of these **NOT WITH ANY OTHER CODE**
13. Prefer not to say **NOT WITH ANY OTHER CODE** **CAPI: DO NOT READ OUT**

Q73a To which of these ethnic groups do you consider you belong to?

WHITE

1. British
2. Irish
3. Any other White background

MIXED

4. White and Black Caribbean
5. White and Black African
6. White and Asian

7. Any other Mixed background

ASIAN OR ASIAN BRITISH

8. Indian
9. Pakistani
10. Bangladeshi
11. Any other Asian background

BLACK OR BLACK BRITISH

12. Caribbean
13. African
14. Any other Black background

CHINESE OR OTHER ETHNIC GROUP

15. Chinese
16. Any other ethnic group

17. Prefer not to say **CAPI:** DO NOT READ OUT

Q46. **CAPI/ONLINE:** Thinking about all the people in your household, including yourself, how many people live here for each of these age groups? **ONLINE: If there are no people in your household belonging to a certain age group, please select 'zero' for it.**

DP PLEASE PREVENT 4 0'S BEING ENTERED

Up to 5 years	0	1	2	3	4	5+
6 to 15 years	0	1	2	3	4	5+
16 to 65 years	0	1	2	3	4	5+
Over 65 years	0	1	2	3	4	5+

Prefer not to say **NOT WITH ANY OTHER CODE. CAPI:** DO NOT READ OUT

DP: THE ERROR MESSAGE THEY SEE IF THEY HAVEN'T ANSWERED SHOULD SAY "This question must be answered. If there are no people in your household belonging to a certain age group, please select 'zero' for it."

Q47. **CAPI/ONLINE:** And finally, what type of property do you live in?

1. Flat
2. Terraced house
3. Semi-detached house
4. Detached house
5. Bungalow
6. Prefer not to say **CAPI:** DO NOT READ OUT

Q48. **CAPI/ONLINE:** We really appreciate the time that you have given us today. Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for Wessex Water?

1. Yes, for both clarification and further research
2. Yes, for clarification only
3. Yes, for further research only
4. No

Q73a How would you rate your enjoyment in completing this survey? Please use a scale of 1 to 10 where 1 means 'low level of enjoyment' and 10 means 'high level of enjoyment'.

ONLINE: DP ADD SLIDER

CAPI: DP ADD HORIZONTAL GRID LIKE BELOW

Low level of enjoyment	1	2	3	4	5	6	7	8	9	10	High level of enjoyment

Q49. **CAPI:** Finally please look at Showcard S. **CAPI/ONLINE:** Wessex Water likes to hear what their customers think of their service. They have been running an online customer panel called Wessex Water 'Have Your Say' for nearly 4 years and have over 2,000 members. They would now like to invite you to join their panel. As a panel member you will be asked to take part in a short survey roughly every 3 months.

The surveys are about Wessex Water and things that matter to you as customers. The information is used to help Wessex Water provide you with a better service now and in the future.

If you want to find out more, visit www.wessexwater.co.uk/haveyoursay

If you sign up, you are under no obligation and can leave the panel at any time.

ONLINE: If you are interested in joining the panel please click **here**.

ONLINE: Thank you. This research was conducted under the terms of the MRS code of conduct and is completely confidential.

Please press the submit button at the bottom of the page to exit the survey.

CAPI: Thank you. This research was conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm my credentials or those of Accent please call the MRS free on 0500 396999.

Please can I take a note of your name and where we can contact you for quality control purposes?

Respondent name: [**CATI:** DP, IMPORT FROM ID]

Telephone: [**CATI:** DP, IMPORT FROM TELNUMBER]

HAND OVER THE INCENTIVE If you have any queries about your incentive please contact us on 020 8742 2211. Thank you.

Interviewer Confirmation

CAPI: I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Yes
No

SYSTEM INFORMATION
Time interview completed:

INTERNAL USE ONLY: **Click here**

Online only	X			
CATI only		(DP: add QAX)		
CAPI/Tablet	X	(BCQs:	) Q8	Paper showcard? Y x N
CATI recruit for online/field		(BCQs:	) Q9	
Field recruit for online/CATI		(BCQs:	) Q12	
Recruit only (ie for qual)				

Wessex Water
PR19 Community Engagement and Water Resources Research
(Stage 2)

Pilot Report (Final)
March 2017

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CONTENTS

1 INTRODUCTION

1.1 Background

Wessex Water has commissioned Accent to design and implement a second stage (Stage 2) quantitative stated preference (SP) survey comprised of two stated preference (SP) exercises.

The first exercise aims to understand customers' preferences for various activities that Wessex Water could undertake to engage the community and build a relationship of trust and confidence with its customers.

The second exercise looks into ways of maintaining or improving the water supply-demand balance by gauging customers' preferences for a number of demand management attributes.

To date, the pre-testing of the survey instruments with Wessex Water's customers consisted of a pilot phase in which the following number of interviews were undertaken:

- Household: 76 interviews
- Non-household: 50 interviews.

1.2 Objectives

This document is our pilot report for this study. It summarises the survey instrument, our pre-testing methodology and key findings from our econometric model and WTP estimations, and outlines recommendations on how to progress with the main survey.

1.3 Structure of the Report

The remainder of this note is structured as follows. Section 2 describes the survey designs; Section 3 describes the pre-testing methodology, and size and characteristics of the achieved samples. Section 4 discusses the cognitive interviews feedback; Section 5 contains our pilot findings, including respondent and interviewer feedback on various aspects of the questionnaire, results from stated preference (SP) models estimated on the pilot data, and descriptive results on customers' willingness to pay for improvements. Section 6 summarises all the findings and recommendations.

2 SURVEY DESIGNS

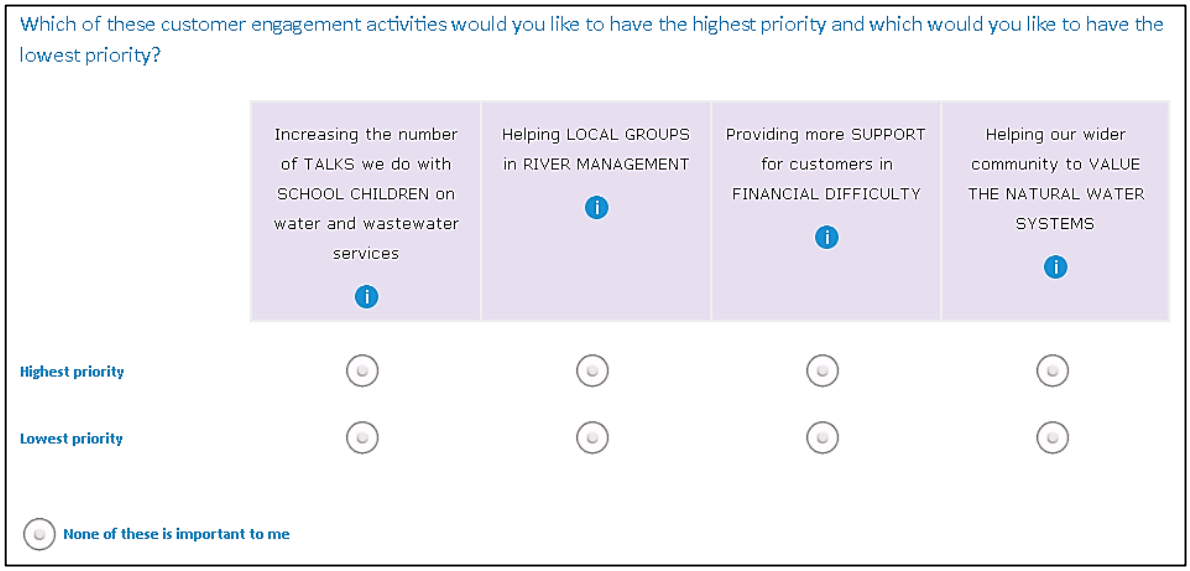
This section describes the design approaches to both the Community Engagement and Water Resource Management components of the Stage 2 survey.

2.1 Community Engagement Survey

The Community Engagement component of the survey was based on a 'MaxDiff' exercise. The MaxDiff, or Best-Worst Scaling, technique, is an established and robust alternative to the use of discrete choice experiments (DCE), whilst still being based on the same underlying theory (Random Utility Theory).[1]

Participants were presented with repeated choice cards in which they had to choose the initiative that they would like to have the highest priority, and the one they would like to have the lowest priority out of a total of four presented each time. An example MaxDiff choice card is found in Figure 1.

Figure 1 Example choice card form the Community Engagement MaxDiff exercise



The (i) icons in the above figure indicate a button that respondents could click on to see more information about the initiative in question.

The Community Engagement MaxDiff exercise consisted of eight initiatives altogether. These initiatives, and the descriptions supporting them, are shown in Table 1.

[1] Louviere, J., Flynn, T., and Marley, A. (2015) Best-Worst Scaling: Theory, Methods and Applications, Cambridge University Press

Table 1 Initiatives included in the Community Engagement MaxDiff exercise

Activity	Description
Helping customers to save water and money	Wessex Water can help its customers save water and money through the provision of better information on how they could use less water. Wessex Water could do this by means of awareness campaigns, water efficiency advice and by supplying free water meters to its customers.
Reaching out to school children	Wessex Water can reach out to younger generations by increasing the number of talks it does with schoolchildren on water and wastewater services, and providing more educational resources for teachers.
Providing more support for customers in financial difficulty	Wessex Water can increase the amount of support it offers to customers in financial hardship such as low rate tariffs and debt repayment schemes.
Increased staff engagement with the local community	Wessex Water can encourage its staff to get more involved with the local communities they are serving by allowing them to spend more time in the working week on local community projects and charity activities.
Helping local groups in river management	Wessex Water can encourage river stewardship by working with and involving local customer groups in the management of the waterways near to where they live or work. This could include activities such as hosting regular volunteer days improving conditions on river banks, providing education on river protection, and offering vocational trainings and work placements to help develop river management skills.
Increasing or improving the provision of recreational facilities	Wessex Water can increase the provision of recreational facilities or improve the quality of existing ones such as reservoir visitor centres, sailing sites, fishing sites, cafés, play parks etc.
Helping our wider community to value the natural water system	Wessex Water can help the wider community to value the natural water system by increasing its expenditure on campaigns aimed at raising the awareness of the wider public about water resources and ecosystems through various media (TV, radio, print, social media etc).
Reaching out to more vulnerable customers	Wessex Water can attend or hold more events in the local community to reach out to customers who are more vulnerable (including senior citizens and customers in financial hardship).

Given the difficulty for customers to evaluate all these initiatives at once, the MaxDiff exercise presented them with repeated choice sets that each assorted 4 out the 8 attributes and recorded the highest and lowest priority for the respondent. The experimental design for this exercise was generated using an algorithm which sought to maximise the statistical precision of the estimates. A total of 200 choice cards were generated and grouped in 20 blocks of 10 cards each. Each participantnt was administered choice cards from a randomly selected block, hence answering 10 MaxDiff choice cards.

The MaxDiff exercise generates a quantitative index of 'priority' for each of the initiatives included in the design for the customer population or sub-populations. This measure provides a means of understanding how customers would like to see the initiatives ordered in terms of priority.

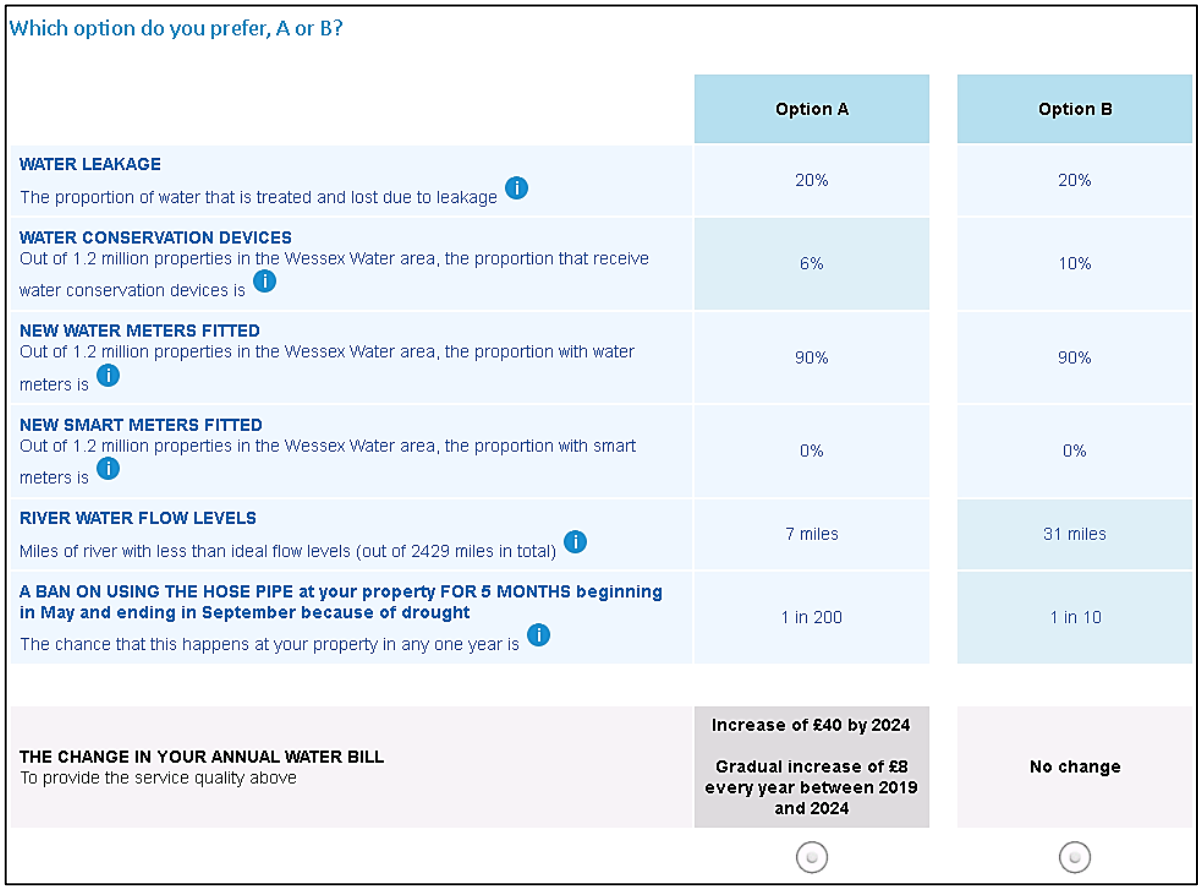
2.2 Water Resource Management Survey

The purpose of the Water Resources Management survey was to obtain estimates of customers' willingness to pay (WTP) for different options that Wessex Water could implement in its water resources management plan. The questionnaire was developed around the use of discrete choice experiment (DCE) questions as the means of eliciting customer priorities and WTP.

The DCE questions offered participants a series of choices between two alternative packages of service levels. The questions required the participant to make a trade-off, with some service measures better in one alternative and some better in the other. The choices made by the participants indicate how they value each of the service measures in relation to one another, in accordance with established principles of random utility theory[2].

An example choice card from the Water Resources Management survey is presented in Figure 2.

Figure 2 Example of a choice card from the Water Resource Management DCE



[2] See for example Train, K. (2003) "Discrete Choice Methods with Simulation", Cambridge University Press.

The full set of attributes used in the Water Resources Management survey, and the descriptions for each of them again accessed via the (i) buttons in the above choice format, are shown in Table 2. These service measures were proposed by Wessex Water.

Table 2 Water resource SP attributes and levels

Attribute	Units	Levels	Description
Water leakage	%	22% (-1), 21% (0), 20% (+1) and 19% (+2)	Wessex Water can undertake infrastructural works to reduce the extent of leakage from water mains. Currently 21% of the water that is treated by Wessex Water gets lost due to leakage.
Water conservation devices	% of properties	6% (-1), 7% (0), 10% (+1) and 12% (+2)	Wessex Water can enhance the water efficiency of its operations by increasing the number of its customers who receive water conservation devices. Wessex Water could also provide high-efficiency shower heads which affect water consumption by controlling the flow and spray pattern of the water. Currently the proportion of customer properties receiving such devices is 7%.
New water meters fitted	% of properties	73% (-1), 77% (0), 78% (+1) and 90% (+2)	Wessex Water can enhance the water efficiency of its operations by fitting more unmetered customer properties with new water meters, and hence increase meter uptake across its customer base. Currently 77% of properties are fitted with meters.
New smart meters fitted	% of properties	0% (-1), 0% (0), 10% (+1) and 43% (+2)	Wessex Water can further enhance its water efficiency by fitting more customer properties with new smart meters that can digitally send meter readings to the company. This can ensure more accurate water bills. Smart meters also come with monitors, so you can better understand your water usage. Currently no properties are fitted with smart meters.
River water flow levels	Miles with less than ideal flow levels	31 miles (-1), 16 miles (0), 7 miles (+1) and 0 miles (+2)	The flow rates of rivers in the Wessex Water area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified either as having 'natural flow' or 'low flow'. A river with 'low flow' may have had some water taken from it to supply customers. It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife. Currently, out of 1,641 miles of river in your area, 1,624 miles have 'natural flow' and 17 miles have 'low flow'.

Attribute	Units	Levels	Description
A ban on using the hose pipe for 5 months from May-September because of drought	Chance	1 in 10 (-1), 1 in 100 (0), 1 in 200 (+1) and 1 in 500 (+2)	As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one. Currently there is a 22% chance that your property will experience this problem over the course of our 25 year plan. An alternative way of explaining this is that there is a 1 in 100 risk that this happens to a property in the Wessex Water area in any year.

Importantly, two of the service measures in the above table (river water flow levels and hosepipe bans) were also included within the Stage 1 WTP survey[3]. This allows the results for the two surveys to be compared against one another, and potentially linked in order to make them consistent. Further discussion of this issue is included in Section 5.

Also included in the exercise was the change in the customer's annual bill from Wessex Water. The bill was presented as a monetary amount for household customers and as a percentage deviation from current bills for business customers.

The experimental designs for the Water Resources Management exercise were generated using an algorithm which sought to maximise the statistical precision of the estimates, whilst avoiding choice pairs where one option dominated the other one (i.e. was better on all service aspects). For each of the lower level exercises as well as the package exercise, a total of 30 choice cards were generated and grouped in 6 blocks of 5 cards each. Each respondent was administered 5 choice cards from a randomly selected block for each exercise.

[3] See Accent-PJM (2017) Wessex Water PR19 Willingness to Pay Research – Pilot Report (Version 1), March 2017 for details of the Stage 1 Willingness to Pay survey.

3 METHODOLOGY

3.1 Cognitive Depth Interviews

Ten cognitive depth interviews, five with household customers and five with non-household customers, were undertaken with the purpose of informing the pilot and main stage of this research, in particular:

- testing that respondents were able to understand what was being asked
- ensuring the information given was sufficient for respondents to feel they were able to provide an informed response.

All cognitive depth interviews were conducted using a computer-assisted telephone interviewing (CATI) method. Fieldwork was undertaken by Accent's Telephone Unit in Edinburgh. Given the qualitative nature of the approach, all interviews were undertaken by senior interviewers with extensive interviewing experience.

Sampling and Recruitment Method

The sample for both household and non-household interviews was provided by Wessex Water and comprised their dual supply customers only.

To confirm supply area, participants were asked for the first part of their postcode which was then checked against the postcode list supplied by Wessex Water. If their postcode matched the lookup, customers were asked to confirm that both their water and waste water services are supplied by Wessex Water. If it did not match, they were asked who provided their water and sewerage services. Both dual supply and water only customers were allowed to proceed.

Household customers were defined as those who are either solely or jointly responsible for their household's water and waste bill. Business customers were defined as those who are either solely or jointly responsible for their organisation's water and waste bill and/or liaising with their water and sewerage provider.

To achieve ten completed interviews, eleven household customers and seven non-household customers were recruited.

The breakdown of household interviews by gender, age, SEG and water meter status is shown in Table 3 below. Table 4 then shows the breakdown of non-household interviews by bill size, annual water consumption, number of sites operated from, number of employees, business sector and water meter status.

Table 3: Breakdown of Household Cognitive Depth Interviews

Characteristic	Value	Frequency
Gender	Male	5
Age	35-44 45-54 55-64 65-74	1 2 1 1
SEG	AB C1C2 DE	1 3 1
Water Meter Status	Water meter No water meter	1 4
Total		**5**

Table 4: Breakdown of Non-household Cognitive Depth Interviews

Characteristic	Value	Frequency
Bill size	Small (less than £1,000) Medium (£1,000-19,999) Large (£20,000 and over)	3 1 1
Annual water consumption	<5Ml	5
Number of sites	1 4+	4 1
Number of employees	Less than 4 4 to 49 50 to 249 Over 250	1 2 1 1
Business sector	Government, health & education Other	2 3
Water Meter Status	Water meter No water meter Don't know	3 1 1
Total		**5**

3.2 Pilot Interviews

The pilot comprised an online survey with household customers and a CATI survey with non-household customers.

A total of 126 interviews were achieved, comprising:

- 76 x household (HH) online interviews
- 50 x non-household (NHH) CATI interviews.

Interview Length

The average interview length for the two pilot surveys is shown in Table 5 below.

Table 5: Average Interview Length

	HH Online	NHH CATI
Average interview length	20 minutes	25 minutes

Sampling and Recruitment Method

The sample for the online household and CATI non-household pilot was provided by Wessex Water and comprised their dual supply customers. Again, customers' postcodes were checked against a lookup list to confirm their supply area.

In the CATI survey, 87 non-household customers were recruited to achieve 50 completed interviews.

In the online survey, invites were sent out to 1,500 household customers, of which 117 email addresses appeared to be invalid. This yielded 76 completed surveys at a 5.5% response rate.

Sample Characteristics

Households

The breakdown of household interviews by key characteristics – gender, age, SEG and water meter status – and by survey type is shown in Table 6 below.

Table 6: Breakdown of Household Pilot Interviews by Key Indicators

Characteristic	Value	Frequency
Gender	Male	41
	Female	35
Age	18-24	2
	25-34	6
	35-44	14
	45-54	20
	55-64	12
	65-74	11
	75+	4
	Refused	7
SEG	AB	44
	C1C2	17
	DE	7
	Refused	8
Water Meter Status	Water meter	53
	No water meter	17
	Don't know	6
Total		76

Table 7 below shows the breakdown of all household interviews by working status, highest level of qualifications, benefits and property type.

Table 7: Breakdown of Household Pilot Interviews by Other Indicators

Characteristic	Value	Frequency
Working status	Working full-time (30+ hours a week)	33
	Working part-time (8-29 hours a week)	11
	Not working – looking for work	1
	Retired	16
	Retired unpaid voluntary work	8
	Looking after family/home	2
	Other	1
	Refused	4
Highest level of qualifications[4]	No qualifications	2
	Level 1	4
	Level 2	12
	Apprenticeship	1
	Level 3	14
	Level 4 and above	41
	Other qualifications	2
Benefits	Attendance allowance	1
	Carer's allowance	1
	Child tax credit	6
	Council tax benefit	3
	Disability living allowance	3
	Housing benefit	3
	Income support (or similar)	
	Jobseeker's allowance	
	Pension credit	1
	Universal credit	2
	Working tax credit	2
	None of these	61
	Refused	3
Property type	Flat	10
	Terraced house	20
	Semi-detached house	21
	Detached house	21
	Bungalow	3
	Refused	1
Ethnic background	White: British	70
	White: Any other White background	3
	Asian or Asian British: Indian	1
	Black or Black British: Caribbean	1
	Refused	1
Total		**76**

(4) **Level 1:** 1-4 O Levels/CSE/GCSEs, Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills; **Level 2:** 5+ O Level/CSEs/GCSEs, School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma; **Level 3:** 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced

4

Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma; **Level 4** and above: Degree, Higher Degree, NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications; **Other qualifications**: Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown).

Non-households

A breakdown of non-household interviews by bill size, annual water consumption, number of sites operated from, number of employees, business sector and water meter status is provided in Table 8 below.

Table 8: Breakdown of Non-household Pilot Interviews

Characteristic	Value	Frequency
Bill size	Small (less than £1,000)	30
	Medium (£1,000-19,999)	18
	Large (£20,000 and over)	2
Annual water consumption	<5 megalitres	48
	>5megalitres +	2
Number of sites	1	38
	2	4
	3	0
	4+	8
Number of employees	Sole trader	6
	Less than 4	19
	4 to 49	19
	50 to 249	2
	250 +	4
Business sector	Agriculture, Forestry and Fishing	4
	Manufacturing	5
	Wholesale and retail trade (incl motor vehicles repair)	12
	Transport and storage	2
	Hotels and catering	4
	IT and communication	1
	Finance and insurance activities	1
	Business services	3
	Government, health & education	6
	Arts, entertainment and recreation	3
	Other service activities	4
	Other	5
Water Meter Status	Water meter	34
	No water meter	9
	Don't know	7
Total		**50**

Survey Enjoyment

All participants were asked to rate their enjoyment in completing the survey using a scale of 1 to 10 where 1 means 'low enjoyment' and 10 means 'high enjoyment'. Table 9 shows mean ratings given by survey type.

Table 9: Survey Enjoyment Ratings

Survey enjoyment	HH	NHH
Mean rating	4.9	6.6
Base size	76	50

Drop Out and Screen Outs Analysis

Table 10 shows the breakdown of those customers who entered the survey but did not complete. This includes both those who were screened out due to their answers ("screen outs") and those who stopped filling in the survey after opening the link ("drop outs").

Table 10: Online Survey Drop Outs & Screen Outs

	HH Online
Entered survey	178
Screen outs	21
Drop outs	81
Final completes	**76**

Table 11 below shows the breakdown of those who were screened out of the survey, and Table 12 shows which screen participants were on when they stopped filling in the survey.

Table 11: Online Survey Screen Outs

Reason for screening out	Frequency
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	
Yes	8
Q2: "Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?"	
No	3
Q4: "Please can you tell us the first part of your postcode?"	
Prefer not to say	5
None of the above letters	3
Q5 (if postcode matches lookup): "According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?"	
Don't know	1
Q6: "Which of the following best describes your household?"	

Don't know	1
Total	**21**

Table 12: Online Survey Drop Outs

Screen where stopped filling in the survey	Frequency
Introduction screen	16
Screening section	
Q1: "Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)?"	9
Q4: "Please can you tell us the first part of your postcode?"	4
Q4A: "Just to check, this makes your postcode [postcode from Q4]. Is this correct?"	1
Q10: "Does the chief income earner have a state pension, a private pension or both?"	3
Q14: "Do you have a water meter?"	4
Main questionnaire	
Q20: "Do you practice any of the following leisure activities?"	3
Q34: "Of all the service areas you have just read about, which, if any, would you most like to see improved in the future?"	2
SP Choice exercise 1: Max/Diff	
Max/Diff introduction screen	12
Max/Diff 1st choice set	2
Max/Diff 2nd choice set	1
Max/Diff 4th choice set	3
Max/Diff 5th choice set	1
Max/Diff 6th choice set	1
Max/Diff 7th choice set	1
Max/Diff 9th choice set	2
Q47: "Why weren't you able to make the comparisons in the choices?"	1
SP Choice exercise 2: Package	
Package 1st introduction screen	1
Package 2nd introduction screen	2
Package 3rd introduction screen	1
Package 4th introduction screen	2
Package 1st choice set	2
Q57: "Why did you choose the option you did?"	1
Package 2nd choice set	1
Package 3rd choice set	1
Follow-up questions	
Q66: "Which levels did you feel were not easy to understand and why?"	1
Classification section	
Q74: "Thinking about all the people in your household, including yourself, how many people live here for each of these age groups?"	1
Q77: "Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for Wessex Water?"	2

Total	**81**

4 COGNITIVE FEEDBACK

4.1 Household Interviews

General Feedback

Five household interviews were completed and there were no major problems with any of them. Participants generally found the choice cards and SP games easy to understand.

The routing worked correctly in all interviews.

The average interview length for the five cognitive interviews was 61 minutes (ranging from 48 minutes to 1 hour 17 minutes).

Background Questions (Q20-Q25)

No comments were made about this section.

Community Engagement Activities (Q26-Q45)

There were some minor text changes recommended and a few concepts were felt to require additional explanation.

Show Card D1 "Helping customers to save water and money if they are metered"

Recommendation: Change "the metering" to "metering".

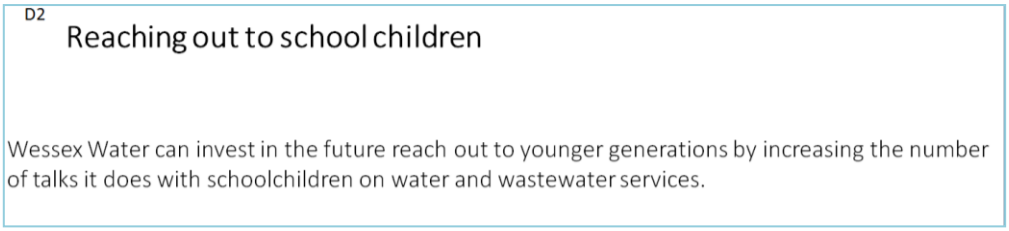
D1

Helping customers to save water and money if they are metered

Wessex Water can help its customers save water and money through the provision of better information on how they could use less water. Wessex Water could do this by means of awareness campaigns, water efficiency advice and through the metering, in addition to supplying free water meters to its customers.

Show Card D2 "Reaching out to school children"

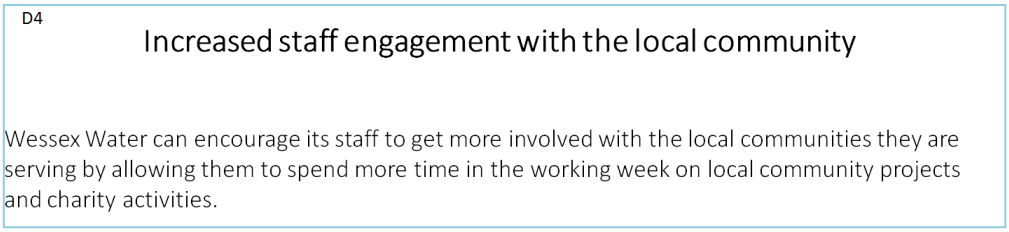
All five participants found this clear and did not have any comments.



Show Card D3 "Providing more support for customers in financial difficulty"

All five participants found this clear and did not have any comments.

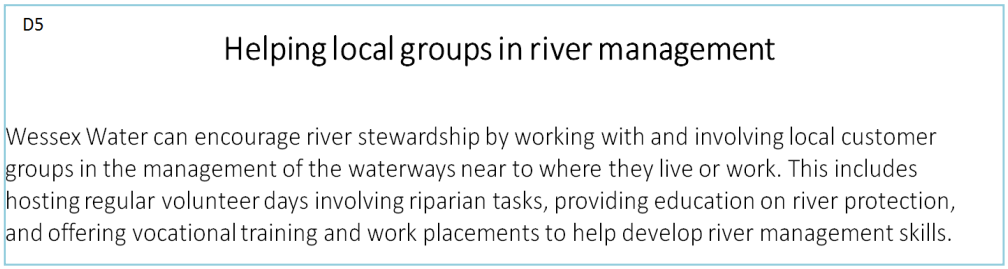
Show Card D4 "Increased staff engagement with the local community"
All five participants found this clear and had no comments.



Show Card D5 "Helping local groups in river management"

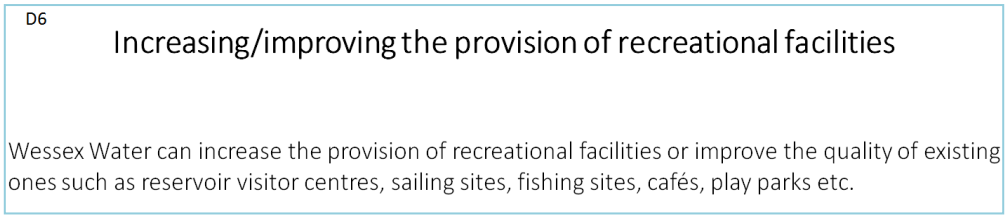
Recommendation: Provide a definition for "riparian tasks" or rephrase. This was mentioned by three out of five participants.

"I don't know what riparian tasks are.
There should be a definition or it should be reworded."



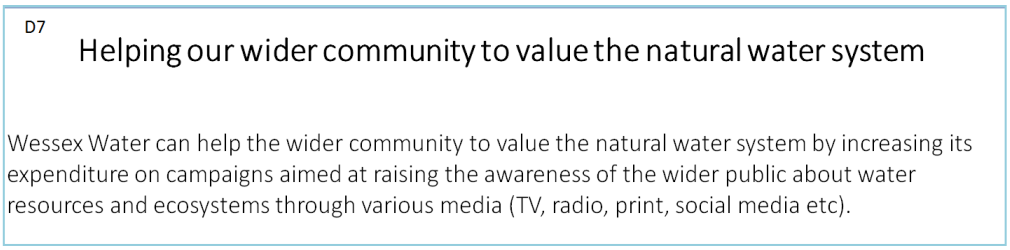
Show Card D6 "Increasing/improving the provision of recreational facilities"

All five participants found this clear and did not have any comments.



Show Card D7 "Helping our wider community to value the natural water system"

All five participants found this clear and did not have any comments.



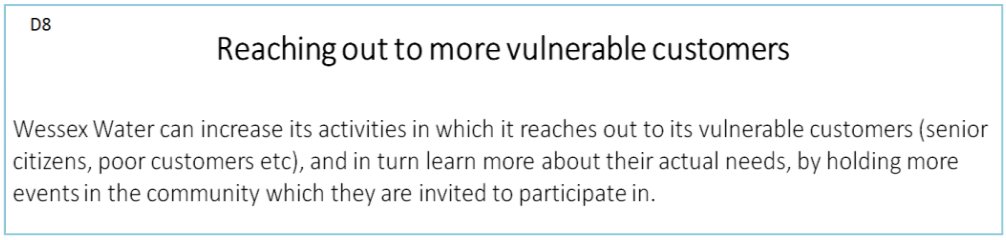
Show Card D8 "Reaching out to more vulnerable customers"

Recommendation: Use "financial hardship" or "low income" instead of "poor customers". This was mentioned by three out of five customers.

Recommendation: One customer though it was unclear who is invited to participate in the events – Wessex Water or the customers. It should read "…which the *customers* are invited to participate in".

We suggest amending it to the following:

"Wessex Water can increase its activities in which it reaches out to its vulnerable customers (including senior citizens and customers in financial hardship), and in turn learn more about their actual needs, by holding more events in the community which customers are invited to participate in."



Community Engagement – Choice Experiment (Q36-47)

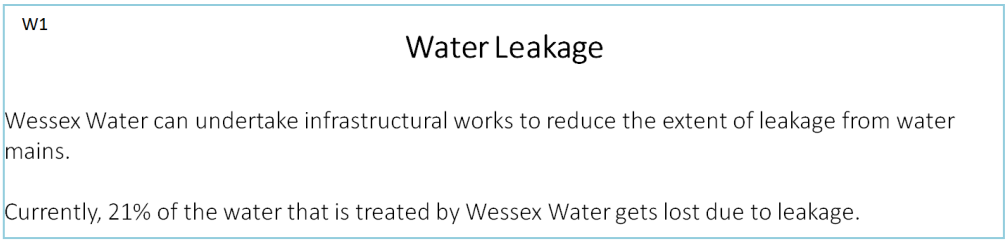
Four of the five participants felt able to make comparisons between the two options presented in the MaxDiff exercise; one did not:

"…I was able to pick my highest priority but couldn't choose between the remaining three for the lowest."

Water Resources (Q48-55)

Show Card W1 "Water Leakage"

All five participants found this show card clear and did not have any comments.



Show Card W2 "Water Conservation Devices"

Recommendation: Define "bath aerators" and "high-efficiency shower heads". Two participants did not understand this.

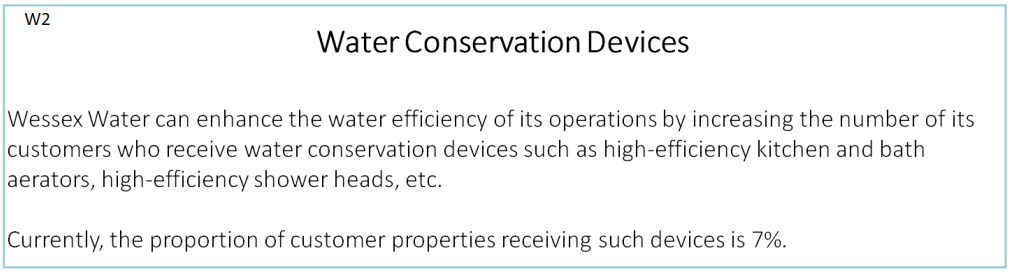
We suggest the following text:

"Wessex Water can enhance the water efficiency of its operations by increasing the number of its customers who receive water conservation devices.

Such devices include high-efficiency kitchen and bath aerators which make a faucet more water efficient. By mixing the water with air, they control the amount of water that flows through the tap without affecting the water pressure.

Wessex Water could also provide high-efficiency shower heads which affect water consumption by controlling the flow and spray pattern of the water.

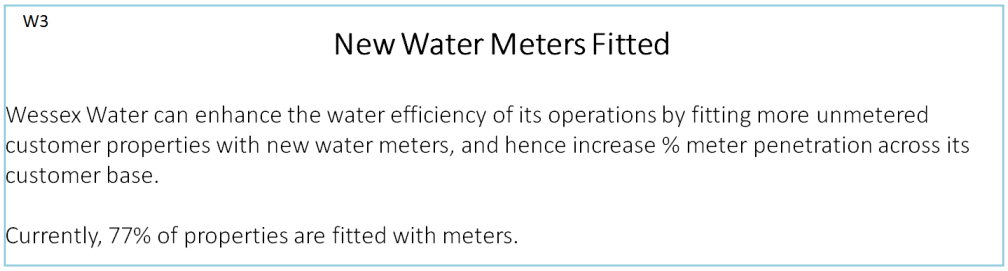
Currently the proportion of customer properties receiving such devices is 7%."



Show Card W3 "New Water Meters Fitted"

Recommendation: Say "meter uptake" instead of "% meter penetration":

"This is management speak and needs rewording to something simpler."



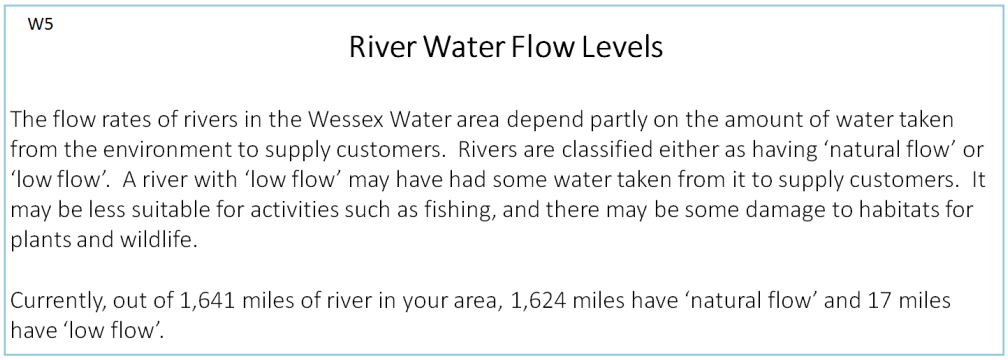
Show Card W4 describes "New Smart Meters Fitted"

Recommendation: Four participants pointed out that it should be "water usage" not "energy usage".

Recommendation: Delete "even" from "Wessex Water can even further enhance…"

Show Card W5 "River Water Flow Levels"[5]

This show card was found to be clear and no comments were made.


W5

River Water Flow Levels

The flow rates of rivers in the Wessex Water area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified either as having 'natural flow' or 'low flow'. A river with 'low flow' may have had some water taken from it to supply customers. It may be less suitable for activities such as fishing, and there may be some damage to habitats for plants and wildlife.

Currently, out of 1,641 miles of river in your area, 1,624 miles have 'natural flow' and 17 miles have 'low flow'.

Show Card W6 "Hosepipe Bans"

This show card was found to be clear and no comments were made.


W6

Hosepipe Bans

As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.

Currently, there is a 22% chance that your property will experience this problem over the course of our 25 year plan.

However, when asked whether they would have preferred to see the chance of this happening expressed as "1 in 100 risk" instead of "22% chance", all five participants agreed:

"…seems more relevant to the customer as 25 years is a long timescale to think about."

"I just think people are more used to thinking in terms of out of 100. It's also a shorter time period which is easier to visualise."

"It paints a more positive and clearer picture. Some might not understand 22% over 25 years but 1/100 over a year is easier."

"People are more used to thinking in terms of "out of 100"."

[5] Note that following the launch of Stage 2 cognitive interviews, this show card was changed to a pie chart in the Stage 1 pilot.

Three participants associated the "1 in 100" figure with a low risk of being affected by a hosepipe ban:

"I'm not very likely to be affected."

"It's very unlikely that we are going to have a water shortage as we have high capacity in our reservoirs. It doesn't paint a negative picture. We are much better equipped to manage our water resources than we were in the 70's for example."

"The risk of a ban is actually a lot lower than I'd have thought."

Two participants converted this to a percentage chance per year:

"The possibility that there may be a hosepipe ban is 1% over the following year."

"There is a 1% chance over a year of having a hosepipe ban."

Water Resources – Choice Experiment (Q56-62)

No participants had problems with the package exercise.

Follow-up Questions (Q63-Q68)

Four out of five participants said they generally felt able to make comparisons between the choices; one did not:

"The blue text was quite hard to read after I printed the material and we need a stronger visual indicator as to whether the bill is increased or decreased."

All five participants found the service levels easy to understand.

However, two participants felt that some of the service levels were implausible, in particular the chance of a hosepipe ban:

"A 1 in 10 chance of a hosepipe ban seems very high."

"The occurrence of hosepipe bans seemed very low based on past experience but I could see how that chance would drop with better water resource management."

4.2 Non-household Interviews

General Feedback

Five non-household interviews were completed and there were no major problems with any of them. Again, participants generally found the show cards and games easy to understand but there were some suggestions for minor wording changes.

The routing worked correctly in all interviews.

The average interview length for the five cognitive interviews was 45 minutes, ranging from 29 minutes to 1 hour 11 minutes.

General comments

- As this survey is only about water service, could we include those in the dual supply sample who say they are water only customers?

- Some non-household participants were concerned about the level of leakage.

Background Questions (Q21-23)

No comments were made about this section.

Community Engagement Activities (Q26-Q45)

Similar to the feedback from household customers, this section was generally found to be clear:

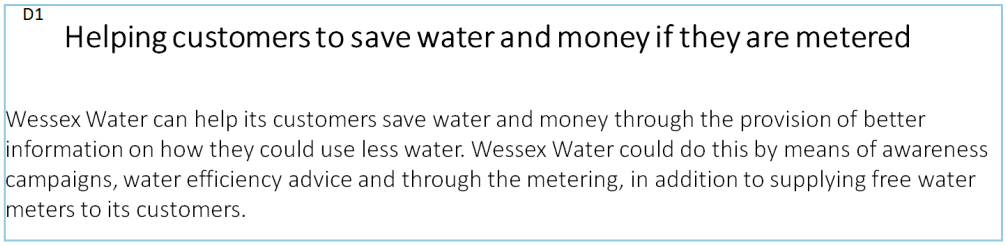
> *"I thought that it was a very good section and presentation was good.*
> *I also thought it was very positive information coming from Wessex Water."*

However, there were some minor text changes recommended and a few concepts were felt to require additional explanation.

Show Card D1 "Helping customers to save water and money if they are metered"

All five participants found this show card clear and did not have any suggestions.

> *"All easy to read, font size and layout is good, all clear."*



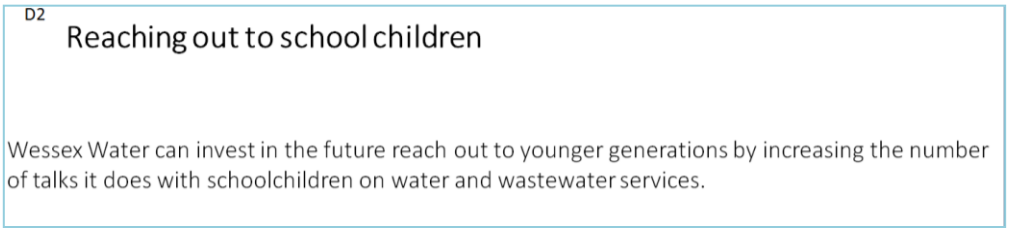
Show Card D2 "Reaching out to school children"

Recommendation: Two participants suggested to revise this sentence. We recommend changing the wording to:

"Wessex Water can invest in the future and reach out to younger generations by increasing the number of talks it does with schoolchildren on water and wastewater services."

Recommendation: One participant suggested providing examples:

"…I would expand on what they will try to do, ie school visits, raise awareness of environmental issues, etc."



Show Card D3 "Providing more support for customers in financial difficulty"

Four out of five participants found this show card clear but one customer found the sentence too long:

"The wording is understandable but it's a long sentence so quite hard to take in."

Recommendation: Amending the wording to the following:

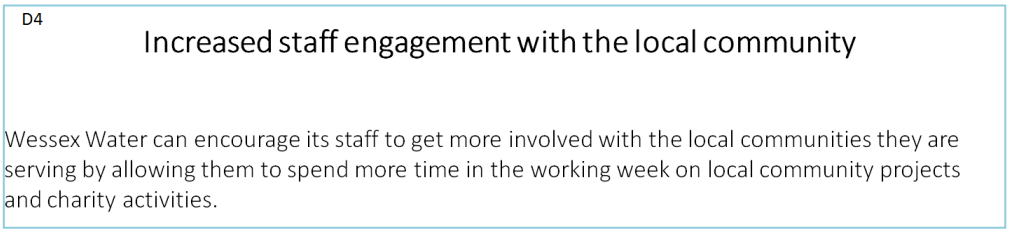
"Wessex Water can increase the amount of support to customers in genuine financial hardship. This could be done through targeted community engagement programmes with the aim of encouraging uptake of the range of financial assistance schemes available."

Show Card D4 "Increased staff engagement with the local community"

Four out of five participants found this show card clear but one customer would have liked to see additional information:

"What does that mean? They should cite examples of what community involvement would entail. It needs more detail as to what would be involved. That reads to me as if all the staff would be doing some sort of community work each week."

Recommendation: Wessex Water to suggest additional information to be included.



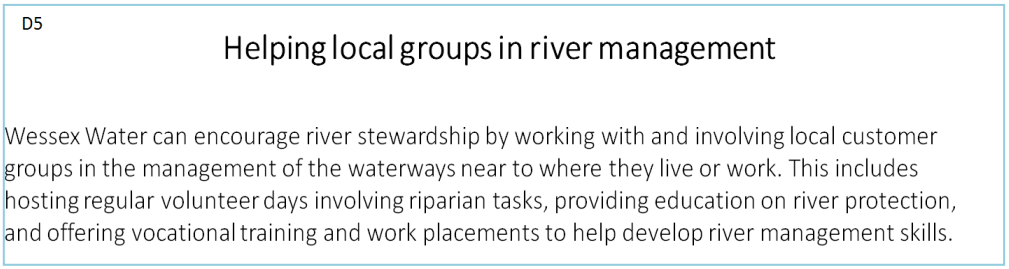
Show Card D5 "Helping local groups in river management"

Similar to the feedback from household interviews, two out of five non-household participants required a definition of "riparian tasks".

"What does the word "riparian" mean, does it mean repair?"

"There needs to be either a definition of riparian tasks or different wording should be used."

Recommendation: Provide a definition for "riparian tasks" or rephrase it.

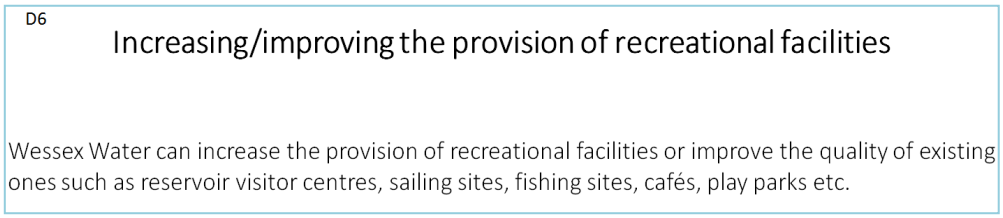


Show Card D6 "Increasing/improving the provision of recreational facilities"

Four out of five participants found this show card clear and did not have any comments. However, one participant had the following suggestion:

"I don't like the slash between increasing and improving.
It should read: "Increasing and improving.""

Recommendation: Change the heading to "Increasing or improving the provision of recreational facilities".



Show Card D7 "Helping our wider community to value the natural water system"

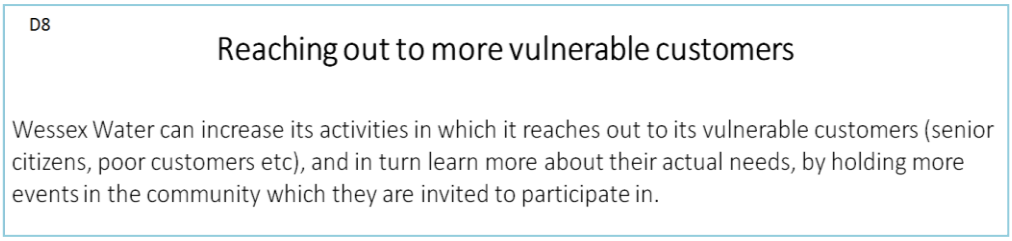
All five participants found this clear and did not have any suggestions.

Show Card D8 "Reaching out to more vulnerable customers"

Again, customers flagged up the phrase "poor customers":

"The term "poor customers" should not be used, perhaps it should be described as "financial difficulty" or "low incomes". It's also very strange to have those two terms in brackets to describe vulnerable customers, either don't provide examples or give the full list of customer types who can be described as vulnerable. Also, financial hardship is already mentioned at D3."

Recommendation: Do not use "poor customers" – use "financial hardship" or "low income" instead.



Community Engagement – Choice Experiment (Q36-47)

Three of the five participants felt able to make comparisons between the two options presented in the MaxDiff exercise. However, two participants noted that they thought all of these activities are very important and found it difficult to choose one to have lowest priority.

Water Resources (Q48-55)

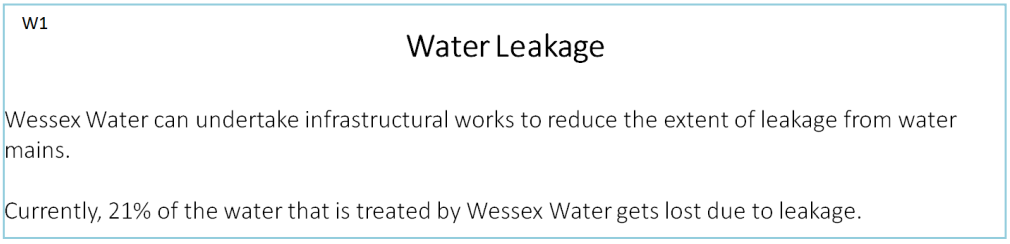
Show Card W1 "Water Leakage"

Four out of five participants found this clear and did not have any comments. However, three customers were concerned about the level of leakage:

"This fact - 21% - is frightening, this is a lot!"

"I'm surprised that it is as high as 21% - suggests to me there is a big problem."

"It's unclear as to what the point of this statement is.
They are telling us they are losing 21% of the water but not doing anything about it.
What is their aim? I'd rather they tell me what they are doing about it."



Show Card W2 "Water Conservation Devices"

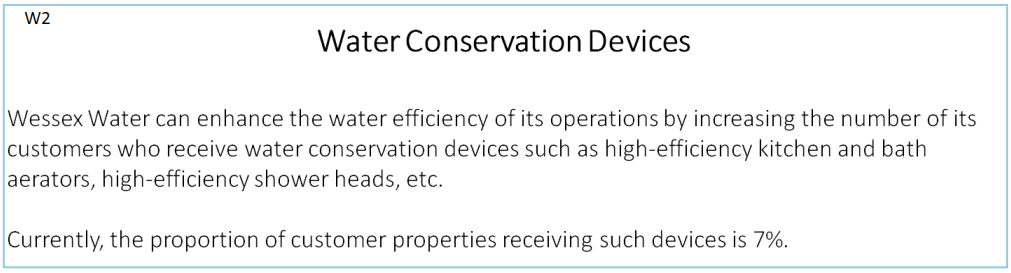
Four out of five participants found this clear. One customer noted that the service level, 7%, seems "far too low".

Recommendation: One customer felt that the reason why we are listing different service failures – to assess which areas they would like to improve – needs to be made clearer:

"This is just listing the problems with their service and not telling us what they are doing to solve them.

[after further explanation from interviewer:]

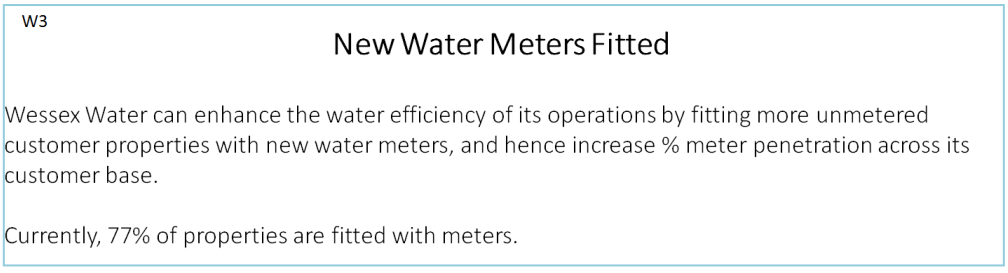
They need to prompt participants that they will then be asked which areas we want them to improve; otherwise it just reads as a list of failures by the water company."



Show Card W3 "New Water Meters Fitted"

All five participants found this show card clear. One customer had the following comment:

"I'm pleasantly surprised that 77% [of properties are] *fitted."*



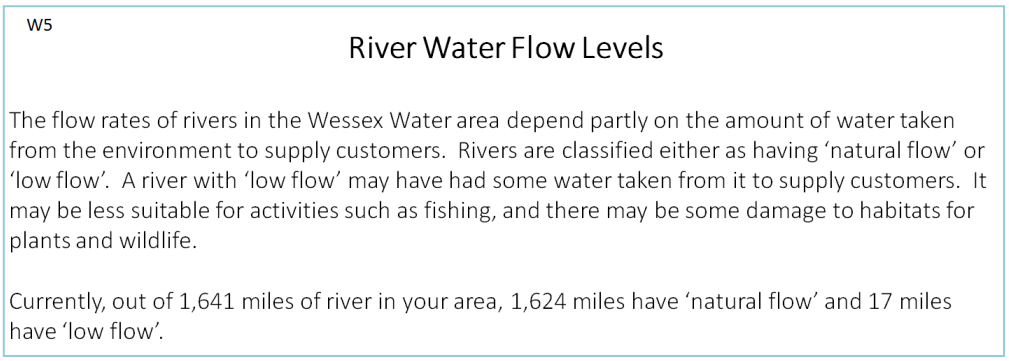
Show Card W4 describes "New Smart Meters Fitted"

Four out of five participants found this clear and had no comments.

Show Card W5 "River Water Flow Levels"[6]

All five participants found this show card clear. One customer had the following comment:

"It is pleasing and interesting that only 17 miles have low flow, I thought it was higher."



Show Card W6 "Hosepipe Bans"

This show card was found to be clear and no comments were made.

[6] Note that following the launch of Stage 2 cogs, this show card was changed to a pie chart in the Stage 1 pilot.

Three out of five participants would have preferred to see the chance expressed as "1 in 100 level risk":

"I find it much easier to think of things in terms of "out of one hundred" and across a yearly timescale, rather than a percentage over a long timescale."

"This sounds better, not to frighten people… and clearer than 22% - this could be more confusing."

"It sounds like a less off possibility."

However, two customers preferred "22% chance":

"Because this is more understandable for me as a percentage.

"Personally I relate better to percentages."

Water Resources – Choice Experiment (Q56-62)

There was a minor error in one of the choice sets which has now been fixed.

Follow-up Questions (Q63-Q68)

Three out of five participants said they generally felt able to make comparisons between the choices; two did not:

"I feel it is the lesser of two evils, more important that they cut down on leaks than going onto water meters."

"Need to highlight the increased efficiency."

As in the household survey, all five non-household participants found the service levels easy to understand.

However, two participants felt that some of the service levels were implausible, in particular they were concerned about the level of leakage:

"I'm very worried if 21% of my water is leaking, I would make sure that is not happening."

"The leakage was higher than I expected - at 21% they need to address this fact."

4.3 Summary

The results above and the positive comments we received are very encouraging from a survey design perspective. Both stated preference exercises were generally found to be clear, and we received no complaints about the length or complexity of it.

There was some very useful feedback from both household and non-household participants. The recommendations we received were predominantly about the wording of attribute descriptions. Based on the feedback, we revised the text for pilot stage to increase comprehension.

5 PILOT FINDINGS

5.1 Participant Feedback

Table 13 summarises participants' feedback to the Community Engagement MaxDiff and Water Resources Management DCE surveys of both household and non-household samples. The results indicate a good level of comfort on the part of participants with various aspects pertaining to the comprehension of the two SP exercises.

As in Stage 1, non-households scored higher on all counts than their household counterparts. This customer feedback provides reassuring evidence that the two SP instruments are well understood by respondents.

Table 13 Respondent Feedback to SP Exercises

	Household		Non-household	
	Community Engagement (MaxDiff)	Water Resource Management DCE	Community Engagement (MaxDiff)	Water Resource Management DCE
Did you generally feel able to make comparisons between the options I presented to you?	78.9%	82.9%	78.0%	92.0%
Did you find each of the levels of service we described easy to understand?		88.2%		96.0%
Were any of the service levels so low or so high that they were implausible?		88.2%		94.0%

The reasons given for participants saying they were unable to make comparisons between the options presented in the Community Engagement exercise included many who cited the repetitive nature of the questions. In light of these responses, and given the performance of the econometric modelling for this exercise (discussed in 5.2), we recommend reducing the number of questions asked in this exercise from 10 down to 6 per person. This change should substantially improve the enjoyability of the survey as a whole, as well as reduce the number of people saying they are unable to make comparisons in this exercise, while still being sufficient to generate a robust model of preferences.

An additional reason cited by a few customers was that there was insufficient information given. However, in a survey context a balance always needs to be struck between providing enough information and avoiding excess information which could over-burden the participant. In the present case, we would advise restraint against adding any more information to the descriptions.

In respect of the Water Resources Management exercise, the reasons given primarily centred on the concern that the exercise was generally quite complicated/confusing,

although one respondent cited as a reason that Wessex Water wastes too much in leakage and gets paid too much already. In the absence of any specific concerns, we do not advise any changes to this exercise on account of this feedback.

5.2 Econometric Models

We have estimated econometric models using the pilot stated preference (SP) data in order to check that the Community Engagement and Water Resource Management exercise models are theoretically consistent, as well as to be able to derive WTP results from the Water Resource Management exercise. To this end, we are examining whether the coefficients of the most basic models have the correct signs and are reasonably precisely estimated, given that the precision will improve with more data. In addition, the results from this analysis allow us to calibrate the cost levels and the experimental design.

Community Engagement MaxDiff Exercise

The Community Engagement MaxDiff data were analysed using a rank-ordered logit model which is equivalent to a conditional logit analysis on derived data constructed by 'exploding' the rankings into choices. In our exercise, 3 choices were derived for each ranking set as follows: (1) the 'highest priority' option was treated as being chosen over the remaining three activities in the ranking set, and (2) each of the two attributes that were neither ranked as 'highest priority' or 'lowest priority' was each considered to have been chosen from a choice set that is composed of the attribute in question and the 'lowest priority' attribute.

The modelling methodology requires that one attribute be omitted so as to be treated as the base category. The choice of omitted attribute has no impact on the relative results. We chose the 'Providing more support for customers in financial difficulty' attribute for this purpose.

For the remaining attributes, coefficients and priority scores are presented below. The priority score for a given attribute is the relative priority attributable to the activity in question in comparison to the baseline attribute (i.e. 'Providing more support for customers in financial difficulty'). A higher priority score indicates that customers prefer it to be given a higher priority.

The below results (Table 14) show that all coefficients are highly significant and their magnitudes broadly make intuitive sense. For example, we find that:

- The ranking of the priority scores are broadly consistent across the household and on-household samples, suggesting that their priorities are congruent;

- 'Helping customers to save water and money' had the highest priority score in both household and non-household samples, while 'Providing more support for customers in financial difficulty' had the lowest. This suggests that customers preferred that resources be diverted to Community Engagement activities and interventions that would help customers achieve more efficiency in their water use, and by implication financial savings, rather than those that seek to directly support customers in financial difficulty.

- At the top of the priority list was 'Increased staff engagement with the local community' and 'Helping our wider community to value the natural water system'. This suggests that Wessex Water's customers are keen on seeing their water provider getting in closer touch with local communities and engaging them for environmental causes.

All of these findings indicate that the MaxDiff exercise is working as expected.

Table 14. Community Engagement MaxDiff Rank-ordered Logit Models

Variable	Household		Non-household	
	Coeff.	Priority score	Coeff.	Priority score
(1) Helping customers to save water and money	2.368***	10.67	1.995***	7.35
(2) Reaching out to school children	0.915***	2.50	0.702***	2.02
(3) Providing more support for customers in financial difficulty	(omitted)	1.00	(omitted)	1.00
(4) Increased staff engagement with the local community	1.347***	3.84	1.155***	3.17
(5) Helping local groups in river management	0.975***	2.65	0.798***	2.22
(6) Increasing/improving the provision of recreational facilities	0.698***	2.01	0.253*	1.29
(7) Helping our wider community to value the natural water system	1.141***	3.13	0.935***	2.55
(8) Reaching out to more vulnerable customers	0.944***	2.57	0.508***	1.66

*Model = rank-ordered logit; dependent variable = rank, where 1 indicates the option ranked as highest priority', 4 'least priority', and the remaining two attributes were equally ranked at 2; estimates all based on unweighted data; * significant at 10%; ** significant at 5%; *** significant at 1%; (1) All variables are dummies, equal to 1 when the attribute present is in the ranking set, and 0 otherwise.*

Water Resource Management DCE

We estimated conditional logit (CL) models for each of the household and non-household samples. Results are presented in Table 15.

The following observations can be made about the results.

- 'Water leakage' has the expected negative sign and is statistically significant in both models, indicating that people prefer less leakage all else equal.

- 'Water conservation devices', 'New water meters fitted' and 'New smart meters fitted' all have coefficients close to zero and statistically insignificant in both samples. This indicates that there are likely to be no additional costs or benefits associated with these solutions from the customer perspective, once other factors, particularly the bill level, are controlled for.

- 'River water flow levels' has the expected sign (negative) in both samples. The coefficient is highly statistically significant in the household sample, but insignificant in the non-household sample. This indicates, as expected, that customers prefer fewer miles of low-flow rivers all else equal.

- 'Hosepipe ban' unexpectedly has a positive sign in both samples, although statistically significant in the household sample. This finding suggests, counter to expectation, that customers prefer more frequent hosepipe bans all else equal. We discuss this issue further below.

- Bill is highly significant and negative in both household and non-household samples. This indicates, as expected, that people prefer lower bills all else equal.

Table 15 Water Resource Management DCE models

	Household		Non-household	
Variable	**Unit**	**Coeff.**	**Unit**	**Coeff.**
Water leakage	%	-0.1355 (0.0730) *	%	-0.2930 (0.0852) ***
Water conservation devices	%	-0.0010 (0.0298)	%	-0.0261 (0.0348)
New water meters fitted	%	0.0092 (0.0119)	%	-0.0157 (0.0146)
New smart meters fitted	%	0.0019 (0.0055)	%	-0.0059 (0.0051)
River water flow levels	Miles	-0.0262 (0.0072) ***	Miles	-0.0055 (0.0076)
Hosepipe ban	Chance	4.4758 (2.2251) **	Chance	0.7793 (2.7130)
Bill change	£/hh/yr	-0.0237 (0.0037) ***	%/hh/yr	-0.0373 (0.0163) **
Observations LL Pseudo R2		380 -227.660 0.136		250 -162.230 0.064

*Model = Conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

The above models are reasonably well estimated given the small sample sizes, and the results are, with one exception, all intuitively reasonable. However, as stated above, the coefficient for hosepipe ban has a positive sign in both samples, although statistically significant in the household sample. This suggests that customers prefer more frequent hosepipe bans all else equal, which is clearly counter-intuitive.

We suspect that this finding may be driven by the presence of some people who do not care about hosepipe bans, but for whom having more frequent hosepipe bans might lead to a lesser need for taking water from the environment or to lower bills in the future. Counter to this, we would expect that there are a significant segment of customers in the population who do care about lowering the risk of hosepipe bans, but who aren't present in large enough numbers in the pilot sample to cause there to be the expected negative coefficient on hosepipe ban in the models.

Our recommendation with respect to this issue is that the survey should include a question prior to the start of the Water Resources Management exercise asking the respondent what impact a hosepipe ban would have on them. We would then be able to estimate a model with distinct coefficients on hosepipe ban for those that say that a hosepipe ban would have no impact, and for those that say it would have some impact. If we estimate a positive coefficient on hosepipe ban for the former group, we could reasonably restrict the model to have a zero coefficient on hosepipe ban for this group on the basis that they said that a hosepipe ban would have no impact on them.

In either case, we would derive a weighted average coefficient for the Wessex Water customer base using the relative sample proportions of those that say that a hosepipe ban would have no impact, and those that say it would have some impact. This approach would ensure that the value taken forward from the research for improved level of service would be positive, as expected, while fully reflecting customers' views and priorities.

For the purposes of deriving WTP from the above econometric models we disregard the hosepipe ban risk value at this stage. This is on the basis that we do not have confidence that the negative value estimated for improved levels of service accurately reflects customers' true valuations, for the reasons discussed above.

5.3 Willingness to Pay

Unit WTP values and WTP values for status quo (SQ) to +1 improvements are presented in Table 16. These findings show, for example, that households were willing to pay £5.71 for a reduction from 21% to 20% leakage, all else equal, and £11.03 for a reduction in low flow rivers from 16 miles to 7 miles. WTP for the remaining attributes was close to zero, and not statistically significant as discussed above.

Table 16 WTP values from the Water Resources Management exercise

	Attribute units & levels			Household		Non-household	
Variable	Unit	SQ	+1	Unit WTP (£/unit/hh/yr)	WTP SQ to +1 (£/hh/yr)	Unit WTP (%/unit/hh/yr)	WTP SQ to +1 (%/hh/yr)
Water leakage	%	21%	20%	-£5.71 (3.1501) *	£5.71	-7.86% (0.0852) ***	7.86%
Water conservation devices	%	7%	10%	-£0.04 (1.2554)	-£0.12	-0.70% (0.0348)	-2.10%
New water meters fitted	%	77%	78%	£0.39 (0.4979)	£0.39	-0.42% (0.0146)	-0.42%
New smart meters fitted	%	0%	10%	£0.08 (0.2348)	£0.80	-0.16% (0.0051)	-1.58%
River water flow levels	Miles	16 miles	7 miles	-£1.10 (0.3237) ***	£11.03	-0.15% (0.0076)	1.49%
Hosepipe ban	Chance	1 in 100	1 in 200	£0 *	£0		0%

*Estimates all based on unweighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

6 CONCLUSIONS AND RECOMMENDATIONS

Findings from the cognitive interviews were very encouraging, and provided strong support of both the Community Engagement exercise and the Water Resource Management exercise. Both stated preference exercises were generally found to be clear, and we received no complaints about the length or complexity of it.

The recommendations we received were predominantly about the wording of attribute descriptions. Based on the feedback, we revised the text for the pilot stage in a small number of areas to increase comprehension.

In terms of the pilot findings, we were able to estimate good-fitting and plausible econometric models for the households and non-household samples for the Community Engagement exercise. However, there were a number of comments from participants that the exercise was repetitive and that the choice questions were similar. On the basis of both sets of findings, we recommend shortening the exercise significantly from ten questions per person to six. On the basis of the econometric model performance, and given that there are only eight attributes in this exercise, we believe this will improve the enjoyment of the survey, and reduce its length, while still providing sufficient choice data with which to estimate a statistically robust model of customer priorities.

As for the Water Resources Management exercise, results were broadly encouraging. Expected signs were obtained for water leakage, river flows and bill levels, and with good statistical precision. Three of the measures were not statistically significant – water conservation devices, ordinary meters and smart meters. However, this is likely to be a consequence, in our view, of these measures leading to only very small external costs/benefits once the impact on the supply-demand balance and the bill are controlled for. It is hence not surprising that the resulting values from a small sample are insignificant.

However, the results from the econometric model for the Water Resources Management exercise suggested that customers prefer more frequent hosepipe bans all else equal. Whilst this could be seen as counter-intuitive, we have recommended an approach which would ensure that the value taken forward from the research for improved level of service would be positive, as expected, while fully reflecting customers' views and priorities. (See section 5.2 for further details.)

Overall, once the changes recommended herein are made, we are confident that the survey instrument will be able to deliver the robust estimates of community engagement priorities and willingness to pay for water resource management options, as required.

APPENDIX A

Show Material

About Wessex Water

- Wessex Water is a regional water and sewerage business serving 2.8 million customers across South West England including Dorset, Somerset, Bristol, most of Wiltshire and parts of Gloucestershire and Hampshire.
- We treat and supply 280 million litres of water a day to 1.3 million customers (approximately a tonne of water to every customer weekly.
- We take away and treat 480 million litres of sewage from 2.8 million customers every day.
- We continue to engage on a day to day basis with our customers through a variety of channels. In any one year we talk to around 60,000 customers as part of this routine engagement and their voice does make a difference to the services we offer and the communications we provide.
- We aim to provide our customers with the highest levels of service and give them the best possible experience when dealing with us. We are required by law to maintain certain standards and we aim to go beyond these by offering our customers one of the best overall guarantees in the industry.

Our regulators B

Every aspect of Wessex Water's performance is tightly monitored and regulated. The list below sets out the roles and responsibilities of our Regulators:

Ofwat is our economic regulator. It ensures that the Company provide good quality service at a fair price by: setting price limits; ensuring that it properly carry out our statutory responsibilities; protecting customer standards of service; and encouraging efficiency

The Drinking Water Inspectorate ensures that the Company supply water that is safe to drink and meets standards set out in Water Quality Regulations. It also investigates consumer complaints and incidents that affect, or could affect, drinking water quality.

The Environment Agency (EA) seeks to maintain and improve the quality of 'raw' water in England and Wales, and is responsible for issuing water companies with abstraction licences. The EA is concerned with the quality of fresh surface and underground water, marine and estuarial waters, and strives to prevent/reduce the threat of water contamination.

Consumer Council for Water promotes and represents the interests of our customers in respect of prices, service and value for money. It also investigates customer complaints.

D

Community Engagement Activities

- HELPING CUSTOMERS TO SAVE WATER AND MONEY
- REACHING OUT TO SCHOOL CHILDREN
- PROVIDING MORE SUPPORT FOR CUSTOMERS IN FINANCIAL DIFFICULTY
- INCREASED STAFF ENGAGEMENT WITH THE LOCAL COMMUNITY
- HELPING LOCAL GROUPS IN RIVER MANAGEMENT
- INCREASING OR IMPROVING THE PROVISION OF RECREATIONAL FACILITIES
- HELPING OUR WIDER COMMUNITY TO VALUE THE NATURAL WATER SYSTEM
- REACHING OUT TO MORE VULNERABLE CUSTOMERS

D1

Helping customers to save water and money

Wessex Water can help its customers save water and money through the provision of better information on how they could use less water.

Wessex Water could do this by means of awareness campaigns, water efficiency advice and by supplying free water meters to its customers.

D2

Reaching out to school children

Wessex Water can reach out to younger generations by increasing the number of talks it does with schoolchildren on water and wastewater services, and providing more educational resources for teachers.

D3

Providing more support for customers in financial difficulty

Wessex Water can increase the amount of support it offers to customers in financial hardship such as low rate tariffs and debt repayment schemes.

D4

Increased staff engagement with the local community

Wessex Water can encourage its staff to get more involved with the local communities they are serving by allowing them to spend more time in the working week on local community projects and charity activities.

D5

Helping local groups in river management

Wessex Water can encourage river stewardship by working with and involving local customer groups in the management of the waterways near to where they live or work.

This could include activities such as hosting regular volunteer days improving conditions on river banks, providing education on river protection, and offering vocational trainings and work placements to help develop river management skills.

D6

Increasing or improving the provision of recreational facilities

Wessex Water can increase the provision of recreational facilities or improve the quality of existing ones such as reservoir visitor centres, sailing sites, fishing sites, cafés, play parks etc.

D7

Helping our wider community to value the natural water system

Wessex Water can help the wider community to value the natural water system by increasing its expenditure on campaigns aimed at raising the awareness of the wider public about water resources and ecosystems through various media (TV, radio, print, social media etc).

D8

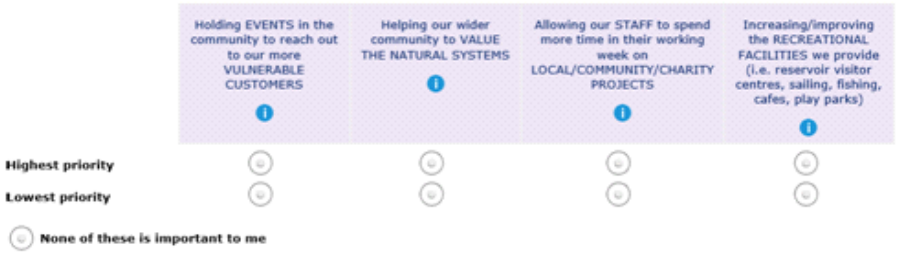
Reaching out to more vulnerable customers

Wessex Water can attend or hold more events in the local community to reach out to customers who are more vulnerable (including senior citizens and those in financial hardship).

E

Instructions for the first choice exercise

For the next ten questions you will be shown four community activities which will be presented like the example shown below:



For each set of activities, we would like you to select **one** activity that you would like to have the **highest priority** and **one** to have the **lowest priority.**

W

Water Resources

- WATER LEAKAGE
- WATER CONSERVATION DEVICES
- NEW WATER METERS FITTED
- NEW SMART METERS FITTED
- RIVER WATER FLOW LEVELS
- HOSEPIPE BANS

W1

Water Leakage

Wessex Water can undertake infrastructural works to reduce the extent of leakage from water mains.

Currently 21% of the water that is treated by Wessex Water gets lost due to leakage.

W2

Water Conservation Devices

Wessex Water can enhance the water efficiency of its operations by increasing the number of its customers who receive water conservation devices.

Such devices include high-efficiency kitchen and bath aerators which are more water efficient. By mixing the water with air, they control the amount of water that flows through the tap without affecting the water pressure.

Wessex Water could also provide high-efficiency shower heads which affect water consumption by controlling the flow and spray pattern of the water.

Currently the proportion of customer properties receiving such devices is 7%.

W3

New Water Meters Fitted

Wessex Water can enhance the water efficiency of its operations by fitting more unmetered customer properties with new water meters, and hence increase meter uptake across its customer base.

Currently 77% of properties are fitted with meters.

W4

New Smart Meters Fitted

Wessex Water can further enhance its water efficiency by fitting more customer properties with new smart meters that can digitally send meter readings to the company.

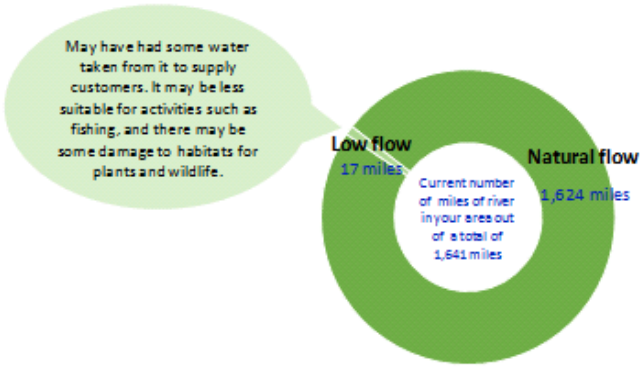
This can ensure more accurate water bills. Smart meters also come with monitors, so you can better understand your water usage.

Currently no properties are fitted with smart meters.

W5

River Water Flow Levels

The flow rates of rivers in the Wessex Water area depend partly on the amount of water taken from the environment to supply customers. Rivers are classified as:



W6

Hosepipe Bans

As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months).

For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one.

Currently there is a 22% chance that your property will experience this problem over the course of our 25 year plan.

An alternative way of explaining this is that there is a 1 in 100 risk that this happens to a property in the Wessex Water area in any year.

X1

Instructions for the second choice exercise

Wessex Water can invest your money to improve service levels across all service areas. Alternatively, by spending less in some areas, Wessex Water will be able to spend more in others, or reduce bills.

The next five questions will each present you with two options of service aspects, and ask you to choose between them. You will also see the associated change in your annual water bill from Wessex Water from 2019 to 2024.

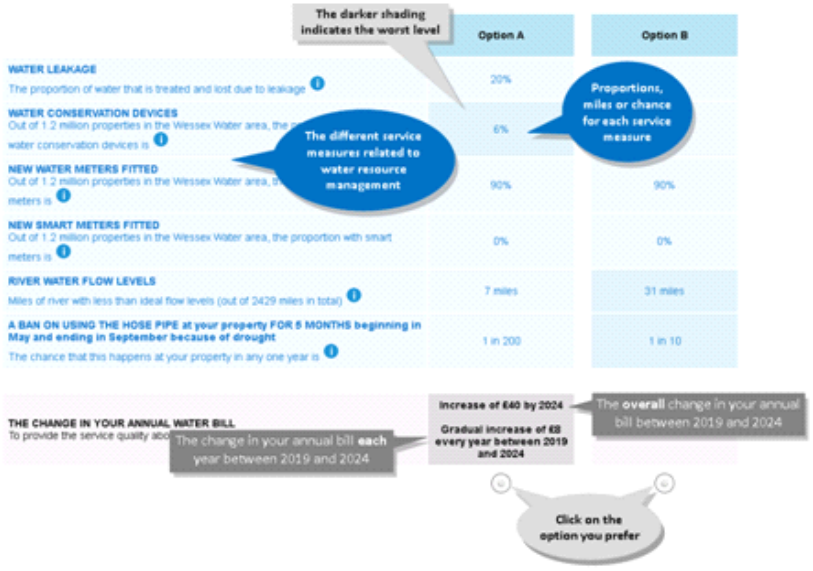
This set of choices is only about the water resources element of your bill, and no changes to other aspects of your water supply or to your sewerage service are considered in this survey.

The aim of this exercise is to encourage you to consider your preferences carefully and decide which option you would prefer. You may some parts more and some parts less but please decide overall which one you would prefer.

The next show card shows the format the options will be presented in.

X2

Instructions for the second choice exercise



X3

Instructions for the second choice exercise

Sometimes a Package may say "NO CHANGE" in the bill, but still include a change in the service levels.

When making your choices between the different service packages please bear in mind the following:

- that your bill would also increase by the rate of inflation each year;
- that any money you would pay for better service levels here will not be available for you to spend on other things; and
- that the new bill level will gradually adjust over five years and stay the same after that. To maintain the service levels, your Wessex Water bill will not drop back to the level it was prior to changes in service levels.

For household customers only:

R

Highest Level of Qualifications

1. No qualifications	
2. Level 1	1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills
3. Level 2	5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma
4. Apprenticeship	
5. Level 3	2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3, Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma
6. Level 4 and above	Degree (e.g. BA, BSc), Higher Degree (e.g. MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (e.g. teaching, nursing, accountancy)
7. Other qualifications	Vocational/Work-related Qualifications, Foreign Qualifications

For household customers only:

s

Wessex Water 'Have Your Say'

Wessex Water likes to hear what their customers think of their service. They have been running an online customer panel called Wessex Water 'Have Your Say' for nearly 4 years and have over 2,000 members. They would now like to invite you to join their panel. As a panel member you will be asked to take part in a short survey roughly every 3 months.

The surveys are about Wessex Water and things that matter to you as customers. The information is used to help Wessex Water provide you with a better service now and in the future.

If you want to find out more, visit www.wessexwater.co.uk/haveyoursay

If you sign up, you are under no obligation and can leave the panel at any time.

Customer Valuation
Research to Support PR19

November 2016

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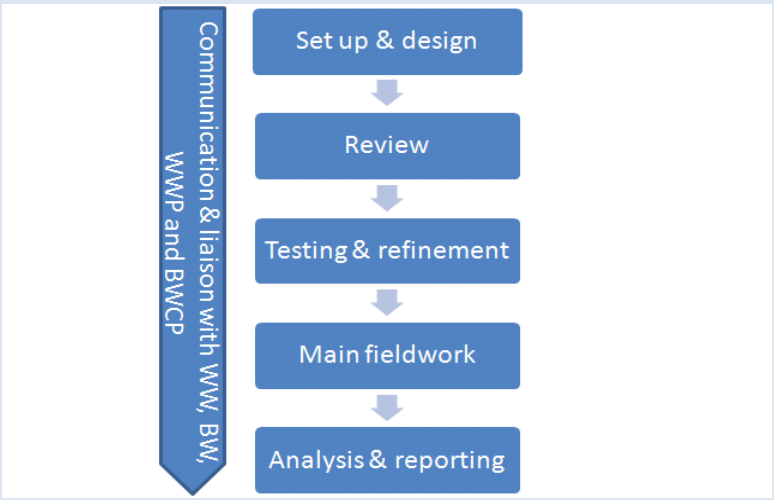
CONTENTS

Executive Overview

Customer Valuation & Stage 2 Research

Context	Wessex Water (WW) and Bristol Water (BW) require an approach to customer valuation measurement that must be robust to a high degree of potential scrutiny by internal and external stakeholders including Ofwat and Wessex Water Partnership (WWP) and Bristol Water Challenge Panel members.
Core Objective	To develop a stated preference survey that will estimate customer valuations of incremental service improvements relating to Wessex Water's and Bristol Water's business plans.
Desired Outcome	Estimates of customer valuations of incremental service improvements. In addition, the data will support setting performance commitments (PCs) and outcome delivery incentives (ODIs).

Overview of approach



Investment	
Why Accent?	A highly experienced and dynamic multi-disciplinary team with a long track record of successful collaboration. Proven track record of meeting tight deadlines without compromising on quality. Deep knowledge of the methodologies for price review research including a large number of customer valuation studies.

November 2016
© Accent 2016

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1. INTRODUCTION

1.1 Background

During PR14 water companies made extensive use of willingness to pay (WTP) evidence to derive economically justified performance commitments (PC) and outcome delivery incentives (ODI). In response to some concerns raised in relation to the methodology used to generate this evidence, Ofwat has challenged companies to consider how customer valuation evidence could be improved and to explore what alternative and complementary tools are available to understand their customers' needs and requirements.

Overall, it is evident that the approach to customer valuation evidence collection for PR19 will need to evolve from, rather than merely replicate, the PR14 approach.

In this context, Wessex Water (WW) requires an approach to customer valuation measurement that must be robust to a high degree of potential scrutiny by internal stakeholders, Ofwat, Wessex Water Partnership (WWP) members and other external stakeholders. This will need to tackle head on the variety of issues that have been raised regarding the PR14 WTP methodology.

Additionally it will need to find solutions that address these issues without losing the key benefits and commendable features of the previous approach, including the need to make the surveys simpler for respondents and to enable the 'triangulation' of results from alternative sources of valuation evidence.

1.2 Objectives

The overall research objective of the present study is to estimate customer valuations of incremental service improvements relating to proposed areas of investment in WW's PR19 business plan. This will be a key discrete research project within the wider customer engagement programme.

The valuations are to be obtained for household and non-household customers, and are to be expressed in pounds per customer per year, for each service area. Confidence ranges as well as point estimates will be provided.

The results are to serve as inputs for use in WW's cost benefit analysis to support the setting of performance commitments (PCs), and will also help determine outcome delivery incentive (ODI) rates.

WW requires a research design that improves upon the approach taken at PR14, in terms of the respondent experience during the interview, but which also stands up to scrutiny with regard to the design and materials used.

1.3 Our Proposal

Accent and PJM are delighted to present this proposal to WW & BW. As an integrated team we offer:

- a highly experienced multi-disciplinary team with a long track record of successful collaboration. Our previous experience of working together will be invaluable in ensuring that we can meet the tight deadlines while not compromising on quality;
- a full-service ISO 20252 registered research agency, with the resources and equipment to undertake both qualitative and quantitative studies of significant size - Accent has 35 full time staff and a network of consultants to call upon in the building of project teams;
- proprietary software custom-built to utilise the most advanced and up to date stated preference (SP) approaches available;
- deep knowledge of stated preference methodologies and their application in the water sector, with experience including dozens of customer valuation studies for water companies from PR04 through to PR19, as well as the UKWIR 2011 'Carrying out WTP surveys' study;
- similar experience in other regulated sectors – transport, energy, post, finance, health and environment;
- a carefully considered work plan, based on our prior experience of similar studies, that will provide high quality results within a tight timeframe; and
- a strong reputation for delivering independent and high quality advice to a wide range of clients, including policy makers, regulators and businesses operating in network and regulated industries.

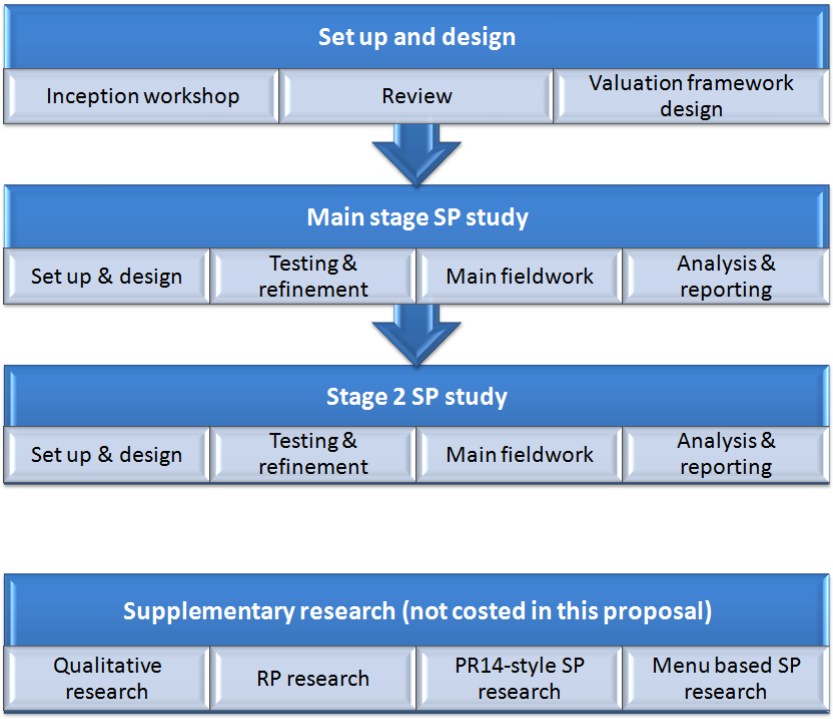
The next section sets out our proposed methodology followed by a timescale for the study in Section 3. Section 4 sets out the relevant experience of Accent and the proposed study team, Section 5 provides details of our budget and other contractual issues, while Section 6 describes our quality control procedures.

Appendix A contains background to Accent and our relevant experience in more detail and team CVs are included as Appendix B.

2. METHODOLOGY

2.1 Introduction

In order to fulfil the research objectives, our recommended approach takes in three key phases of work with an additional option for "supplementary" reasearch as summarised below:



We would begin with a set-up phase with the aim of developing a 'valuation framework' – an agreed set of service measures and levels to be valued, and an agreed research programme to obtain those values.

Based on a review of the potential areas of investment highlighted in the research brief, we would then expect there to be a minimum of two core research studies: a 'Main stage' SP study and a 'Stage 2' SP study focusing on water supply demand options.

WW & BW have also indicated that there are likely to be further potential briefs developed to explore other sources of triangulation.

The companies will also be looking to contextualise the findings against other sources of customer data and the PR19 programme components that have already been undertaken as well as potentially making comparisons with the PR14 valuations.

We would recommend that WW and BW appoint a peer reviewer to provide assurance to WW, BW and external stakeholders as to the quality of the research. We would be pleased to discuss options for this peer review with WW & BW if that would be helpful.

Across each of these phases we will ensure that we liaise with Wessex Water, Bristol Water, the Wessex Water Partnership and Bristol Water's Challenge Panel.

Each of the phases of work is described in greater detail in the remainder of this section once we have addressed some of the key issues we've considered when designing our approach.

2.2 Key Issues

Challenges for PR19 Customer Valutation Methodology

The following table summarises the key challenges and concerns regarding the PR14 approach, and our proposed method of addressing them for PR19 (table 1).

Table 1: Challenges for PR19 WTP Methodology

Challenge/concern	How we would address
PR14 WTP instrument was widely viewed as being too complex/abstract	Accent and PJM have developed a simpler and less abstract research instrument (more details of this below.) A key benefit of the new approach is that it avoids the need to present respondents with the task of trading off small risk changes (eg '1 in 10,000 chance of sewer flooding') against one another, the source of much of the difficulty with the PR14 approach.
Unclear how answers feed into business plans/a 'black box'	Based on our PR14 experience, we believe it is vital that the client and agency teams and the WWP engage at an early stage to discuss the methodology for developing and using customer valuation evidence, and allow a genuine dialogue to take place. Building a good relationship between the WWP and the researchers undoubtedly helps to avoid subsequent critique of the methodology at a later time in the programme.
WTP measures don't take account of comparative performance	Ofwat intervened at PR14 to replace certain PCs and ODIs based on WTP evidence with those based on comparative performance information. We believe this issue could be prevented by including comparative performance information within surveys. We would seek to discuss the practicalities of doing this with WW at the project outset.
WTP numbers are too variable across companies to be valid; Customer valuation measures need to be triangulated with/supported by other evidence	Ofwat has cited the variability of WTP numbers for comparable service measures as a reason why companies should look beyond sole reliance on SP evidence at PR19. We propose that a twin-track approach is taken to address this issue. - Firstly, we are nearing completion on a cross-industry study related to this issue where we have analysed the variation across companies' PR14 WTP results in order to be able to explain it. The results from this study show that the majority of the variance is explained via observed differences between survey instruments. This finding should go some way to alleviating concerns with regard to the PR14 WTP research, but it also highlights that there remains substantial room for improvement in relation to customer valuation elicitation. - Additionally, we recommend to WW that distinct but comparable research is undertaken to test, validate and triangulate with the main SP results. (See the 'Further Optional Value Added Work Streams' in section 2.6 for details).

Customer valuation measures aren't consistent with how they are applied in ODIs	As noted in a Water 2020 discussion paper by Northumbrian Water, it is not necessarily the case that customer valuation measures obtained in the context of setting ODI rates would be the same as when obtained in the context of setting PCs. However, economic efficiency requires that the ODI rate is based on the same value as was used to set the PCs. This means that WW's valuation framework needs to capture customer valuation estimates that are valid both for setting performance commitments and to use as the basis for setting ODI rates. This requires there to be close links between research streams focussed on outcome definition, measurement, and ODIs and the customer valuation research. We would seek to discuss these links with WW at the project outset.

Survey Instrument

There are a number of different data collection methods that could be utilised for both the main customer valuation and Stage 2 surveys. We have considered the following when putting together our proposal:

Online – through commercial panels

Benefits: very cost effective. Participants can complete the survey at their own convenience – entering the survey any number of times.

Disbenefits: difficult to control quotas within specific geographical areas. Participants likely to be clustered in metropolitan areas meaning a wide geographical representation is hard to achieve. Biased towards certain age and social demographic groups.

Recommendation: we have contacted all of the key panel companies and none could guarantee to provide sufficient sample with age, geographical and SEG quotas to ensure the survey would be representative of WW's and BW's supply areas. We have, therefore, discounted this method.

Online – utilising customer sample supplied by WW & BW

Benefits: very cost effective. Participants can complete the survey at their own convenience – entering the survey any number of times. Provided there is sufficient sample (which the numbers that WW & BW has quoted indicate that there seems to be) the fieldwork can be conducted without offering a thank you incentive.

Disbenefits: limited information on each customer (ie: age, SEG, location) which can make filling quotas difficult.

Recommendation: we understand that WW & BW hold email sample sufficient sample to conduct the majority of household interviews online without offering an incentive. Issues around quotas can be overcome through boosting hard to reach groups through an complementary method (see below). It is also possible to oversample in an attempt to reach minimum quotas given that there is no incentive overrun to consider.

Telephone

Benefits: using random digit dialling it is possible to target quite specific geographical areas (which is important when, for example, targeting water only/dual supply areas). Additionally telephone research can cover the whole of WW's and BW's supply areas avoiding any geographical clustering. Respondents are taken through the interview by a trained interviewer ensuring they are comfortable with the questions and answers they are giving. Show material can be used – this is either mailed or emailed to a respondent after a short recruitment interview with a full interview made at a time convenient to the respondent OR emailed to the respondent during the recruitment interview so that the main interview can happen at the same time. A further alternative is sending the respondent a secure link to their show material which can be accessed via the Internet.

Disbenefits: is more expensive than a self completion methodology. Can exclude certain types of households (such as mobile only although there are sample suppliers who are starting to provide geographically defined sample of mobile numbers).

Recommendation: if WW & BW do not feel comfortable with a self completion method (as above – utilising WW/BW supplied sample) this would be our suggested approach for the majority of the data collection.

Face to face – in home

Benefits: respondents are taken through the interview by a trained interviewer ensuring they are comfortable with the questions and answers they are giving. All types of customers can be included in the research such as low income, mobile only, etc.

Disbenefits: an expensive data collection method. Interviews will be geographically clustered.

Recommendation: given that telephone research provides similar benefits without the core disbenefit of geographical clustering we do not recommend that in home face to face interviews are used as the primary data collection tool. However, we do believe that there is a role for in home interviews to ensure that all customers groups are included in the overall sample and recommend that a booster of 100 interviews are conducted using this method to ensure we include all seldom heard customer groups.

Face to face – hall tests

Benefits: respondents are taken through the interview by a trained interviewer ensuring they are comfortable with the questions and answers they are giving.

Disbenefits: an expensive data collection method. Interviews will be geographically clustered. Certain types of customers will be excluded (such as those with mobility issues). Incentives required.

Recommendation: given that telephone research provides similar benefits without the disbenefits of geographical clustering or excluding certain customer groups we do not recommend that hall tests are used.

Survey instrument recommendation

Taking the above into consideration our recommendation for the household surveys would be to conduct the research using either an online approach with sample supplied by WW/BW or a telephone approach with sample sourced by Accent.

Irrespective which of these two approaches is used we would also recommend a booster of 200 face to face in-home interviews to ensure that we capture the views of seldom heard customers who are unlikely to respond to either online or telephone surveys (such as very low income households or mobile only households. These interviews will be split equally between the Bristol Water supply area and the Wessex supply area excluding customers in the Bristol Water area.

For these interviews we would suggest that we focus on specific areas (such as those with higher than average households on very low incomes) to ensure we maximise indentifying in scope respondents. This is a method we have used across a number of projects in the water sector – including those assessing customers' response to social tariffs.

For the non household survey our recommendation would be to conduct the research utilising a telephone method. Our experience has shown that business respondents across the different size categories are often disengaged from online surveys meaning response rates can be very low (particularly without an incentive). In addition, we cannot be sure who is actually completing the survey – often it can be an assistant or someone in an administrative role rather than the decision maker. Business respondents can also benefit from having an interviewer led interview which takes some of the burden of completing the survey away from them.

2.3 Phase 1: Valuation Framework Design

Areas of Investment

The draft categories of the investment plan to be assessed were given in the brief. The following table contains all of the categories from the brief), re-ordered into groups, and indicates how we would propose to explore them in our research. [Note this relates to the original list supplied by WW and does not take into account a similar list for BW which is expected to be delivered by 2nd December 2016]. The approach would be reviewed following the inception meeting, and review of relevant materials supplied by WW/BW at the project outset.

Table 2: Areas of investment and potential valuation approach

Area of investment	Valuation approach	Comment
Drinking water acceptability (hard / soft, taste & odour)	Main stage survey	Value per avoided incident would be obtained from the joint analysis of the MaxDiff and Package exercises as described in Figures 2 and 3 and 2.4.

Supply interruptions (planned and unplanned)	Main stage survey	Since our proposed approach is able to value more attributes within a single survey than at PR14, we would be able to potentially include several different durations of planned and unplanned interruption within a single survey, rather than requiring a separate 'Stage 2' survey. This could therefore be more cost-effective that the PR14 approach.
Resilient services (eg properties supplied by a single source)	Main stage survey	We would envisage obtaining a value per avoided long term stoppage, and would advise that resilience investment be valued via multiplying this value by the extent to which the risk of such incidents would be reduced.
Loss of pressure	Main stage survey	Potentially, separate values could be obtained for intermittent versus persistent low pressure, all within the main survey instrument, if so desired.
Sewer flooding (internal, external)	Main stage survey	Potentially, separate values could be obtained for different external locations or for different severities, all within the main survey instrument, if so desired.
CSO spills	Main stage survey	Potentially, separate values could be obtained for different categories of pollution incident and/or different distances from the customer to the affected water.
Bathing water quality	Main stage survey	Note that bathing water quality (and river water quality,and river flows) would need to be measured via the extent to which pollution causing lower quality levels is avoided. Potentially, different levels of quality/impact could be valued, and/or different distances from the customer to the affected water.
River water quality	Main stage survey	As above for bathing water quality.
River flow (levels of abstraction)	Main stage + Stage 2 surveys	As above for bathing water quality. However, this attribute would also advisedly be included within our proposed Stage 2 survey focused on water supply-demand options as the choice of option will likely affect river flows.
Temporary bans on water use (TUB) / Non-essential use bans (NEUB)	Main stage + Stage 2 surveys	Values for TUBs would be obtained for households only, whereas values for NEUBs would be obtained for non-households only. The attributes would also advisedly be included in the Stage 2 survey research on the basis that different supply-demand balance options would have different impacts on the chance of a TUB/NEUB.
Leakage	Stage 2 survey	Different levels of leakage would advisedly be valued in the Stage 2 survey as water supply-demand balance options.
Metering	Stage 2 survey	Metering would advisedly be valued in the Stage 2 survey as a water supply-demand balance option.

Water efficiency (devices, behaviour change)	Stage 2 survey	Water efficiency measures would advisedly be valued in the Stage 2 survey as water supply-demand balance options.
Reduced carbon footprint	Value transfer	The recommended method for valuing reduced carbon footprint is to use published figures from DECC. We would support this recommendation, and would be pleased to advise WW on how to obtain such a value in more detail if commissioned.
Intergenerational investment (ie maintaining/investing for 20-50 years' time)	To be discussed.	There are two key issues pertaining to the valuation of intergenerational investment: (i) the extent to which customers in the future will benefit from the investment, and (ii) the extent to which the costs and the benefits are out of sync, ie the extent to which current customers would be paying for future generations' benefits. In respect of the first issue, there are potentially ways in which this could be explored via analysis of how values change with age and, in conjunction with analysis of demographic changes, how the value is likely to be different in future from its current level. In relation to the synchronisation of costs and benefits, this issue depends to a large extent on the RCV run-off rate chosen by WW to depreciate its capital investment. A low run-off rate would potentially obviate the need for any imbalance. However, if, for any reason, the run-off rate must be set higher than the rate consistent with paying-for-benefits, then there are potentially ways to explore the current generation's willingness to pay for benefits accruing to future generation. Such research would effectively estimate a discount rate that could be used to perform inter-year transfers of costs and benefits to obtain a present value valuation of long-term investments, given estimates of the in-year benefits from the investment for each year in the investment horizon. In general, based on the literature on stated preference discount rate estimation, as well as our own research for another water company, we would expect to obtain a significantly higher discount rate estimate than the Green Book rate of 3.5% typically used in CBA. This would raise the question as to which discount rate was preferable, and there would be arguments to support both sides. Overall, there are important issues to be discussed in relation to this area which cannot be resolved within this

		proposal. If commiussioned, we would therefore seek to discuss the area with WW at the project outset.
Homes not currently served by mains water	To be discussed.	It is not clear to us that there should be any attempt made to obtain a customer value for connecting homes to the mains water supply. Rather, we expect that WW has a duty under section 37 and 94 of the WIA91 to develop its network in order to meet increasing demand through new connections. Furthermore, there will be recoverable costs for so doing, as well as a new revenue stream once the connection is in place.
Community engagement	To be discussed.	It is not clear to us what, if anything, would need to be valued under the banner of community engagement. Is it the potential for local sponsorship for instance? For this reason, we would need to discuss this area with WW in more detail to understand the research needs prior to deciding upon an appropriate methodology.

Phase 1 Tasks and Deliverables

Task 1.1: Inception Workshop

At the beginning of the project we recommend an inception workshop consisting of WW internal stakeholders. This meeting will be held to:

- agree the objectives for the study
- discuss initial views on how the research might develop and any feasibility constraints
- agree project timescales, project management arrangements and procedures for the subsequent stages of the project
- identify any materials relevant to the study that should be brought to the attention of the project team, in particular the recent qualitative and quantitative research to inform the business plan along with the ongoing tracking studies.

The meeting will be important to ensure that the project is effectively kicked off and managed.

Accent would set the agenda for the meeting and provide a project résumé following the meeting which would minute key elements of the discussion, details of any changes in scope agreed, and final specification of the project approach and timescale.

Task 1.2: Review of Materials

Following the inception meeting, we would initiate a review of what was done at PR14 with regard to the design, implementation and use of value evidence, and how things have moved on, in terms of WW and the wider industry challenges since PR14. This review would inform the development of the valuation framework and initial design of research materials, both discussed below.

Task 1.3: Development of Valuation Framework

A valuation framework is needed at an early stage of the research as a means of ensuring that, and showing how, the research will deliver all the required outputs. It will involve a review of WW's and BW's PR14 valuation framework and its requirements for PR19, and relevant guidance documents.

Task 1.4: Debrief and Agreement on Way Forward

Accent and PJM would discuss the draft valuation framework with WW/BW and agree any amendments to be made. Ultimately, we would aim to agree with WW/BW what attributes and levels are required for valuation, in detail, and what research methodologies will be used to obtain the required valuations.

Phase 1 Deliverables

The project deliverables from the design phase would include a project résumé following the inception workshop, and a valuation framework document, including agreed main research programme.

2.4 Phase 2a: Main Stage Stated Preference Research

Main Stage SP Research Programme

Our recommended approach to the main stage research comprises four phases:

- Stage 1: Set up & design
- Stage 2: Testing & refinement
- Stage 3: Main fieldwork
- Stage 4: Analysis and reporting.

Table 1 outlines the tasks involved in each phase, and the outcomes that would be delivered. The research team would liaise directly or indirectly with WW's and BW's stakeholders throughout the study, and would provide ongoing ad hoc support to WW/ BW throughout the full PR19 planning period to deal with any issues concerning interpretation and application of the results.

Table 3: Outline Research Programme

Stage	Task	Outcomes
(i) Set up & design	Development of questionnaire, experimental designs and sample plans.	Draft survey instrument for testing Experimental designs for pilot Sample plans
(ii) Testing & refinement	Cognitive interviews Pilot study Refinements to survey instruments	Cognitive report Pilot report Final survey instruments Draft excel output tables

	Production of draft output tables Meeting with steering group	
(iii) Main fieldwork	Household survey (waste only and dual-supply areas) Non-household survey (waste only and dual-supply areas)	Datasets
(iv) Analysis & reporting	Descriptive analysis Econometric analysis Development of WTP functions Reporting Delivery workshop(s)	Topline results Draft final report Final report Excel workbook of output Delivery workshop

In the remainder of this section, we provide further details concerning the scope of work to be undertaken and the outputs that would be delivered at each stage starting with an explation of our proposed new valuation method.

Proposed New Valuation Method for PR19

In response to the key criticism that the PR14 approach was too complex, we have developed a proposed new form of choice question for PR19. The form of question is based on the MaxDiff, or Best-Worst Scaling, technique, which is an established and robust alternative to the use of discrete choice experiments (DCE), whilst still being based on the same underlying theory (Random Utility Theory).[1]

Our proposed new form of choice question is illustrated in Figure 2 below, alongside a choice card based on UKWIR (2011) "Carrying out WTP surveys" which illustrates the PR14 valuation approach (Figure 1).

[1] Louviere, J., Flynn, T., and Marley, A. (2015) Best-Worst Scaling: Theory, Methods and Applications, Cambridge University Press

Figure 1: Example PR14 Choice Card (Based on UKWIR, 2011)

	Option A	Option B
AN UNEXPECTED INTERRUPTION to your water supply at your property lasting between 6-12 hours. The change that this happen at your property in any one year	5 in 1,000	1 in 1,000
THE WATER AT YOUR PROPERTY HAS A TASTE OR ODOUR that is not ideal for a week at a time, but it is safe to drink The change that this happen at your property in any one year	10 in 1,000	8 in 1,000
THE WATER IS DISCOLOURED AT YOUR PROPERTY for a week at a time, but it is safe to drink. Running the tap for several minutes will not remove the discolouration The change that this happen at your property in any one year	15 in 1,000	12 in 1,000
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL to provide the service quality above. The new level will also apply in all later years	Same as now every year for 5 years from £442 in 2015 to £442	Increase of £10 each year for 5 years from £442 to £492 by

Figure 2: Example Proposed Choice Card for PR19

Which of these types of service failure would be worst for you and which would be the least bad?

Worst		Least bad
☐	AN UNEXPECTED INTERRUPTION to the water supply at your property lasting between 6-12 hours.	☐
☐	A BAN ON USING THE HOSE PIPE at your property that would typically last for 5 months beginning in May and ending in September.	☐
☐	YOUR TAP WATER HAS A TASTE AND SMELL that is not ideal for a week, but it is safe to drink.	☐
☐	YOUR TAP WATER IS DISCOLOURED for a week, but it is safe to drink. Running the tap for several minutes will not remove the discolouration.	☐

The key advantage of the proposed method is that the questions would be much simpler for respondents to answer. The approach does not need so many SP exercises which also simplifies the burden on participants.

The PR14 approach presented options containing alternate levels of risk for each type of service failure in question, plus a change in the water bill, and respondents chose their preferred package. Options varied across the experimental design in terms of the combinations of risk levels though the service measures themselves were the same in each question within a choice exercise.

By contrast, our proposed PR19 approach presents four types of service failure at a time and asks respondents to choose which would be worst for them and which would be least bad. No risks are shown in this case; respondents just have to imagine the service failure itself. In an exercise of this kind, the combination of four service measures would change in each question.

Overall, around 20-25 attributes could be included robustly within a design, with potentially many more being possible if sample sizes are large and designs are segmented so that different people see different combinations. This represents a substantial increase from the number of attributes that could be included in a PR14-style research instrument.

Accordingly, an important benefit of the proposed approach is that it could potentially avoid the need to conduct several costly Stage 2 surveys to obtain values for all of the required attributes in WW's and BW's service measure frameworks.

The MaxDiff exercise would generate a quantitative measure of preference, otherwise known as utility, for each of the attributes included in the design for the customer population or sub-populations. This measure provides a means of understanding how bad each type of service failure would be relative to some benchmark.

In order to generate value estimates per avoided service failure an additional question, or set of questions, will be needed. This is because the MaxDiff questions only generate relative measures of utility, and these must be scaled to a money metric using evidence on customers' willingness to trade off money for service level changes at the package level.

An illustrative example of the type of question that might be adopted for PR19 to capture willingness to pay at the package level is shown in Figure 3.

On the surface, this type of question appears similar to the PR14 valuation approach. However, it is in fact simpler due to the fact that the proposed PR19 questions only need to show a limited range of package alternatives, rather than having each attribute potentially taking any service level. They also show the packages systematically improving in service quality for increases in price which makes it far easier for respondents to understand what is happening and what they are being asked to do.

Figure 3: Illustrative PR19 Package Choice

	OPTION A (Same as now)	OPTION B	OPTION C
DISCOLOURED WATER (customers affected per year)	3,000	2,000	1,500
WATER TASTE & SMELL not ideal (customers affected per year)	2,000	1,500	1,000
UNEXPECTED INTERRUPTIONS (customers affected per year)	100,000	80,000	60,000
PERSISTENT LOW WATER PRESSURE (customers affected per year)	200,000	150,000	100,000
SEWER FLOODING INSIDE CUSTOMERS' PROPERTIES (number of customers affected per year)	200	150	140
SEWER FLOODING IN CUSTOMERS' GARDENS & PUBLIC AREAS (number of customers affected per year)	2,500	2,300	1,800
POLLUTION INCIDENTS (number of incidents per year)	50	30	10
RIVER WATER QUALITY (percentage of river miles that are at least 'Good' quality)	70%	75%	80%
THE CHANGE IN YOUR ANNUAL WATER & SEWERAGE BILL to provide the service quality above.	Same as now every year for five years, from	Increase of £4.40 every year for 5 years, from	Increase of £8.60 every year for 5 years, from
The new bill level will also apply in all later years and excludes inflationary changes.	£442 in 2019 to **£442 from 2024**	£442 in 2019 to **£464 from 2024**	£442 in 2019 to **£485 from 2024**

The PR14 approach required lots of variation in service levels in order to estimate values for each service level change in each service measure. By contrast, in the PR19 approach relative values of each of the included elements are measured via the MaxDiff exercise and so the Package exercise would only need to derive a small number of package valuations in order to scale these relative values. The PR19 Package questions would therefore be relatively straightforward for respondents to answer.

In principle, additional profiles could be generated to show, for example, a "Flat bill" alternative, which includes some improvements, or a "Minimal investment" alternative, which includes some decrements to service. The advantage of having multiple profiles in this exercise, rather than just a single package, is that customer value is not expected to be linear in service level change. By having multiple package valuations, one can derive individual service measure level value estimates that are sensitive to the size/cost of the package within which they are to be carried out.

Importantly, we would anticipate that in the package exercise additional information would be provided to show comparative performance details where possible. By so doing, the approach would address one of the key issues raised by Ofwat with respect to the PR14 valuation approach.

The examples shown above are illustrative only at this stage. They show clearly, however, that the questions address the sam issues as those included in the PR14 WTP research, but are much simpler for respondents to answer.

They therefore represent a significant innovation in customer valuation elicitation design for the water sector.

Pros and Cons

The following table summarises our view of the advantages and disadvantages of adopting the proposed new approach for eliciting customer valuations at PR19.

Table 4: Advantages and Disadvantages of Proposed New Approach to WTP Measurement

Advantages	Disadvantages
Questions are much simpler for participants to answer.	Imposes 'Expected Utility Theory' ie a 'rational' approach to valuing risky prospects. Since people are not always rational, this assumption may not be consistent with what they would actually choose. However it should still be consistent with their true values.
The approach is driven by a lower number of exercises, hence surveys will be shorter and less likely to cause fatigue.	Novel methodology for WW, hence resulting values may depart from those found under the previous methodology.
Proven to be effective outside the UK water sector.	Methodology is yet to gain widespread approval in the water sector.
The method is statistically more efficient, hence confidence intervals will be narrower for a given sample size.	
Capable of valuing more attributes within one survey, hence less need for stage 2 surveys.	
Based on the same, or similar descriptions of service measures, and the same layout of package choices; hence there would be a strong continuity with previous research and potential synergies with acceptability testing research.	
Based on the same underlying theory (Random Utility Theory) as choice experiments, and developed by the same academics; hence credibility is assured and there is further continuity with previous research. The output is provided in same format to PR14	

The principal advantage of the proposed new approach is that the questions are much simpler for respondents to answer and the questionnaire shorter.

The majority of criticisms made of the PR14 WTP approach related in some way to the complexity of the choices facing customers, and/or their abstract nature. We have therefore taken very seriously the challenge of developing a research instrument that addresses this issue without losing the key benefits and commendable features of the previous approach.

A particular issue with the PR14 WTP approach was due to the fact that many service measures were characterised as the risks of a service failure of some kind, and those risks were almost always very small. Efforts were made at the time to try and minimise the difficulties to respondents by incorporating visual representations of risk levels (showing triangles of different sizes, scaled proportionally to risk). However, these devices were only able to make things a little easier for respondents, and not to completely overcome the fundamental difficulties that people have in understanding and appreciating differences between very small risk levels.

In our view, the complexity of the PR14 research instrument lay almost entirely in the fact that it required respondents to understand and make trade-offs between these very small risk levels. Accordingly, it would make the survey very much simpler if dealing with small risk changes could be avoided altogether.

Our approach to avoid the need to ask customers about small risk changes is to impose the principle of rational choice under risk, also known as 'Expected Utility Theory' (Von-Neumann and Morgenstern, 1953). Under this principle, the utility, or value, that a customer gets from a small reduction in the risk of a service failure is equal to the change in probability multiplied by the loss of utility associated with the service failure itself. For example, a reduction from "2 in 10" to "1 in 10" in the chance of a supply interruption would be valued as (2/10 -1/10) times the value of an avoided supply interruption. This makes the valuation potentially much simpler because one only needs to know the value of an avoided supply interruption to value any reduction in the risk of a supply interruption.

The advantage of imposing this principle in the case of water company WTP surveys is that one can focus on the relative aversion to different types of service failure directly, and then simply scale these values by the extent of the service improvement, measured by the change in risk per customer, in order to measure the relative value of each of the candidate service improvements. In other words, there is no need to ask respondents to consider small risk changes in order to understand the relative values of different types of service improvement.

The approach forces rational choice under risk, which can be seen as an advantage or a disadvantage depending on one's perspective. It is an advantage in the sense that rational choice is an appealing principle to adhere to; it is a disadvantage in the sense that there is clear behavioural evidence that people do not always choose rationally under risk.

On balance, it is argued that the benefits of employing this assumption far outweigh the concerns attached to asking respondents to give their views on complex small risks.

Given this approach to separating out risk from the aversion to the service failure itself, the elicitation method needs to adapt to focus on valuing relative aversions to different types of service failure. In this regard, the MaxDiff approach is very clearly an optimal approach. It is exactly suited to obtaining quantitative measures of relative preference between a list of on-off type features, and to do so with a high degree of statistical efficiency. Moreover, it is capable of handling large numbers of features/service failure

types and so is well suited to the case of water companies where service measure frameworks often contain very detailed and long lists of attributes to be valued.

The MaxDiff, or Best-Worst Scaling, technique has an academic pedigree equal to that of choice experiments and contingent valuation methods. It is, in fact, based on the same underlying theory (Random Utility Theory) and has been developed by the same academics credited with the development of choice experiments.

Thus, although the methodology would be novel to WW, and does not yet have widespread approval in the water sector, there should be no question that the technique is without pedigree, or risky in any way. Rather, it should be seen as representing a positive evolution of the approach to WTP measurement for the water industry that effectively solves the practical issue of how to deal with the fact that valuing small risk changes is ultimately very difficult indeed for the general public.

We are currrently working with this approach with another WASC and have discussed the approach at some length with Ofwat and other stakeholders in the industry.

Task 2a.1: Experimental designs

Following agreement of the attributes and levels to be valued in the main stage survey, we would develop experimental designs to be taken forward to the testing phase. These designs would be developed using Ngene software and incorporated within an Excel workbook to be shared with WW. This workbook would allow WW to see the choice situations that respondents would face in the survey. A design note would also be produced and shared with WW and BW at this stage in order to document the structure of the SP designs prior to the testing phase.

Task 2a.2: Development of questionnaires

The questionnaire and supporting materials would be developed to include example choice cards, example value elicitation questions and visual presentations for testing.

The questionnaire will be built around the SP design, and so would be expected to include one MaxDiff exercise (Figure 2) and one Package exercise (Figure 3). In addition, the questionnaire would include explanations of each of the service measures (which could be provided via hover buttons to keep the design looking uncluttered), questions on experiences, follow-up feedback questions following the SP exercises, and demographic questions.

Once agreed, we will programme the questionnaire into our bespoke questionnaire software – Accis. The software handles the full range of question types and, because we have developed it in-house, it is extremely flexible. If the programme code does not yet exist to allow for a certain question type, formula, presentation etc, we simply ask our in-house programmer to develop it for us.

Task 2a.3: Sample plans

Sample plans for the main stage would be developed during the set up and design stage and agreed with WW and BW. We discuss our initial proposals with regard to sample size and structure in the context of the 'Main fieldwork' stage below.

Stage (i) deliverables

- Example choice cards, example value elicitation questions, and visual presentations for testing; plus, a document explaining the rationale behind all proposed approaches and issues to be pursued, and how the subsequent cognitive interviews will be used to test and refine them.

- Cognitive interview research materials for each survey to be signed off by WW prior to implementation.

Stage (ii) Testing & Refinement

Task 2a.4: Cognitive interviews

Cognitive interviews involve taking a participant through the survey but including additional questions to probe for levels of comprehension and ease of completion. We propose conducting a series of cognitive interviews to ensure that the survey instrument is tested with household and non-household customers.

We would recommend conducting 5 interviews each with household and non-household customers for this purpose (giving 20 cognitive interviews in total – 10 in the Wessex dual supply area and 10 in the Bristol supply area). Suitable incentives for participation would also be used for this research phase.

The output from this phase would be an assessment of whether the core questions 'worked' from a cognitive perspective, and potentially a series of recommendations with regard to refining the survey instrument is areas where it did not.

This task is of critical importance given the potential changes to approach discussed in the 'Proposed New Valuation Method for PR19'.

Task 2a.5: Refinement of materials

Following the cognitive interviews, we would refine the materials for the pilot phase of research to ensure that they reflect the outcomes from the cognitive interview phase.

Task 2a.6: Pilot survey

In order to fully test the research approach, we propose a pilot sample of households and non-households, and then to analyse the data to obtain value estimates from it that can be seen to be usable for setting performance commitments and ODIs. By so doing, the study will ultimately result in an approach that can be clearly seen to be fit for purpose.

With regard to pilot sample sizes, we recommend conducting 50 interviews each with household customers and non-household customers – giving 100 pilot surveys in total for each area (WW and BW).

The household pilot will use the survey instruments (phone/post email/phone or online) agreed at the inception workshop. We will conduct 40 interviews using this method and 10 utilising a face to face method giving 50 in total (100 in total across the two areas). The non household element would be piloted using the phone/post email/phone methodology.

The proposed sample sizes strike a balance between gathering a reasonably robust data-set capable of generating indicative value estimates, versus the cost consideration that this is a pilot study rather than a full-scale survey aimed at estimating values to a high level of precision.

The pilot will also provide an opportunity to discern how many online invitations need to be sent as well identify any sub-groups of customers that may require booster with an alternative survey mode.

With regards to the household sample we will ensure that it is structured around a range of socio demographic characteristics such as age and socio-economic group and for the non-household sample we will look to structure the sample around organisation size and sector.

A note would be written for the WW and BW steering groups documenting the pilot phase of research for each survey. It would include details of the approach adopted, the findings obtained with respect to valuations, an assessment of the validity of those findings, and any implications of the research with respect to the overall framework being developed.

Following the pilot analysis, new experimental designs would be created for all stated preference exercises so as to make best use of the latest valuations to optimise the statistical efficiency of the designs. For instance, a 'D-efficient' design methodology will be adopted.

Task 2a.b: Including a PR14 Control Sample – Household Customers Only

As part of the review of PR14 work Paul Metcalfe has reviewed the show material and approaches from PR14, including those utilised by Wessex and Bristol. These are not too dissimilar from those used by Accent for other companies during PR14 consultation programmes (which is unsurprising given we were involved in the development of the UKWIR approach). Paul was part of the Nera team for that project working alongside Accent.

Our recommended approach would be to take both the PR14 and PR19 approaches through to the pilot stage at which point we would undertake detailed comparison analysis and produce a presentation (outlining the headline findings) and a report (showing detailed findings).

In order to provide a robust comparison between the two approaches we would increase the sample size – in our original proposal we included a pilot study of 100 household interviews. For the comparison pilot we would want to increase this to 200 for the PR14 approach and 200 for the PR19 approach – giving 400 pilot interviews in total. This is for each supply area – so 400 interviews in total for Wessex and 400 in total for Bristol.

Stage (ii) deliverables

Deliverables for each company from the testing & refinement stage would include the following:

- A note documenting findings and recommendations following the cognitive interview phase.
- Pilot research materials for each survey, including programmed questionnaires, to be signed off prior to implementation.
- A note documenting the pilot phase, including details of the approach adopted, the findings obtained with respect to valuations, an assessment of the validity of those findings, and any recommendations for revisions to the research instruments.
- A final set of research materials, including revised experimental designs, for main stage implementation.

Stage (iii) Main Fieldwork

Task 2a.7: Household Survey Sample

Our recommendation would be to conduct 1,000 household interviews in each of the two supply areas – 900 of which would be conducted by telephone or online (depending on the method agreed during the inception workshop) with a further 100 interviews conducted in home with seldom heard customers. We recommend this sample size as we feel it would provide sufficient granularity to explore key customer segments.

In designing the sample structure the key criteria that need to be met will be:

- that there are sufficient numbers of interviews within particular cells of interest (say ABC1s, 18-34 year olds etc) to determine customer valuations for these specific segments
- that the overall dataset is representative of WW customers.

Where the number of interviews falls short of the representative target we would propose to weight the data upon completion of fieldwork to match the make up of WW's and BW's customer bases.

In practice this means we would need to agree minimum quotas for specific sub sets to ensure that data is collected for all key groups which can then be weighted as necessary. It is envisaged that these key groups would be discussed with WW and BW but could include:

- Age
- Location
- Socio Economic Status/Income
- Contact/non-contact with WW
- Metered/unmetered
- Disabled/vulnerable/high dependency on water/offline
- Low income.

For the WW supply area we would discuss the ratio of Waste and Water customers but at this stage anticipate that our focus would be predominantly on the dual service customers.

We have considered that there is a further customer group in the non WW supply area ie 'Water only' customers. We note that this represents a very small proportion of customers across what are sparsely populated areas. To add these customers in as a segment of interest would be potentially quite costly depending on the data collection approach adopted and, hence, at this stage we have not provided costs to incorporate this customer group but could do so if this is required.

Task 2a.8: Non-household Survey Implementation

When considering a data collection approach for NHH customers, a key concern with regard to online interviewing is that it is generally impossible to ensure that the most appropriate person is the one answering the survey. Therefore, we would suggest using a phone-post/email-phone approach for the non-household survey.

The key criterion to be met is that there are sufficient numbers of interviews within particular cells of interest (eg size of organisation, size of bill, water/waste usage) to determine customer priorities and valuation for these specific segments.

Again, it is envisaged that a number of quotas would be placed on the data collection. These would be discussed with WW and BW but could include:

- Size/bill size of organisation
- Water/waste usage
- Location
- Metered/unmetered

350 interviews will be completed with non-household customers in the Wessex area and 300 in the Bristol Water area. We recommend this sample size as we feel it would provide sufficient granularity to explore key customer segments.

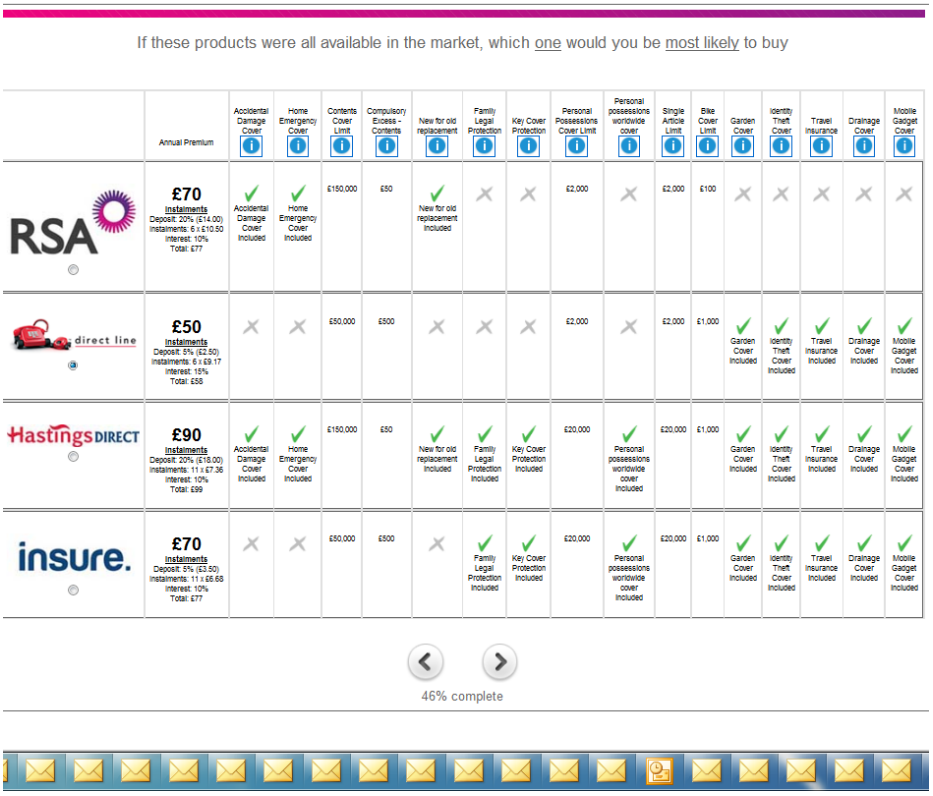
Online fieldwork

Accent recognises that when developing a questionnaire, particularly for a self completion survey, the lay-out is as important as the design content. The lay out needs to be immaculate and appropriate to the type of survey being conducted.

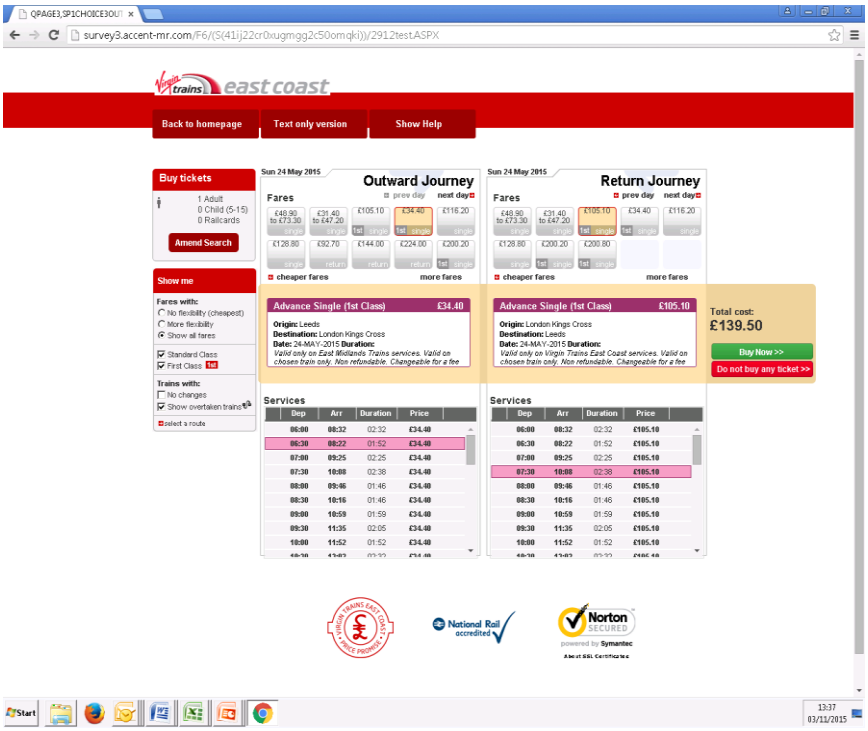
Accent has an in-house team of programmers and survey designers which allows us to be very flexible in this regard and, as a result, we regularly develop new ways of visualising questionnaires for online surveys.

Over the past years we have, for instance, conducted several projects on behalf of financial services providers around online product propositions offered through price comparison websites. Often it was decided that the best way to approach the lay-out was to ensure the survey mirrored as closely as possible a price comparison website ensuring that respondents would make their choices in a way that was close to how they would make them in 'real life'.

In the example shown below, for instance, the blue 'i' buttons are hover buttons which show more detailed information when participants hover over them. This is a feature which we integrate in all our stated preference surveys as it allows the show material and the actual stated preference exercise to be as smooth and unencumbered for the participant as possible.



We have also been working with the rail industry to explore customers' degree of flexibility in terms of departure and arrival times as well as assessing price elasticities. Whilst this is a complex issue in terms of design and analysis we needed to ensure that the stated preference exercises were meaningful and engaging for respondents to complete. We therefore developed an interface that mirrored one of the train company websites to accommodate the stated preference exercises:



Telephone Fieldwork

Telephone fieldwork would be conducted from Accent's dedicated telephone unit. Based in Edinburgh, the unit has been specially designed with the emphasis on providing the environment for work of the highest quality.

The unit is staffed by a highly experienced interviewing team, trained to ISO 20252 standards. All interviewers are tested on their written and verbal skills on recruitment and numeric skills are covered within their interviewing training programme.

The interviewing team regularly conduct quantitative and qualitative telephone interviews in consumer and business markets on a wide range of subjects. In the 12 months to the end of September 2015 Accent's telephone unit successfully conducted over 103,000 quantitative telephone interviews and recruited several hundred focus groups and depth interviews.

Task 2a.9: Data Processing

Accent undertakes all data preparation and processing in-house.

- We first check that the total number of interviews agrees with the Telephone Unit's records.
- Prior to the production of the first run of data we carry out report edits to check that the data are in the correct range, routing has been followed and to identify missing values.
- If any logical inconsistencies are found, forced edits are applied as appropriate and the logic of this forcing is documented in the syntax.
- Subsequent data runs establish if the forcing has the desired effect.

- No data is assumed/imputed without the full knowledge of the client.

A codeframe for any open or other questions is drawn up by our Senior Coding Supervisor and this is submitted to the client for approval prior to being used.

Stage (iii) Deliverables

The outcome from the main fieldwork stage would be a fully checked and validated dataset, ready for analysis.

Stage (iv) Analysis & Reporting

Task 2a.10: Basic Frequency Analysis

Standard question analysis is undertaken using SPSS and output is in the form of frequencies (initially) and then simple data tabulations in Excel, as well as raw data in Excel format.

Checks of tabulations and other data outputs include:

- all tables are present and complete
- any abbreviations used accurately reflect the full content
- the correct base size is shown and the base correctly labelled
- cross breaks are checked against the source questions
- derived data are checked against their source
- subgroup and net totals are correct
- there are no blank tables
- any weighting is correct
- frequencies have been checked prior to running tabulations
- spelling is correct
- any statistical analysis used is appropriate and correct.

Additionally, the following is checked for data tables:

- the source question is included
- where data is weighted, a description of the weighting method is included
- subgroups are clearly identified
- the base is shown clearly (for both weighted and unweighted data)
- the number and/or proportion of those giving a 'not stated' or 'don't know' response is shown
- any analysis variables and other statistical tests are shown clearly such as significance testing, indexing, scoring, scaling, calculation of means, standard deviations
- information on any data that has been suppressed to assure confidentiality.

Task 2a.11: Stated Preference Analysis

On the basis of utilising a survey instrument including PR19 choice exercises responses would be obtained on customers' worst and least bad types of service failure from the MaxDiff exercise, and on customers' preferred packages from the Package exercise.

MaxDiff choices will be interpreted in line with Random Utility Theory, such that a choice of one service failure as being the worst is understood to indicate that the (dis-)utility associated with that scenario for that respondent is higher than under any of the other three service failures in that choice question. Similarly, the choice of another service failure as being the least bad indicates that the (dis-)utility associated with that scenario for that respondent is lower than under any of the other three service failures in that choice question.

Given this way of interpreting the choices made by respondents, we can use econometric analysis to estimate the average (dis-)utility for the population or any sub-segment associated with each of the included service failures. One of the service failures would need to be omitted, and hence implicitly assigned a (dis-)utility value of zero, in order to estimate the model.

With respect to the econometric analysis, the most applicable techniques to the present study would be the multinomial logit (MNL), and mixed logit (MXL) models.

- MNL models are the simplest type, and we propose to begin by using this model to develop an appropriate specification, in terms of the selection of interaction effects and the functional forms of the included variables (linear, log-linear etc)

- MXL models are the state of the art in discrete choice analysis due to the fact that they allow for unobserved heterogeneity of respondents' preferences. They are more time consuming to estimate but the final estimates will be based on mixed logit models. These models will describe the variation in preferences over the WW customer base, as well as obtaining estimates of the average values for each service level change.

Following estimation, the (dis-)utility values would be transformed to 'odds ratios' in order to be interpretable as relative values. This transformation would involve simply taking the exponential of each of the (dis-)utility estimates. The omitted category would therefore have an odds ratio of 1 (=exp(0)), a service failure that is considered twice as bad, for example, would have an odds ratio of 2, and a service failure that is considered half as bad, for example, would have an odds ratio of 0.5.

This measure will itself provide a means of understanding how bad each type of service failure is relative to some benchmark. In order to generate value estimates, however, then these odds ratios will need to be scaled using results obtained from analysis of the Package choices.

From the Package exercise, we would obtain responses on customers' preferred package from each choice set. The bill impacts associated with each package would be varied over the sample in order to provide data on the proportions willing to pay more or less than each of the price levels included in the design. Either an econometric model (logit/mixed logit) or the Turnbull non-parametric estimator will then be used to obtain an estimate of mean value for each of the packages included in the design.

Given an estimate of mean customer value for a package, the final step will be to use this value to scale the odds ratio values as derived from the MaxDiff exercise.

To demonstrate how we would do so, let the following define the relevant terms:

WTP$_k$ mean value per avoided service failure of type *k*, the target measure for AIS

WTP$_P$ estimated mean value for package *P*, derived from the Package exercise analysis

P$_k$ the change in number of service failures of type *k* embedded within package *P*

U$_k$ the odds ratio estimate for service failure *k*, derived from the MaxDiff exercise analysis.

U$_P$ the unscaled sum of utilities for package P, derived as $U_P = \sum_k U_k P_k$

N the number of WW customers

Then, we have the following formula to derive our main estimates of *WTP$_k$*:

$$WTP_k = \frac{WTP_P}{U_P} U_k \frac{N}{P_k}$$

This formula states that the value of an avoided service failure of type *k* would be calculated by dividing mean package level value by the unscaled estimate of total utility for the package as derived using MaxDiff results, then multiplying by the odds ratio associated with service failure *k*, again as derived from the MaxDiff analysis, then multiplying by the number of WW's and BW's customers, and then finally dividing through by the change in the number of service failures of type *k* that are embedded within the package.

Each of the terms within the above equation will be straightforward to obtain, and the logic is intuitive. The ultimate results represent the total customer valuation for any segment/the entire customer base for avoiding one unit of each specific type of service failure, and as such should be directly implementable within AIS.

The benefit functions would, by default, be linear. This means that there would be a single value for each unit change in each attribute. The value taken will depend, however, upon whether the overall package is one of a declining bill or an increasing bill. This is because the Package DCE analysis will obtain values for more than one package, and each package valuation will result in a different estimate per avoided service failure.

By having multiple package valuations, one can derive individual service measure level value estimates that are sensitive to the size/cost of the package within which they are to be carried out. As a minimum, these separate estimates could be incorporated within AIS as a means of informing the range of estimates that should be tested. A better means of incorporating them, however, would be to incorporate within AIS the ability to select

the appropriate unit value given the type of package (flat bill, moderate increase, etc) being modelled. We would be happy to discuss this issue further with WW and BW at an appropriate time.

In addition to estimating average customer valuations, our analysis would also investigate how valuations vary across customer groups. For example, we would examine variations by the following segmentations:

- high/low bills
- dual/waste only
- vulnerable/other customers
- metered/unmetered
- regional variations.

We would discuss with WW and BW whether any other specific segmentation would be useful, and carry these out accordingly.

We note Ofwat's desire to see more detailed segmentation coming through this programme of work.

It is important to note that though we are advocating a far simpler data collection approach the output can be provided in exactly the same format as it was for PR14.

Task 2a.11: Validity Appraisal

The validity of the outputs of the quantitative analysis would be assessed along the usual two broad dimensions; content and construct validity. In addition, we would compare results against those from PR14 research by WW and other companies to identify if there are any significant discrepancies.

We are in a very strong position to do so having recently analysed PR14 data from across the UK.

Content validity judgements take into account the entirety of the study with the key test being that valid values are revealed by participants in the stated preference survey. Accent's high professional standards and extensive experience will ensure that the stated preference survey is developed and conducted in a manner that will ensure the validity of responses to the greatest possible extent. Peer review would also form part of the content validity assessment.

Example of content validity analysis would include examination of responses to verbatim follow-up questions (following the valuation section). These will be analysed to identify cases where answers are invalid, for example due to their representing 'protests', or a rejection or misunderstanding of the valuation task. Such cases will be identified and highlighted and the option taken to remove them from the econometric analysis.

Construct validity assessments take into account the extent to which external evidence gives credence to the outputs and the extent to which the output conform with prior expectations.

Examples of construct validity testing would include:

- analysing the internal consistency of response data with expectations. For example, we would test to see whether values are higher for high income groups than for low income groups and whether customer valuations are higher for groups that have experienced service failures in the past.

- analysing the extent to which external evidence gives credence to the outputs and the extent to which the outputs conform with prior expectations. To this end, comparisons will be made between the outputs of this study and PR14 valuation studies.

Stage (iv) (Final) Deliverables

The outputs for each company from this phase of work would include:

- a presentation of the findings
- a detailed technical report containing all the customer valuation results.
  - The main report will be written for a non-technical audience; appendices will contain full technical details to support an audit trail of how the results were derived, including the econometric specifications adopted and any intermediate results obtained.
- a results worksheet
- fully labelled datasets for households and non households containing response data.

Phase 2a Deliverables

In summary, our core deliverables for each company will comprise:

- **Stage 1 – Setup and Design:**
  - draft customer valuation questionnaires for household and non-household customer groups
  - a summary report explaining the design features of the questionnaires, and the proposed sample plans
  - a design workbook allowing WW and BVW to browse through choice situations as they would appear to respondents

- **Stage 2 – Customer Valuation Surveys Testing & Refinement:**
  - a summary report of the findings of cognitive depths and recommendations for change
  - a summary report of the findings of the pilots and recommendations for change

- **Stage 3 – Customer Valuation Surveys Main Fieldwork:**
  - a fully checked and validated dataset, ready for analysis

- **Stage 4 – Analysis & Reporting:**
  - an early summary of the findings
  - a presentation of all findings
  - a detailed technical report containing all the customer vluation results
  - a results worksheet
  - fully labelled datasets for households and non-households containing response data

2.5 Phase 2b: Stage 2 Research

Outline Stage 2 SP Research Programme

A 'Stage 2' SP survey would be needed to obtain values for some of the areas of investment highlighted in the brief, and discussed in Table 2 above. In particular, we propose a Stage 2 survey focused on water supply-demand management options, which would obtain customer valuation values in relation to leakage, metering, water efficiency measures, and potentially any others that WW and BW may wish to include, such as new or extended surface water abstractions, or boreholes, or water transfers to/from neighbouring companies.

Our recommended approach to the Stage 2 research would again comprise four phases:

- Stage 1: Set up & design
- Stage 2: Testing & refinement
- Stage 3: Main fieldwork
- Stage 4: Analysis and reporting.

If WW and BW decide to proceed with this Stage 2 survey, we would propose to run this work stream in parallel to the main stage survey,

In the remainder of this section, we provide further details concerning the scope of work to be undertaken and the outputs that would be delivered at each stage.

Stage (i) Set up & Design

Task 2b.1: Development of questionnaire

The questionnaire for this survey would be built around a single SP exercise. This exercise would ask respondents to choose between different packages of water supply-demand measures. Importantly, each package of measures would be associated with a TUB/NEUB frequency level, a bill impact, and potentially one or more environmental impact attributes such as river flow levels.

The following figure shows an example choice card from a previous study conducted for a water company at PR14. The selection of measures to be included, and the relevant

frequencies of TUBs/NEUBs to be included would be agreed with WW and BW at the project outset.

We would look to employ the same improvements as we are suggesting for the main valuation survey.

Bill figures would also be quoted in monetary terms and not percentages.

Figure 4: Example Stage 2 Choice Card

CHOICE CARD A2 Which option do you prefer?

	Option A	Option B
WESSEX WATER MEASURES		
Reduce leakage rate (from 22% to 20%)	✔	✔
Reduce leakage rate (from 20% to 15%)	✔	✔
Compulsory metering (ordinary meters)	✔	✘
Compulsory metering (smart meters)	✘	✘
Expand existing reservoir	✘	✘
Re-open existing unused reservoir	✔	✔
New wastewater recycling works	✔	✔
New water transfers from neighbouring companies	✔	✘
Water saving measures offered to all customers	✘	✔
FREQUENCY OF TEMPORARY USE BANS (lasting 5 months on average, from May to September)	**1 in 40 years**	**1 in 40 years**
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of 2% each year for 5 years from 2014, a total change of **+10% from 2019**	Increase of 1% each year for 5 years from 2014, a total change of **+5% from 2019**
Which option do you prefer?	☐	☐

In addition, the questionnaire would include explanations of each of the measures, follow-up feedback questions following the SP exercises, and demographic questions.

Once agreed, we would programme the questionnaire into our bespoke questionnaire software – Accis.

Task 2a.2: Experimental designs

Following agreement of the attributes and levels to be valued, we would develop experimental designs to be taken forward to the testing phase. These designs would be developed using Ngene software and incorporated within an Excel workbook to be shared with WW and BW. A design note would also be produced and shared with WW at this stage in order to document the structure of the SP designs prior to the testing phase.

Task 2a.3: Sample plans

Sample plans would be developed during the set up and design stage and agreed with WW and BW. We discuss our initial proposals with regard to sample size and structure in the context of the 'Main fieldwork'stage below.

Stage (i) deliverables

- A full draft survey instrument to be taken forward for testing.
- A design note and experimental design workbook relating to the SP exercise.

Stage (ii) Testing & Refinement

Task 2a.4: Cognitive interviews

As for the main stage survey, we would recommend conducting 5 interviews each with household and non-household customers to cognitively test the draft survey instrument. Suitable incentives for participation would also be used for this research.

The output from this phase would be an assessment of whether the core questions 'worked' from a cognitive perspective, and potentially a series of recommendations with regard to refining the survey instrument is areas where it did not.

Task 2a.5: Refinement of materials

Following the cognitive interviews, we would refine the materials for the pilot phase of research to ensure that they reflect the outcomes from the cognitive interview phase.

Task 2a.6: Pilot survey

For the pilot survey, we would propose a pilot of 50 interviews each with household customers and non-household customers – giving 100 pilot surveys in total in each of the WW and BW areas (ie: 200 in total). These proposed sample sizes strike a balance between gathering a reasonably robust data-set capable of generating indicative value estimates, versus the cost consideration that this is a pilot study rather than a full-scale survey aimed at estimating values to a high level of precision.

With regards to the household sample we will ensure that it is structured around a range of socio demographic characteristics such as age and socio-economic group for household customers and for the non-household sample we will look to structure around organisation size and sector.

A note would be written for the WW steering group documenting the pilot phase of research for each survey. It would include details of the approach adopted, the findings obtained with respect to valuations, an assessment of the validity of those findings, and any implications of the research with respect to the overall framework being developed.

Following the pilot analysis, new experimental designs would be created for all stated preference exercises so as to make best use of the latest valuations to optimise the statistical efficiency of the designs. We would look to employ a 'D-efficient' design methodology.

Stage (ii) deliverables

Deliverables from the testing & refinement stage would include the following:

- A note documenting findings and recommendations following the cognitive interview phase.

- Pilot research materials for each survey, including programmed questionnaires, to be signed off prior to implementation.

- A report documenting the pilot phase, including details of the approach adopted, the findings obtained with respect to valuations, an assessment of the validity of those findings, and any recommendations for revisions to the research instruments. The report will also focus on key differences and similarities between the PR14 and PR19 approaches.

- A final set of research materials, including revised experimental designs, for main stage implementation.

Stage (iii) Main Fieldwork

We envisage the second stage interviews lasting 15 minutes (both for household and non household surveys). In terms of samples we would recommend 600 household interviews with 500 either by telephone or online (as to be agreed at inception workshop) and 100 face to face interviews with vulnerable/hard to reach customers. For the non household survey we recommend 300 interviews, to be completed by telephone with sample supplied by WW.

Stage (iii) Deliverables

The outcome from the main fieldwork stage would be a fully checked and validated dataset, ready for analysis.

Stage (iv) Analysis & Reporting

Task 2a.10: Basic Frequency Analysis

Standard question analysis would be undertaken in the same manner as for the main stage survey. Outputs would be in the form of frequencies (initially) and then simple data tabulations in Excel, as well as raw data in Excel format.

Task 2a.11: Stated Preference Analysis

The focus of the stated preference choice analysis will be to obtain benefits values for direct use in WW's water resources planning tools. We will confirm the requirements for the outputs at the design stage so that there is clear sight from both sides of the expected outputs from an early stage.

The most applicable discrete choice models to the present study would be the conditional logit (CL), and mixed logit (MXL) models.

- CL models are the simplest type, and we propose to begin by using this model to develop an appropriate specification, in terms of the selection of interaction effects and the functional forms of the included variables (linear, log-linear etc).

- MXL models are the state of the art in discrete choice analysis due to the fact that they allow for unobserved heterogeneity of respondents' preferences. They are more

time consuming to estimate but we expect to be able to develop a mixed logit model for inclusion in our final report. This model will describe the variation in preferences over the WW customer base.

The initial output of the analysis will be measures of relative priorities across all the different water supply-demand measures net of their impact on the frequency of a hosepipe ban. Importantly, we will also obtain an estimate of customers' valuations for avoiding a TUB/NEUB. Since we will also obtain this value in the context of the main stage survey we will therefore be able to link the stage 2 results into the main stage results by scaling all the values for water supply-demand measures by the relative value of an avoided TUB/NEUB in the two surveys. By so doing, the results from both surveys will be consistent with one another.

The results will show how much customers are willing to pay for each type of supply-demand measure, net of its impact on the frequency of TUBs/NEUBs. This value may be either positive or negative depending on whether the measure is seen as having good or bad effects in addition to the main effect of improving the supply-demand balance. Based on previous research in this area, we would anticipate customers having a positive value for leakage reduction but negative values for most other types of measure.

Our analysis could also investigate how priorities varied across customer groups. For example, we could examine variations by the following segmentations:

- For household customers: age, socio-economic group, region, metered/unmetered, high/low bill payers, dual/waste.

- For business customers: region, number of employees, sector, bill size.

We would discuss with WW which, if any, specific segmentations would be useful, and carry these out accordingly.

Task 2a.11: Validity Appraisal

As for the main stage survey, we would also complete a validity analysis for the stage 2 survey. This would comprise content and construct validity appraisals.

Stage (iv) (Final) Deliverables

The outputs for each company from this phase of work would include:

- a presentation of the findings
- a detailed technical report containing all the WTP results.
  - The main report will be written for a non-technical audience; appendices will contain full technical details to support an audit trail of how the results were derived, including the econometric specifications adopted and any intermediate results obtained.
- a results worksheet
- fully labelled datasets for households and businesses containing response data.

Phase 2b Deliverables

In summary, our core deliverables for the stage 2 survey will comprise:

- **Stage 1 – Setup and Design:**
  - draft customer valuation questionnaires for household and non-household customer groups
  - a summary report explaining the design features of the questionnaires, and the proposed sample plans
  - a design workbook allowing WW to browse through choice situations as they would appear to respondents

- **Stage 2 – Customer Valuation Surveys Testing & Refinement:**
  - a summary report of the findings of cognitive depths and recommendations for change
  - a summary report of the findings of the pilots and recommendations for change

- **Stage 3 – Customer Valuation Surveys Main Fieldwork:**
  - a fully checked and validated dataset, ready for analysis

- **Stage 4 – Analysis & Reporting:**
  - an early summary of the findings
  - a presentation of all findings
  - a detailed technical report containing all the valuation results
  - a results worksheet
  - fully labelled datasets for households and non-households containing response data.

2.6 Phase 2c: Optional Supplementary Research

In addition to the core work programme Accent can provide substantive assistance with developing the valuation framework through other approaches.

The proposed team has developed further work streams for other companies which we feel add value to engagement programmes of this nature. These approaches have also been implemented effectively in our ongoing work for other water companies.

Such studies can be triangulated with core research elements such as customer valuation or acceptability studies to provide further depth and evidence.

We note that there are time constraints regarding this work and so we have not costed for these approaches at this stage but would be happy to discuss should they be of interest.

We describe these optional work streams below, grouped into the following categories:

- Value transfer
- Revealed preference surveys
- PR14-style stated preference survey
- Menu-based stated preference survey
- Qualitative research.

Value Transfer Research

Although the WTP research is likely to form a core component of WW's valuation evidence base, there are other external sources of evidence that can, and potentially should, be brought into consideration when developing the business plan. These include, amongst others: HSE cost of injury evidence for valuing the health effects of drinking water quality, European Commission evidence on the external costs of sewage sludge disposal and recycling routes; DECC's shadow prices for carbon; etc.

If commissioned, the output from this research element would be a report containing the full, documented, suite of additional valuation evidence in the format needed for incorporation into WW's planning systems.

Revealed Preference Surveys

There is an argument (and Ofwat are making it) for revealed preference studies to be undertaken to potentially triangulate the stated preference work.

There are a number of ways that this can be effected and a couple of prime examples are cited here:

- Recreation demand surveys could be undertaken if there are any improvements being planned that affect recreation opportunities or quality eg reservoir improvements.

- Averting behaviour surveys could be undertaken to explore customers' use of bottled water, water softeners, and so on, as a means of gauging their willingness to pay for changes in their water quality.

Menu-Based Stated Preference Survey

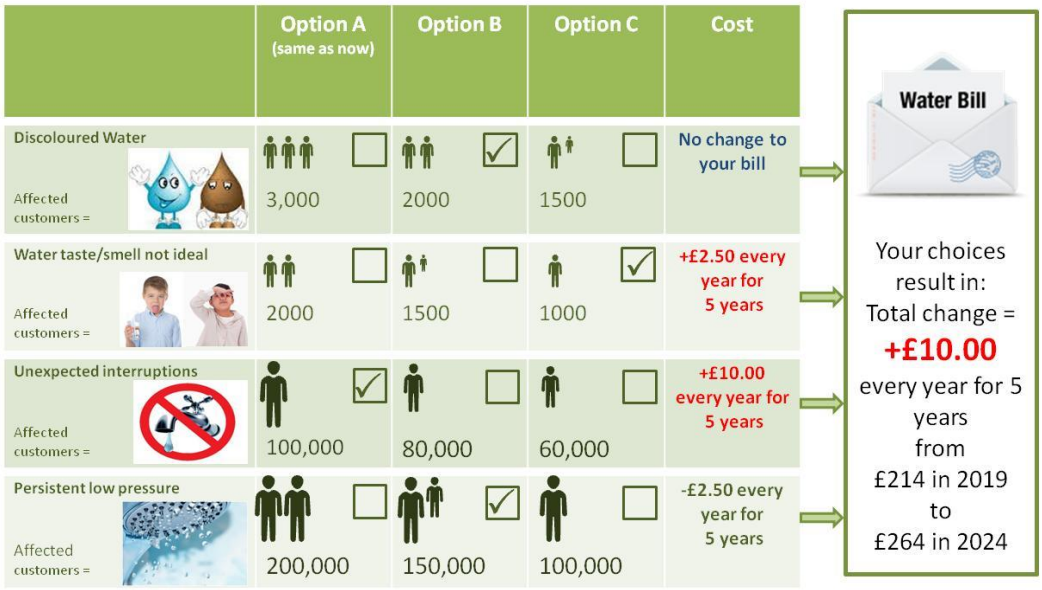
An additional option for triangulation of values from the main stage survey would be to conduct a 'menu-based' SP survey. In this survey, respondents would choose the levels of improvement they would like to see from a menu, and be updated in real-time as regards the total bill impact of their choices. This survey would ask about the same types of improvements as included in the main stage valuation survey, but using different elicitation methods. It would thereby help to validate the findings from the main research.

Accent-PJM successfully conducted a study along these lines for another water company at PR14. The results for almost all service measures were consistent between this survey and the main stage survey that Accent-PJM also conducted, and this result was

considered to provide good supporting evidence as to the validity of the main stage results.

See the figure below for an example of such a menu-based choice question, which utilises elements of 'gamification' to capture responses.

Figure 2 Example Menu-Based SP Choice



Qualitative Research

Traditionally we would support the customer valuation research with a qualitative programme. We acknowledge that this programme may already be in place but would be very happy to discuss the options with WW and BW. We could utilise a series of panels, deliberative research and workshops.

This work could, for instance, be coordinated across four main groups:

- Online, qualitative panel with household customers
- Online, qualitative panel with non-household customers
- Online, qualitative panel with 'customers of the future' (ie 16-21 yr olds)
- In-school workshops with 'customers of the future' (ie 5-11 and/or 11-18 yr olds)

'Customers of the future' have been included as targets as they are seldom heard in processes of this kind but given the longevity of the research 'legacy' it is important that these voices are heard. This is also an area that Ofwat is particularly interested in seeing insight directed towards.

The rationale for these additional approaches is to permit cost effective, in-depth discussion of particular topics with various target customers to support the requests for information which arise during the programme of research.

In addition to these approaches there may also be advantages of conducting deliberative workshop sessions and/or pre-placed face to face work (in home, group discussions etc).

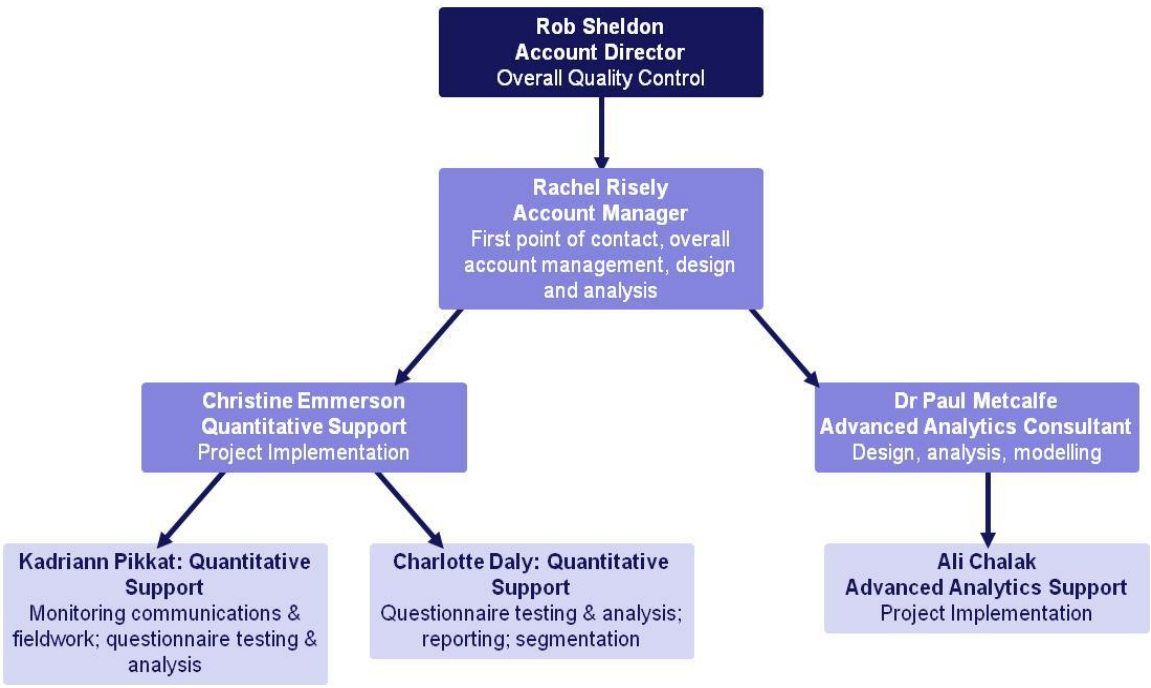
3. EXPERIENCE OF ACCENT AND THE PROPOSED STUDY TEAM

3.1 Proposed Study Team and Experience

Good project delivery means understanding the client's role and sector, and the issues that they face. Accent's senior executives are assigned accounts according to their level of knowledge and research expertise in the client sector. Where a number share similar levels of experience – as is the case in the water sector – account will be taken of the type of study commissioned by the client (eg price review, customer satisfaction, qualitative research, panel studies etc). For this reason we have a range of staff members assigned to this project.

The project will be assigned the most appropriate Project Manager/Director. The former will be the first point of contact, typically designing all materials and analysing and reporting the findings. The director is the second point of contact and reviews all project materials and deliverables. In this case, the Project Manager and Director will be Rachel Risely and Rob Sheldon respectively, both highly experienced in delivering price review/water sector research.

For this project, we have included team members with extensive experience of working on research of this nature. We envisage the following programme team for this research lot:



Below is an outline of the key team members highlighting their roles, responsibilities and experience.

Rob Sheldon is Accent's Managing Director. He has a postgraduate degree in econometrics and over 35 years experience in market research. Rob has directed many

projects in the water sector including PR14 research programmes for many of the water companies within the recent PR14 process. Rob is a Fellow of the Market Research Society and would be the client's second point of contact as well as providing consultancy and quality control.

As account director Rob would be responsible for all of the following:

- liaison with Wessex Water (2nd point of contact)
- strategic advice
- quality control of all project materials
- overseeing timely & high quality delivery of the project
- face-to-face debrief.

Rachel Risely is an Accent Director. She is an experienced project manager and market research consultant gained from her 25 years' of research experience working with numerous public and private sector organisations. Rachel specialises in large scale projects and is a highly experienced quantitative (tracking, stated preference, branding etc) researcher. She is also a skilful presenter and communicator. Rachel's water sector clients include South Staffordshire Water, CC Water, Portsmouth Water, Sutton & East Surrey Water, Anglian Water, Dŵr Cymru Welsh Water, Anglian Water, Northumbrian Water, Cambridge Water, Dee Valley Water and South East Water. She has a BA in Business Studies and is a Member of the Market Research Society and AQR.

As account manager Rachel would be responsible for all of the following:

- liaison with Wessex Water (1st point of contact)
- design of the research materials
- monitoring recruitment
- providing client updates
- analysis, reporting and presentation de-brief.

Christine Emmerson is a Research Director with Accent. She has over seventeen years of experience of both academic and commercial research with particular expertise in managing large scale stated preference studies. Christine has been involved with price review related research for clients including: UKWIR, Southern Water, South East Water, Sutton and East Surrey Water, Portsmouth Water, Northumbrian Water, Scottish Water, and Anglian Water. The types of projects Christine has worked on include: pricing and willingness to pay, consumer advocacy; stakeholder planning; and large scale customer engagement programmes. Christine is a certified member of the Market Research Society.

As account support Christine would be responsible for all of the following:

- providing support for design of the research materials
- analysis, reporting and presentation de-brief.

3.2 Subcontractors – Approach to Management

When working for Accent all sub-contractors are expected to adhere to our quality procedures (as required by ISO 20252). All sub-contractors work to the Market Research Society code of conduct and a sub-contractor agreement is issued by Accent for each project on which they work. This must be signed and returned to Accent. Accent hold all final copies of any materials developed and would remain the single point of contact for WW.

Subcontractors are subject to the same levels of risk management as Accent staff and the Accent project manager would monitor the elements of work being conducted by the subcontractor to ensure they are being delivered to the required standards and timescales.

For this research, Accent would work with PJM Economics. Accent has worked with PJM Economics for numerous projects over the last ten years including working on most of Accent's price review research conducted for PR14 and SR15. This means that we have a seamless approach to our working arrangements which are delivered to the highest quality standards.

In the highly unlikely event of the specific team members being unavailable, PJM would be able to field a replacement.

3.3 Subcontractors – Experience

PJM Economics is a consultancy with extensive experience of conducting price review research. Below is an outline of the key team members from PJM Economics, highlighting their roles, responsibilities and experience.

Dr Paul Metcalfe – Econometrics Consultant
Paul is a Director of PJM economics and will be responsible for designing and delivering the SP element of the quantitative research.

Paul is an experienced economist specialising in SP survey design and analysis, economic regulation, cost-benefit and cost-effectiveness appraisal, and applied econometrics. He has completed over 30 SP studies with Accent over the past ten years, in water, transport, energy, health, post and financial services sectors. These include PR14 studies for Welsh Water, South East Water, Sutton and East Surrey Water, Southern Water, Northumbrian Water and South West Water. He also contributed to the UKWIR (2011) "Carrying Out Willingness to Pay Surveys" guidelines.

Before founding PJM economics, Paul worked at NERA economic consulting in London. Paul has a BSc in Economics from the University of Bristol, an MSc in Economics from the University of York, an MSc in Human Geography from the London School of Economics, and a PhD in Environmental Economics from the London School of Economics.

Dr Ali Chalak – Econometrics Consultant, Project Support
Supporting Dr Paul Metcalfe would be Dr Ali Chalak. Ali has extensive experience in the water sector, having completed several WTP studies at PR09 and PR14. Ali has a PhD in Economics from Imperial College, London. In addition to his work with PJM, he is currently an Associate Professor in Applied Economics at the American University of Beirut, Lebanon.

3.4 Accent Experience

Utility research is a particular specialism of Accent and PJM.

We have a vast amount of experience of working within the water sector, supporting companies with their strategic research programmes. Accent worked with 14 water companies during their PR14 insight programme, PJM with 10.

Below is a selection of Accent's recent and current utility sector clients which illustrates the range of organisations we work with:

Water Sector Clients

Anglian Water	South East Water
Bristol Water	South West Water
Dwr Cymru Welsh Water	Sutton and East Surrey Water
Northumbrian Water	Thames Water
Essex and Suffolk Water	Yorkshire Water
Portsmouth Water	Hartlepool Water
Scottish Water	Ofwat
Severn Trent Water	CCWater
Southern Water	UKWIR
Water UK	

Other Utility Companies

British Gas	npower
British Gas Business	Ofgem
Central Networks	OnStream
Defra	Scotland Gas Networks
e.on	Scottish and Southern Energy
EDF Energy	ScottishPower
Electricity North West Ltd	ScottishPower Energy Networks
Energy Saving Trust	Southern Gas Networks
Energywatch	United Utilities
National Grid	UK Power Networks Ltd
Northern Powergrid	Wales & West Utilities
Northern Gas Networks	Western Power Distributions

3.5 Case Studies

Below we have included examples of relevant projects undertaken within the water sector.

Online Research

Accent has, in recent years, carried out online research programmes on behalf of:

- **HomeServe**, upon their acquisition of Home Energy Services (HES), to test the brand perceptions of HES customers and identify any key risks that may emerge as they are migrated to Homeserve products. A 10 minute online survey was conducted with 794 HES customers.

- **Welsh Water**, who asked Accent to review the Outcome Delivery Incentives (ODIs) it put forward in its business plan to see how it could develop them further in light of the latest guidance from Ofwat. A three stage study was undertaken - desk research, an online SP survey of 500 households to obtain WTP evidence to support a drinking water safety ODI and a phone-post/email-phone survey of 500 household customers to test customer acceptability of the potential new ODIs.

- **South East Water (SEW)** who commissioned Accent to undertake research to understand customer views of linking bills to performance. Accent undertook two waves of online research to gather views.

- **Southern Water**, to test what extent business and domestic customers were happy with, and supportive of, Southern Water's 2015-2020 business plan. 1000 household consumer and 500 business consumer interviews were conducted. Detailed analysis and reporting was conducted.

- **Southern Water**, who commissioned Accent to test the acceptability of its business plans. The research programme involved two parts, each of which included four stages: setup and design, testing and refinement, main fieldwork and analysis and reporting. A mixture of cognitive interviews, phone-post/email-phone and online surveys were conducted amongst both domestic and business customers.

Telephone Research

Recent programmes covering telephone interviewing of household and non-household customers include assignments on behalf of:

- **During PR14, ten water companies commissioned Accent** to undertake a programme of research to understand customers' priorities and their willingness to pay for services. In general, the research comprised four stages: 1) Setup and design, 2) Testing and refinement, 3) Main fieldwork, 4) Analysis and reporting. A range of data collection approaches were utilised including Phone-post/email-Phone and online interviews among business and domestic customers.

- **Sutton & East Surrey Water (SESW)** who commissioned Accent, for a tenth consecutive year, to carry out a customer satisfaction survey investigating how satisfied customers are across a range of service attributes. 400 CATI interviews are conducted each year with the aim to benchmark and monitor performance on an

annual basis, and to see what impact changes to working practices have on customer satisfaction.

- **Anglian Water Business** comprising 400 telephone interviews to measure small, medium and large business customer satisfaction, track performance over time, compare performance with peers and to help shape AWB's strategy for retaining customers and winning new business when the market opens to competition.

- **United Utilities** who commissioned a two-stage research project exploring the impact of the recent Cryptosporidium incident on customer satisfaction and perceptions. Accent conducted 6 focus groups, 18 tele-depths and 550 CATI surveys.

- **The Energy Saving Trust** to undertake research to build an understanding of how businesses perceive the opportunities to engage consumers on sustainability and energy issues and to contrast the findings with consumer perceptions. Accent conducted 225 CATI interviews with senior decision-makers in relevant sectors. The final deliverables included data tables and a summary report.

- **Dwr Cymru Welsh Water (DCWW)** who wish to explore aspects of customer trust and views of service and brand through a telephone tracking survey. This will be conducted in 4 waves over 2 years. Both non-household and households customers are taking part in the survey with 750 taking part in each wave.

- **Sutton & East Surrey Water**, who commissioned Accent for a second consecutive year to undertake an ongoing business satisfaction tracker with small, medium and large businesses. The study comprises 200 interviews and 15 depths in 2015/2016, undertaken on an ongoing basis and reported on quarterly dashboards, bi-annual reports, and depth action reports.

- **South East Water (SEW)** who commissioned Accent to undertake ongoing customer satisfaction research to input into their Outcome Delivery Incentives reporting between 2015 and 2020. Accent are conducting and reporting on 133 CATI interviews per month, 1,600 per annum, with households. Further booster interviews and depth interviews will also be carried out periodically.

Face to Face Research

Recent research programmes that Accent has carried out through face to face interviewing include assignments on behalf of:

- **Anglian Water** who wished to explore awareness and views of their ITV weather sponsorship, its perceived value for money and customer views on a number of reputational questions. Accent was commissioned for a second time to conduct 3 waves of research using a face-to-face survey to track customer opinions (600 each wave).

- **Scottish Water** who launched a series of customer campaigns which aimed to change customer behaviour. Accent was commissioned to undertake research both before

and after the campaign launch to test the effectiveness of the campaign. 2,600 on street interviews were conducted across five locations in Scotland.

- **Bristol Water (BW)** who commissioned Accent and NERA to conduct research into consumers' "willingness to pay" (WTP) for changes in various water service attributes. This study supported Bristol Water's assessment of investment priorities for the 2014 Price Review (PR14). The research comprised two phases: 1) 15 face to face paper cognitive interviews to test the wording and flow of the survey instrument, 100 face to face pilot interviews with domestic customers and 600 face to face main CAPI interviews with domestic customers; 2) Phase two will include a face-to-face survey of domestic customers and a non-domestic survey via phone-post/email-phone (PpP).

4. COMMERCIAL OFFER & OTHER CONTRACTUAL ISSUES

4.1 Commercial Offer

The costs and associated breakdowns are noted below:

Wessex (interviews in Wessex area *excluding* Bristol supply area)	£
Customer valuation: Household: 900 online and 100 in home Non household: 350 telephone	
PR14 pilot: Household only: 200 PR14 & 200 PR19 online	
Stage 2: Household: 500 online HH and 100 in home Non household: 300 telephone	
Bristol (interviews in Bristol supply area)	
Customer valuation: Household: 500 online HH and 100 in home Non household: 300 telephone	
PR14 pilot: Household only: 200 PR14 & 200 PR19 online	
Stage 2: Household: 500 online HH* Non household: 300 telephone *note no 100 in home for seldom heard	
TOTAL	

4.2 Other Contractual Issues

Budget Validity & Invoicing

Budgets are valid for 90 days from date of submission.

Accent's preferred invoicing schedule is:

- 30% on commencement of the project
- 30% on completion of the SP pilot
- 30% on completion of the mainstage fieldwork
- 10% on acceptance of the final report.

Terms & Conditions of Contract

Accent notes WW's Terms and Conditions as found in the invitation to tender and is happy to comply with them.

Peer Review

We also note that a peer review of the research may be required prior to submission to Ofwat. Accent and PJM are used to this process and can confirm this would be acceptable.

Insurance

Accent has insurance cover as follows:

- Employer's liability £10,000,000
- Public/product liability £10,000,000
- Professional indemnity £5,000,000.

Registered Company Name

For the purposes of checking information at Companies House or with a credit reference agency, please note that the company name is Accent Marketing & Research Ltd, registration number 2231083, and should not be confused with other companies registered with similar names.

5. QUALITY CONTROL

5.1 Quality Control Standards

Accent has always been committed to quality. We are a Market Research Society (MRS) Company Partner and abide by the standards of quality set by the MRS. Accent is registered under the Data Protection Act 1998. In addition, Accent is registered to the market, opinion and social research International Standard ISO 20252. In order to comply with this, full documentation of all work undertaken is retained and can be subject to audit at any time.

Quality control procedures require that:

- all proposals are checked by a senior executive other than the author
- all project material is read and checked by the Project Director
- each member of the project team is personally briefed by the Project Manager who works closely with them to ensure that it runs smoothly and to the high standards set by Accent
- 10% of all face-to-face interviews are validated, either in person or by telephone
- 5% of all telephone interviews are listened-in to
- all interviews are subject to 100% manual edit by fully trained and personally briefed coders
- 5% of all coding and data entry is quality controlled by the field coordinator
- all interviews are then subject to a computer edit with appropriate logic checks
- all projects are fully audited and subject to independent checks.

5.2 Risk Management

Accent and PJM have worked on numerous projects of this nature so do not anticipate any issues. However, below is a table of potential risks to the project and how we would deal with them should they arise.

Risk Detail	Risk Rating (High, Medium, Low)	Mitigation
Availability of Key Members of the Team and of Researchers		
Accent or PJM staff illness or absence	Low	Each project has a dedicated project manager, but also a project director who will be fully informed of all activity on the project. In the event, therefore, of the project manager being away from the office on annual leave or, for example, absent due to illness, the project director would be available to run the project in his/her absence. Accent's quality control procedures – which track the progress of each project and the status of all documentation (eg questionnaires, reports etc) – also ensure that any other member of staff would also be able to pick up the project in the absence of the project manager and director. PJM has five staff, any of which could potentially take over responsibility for project delivery.
Unavailability of subcontractor	Low	Accent has worked with PJM Economics on over 30 projects during the last ten years including most of Accent's price review research conducted for PR14 and SR15. This means that we have a seamless approach to our working arrangements which are delivered to the highest quality standards. In the highly unlikely event of subcontractor unavailability, PJM would be able to field a replacement if required.
Interviewer absences	Low	Accent has a large pool of trained interviewers on which to draw. We will choose the most suitable interviewers for this particular project. However, in the event of interviewers being unavailable or dropping out, there will be other interviewers who we can draw on and who will be briefed as needed.
Risks to the Timetable		
Not completing the project	Low	We have set out our timescales within this proposal and are confident that we can meet them.

within the specified timetable		We will work closely with WW to ensure that all parties are clear on the required deadlines to sign off documents in order to avoid project deadlines slipping. The Project Manager will closely monitor progress in the areas Accent/PJM are responsible for. If at any stage we were concerned that the timescale may be slipping we would put additional resources (interviewers or Executive staff as applicable) onto the project.
Quality of Deliverables		
Errors in the questionnaire	Low	All questionnaires are checked by the Project Director in addition to the Project Manager. Clients are asked to approve questionnaires prior to programming. The Project Manager, another staff member and the client all check the programmed questionnaire. As a final check, we would also closely review the data from the early stages of fieldwork
Reaching the desired target number of interviews	Low	Accent will be using trained interviewers, skilled at maximising response rates. Fieldwork will be monitored 100% of the time with daily updates provided to the project manager and director.
Not achieving a representative sample	Low/ medium	We believe that the approach to sampling we describe within the proposal will minimise bias in the sample.
Poor quality interviewing	Low	Accent ensures that all survey staff are fully briefed on all research projects. These briefings include background to the research and its objectives, any sampling and quota requirements, a full questionnaire run through and any questions. These are supported by written briefing notes. All of Accent's interviewers are fully trained and supervised. 10% of all interviews are conducted in the presence of a supervisor. 100% of all questionnaires returned are checked for completeness. 10% of all interviewers' work is back-checked with the participant to ensure that the interview took place and was conducted in the correct manner. Any issues identified as a result of these checks are addressed immediately, with the interviewer in question being accompanied on subsequent interviews

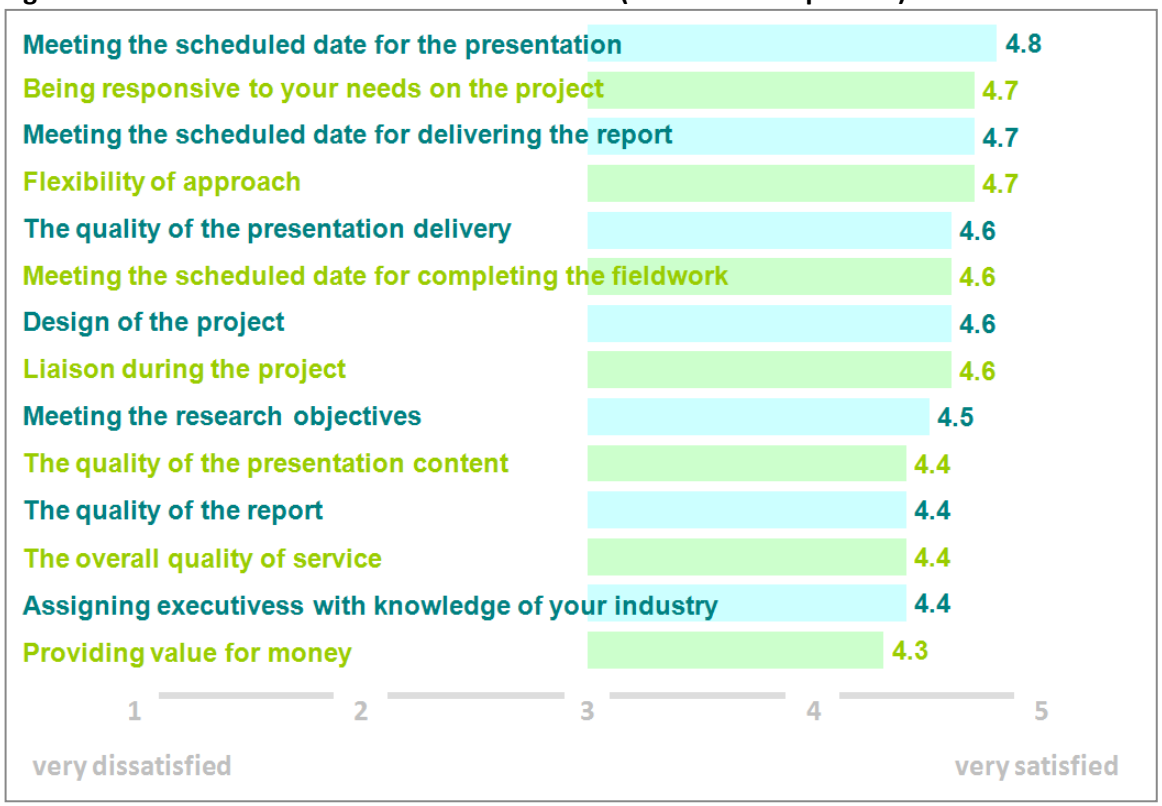
		to ensure the issue is addressed. If it is not the interviewer will be removed from the project.
Fire or flood	Low	Accent backs up all data and project documents on a daily basis. The back-up tapes are kept in a safe, which is secure against fire or flood.
Errors in reporting	Low	Accent will undertake a series of range and logic checks with the data before commencing analysis. A tabulation specification will be prepared by the project manager. Frequencies will be prepared and examined by the project manager before analysis commences. All reporting will be checked by the project director and any errors corrected.
Other Risks		
Demands of project exceed contractor's resource allocation (eg projected costs overrun, workload underestimate etc.)	Low	WW has spelt out clearly what is required for each option and Accent has costed accordingly. However, should any element of the project differ substantively from what was stipulated in the brief, Accent would wish to have a further discussion about budget with WW. Final budgets would be agreed in consultation with WW.

5.3 What Our Clients Say about Us

Accent has steadily built a very strong relationship with its clients based on the all round quality of its work. Our clients demonstrate their satisfaction with our research by commissioning us to do more work for them – currently around 85% of our work is repeat business.

To ensure that we are maintaining the quality levels that are important to us and our clients, we seek client feedback on the quality of service that we have provided on the completion of every project, with the results being presented and discussed at Board level. Results for the last financial year for the key aspects of service measured are given in Figure 1 below, showing that our clients are more than satisfied with us across all of these areas, particularly meeting the scheduled presentation and reporting dates, our responsiveness to client needs and our flexibility.

Figure 3: Client satisfaction with Accent's research (Oct 2014 to Sept 2015)



Base: 32

The quality of Accent's research was first acknowledged by an industry award in 1997. That quality has been sustained over the years with three further awards and accolades.

APPENDIX A
Accent's Background and Relevant Experience

Accent's Background

Background

Accent is a full service ISO 20252:2012 registered research agency, with offices in London and Edinburgh and the resources and equipment to undertake both qualitative and quantitative studies of significant size. The company has thirty two full time staff and a network of consultants to call upon in the building of project teams.

The field office has seven full time staff and a nationwide network of supervisors, interviewers and group recruiters who can provide the highest quality fieldwork for both qualitative and quantitative research wherever it is required.

Accent has two dedicated telephone units – the London Telephone Unit (LTU) and the Edinburgh Telephone Unit (ETU). Both provide high quality, centrally controlled telephone fieldwork. They are staffed by highly trained and experienced interviewing teams who regularly conduct quantitative and qualitative telephone interviews in business and consumer markets on a wide range of subjects.

Accent is expert in research using trade-off techniques. The agency is the market leader in the use of stated preference research, a sophisticated form of conjoint or trade-off research and currently funds a five year Stated Preference Fellowship at Leeds University. Accent staff have been instrumental in the introduction and development of the technique in the UK, and have conducted many hundreds of studies using these methods for high profile clients in transportation, utilities, telecommunications, retail, healthcare and financial services sectors, among others.

For further information on Accent and our capabilities please visit our website at www.accent-mr.com.

Accent's Clients

A selection of Accent's clients drawn primarily from the utilities sector is set out below.

- Anglian Water
- Anglian Water Business
- Bristol Water
- British Gas
- British Gas Business
- CCWater
- Cambridge Water
- Dee Valley Water
- Delta Energy & Environment
- Energy Saving Trust
- Gas Safe Register
- National Grid
- Northumbrian Water
- Ofgem
- Ofwat
- Ovo Energy
- Portsmouth Water
- Scottish and Southern Energy
- South Staffordshire Water plc
- South West Water
- Sutton and East Surrey Water
- Stockholm International Water Institute (SIWI)
- Thames Water
- The Water Report
- UK Power Networks
- UKWIR
- United Utilities
- Vivid Economics Ltd

- Scottish Water
- ScottishPower
- South East Water
- Severn Trent Water
- Wales & West Utilities
- Water UK
- Western Power Distribution (WPD)
- Yorkshire Water

APPENDIX B
Team CVs

Rob Sheldon

- Position in Firm: Managing Director

KEY EXPERIENCE AND SKILLS

- Thirty years research and project management experience
- Internationally acclaimed expert in stated preference
- Regular lecturer at international conferences and courses

EDUCATIONAL AND PROFESSIONAL STATUS

- BA (Hons), University of Liverpool
- MSc, University of Bristol
- Fellow, Market Research Society and was Board Chair (MRS)
- Member of ORR Consumer Expert Panel, 2013 - Present
- Board Chair, Association for European Transport, 1999 – 2007

EXPERIENCE RECORD

Accent 1988 to present

A selection of projects Rob has been involved in (usually as Director) is listed below:

South East Water (2016) is launching a customer magazine and has commissioned Accent to conduct pre and post launch research to understand customer views. Research will be conducted by telephone over two waves and a report provided.

United Utilities (2015/16) commissioned a two-stage research project to explore the impact of the recent Cryptosporidium incident on customer satisfaction and perceptions. Accent conducted 6 focus groups, 18 tele-depths and 550 CATI surveys.

Anglian Water (2015) wished to explore awareness and views of their ITV weather sponsorship, its perceived value for money and customer views on a number of reputational questions. Accent was commissioned for a second time to conduct 3 waves of research using a face-to-face survey to track customer opinions (600 each wave).

Dwr Cymru Welsh Water (DCWW) (2015) wishes to explore aspects of customer trust and views of service and brand through a telephone tracking survey. This will be conducted in 4 waves over 2 years. Both non-household and households customers will take part in the survey with 750 taking part in each wave.

South East Water (SEW) (2013) conducted an extensive customer engagement programme to understand the views of their customers. As part of that, they commissioned a further customer priorities study to compare and contrast the findings from their WTP stated preference study. This project consisted of an initial, exploratory research design and included a qualitative phase.

Outcomes – ongoing tracking (2014-2020) Following on from an initial baseline study **South East Water (SEW)** commissioned Accent to undertake customer satisfaction research to input into their Outcome Delivery Incentives. Accent conducted 1000 CATI interviews with households to understand levels of satisfaction. This led on to an ongoing study which captures satisfaction on a monthly basis.

Small Company Premium (2014) South East Water commissioned Accent to explore issues related to the 'Small Business Premium' element of water bills. This was done though a series of four focus groups in two locations within the South East Water region. Findings were reported in the form of a short,

topline report and a full presentation report.

Further Acceptability Testing (2014) South East Water (SEW) wished to further test the acceptability of its business plan with Thames Water sewerage customers. The findings informed the wider business planning process. This was a follow-up to previous acceptability testing which included revised bill levels. A phone-post/email-phone survey with 400 household customers was undertaken.

Weather Sponsorship (2014) Anglian Water has taken over the sponsorship of weather in the Anglian ITV region and they wished to explore awareness and views of the sponsorship, its perceived value for money and customer views on a number of reputational questions. Accent conducted 4 waves of research using a telephone survey to track customer opinions.

ODI Repeat (2014) Welsh Water asked Accent to review the Outcome Delivery Incentives (ODIs) it put forward in its business plan to see how it could develop them further in light of the latest guidance from Ofwat. A three stage study was undertaken - desk research, an online SP survey of 500 households to obtain WTP evidence to support a drinking water safety ODI and a phone-post/email-phone survey of 500 household customers to test customer acceptability of the potential new ODIs.

ODI Research South East Water (2014) South East Water (SEW) commissioned Accent to undertake research to understand customer views of linking bills to performance. Accent undertook two waves of online research to gather views.

Extra analysis of PR14 work (2014) South East Water (SEW) commissioned Accent to provide further analysis following the PR14 willingness to pay (WTP) and business plan acceptability research. Desk research was conducting in conjunction with PJM Economics.

Business Customer Satisfaction Research (2014) - A commission by **Anglian Water Business** comprising 8 upfront tele-depth interviews, over 700 12-15 minute telephone interviews and 10 5-minute follow-up interviews to measure small, medium and large business customer satisfaction, track performance over time, compare performance with peers and to help shape AWB's strategy for retaining customers and winning new business when the market opens to competition.

YW SIM Replica Interim (2014) Yorkshire Water asked Accent to carry out an interim SIM Replica study; this provides customers' overall satisfaction with the way their query/contact has been handled. 400 telephone interviews will be undertaken with customers who have had their problems and issues resolved across a range of both operational and billing queries.

YW Customer Tracker Interim (2014) Yorkshire Water asked Accent to carry out an interim Domestic Tracker. 600 CATI interviews were undertaken to understand perceptions of the company across a range of different attributes such as core service delivery, value for money, customer advocacy and communication issues.

Customer Tracker (2013) Sutton & East Surrey Water (SESW) commissioned Accent, for an eighth consecutive year, to carry out a customer satisfaction survey investigating how satisfied customers are across a range of service attributes. 400 telephone interviews were conducted which allowed SESW to benchmark and monitor its performance on an annual basis, and to see what impact any improvements and changes to working practices have on customer satisfaction levels.

MHRA Perceptions Audit Trail (2013) - The **MHRA** was undertaking a project to audit stakeholders' current perceptions of the agency, what it does and how it does it to inform the business planning and strategy development. These key stakeholders included representation from government, industry, healthcare professionals, patients, academia and research. Accent conducted 20 tele-depth interviews. The deliverables were a summary presentation and a detailed report. The project had a short turnaround period of 3 weeks to initial reporting.

PR14 Willingness to Pay Studies (2012-2013) During PR14, ten water companies commissioned Accent to undertake a programme of research to understand customers' priorities and their willingness to pay for services. In general, the research comprised four stages: 1) Setup and design, 2) Testing and refinement, 3) Main fieldwork, 4) Analysis and reporting. A range of data collection modes were used

eg Phone-post/email-Phone and online with business and domestic customers.

WW Social Tariffs Qual (2013) - **Dwr Cymru Welsh Water (DCWW)** wished to better understand consumer views about the introduction of social tariffs. An inception workshop was followed by 6 extended pre-tasked discussion groups. A presentation provided a snapshot of how different groups of consumers respond. Our analysis ensured that we are able to identify these differences by SEG, income, location and those who would be most likely to benefit from the introduction of social tariffs and those who would be cross subsidising any such tariff.

Southern Water – Acceptability Testing part 3 – quant (2013) - **Southern Water** has developed a business plan which details their plans for the next 5 years (2015-2020). The research aimed to understand to what extent business and domestic customers are happy with, and supportive of, Southern Water's final business plan. 1000 household consumer and 500 business consumer interviews were conducted with detailed analysis and reporting.

VW and Audi Offers (2013) - **Volkswagen Financial Services (VWFS)** required testing of some offers (that included Deposit Contribution, APR, Free Insurance and Service Plans) specific to the VW and Audi brands. VWFS also wished to understand how these offers rank against each other and what the perceived value of them is to (potential) customers. An online methodology was used with a Stated Preference element. All 326 respondents were recruited from the Customer Panel that Accent is building for VWFS.

Alternative SIM Measure : Implementation Plan (2013) The water industry is developing a new SIM survey which will be shorter and more meaningful in terms of analytics, but will also replace the existing regulatory measure. **UK Water Industry Research (UKWIR)** decided that the new qualitative SIM measure should be thoroughly tested in order for it to inform company responses to Ofwat's consultation on how the SIM measure should be developed and implemented from 2015 onwards. To do this 2,500 telephone interviews were undertaken across the UK water sector.

SDS Testing (2013) - The objective of this research was to test attitudes towards **DCWW's** long term planning document "Our Sustainable Future 2040" and followed on from core PR14 WTP research. Deliberative qualitative research was conducted with domestic and business customers including approximately 100 10-15 minute pre group depths, 8 extended focus groups with domestic customers split between water versus wastewater, 2 extended focus groups with SMEs and 10 45-minute depth interviews with large businesses.

Qualitative SIM Methodology (2012) A team of Atkins, Henley Management School and Accent was commissioned by **UKWIR** to identify whether a future alternative to the current qualitative SIM component would better reflect consumer satisfaction and value for money, thereby helping to stimulate continued service improvement. The project comprised a literature review and a series of tele-depth interviews with customer service owners across a range of blue chip companies. The final report made recommendations as to what a new measure might look like and how it could be tested.

UKWIR (2011) commissioned Accent and NERA to undertake a comprehensive programme of research designed to develop a common framework for carrying out WTP surveys in the water sector. A 9 stage research approach was adopted which included self completion stakeholder interviews, SP Practitioner depths, a literature review, online interviews, stakeholder workshops, consumer focus groups, business depths and cognitive face to face consumer and business tele-depths.

Northumbrian Water Limited (NWL) (2012) commissioned Accent to undertake research to determine what customers believe are the most important areas of service provided by them, what improvements customers would like to see to these services and what customers are willing to pay for specific aspects of the service NWL offers. Accent undertook 14 90-minute focus groups, 12 45-minute business tele-depths, 16 cognitive interviews, 160 domestic Phone-post/fax/email-Phone (PpP) pilot interviews, 160 business PpP pilot interviews, 1700 domestic PpP mainstage interviews, 700 business PpP mainstage interviews and analysis and reporting.

Rachel Risely

- Position in Firm: Deputy Managing Director

KEY EXPERIENCE AND SKILLS

- 25 years research experience
- Utilities, retail, transport, travel/tourism research expertise
- Experienced presenter including conference papers
- Highly experienced mixed methodology project consultant
- Qualitative research including focus groups
- Quantitative research including tracking studies and stated preference

EDUCATIONAL AND PROFESSIONAL STATUS

- BA Business Studies, Plymouth University
- AET Board Member
- Tourism Programme Committee Member for ETC
- Member – Market Research Society
- Member – AQR
- MRS Trainer – Introduction to Quantitative Research

EXPERIENCE RECORD

Accent 2004 to present

A selection of projects Rachel has been involved in either as Manager or Director is listed below.

Social Tariff Research Cambridge (2015) - Qualitative and quantitative work for **South Staffs Water** to help with development of their social tariff proposition.

SCP and Outcomes (2014) - As part of the PR14 process, **Portsmouth Water** wished to explore customer views on their proposed 'small company premium' and outcome delivery incentives. 400, 15 minute interviews were conducted with customers across the Portsmouth Water region.

Small Company Premium (2014) - **Portsmouth Water** commissioned Accent to explore issues related to the 'Small Business Premium' element of water bills. Four focus groups were held in two locations within the Portsmouth Water region. Findings were reported in the form of a report which was included in Portsmouth Water's PR14 submissions to Ofwat.

Small company charge premium (2014) - **Sutton and East Surrey Water** commissioned Accent to explore issues related to the 'Small Business Premium' element of water bills. Four focus groups were held in two locations within the Sutton and East Surrey Water region. Findings were reported in the form of a report which was included in Sutton and East Surrey Water's PR14 submissions to Ofwat.

TransPennine Express (TPE) Franchise Bid (2014) - **the First Group** is one of the shortlisted bidders for the TPE franchise, which is a joint venture between First and Keolis who operate this flagship route across the north of England. The new franchise will run for 7-9 years from February 2016 with the contract being awarded in October 2015. The First Group has commissioned Accent to undertake a combination of qualitative and quantitative research in preparation for the bid.

T1 Service Improvements (2014) - Focus groups and stated preference interviews for **Dublin Airport Authority** to assess passengers' willingness to pay for improvements at T1.

Website Development (2014) - **Anglian Water Business** wished to combine their two business websites into one which covered operations for the whole of the UK. Accent was commissioned to undertake research to understand the customers' needs from the business website. The methodology consisted of conducting 24 F2F depths at the customers place of work and in surf clinics, lasting 60 minutes in duration.

Metering Comms Assessment (2014) - **Anglian Water** undertook a comprehensive metering programme in 2014. They ran a pilot in the 'Barnoldby area' which incorporated proactive and enhanced metering. Anglian Water commissioned Accent to conduct research to test the pilot in order to optimise operations and communications before the national rollout. Two pre-tasked discussion groups were conducted, lasting 90 minutes each.

East Coast Franchise Support (2013) - **Virgin Trains** was in the process of preparing their bid for the East Coast franchise, which provides high-speed intercity train services linking England and Scotland along a route of almost 1,000 miles. As part of the process a requirement for primary research was identified to provide detailed insight into customer and potential customer attitudes, behaviour and perceptions. Virgin Trains commissioned Accent to undertake 2,225 stated preference interviews with rail users and 1,150 stated intention interviews with non rail users.

WW Social Tariffs Quant (2013) - **Dwr Cymru Welsh Water (DCWW)** commissioned Accent to deliver a series of deliberative workshops followed by a quantitative phase to analyse customers' views on a new proposed social tariff. Six discussion groups were conducted across three locations, a total of 36 customers participated. Following the qualitative phase, a follow up quantitative phase consisting of 440 computer assisted telephone interviews was conducted. The interviews were an average of 24 minutes in duration.

Bill Design Assessment (2013) - Accent was commissioned by **Anglian Water (Anglian)** to help them refine and update their bill layouts. As Anglian was changing their print company so it was an opportune time to do this. A client workshop was followed by 6 pre-tasked 90 minute domestic customer groups to understand customers' preferences. A report and presentation of the results helped Anglian develop their new bill design and layouts.

Social Tariffs (2013) - **Sutton & East Surrey Water (SESW)** commissioned Accent to carry out research to better understand consumer views about the introduction of social tariffs. The research provided a better evidence base of consumer attitudes to, and willingness to pay for, charges on water bills when placed in the wider context of how those charges could be used. Four pre-tasked discussion groups were held with customers. The groups were followed by 400, 15 minute telephone interviews with domestic customers. The research programme consisted of 2 debrief presentations – one following the completion of the qualitative phase and another integrated presentation bringing together the qualitative and quantitative findings.

WW Social Tariffs Qual (2013) - **Dwr Cymru Welsh Water (DCWW)** wished to better understand consumer views about the introduction of social tariffs. An inception workshop was followed by 6 extended pre-tasked discussion groups. A presentation provided a snapshot of how different groups of consumers respond. Our analysis ensured that we could identify these differences by SEG, income, location and those who would be most likely to benefit from the introduction of social tariffs and those who would be cross subsidising any such tariff.

Social Tariffs - Quant (2013) - **South East Water** was considering its strategy for social tariffs as companies were officially asked to look at ways to help those with affordability issues. Defra issued guidance for water companies on the introduction of these potential tariffs. This research helped them to better understand consumer views about the introduction of such tariffs (and the cross subsidisation this would entail). The research provided a better evidence base of consumer attitudes to, and willingness to pay for, charges on water bills when placed in the wider context of how those

charges could be used. 600, 15 minute CATI interviews were undertaken.

Social Housing Profiling Year 2 (2013) - **npower** commissioned Accent for a second successive year to provide a profile of energy saving behaviour in the social housing sector and reactions to the concept of the "Green Deal". The research was quantitative and conducted using CATI. 100 social landlords and 300 social housing tenants were interviewed.

Social Tariffs - Qual (2013) - **South East Water** was considering its strategy for social tariffs. They wished to better understand consumer views about the introduction of such tariffs. Eight pre-tasked extended groups were held, the client viewed 2 of these groups. A presentation of the findings was given at the completion of the groups.

Social Tariffs & Affordability (2013) - **Severn Trent Water (STW)** commissioned Accent to undertake research to better understand consumer views about the introduction of such tariffs (and the cross subsidisation this would entail). Eight pre-tasked extended groups and 6 pre tasked paired depth interviews were undertaken.

Class Structure (2013) - **East Coast** believe that the current configuration of its rolling stock and onboard service offering may not be the most appropriate given customer behaviour, needs and preferences. A hypothesis has been developed that East Coast could better define their proposition and generate more revenue by changing the rolling stock configuration and service offered in line with the requirements of specific customer groups/segments. Research was needed to help support the development of this hypothesis. 640 on train and 2,790 online Stated Preference interviews were undertaken.

Business Plan Validation (2013) - **Dwr Cymru Welsh Water (DCWW)** commissioned Accent to undertake qualitative research to explore customer attitudes towards its draft business plan. The research comprised 8 2-stage deliberative focus groups and 20 2-stage deliberative tele-depths. The groups were held in 4 locations across the DCWW region, with one in each location being held with those aged 18-44 and the other those aged 45+, as well as the groups being segmented by two different socio economic groups, ie ABC1s and C2DEs. The depth interviews were split by size and sector.

Customer Service Proposition (2013) - The objective of this research project for **Dwr Cymru Welsh Water (DCWW)** was to determine customers' priorities for service eg lead in times, website functionality, use of social media for communications etc as input into DCWW's business plan. Overall 20 face-to-face depths with domestic customers were conducted in qualitative clinics with those who were known to have used the relevant channels (web/contact centre etc). In addition, 20 tele-depths with business customers were conducted covering a mix of sizes and segments. .

SDS Testing (2013) - The objective of this research was to test attitudes towards **DCWW's** long term planning document "Our Sustainable Future 2040" and followed on from core PR14 WTP research. Deliberative qualitative research was conducted with domestic and business customers including approximately 100 10-15 minute pre group depths, 8 extended focus groups with domestic customers split between water versus wastewater, 2 extended focus groups with SMEs and 10 45-minute depth interviews with large businesses.

Social Tariffs Deliberative Stage (2012) - **Northumbrian Water** was considering its strategy for social tariffs to help those with affordability issues. Accent was commissioned to undertake research to better understand consumer views about the introduction of such tariffs. The research explored customers' willingness to pay for charges on water bills and comprised ten reconvened deliberative 90 minute discussion groups.

Christine Emmerson

- Position in Firm: Research Director

KEY EXPERIENCE AND SKILLS

- Wide range of industry expertise including utilities, transport, social policy, local government and health
- Extensive experience with both qualitative and quantitative research methodologies
- Worked on PR14/SR15 research for circa 10 companies
- Project managed PR14/SR15 engagement programmes for 3 companies

EDUCATIONAL AND PROFESSIONAL STATUS

- BSc (Hons) Industrial Design, Brunel University
- PhD, Brunel University
- Member – Market Research Society
- Member – AQR

EXPERIENCE RECORD

Accent 2007 to present

Christine has over eighteen years experience of both academic and commercial research. A selection of projects Christine has been involved in is listed below:

South East Water (2016) is launching a customer magazine and has commissioned Accent to conduct pre and post launch research to understand customer views. Research will be conducted by telephone over two waves and a report provided.

United Utilities (2015/16) commissioned a two-stage research project to explore the impact of the recent Cryptosporidium incident on customer satisfaction and perceptions. Accent conducted 6 focus groups, 18 tele-depths and 550 CATI surveys.

Anglian Water (2015) wished to explore awareness and views of their ITV weather sponsorship, its perceived value for money and customer views on a number of reputational questions. Accent was commissioned for a second time to conduct 3 waves of research using a face-to-face survey to track customer opinions (600 each wave). Accent previously conducted 4 waves of research using a telephone survey to track customer opinions.

Dwr Cymru Welsh Water (DCWW) (2015) wishes to explore aspects of customer trust and views of service and brand through a telephone tracking survey. This will be conducted in 4 waves over 2 years. Both non-household and households customers will take part in the survey with 750 taking part in each wave.

South East Water (SEW) (2014) commissioned Accent to provide further analysis following the PR14 willingness to pay (WTP) and business plan acceptability research. Desk research was conducting in conjunction with PJM Economics.

Portsmouth Water (2014) wished to explore customer views on their proposed 'small company premium' and outcome delivery incentives, As part of the PR14 process. 400, 15 minute interviews were conducted with customers across the Portsmouth Water region.

Outcomes – ongoing tracking (2014-2020) Following on from an initial baseline study **South East**

Water (SEW) commissioned Accent to undertake customer satisfaction research to input into their Outcome Delivery Incentives. Accent conducted 1000 CATI interviews with households to understand levels of satisfaction. This led on to an ongoing study which captures satisfaction on a monthly basis.

Small Company Premium (2014) South East Water commissioned Accent to explore issues related to the 'Small Business Premium' element of water bills. This was done though a series of four focus groups in two locations within the South East Water region. Findings were reported in the form of a short, topline report and a full presentation report.

Further Acceptability Testing (2014) South East Water (SEW) wished to further test the acceptability of its business plan with Thames Water sewerage customers. The findings informed the wider business planning process. This was a follow-up to previous acceptability testing which included revised bill levels. A phone-post/email-phone survey with 400 household customers was undertaken.

ODI Research South East Water (2014) South East Water (SEW) commissioned Accent to undertake research to understand customer views of linking bills to performance. Accent undertook two waves of online research to gather views.

Extra analysis of PR14 work (2014) South East Water (SEW) commissioned Accent to provide further analysis following the PR14 willingness to pay (WTP) and business plan acceptability research. Desk research was conducting in conjunction with PJM Economics.

The Office of Rail Regulation (2014) commissioned Accent to conduct desk research to understand what the rail sector can learn from other regulated sectors, primarily the water sector 'Price Review' process, about how to engage with customers when determining customer priorities for company investment and what the benefits are.

South East Water (SEW) (2013) conducted an extensive customer engagement programme to understand the views of their customers. As part of that, they commissioned a further customer priorities study to compare and contrast the findings from their WTP stated preference study. This project consisted of an initial, exploratory research design and included a qualitative phase.

PR14 Research Overview (2013) - **Sutton and East Surrey Water** has recently conducted a large scale programme of research as part of their price review process. They asked Accent to draw together an overview document of all the different strands of research.

PR14 Peer Review (2013) - **Portsmouth Water** has recently conducted a programme of research to support their price review research. They asked Accent to conduct an end-to-end peer review of this research.

Southern Water – Acceptability Testing part 3 – quant (2013) - **Southern Water** has developed a business plan which details their plans for the next 5 years (2015-2020). The research aimed to understand to what extent business and domestic customers are happy with, and supportive of, Southern Water's final business plan. 1000 household consumer and 500 business consumer interviews have been conducted. Vulnerable customers were also included in the research. Detailed analysis and reporting was conducted.

Southern Water – Acceptability Testing part 3 – qual (2013) - **Southern Water** has developed its strategic statement, which outlines its proposed strategy for the next 25 years, and its business plan, which details their plans for the next 5 years (2015-2020). The purpose of this final phase was to test the acceptability of the final business plan by outcome and attribute against the selected acceptability criteria. Eight focus groups with domestic customers, which included two groups with vulnerable customers, and 8 tele-depths with business customers were carried out. Business and domestic customer results were presented separately.

Stakeholder Workshops (2013) - **Southern Water** commissioned Accent to conduct a series of ten workshops to discuss and debate issues related to their future business plan. Accent facilitated the

workshops over two phases.

Northumbrian Water Limited (NWL) (2012) commissioned Accent to undertake research to determine what customers believe are the most important areas of service provided by them, what improvements customers would like to see to these services and what customers are willing to pay for specific aspects of the service NWL offers. Accent undertook 14 90-minute focus groups, 12 45-minute business tele-depths, 16 cognitive interviews, 160 domestic Phone-post/fax/email-Phone (PpP) pilot interviews, 160 business PpP pilot interviews, 1700 domestic PpP mainstage interviews, 700 business PpP mainstage interviews and analysis and reporting.

Customer Engagement PR14 (2012) - **South East Water** commissioned Accent to undertake a programme of research to understand customers' priorities and their willingness to pay for services. The research comprised four stages: 1) Setup and design, 2) Testing and refinement, 3) Main fieldwork, 4) Analysis and reporting, and included a mix of cognitive interviews and Phone-post/email-Phone interviews among business and domestic customers. Further supporting research included: online panel discussions; in-school workshops; and, a further stated preference study exploring water resource issues.

Customer Engagement (2012) - **Southern Water Services (SWS)** commissioned Accent, supported by Jacobs, to undertake willingness to pay (WTP) research into the economic value of benefits, and support its application in cost benefit analysis (CBA) for the development of its 2015-20 business plan. The research comprised four stages: 1) Setup and design (including qualitative work), 2) Testing and refinement, 3) Main fieldwork, 4) Analysis and reporting, and included a mix of focus groups, business teledepths, cognitive interviews and Phone-post/email-Phone and online interviews among business and domestic customers.

UKWIR (2011) commissioned Accent and NERA to undertake a comprehensive programme of research designed to develop a common framework for carrying out WTP surveys in the water sector. A 9 stage research approach was adopted which included self completion stakeholder interviews, SP Practitioner depths, a literature review, online interviews, stakeholder workshops, consumer focus groups, business depths and cognitive face to face consumer and business tele-depths.

PR14 Seminars (2011) - Accent was asked to provide consultancy services to a number of water companies. A series of seminars were delivered in relation to PR14 and associated issues to support companies with their business planning processes.

Water Use Measures (2011) - Accent provided consultancy services to **Stockholm International Water Institute (SIWI)**. Accent assisted with the design of a questionnaire for stakeholders in South Africa and helped finalise its development for further study. A survey instrument was delivered to SIWI to support their ongoing research.

Provision of Customer Engagement and Research Programme (2010) - **Scottish Water** commissioned Accent to conduct a cutting edge programme of research to explore overall customer engagement. The approach included a series of 8 deliberative groups, a robust stated preference survey (1000 phone-post-phone interviews), online stated preference survey (200 interviews), an online customer panel, school workshops, an industry expert panel and 8 further standard focus groups. The aims of the research were to understand key service expectations, customer priorities and perceptions of **Scottish Water**. Vulnerable customers were also targeted as part of this research.

Dr. Paul Metcalfe

Director, PJM Economics

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Tel: +44 1202 831316
Email: paul@pjmeconomics.co.uk

OVERVIEW

Paul Metcalfe is an experienced economist specialising in environmental valuation, economic regulation, cost-benefit and cost-effectiveness appraisal, survey design and analysis, and applied econometrics. He has advised clients in water, transport, energy, environment, health, post, telecoms, financial services and local government sectors. Prior to founding PJM economics, Paul worked at NERA Economic Consulting and the Centre for Market and Public Organisation.

EDUCATION

2007 – 2012	PhD in Environmental Economics London School of Economics and Political Science, UK
2006 – 2007	MSc in Human Geography Research London School of Economics and Political Science, UK
2000 – 2001	MSc in Economics University of York, UK
1995 – 1998	BSc in Economics University of Bristol, UK

PROFESSIONAL EXPERIENCE

02/2012 – present	Director, PJM Economics, (Dorset, UK)
01/2010 – 12/2015	Visiting Lecturer, Dept of Economics, City University, (London, UK)
04/2008 – 02/2012	Independent Consultant, (London, UK)
09/2006 – 03/2008	Special Consultant, NERA Economic Consulting (London, UK)
08/2002 – 05/2006	Consultant, NERA Economic Consulting (London, UK)
01/2002 – 08/2002	Project Consultant, Norwich Union, (York, UK)
09/1998 – 08/2000	Research Assistant, CMPO, University of Bristol, (Bristol, UK)

MEMBERSHIPS

Royal Economic Society, European Association of Environmental and Resource Economists, Chartered Institute of Water and Environmental Management, UK Network of Environmental Economists.

SELECTED PUBLICATIONS

Metcalfe, P. and Baker, W. (2015) The Sensitivity of Willingness to Pay to an Economic Downturn, Journal of Environmental Economics and Policy,4(1).

Metcalfe, P. et al. (2012) An Assessment of the Nonmarket Benefits of the Water Framework Directive to Households in England and Wales, Water Resources Research, 48.

Metcalfe, P. and Baker, W. (2012) Willingness to Pay to Avoid Drought Water Use Restrictions, Working Paper.

NERA and Accent (2011) Carrying Out Willingness to Pay Surveys, UKWIR Report Ref. No. 11/RG/07/22.

NERA and Accent (2009) The Social Value of the Post Office Network, Report to Postcomm, UK.

NERA and Accent (2008) CRP Project 4d: Public Preferences for WFD Outcomes [Prioritisation], Final Report for DEFRA, UK.

NERA and Accent (2007) The Benefits of Water Framework Directive Programmes of Measures in England and Wales, A Final Report to DEFRA re CRP Project 4b/c, UK.

Baker, W. and Metcalfe, P. (2007) Estimating Customers' Willingness To Pay For Service Quality: The Example Of Water Service Reliability In London, in Voll, S.P. and M.J.King (eds) The Line in the Sand: The Shifting Boundary Between Markets and Regulation in Network Industries.

Asteriou, D., Cubbin, J., Jones, I., Metcalfe, P., Paredes, D. & Van der Veer, J (2005) The Demand for Long Distance Travel in Great Britain: Some New Evidence (Report No. 05/01). London, UK: Department of Economics, City University London, UK.

NERA (2004) Review of Seasonal Adjustments, A Report for Office of the Deputy Prime Minister, UK.

NERA (2004) Estimating Opex and Capex Efficiency, A Report for Water UK.

NERA (2003) Research on Long-Term Fare Elasticities, A Report for the Strategic Rail Authority, UK.

NERA (2003) A Framework Methodology for Estimating the Impact of Household Metering on Consumption, UK Water Industry Research, Report Ref. No. 03/WR/01/4.

NERA (2003) UK Water Cost of Capital, A Report for Water UK.

RELEVANT PROJECTS

Welsh Water, UK
PR19 Willingness to Pay Research
Currently leading the stated preference design, analysis and reporting components of a programme of research with Welsh Water customers to explore their priorities between various service areas, and their willingness to pay for improvements.

Bupa, UK
Price Elasticity Research
Currently leading the stated preference design, analysis and reporting components of a study exploring the demand for private health insurance in the UK.

Transport for London, UK
Currently leading the stated preference design, analysis and reporting components of a study exploring the relative importance of a large number of journey-related attributes, and people's willingness to pay for improvements. Attributes included relate to bus, tube, car, cycle and walking modes.

TransUrban, Australia
Price Elasticity Research
Currently leading the stated preference design, analysis and reporting components of a study exploring the demand for TransUrban assets, which include toll roads and bridges, in the Brisbane area.

Scottish Water, UK
Meta-analysis of PR14 Willingness to Pay Results
Led an econometric modelling study to explore the sources of variation in the willingness to pay results reported by water companies for identical, or similar, service measures at the 2014 water price review.

London School of Economics, UK
Decision Rules Research
Collaborated on an academic study involving a stated preference survey to explore households' preferences amongst different options for how decisions could be made by a public body. The research was undertaken in the context of flood control investment in Houston, Texas, and the alternative decision rules tested included the cost-benefit analysis / Kaldor-Hicks rule, majority rule, and a priority-to-the-poor rule.

Ministry of Transportation, Turkey
Transportation Masterplan
Led the design, analysis and reporting components of a stated preference research study exploring the value of travel time savings across various travel modes.

Ministry of Transport and Public Infrastructure, Malawi
Transportation Masterplan
Led the design, analysis and reporting components of a stated preference research study exploring the value of travel time savings across various travel modes.

Passenger Demand Forecasting Council, UK
Fares Simplification Research
Led the design, analysis and reporting components of a stated preference research study exploring the potential impact of fares simplifications on demand for rail travel and ticket type choice.

First Buses, UK
Price Elasticity Research
Led the design, analysis and reporting components of a stated preference project to explore passengers' price elasticity of demand and preferences between various ticketing options.

Suffolk County Council, UK
Sizewell C Impact Assessment
Led the design, analysis and reporting components of a stated preference research study exploring……

First Group, UK
South West Trains Franchise Bid Stated Preference Research
Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's bid for the South West rail franchise.

Royal Mail, UK
Parcels Market Stated Preference Research
Led the design, analysis and reporting components of a stated preference research study exploring the characteristics of market demand for parcels in the UK. The output from the study included a simulator model to predict the impact on demand and revenues due to bespoke scenarios inputted by the user.

DEFRA, UK
Peer Review of Updated Benefits Estimates for the Thames Tideway Tunnel
Reviewed a study which updated the environmental benefits estimates attributable to the prospective Thames Tideway Tunnel.

University of Cambridge, UK
Smart Energy Stated Preference Research
Led the design component of a stated preference project to explore households' preferences with respect to smart energy technology and service contracts. The research was used within a broader academic study into smart energy issues.

Virgin Trains, UK
Car Competition Stated Preference Research
Led the design, analysis and reporting components of a stated preference project to explore the impact of falling car fuel prices on the demand for rail, and other aspects related to the competitive interaction between car and rail. The research was used in conjunction with a parallel revealed preference study to help Virgin Trains understand current trends and make predictions with respect to rail demand going forward.

Highways England, UK
Road User Stated Preference Research
Led the design and analysis components of a stated preference research study exploring road users' priorities in relation to various types of improvement to the roads, and to Highways England's services. The research was used to support Highways England's strategy development.

University College London, UK
Impacts of Community Severance Stated Preference Research
Led the design component of a stated preference project to explore the impact on local residents of road widening, and their preferences for alternative types of pedestrian crossing. The research was used within a broader academic study into community severance impacts.

First Group, UK
East Anglia Franchise Bid Stated Preference Research
Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's bid for the East Anglia rail franchise.

WPD and National Grid, UK
Stated Preference Valuation of Water and Sewerage Service Attributes
Led the design, analysis and reporting components of multiple stated preference projects for UK water companies. The studies were all focussed on valuing improvements to water and sewerage service levels, to support business optimisation modelling and planning in advance of the 2014 industry price review.

First Group, UK
Trans Pennine Express Franchise Bid Stated Preference Research
Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's successful bid for the Trans Pennine Express rail franchise.

TSB, UK
Added Value Accounts Market Research
Led the design, analysis and reporting components of a stated preference project to explore customers' preferences with respect to various bank account features. Developed a simulator model to predict the impact on market share and revenue of introducing a suite of new accounts as a function of the accounts' features and prices.

UK Hydrographics Office, UK
Electronic Navigational Charts Market Research
Led the design, analysis and reporting components of a stated preference project to explore the preferences and choices of customers in the worldwide market for electronic navigational charts. Developed a simulator model to predict the impact on market share and revenue in response to various hypothetical own-company and competitor supplier actions.

European Bank for Reconstruction and Development, UK
Appraisal of Infrastructure Investment Proposals
Advised on the design and analysis of a stated preference survey to appraise the viability of water and wastewater infrastructure investment proposals in the Kyrgyz Republic.

Transport for London, UK
Stated Preference Study to Appraise the Impact of an Ultra Low Emissions Zone in London
Led the design and analysis of an SP study on behalf of Transport for London to forecast the effect of introducing an ultra-low emissions zone, and corresponding charges for non-compliance, on travel behaviour and revenue. The output included a spreadsheet model allowing TfL to obtained quantitative predictions in response to varying the level of the charge and its timing, by vehicle type.

Intercity Railways, UK
East Coast Franchise Bid Stated Preference Research
Led the design and analysis of an SP study to explore passengers' preferences with respect to a wide range of service attributes, including travel time-shifting and flexibility, booking options, station facilities and on-board facilities. The research was used to support the company's ultimately successful bid for the East Coast rail franchise

A Club of 15 UK Water Companies
Review of PR14 Willingness to Pay Estimates
Conducted a review and comparison of the results obtained by water companies' willingness to pay research studies for the 2014 industry price review.

Scottish Water, South West Water, Northumbrian Water, Essex & Suffolk Water, Welsh Water, Southern Water, South East Water and Sutton & East Surrey Water, UK
Stated Preference Valuation of Water and Sewerage Service Attributes
Led the design, analysis and reporting components of multiple stated preference projects for UK water companies. The studies were all focussed on valuing improvements to water and sewerage service levels, to support business optimisation modelling and planning in advance of the 2014 industry price review.

UK Water Industry Research
Carrying out Willingness to Pay Surveys
Advised on issues relating to the development of a common framework for the design and conduct of willingness to pay surveys in the context of valuing the benefits of water company investment programmes. This included identifying and defining the relevant service measures, attributes and levels plus the wider survey features that may affect the reliability and robustness of WTP results; identifying aspects of service or environmental improvement which may be better valued in ways other than by such surveys, and providing guidance on valuation for such cases.

Competition Commission, UK
Peer Review of Stated Preference Survey Design
Reviewed a stated preference survey questionnaire for use in the Payment Protection Insurance inquiry.

Infraco, Uganda
Appraisal of an Infrastructure Investment Proposal
Advised on the design and analysis of a stated preference survey to appraise the viability of water, electricity and transport infrastructure investment proposals in rural Uganda.

Ministère de l'Ecologie, de l'Energie, du Développement Durable et de l'Aménagement du Territoire (MEEDDAT), France
An Econometric Model of Household Vehicle Choice
Developed a model of household vehicle choice in France. The model was estimated using discrete choice econometric methods on data from a large sample of individual households. The main purpose of the model was to predict the effect of introducing a new vehicle excise tax favouring the least-polluting vehicles.

Postcomm, UK
The Social Value of the Post Office
Designed and analysed a UK-wide survey to quantify the social value of the post office network to UK households and businesses. Choice experiments and contingent valuation methods were employed to elicit values.

Environment Agency, UK
Further Analysis of the Benefits of the Water Framework Directive to England and Wales
Developed extensions to the spreadsheet model created for CRP Project 4b/c (see below), and conducted analyses of the benefits of the Water Framework Directive under specified scenarios. Also provided training in the use of the models and in the interpretation of the results. The models were used in the development of the river basin management plans for the first Water Framework Directive planning period (2009-2015).

Defra (CRP Project 4d), UK
Public Preferences for Water Framework Directive Outcomes [Prioritisation]
Co-managed a study to design and analyse a national household survey to elicit household preferences between alternative types of improvement to the water environment. The results are being used to help determine the content of the first set of river basin management plans required by the EU Water Framework Directive.

Defra (CRP Project 4b/c), UK
Valuing the Benefits of the Water Framework Directive to England and Wales
Managed a major government study to design a survey instrument capable of valuing the benefits of the EU Water Framework Directive to households in England and Wales, and then analyse the results using a range of econometric techniques. The project involved focus group research, stakeholder interviews and a literature review to inform the survey design. The main outputs were a detailed report, and a spreadsheet model valuing the benefits of specified implementations of the Water Framework Directive.

Anglian Water, UK
Peer Review of Benefits Appraisal for PR09 CBA
Contributed to a peer review of ICS's evaluation of the benefits of Anglian Water's investment programme for PR09.

Anglian Water, Thames Water and South West Water, UK
Stated Preference Valuation of Water and Sewerage Service Attributes
In five separate projects, advised on design and analysis issues relating to stated preference surveys for valuing improvements to water and sewerage service levels, for three UK water and sewerage companies. The results of the surveys were to be used for business optimisation modelling and in regulatory submissions for the 2009 price review.

A Major International Pharmaceutical Company
Stated Preference Analysis of Consumer Preferences for Drug Attributes
Advised on analysis and interpretation of results from choice modelling study of consumer preferences for drug attributes.

Thames Water, UK
Drought Order Economic Impact Assessment
Managed a project assessing the costs and benefits to residents and businesses in the London and Thames Valley areas of a proposed statutory drought order, which would limit the use of water for non-essential uses.

Defra (CRP Project 1c), UK
Screening Economic Mechanisms for Inclusion in Programmes of Measures for the Water Framework Directive
Managed a project evaluating which pricing policies, cost recovery mechanisms and economic instruments could potentially play a role in the achievement of the objectives of the Water Framework Directive.

Thames Water, UK
Valuing the Economic and Social Cost of Drought Water Use Restrictions
Managed a project involving a stated preference study of the costs of drought water use restrictions to customers. Study included qualitiative and quantitative research, design, implementation and analysis.

Water UK
Long-Term Planning in the UK Water Sector
Co-wrote a scoping note on issues concerning long-term planning for policy-makers, regulators and water companies.

Thames Water, UK
The Economics of Wastewater Supply-Demand Planning
Managed a project involving the design of a cost-benefit framework for planning investments in the wastewater service.

Environment Agency, UK
Time-Limited Licences
Examined the economic implications of the Environment Agency's intended approach to the management of abstraction licences.

Department for Regional Development, Northern Ireland
Reform of Northern Ireland Water Service
Undertook research contributing to a wide-scale analysis of the options for institutional reform of the Northern Ireland water sector. The project comprised: examination of restructuring of the national water utility and development of options for private sector participation; forecasting anticipated efficiency improvements; constructing financial valuation model; and, asset valuation.

A European Water Service Provider
Activity-Based Cost Modelling
Managed a project involving the construction of a model for the fair allocation of all the costs of water and sewerage services across household, industry and commercial customers for the determination of bills.

Eurocontrol
Cost Benchmarking Analysis
Managed a project involving an econometric stochastic frontier analysis of European air navigation service providers' costs.

Lloyd's Pharmacies, UK
Forecasting Prescriber Volumes
Developed an econometric model with which to forecast prescription volumes for different classes of drug within primary care trust areas. The model was based on panel data analysis of population demographics and historic trends.

Network Rail – Office of Rail Regulation, UK
Enhancement Framework in Regulated Utilities
Wrote a chapter describing some key features of the England and Wales, and Scottish, water and sewerage industries in respect of the way that risks in capital enhancement projects are allocated between companies, customers and third parties. The full report drew comparisons between the electricity, gas, water and sewerage, airports and rail industries.

Essential Services Commission, Australia
Note on Infrastructure Charges
Wrote a note on the scope and structure of the infrastructure charge in the England and Wales water and sewerage industry. Included a discussion of the issues surrounding the charge since it was introduced at privatisation and the resulting reforms that took place.

Lloyd's Pharmacies, UK
Estimating Determinants of Prescription Volumes
Advised on panel data econometric issues for a project analysing the effects of local area characteristics on volumes of different types of drugs prescribed by GPs.

Office of the Deputy Prime Minister, UK
Review of Seasonal Adjustments
Managed a project involving the analysis of benefit claimant data at Local Authority level to identify whether patterns of seasonality differ in predictable ways across Local Authorities. We used the X12-ARIMA filter method and panel data regression methods to analyse the seasonal components of the multiple time-series.

Northumbrian Water, UK
Cost of Capital Analysis
Estimated the cost of equity for UK water companies using Dividend Growth Models.

Thames Water, UK
Review of a Reservoir Development Proposal
Jointly led a workshop to review all aspects of a proposal to develop a major reservoir. Issues covered included the statement of needs, estimation of impacts and monetary valuation of these, estimation of scheme and system costs, optimisation of supply-demand plans considering all potential sources of yield and demand management possibilities, key elements of the land-use and regulatory cases required.

Scottish Water
Comparative Efficiency Analysis
Estimated the relative efficiency levels of UK water companies' operating expenditures using panel data regression models.

Scottish Water
Forecasting National Construction Output Prices
Derived medium-term econometric projections for the national Construction Output Price Index using an error correction model.

Anglian Water, UK
Macroeconomic Forecasts and Scenarios
Developed internally consistent and credible forecast scenarios for a number of economic variables including GDP, RPI, interest rates, construction prices and industrial water demand.

Water UK (UK Water Industry Trade Body)
General Efficiency Analysis
Produced medium-term forecasts for opex and capex input prices as an input into an analysis of the scope for efficiency in UK water and sewerage industry over the coming price review period.

Scottish Water
Financial Risk Model
Identified and quantified Scottish Water's financial risk exposures as an input into the development of a model to take account of the impact of risk exposures on the company's financial position.

Scottish Water
Demand Forecasting
Advised Scottish Water on best practice methods for water demand estimation and forecasting.

A Group of UK Water Companies
Financial Risk Model
Assisted with the development of a financial risk model to take account of water company risk exposures and the resulting impact on financial indicators through the use of Monte Carlo

analysis. The work also involved identifying and quantifying the risks facing water companies ahead of the periodic review.

Water UK
Estimating the Cost of Capital for UK Water Companies
Analysed recent evidence on the cost of capital for UK water companies using CAPM and DGM methodologies.

Strategic Rail Authority, UK
Estimating Long-Term Fare Elasticities of Rail Demand
Constructed models of demand for four segments of the UK rail passenger market. Estimated cointegration models using panel data, with fixed effects estimators and with an error correction mechanism.

UK Water Industry Research
The Impact of Household Metering on Consumption, Further Analysis
Managed a project involving the estimation of the effects of metering on household water consumption in various weather conditions and over time using a panel dataset. Also, using company information on metering promotions, estimated the impact of publicity on the propensity of households to opt to pay for water and sewerage services on a measured basis.

Opta, Netherlands
Estimating the Cost of Capital for the Telecommunications Industry
Estimated the cost of capital for termination and origination fixed line telecommunication services.

Water UK
Estimating the Cost of Capital for UK Water Companies
Analysed evidence on the CAPM beta for UK water companies as part of NERA's report for Water UK for the 2004 periodic review.

Southern Water, UK
Review of Tariffs for Bulk Supply and Network Access
Reviewed estimation methods and issues with respect to the client's proposals to base their bulk supply charges on Long Run Marginal Cost and their network access charges on the Efficient Component Pricing Rule.

Yorkshire Water and United Utilities, UK
The Impact of Household Metering on Consumption
Estimated the effects of metering on household water consumption using panel datasets. Also estimated a model of the propensity of households to opt to pay for water and sewerage services on a measured basis.

Northumbrian Water, UK
Forecasting Industrial Water Demand
Quantitatively analysed a panel dataset to derive regional and sectoral forecasts for non-residential water use. Estimated dynamic demand model using the Arrelano-Bond GMM estimator.

Northumbrian Water, UK
Forecasting National Construction Output Prices
Derived medium-term projections for the national Construction Output Price Index using macroeconomic and construction industry data sources.

UK Water Industry Research
The Impact of Household Metering on Consumption
Estimated the effects of metering on household water consumption using panel datasets with a random effects estimator. Also developed and estimated a complementary log-log discrete choice model of the propensity of households to opt to pay for water and sewerage services on a measured basis.

Western Power Distribution, UK
Cost of Capital Analysis
Quantitatively assessed the reliability of recent estimates of the CAPM Beta for UK Utilities.

Dr. Ali Chalak

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OVERVIEW

Dr. Chalak has earned his B.Sc. degree in Agriculture from the American University of Beirut (AUB) in 2000, and completed his M.Sc. in Tropical Agricultural Development, option in Crop Protection, from the University of Reading, UK, in 2001. He then went on to complete a Ph.D. in Applied Economics at Imperial College London, Wye Campus, UK, in 2008. Dr. Chalak has worked as a consultant in the UK between 2006 and 2009, first in ICF International and then ICS Consulting. He was involved extensively in willingness-to-pay research conducted for a variety of UK water and wastewater companies in the framework of PR09. Dr. Chalak joined the Faculty of Agricultural and Food Sciences at AUB as faculty member in 2009, and is currently an Associate Professor in Applied Economics. His research focuses on alcohol control and harm reduction policy in Lebanon; commuters' and motorists' behaviour, modes of transport, and greenhouse gas emissions; adoption of conservation agriculture among farmers in Lebanon and the MENA and consumer demand for food products with safety or environmental labels and certificates. He remains actively engaged in independent consulting for the UK water industry, whereby he has been involved in a large number of willingness-to-pay studies in the context of PR14 and, currently, PR19.

EDUCATION

2002-2008	PhD in Applied Economics Imperial College London, Wye Campus, University of London, UK
2000-2001	MSc in Tropical Agricultural Development – Option in Crop Protection University of Reading, UK
1996 – 2000	BSc in Agriculture and Diploma 'Ingénieur Agricole' American University of Beirut

PROFESSIONAL EXPERIENCE

09/2009 – present	Associate Professor of Applied Economics, Faculty of Agricultural and Food Sciences, American University of Beirut (Beirut, Lebanon)
02/2008 – 09/2009	Consultant, ICS Consulting (London, UK)

08/2006 – 01/2008	Consultant, ICF International (London, UK)
10/2003 – 03/2006	Part-time Teaching Assistant, Imperial College London, Wye Campus (Wye, Ashford, UK)
05/2004 – 06/2004	International Consultant, Imperial College Consultants (ICON) and World Bank (Wye, Ashford, UK)
11/2001 – 08/2002	Quality Inspector and Agricultural Engineer, TÜV-Hellas SAL (Beirut, Lebanon)

MEMBERSHIPS

Agricultural Economics Society, Lebanese Economic Association, European Association of Environmental and Resource Economists, Association of Environmental and Resource Economists, Agricultural and Applied Economics Association, Order of Engineers and Architects Lebanon.

SELECTED PUBLICATIONS

Articles in refereed international journals

Chalak, A., Abiad, M. & Balcombe, K. (Forthcoming). 'Joint use of attribute importance ranking and non-attendance data within a choice experiment on food safety certification in Lebanon.' *European Review of Agricultural Economics*. doi: http://dx.doi.org/10.1093/erae/jbw004.

Moledor, S., Chalak, A., Fabian, M. & Talhouk, S. (2016). 'Socioeconomic dynamics of vermicomposting systems in Lebanon.' *Journal of Agriculture, Food Systems, and Community Development* 6(3): 1-24. doi: http://dx.doi.org/10.5304/jafscd.2016.064.007.

Chalak, A., Al-Naghi, H., Irani, A. & Abou-Zeid, M. (2016). 'Commuters' behavior towards upgraded bus services in Greater Beirut: Implications for greenhouse gas emissions, social welfare and transport policy.' *Transportation Research Part A: Policy and Practice* 88: 265-285. doi: http://dx.doi.org/10.1016/j.tra.2016.04.001

Ghandour, L., Chalak, A., Al Aily, A., Yassin, N., Nakkash, R., Tauk, M., Heffron, M. & Afifi, R. (2016). 'Alcohol consumption in the Arab region: What do we know, why does it matter, and what are the policy implications for youth harm reduction?' *International Journal of Drug Policy* 28: 10-33. doi: http://dx.doi.org/10.1016/j.drugpo.2015.09.013.

Chalak, A., Abou-Daher, C., Chaaban, J. & Abiad, M. (2016). 'The global economic and regulatory determinants of household food waste generation: A cross-country analysis.' *Waste Management* 48: 418-422. doi: http:dx.doi.org/10.1016/j.wasman.2015.11.040.

Irani, A. & Chalak, A. (2015). 'Harnessing motorists' potential demand for hybrid-electric vehicles in Lebanon: Policy options, CO_2 emissions reduction and welfare gains.' *Transport Policy* 42: 144-155. doi: http:dx.doi.org/10.1016/j.tranpol.2015.06.001

Hecht, J., Reid, S. & Chalak, A. (2015). 'A marketing analysis of the equitability of water/sewerage service improvements.' *Journal – American Water Works Association* 107(4): E224-E233. doi: http:dx.doi.org/10.5942/jawwa.2015.107.0040.

Abou Zaki, S., Chaaban, J., Nasreddine, L. & Chalak, A. (2014). 'The impact of food price increases on nutrient intake in Lebanon.' *Agricultural and Food Economics* 2(3). doi: http:dx.doi.org/10.5942/jawwa.2015.107.0040.

Chalak, A., Reid, S., Silcock, M. & Abiad, M. (2013). 'Customers' perspectives of water safety and service failure risks.' *Journal – American Water Works Association* 105(8): E449-E459. doi: http:dx.doi.org/10.5942/jawwa.2013.105.0092.

Abiad, G. & Chalak, A. (2012). 'Unraveling mean and variance heterogeneity influences of information provision on safer food purchasing decisions: A heteroscedastic mixed logit approach.' *Food Economics* 9(3): 135-144. doi: http:dx.doi.org/10.1080/2164828X.2013.781942.

Chalak, A., and Abiad, M. (2012). 'How effective is information provision in shaping food safety related purchasing decisions? Evidence from a Choice Experiment in Lebanon.' *Food Quality and Preference* 26(1): 81-92. doi: http:dx.doi.org/10.1016/j.foodqual.2012.04.001.

Chalak, A., Hecht, J., Reid, S. & Abiad, M. (2012). 'Willingness-to-pay for greenhouse gas reductions: A Bayesian investigation of distributional patterns.' *Environmental Science and Policy* 19-20: 147-157. doi: http:dx.doi.org/10.1016/j.envsci.2012.02.003.

Reid, S., Chalak, A. & Hecht, J. (2010). 'Determining the optimal investment plan for water utilities: The case of Veolia Water Central.' *Water Science and Technology: Water Supply* 10(3): pp. 367-375. doi: http:dx.doi.org/10.2166/ws.2010.098.

Balcombe, K., Chalak, A. & Fraser, I. (2009). 'Model selection for the mixed logit with Bayesian estimation.' *Journal of Environmental Economics and Management* 57(2): pp. 226-237. doi: http:dx.doi.org/10.1016/j.jeem.2008.06.001.

Balcombe, K., Bailey, A., Chalak, A. & Fraser I. (2008). 'Modifying willingness to pay estimates where respondents mis-report their preferences.' *Applied Economics Letters* 15(5): pp. 327-330. doi: http:dx.doi.org/10.1080/13504850600706123.

Chalak, A., Balcombe, K., Bailey, A and Fraser, I. (2008). 'Pesticides, preference heterogeneity and environmental taxes.' *Journal of Agricultural Economics* 59(3): pp. 537-554. doi: http:dx.doi.org/10.1111/j.1477-9552.2008.00163.x.

Balcombe, K., Bailey, A., Chalak, A. & Fraser I. (2007). 'Bayesian estimation of willingness-to-pay where respondents mis-report their preferences.' *Oxford Bulletin of Economics and Statistics* 69(3): pp. 413-438. doi: http:dx.doi.org/10.1111/j.1468-0084.2006.00198.x.

Crane, M., Norton, A., Leaman, J., Chalak, A., Bailey, A., Yoxon, M., Smith, J. & Fenlon, J. (2006). 'Acceptability of pesticide impacts on the environment: what do United Kingdom stakeholders and the public value?' *Pest Management Science* 62(1): pp. 5-19. doi: http:dx.doi.org/10.1002/ps.1134.

Conference proceedings and papers

Hecht, J., Chalak, A. & Reid, S. (2010). 'How equitable are proposed water and sewerage service improvements? Evidence from a marketing analysis of stated preference data.' Paper presented at the 80th Annual Conference of the Southern Economic Association, Atlanta, Georgia, 20-22 November 2010.

Chalak, A., Reid, S. & Hecht, J. (2010). 'Using Bounded Bayesian Mixed Logit Models to Capture Heterogeneous and Shifting Public Attitudes towards Climate Change Risks.' Paper accepted at the workshop on "Risk Elicitation and Stated Preference Methods for Climate Change Research", EnviroChange, University of Trento, Trento, 21-22 October 2010.

Chalak, A and Reid, S. (2010). 'Customers' inertia in response to risks of water service failure: insights from a Bayesian analysis of a water company choice experiment.' Paper presented at the Applied Environmental Economics Conference (Envecon 2010), The Royal Society, London, 12 March 2010.

Reid, S., Chalak, A., & Hecht, J. (2009). 'Determining the optimal investment plan for water utilities: The case of Three Valleys Water.' In K. P. Tsagarakis (Ed.), 2nd International Conference on Water Economics, Statistics and Finance. Conference Proceedings (Vol. I, pp. 137-148). International Water Association (IWA), Alexandroupolis, Thrace-Greece, 3-5 July 2009.

Chalak, A., Bailey, A., Balcombe, K. & Fraser, I. (2006). 'Pesticides, preference heterogeneity and non-market values: a latent class model.' Paper presented at the 80th AES Annual Conference, Paris, 29-31 March 2006. Available from: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.ibrarian.net%2Fnavon%2Fpaper%2FPesticides__Preference_Heterogeneity_and_Non_Mark.pdf%3Fpaperid%3D4934890&ei=0AYjVZy4EsziaqvwgKAF&usg=AFQjCNFF8Ep1b3_H2GB2lSd2WhXcrf9Uyw&bvm=bv.89947451,d.d2s.

Reports

"C1 customer views: Customer consultation process. Report for Northern Ireland Water", ICS Consulting, UK, February 2009.

"Post DBP Choice Experiments: Supply Interruptions and Water Quality. Report for Anglian Water Services", ICS Consulting, UK, February 2009.

"Customer willingness to pay for reducing odour nuisance from the Beckton sewage treatment works. A report for Thames Water Utilities Ltd.", ICS Consulting, UK, May 2008.

"Customer preferences and willingness to pay. A report for Three Valleys Water, Folkestone & Dover Water Services and Tendring Hundred Water Services (Veolia Water)", ICF International, London, UK, February 2008.

"Customer preference surveys for PR09 investment planning: Stage 2 studies. A report for Thames Water Utilities Ltd.", ICF International, London, UK, February 2008.

"Customer preference surveys for PR09 investment planning. A report for Thames Water Utilities Ltd.", ICF International, London, UK, February 2008.

RELEVANT PROJECTS

Welsh Water, UK
PR19 Willingness to Pay Research
Currently contributing to the stated preference design, analysis and reporting components of a programme of research with Welsh Water customers to explore their priorities between various service areas, and their willingness to pay for improvements.

Save the Children and UNICEF, Jordan
Cost Efficiency Evaluation
Currently leading the analysis and reporting components of an independent cost efficiency evaluation of the Infant and Young Child Feeding (IYCF) Program in Syrian refugee camps and host communities in Jordan

CEDRO, UNDP, Lebanon
Econometric Analysis and WTP Research on Energy Efficiency and Renewable Energy
Currently leading the design, analysis and reporting components of various stated preference and related survey-based studies investigating the demand and WTP for energy efficiency and renewable energy in Lebanon.

Irish Water, **Ireland**
PR14 Customer and WTP Research
Led the analysis and contributed to the reporting components of a stated preference study of Irish customer priorities for improvement in their water and wastewater service.

Thames Water Utilities, UK
PR14 Customer Research
Led the analysis and contributed to the reporting components of a survey-based study of Thames Water customers' views and priorities for improvement of leakage and restricted use of their water service.

Severn Trent Water, UK
PR14 Customer and WTP Research
Contributed to the analysis and reporting components of a follow-on stated preference study of Severn Trent's customers' preferences for service improvements.

Dong Energy, Denmark
Stated Preference Research
Led the analysis and contributed to the reporting of a stated preference study to estimate the non-financial impacts associated with investment in improving health and safety, environmental performance, reputation and employee engagement for the purpose of investment optimisation of this leading Danish energy provider.

South Staffordshire Water, UK
PR14 Customer and WTP Research
Contributed to the stated preference design, analysis and reporting components of a programme of research with South Staffordshire customers to explore their priorities between various service areas, and their willingness to pay for improvements.

ICS Consulting, UK
PR14 Acceptability research
Contributed to the conceptualization of novel methods for evaluating customers' acceptability of water and wastewater service improvements among UK customers.

Various England and Wales Water and Wastewater Companies
PR14 Stated Preference Research
Provided econometric support for second stage stated preference studies for various England and Wales water and wastewater companies.

Anglian Water Services, UK
PR14 Customer and WTP Research
Contributed to the stated preference design, analysis and reporting components of a programme of research with Anglian Water customers to explore their priorities between various service areas, and their willingness to pay for improvements.

Severn Trent Water, UK
PR14 Customer and WTP Research
Contributed to the stated preference design, analysis and reporting components of a programme of research with Severn Trent Water customers to explore their priorities between various service areas, and their willingness to pay for improvements.

Thames Water Utilities, UK
PR14 Stated Preference Customer Research
Contributed to the design, analysis and reporting components of second stage stated preference studies evaluating Thames Water customers' priorities for improvements in their sewer flooding, supply interruptions and environmental performance of their service.

South West Water, UK
PR14 Customer and WTP Research
Contributed to the stated preference design, analysis and reporting components of a programme of research with South West Water customers to explore their priorities between various service areas, and their willingness to pay for improvements.

Thames Water Utilities, UK
PR14 Follow-on WTP/WTA Research
Contributed to the analysis and reporting of a follow-on WTP and WTA study of Thames Water customers' priorities.

Yorkshire Water Services, UK
WTA and WTP valuations for investment planning
Contributed to the analysis and reporting components of follow-on stated preference studies exploring different econometric approaches to the estimation of WTP and WTA for service improvement/deterioration among Yorkshire Water customers.

YouGov, UK
Customer Research and Econometric Analysis

Led the econometric analysis of water customer data from a UK National Water Survey exploring different perceptions, attitudes and priorities for improvement related to UK customers' water and wastewater service.

Virgin Media, UK
Econometric Modelling of Broadband Network Capacity
Led the conceptualization, analysis and reporting components of a study exploring the probabilistic relationship between actual download speeds and broadband network capacity, given customer demand, of this leading UK internet provider. The study also generated a tool to support the decision to upgrade network capacity.

Thames Water Utilities; Veolia Water; Anglian Water; Northern Ireland Water
PR09 and PC10 Customer and WTP Research
Led the design, analysis and reporting components of a programme of stated preference research exploring Thames, Anglian, Veolia and Northern Ireland Water customer priorities between various service areas, and their willingness to pay for improvements.