Update to claim: Manchester and Pennines resilience

Cost assessment representations: Appendix

Document Reference: D003c

This document is our response to the Ofwat feedback to that proposed cost adjustment, which was included in the Ofwat document FM_CAC_NWT_IAP in section NWT- WN601001.

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1. Introduction

This is our more comprehensive response to the feedback received in the assessment of the cost adjustment claim for the Water Network+ baseline due to the "Manchester & Pennines Resilience" scheme. In reviewing the comments for each of the assessment gates and comparing to our updated views on the programme (as it matures) we believe that the reductions to the cost for the scheme are not appropriate and would put at risk our ability to deliver the DPC in the most effective way. We remain confident that the need for an adjustment is justified from both an econometric and engineering perspective and that there are "*regional operating circumstances with significant impact on costs*" which support the need for a cost adjustment claim.

This supplements the information previously supplied within the May and September 2018 submissions and does not seek to repeat information contained within these other than for where it directly relates to an issue raised. We address each of the assessment gates separately, responding to the issues raised in turn and providing clarity and further validation where necessary.

1.1. Feedback from the IAP

The results of the assessment of the claim is contained within FM_CAC_NWT_IAP under NWT-WN601001 and summarised in Table 1 below. Overall, Ofwat assessed the claim as having

> *"provided extensive documentation to support its proposed solution for the M&PR scheme and hence the need for AMP7 study and project preparation funds. However, when benchmarked against recent large and complex projects,* ***the value of NWT's cost adjustment claim appears excessive****.* ***Furthermore, NWT's claim amount includes ~9% appointee overhead cost. The overhead cost has been removed and the remaining costs trimmed so that the cost adjustment value lies within the benchmarking range."***

Table 1 IAP gate results for cost adjustment claim WN601001 - Manchester & Pennine resilience

Test area	Assessment
Need for investment	Pass
Need for adjustment	Partial pass
Management control	Partial pass
Best option for customers	Pass
Robustness and efficiency of costs	Partial pass
Customer protection	Pass
Affordability	Pass
Board assurance	Pass

We do not believe that any concern raised within the '*need for adjustment*' or '*management control*' sections require any further evidence as it does not appear that they have impacted the resulting addition to the baseline or acceptability of scheme. However, we are happy to provide further evidence on these areas if there are specific issues that remain a concern. This document focussed on the comments relating to the '*robustness and efficiency of costs*' which we address in section 2 below. Depending upon the final outcome of the assessment, there may be also be a need to revisit

the incentive rate associated with the performance commitment "*B09-DP Manchester and Pennine resilience*" which we explain within section 3.

2. Robustness and efficiency of costs

Whilst we do not have an equivalent bottom up build against which to compare to our own, Ofwat's difference in the assessment of the efficiency of costs apparently relates only to two aspects of the programme, the **appointee overhead costs** allocated to the programme and the **geotechnical survey** work we will undertake prior to the appointment of a CAP. It is therefore our inferred understanding that Ofwat deems all other aspects of the programme as efficient and include all expenditure within the addition to the baseline.

We maintain that our original expenditure proposals for delivering the DPC are appropriate but will attempt to accommodate the removal of the overhead 'in the round'. However, in reducing the expenditure assumptions for ground investigations, Ofwat has placed an additional and undue risk on the programme that will ultimately be reflected within the CAP bids, which could negatively affect the value for money of the DPC. Our bottom up costs are summarised in Table 2 below.

Table 2 Summary of UUW Expenditure requirements for AMP7

Phase	*Activity*	*TI*	2020-21	2021-22	2022-23	2023-24	2024-25	AMP7
Initial design	*All items (excluding GI)*	*£0.48*	*£0.00*	*£0.00*	*£0.00*	*£0.00*	*£0.00*	**£0.48**
Initial design	*Devise & compile contracts for Site Investigation (SI) survey*	*£0.12*	*£0.24*	*£0.00*	*£0.00*	*£0.00*	*£0.00*	**£0.36**
Surveys & studies	*ECI support to GI*	***£0.35***	**£0.16**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.50**
Surveys & studies	*GI survey including enabling works and interpretive report*	***£9.72***	**£21.78**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£31.50**
Surveys & studies	*Land Compensation associated with GI works*	***£0.29***	**£0.23**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.52**
Surveys & studies	*Set up of scope and manage contracts: Ecology & environmental surveys*	***£1.12***	**£0.47**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£1.59**
Planning/ consents	*All items*	*£5.88*	*£6.94*	*£3.98*	*£0.98*	*£0.00*	*£0.00*	**£17.77**
Detailed design	*All items*	*£0.00*	*£0.00*	*£0.00*	*£0.43*	*£0.58*	*£0.58*	**£1.59**
Procurement	*All items*	*£0.00*	*£1.62*	*£2.50*	*£0.17*	*£0.00*	*£0.00*	**£4.29**
Build	*All items*	*£0.00*	*£0.00*	*£0.00*	*£0.82*	*£1.10*	*£6.15*	**£8.08**
Management overhead	*All items*	***£1.62***	**£2.83**	**£0.58**	**£0.22**	**£0.15**	**£0.61**	**£6.00**

Total		***£19.58***	**£34.26**	**£7.07**	**£2.61**	**£1.83**	**£7.33**	**£72.68**

2.1. Removal of the overhead

With regard to the removal of an appointee overhead to the programme, we do not believe that the complete removal of the overhead is a realistic assumption to make. An overhead (re)charge generally comprises functional support of other activities e.g. finance, asset management, operations etc. rather than any specific, standalone deliverables and so a complete removal of them would seem excessive, as the functional input will clearly be required to ensure the successful delivery of the DPC. In developing the cost estimate for our work within the DPC project, we thought it more prudent and transparent to include the overhead as a bottom up build (but expressed as a percentage of the programme) as opposed to including the standardised corporate overhead percentage as we do for other capital projects. Functional support will not significantly scale with the value of the project and so to a degree, this is the recovery of a fixed cost within the project. This means that the *percentage* of overhead on a larger programme like Tideway will likely be smaller than that required on the Manchester & Pennines Resilience, which in turn will be smaller than that required on our smaller schemes in the period. Manchester & Pennines Resilience is over and above our business as usual activities in terms of both scale and programme management and so simply assuming that these overhead costs can be absorbed into the rest of our programme of work in unrealistic. We note that Ofwat accepted all overhead costs for the Thames Tideway Tunnel in PR14[1] and we do not see any legitimate reason why their approach should have changed when assessing this scheme. **We are willing to attempt to accommodate this further challenge 'in the round' and therefore remove this element from the claim (while keeping the expenditure in the business plan) as it more appropriate to focus on the remaining aspects of the claim that more demonstrably result in higher costs and are to a larger extent, outside of management control**.

2.2. Expenditure required to undertake sufficient ground investigations

The second issue raised by Ofwat surrounds the estimated expenditure to deliver the appropriate level of geotechnical surveys to support the engineering and design of the final solution. Since the September submission, we have been progressing the initial phases of the DPC, obtaining more detail and information of how it will progress, as would be expected given the increasing maturity of the programme. Part of this has entailed developing the more thorough, bottom up view of the specific activity for each section that is required from the ground investigations programme as well as tendering the first phase of the programme, which will provided greater certainty around cost. At the time of writing, the tenders for the first phase of the ground investigations programme are currently being assessed. Indications are that these support our estimate on cost. Given our improved understanding of the scope and cost of what is required, **Ofwat's assessment of the expenditure to deliver these investigations appears to be too low to ensure that we can deliver the programme of work effectively**. We summarise below the evidence for this and the additional work that has occurred since the September submission, which tends to support our initial view of costs.

2.2.1. Determining ground investigation cost estimates

In our business plan submission, we expressed the cost estimate for ground investigations (GI) as a percentage (4.2%) of construction costs, with total construction costs of £766m and ground

1 https://webarchive.nationalarchives.gov.uk/20150603204757/http:/www.ofwat.gov.uk/pricereview/pr14/pap_tec1412feederrbrtemplatestmsfd.xlsm

investigations of £31.5m[2]. We derived this initial estimate by assessing the unit costs from the ground investigations that were undertaken as part of our AMP6 West Cumbria pipeline project as this, although shorter in length, offered an appropriate benchmark against which to compare while bearing in mind a standard 'norms' approach. The West Cumbria unit costs for the Castlerigg tunnel section are appropriate because, although significantly shallower than sections of Manchester & Pennines Resilience, they represent some of our most recent and deepest tunnelling where the cost of ground investigations per kilometre is about £673k/km. These were also benchmarked upon comparison with available HS2 costs per kilometre of £680k indicating that our assumptions are efficient. We applied this unit cost to the amount of investigations considered necessary in order to obtain sufficient information regarding the geological and groundwater conditions present against which a CAP could progress the scheme at an appropriate risk.

The purpose for conducting ground investigations within our preparatory work is to provide detailed information into the geological and groundwater conditions near the existing asset to assess the viability of potential solutions, including the baseline solution. This additional information increases the confidence of a potential CAP regarding the risks that may prevail, which in turn will be reflected in more accurate cost estimates and a reduced allowance for delivery risks. If investigations were not undertaken to a sufficient standard, a potential CAP would be expected to reflect this in their price in terms of a larger risk component or additional costs to undertake the work themselves, adding both additional cost and time to the project. The consequences of poor preparatory work, such as adequate initial investigations accompanied by an appropriate level of geotechnical baseline reporting are becoming apparent within HS2 where reported[3] cost overruns, at least in part attributed to geotechnical reporting, are an ever-increasing problem threatening the financial logic of the project.

Tunnelling projects in the UK encounter a wide variety of ground risks and the British Tunnelling Society and the Association of British Insurers have published codes of practice that necessarily require projects to achieve an acceptable standard in order to be insurable. In terms of ground information, this would require, inter alia, information regarding the nature, form, composition and structure of the ground (both artificial and natural) and groundwater together with geotechnical properties of the ground. There is an increasing demand for development of tunnels and underground spaces and, in parallel, an awareness of the challenges that can pose. The International Federation of Consulting Engineers and the International Tunnelling and Underground Space Association (ITA-AITES) advise they would be looking at the contractual approach for such works. Their recent comments emphasise the importance of ground investigation information. They state:

> *"underground construction is highly dependent on the geological, hydrogeological and geotechnical properties of the ground, which have a defining influence on the methods required for the successful implementation of the works….the difficulty in predicting ground behaviour and foreseeable conditions implies an inherent uncertainty in underground construction which gives rise to unique contractual risks regarding construction practicability, time and cost"[4].*

It is important to recognise that, although there are differences from project to project, there is a recognised, strong and consistent relationship between appropriate preparatory works (ground investigations) and the risk of cost overrun (alternatively priced as risk within cost estimates). It

[2] Although as can be seen in Table 2, there are additional costs not included within this estimate which are attributable to the ground investigations programme.

[3] 'HS2 plans to reduce ground risk cost described as "carnage"', Ground Engineering, 28 January, 2019

[4] 'Fidic teams up with tunnelling association for new form of contract', Ground Engineering, 08 May, 2019

follows that a reduction in the opportunity for sufficient work to be undertaken results in higher costs from potential CAPs. It has been conventional to use this relationship to estimate the risk of cost overruns. Among the factors that can affect the typical ground investigation/project cost relationship are:

- code guidance,
- complexity,
- topography (requirement for considerably greater depth of drilling above the tunnel horizon),
- remoteness,
- environmental/ecological factors and
- existing desk study boreholes (BHs);

Each of the above factors has some impact on the expected ground investigations requirements for Manchester & Pennines Resilience, although the impact to some of the tunnel sections is disproportionate to others. What is clear from our continued work into developing the programme is that there is not a single rate or 'norm' assumption that can value the investigations required on this specific project.

The requirements of each investigation varies from section to section. There are examples that show where topography and environmental/access considerations are lower and more typical (for United Utilities and arguably the UK) sectional project costs are demonstrated; Ofwat specify this typical range as being from 2-4% of construction costs.

Table 3 Estimated sectional ground investigation costs as a proportion of total construction cost.

Tunnel section	Section length (km)	Average borehole depth (m)	Maximum borehole depth (m)	Ground investigation cost (£m)	Construction cost (£m)	GI / Construction %
TO1	3.5km	35m	70m	1.84	50.74	3.6%
TO2	8.5km	27m	80m	3.23	105.84	3.1%
TO3	16.6km	119m	240m	10.85	238.79	4.5%
TO4	4.3km	31m	135m	2.78	70.85	3.9%
TO5 and TO6	18.9km	78m	200m	12.79	300.01	4.3%
Total	**51.8km**			**31.50**	**766.23**	**4.1%**

From Table 3 above it is evident that for a section such as T02, where the topographic relief is lower and access is more straightforward, the cost correlation for ground investigation to sectional project cost is 3.1% of construction cost (average borehole depth of 27m); significantly lower than the average. The much longer T03 section has a ground investigation cost to sectional cost ratio of 4.5%, which is greater than Ofwat's upper bound of 4.0% (average borehole depth of 119m). It is reasonable to say that within the UK it is not 'typical' that, for 46km of tunnelling, the average depth of more than 200 investigative boreholes should exceed 70m below ground level. The proportion of work in the more challenging sections influences the average. In total, sections T02, TO5 and TO6 are over 70% of the total ground investigation requirements. The impact of the factors that affect the scope of the ground investigation programme significantly increases the average investigation depth and leads to the overall estimate of expenditure that is above what Ofwat expect using 'norms' assumptions to derive required expenditure. The atypical requirements support the premise that **Ofwat should not place an over-reliance on a simplified 'norms' approach to assessing the expected ground investigations costs for this scheme**.

It is also worth noting that many sites forming part of the statistical data for empirical ground investigation, cost correlations would have been able to rely on a larger proportion of existing desk study information, a great deal of information in some cases. In such cases, this would reduce the amount of additional information required, as the information is already available, bringing the relative ground investigation cost down. It follows that, with the comparatively low proportion of existing ground investigation information available for the route of Manchester & Pennines Resilience, the requirements of ground investigations would be higher leading to an estimate that would be a higher proportion of the expected project cost in order to achieve a similar degree of confidence. Furthermore, in as much as one may consider 'norm' guidance, the complexity and lack of existing borehole information point to consideration of upper bound, or above, correlation levels.

When considering the appropriate general guidance of ground investigations for tunnelling projects, for instance the 2-4% range suggested by Ofwat, it is worth noting there is not a particular single approach that should be adopted; dictated by the number of variables and unique nature of each tunnelling project. The International Tunnelling (and underground space) Association (2015[5]), while reporting that 3% of the project construction costs should be considered as normal, advise that these levels could increase to 8-10% depending on project depth and complexity. They note that the data for a number of the projects they reviewed does not include additional work such as the geophysics (inclusion of which would increase the ground investigation percentage of project costs).

In addition to long established cost correlation, more recent developments in codes and standards has led to increasingly prescriptive guidance as to the spatial requirements (largely longitudinal spacing in the case of Manchester & Pennines Resilience) of investigation points/boreholes. In order to provide guidance appropriate to the complexity and risk of a structure/project, BSEN1997-1 provide for three Geotechnical Complexity levels.

[5] https://about.ita-aites.org/publications/wg-publications/content/7/working-group-2-research

Table 4 BSEN1997-1 geotechnical categories and differences in design requirements and procedure

Geotechnical category	Includes	Design requirements	Design procedure	Examples
1	Small and relatively simple structures – with negligible risk	Negligible risk of ground movements Ground conditions known No excavation below water table	Routine design and construction methods	No excavation below the water table or if comparable local experience indicates that a proposed excavation below the water table will be straightforward
2	Conventional types of structure & foundation with nor exceptional risk or difficult soil or loading condition	Quantitative geotechnical data & analysis to ensure fundamental requirements are satisfied	Routine field and lab testing Routine design and execution	Spread foundations; raft foundations; pile foundations; walls and other structure retaining or supporting soil or water; excavations; bridge piers and abutments; embankments and earth works; ground anchors and other tie-back systems; tunnels in hard, non-fractured rock and not subjected to special water tightness or other requirements
3	Structures or parts of structure not covered by geotechnical category 1 or 2	Use alternative provisions and rules to those in BS EN 1997-1 (EC7)		Very large or unusual structures; structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions; structures in highly seismic areas; structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

The determination of ground investigation requirements based upon code guidance is straightforward but simplistic. Assessing the requirements within Table 4 above, Manchester & Pennines Resilience is a Category 3 project because;

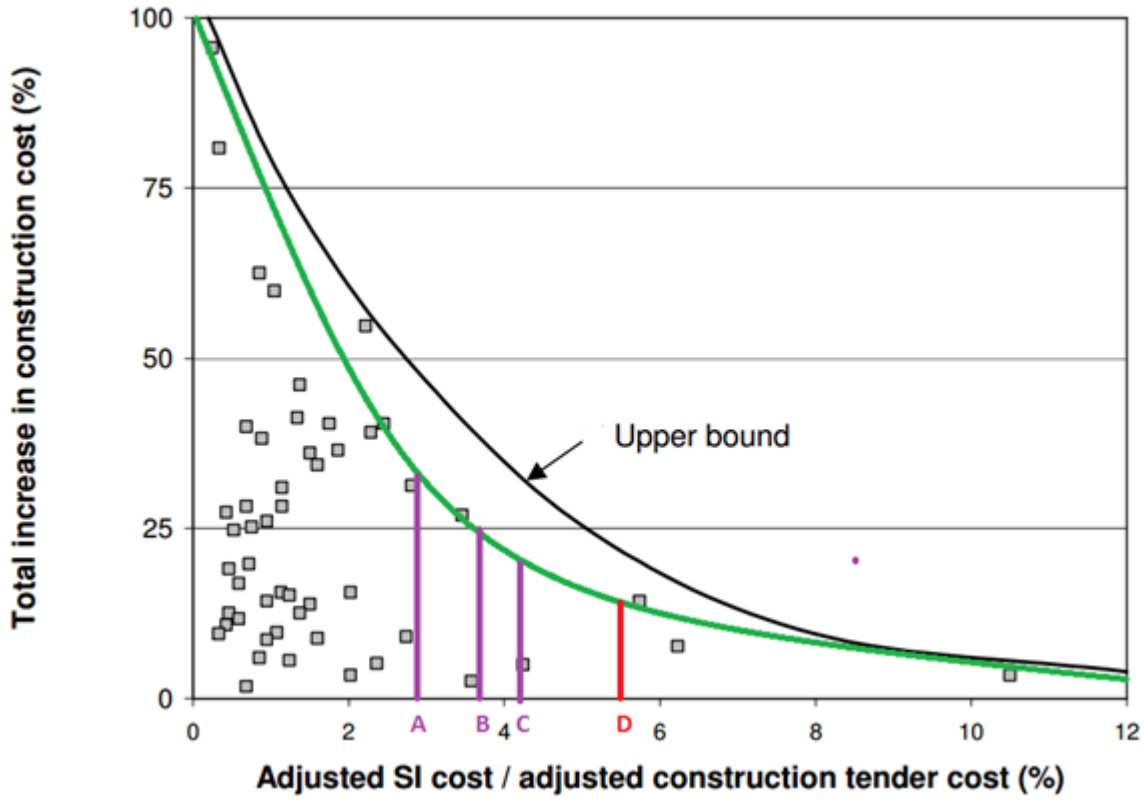
- the rock will be fractured and varied, there will be faults and coal measures and mine workings to bore through along with significantly challenging shaft construction. Tunnels under Category 2 are categorised as being in non-fractured rock and not having 'other requirements'.
- A Geotechnical Category 3 project is, amongst other things, 'large', 'unusual', 'abnormal' or 'exceptionally difficult', which is appropriate given the scale, depth and topography in which the scheme will operate.

In applying a Category 3 approach, the initial start point would be an expectation to be at least similar to a Geotechnical Category 2 project, however as indicated in the table the nature of the structure(s) and complexity allows alternative provisions and rules to the be considered. Even if one were to apply a structure complexity level of 'Geotechnical Category 2' (BS EN1997), prescribed ground investigations would suggest an estimate of around £41m, so in excess of the £31.5m that we included in the cost adjustment claim. In the following sections we outline how our efficient approach will still

provide full length coverage of the rout although it should be noted reduction below the £31.5m would lead to a significant increase in risk for the customer and CAP and attraction of the project to potential CAPs.

Figure 1 below brings together one of the more common plots regarding ground investigation cost correlation along with the estimates for Manchester & Pennines Resilience. This can provide an opportunity to consider the risk of possible cost overrun associated with reduced ground investigations.

Figure 1 Cost overruns as a function of expenditure on site investigations (Mott MacDonald and Soil Mechanics Ltd, 1994[6])



The Mott MacDonald ground investigation cost/project cost relationship plot is considered to confirm a relationship between the proportion of ground investigation investment and the potential overrun/risk for the project. Generally, the higher proportion of ground investigation invested lowers the risk of additional (unforeseen) cost. It is evident that a number of projects fall at different risk levels for the same proportion of ground investigation. Many of those with lower risk levels will likely have abundant desk study information or be comparatively low complexity projects. The original paper noted that increases in project costs, or risks, were many times higher than the ground investigation costs and that, on average, they were higher on larger projects. As Manchester and Pennines Resilience is considered a Category 3 project (high complexity project), it would be anticipated to be closer to the upper bound relationship (upper bound line added by Prof Clayton Southampton University 2001).

Considering a curve lower than the upper bound, lines A, B and C indicate the component parts of the Manchester and Pennines Resilience ground investigations.

A. Represents borehole investigation (and down hole geophysics)
B. Adds, Surface Geophysics

[6] https://blog.geotechpedia.com/index.php/category/general/

C. Adds, Logging by British Geological Survey (BGS) of the existing HA construction and 3D modelling by BGS

Combining these three components then results in the expenditure included in our business plan and cost adjustment claim.

In the context of Manchester and Pennines Resilience, each of these additional components reduces risk. The reduction from A to C is about £70m or more than £100m using Clayton's upper bound curve for an increase in ground investigation cost of only £8m. Point D represents the cost of a 'borehole only' approach using Category 2 (BSEN) spacing guidance. We have discounted this approach as the code permits a more innovative and cost effective approach for Category 3 reflected in point C above and explained further below.

Our adoption of boreholes, surface geophysics, logging of the existing HA records and 3D modelling allows a full-length ground model to be developed and outline Geotechnical Baseline Report (GBR) to be prepared. If further reductions in ground investigations allowance were made, it would reduce the borehole numbers below the optimal level and therefore increase risks; it would also reduce the credibility of the GBRs. **The absence of GBRs caused reported 50% increases on sectional costs for HS2[7] and we do not believe that it is sensible to reduce the ground investigations expenditure requirement below our proposed level**.

Rather than simply seeking additional expenditure to complete further traditional investigations, we have sought to provide innovative approaches in order to deliver code guidance toward a comprehensive longitudinal coverage and, while providing some efficiency, at a reasonable level of risk for the project, CAP and customers. The challenge for the investigations programme is therefore to:

a) provide an appropriately comprehensive, code compliant, overall coverage ground investigations,
b) avoid or seek alternatives to the physical surface constraints (in terms of investigation points and access),
c) deliver a comprehensive and reasonably attractive investigation and risk reduction to a CAP and Contractors,
d) provide the opportunity for a major ground engineering project to be delivered at acceptable risk and,
e) complete the ground investigation, reporting and development of a ground and groundwater model at a realistic cost.

It was noted above that particular site constraint factors increase the empirical ground investigation cost estimate based on correlation to the upper bound level. Similarly, strict adherence with code guidance regarding particular borehole spacing is affected by those same factors (e.g. topographic, environmental, ecological and designated land). Unsurprisingly these also increase expected costs and, in some cases, the particular guidance spacing cannot be sustained due to the physical or regulatory constraints. This poses the question of how to achieve the requisite coverage of ground investigations at a reasonable cost and risk reduction. In order to provide appropriate and comprehensive ground investigations, it has been necessary to consider opportunities beyond the minimum spacing requirement (that is not physically/regulatory practicable). To provide the appropriate coverage, it is the intention to:

1. Undertake phases of traditional intrusive geotechnical investigation, on line and at reasonable spacing where possible and in other areas utilise 'off line' boreholes to assist in development of the ground model (comprehensive downhole geophysics to be undertaken in deep BHs),

[7] 'HS2 plans to reduce ground risk cost described as "carnage"', Ground Engineering, 28 January, 2019

2. Utilise innovative Vibroseis geophysical investigation (along with shallow geophysics where appropriate), providing seismic refraction and reflection data along with magnetometer, microgravity, resistivity and locally Ground penetrating radar,
3. Detailed geological and engineering geological assessment of the original construction records of the Haweswater Aqueduct (likely to be undertaken by BGS using their stratigraphic and engineering geology specialists) and,
4. Building a 3D ground and ground water model using the intrusive BH information, the interpreted geophysical model, the more or less continual horizontal HA geological information along with any additional desk study information (however in many areas desk study information is very limited). Develop this to provide a full-length ground model with the opportunity to examine and interrogate in 3D and take 2D cross and long sections for associated shaft and tunnelling reports and contracts.

We expect that adopting this innovative approach will, in terms of opportunity for risk evaluation, enable us to largely provide coverage approaching that associated with a prescriptive Category 2 approach being followed (although, as outlined above, not practicable).

In conclusion, whilst the cost of £31.5m proposed lies marginally above the upper bound 'norm' that Ofwat considered, we have summarised why it would be expected to be so and note that it is below the prescribed BS EN guidance for a project of this scale and complexity. Nonetheless, due to efficiencies and innovative techniques, we consider that the scope outlined will meet the requirements of the ground investigations programme for the expenditure stated.

We have pursued lower cost alternatives wherever it is feasible and so any further reduction to the assumed costs will result in a reduction in the amount of investigations that we undertake, thus lowering the confidence that a potential CAP can place on the ground model and conditions. In particular it is noted that absence of Geotechnical Baseline Reports (GBR) is reported to have resulted in sectional cost increase of 50% for HS2 (they are now undertaking those reports). We would be concerned if sectional or project costs were wholly, or in part, exposed to similar cost increase and note that further reduction to the efficient ground investigations approach adopted would reduce the credibility of the preliminary GBRs we intend to provide.

Compliance with Category 3 code guidance will be met through the combined investigation approach along with appropriate reporting (CAP/Contractors may undertake some additional investigative work to suit their solution where required). As expected, some sections will be within a typical 'norm' range for ground investigations costs assessed on sectional project costs and, understandably, the more challenging sections will be significantly above the typical with the result that the overall average estimate is consistent with the 4.2% that we had previously estimated.

2.2.2. Risk considerations

The overall estimated ground investigation cost is £31.5m where the particular project challenges are addressed at an acceptable risk by the proposed approach to ground investigations, ground modelling and reporting.

As we have already sought the most efficient and innovative solutions, a further reduction to ground investigation expenditure would therefore either increase borehole spacing (1 above) or reduce scope for additional items 3 to 4 above, both of which result in increased risk and ultimately the price from the CAP. Industry correlations of cost overrun may also be used as a guide to the risk related to the proportion of ground investigation spent on a project. Correlations (Mott MacDonald 1994) suggest that, for Manchester & Pennines Resilience, each £1m reduction in ground investigations investment there is potential for £10m+ increase in project risk; increasingly less reliable preliminary GBRs could have an additional adverse impact (like their absence for HS2) in tens of millions of increased risk/bid

price. Our consideration is that a reduction in ground investigations would be disproportionate to the increased risk for customers and the CAP while consequential reduced attraction to CAP bidders is an associated consideration.

We are confident that the additional information provided here, taken alongside that originally supplied within our submission, provides the evidence required for Ofwat to have greater certainty in the underlying requirement and valuation of the claim and thereby accept the adjustment in its entirety. We would welcome further discussion on any aspect if it were required.

3. Incentive rate on performance commitment

In our 1st April submission, we noted:

> *"Ofwat has assumed that UUW's cost in relation to the Manchester and Pennine resilience scheme is £15m (or 21%) lower than the £72.3m assumed in our September 2018 business plan. The incentive rate for this ODI was set based on the assumed £72.3m costs included within our business plan. It would seem reasonable that the incentive rate should be adjusted to reflect any revisions made by Ofwat to the assumed costs incurred by UUW for this scheme. Given that the IAP cost assessment indicated a 21% reduction in the cost of the scheme, then the incentive rate for this ODI should also be reduced from £86,195 to £68,073 per 1% completed."*

We maintain the position that the incentive rate must be calibrated in line with the expenditure assessment. If having reassessed our claim, Ofwat allow the full revised value within cost assessment then the incentive rate will still need to change from its current value to reflect the removal of the overhead from within the claim. If Ofwat does not change its assessment of the costs required to deliver the DPC, then the incentive rate should be reduced further. We would welcome confirmation of the proposed incentive rate prior to the Final Determination.