

Part B6 – Customer Service Strategy and Changes in Service (Sewer Flooding)**Summary Report by REPORTER****Summary of Audit Findings and Reporter Opinion**

Since the DBP, the Company has undertaken further work to improve the robustness of its plan and address Reporter challenges and issues raised by Ofwat in the draft Baseline Report.

In response to challenge from Ofwat, the Company has significantly reduced the number of schemes included in its programme that are non cost-beneficial. The Company has now included 13 non cost-beneficial schemes (CBA ratio <0.9 pre-efficiency). We have challenged the Company on its reasons for including these schemes and consider that it has done all that can be reasonably expected in terms of disclosing its reasons for including them in its programme.

(TEXT REDACTED)

Additions due to better information have been estimated on the basis of AMP4 data, which indicates that a further three properties (Internal 1 in 10) per scheme are likely to be found. We consider that at programme level the addition of three properties per scheme appears reasonable. At a scheme level this assumption is more questionable. There are 46 schemes in the programme that have single reported driver properties. It is apparent that additional 'assessed' properties will not be found for some of these and as a result some will not be cost-beneficial unless 'FLIP' type (small pumping station) solutions are found. We challenged the Company on this. The Company responded that on the basis of AMP4 data it would seek to use low cost FLIP solutions or other low cost solutions where cluster sizes fail to grow to a sufficient size. The Company stated that its £9m negative FLIP adjustment would be adequate to cover properties with insufficient cluster sizes so Thames has challenged itself to provide lower cost solutions in these circumstances. We are aware that FLIP solutions can only be used in limited circumstances. We therefore consider that there is a risk, albeit relatively small that failure to identify additional properties may result either in the inability to deliver some outputs or in the promotion of some non cost-beneficial schemes.

The Company has updated its unit cost model based on a larger sample of schemes costed to the Company's new 1 in 30 design standard. The schemes have been developed to outline design stage and are based on hydraulic models undertaken in accordance with current industry standards and practice. The solutions have been costed using the Company's cost

models. We consider that they provide a sound basis for costing the programme.

The Company has identified synergies between its sewer flooding and supply demand new development programmes using a systematic and robust methodology which we consider has defined the extent of likely overlap. We therefore consider that costs will not have been double counted.

The Company has undertaken further study of flooding risk in the Counters Creek catchment to justify the scheme and a significant increase in the development costs. We consider that further work needs to be undertaken between now and the Final Determination to better articulate the modelling work that has been completed to date, if this scheme is to be included in the AMP5 programme. We also consider that a more structured approach to optioneering using risk matrices would improve the case. This was discussed with Ofwat at a site meeting on 30th March 2009.

We also consider that further work needs to be undertaken with respect to the smaller but similar Lambeth scheme to demonstrate the case for proceeding with this.

The Company has undertaken a large amount of work to develop its sewer flooding programme for the FBP. This is based on a well thought out methodology, the selection of the most reliable datasets and the use of systematic and transparent analyses.

We consider that the Company has presented a well considered and soundly based plan within the limitations of uncertainty that is inherent in forecasting the number of additions to the DG5 registers and the costs of delivering solutions.

Reporter Engagement & Scope of Audit

We have tracked the Company's work supporting its Part B6 Sewer Flooding submission from the DBP and have reviewed the FBP submission through undertaking a series of audits on the 10th, 12th and 26th March 2009 at the Company's offices in Reading.

The audits consisted of interviews with the Thames team responsible for the preparation of the sewer flooding submission. This included a review of the assumptions and methodology that underpin the submission, a review of the analyses that were undertaken and examination of a sample of scheme solutions. We trailed a sample of data and costs from their sources into the FBP tables.

We confirm that we have fully reviewed the Company's Part B6 submission, data tables and supporting information. We consider that the submission is complete and that it conforms to the Reporting Requirements.

We have followed the Reporter Guidance and have addressed the points set out in our audit plan. We have included summary statements addressing the guidance and audit plan actions in a template format attached below.

Summary of Thames Water's Proposals

We confirm that Thames was on target at JR08 to deliver its AMP4 sewer flooding programme. The DG5 risk registers position at the end of AMP4 is difficult to forecast as the number of additions per year is variable. However, the forecast register size of 1,620 by the end of AMP4 seems reasonable.

(TEXT REDACTED)

The major part of the proposed investments set out above relate to a reduction in the DG5 register position by 440 to 1,180 by the end of AMP5 and dealing with an estimated number of 371 DG5 net additions per annum.

The plan includes (TEXT REDACTED) for dealing with properties on low risk registers that have suffered internal flooding on more than one occasion.

Thames has included a small budget to implement one external flooding scheme, which is very cost-beneficial. There is very limited customer support for dealing with external flooding, so other schemes have not been found to be cost-beneficial. However, the Company has included investment to address external flooding of the A41 at Hendon Way, London. This is a long standing problem and the Company is under pressure from Transport for London to take action now that it has determined that the problem is due to flooding from the public sewer. Thames has undertaken an appraisal and identified a solution at £'x'm. This scheme cannot be justified using the Company's standard willingness to pay cost benefit assessment methodology. The Company has therefore sought to justify the scheme using an assessment of benefit based on the cost of delay and disruption to traffic. We discuss the proposals for this scheme later in our report.

The Company has identified synergies with supply demand new development at two locations and has allocated scheme costs between the two drivers to account for this.

Thames has included a scheme to provide FLIPS (low cost pumping stations serving one or two properties) in the Counters Creek area of London to provide protection to properties while it develops its Counters Creek strategic flooding scheme, which it expects to implement in AMP6. [TEXT REDACTED]

Thames currently offers mitigation to properties on the 1 in 10 and 2 in 10 internal and external flooding registers. Thames proposes to extend its offer of mitigation to the 1 in 20 and severe weather registers where properties have flooded more than once in five years. The Company also intends to extend the range of mitigation devices it will offer. The Company has based its programme cost [TEXT REDACTED] on the assumption that it will not be able to increase customer take up of mitigation from a current level of 23% and on cost information derived from its AMP4 programme.

The Company has included a negative [TEXT REDACTED] adjustment figure on the basis that it will substitute low cost FLIP solutions for a number of schemes which are currently based on the provision of high cost hydraulic solution. The figure [TEXT REDACTED] assumes some 3.3% of outputs will be delivered in this way and is based on an analysis of AMP4 data, which shows that 2.5% of the AMP4 outputs it has delivered by this means.

The Company has included investment for the development of two strategic schemes to deal with significant numbers of properties that are considered to be at risk of flooding in London. Thames has proposed that development funding should be allocated for the Counters Creek and Lambeth [TEXT REDACTED]. This investment will take the schemes beyond study stage and provide funding for design development so that construction can commence at the beginning of AMP6 or in the case of Counters Creek, at the end of AMP5, subject to OFWAT approval.

The Company's is proposing a programme to address other causes flooding [TEXT REDACTED]. This is discussed under Part B3.

We confirm that Thames' submission, tables and supporting documents are complete and consistent with the SDS and JR08.

The proposals are based on existing design criteria with the exception of the design standard for infrastructure. A review undertaken by external consultants [TEXT REDACTED] has shown that the Company's design standard, which is to provide protection from flooding for a 1 in 15 storm event, is not consistent with industry practice, which is generally to provide protection for a 1 in 30 event. The Company has therefore based its plans on a 1 in 30 standard. We consider that this is appropriate. No allowance has been made in the FBP for climate change although the Company is continuing to review available climate change data and assess the implications of designing solutions to differing design standards.

Review of Company Proposals

Additions Forecast

We have reviewed the data, methodology and analyses used by the Company to derive its Additions forecast. There will inevitably be a level of uncertainty in this forecast. However, we are satisfied that the Company has devised a robust methodology, selected its most reliable datasets, and undertaken the analyses in a systematic manner. We have trailed the calculations from source data to output and have not found any errors or areas where we consider that bias may have been introduced. We therefore support the forecast of 370 new additions per annum.

We note that the Company has changed its approach from the DBP and has not used its Flood Risk Assessment (FRA) tool to estimate additions for the FBP. We support this decision as we considered that the FRA was not sufficiently robust for business planning purposes. The FRA was used at the DBP to estimate a relatively small number of DG5 assessed additions (due to better information). This change of approach has resulted in a small reduction in the estimated number of DG5 new additions.

Thames has indicated in its commentary that this level of additions is likely to be significantly higher than the numbers forecast by other water companies. Thames believes that this is due to the high number of basement properties within its area compared to other water companies. We consider that this is probably a reasonable explanation as some 46% of DG5 properties are located in Inner London and this is where the majority of basement properties are located.

Known Programme

The Company has undertaken additional work to refine the costs for its Known Programme. For the DBP, costs had been developed from a combination of desk top studies and outline designs. The desk top studies used empirical means to scope solutions and the outline designs were scoped on the basis of hydraulic modelling. The FBP programme consists of 138 schemes. Of these, 50 schemes have been individually scoped and costed. The remaining 88 have been costed on a unit cost basis, with the costs being drawn from the 50 schemes included in the programme and a further 22 that were excluded from the programme post optimisation.

The Company has used the current WaPUG Code of Practice for the Hydraulic Modelling of Sewers (3rd Edition) as the modelling procedure for all of its models. From the sample of models we have reviewed, we are satisfied that the requirements of the code have been followed. Models are developed to different levels of detail, calibration and verification and are referred to as type I, II and III. The Company has used this as basis for allocating model confidence grades from A to C, with A corresponding to 10% to 20%, B – 20% to 30% and C – less than 30%.

Of the 50 schemes included in the programme costed on the basis of outline designs, 70% were based on models with a confidence grade of B or better. Of the 72 schemes used as the basis for deriving the unit costs, 69% were based on models with a confidence grade of B or better.

We confirmed for a sample of schemes that the scopes had been correctly extracted from the solutions modelled and had been costed using the latest EES cost models. We consider that there is a good level of confidence in the costs for the 50 schemes included in the plan on the basis of outline designs. There is less confidence in the schemes that have been unit costed, due to the higher proportion of lower confidence models used to scope the solutions. However, we consider that they provide an adequate basis for business plan costing.

Costs

The Company has drawn cost data for the Additions Programme from AMP4 outturn and forecast unit costs. We consider that these costs have been analysed satisfactorily and are robust. The costs have been adjusted by an uplift factor to account for the proposed increase in design standard. There was poor confidence in this adjustment factor for the DBP. The Company has extended the sample of schemes used as the basis for the uplift factor from nine to twenty one schemes. These have been modelled at the new 1 in 30 design standard and compared with the solutions that had been designed to meet the current 1 in 15 standard. Both solutions were re-costed using current EES cost model data to derive the uplift factor of 25.5%. We noticed an inconsistency in the data for one of the scheme used in the analysis, but are generally satisfied that the methodology used and sample size are appropriate to achieve a good level of confidence in the accuracy of this adjustment factor.

We confirm that the costs used for the known programme have been drawn from the latest EES cost models. These comprehensively cover the majority of work items identified in the outline designs. A limited use of bottom up estimates for a small number of items not covered by the cost models has been used. Our examinations of a sample of scheme costings showed that they had been carefully prepared are suitably detailed and are robust.

We have reviewed the unit cost analysis, trailing a sample of costs to their sources. We noted that the analysis has been undertaken in a systematic manner and we were able to satisfactorily follow the derivation of the costs. We found no errors.

Where the Company used a bottom up approach to scheme costing, we noted that it had adopted the same process as used to cost other elements of the

business plan. Scheme details and costs had been processed through the Company's Asset Planning System (APS) and Investment Management System (IMS), using the standard appraisal methodology based around an appraisal brief, study, technical and peer reviews. This process is consistent with the procedure we would expect to see in a water company's day-to-day capital expenditure approval arrangements. Based on a review of a sample of schemes, we consider that the standard of rigour in the assessment of needs, solution development and costing is appropriate for business planning purposes. The unit costs show a step increase on the AMP4 unit costs. This is due to an increase in design standard to bring Thames into line with the standard generally provided by other water utilities, smaller number of outputs per scheme for historic flooding and a small increase from a change in the mix of solutions from cheaper sewer upsizing to more expensive vertical off-line storage.

Cost Benefit Analysis

The Company has used specialist consultants to undertake stated preference surveys to elicit customer views and willingness to pay to reduce different flooding risks. This has been undertaken using the two stage approach advocated by the UKWIR study on CBA for sewer flooding. The programme comprises cost beneficial and a small number of non-cost beneficial schemes. The Company considers that it is reasonable to include non cost beneficial schemes where they provide flood alleviation to 'vulnerable' properties such as schools and care homes, properties subject to frequent flooding and properties where mitigation is unsuitable. We consider that where the Company can demonstrate that flooding is having an exceptionally severe impact on properties there may be grounds for this approach. We comment on the individual non cost-beneficial schemes in our challenge log, which is attached.

A key assumption that directly impacts on the CBA assessment is the estimate that in addition to the properties on the DG5 registers, a further three properties (internal 1 in 10) per scheme are likely to be found by assessment and added due to better information. This is based on an analysis of schemes completed in AMP4 to date. This assumption has a direct bearing on whether schemes are likely to be cost-beneficial, particularly for the Known Programme, which is expected to be largely made up of schemes dealing with small property clusters. The verification of the number of better information additions is difficult as the process used by Thames involves a degree of judgement. However, we confirm that the Company's AMP4 data shows that that a programme level the addition of three properties per scheme appears reasonable. At a scheme level this assumption is more questionable. There are 46 schemes in the programme that have single reported driver properties. It is apparent that additional 'assessed' properties will not be found for some of these and as a result they will not be cost-beneficial unless Flip type

solutions are found. We challenged the Company on this. The Company responded that on the basis of AMP4 data it would seek to use low cost 'FLIP' (small pumping station) type solutions or other low cost solutions where cluster sizes fail to grow to a sufficient size. The Company stated that its £'x' m negative FLIP adjustment would be adequate to cover properties with insufficient cluster sizes so Thames has challenged itself to provide lower cost solutions in these circumstances. We are aware that these solutions can only be used in limited circumstances. We therefore consider that there is a relatively small risk that failure to identify additional properties may result in some highly non cost-beneficial schemes being promoted.

We have reviewed the CBA methodology employed by the Company and the way it has prioritised its proposed programme of work. We consider that the methodology complies with the UKWIR guidance. We have noted that the work has been peer reviewed and judged to meet accepted standards. We have reviewed the results and consider that the allocation of priorities between different types, severities and frequencies of flooding are logical. We consider that the work meets the reporting requirements and that the Company has used the data to correctly determine the cost beneficial status of its proposed schemes.

Counters Creek and Lambeth Strategic Schemes

The Company has included proposals in its FBP to develop schemes for two London catchments where it considers there are serious and wide-scale flooding risks and where local scale solutions to these risks are generally impracticable. [TEXT REDACTED]

With regard to the Counters Creek scheme, which would address flooding risk in the Hammersmith and Fulham and Kensington and Chelsea catchment, we note that Thames has included £'x' [TEXT REDACTED] (included under supply demand growth) for study and design development during AMP5, with the intention of commencing construction at the end of AMP5. The Company has undertaken a 'proof of concept' study to demonstrate the business case for the scheme.

[TEXT REDACTED]

We have undertaken a desktop review of the information the Company has assembled to support the case for the investment it proposes in AMP5. [TEXT REDACTED] We have concluded that while it is clear that there is a problem with flooding in both catchments, the practicability and cost effectiveness of both schemes has not yet been demonstrated. Further work needs to be undertaken between now and the Final Determination to better articulate the modelling work that has been completed to date, if these schemes are to be included in the AMP5 programme. We also consider that a more structured

approach to optioneering using risk matrices would improve each case. This was discussed with Ofwat at a site meeting on 30th March 2009.

A41 Hendon Way

The Company has included a scheme to address frequent flooding of the A41 at Hendon Way in London (TEXT REDACTED). The scheme was included in the DBP as an integrated urban drainage pilot scheme on the grounds that the flooding was caused by a combination of highway drain misconnections and surface water misconnections into the public sewer. The Company has undertaken survey and hydraulic modeling work that shows that the highway drainage is satisfactory and that the problem is caused solely by insufficient capacity in the public sewer. Therefore, if a solution were to be implemented it would presumably need to be funded in total by the Company.

There is limited reported data on the frequency of flooding. The area is included in the Company's flooding register as a 1 in 10 external entry. However, Transport for London has expressed the view that the road has been affected by flooding since the early 1990s, is subject to flooding several times a year and is pressing the Company to take action to address the problem. Hydraulic modeling undertaken by the Company predicts that the flooding occurs three to four times per year.

The scheme cannot be justified on the basis of the normal willingness to pay CBA approach. External property flooding attracts very low levels of benefit. The Company has therefore sought to justify this scheme as a special case and has used consultants to estimate the benefit in avoidance of traffic delay and disruption using Department of Transport benefit assessment methodology. We have reviewed the consultant's report and noted that due to limitations in the available data, some assumptions have had to be made which suggests that the benefit analysis is likely to be of low confidence. However, we note that the Company has adopted the lower of the two benefit figures proposed by the consultants and on this basis the scheme is marginally non cost-beneficial. We accept that other factors such as the safety of underpass users and loss of retail trade at Brent Cross have not been quantified in the benefit analysis. Ofwat have stated to Thames between draft and final that CBA must not be applied mechanically and cases where the CBA framework doesn't fully capture all the consequences are valid for inclusion with supporting evidence. Thames has provided supporting evidence, involving expert consultants in the field of predicting traffic disruption costs. The hydraulic models used are of high confidence, and Thames have done their best to mitigate the uncertainties in determining traffic disruption cost by employing experts and using the lower estimates.

The Company has developed a solution based on the provision of storage, which appears to be correctly scoped and costed. We challenged the

Company to review an alternative option of raising the carriageways. The Company investigated this and reported that it was not viable as it would mean raising the level by 1m and investing in an asset that it would not own. We also challenged the Company that it should design a solution to provide a lower level of protection than the 1 in 30 standard in order to reduce the cost.

This scheme is significantly non cost beneficial as defined by the Company's normal cost benefit assessment process based on its willingness to pay surveys. We recognise that the alternative method of cost benefit analysis produces a more favorable result but the scheme still remains marginally non cost beneficial.

Programme Overlap

We challenged the Company on its assumption that there is no overlap between the sewer flooding and supply demand new development submissions for the DBP. For the FBP, the Company developed a methodology that allowed both flooding schemes and new development schemes to be mapped on its GIS to identify any overlaps. We have reviewed the Company's analysis and consider that it has identified synergies between these programmes using a systematic and robust methodology which we consider has defined the extent of likely overlap. We therefore consider that costs will not have been double counted.

Climate Change

The Company has not made specific provision for climate change in its proposals for its AMP5 programme. This is due to the current high level of uncertainty in the likely impacts of climate change. Thames has investigated the costs of going beyond a 1 in 30 standard and concluded that this would result in a large increase in unit costs. This in turn would result in the Company being able to deliver fewer outputs within the CBA framework. There is also the view that solutions other than providing additional sewer capacity need to be developed including measures such as SUDs and IUDs and the development of surface water management plans in order to address the challenge of climate change.

There are currently many legislative, organisational and funding obstacles to the implementation of SUDs and IUDs, particularly with regard to their application within existing developed catchments.

The Company will take account of the latest UKCIP09 climate change data when this becomes available later this year, and will seek to amend its plans if necessary through the climate change protocol Ofwat is expected to introduce for AMP5.

Summary of Audit and Review

We are satisfied that the Company has fully disclosed its assumptions, methodology and data sources used for the preparation of its B6 submission for sewer flooding and confirm that it has cooperated with us fully in the audits we have undertaken. The Company has demonstrated through interview that detailed investigations and studies have been carried out to inform the sewer flooding programme. The Company was fully co-operative and provided subsequent information in a timely manner to enable us to complete our work.

We consider that the Company's commentary provides a full and detailed explanation of its plans and the bases for these and that its methodology is based on the latest guidance.

We have seen evidence that the Company's submission has been subject to a good level of internal checking and challenge and are satisfied that there has been appropriate input and oversight from the Company's Senior Managers and Directors. We have noted that the submission has been signed-off by the responsible Senior Manager and Director.

We are satisfied that the Company has fully disclosed its assumptions, methodology and data sources used for the preparation of its B6 submission for sewer flooding and confirm that it has cooperated with us fully in the audits we have undertaken.

We consider that the Company has presented a well considered and soundly based plan within the limitations of uncertainty that is inherent in forecasting the number of additions to the DG5 registers and the costs of delivering solutions.

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