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Part B3 – Maintaining Service and Serviceability**1. Summary Report by REPORTER****Summary of audit findings & Reporter opinion**

The Company has carried out significant work since submission of the DBP to put together a more coherent and robust case for service and serviceability investment.

A number of key assumptions have been made which include:

- At the end of AMP4 all sub services will have stable serviceability status.
- Interventions are based on a like for like replacement and current technical standards.
- The level of expected future demand on the network from population growth and new housing development.

We have found that the plan has taken a measured and balanced approach to investment, with no significant material issues identified.

The FBP has involved a considerable amount of detailed and complex work that has required the Company to present a plan with sufficient detail to gain the confidence and understanding of their proposals for investment.

The FBP incorporates a number of changes from the DBP which includes:

- A revised business plan structure and presentation to support and convey the needs for investment.
- Further confirmation that shows alignment with both the Capital Maintenance Common Framework (CMCF) and principles of the Asset Management Assessment Process (AMPAP).
- Stronger evidence to support investment across all services, taking into account the feedback from both Reporter and Ofwat on the DBP.
- Response to Ofwat's Asset Management Assessment (AMA) detailed in the Capital Incentive Scheme (CIS) Draft Report.
- Careful consideration of the CIS to ensure the FBP can achieve a CIS baseline of less than 100 for the FD.

(TEXT REDACTED)

The significant changes since the DBP have been as follows:

- Increased investment for Mains Replacement (WI).
- Transfer of investment for Trunk Mains to Enhanced Services (WI).
- Increased investment for Sewage Treatment related to proportional allocation and Deephams STW (SNI).
- Removal of Private Sewers investment (SI).

(TEXT REDACTED)

The Company has developed the FBP against a background of significant work and effort together with high technical standards some of which are industry leading. This is especially evident with the Trunk Mains and Large Sewers business cases.

There are also a number of areas where the detail and analysis has been impressive including Small Sewers and Distribution Mains business cases.

The Company has used a risk based approach to establish an investment programme targeted at maintaining stable serviceability and addressing special risks, within a 25 year context, and taking into account the priorities of customers and stakeholders.

The asset management planning work has been found to be structured and sound, and aligned with the Capital Maintenance Common Framework. The Company's approach is forward looking taking into account the past and present performance, drawing conclusions about the future from analysis of data and the priorities of customers and stakeholders.

The asset management planning approach has been reviewed in terms of the Asset Management Planning Assessment Process (AMPAP) where we have concluded that the Company's approach to management, processes and systems is largely robust (AMPAP Score 4). This places the Company in a very strong position with the recent organisational changes and investment in AMP5 for new systems, to reach optimum levels of asset management.

We found that the Company's approach to risk was well founded across all services, with sound evidence that risk assessments were structured and linked to needs, interventions and asset performance. Both probability and consequence has been determined using a standard process which was consistently applied.

Extensive consultation has been undertaken with customers and key stakeholders to develop a FBP that takes a measured approach to prioritising and delivering both medium and long term aspirations. This engagement has followed a structured and well defined process to seek customer and stakeholder views and to enable services to be valued by customers for cost benefit analysis.

The cost benefit analysis work has been used to help inform rather than define the FBP. The Company methodology using the Customers Willingness to Pay survey results linked to service consequences has been applied to all business cases which have shown overall a net benefit for investment. (TEXT REDACTED)

The scope of the investment provides adequate expenditure to maintain stable serviceability through AMP5 and addresses areas of risk that have a significant effect on the health and safety of the Company employees and the public.

The business cases have been strengthened through a greater understanding of the risks and costs to maintain stable serviceability for AMP5 for both infrastructure and non-infrastructure assets.

The Company has improved performance across the services, which is evident throughout the FBP. The increased focus on service has ensured that serviceability has improved and we consider that the Company are in a positive position to maintain this performance for the remainder of AMP4.

(TEXT REDACTED)

We are satisfied that in broad terms expenditure between AMP4 and AMP5 is similar and arguments to show a small reduction either way would not redefine the scale of investment based on our findings.

We have examined and challenged the Company on pace of investment and consider that the FBP provides a reasonable balance between risk that needs to be addressed within AMP5 and risk that can be tolerated and addressed in future AMP periods.

We are satisfied that the Company has considered areas of significant risk

[REDACTED]

associated with emerging legislation that could materially impact on the investment programme.

The Company has considered trade off for investment and risk between asset groups and where possible this has been built into the investment plan.

The overall certainty of cost and deliverability has been reviewed both at programme and project level. The Company has used extensively the Engineering Estimating System to develop costs based on actual historic costs and articulated their procurement and delivery strategy taking into account the complexity and scale of work to be carried out.

We found that the overall approach to costing and deliverability was robust having undertaken a sample of projects and programmes to audit. (TEXT REDACTED)

The base service output projections are broadly reasonable taking into account the current levels of performance and the effects of the investment.

We have audited the incremental changes for operating costs and our findings are reported separately.

Investment associated with Carbon Mitigation and Management and General including SCADA is also reported separately.

We have jointly reviewed with the Company financial auditors the treatment of expenditure for Communication Pipes, Manhole Cover Replacement, CCTV, Maintenance of Sewer Ancillaries, Residual Blockages, Rising Mains Bursts, Gravity Sewer Collapse Rehabilitation and concluded that it is reasonable for these elements to be classified as Infrastructure Renewals Expenditure. Details of the Reporter and Company Auditor findings are set out in Annex 7 together with the Company accounting guidelines for network related expenditure.

(TEXT REDACTED)

Investment for power resilience has been included for water non-infrastructure assets within B3. The potential overlap of investment between B3 and B6 has been reviewed (TEXT REDACTED)

The level of overlap when considered against the overall investment and efficiencies being applied is not considered to be material.

2. Reporter Engagement & Scope of Audit

We have reviewed all the Company's submissions, tables and supporting documents, and found the documentation complete and consistent.

The Reporter audit findings for the following elements of B3 are reported separately:

- Management and General (including SCADA)
- Operating Costs
- Carbon Mitigation
- Research and Development

We have updated our DBP plan checklist and aligned this with the audit plan in accordance with Ofwat's latest guidance. (TEXT REDACTED)

For the projects and programmes within each asset group, audit reports have been produced together with some site visits, this is detailed in Annex 3. This work has been targeted at validating the underlying data, needs and costs for each asset group, and support the findings in Annex 2.

Throughout the audit the Company have been challenged in order to clarify and amplify areas of the FBP, (TEXT REDACTED)

A full assessment of the Company's approach to asset management planning has already been carried out in the DBP; the results are included in Annex 5 for completeness.

(TEXT REDACTED)

In accordance with Ofwat guidance we have focused our attention on areas of large investment and where there is a significant uplift in expenditure between AMP4 and AMP5.

The audit has included over thirty meetings with staff on site and at the Company offices. At the meetings a number of documents were examined including, policies, procedures, process maps, spreadsheets, project documentation, together with sample checks across processes, and interrogation of databases.

The Company has followed robust internal governance procedures up to and including sign-off at director level. Staff and teams have been extremely co-operative, diligent and responsive, providing information when required and explaining areas of uncertainty.

3. Summary of Thames Water's proposals (Thames Water Structure)

3.1 Introduction

The Company has highlighted within this section that they have developed the FBP taking into account a number of improvements including:

- Addressing Ofwat feedback from: the Capital Incentive Scheme (CIS) Report December 2008, comments on the Draft Business Plan (DBP), and scoring for Assessment of Asset Management (AMA).
- Restructuring of the business plan contents to improve the presentation of the plan and make a more compelling case for capital maintenance investment
- Improved the evidence supporting the business planning decisions, investments and outputs

The above has been evidenced from audit work carried out for the Final Business Plan (FBP) where the Company has fully co-operated with the Reporter in responding to challenges and questioning.

It has also been found that the Company has developed the FBP in accordance with the principles of the Capital Maintenance Common Framework (CMCF), using a sound and structured process to determine risk, needs, solutions and to identify an optimal programme of investment.

Cost benefit analysis has been used wherever possible to support “Cost Effective” planning objectives but in particular to justify Trunk Mains and SCADA under the “Cost Beneficial” planning objective.

3.2 Overall Summary of Our Capital Maintenance Plan

The Company confirm that the scope of the plan includes investment for:

- Stable Serviceability
- Special Risks
- New Capital Maintenance

The risk based approach for assets is explained in terms of consequence and criticality which is reflected in the development of the business cases audited.

(TEXT REDACTED)

Serviceability Investment

The serviceability component across AMP4/5 shows broad alignment for stable serviceability.

Special Risk Investment

The special risk investment is exceptional and represents expenditure that may be considered atypical. This element of the plan has been fully scrutinised with no material issues identified.

(TEXT REDACTED)

Ofwat Challenges & Thames Water's "Annex 10" response

A number of challenges were made by Ofwat to the Company following submission of the DBP. The Company has set out responses and recommendations for final assessment which have been audited and the findings detailed in the following sections.

3.3 Water Capital Maintenance Plan

Application of Customer Research to Business Plan Development

The application of Consumer Research to the capital maintenance business plan has been reviewed with findings (TEXT REDACTED)

3.4 Sewerage Capital Maintenance Plan

Application of Customer Research to Business Plan Development

The application of Consumer Research to the capital maintenance business plan has been reviewed with findings. (TEXT REDACTED)

3.5 Planning Objectives, Direction and Delivery

(TEXT REDACTED)

The Company has set out within this section the overall approach taken for Stakeholder Engagement, Leadership, Policy and Strategy.

3.5.1 Stakeholder Engagement

The Company has carried out extensive consultation in order to involve customers and key stakeholders in the development of the final business plan and long term aspirations.

The programme of consultation has followed a structured and well defined process to seek customer and stakeholder views for the Company Strategic Direction Statement (SDS) and the Draft Business Plan (DBP), through the summer of 2007, followed by events carried out in autumn 2007, spring 2008 and autumn 2008.

It is evident from the consultation work carried out that the Company has followed a systematic approach of engagement with customers and key stakeholders as part of their business planning consultation process.

The feedback from the consultation process included “Customer Willingness to Pay” (WTP) surveys, the results of which have been used to calculate the cost benefit of schemes, programmes of work for the entire capital maintenance business plan.

The valuation methodology is aligned with the Capital Maintenance Common Framework in terms of valuing performance that directly affects service.

We have identified within B6 uncertainties over the valuation of customers willingness to pay to maintain the status quo. Customers were only invited to give their views on improvements or deterioration in levels of service. This aspect is reviewed more fully in B6 (TEXT REDACTED)

The planning objectives for each of the asset groups have taken into account current service levels and the views of customers and stakeholders on preferences and serviceability.

The cost benefit analysis work has been extensive, and followed a structured approach using the results of the customer Willingness to Pay survey work together with valuations from other sources depending on the service, driver (base, quality, enhancement, supply demand), and specific programme of work.

(TEXT REDACTED)

From the audit work carried out and where these systems were used it was evident that the Company had put in place a structured and rigorous process to control and manage the data being used to develop the investment programme for capital maintenance.

We found that:

- Stakeholders views have been actively sought and used to develop the overall business plan
- The planning objectives identified throughout the business plan were thoroughly considered and appropriate
- The process for evaluating the service benefits and changes in performance were structured, thorough and transparent

The cost benefit analysis has taken into account the results of the WTP survey valuations with both operating and capital cost elements.

3.5.2 Leadership, Policy and Strategy

Leadership hierarchy is clearly visible across the Company, including the responsibilities of the Board, Executive Management Team, Regulation Committee, and other business areas.

The Company has set out its vision statement and in accordance with its back to basics strategy identified key objectives to be delivered as part of a long term plan against a 25 year investment strategy.

The Board and Executive Management Team regularly review and endorse plans to ensure that performance is maintained against business plan key objectives and obligations.

Corporate policies are documented with references to procedures and any other relevant documentation.

Governance requires mandatory adherence to Company policies and procedures, and has been improved to provide a more rigorous sign off process for non financial data. Directors are required to certify annually that the arrangements within their business area are robust and compliant with corporate policies and procedures.

The Company has an “Integrated Business Risk Management” process in place, and audits are regularly carried out and submitted to the “Audit and Risk Committee” for scrutiny and progress with remedial action.

Performance monitoring and reporting uses base operating data together with regular meetings involving asset management planning staff to ensure the business key targets are met as part of its strategic business plan.

There is Board level support for asset management planning policies, asset stewardship and best operating practices, to ensure that the services being provided are both efficient and effective.

The asset management planning activity is fully documented and provides clear and concise details on policies, procedures, processes, and systems, together with interfaces, to provide a basis for audit and “continuous improvement”.

The asset management planning policies and procedures are accessible and are aligned with the strategic objectives of the Company.

The Company has recently created an Asset Management Directorate which is responsible for asset management activities which will play a pivotal role in securing quality assurance accreditation for asset management through PASS 55 (Publicly Available Asset Standard Specification).

We found that:

- Support is provided from the Board and Executive Management Team to deliver asset management policies and best operating practices as part of an integrated approach to asset management
- Governance across the business is visible and clear with audits carried out to uncover any weaknesses, and accountability and responsibility discharged through the Director certification process
- The asset management policies and procedures that are currently in place are linked, dynamic and updated based on the extensive work carried out for PR09

3.6 Approach to Asset Management Planning

The Company has carried out some excellent work in this area during AMP4 by making significant changes in the way information has been gathered and used to develop asset plans.

It has been evidenced through audit that improvements have been made in many areas including processes, systems and people skills, which has also reinforced the day to day business of planning as part of a wider and more integrated approach for asset management.

The approach to asset management planning is sound structured and consistent with the principles of the Capital Maintenance Common Framework (CMCF).

The Company since the DBP has made further progress in strengthening asset management by:

- Re-organising and forming an Asset Management Directorate as a key business area
- Adopting quality assurance for asset management through PAS55 for accreditation and continuous improvement
- Finalised plans for system integration as part of the IT investment programme to strengthen areas involving data granularity, integrated systems and processes

These changes will enhance the current approach to asset management planning which has already seen improvements during AMP4.

The following sections provide a commentary on the Company asset management planning activities based on Asset Management Planning Assessment Process (AMPAP).

3.6.1 Management

Asset management planning involves various teams across the business involved at both a strategic and tactical level.

The teams translate strategic management plans into tactical asset plans for delivery during the AMP period.

These teams combine a focus on routine planning together with monitoring progress on plans for PR04, and formulation of the business plans for PR09 and beyond.

The main objective is to “Develop medium and long term asset investment plans to deliver the corporate objectives for customer service levels, provide a secure and stable return to shareholders and maintain asset stewardship”. Our audit work reviewed the activities carried out within asset management planning:

(TEXT REDACTED)

The Company has re-organised since 1st April 2009 and brought the asset planning teams into one Asset Management business under the Asset Owner. This team will take overall responsibility for:

- Defining asset management plans to deliver corporate objectives
- Optimisation of the plans in terms of capital and operating cost efficiencies
- Maintain standards and out-performance of costs
- Formally monitor service and challenge the service providers

The new management structure will continue to focus on asset management planning and strengthen areas associated with quality assurance together with new systems for work and asset management.

We found that:

- The asset management teams have defined roles and responsibilities.
- Regular meetings are structured to ensure the teams are involved in plans and actions to meet the business key service targets.

- Specific staff had been given responsibility for management and control of data, supported with procedures for governance.
- The new management structure will drive further improvements for work and asset management across the business
- The asset management planning function has matured through development of the AMP5 investment programme, which provides a strong foundation for the new organisation to build on

3.6.2 People

The Company asset management teams are supported where appropriate with contract staff and consultants for various projects and special assignments.

Staffs are engaged under a formal process for roles within the Company, where the Company sets out their requirements for qualifications, competencies and skills.

The Company has a defined process in place to help develop their staff and measure individual performance against Company targets using a twice yearly "Personal Development Review".

The review documentation sets out for individuals their accountabilities and responsibilities together with role and key performance indicators against which they will be measured.

For consistency there are peer reviews and also a guide is provided which details how the review process is to be conducted.

We found that:

- There is a Company wide process for staff development and for measuring the performance of individuals.
- The process for staff development is documented with guidance, and peer reviews to achieve consistency.
- Key performance indicators are used to measure performance and provide accountability for delivering activities for which staff are responsible.
- The Company has a wide range of experienced and qualified staff to deliver the asset planning strategies.

- Staffs are accountable for delivering specific tasks and targets within their business area, this is reviewed every six months, and for contractors every month.

3.6.3 Processes

Over the last three years the Company has introduced new processes together with new systems to help develop robust business plans based on the principles of the CMCF.

The processes for PR09 are forward looking, service focused and risk based, taking into account both internal and external changes.

The planning horizon covers both the development of medium (2010 to 2015) and long term (2015 to 2035) plans together with work for “business as usual” planning.

The planning process takes into account the delivery of service to customers and the environment, and is integrated across other investment streams i.e. quality, supply demand balance and enhancement.

The planning process takes into account not only customers and environment but also the health and safety of staff and the public.

Information and data management processes are used to collect data from various sources with procedures and staff in place to maintain data integrity.

The data sources at lower levels are fractured, however the Company has put in place extra resources and controls to make sure these areas are robust for development of the AMP5 investment programme. The Company are proposing new IT systems for AMP5 which will not need additional resources, and instead provide a fully integrated system and process architecture.

Draft plans are challenged and assessed as part of a routine checking process to ensure that all aspects including safety and environmental implications have been adequately covered.

(TEXT REDACTED)

We found that:

- The asset management planning processes are documented and follow a clear and systematic approach to develop investment needs

- The asset management planning process is supported with strong and dynamic systems.

(TEXT REDACTED)

- The processes at lower levels where data is held and transferred into the higher level systems are fractured requiring extra resources and controls to compensate
- The processes have points for internal challenge and validation for decision making
- The approach for identifying risk, needs, interventions, and optimal solutions is sound, structured and robust
- The process interfaces with systems is well defined with appropriate controls in place and clear ownership and accountability
- New asset and work management systems proposed in AMP5 will address low level process inefficiencies and provide the basis for fully integrated processes across the business

3.6.4 Systems

There are numerous systems that feed into the asset management planning process including the corporate risk management system, financial models, and other mainline data systems. (TEXT REDACTED)

We found that:

- The primary systems at the centre of the asset management planning function and have been found to be reliable, structured and essential systems to develop and optimise investment
- The primary systems are integrated, dynamic and support the whole process of asset management planning from risk to need, intervention to least cost and optimal solution to optimal programme.
- The primary systems have good controls and governance in place with confidence in their outputs.

- The Company are proposing investment in new asset and work management systems which will enhance the primary systems currently in place
- The systems are fully documented to provide a clear understanding of their use and limitations

3.6.5 Data

Data is routinely collected from across the Company to monitor and report on performance, and for use in asset management planning.

Asset observations are analysed and then used to drive improvement or address weaknesses within service areas, and to develop asset management investment plans.

The Company in AMP4 have made improvements to data management and control processes, with staff appointed and accountable for data provenance and integrity.

Data sources however are fragmented and in some datasets lack the level of granularity needed for more precise analysis and performance modelling.

The Company has addressed the fragmentation by putting in place extra resources to manage the data integrity and reliability.

(TEXT REDACTED)

We found that:

- Through developing the AMP5 investment plan the Company has embarked on a number of initiatives to address data shortage on assets. This has involved FMEA studies together with other site surveys and extensive modelling work

(TEXT REDACTED)

- Asset data is collected from various sources across the Company and with data owners accountable and responsible for data integrity and reliability.
- Survey work and studies are being carried out to provide greater confidence with the data being used and to update records.

- Data integrity has been improved through additional management and control procedures, and new systems will provide a more effective repository for gathering data across the Company.
- The new Asset Management structure includes an Asset Information team for accountable for data quality policy, standards and governance and data improvements

3.6.6 Analysis

The Company has carried out significant analysis on data from asset observations, and past performance, in order to develop models and assist with asset management planning.

Extensive non infrastructure survey work including FMEA studies has been undertaken focusing on assets or a combination of assets that present the greatest degree of risk to service, health and safety and the environment. This has ensured that the analysis has been appropriately targeted.

For underground infrastructure assets historic information for service and asset performance is more readily available across several years of reporting. Studies and special surveys have also been commissioned where necessary to provide better information to improve analysis and future predictability.

Performance models have been constructed, and tested in order to validate their results for reliable predictions of future performance for a number of infrastructure asset groups. Where necessary sensitivity testing has been used to provide greater confidence with predictions for performance and asset deterioration.

A range of models have been used to help define failure probability, consequence, risk, deterioration, in order to establish reliable forecasts for future investment needs. A number of techniques being used to validate and calibrate them including cross checks against other data sources, and field test validation.

There is a good understanding of the impact of asset failure on service levels based on analysis of risk, with linkage between risk, need, intervention and operational performance measures.

It is intended that the models being used for analysis for PR09 will be regularly reviewed to improve the predictability of expenditure and asset performance, and to keep abreast of research and development of new modelling techniques and analysis tools.

Interventions have been developed based on needs and where appropriate “spend to save” solutions have been identified. Costs are produced using the EES historic cost information indexed to current year. Where there is insufficient data to predict reliably the capital or operating costs a bottom up valuation is used and models updated.

Investment optimisation is carried out within the IMS which identifies the least cost solution for specific needs and then ranks schemes against benefit taken from the customer willingness to pay survey valuations. The system is reliable and can work at project and programme level to optimise investment.

We found that:

- Analysis is carried out systematically and in line with the requirements of the Common Framework, using information on serviceability, asset performance and expenditure to predict future service and help develop investment needs
- Historical analysis is undertaken to identify forward looking trends taking into account past performance and expenditure
- Performance modelling has been developed to help support predictions of future asset performance and investment needs
- Probability of failure and consequence modelling has been used to help identify future investment needs
- The process of risk assessment has been used extensively throughout the asset management planning process
- Capital and operating costs have been determined from reliable sources to cost solutions and impact on operating costs
- Validation of modelling activities uses a number of techniques which are considered to be tried and tested and reliable

3.6.7 Reporting**Internal Reporting**

The Company has in place a robust reporting structure that uses routine data to monitor performance against key Company targets. Reporting is carried out across the Company from grass roots through to the executive management team and the board.

Risks and any deviations from targets are highlighted and investigated to establish root causes, and instigate action plans.

The action plans are reviewed monthly in supply and waste operational meeting (WORM) involving the asset management planning team.

Data is aggregated from site or location for reports to be produced for local teams, business areas and the Company, to monitor performance against Company targets.

The information captured provides visibility and performance measurement at all team levels across the Company.

External Reporting

External reporting to Ofwat is carried out formally in the form of the June Annual Return (JAR), which highlights key outputs and service performance of the Company.

The JAR is audited against Ofwat guidance to then report on the completeness and validity of the information and judgements presented.

The reporting details performance for infrastructure and non infrastructure assets together with any specifics related to management and general, identifying any special factors that may have impacted on expenditure or regulatory outputs.

The information that is presented in the reports follows a strict sign off process for governance and includes a confidence grade to highlight the level of accuracy and reliability.

We found that:

- Reporting both internally and externally follows a well defined process of sign off and accountability.
- The internal reports provide a “business as usual activity” to monitor performance across cost and other service targets.
- External reporting carries improved governance with a strict sign off process. New systems will provide enhancements across the reporting streams and data pick up.

3.6.8 Continuous Improvement

The DBP assessment for asset management planning based on AMPAP and reviewing Management, Processes and Systems is detailed in Annex 5. This assessment confirms that asset management planning activities are largely robust (AMPAP Score 4).

The assessment showed that there is robust evidence to show that the Company has in place a sound approach to asset management planning.

The main areas for improvement included, quality assurance, systems integration, continuous improvement with more formal business as usual processes and procedures, and data granularity. These areas are already being addressed by the new Asset Management Directorate and supported with the proposed introduction of new IT systems.

The findings from the assessment also supports a previous review of Thames Water's asset planning arrangements by the Reporter (HMS Report CMCF & AMPAP – March 2008) which confirmed that the overall approach by the Company is sound and well structured for business as usual and future planning activities.

The Company are well placed to develop and strengthen existing arrangements for PR09.

3.6.9 Delivering the Plan

The Company has set out their procurement strategy for AMP5. (TEXT REDACTED)

Project delivery will be through delivery streams each specific to the type of project, these delivery streams include: AMP4 Complex, Baseload, Potential Baseload, Annual, Reactive and Complex.

The approach being taken by the Company is considered to be reasonable and measured, reflecting the type and complexity of projects that need to be implemented.

3.6.10 Assessment of Serviceability Reference Levels and Control Limits

The Company has used the methodology set out by Ofwat in RD15/06 for reference levels. Control limits are also calculated using Ofwat's methodology.

3.7 Water Infrastructure

3.7.1 Summary of Water Infrastructure Capital Maintenance Plan

The scope of investment covers the following key areas:

- Maintaining stable serviceability
- Special risks
- New capital maintenance

(TEXT REDACTED)

Serviceability Investment

Investment in AMP4 has restored stable serviceability, with AMP5 investment targeted to maintain stable serviceability. The increased expenditure in AMP5 is marginal.

(TEXT REDACTED)

New Capital Maintenance Investment

We have not undertaken a detailed assessment to ascertain the status of these areas of investment; however this aspect could be reviewed during the query period if appropriate.

(TEXT REDACTED)

Reference Levels and Control Limits

The following comments are made based on the Company submission.

Bursts

The Company since the DBP has identified the reference level and control limits using the JR08 burst definition. The setting of the reference level and control limits is reasonable with no material issues identified.

DG3 > 12 Hours

The Company since the DBP has not changed the reference level, however the lower control limit has been changed in line with Ofwat's draft CIS report. The reference levels and control limits are reasonable with no material issues identified.

Iron Mean Zonal Compliance

The Company has not changed the reference level from DBP, however the control limits have been changed based on 3 x standard deviations between JR01 and JR02. The reference level and changes in control limits are considered to be reasonable with no material issues identified.

DG2 Pressure

The Company has since the DBP improved the reference level and revised the control limits. These changes are reasonable with no material issues identified.

Activity Summary

The following outputs detailed in the Company submission highlighting changes since the DBP have been reviewed with no material issues identified

- Length of aqueducts and tunnels refurbished = 21Km
- Storage reservoir work = 18 projects > £500k spend
- Length of mains renewed = 1,097Km
- Trunk mains relined = 6Km

Cost Benefit Analysis

(TEXT REDACTED)

The work carried out in this area has been checked on a sample basis for the asset groups with no material issues identified.

Ofwat Challenges on Capital Incentive Scheme (and HMS response)

1. The AMA scoring for supply infra based on Ofwat's CIS Draft Report in December which resulted in a challenge to the exposed component of the DBP (less exceptional items). (text redacted)

Areas highlighted as uncertainties included definition of intolerable risk, mains modelling, and proposals for high consequence low probability investment.

The Company has carried out significant work in this service area, exposing special risks which have been scaled by tolerability. The mains modelling work has been extensive with considerable validation carried out within the operations business to help target areas of greatest risk of failure.

This work coupled with cost benefit analysis shows a balanced approach has been taken to investment, with a programme which is realistic and achievable in terms of delivering the benefits and outputs.

(TEXT REDACTED)

2. For distribution mains Ofwat did not accept the Company plans in B5 as there could be a loss of benefit to capital maintenance from a reduced VMR programme. The Company were challenged to review proposals in B3 to maintain stable serviceability.

We have reviewed the Company proposals for distribution mains and are satisfied that the replacement work and proposed investment will maintain stable serviceability. (TEXT REDACTED)

The Company has not included any proportional allocation to capital maintenance for the VMR work funded within the supply demand plan on the basis that the capital maintenance plan should only include the investment required for stable bursts and leakage performance.

Ofwat may wish to consider whether excluding proportional allocation from supply demand is appropriate.
(TEXT REDACTED)

3. For communication pipes and local mains replacement investment Ofwat considered this should be allocated to operating costs.

We have reviewed this with the Company and KPMG and found that it is reasonable to account for this investment as capital infrastructure renewal expenditure.

Water Infrastructure Serviceability - Historical Analysis

The background and starting point in the AMP4 FD was that Ofwat's assessment of serviceability for water infrastructure was deteriorating and that stable serviceability had to be achieved by 2009.

Serviceability action plans were put in place and progress has been reported on a six monthly basis.

The Company has used the action plans to implement a robust turnaround of improved serviceability over the last two years, resulting in restoration of stable serviceability in 2008.

A considerable amount of work has been undertaken by the Company to better understand infrastructure assets, in terms of age, condition and likely risk of failure. This work has been used to drive investment into areas where an improvement has been seen in serviceability.

(TEXT REDACTED)

The approach taken by the Company to drive through improvements is sustainable and with continued focus serviceability should not deteriorate throughout AMP4.

3.7.2 Distribution Mains

(TEXT REDACTED)

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis which shows the investment for mains replacement is cost. (TEXT REDACTED)

The process has been checked and found to be consistent with the Company standard methodology, based on consequences involving leakage, and unplanned supply interruptions.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The data has been reviewed on a sample basis and found to be traceable and reliable.

Modelling of deterioration has been carried out using weekly burst data across a 13 year time series for each of regional areas within Thames.

Variables including time, temperature, soil moisture deficit have been used to analyse and predict burst rates. The model predictions for bursts compare favourably with actual burst history across each of the regions, which provides a high level of confidence in the forward looking analysis for deterioration of the network of 2.75%.

The Company has also undertaken cohort modelling to analyse failure of the network based on cohorts at DMA level, using Ofwat's new definition of a burst. The output from the model has been used to identify the length of mains to be replaced to address deterioration and maintain burst performance.

The impact of mains deterioration on leakage and unplanned supply interruptions has been considered, taking into account the work being carried out in AMP4 for VMR. The treatment of these areas to quantify the effects on performance is reasonable.

As a result of the significant reduction of VMR in the supply demand plan from 2,000Km to 400Km the Company has revisited investment needs for stable serviceability.

The Company have identified through modelling, experience and investment in AMP4, and recent changes in supply demand that the following headline performance requirements must be met for stable serviceability in AMP5.

AMP5 Performance Requirements for Stable Serviceability				
Leakage	Avoidance	Bursts Avoidance	DG3	Points
MI/d			Avoidance	
73MI/d		1,530	1,169	

The Company has carried out sensitivity analysis reviewing burst rate, impact of weather and leakage as a service indicator. This work provides confidence in both the deterioration rates used and cohort modelling work.

(TEXT REDACTED)

The programme of work for AMP5 has been reviewed and considered realistic based on past performance in AMP4 where the Company has been able to deliver similar levels of work.

(TEXT REDACTED)

The increased level of mains replacement activity in AMP4 is based on the additional replacement requirements identified for stable serviceability based on the modelling work, and taking into account burst benefits from the Supply Demand VMR programme.

There have been a number of changes since the draft business plan all of which have been reviewed with no material issues.

The Investment for AMP6 has been assumed to be at a similar level to AMP5, this is reasonable.

We are satisfied that the proposed investment is robust.

3.7.3 Local Mains Replacement

(TEXT REDACTED)

The planning objective is cost effective for stable serviceability. Cost benefit analysis has not been carried out as this work is reactive.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The main benefits from the investment are to maintain stable serviceability, and reduce leakage.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

(TEXT REDACTED)

We are satisfied that the business case for investment is robust.

3.7.4 Communication Pipes

(TEXT REDACTED)

This business case includes both communication pipes and the section of pipe between the boundary box and the customer curtilage which the Company call a "MRRPB".

The planning objective is cost effective, with cost benefit analysis, with the benefit derived from leakage. (TEXT REDACTED)

The approach has been reviewed and found to be consistent with the Company standard methodology for cost benefit analysis, with no material issues identified.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The main benefits from the investment are to maintain service to customers and reduce leakage. In maintaining service the customer is protected against unplanned interruptions, low pressure, and possible flooding. (TEXT REDACTED)

The Company has modelled deterioration using data from the Geographical Information System together with information on pipe and environmental attributes.

Due to the limited information available from GIS the Company used age data associated with the distributions mains business case and business

knowledge to further supplement the information available. The approach and supplementary data has been checked with no material issues identified.

The model predicts a deterioration rate of 1% per year which is lower than the rate for distribution mains at 2.75%. However the Company has decided not to take a proactive approach of replacement but to continue to replace on a reactive basis.

(TEXT REDACTED)

We are satisfied that the business case for investment is robust.

3.7.5 DG2 Low Pressure

(TEXT REDACTED)

The planning objective is cost effective for stable serviceability.

The Company has also carried out cost benefit analysis which shows the investment is cost beneficial. The process has been reviewed and found to be consistent with the Company cost benefit standard methodology, and based on the consequence of low pressure.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The investment is required to maintain stable serviceability by addressing low pressure problems, and based on historic performance.

Risk has been identified on a block basis which links to the need, solutions, and the low pressure operational performance measure. The approach has been reviewed and found to be reliable reflecting the requirements for investment in AMP5.

(TEXT REDACTED)

There have been no changes made between the draft and final business plan.

AMP6 expenditure is assumed to be the same as AMP5, which is reasonable.

We are satisfied that the case for investment and allocation of expenditure to capital maintenance is robust.

3.7.5 DOMS

(TEXT REDACTED)

A capital investment proposed for:

- New strategic flushing schemes
- New targeted flushing schemes
- Hydraulic modelling to support emerging aesthetic risk
- Hydraulic model design and strategic flushing in DMA's affected by Crandalite
- In line water quality monitors

The planning objective is cost effective for stable serviceability. The Company has also carried out cost benefit analysis which shows the investment is cost beneficial..(TEXT REDACTED)

The process has been reviewed and found to be consistent with the Company cost benefit standard methodology, based on the consequence of aesthetic water quality failures.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The investment is required to maintain stable serviceability by reducing the risk of water quality problems related to both aesthetic and iron failures.

The risk of water quality problems is assessed continually using the DOMS DMA Water Quality Risk Database, by scoring and ranking of risk taking into account customer complaints, flushing activity, bursts, water quality incidents, and statutory sample results.

The database was reviewed and showed that changes in water quality were being actively used to investigate and resolve water quality problems.

The Company demonstrated that a thorough and structured approach was being taken to monitor and reduce the risk of water quality failures in the network at DMA level using reactive incident reviews and pro-active studies. The risk was directly linked to need, intervention and operational performance measure.

The methodology adopted by the Company aligns with industry good practice and provides a sound basis for the development of Drinking Water Safety Plans (DWSP's).

(TEXT REDACTED)

The changes made between the draft and final business plan have been reviewed with no material issues identified.

The AMP6 expenditure is the same as AMP5 which is reasonable.

We are satisfied that the business case for investment is robust.

3.7.6 Trunk Mains .(TEXT REDACTED)

3.7.7 Storage Reservoirs (TEXT REDACTED)

3.7.8 Raw Water Tunnels (TEXT REDACTED)

3.7.9 Aqueducts (TEXT REDACTED)

3.7.10 Diversions

An investment (TEXT REDACTED) is proposed for customer led diversions. based on:

- Notified work for the 3 major diversion projects
- Emerging requirements

The planning objective is cost effective to meet statutory requirements for third party diversions. Cost benefit analysis has not been used as the investment does not require such analysis to be undertaken.

The processes and planning systems used to identify and develop work for diversions has been reviewed and found to be structured and robust.

(TEXT REDACTED)

The key benefit associated with this investment is to meet customer needs in the most efficient and cost effective manner.

The solutions involved for diversionary work broadly fall into standard engineering work types but take into account any specific local disruption and environmental impacts.

(TEXT REDACTED)

A review of costs on a sample basis showed that the process was through with no material issues identified.

The capital delivery process also considers deliverability of projects taking into account any specific issues of complexity and liaison with third parties.

The experience gained within AMP4 and Company expertise places the Company in a good position for local liaison with councils and other organisations to enable projects to be delivered within realistic timescales. The sound planning and implementation processes provide confidence that the Company can meet their obligations for diversions at least cost.

(TEXT REDACTED)

AMP6 expenditure is assumed to be the same as AMP5, which is the best estimate that the Company can give in the absence of more definitive information on AMP6 needs.

There have been no changes in cost or content since the Draft Business Plan.

We are satisfied that the business case for investment is robust.

3.7.11 Base Service Output Projections

The following commentary set out our opinion on the Company proposals for six key performance indicators.

We have found that the Company has reasonably interpreted the guidance from Ofwat for setting reference levels and control limits.

We also consider that the predictions reflect the proposed investment, with no material issues identified.

With respect to the deterioration in performance in 2008/09 for bursts and DG3 overall score, it is understandable that the cold weather will have influenced these areas, and we accept that in some years there will be peaks.

3.8 Water Non-Infrastructure Service

3.8.1 Summary of Water Infrastructure Capital Maintenance Plan

The scope of investment covers the following key areas:

- Maintaining stable serviceability
- Special risks
- New capital maintenance

(TEXT REDACTED)

The Company has split the investment into three components of expenditure, including serviceability, special risk and new capital maintenance.

Serviceability Investment

The investment in AMP4 and AMP5 is broadly similar to maintain stable serviceability.

(TEXT REDACTED)

New Capital Maintenance Investment

We are satisfied that the following items can be considered atypical and exceptional: SCADA, Ozone Plant refurbishment, Carbon Mitigation, and Metering Strategy.

For the remaining items we have not undertaken a detailed assessment to ascertain their status; however this aspect could be reviewed during the query period if appropriate.

(TEXT REDACTED)

Expenditure and Forecasts for AMP5

(TEXT REDACTED)

AMP 5 Investment

We found that there are no areas of material concern for the proposed investment.

DBP Changes

The changes since the DBP have been reviewed and no material issues identified.

(TEXT REDACTED)

Reference Levels and Control Limits

The Company changes to reference levels and control limits since submission of the DBP highlighted below are considered to be reasonable with no material issues identified.

WTW Coliforms

The Company since the DBP has changed the reference level and control limits taking into account latest performance and Ofwat's feedback from the CIS.

Service Reservoirs Coliforms

The Company since the DBP has changed the reference level in line with Ofwat's feedback from the CIS, and also changed the control limits taking into account the revised line definition.

Turbidity

The Company since the DBP has changed the reference level in line with Ofwat's CIS feedback, and also changed the control limits taking into account performance is JR03 and JR04.

Enforcement Incidents

The Company has retained the DBP reference level and control limits in agreement with Ofwat's CIS feedback.

Unplanned Maintenance

There has been no change since the DBP.

Activity Summary

The following outputs detailed in the Company submission highlighting changes since the DBP have been reviewed with no material issues identified

- Refurbished or new water treatment works = 33
- Refurbished or new pumping stations = 10
- Refurbished or new service reservoirs = 14
- New or refurbished district meters and prv's = 2,084
- Household meters renewed = 121,010

Cost Benefit Analysis

(TEXT REDACTED)

The work carried out in this area has been checked on a sample basis for the asset groups with no material issues identified.

Ofwat Challenges on Capital Incentive Scheme (and HMS response)

1. The AMA scoring for supply infra based on Ofwat's CIS Draft Report in December which results in a challenge to the exposed component of the DBP (less exceptional items). (TEXT REDACTED)

Areas highlighted as uncertainties included asset planning approach and embedding within operations, definition of intolerable risk, mains modelling, and proposals for high consequence low probability investment, validation and consistency between judgements underpinning risk assessments.

The Company asset planning approach has been reviewed and whilst this area is developing it has already reached through the development of the AMP5 programme a good level of maturity to ensure the investment processes are sound and structured.

It has also been evident through the audit work that there has been considerable involvement with operations to not only develop plans but to validate risk, needs, interventions and impact on operational performance measures.

The Company has also carried out significant work to expose risk through the FMEA study process using asset reliability models and to scale tolerability.

The planning has been extensive with considerable validation carried out within the operations business to help target areas of greatest risk of failure. This work coupled with cost benefit analysis shows a balanced approach has been taken to investment, with a programme which is realistic and achievable in terms of delivering the benefits and outputs.

2. (TEXT REDACTED)

3. For transfer of carbon mitigation each component of the plan to be individually costed and allocated to the correct sub-category.

Please refer to the Reporter findings for Carbon Mitigation.

Water Non Infrastructure Serviceability - Historical Analysis

The background and starting point in the AMP4 FD was that Ofwat's assessment of serviceability for water infrastructure was improving.

In its latest assessment for 2007-08, Ofwat have confirmed that the Company has continued to deliver stable serviceability throughout AMP4.

A number of key elements have helped the Company achieve stable serviceability, these are:

- better understanding of quality failures through root cause analysis
- better targeting of investment in hot spot areas
- introduction of additional manual sampling for turbidity
- focused monthly review meetings to better understand risk and put in place remedial action
- development of water safety plans to identify risks and develop investment plans

The approach taken by the Company to maintain levels of serviceability is sustainable and with continued focus serviceability should not deteriorate throughout AMP4.

3.8.2 Water Treatment Works

Investment is proposed for: (TEXT REDACTED)

- Refurbishment of Water Treatment Works
- Refurbishment of High Lift Pumping Stations
- Refurbishment of High Voltage Assets
- Reactive Maintenance
- Carbon Programme

The planning objective is cost effective for stable serviceability. Cost benefit analysis has been carried out excluding reactive maintenance.
(TEXT REDACTED)

The analysis has been checked and shown to be consistent with the Company standard methodology based on using consequences involving: injuries, unplanned supply interruptions, and water quality failures.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The key benefits associated with this investment include reduced risk of: unplanned supply interruptions, water quality failures, and injuries, which could be tracked and linked with risk, needs, interventions and operational performance measures.

(TEXT REDACTED)

The deliverability of the project work has been assessed by the Company with the view that the work can be delivered and the outputs met.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed with no material issues identified.

The investment proposed for AMP6 is reasonable with no material issues identified.

We are satisfied that the business case for investment is robust.

3.8.3 Service Reservoirs

An investment is proposed for: (TEXT REDACTED)

- Concrete Softening
- Critical Reservoirs - Additional Capacity
- Preload Design Issues
- Overflow Control System Obsolescence
- Poor Reservoir Turnover
- Fragile Roofs
- Statutory Reservoir Overflows
- Sampling Systems
- Planned FMEA Work
- Reactive Maintenance

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit, this excludes reactive maintenance. (TEXT REDACTED)

The cost benefit analysis has been carried in accordance with the Company standard methodology, taking into account water quality failures, external flooding and unplanned supply interruptions.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The main benefits associated with this investment include reduced risk of: unplanned supply interruptions, external flooding, and water quality failures. The benefits were reviewed and shown to be linked to risk, needs, interventions and operational performance measures.

(TEXT REDACTED)

Delivery of the programme has been thoroughly reviewed by the Company with no projects identified that carry significant risk. The checks carried out on a sample basis and across the programme of work did not uncover any material issues and reasonable confidence that the outputs will be met.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is based on the same investment as AMP5 which is reasonable.

We are satisfied that the business case for investment is robust.

3.8.4 Treated Water Pumping Stations

An investment is proposed for: (TEXT REDACTED)

- Refurbishment of high lift water pumping stations
- Refurbishment of booster water pumping stations
- Refurbishment of Ring Main
- Refurbishment of high voltage assets
- * Carbon programme
- Reactive maintenance

* Reporter commentary and findings are set out separately for the carbon programme within its own section in B3

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis which excludes reactive maintenance. The cost benefit analysis has been carried in accordance with the Company standard methodology, taking into account injuries, and unplanned supply interruptions.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The main benefits associated with this investment include reduced risk of: injuries, and unplanned supply interruptions. These benefits were checked and shown to be linked to risk, needs, interventions and operational performance measures.

(TEXT REDACTED)

The process was checked together with sample checks at project level with no inconsistencies found and no material issues identified.

(TEXT REDACTED)

The programme of work does not include any projects that represent any significant risk to delivery within AMP5. There is confidence that the investment programme can be delivered and the outputs met.

The investment has been scaled to ensure stable serviceability is maintained based on planned refurbishment and reactive maintenance expenditure. The investment also underpins reduced risk of: unplanned supply interruptions, injuries and low pressure.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is assumed to be the same as AMP5, which is reasonable.

We are satisfied that the business case for investment is robust.

3.8.5 Raw Water Assets

An investment is proposed for: (TEXT REDACTED)

- Refurbishment of Raw Water Pumping Stations
- Refurbishment of high voltage assets
- Refurbishment of other works
- Storage reservoirs
- Aqueducts
- * Carbon programme

* Reporter commentary and findings are set out separately for the carbon programme within its own section n B3

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis. (TEXT REDACTED)

The cost benefit analysis has been carried out in accordance with the Company standard methodology, taking into account injuries, and unplanned supply interruptions.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The main benefits associated with this investment include reduced risk of: injuries, and unplanned supply interruptions. The benefits were checked and shown to be linked to risk, needs, interventions and operational performance measures.

(TEXT REDACTED)

The projects that make up the programme of work are not technically challenging and similar work has been carried out in AMP4. There is confidence that the programme can be delivered and the outputs met.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is assumed to be the same as AMP5, which in absence of better information is reasonable.

We are satisfied that the business case for investment is robust.

3.8.6 Water Distribution

An investment is proposed for: (TEXT REDACTED)

- Replacement of Meters and Pressure Regulating Valves
- Replacement of Customer Ancillaries
- Replacement of Revenue Meters (planned and reactive)

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis. (TEXT REDACTED)

The Company standard methodology for cost benefit analysis has been followed, with the benefit derived from leakage, and unplanned interruptions.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The main benefits associated with this investment include reduced risk of: unplanned supply interruptions and leakage. These benefits have been reviewed and checked which show in most cases a direct link with risk, needs, interventions and operational performance measures.

(TEXT REDACTED)

The investment has been scaled to ensure stable serviceability is maintained through AMP5, and to reduce the risk of: leakage, unplanned supply interruptions, and injuries.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

(TEXT REDACTED)

AMP6 expenditure is assumed to be the same as AMP5, with the exception of revenue meters which is linked to supply demand projections, and is considered reasonable.

The investment for AMP6 is similar to AMP5 for meters, pressure regulating valves and customer ancillaries, which is reasonable.

We are satisfied that the business case for investment is robust.

3.8.7 Research and Development - please refer to separate Research and Development Report

3.8.8 SCADA - please refer to separate Management and General Report

3.8.9 Base Service Output Projections

We have found that the Company has reasonably interpreted the guidance from Ofwat for setting reference levels and control limits.

We also consider that the predictions reflect the proposed investment, with no material issues identified.

3.9 Sewerage Infrastructure

3.9.1 Summary of Sewerage Infrastructure Capital Maintenance Plan

The scope of investment covers the following key areas:

- Maintaining stable serviceability
- Special risks
- New capital maintenance

(TEXT REDACTED)

The Company has split the investment into three components of expenditure, including serviceability, special risk and new capital maintenance.

Serviceability Investment

Investment in AMP4 assumes restoration of stable serviceability, with AMP5 investment based on maintaining stable serviceability.

The investment in AMP4 is higher than AMP5 and may be attributable to the additional cost to seek restoration of stable serviceability.

(TEXT REDACTED)

New Capital Maintenance Investment

We have not undertaken a detailed assessment to ascertain the status of these areas of investment; however this aspect could be reviewed during the query period if appropriate.

(TEXT REDACTED)

Expenditure and Forecasts for AMP5

AMP 5 Investment

We found that there are no areas of material concern for the proposed investment.

DBP Changes

The changes since the DBP have been reviewed and no material issues identified.

(TEXT REDACTED)

Reference Levels and Control Limits

The Company submission has been reviewed with no material issues, with changes highlighted below.

Sewer Collapses

The Company has retained the DBP reference levels and control limits with no changes recommended by Ofwat.

Pollution Incidents

The Company since the DBP has changed the reference level with revised control limits. The reference level is in line with Ofwat's RD15/06 methodology and revised to JR00 and JR01.

Flooding Other Causes

The Company has agreed with Ofwat's CIS feedback and revised the reference levels and control limits.

Flooding Overloaded Sewers

The Company has retained the DBP reference levels and control limits with no changes recommended by Ofwat.

Sewer Blockages

The Company since the DBP and following better performance than anticipated has revised the reference level and control limits.

Equipment Failures

The Company since the DBP has changed the reference levels and control limits based on improvements associated with recording and reporting.

Activity Summary

The following outputs detailed in the Company submission highlighting changes since the DBP have been reviewed with no material issues identified

- Sewer rehabilitation = 262Km
- CCTV = 7,438Km
- DAP's = 102
- Sewer pipe bridges = 43 locations
- Overflows and outfalls = 168

Cost Benefit Analysis

(TEXT REDACTED)

The work carried out in this area has been checked on a sample basis for the asset groups with no material issues identified.

Ofwat Challenges on Capital Incentive Scheme (and HMS response)

1. The AMA scoring for supply infra based on Ofwat's CIS Draft Report in December which resulted in a challenge to the exposed component of the DBP (less exceptional items).

Areas highlighted as uncertainties included maturity of asset planning approach and embedding with operations, definition of intolerable risk, (TEXT REDACTED) and overall assessment of risk.

The Company asset planning approach has been reviewed and whilst this area is developing it has already reached through the development of the AMP5 programme a good level of maturity to ensure the investment processes are sound and structured.

It has also been evident through the audit work that there has been considerable involvement with operations to not only develop plans but to validate risk, needs, interventions and impact on operational performance measures.

The Company has also carried out extensive modelling and analysis work to identify risk in terms of probability of failure and consequence, and to scale tolerability for health and safety.

The planning has been extensive with considerable validation carried out within the operations business to help target areas of greatest risk of failure. This work coupled with cost benefit analysis shows a balanced approach has been taken to investment, with a programme which is realistic and achievable in terms of delivering the benefits and outputs.

2. Service impacts are unclear and it is not clear how the Company has validated and ensured consistency between the many judgements underpinning the risk assessments

The Company process of determining risk and needs is linked with operational performance measures to establish impact on service and identify appropriate least cost interventions to maintain service standards. This process has been rigorously followed based on the checks carried out on each asset group. Validation has also shown to be structured using a variety of methods including field testing, internal challenge meetings and independent expert judgement.

3. *Exceptional item for other causes flooding – the justification for this investment is not well made and the investment should be part of the ongoing maintenance – the item has been disallowed entirely as an exceptional item.*

The investment proposed for other causes flooding is £x m against an AMP4 investment of £x m with a net benefit of £x m. The investment will reduce the risk associated with blockages and also see an improvement on first time flooding. Flooding is a major concern for customers and this investment will support other work as part of the integrated programme for small sewer investment.

4. *Transfer of manhole cover replacement, CCTV surveys, reactive repair of sewer ancillaries, residual blockages in SDAC's, rising mains burst repairs, gravity sewer collapse repairs from IRE to opex*

We have reviewed the transfers from IRE to opex and consider that the Company treatment of this expenditure as IRE is reasonable.

Serviceability – Historical Analysis

The background and starting point in the AMP4 FD was that Ofwat's assessment of serviceability for sewerage infrastructure was marginal, and that stable serviceability had to be achieved by 2008-09.

Serviceability action plans were put in place and progress has been reported on a six monthly basis. The Company has used the action plans to implement a robust turnaround of improved serviceability over the last two years. Ofwat have judged serviceability in 2007-08 as "stable".

There are a number of key elements that have helped the Company achieve stable serviceability, these are:

- improved reporting of collapses and reporting methodology
- replacing worst performing rising mains

- extensive cctv work followed up with rehabilitation of sewers in poor condition
- addressing high risk sites i.e. sewers crossing railway lines
- sewer cleaning programme

The approach taken by the Company to drive through improvements is sustainable and with continued focus serviceability should not deteriorate throughout AMP4.

3.9.2 Small Diameter Sewers

An investment is proposed for small diameter sewers which includes: (TEXT REDACTED)

- Collapse Avoidance
- Blockage Avoidance
- Other Causes Flooding Avoidance
- Rehabilitation of Collapsed Sewers
- Manhole Cover Replacement

The planning objective is cost effective for stable serviceability.

The Company has carried out cost benefit analysis for Collapse Avoidance, Blockage Avoidance, Other Causes Flooding and Manhole Cover Replacement, excluding Collapsed Sewers as this component of investment is reactive and difficult to calculate tangible benefits.

(TEXT REDACTED)

The process has been reviewed and found to be consistent with the Company standard methodology, and based on consequences involving internal flooding, external flooding, traffic disruption, injuries and cost avoidance.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

Checks have been made on a sample basis to trace the data back to source with no material issues found.

The main benefits from the investment are to maintain stable serviceability, and reduce the risk of: internal and external flooding, pollution, injury and traffic disruption.

The benefits have been examined taking into account the specific areas of investment included within this asset group and found to be linked to risk, need, intervention, performance and outputs. A consistent approach has been taken in developing the benefits with detailed checks showing that there is a good level of confidence that the reduced risk is achievable and realistic.

(TEXT REDACTED)

The programme of work has been developed across AMP5 taking into account the delivery mechanisms and experience gained in AMP4. The range of work does not present any special risks associated with deliverability other than the take up of grease interceptors.

(TEXT REDACTED)

The Company showed that take up of grease interceptors had been addressed by the introduction of contracts with councils to target particular premises where the risk of grease transfer into sewers was high. From the reviews carried out with the Company confidence was gained that the programme of work was realistic and achievable.

The Company has restored stable serviceability for AMP4, through a combination of improved reporting together with better targeting of rehabilitation activity.

The investment across the asset group with the exception of manhole replacement will provide a benefit to reduce the risk of internal and external flooding. In particular the work associated with other causes and blockage avoidance will ensure that there is no deterioration in serviceability.

(TEXT REDACTED)

Taking into account the good progress made in AMP4 for serviceability and the ability to better target investment for AMP5 the reduction is not considered to be a material issue.

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is assumed to be the same as AMP5, which is considered reasonable.

We are satisfied that the business case for investment is robust.

3.9.3 Rising Mains

An investment is proposed for rising mains to include: (TEXT REDACTED)

- Replacement of a proportion of rising mains with first time bursts
- Replacement for all rising mains that have burst once or more in AMP4
- Installation of air valves and surge protection devices
- Installation of shut off valves at high consequence locations
- Reactive maintenance.

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis. (TEXT REDACTED)

The process has been reviewed and found to be consistent with the Company standard methodology, and based on consequences involving pollutions, external and internal flooding, injuries and traffic disruption.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The key benefits associated with this investment to maintain stable serviceability include reduced risk of: pollutions, external flooding, injuries and traffic disruption. Each of the benefits can be traced back to the risk assessment process, needs, interventions and operational performance measures.

Modelling has been carried out using past performance data to predict the needs for rising mains replacement with reasonable correlation between two of the three models used.

This work has been reviewed and is considered to provide sufficient confidence to identify investment requirements for AMP5. It is recognised that going forward greater granularity needs to be achieved to strengthen the modelling techniques and provide greater confidence in predicting future failure and investment requirements.

(TEXT REDACTED)

The programme of work has been reviewed by the Company with no identified issues for overrun.

The programme is not particularly challenging in technical content and as similar work has been carried out in AMP4 there is reasonable confidence that the outputs will be delivered.

(TEXT REDACTED)

In AMP4 the Company has seen a reduction in bursts which has contributed to the restoration of stable serviceability.

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is assumed to be the same as AMP5, which is reasonable.

We are satisfied that the business case for investment is robust.

3.9.4 Large Diameter Sewers

An investment is proposed for: (TEXT REDACTED)

- Sewer rehabilitation
- Sewer surveys

The planning objective is cost beneficial to maintain stable serviceability, address high consequence risk, with no enhanced standard of service for customers. (TEXT REDACTED)

The process used to calculate cost benefit is consistent with the Company standard methodology and is based on consequences involving internal flooding, pollutions and cost of failure.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

The level of detail and analysis carried out by the Company to develop the case for investment is commendable and impressive.

(TEXT REDACTED)

Checks were carried out on a sample basis which was traced back to source with no material issues identified.

The benefits from the investment will not only include reduced risk of internal flooding, pollutions and cost of failure but also reduce the risk of injuries and traffic disruption. A review of the benefits has shown linkage between risk assessment, needs, interventions and performance which provides confidence that the benefits can be realised.

Limited historic failures and performance data has led the Company to risk assess large diameter sewers using models and expert judgement to

determine and prioritise investment for sewer surveys and sewer rehabilitation.

(TEXT REDACTED)The overall programme has been constrained by the Company to ensure the outputs can be met at least overall cost, and to minimise disruptive activities.

(TEXT REDACTED)The type of work involved is not complex however for rehabilitation, liaison with third parties can cause delays resulting in overrun and increased costs. From checks with the Company on the scale of work and previous similar schemes, there is reasonable confidence that the programme of work can be delivered in AMP5 and the outputs met.

As previously highlighted there is little historic performance data, and due to the infrequent failure service indicators do not adequately cover this asset group. However from the survey work and improved work and asset management systems the Company will be able to improve granularity of asset data and improve even further the targeting of investment.

(TEXT REDACTED)

There have been no changes between the draft business plan and final business plan.

AMP6 expenditure is assumed to be the same as AMP5. Clearly when more survey work is carried out and the rehabilitation work is completed during AMP5 a better view can be taken of investment for AMP6.

We are satisfied that the business case for investment is robust.

3.9.5 Sewers Under Railways

An investment is proposed for: (TEXT REDACTED)

- Improvements at sewer crossing locations
- Surveys

(TEXT REDACTED)

The planning objective is cost beneficial to address special risk where the consequences of failure are severe. There is no enhanced standard of service for customers.

The cost benefit analysis shows the investment to be cost beneficial. The process has been reviewed and found to be consistent with the Company

standard methodology, and based on consequences involving injury, external flooding, and cost of failure.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

The survey work carried out has been well documented and has provided a sound basis to identify risk and need, and to develop interventions to address asset failure and reduce the risk of injuries and external flooding.

(TEXT REDACTED), A sample check from data to source was carried out which showed the information to be traceable and reliable.

A review of the site survey reports together with system checks has provided reasonable confidence that the benefits which include reduced risk of injury, external flooding and cost of failure can be realised, based on the proposed investment and outputs.

(TEXT REDACTED)

A review of the optimisation process and cost estimates showed that the Company had taken a consistent approach with no material issues identified.

Delivery of the programme of investment has been reviewed by the Company taking into account the scale and complexity of the work, and implications of having to liaise with third parties. As similar work has been carried out in AMP4 there is reasonable confidence that the programme will be completed in AMP5 and the outputs met.

In AMP4 the Company commenced a comprehensive review of sewers crossing railways due to the severe health and safety consequences associated with asset failure. Improvements to 57 high risk crossings have been carried out within AMP4. There have been no injuries or significant flooding events to date. (TEXT REDACTED)

The forward looking approach for AMP5 takes into account the Company strategy of targeting surveys and remedial works at high risk sites first followed by lower risk sites. The survey work is a rolling programme which will ensure that deterioration and targeting of investment can be optimised.

(TEXT REDACTED)

The changes between the draft business plan and final business plan were negligible with no material issues identified.

AMP6 expenditure is assumed to be similar to AMP5 which is reasonable.

We are satisfied that the business case for investment is robust.

3.9.6 Network Overflows and Outfalls

An investment is proposed for improvements at: (TEXT REDACTED)

- Unsatisfactory Combined Sewer and Storm Sewer Overflows
- Polluted Surface Water Outfalls
- Dual Manholes.

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis. The process has been reviewed and found to be consistent with the Company standard methodology, and based on consequences involving pollution.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

A sample check of data back to source showed the information to be traceable and reliable.

The key benefits associated with this investment include reduced risk of pollutions and internal flooding. The benefits assigned to each of the key outputs and programme of interventions have been determined through a risk assessment process where the chosen interventions are directly linked to risk, need and operational performance measures.

The approach taken has been consistent and from detailed checks no inconsistencies or material issues have been found. On this basis there is reasonable confidence that the benefits in terms of reduced risk are realistic and achievable.

The solutions have been identified on a site specific basis where options have been considered and discussed with the Environment Agency.

(TEXT REDACTED)

The programme and project delivery process has been reviewed and shown to take into account the scale and complexity of work to be implemented. No issues were identified both with the process and sample checks at project level. There is confidence that the investment programme can be delivered and the outputs met.

There is limited historic information on failure to reliably predict future requirements however this has been addressed using targeted site surveys to develop the programme of work for AMP5.

Future work and asset management system improvements will provide better data capture and granularity to enable the Company to improve even further the targeting of investment.

(TEXT REDACTED)

The Company consider that some of the difference is made up by investment in AMP5 that would of been treated as quality enhancement work in AMP4.

Although this goes some way to reducing the gap there still remains a significant difference between AMP4 and AMP5 investment.

However it is difficult to see how the Company could reduce the investment without having to take more risk of pollution and damage to the environment. The peak of investment is the result of a more targeted approach to risk definition and therefore on balance justifiable.

The changes between the draft business plan and final business plan have been reviewed with no material issues.

AMP6 expenditure is assumed to be the same as AMP5, which will be better informed during AMP5 with improved data capture and analytical systems. We are satisfied that the business case for investment is robust.

3.9.7 Sewer Structures

(TEXT REDACTED)

The proposed investment is for:

- Improvements at pipe bridges and sewer bridges
- Improvements for storm tanks
- Reactive maintenance

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis. (TEXT REDACTED)

The process has been reviewed and found to be consistent with the Company standard methodology, and based on consequences involving pollutions, flooding, traffic disruption and injuries.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The key benefits associated with this investment include reduced risk of pollutions, flooding, traffic disruption and injuries.

The benefits assigned to each of the key outputs and programme of interventions have been determined through a risk assessment process where the chosen interventions are directly linked to risk, need and operational performance measures.

The approach taken has been consistent and from detailed checks no inconsistencies or material issues have been found. On this basis there is reasonable confidence that the benefits in terms of reduced risk are realistic and achievable.

(TEXT REDACTED)

The costs and solutions were reviewed at programme level and at project level on a sample basis which showed that the Company had taken a consistent approach with no material issues identified.

The programme and project delivery process has been reviewed and shown to take into account the scale and complexity of work to be implemented.

(TEXT REDACTED)

There is confidence that the investment programme can be delivered and the outputs met.

There is limited historic information on failure to reliably predict future requirements however this has been addressed using targeted site surveys. Future work and asset management system improvements will provide better data capture and granularity to enable the Company to improve even further targeting of investment.

Serviceability is currently stable which should mean that investment in AMP5 should be at similar levels with the exception of any atypical expenditure items.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is assumed to be the same as AMP5 which is reasonable.

We are satisfied that the business case for investment is robust.

3.9.8 Drainage Area Plans and Integrated Urban Drainage

An investment is proposed for:

- Completion of New Stage DAP's, DAP's to Stage 2, and DAP's to Stage 3
- Sewer CCTV work
- In depth sewer monitors

(TEXT REDACTED)

The planning objective is cost effective to support stable serviceability, and which is essential to understand the performance and maintenance requirements for wastewater services.

The methodology used by the Company to develop the Drainage Area Plans and CCTV investment case has been reviewed and found to be thorough, structured and robust.

(TEXT REDACTED)

Information has been gained from the work carried out in AMP4 where the Company has made good progress in establishing a DAP strategy based on the WRC 3 Stage approach, building a model and completing 60 Stage 1 DAP's.

The main benefits associated with the investment are, greater knowledge of the sewerage network, the ability to pro-actively address performance issues linked to flooding, collapses and pollutions together with optimisation of engineering solutions and planning for new development

(TEXT REDACTED)

The Company consider that delivery of the programme of investment is realistic and achievable having gained experience in AMP4.

We are satisfied that the Company has taken a measured approach and confidence exists in delivery of the outputs.

(TEXT REDACTED)

The changes between the draft business plan and final business plan have been reviewed with no material issues identified.

The expenditure for AMP6 is the same as the investment for AMP5 based on DAP work which is reasonable.

We are satisfied that the business case for investment is broadly robust.

Ofwat may wish the Reporter to further assess the case for depth monitors in relation to a) further scrutiny of the cost benefit calculations and b) confirmation of the Company strategy and plan for targeting the installations for non DAP work

3.9.9 Diversions

An investment is proposed for customer led diversions based on: (TEXT REDACTED)

- Notified Work for the 3 major diversion projects
- Emerging requirements

The planning objective is cost effective to meet statutory requirements for third party diversions.

Cost benefit analysis has not been used as the investment does not require such analysis to be undertaken.

The processes and planning systems used to identify and develop work for diversions has been reviewed and found to be structured and robust.

(TEXT REDACTED)

The key benefit associated with this investment is to meet customer needs in the most efficient and cost effective manner.

(TEXT REDACTED)

The capital delivery process also considers deliverability of projects taking into account any specific issues of complexity and liaison with third parties.

The experience gained within AMP4 and Company expertise places the Company in a good position for local liaison with councils and other organisations to enable projects to be delivered within realistic timescales. The sound planning and implementation processes provide confidence that the Company can meet their obligations for diversions at least cost.

(TEXT REDACTED)

We have not reviewed the 'X' STW diversion project as the Company provided details of this project late in the process. We cannot at this point in time confirm whether the business case for investment is robust, however Ofwat may wish the Reporter to review the case during the query period if required. (TEXT REDACTED)

AMP6 expenditure is assumed to be the same as AMP5, which is the best estimate that the Company can give in the absence of more definitive information on AMP6 needs.

The changes since the DBP have been reviewed with no material issues identified.

We are satisfied that the business case for investment is largely robust, however Ofwat may wish the Reporter to review the investment for 'X' STW to complete the review of this asset group and report our findings during the query period.

3.9.10 Sewerage Infrastructure Outputs

We have found that the Company has reasonably interpreted the guidance from Ofwat for setting reference levels and control limits.

We are satisfied with the predictions for all other areas, which reflect the benefits of the proposed investment, with no material issues identified.

3.10 Sewerage Non-Infrastructure

3.10.1 Summary of Sewerage Non Infrastructure Capital Maintenance Plan

The scope of investment covers the following key areas:

- Maintaining stable serviceability
- Special risks
- New capital maintenance

(TEXT REDACTED)

Serviceability Investment

Investment in AMP4 assumes restoration of stable serviceability, with AMP5 investment based on maintaining stable serviceability.

The investment in AMP4 is higher than AMP5 and may be attributable to the additional cost in seeking restoration of stable serviceability.

(TEXT REDACTED)

New Capital Maintenance Investment

We are satisfied that items including SCADA, Sludge Powered Generators, Carbon Mitigation and Growth/Quality are atypical representing significant expenditure.

For the remaining items we have not undertaken a detailed assessment to ascertain their status; however this aspect could be reviewed during the query period if appropriate.

(TEXT REDACTED)

Expenditure and Forecasts for AMP5

AMP 5 Investment

We found that there are no areas of material concern for the proposed investment.

DBP Changes

The changes since the DBP have been reviewed with no material issues identified.

(TEXT REDACTED)

Reference Levels and Control Limits

The Company submission has been reviewed with no material issues, with changes highlighted below.

STW Non Compliance

The Company has retained the changed the reference levels and control limits in line with Ofwat's CIS feedback.

STW Non Compliance – Population Equivalent

There has been no change since the DBP.

Unplanned Maintenance

The Company since the DBP has changed the reference levels and control limits based on improvements associated with recording and reporting.

Activity Summary

The following outputs detailed in the Company submission highlighting changes since the DBP have been reviewed with no material issues identified.

- Refurbishment or new sewage treatment works = 42
- Refurbished or new sludge treatment centres = 11
- Refurbished or new sewage pumping stations = 21

Cost Benefit Analysis

(TEXT REDACTED)

The work carried out in this area has been checked on a sample basis for the asset groups with no material issues identified.

Ofwat Challenges on Capital Incentive Scheme (and HMS response)

1. The AMA scoring for supply infra based on Ofwat's CIS Draft Report in December which resulted in a challenge to the exposed component of the DBP (less exceptional items).

Areas highlighted as uncertainties included maturity of asset planning approach and embedding with operations, and overall assessment of risk.

The Company asset planning approach has been reviewed and whilst this area is developing it has already reached through the development of the AMP5 programme a good level of maturity to ensure the investment processes are sound and structured.

It has also been evident through the audit work that there has been considerable involvement with operations to not only develop plans but to validate risk, needs, interventions and impact on operational performance measures.

The Company has also carried out extensive modelling and analysis work to identify risk in terms of probability of failure and consequence, and to scale tolerability for health and safety.

The planning has been extensive with considerable validation carried out within the operations business to help target areas of greatest risk of failure.

This work coupled with cost benefit analysis shows a balanced approach has been taken to investment, with a programme which is realistic and achievable in terms of delivering the benefits and outputs.

2. *TEXT REDACTED*

3. ***Transfer “Carbon Mitigation” expenditure from quality to capital maintenance ensuring that each component of the proposal is costed and properly allocated.***

Please refer to the Reporters separate report on Carbon Mitigation.

Our responses to Thames Water’s “Annex 10” response

4. ***Sewerage Non Infrastructure – please explain in your FBP the progress made in applying asset reliability models, how much the Company is using FMEA or other investment processes and the extent each is driving assessment.***

The Company has continued to use the asset reliability models for assessing asset performance, in combination with the FMEA studies to provide a structured and thorough approach to risk assessment and identification of needs.

5. ***Sludge Treatment – Increase for sludge due to comprehensive strategy review.***

The findings from our review of the Company sludge strategy are set out in B5.

6. *TEXT REDACTED*

7. ***Sewage Treatment – no mention of Ofwat’s sub threshold indicators or a version of it, to inform the link between FMEA and serviceability.***

The Company has used numerous parameters to measure performance as part of their integrated “dashboard” approach to asset management. Monitoring these parameters allows the Company to instigate corrective control action linked with outcomes from FMEA studies to plan investment for serviceability.

Serviceability – Historical Analysis

During the early part of AMP4 Ofwat's assessment of serviceability for sewerage non infrastructure was deteriorating.

Serviceability action plans have been provided by the Company every six months. These have been scrutinised by the reporter and the overall findings have been that progress is being made by the Company.

Ofwat have retained serviceability assessment as "marginal" until sustained performance can be shown.

The Company has used the action plans to implement a robust turnaround of improved serviceability over the last two years.

There are a number of key elements have helped the Company achieve stable serviceability, these are:

- Providing training for staff and recruiting additional resources
- Capturing more operational data to monitor and manage performance
- Address shortfalls in treatment capacity

The approach taken by the Company to drive through improvements is sustainable and with continued focus serviceability should be restored and maintained throughout AMP4.

3.10.2 Sewage Treatment Works and Sludge Centres

An investment is proposed for: (TEXT REDACTED)

- Refurbishment of STW's with a PE > 50,000
- Refurbishment of STW's with a PE < 50,000
- Refurbishment of sludge powered generators
- Improvements for high voltage assets
- Production of odour management plans
- Reactive maintenance
- Proportional allocation for growth and quality projects
- * Carbon mitigation

* Audit findings for carbon mitigation are reported separately under the auditors report for carbon mitigation

The planning objective is cost effective for stable serviceability, and to maintain compliance with sludge HACCP requirements.

The Company has carried out cost benefit analysis (excluding reactive maintenance and odour management plans) (TEXT REDACTED)

The cost benefit analysis has been carried out in accordance with the Company standard methodology, taking into account effluent consent failures, injuries, and flooding for sewage treatment works and avoided costs for sludge.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust.

(TEXT REDACTED)

The key benefits associated with this investment include reduced risk of: effluent compliance failure, flooding, injuries, pollution and odour complaints. These benefits were tracked back to the risk assessment, with links to needs, interventions and operational performance measures.

(TEXT REDACTED)

Risk assessment was carried out using the FMEA process which was structured, thorough and well executed. This work was pivotal in being able to understand the level of risk faced across wastewater non infrastructure assets.

(TEXT REDACTED)

A review of the cost processes and detailed checks uncovered no inconsistencies and no material issues.

The scale of work to be delivered in AMP5 is not dissimilar to that in AMP4. The main difference in content is the refurbishment of the sludge powered generators which requires specialist contractors to undertake the work.

(TEXT REDACTED)

Overall it may be concluded that the Company has taken a reasonable approach in balancing risk against investment with any further reductions in investment only putting the Company at greater risk of poor performance.

The changes between the draft business plan and final business plan have been reviewed with no material issues identified.

The increase in AMP6 expenditure is based on having to refurbish assets as first time major refurbishment. Whilst this is acknowledged the case will need to be more robustly developed for AMP6.

We are satisfied that the business case for investment is robust.

3.10.3 Pumping Stations

An investment is proposed for: (TEXT REDACTED)

- Refurbishment of sewage pumping stations including critical sites
- Improvements at emergency overflows
- Reactive maintenance.

The planning objective is cost effective for stable serviceability however the Company has also carried out cost benefit analysis for sewage pumping station refurbishment. (TEXT REDACTED)

The cost benefit analysis that has been carried out is consistent with the Company standard methodology, taking into account external/internal flooding, pollutions, injuries, and traffic disruption.

The processes and planning systems used to develop the investment case have been scrutinised and have found to be thorough, structured and robust. Information has been gathered from a number of reliable sources which was traceable when checked at project level.

The key benefits associated with this investment include reduced risk of pollutions, external flooding, injuries and traffic disruption.

(TEXT REDACTED)

The programme of work includes similar work to AMP4, with no complex projects. The Company are confident the programme can be delivered based on AMP4 experience. There is confidence that the investment programme can be delivered and the outputs met.

The changes between the draft business plan and final business plan have been reviewed, with no material issues identified.

AMP6 expenditure is assumed to be the same as AMP5, which is reasonable.

We are satisfied that the business case investment is robust.

3.10.4 Research and Development - please refer to separate Research and Development Report

3.10.5 SCADA - please refer to separate Research and Development Report

3.10.6 Base Service Output Projections

The following commentary set out our opinion on the Company proposals for six key performance indicators.

We have found that the Company has reasonably interpreted the guidance from Ofwat for setting reference levels and control limits.

We also consider that the predictions reflect the proposed investment, with no material issues identified.

4. Commentary on Tables

The following commentaries highlight areas of clarification that were sought from the Company to address uncertainties from the Tables and Table Commentaries. The Company responses provided the necessary clarification with no material issues identified.

4.1 B3.1 Water Service – Base Service Output Projections

4.1.1 Line 10 - % Mean Zonal Compliance with PCV for Lead – please can you provide details of calculations to arrive at 99.13% for 2014/2015?

Company Response: We have already provided a detailed commentary in the line commentary for Table B3.1. Note Table B3.1 includes a typographical error. The third to last paragraph should say 99.13% not 99.19%. We are happy to provide information on the calculation but it will need a face-to-face meeting.

Reporter Response: We note the change, and will follow up information on the calculation subject to Ofwat agreement to undertake this during the business plan query period.

4.1.2 Lines 14 to 19 – DG6,7,8,9 – The Company has confirmed that the performance levels for 2014/2015 against these indicators are realistic and take into account the potential impact of events outside their control.

Company Response: Full details of how the performance levels have been set are detailed in section B6.

Reporters Response: B6 is being reviewed separately with similar interest on why the Company has decided to take a more cautious and less

challenging approach to performance especially against a background of increased investment.

4.2 B3.2 Sewerage Service – Base Service Output Projections

4.2.1 Line 8 – Flooding Other Causes – Can the Company please confirm whether the benefits from SCADA investment associated with the performance for 2014/15 have been taken into account.

Company Response: The Scada investment is assumed to reduce other causes internal flooding at 6 properties in 2014-15. This is factored into our projection of x properties in Table B3.2.

Reporter Response: The feedback is acknowledged, with no further action required.

4.2.2 Line 14 Pollutions Cat 1 & 2 – Can the Company please confirm whether there are any recognisable reasons for the 2008/09 improved performance?

Company Response: We audit all category 1, 2 and 3 pollution incidents on a monthly basis to determine the root cause for the incidents. This information is then sent to each Operational team to review the root cause of the incidents in their area and develop strategies to reduce their number. In addition, License to Operate (LTO) training (given to our contractors to ensure that they understand the risk of pollution incidents and work in a manner to reduce this risk as far as possible) has been reviewed to include competency testing.

The LTO programme was rolled out to all our Contractors by the end of February 2008 with a continuous refresher programme set up for new starters. While these initiatives have contributed to our excellent performance in 2008-09, we believe that we have had an atypically good year and that performance will revert to a level nearer historic levels next year.

Reporter Response: The feedback is acknowledged, with no further action required.

4.2.3 Line 15 Pollutions Cat 3 and Line 16 Pollutions Cat 1, 2, 3 Infra Assets – We are not confident that the level of pollution reduction from SCADA can be achieved by 2014/15. The Company is challenged to provide robust evidence that SCADA can deliver the improved performance.

Company Response: x depth monitors will be installed within the network (600 at CSO's and outfalls) together with x for pumping stations. A proportion of the network monitors will be used for the DAP work. The approach has

been shown to be cost effective and cost beneficial. The predicted reduction in pollution events is based on our experience and is pragmatic.

Reporter Response: Taking into account the widespread use of monitors and with appropriate targeting there is reasonable confidence that pollutions will be reduced.

4.2.4 Line 19 % STW's Non Compliance – The performance for 2014/2015 is identified as 1.13% - this should be 1.12% to be consistent with B3.

4.2.5 Lines 19, 21, 22, and 24 STW's Non Compliance/Breach – The Company is asked to confirm whether the benefits of installing effluent monitoring at STW's under the SCADA investment has been taken into account, and what evidence is there to justify the improved performance by 2014/2015.

Company Response: The Company has x works less than 50,000 PE at risk of failure in AMP5 (as confirmed in B3.5 pages 53 and 54). Scada investment is one of our key management actions to manage this risk.

The improved performance for LUT consents is not correct, it is a typographical error, see comments on 4.2.6 below.

4.2.6 Please confirm that the outputs in Table B3.2 are consistent with outputs in A3.

Company Response: This is confirmed but with the following typographical errors identified. In Table B3.2 line 22, the base level of performance in 2014-15 should be 0.17%, not 0.00%. This is a typographical error. The same error applies to Table A3, line 14.

Reporter Response: The above errors are noted, the case for effluent monitoring having been assessed within the SCADA case with no material issues identified.

4.3 Table B3.5 Water Service - Base Capital Maintenance Expenditure Projections (Infrastructure)

4.3.1 Line 1 – Can the Company please reconcile the - £x m highlighted in the table commentary with the -£x m highlighted in B3.

Company Response: The -£x m in the commentary plus the fixed overhead adjustment of £x m also in the table commentary gives the -£x m.

Reporter Response: The feedback is acknowledged, with no further action required.

4.3.2 Line 12 Grants and Capital Contributions – Can the Company please explain the changes in capital grants and contributions?

Company Response: The grants and contributions are the income recoverable from the diversions projects.

Reporter Response: The feedback is acknowledged, with no further action required.

4.4 Table B3.6 Water Service - Base Capital Maintenance

Expenditure Projections (Non Infrastructure)

Line 1 – Can the Company please reconcile the - £x m highlighted in the table commentary with the +£x m highlighted in B3.

Company Response: The -£x m in the commentary plus the fixed overhead adjustment of £x m also in the table commentary gives the +£x m.

Reporter Response: The feedback is acknowledged, with no further action required.

4.5 Table B3.7 Sewerage Service - Base Capital Maintenance

Expenditure Projections (Infrastructure)

4.5.1 Line 1 – Can the Company please reconcile the - £x m highlighted in the table commentary with the -£x m highlighted in B3.

Company response: The -£x m in the commentary plus the fixed overhead adjustment of £x m also in the table commentary gives the -£x m.

Reporter Response: The feedback is acknowledged, with no further action required.

4.5.2 Line 12 Grants and Capital Contributions – Can the Company please explain the changes in capital grants and contributions?

Company Response: The grants and contributions are the income recoverable from the diversions projects.

Reporter Response: The feedback is acknowledged, with no further action required.

4.6 Table B3.8 Sewerage Service - Base Capital Maintenance

Expenditure Projections (Non Infrastructure)

4.6.1 Line 3 – Can the Company please reconcile the - £x m highlighted in the table commentary with the -£x m highlighted in B3.

Company Response: The -£x m in the commentary plus the fixed overhead adjustment of £x m also in the table commentary gives the -£x m.

4.6.2 Line 14 Grants and Capital Contributions – Can the Company please explain the changes in capital grants and contributions?

Company Response: The grants and contributions are the income recoverable from the 'X' STW diversion project.

Reporter Response: The feedback is acknowledged, with no further action required.

4.7 Table A4 – Water Service – Key Activity Projections (Company Reporting threshold > £500K)

We found the outputs were consistent with B3 for costs > £500k.

The Company was challenged to demonstrate the process and activity calculations for offices, labs, depots and workshops, which were confirmed and found to be reasonable.

The costs were sample checked with no material issues identified and based on the central costs held in the Company reporting database.

4.8 Table A5 – Sewerage Service – Key Activity Projections (Company Reporting threshold > £500K)

We found the outputs were consistent with B3 for costs > £500k.

The Company was challenged to demonstrate the process and activity calculations for offices, labs, depots and workshops, which were confirmed and found to be reasonable.

The costs were sample checked with no material issues identified and based on the central costs held in the Company reporting database.

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