Integrated Delivery to Provide Stakeholder Benefit – Anglian Water Integrated Urban Drainage Framework

1.0 Introduction

Traditionally urban drainage modelling projects have been undertaken at a catchment level with defined roles and responsibilities between client, consultant and survey contractors. In addition much of the valuable data obtained and stored within hydraulic models is not always shared with the wider business. In order to provide increased efficiency and value within our urban drainage delivery we need to change our culture and approach to delivery and stakeholder engagement.

In AMP6 Anglian Water has adopted a very forward looking approach for their urban drainage modelling programme. The key objectives of the programme are to:

- Develop 100% coverage for Urban Drainage Models, to include all surface water sewers.
- Leave a legacy of tools, rigor and robustness of processes and procedures.
- Deliver models to an appropriate level of confidence.
- Embody and employ the principle of “One Version of the Truth”.
- Work collaboratively with all to achieve model build programme and individual business unit needs.
- Ensure best value for the business and outperform working collaboratively with all partners and within the business.

The delivery mechanism comprises an integrated “One Team” approach across the modelling and surveying teams. This requires a change in culture and relationships within both the client and delivery teams to bring out added value behaviours that provide true benefits within the organisations. This can only be achieved through a collaborative and trusting delivery structure, openness to changes in procedures to allow continuous improvement and encourage innovation.

2.0 Collaborative Delivery Structure

Anglian Water’s desire for an alternative approach was set out from the initial procurement stage, seeking an integrated delivery supplier capable of providing the combination of established local onshore and offshore modelling capacity and in-house surveying teams. In addition, key roles such as the client Project Management and a new role, the Model Controller, were to be provided as secondments into the Anglian Water team.

The selected delivery partner comprised an RPS-Atkins team delivering an equal share of the modelling work, with RPS and associated supply chain undertaking the asset and flow surveys (Figure 1).

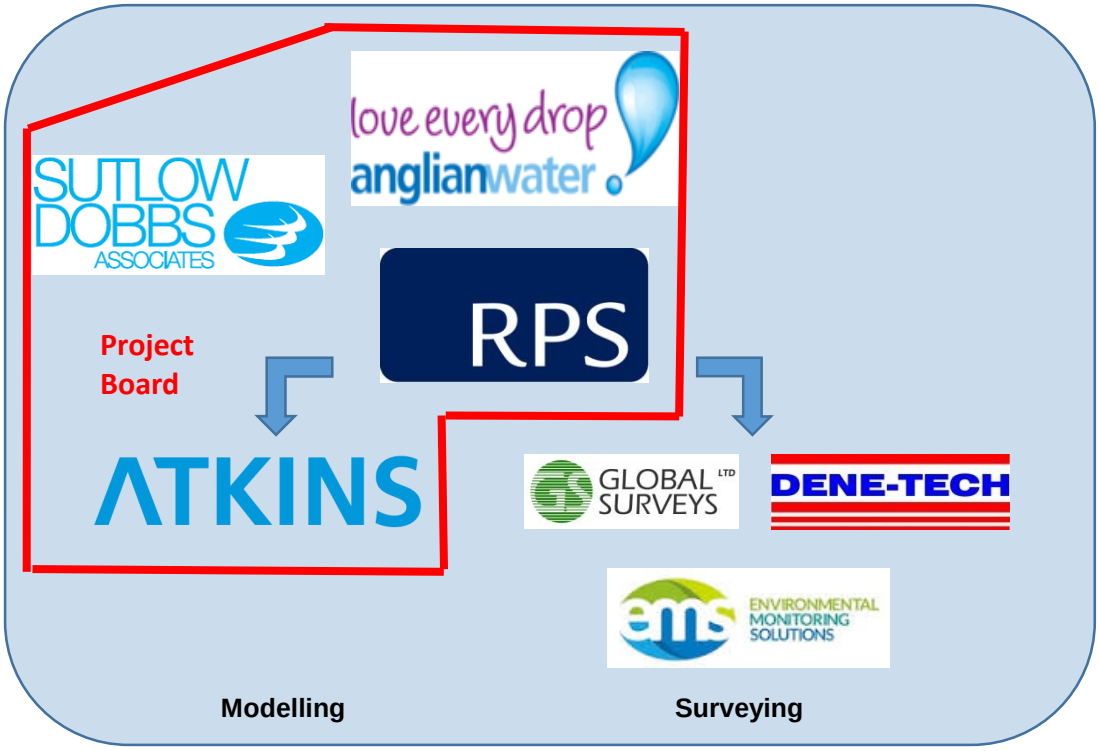

Figure 1 – Integrated Urban Drainage Framework team

Opportunities for efficiencies through integration, collaboration, customer focus and innovation were identified through the award to a single supplier, allowing more consistent models and best value to customers to be delivered. Specific focus areas identified included:

- Removing the modeller / surveyor conflict within a truly integrated team.
- Improving the data quality.
- Improving the co-ordination and communication within the delivery.
- Improving collaboration and innovation with an integrated framework Board/management team.
- Improved resource planning to allow balance of staff and equipment, with flexibility where required.
- Removing duplication of activities and optimising the programme.

The collaborative behaviours are reinforced from the top via a framework Board on which the key parties are all represented (see Figure 1 above). The Board Terms of Reference comprise:

- Programme and phasing of project delivery.
- Agreeing outputs and expenditure.
- Balancing budget with model confidence outputs.
- Managing and mitigating risks.
- Delivering added value to the business.
- Ensuring One Version of the Truth.
- Providing challenge to all aspects of the project
- Agreeing changes and understanding the impact of specification amendments.

Recognising the principle of the right person for the right job, the tender negotiations and behavioural assessment resulted in a split client Project Management role. This has allowed a shared role in programme and project management aspects between Anglian Water and

delivery team needs, with shared programme, spend profile and reporting, whilst harnessing the strengths of two individuals to the benefit of the overall project (Figure 2).

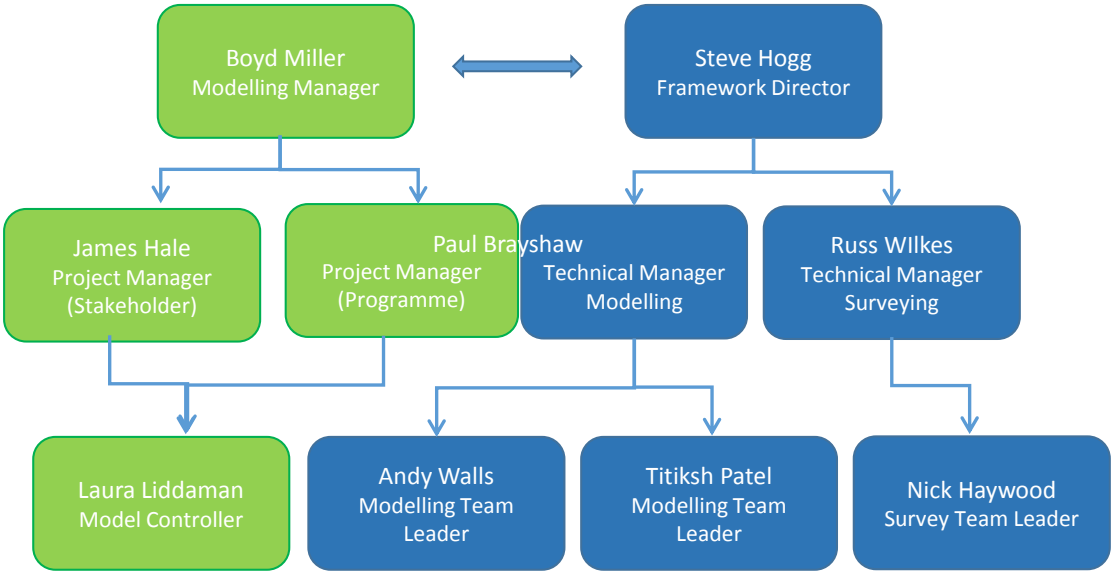

Figure 2 – Delivery and Governance Roles

The key to establishing relationships and building a high performing team is the individuals within the programme. Workshops between Anglian Water, RPS, Atkins and Sutlow Dobbs staff have been held to build social capital, agree the defined principles of the programme, the expectations of stakeholders, programme management and technical delivery teams, and the roles and responsibilities of each. In addition Myers Briggs types were determined and understood within the team to help shape and refine processes, and progress along the Tuckman Curve monitored as part of a KPI. RACI matrices have then been developed for governance and communication to reflect the preferences of individuals and hence ensure communication is effective by using the most appropriate media and format.

The structure therefore promotes a change in behaviours and delivery culture and optimises the integrated delivery team by:

- Managing risk and opportunity through understanding catchment drivers and model confidence.
- Consortium board meetings.
- Development and implementation of rigorous quality assurance processes with defined standards, defined responsibilities and full visibility of progress and auditability.

3.0 Joint Programming

Joint programme ownership provides the basis for efficient delivery by allowing the resource and delivery programme to be optimised whilst also being able to adapt to Anglian Water stakeholder project needs. The reimbursement process also encourages an integrated, proactive and efficient approach, recognising the unprecedented scale and opportunity associated with the scope.

As payment for modelling work is based on a rate per item, such as a modelled asset (sewer length, pumping station, complex CSO), a historical verification point, flow monitor or telemetry verification point and catchment reporting, many of the model build processes are considered at a “batch” level for efficiency. A typical efficiency curve is shown in Figure 3.

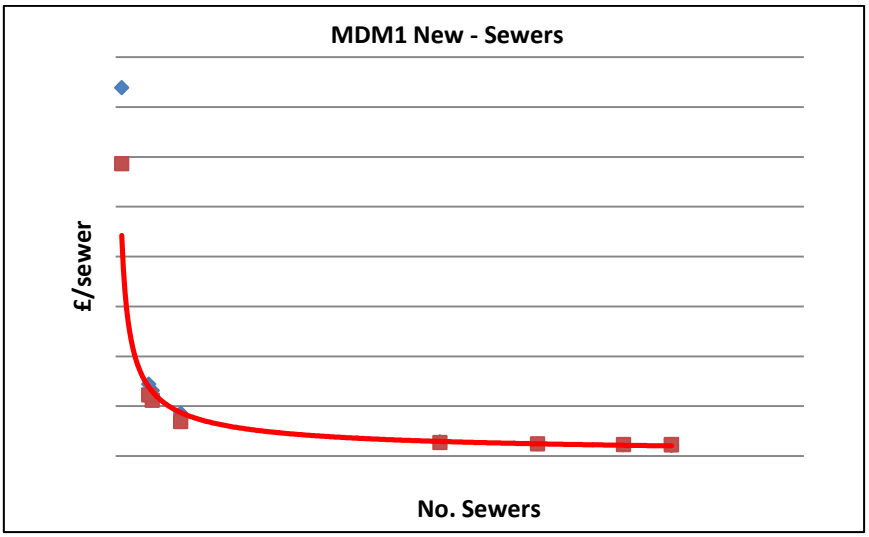

Figure 3 – Batching efficiency curve

The programme was developed to allow the work to provide benefit to other AMP6 programme needs by aligning with internal deadlines where possible. Much of the "unknown" internal needs were considered to have been driven through developer impact assessments hence delivering complete coverage of the Anglian Water region with models of limited initial confidence delivered through the MDM1 stage was prioritised. This also allowed an extended period to be programmed for the asset and flow survey work, which both allows for resource smoothing (during the anticipated AMP6 peak) and reduces the risks associated with lack of suitable rainfall during flow surveys.

This freedom to develop the approach and timeline, combined with a proactive and ongoing review of spend against budget, will allow the team to maximise model confidence against the investment cost and programme.

An example of where the integrated programme is allowing efficiencies to be realised is in the modelling – surveying team interface. Traditionally, the modelling consultant may undertake site selection activities and enabling works that the survey contractor is better placed to undertake as part of his programming. This will then be subject to a formal and specific review with the client organisation to agree and potentially procure and programme the surveys through term contracts. Once on site, the flow survey contractor will be reviewing the data (either in real time or as part of weekly downloads) before providing that same event data to the modelling consultant who undertakes a further data quality review and assurance before reaching recommendations. These recommendations may then require ratification by the client organisation before any monitors are removed, leading to delays in extraction.

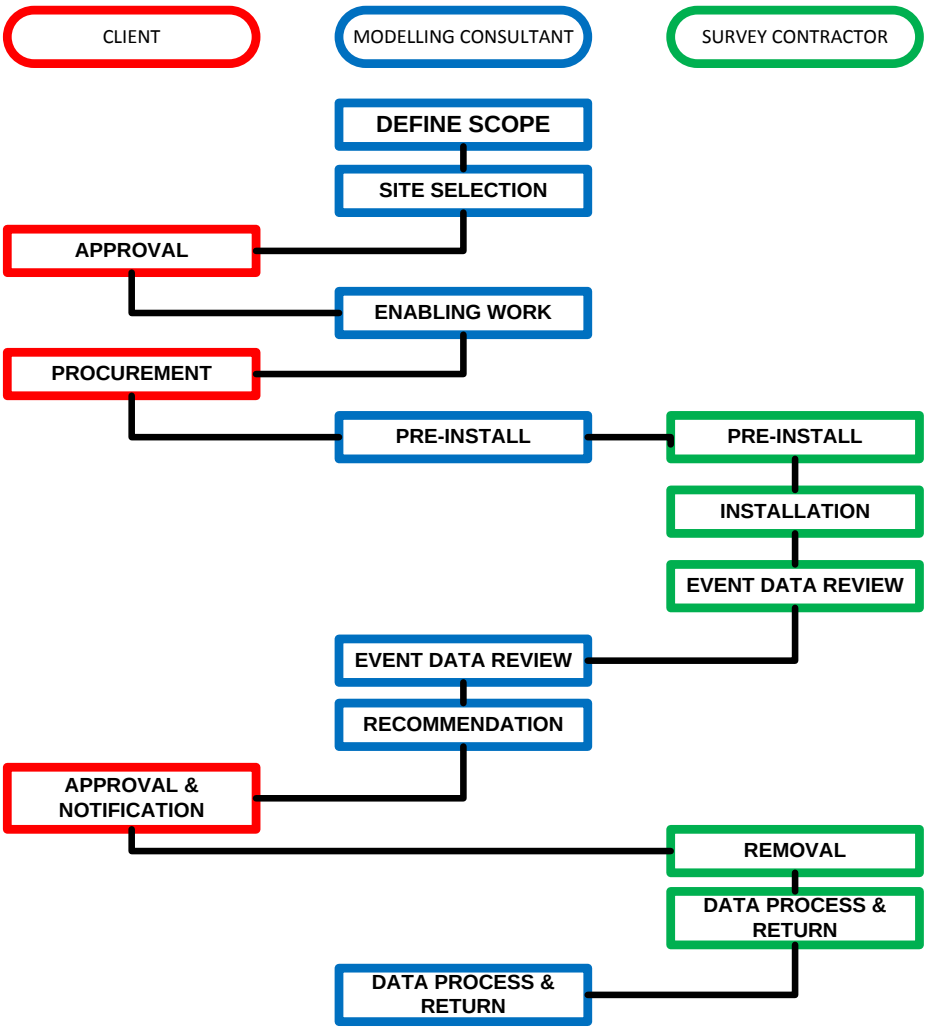

Figure 4 – Traditional Model-Survey Interfaces

With an integrated programme there are opportunities to remove duplication associated with site selection and enabling works, whilst foresight of the programme will allow faster mobilisation and installation of monitors. Maximising the use of telemetered monitors will allow proactive maintenance (e.g. in advance of forecast rainfall) and joint real time review, so poor performing sites can be identified, discussed and actions agreed within hours rather than days. Similarly the process for reviewing the overall equipment performance, occurrence of events and assurance of data can be undertaken very rapidly following rainfall, based on an agreed removal decision matrix. This allows costs to be minimised through programme reduction and the saving of up to two weeks in the programme.

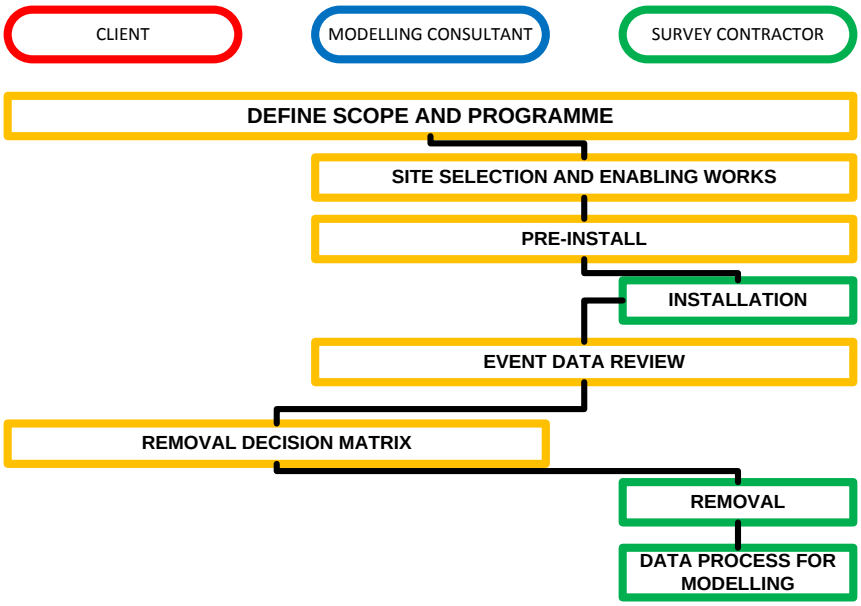

Figure 5 – Integrated Model-Survey Interfaces

Jointly programming work is therefore enabling us to:

- Plan individual surveys together to enable the surveyor planner to better understand the objectives. This in turn leads to enhanced collaboration with the modeller to identify potential problems with data collection, and work together to mitigate them and obtain the required data as efficiently as possible. Using a shared IT platform for data transfer will reduce time and costs involved in survey planning.
- Delivering surveys together, through real time review of telemetered data collection or by training modelling staff to be part of survey teams for key surveys enables modellers to attend site and guide surveys without adding unnecessary cost to the surveys. It also enables real time decisions to be made if data collection problems arise such as monitor ragging, manhole UTG, UTL etc.
- Jointly reviewing data will increase the data handover process enabling data to get into models more quickly. For example, joint assessment of telemetered Flow Survey data will resulted in early identification of rainfall events and permitted quick terminations resulting in reduced survey costs and savings to programme. Additionally this allows pro-active maintenance of monitors in advance of forecast rainfall.

This streamlined process is also important commercially as the payment is based upon the proactive management of equipment to ensure the quality of the flow survey data is “good”. This, combined with other measures such as the definition of hydraulic zones for the assessment of rainfall spatial distribution, should mitigate the risk of flow survey extension due to “poor” data. It also removes any potential conflict between the modelling and surveying teams regarding data quality at verification. Fundamentally, obtaining “good” flow through proactive management leads to better verification for the same effort, and increased overall confidence in the model stock.

4.0 Leveraging Value from Data

A core principle of the programme is that of “One Version of the Truth”, namely the prevention of duplication of data sets to remove replication, repetition of work and dilution of value within the business. The team have actively sought to understand data ownership, information flow paths and potential added value both from the wider internal business and feeding back into it from the modelling work. This has been facilitated through the specific remit of an Anglian

Water Project Management role to actively promote the Integrated Urban Drainage programme internally, and identify and leverage value both to and from the stakeholders. This has increased the awareness and support of stakeholders and built a large number of advocates for the programme across the Anglian Water business.

A primary example of this relates to the corporate sewer records. Traditionally, hydraulic models are initially based on the asset data exported from WaSCo GIS records. The asset build process then infers and interpolates data where gaps exist to provide the complete and connected network for the hydraulic demands to be applied to. Where asset surveys are undertaken the additional information is fed into the model, and into asset management systems. However this complete, confidence flagged, data set created in the model needs to be transferred back to the corporate GIS to realise the full value of the data – thereby informing Operations staff, term contractors and the like of key information to support H&S RAMS including likely manhole depth, diameter etc, where previously there was nothing.

The proposed approach being adopted for the IUD aims to address these points by identifying the key milestone points to return data to the corporate GIS, whilst also providing flexibility for future business changes in the approach (Figure 6).

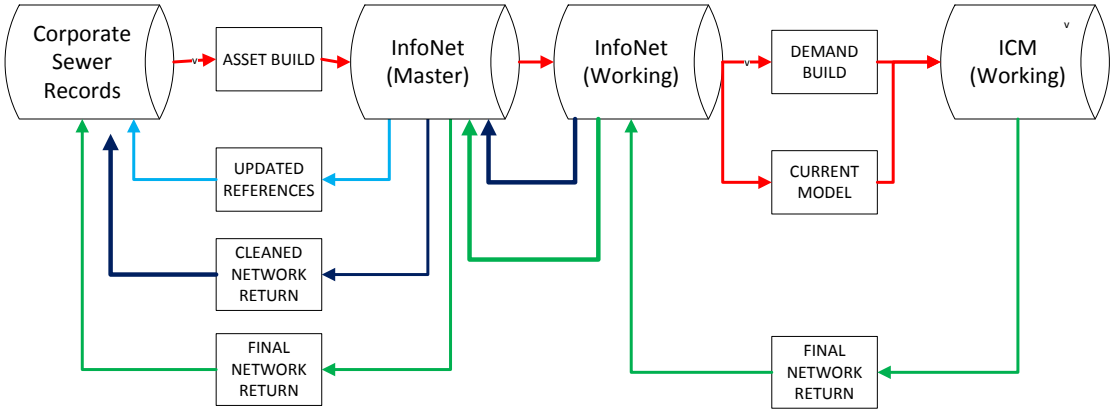

Figure 6 – Data flow to and from corporate and modelling systems

Another example relates to Trade Effluent discharges. Discussions with stakeholders identified that, whilst each consented discharge had a National Grid Reference, there was no linkage to the receiving manhole. However this was an aspiration that the business was keen to undertake to that pollution source tracing could be more readily undertaken. The modelling team is completing this task as part of the demand build so will be providing the draining node reference back to the Trade Effluent team to inform their database moving forwards, adding to the value of the modelling process for wider stakeholders in Anglian Water.

5.0 Integrated Model Delivery

The delivery process comprises a three stage route based on Model Delivery Milestones (MDM) as shown in Figure 7.

- MDM1 comprises a specification compliant new model built from the latest corporate asset data, supplemented by historic model elements where available. The demand build is fully updated with latest domestic and non-residential contributions and runoff surfaces assigned using an enhanced desktop process. This provides a low confidence model.
- MDM2 improves the model confidence through additional asset and flow surveys, and flow, telemetry and historic verification.
- MDM3 comprises the creation of Current and Future models, setting up simulations and reporting.

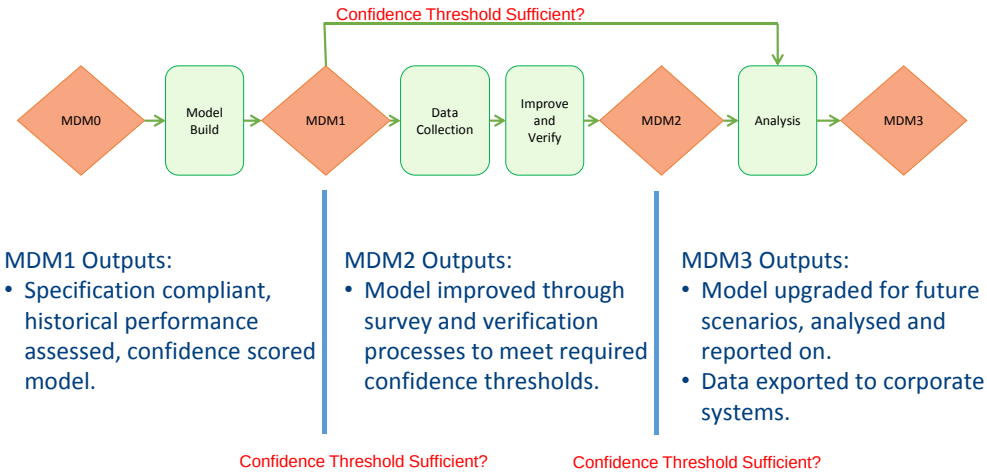

Figure 7 – Model Delivery Milestone Process

All catchments will pass through MDM1 and MDM3: those with additional drivers requiring enhanced model confidence will also pass through MDM2. Payment is made at the end of each MDM to incentivise completion and output delivery.

Quality is being assured through the independent assurance role in order to address any potential conflicts of interest in the role. This role is far from a traditional auditor, with collaborative participation in process brainstorming, specification deviations or clarifications and full and frank lessons learnt sessions.

The efficiency potential provided by the extensive and one-off nature of the project, in the construction of hydraulic models for the entire Anglian Water region, is reflected both in the opportunity to the delivery team, through the development of tools and techniques as part of a continuous improvement culture, and in the value to Anglian Water stakeholders. The modelling aspects are subjected to an efficiency ratchet which reduces year on year and hence incentivises the optimisation of processes and learning curves. This in turn helps to ensure consistency and accuracy in the delivery, with tools providing legacy benefit for future model maintenance activities.

The collaborative culture has allowed the flexibility to challenge and change the scope through open discussion of defined specification procedures, with numerous deviations, clarifications and sub-procedures developed and agreed. With work currently only within the MDM1 stage, examples include:

- Challenging the traditional short term flow monitoring approach and associated weather risk through pilot studies considering merging of rainfall radar and raingauge data to support long term flow data, and the impact on verification and model confidence if a lower number of “critical” monitors are used for longer periods.
- Modelling non-residential flows based on property building size (based on OS Mastermap) rather than type.
- Balancing the business need to represent all former Section 24 sewers in the models against the technical risks associated with large numbers of small diameter, short and dry pipes.
- Optimising the use of InfoNet and ICM for the asset and demand build aspects.
- Streamlining the approach to quality, reporting, meetings and approvals.

This in turn is shaping the processes and tools considered, developed or in-hand which include:

- Processes such as non-residential demand have been processed on a one-off basis at a global (Anglian Water wide) level for efficiency.
- Development of SQLs to facilitate clean-up of former Section 24 sewer data has been undertaken.
- The use of the demand build outputs to semi-automate the population of unsurveyed pumping station data around the Anglian Water specification requirements.
- Consideration of processes to extract and manipulate multiple point telemetry data to support the verification process.
- Refined runoff surface allocation using a contributing area tool (CAT) to define each property to a drainage type (i.e. soakaway, surface water sewer, combined sewer, foul sewer) using a wide range of data sources including OS OpenRoad, customer billing surface water rebate data, property age information and existing surface information. This is being further developed to allow the extrapolation of high confidence data into surrounding locations with similar attributes with a lower confidence.

Legacy use is being considered for each of the tools and processed considered to assist with future model maintenance activities. This helps to drive the wider benefits of the integrated modelling and surveying team into the Anglian Water business.

6.0 Conclusion

Anglian Water's approach to the procurement and delivery of their AMP6 Integrated Urban Drainage framework is providing a truly unique and exciting project. Whilst it is still early days in the overall programme, an open and collaborative delivery structure and culture is being realised through the:

- Opportunity to challenge specification procedures and propose alternatives that allow more efficient working and benefits to the ultimate outcome, working openly with an independent assurance partner.
- Timely review and approval of any specification deviations or clarifications with stakeholders.
- Programme flexibility to align with internal Anglian Water stakeholder deadlines whist also seeking to balance resources and equipment over the full period.
- Open communication channels associated with shared delivery roles representing client and delivery team.
- True no blame culture.

This is being enabled through a delivery model that is encouraging and fostering a change in behaviours and culture to a collaborative a trusting "One Team" approach. This in turn is driving relationships to seek efficiencies, procedural improvements and innovation through challenge and continuous improvement to deliver the best value hydraulic model stock and wider stakeholder benefit for Anglian Water.

Paul Brayshaw, paul.brayshaw@atkinsglobal.com
Russ Wilkes, russ.wilkes@rpsgroup.com