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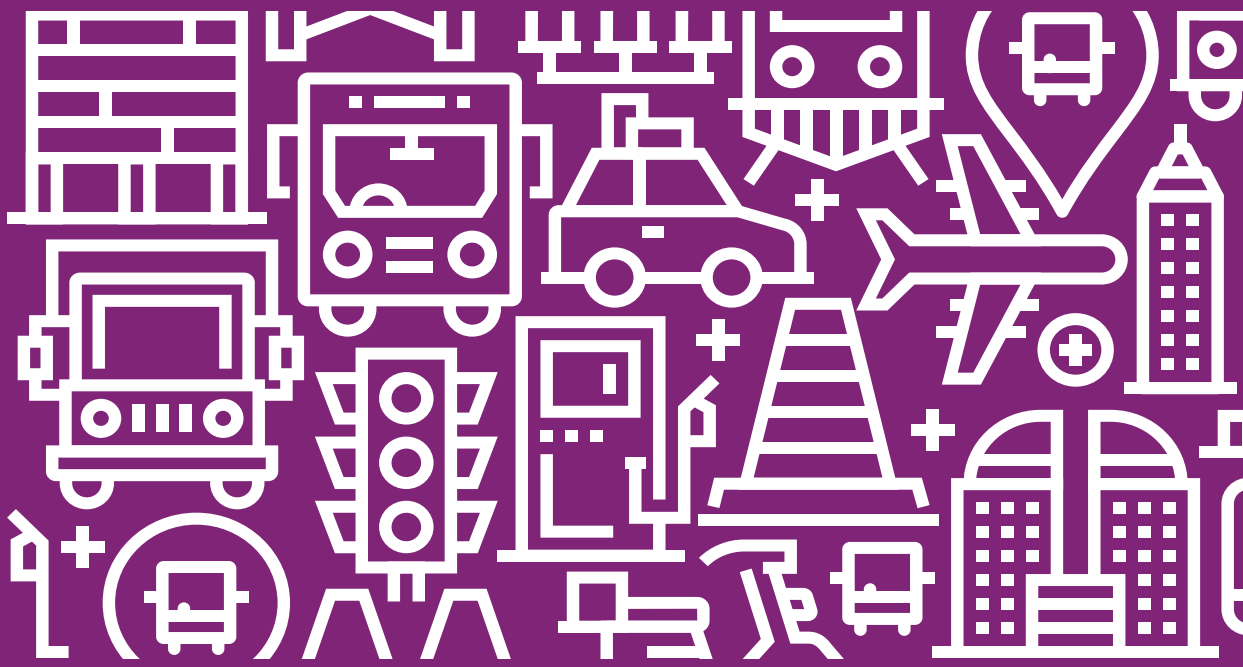

THE COLLABORATION HANDBOOK

A guide to the coordinated delivery of utility infrastructure

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In 2018 a cross-functional team from London Borough of Croydon, Thames Water, SGN, Fluxx and Atkins asked themselves a big question: how can we coordinate the delivery of infrastructure, ultimately reducing the number of highway disruptions?

The answer: by working differently. By thinking big, starting small and proving that it can be done.

The Collaboration Handbook is that team's story of identifying and piloting a collaborative scheme of works as well as a practical guide for teams in local authorities and utilities. A real-life guide for how to identify, appraise and set-up collaborative schemes of work.

If you're interested in the savings and other benefits of collaborative works **see chapter 2.5 and chapter 5**.

If you work in capital works in a utility **we suggest chapters 2, 3, 4 and 5**.

If you work in infrastructure planning/growth and development **we suggest chapters 4.4 and 6**.

If you work in a local authority or a public body, depending on the department the **full handbook will be of relevance to you**.

This book is supported by tools created from our project learnings. They are available in the appendix for ready reference, and downloadable for use.

CONTENTS

01.

INTRODUCTION TO THE HANDBOOK

What this chapter will cover:

- Background and relevance of this book
- Introduction to the Croydon Infrastructure Collaboration Pilot (CICP) and the core team
- Introduction to The Mayor's Infrastructure Development Coordination Team (IDCT)

1.0 KEEPING LONDON MOVING

London is growing, with the population set to reach 10 million in the next decade. The Mayor has set a target to build over 65,000 homes a year to support this growth up to 2041. We must also invest in new development and infrastructure across the city.

Construction is booming, particularly in London's Opportunity Areas. However, this has an impact on local people, our economy and the environment. These impacts are often acutely felt on our road network, due to street works and roadworks. Street works[1] refers to any work done in a street in pursuance of a statutory right or street works licence. These works are a major contributor to congestion and poor air quality, and cause disruption on the streets of London.

To keep London moving, we must have an efficient road network.

Yet in 2016, TfL estimated that congestion cost London's economy £6.7bn.[2] Around 15 per cent of our congestion is caused by street works. If utility companies and others worked more closely together we could reduce both the need to close roads and the frequency of projects.

Missing chances to collaborate can cost Londoners through extra congestion and damage to the environment. It is therefore vital that infrastructure planning and delivery is better coordinated. This is known as 'dig once'. We call this approach collaborative street works.

Yet street works and roadworks projects are often done in isolation, with just one utility provider or highway authority involved. As this handbook shows, this can mean one project is immediately followed by another in the same road space. In such cases, more than one work promoter may be able to work together in the same road space at once.

"To make sure we can cater for London's growth with minimal disruption, we need the capital's new infrastructure to be planned and delivered effectively. This means considering essential utilities and transport infrastructure before demand materialises – not as an afterthought in response to new development. It also means building infrastructure in a way that minimises disruption to Londoners and London businesses."
Jules Pipe, Deputy Mayor, Planning, Regeneration and Skills, April 2019

This handbook aims to give boroughs and utility networks the tools they need to collaborate on street works. While this document speaks most about street works collaboration in London, the principles are transferable to other local authority areas.

1 *Source: New Roads and Street works Act 1991*
2 *Source: Understanding and Managing Congestion, InRix Nov 2017*

1.1 HANDBOOK CONTEXT

CROYDON INFRASTRUCTURE COORDINATION PILOT (CICP)

The first version (V1) of the handbook is an output of a collaborative working initiative called the Croydon Infrastructure Coordination Pilot (CICP), delivered alongside the London Borough of Croydon (LBC) by partners – design consultancy Atkins and innovation consultancy Fluxx.

CICP was funded by TfL's Lane Rental scheme and sanctioned by the Lane Rental Governance Committee (LRGC), including representatives from the major utilities, London Councils, TfL and the Department for Transport (DfT).

Building on the success of the CICP Project, the Greater London Authority's new established team (see **chapter 1.2**) is promoting street works collaboration across London.

If you are interested in participating in a street works collaboration in London, please contact us at idct@london.gov.uk. If you are interested in finding out more on the CICP please contact alexander.pocklington@croydon.gov.uk.

This version of the handbook is owned by London Borough of Croydon with contributions from the Greater London Authority (GLA). The GLA will be responsible for the handbook after publication of Version 1, which will include the full post-project appraisal of our pilot collaborative street works project at Epsom Road, Croydon (see **chapter 4.2**). Future iterations of the handbook will be the responsibility of the GLA.

Alexander Pocklington, *Principal Impact Assessment Engineer at London Borough of Croydon*

Lee Hewitt, *Head of Delivery (eight2o), eight2o/Thames Water*

Andrew Reynolds, *General Manager (Major Works, South) SGN*

Angus Kelly, *Infrastructure Consultant at Atkins*

THE CICP TEAM

We are a diverse team, with expertise on the Atkins side in capital works delivery and geospatial data, and on the Fluxx side in agile innovation and change management. This was combined with the leadership and experience of a champion at London Borough of Croydon with expertise in highways management, transport planning, street works and construction logistics.

Through our test and learn approach we've built a data sharing tool, identified the Epsom Road collaboration opportunity, and with the expertise and passion of a wider cross functional team delivered a pilot programme of collaborative street works.

We documented the process, the conversations, the challenges we faced and the solutions that arose, in order to create this handbook. If you are interested in finding out more about our test and learn approach to collaboration and street works please contact info@atkinsglobal.com or embrace@fluxx.uk.com.

Melanie Marchant, *Innovation and Engagement Lead at Fluxx*

Natasha Lalwani, *Senior Consultant at Fluxx*

Gemma Stafford, *Consultant at Fluxx*

Jack Metcalfe, *Digital and Geospatial Consultant at Atkins*

Paul Forrester, *Head of Growth Zone at London Borough of Croydon*

Shriya Bishnoi, Consultant at Fluxx

Oscar Watkins, *Senior Policy Officer at Greater London Authority (GLA)*

SUPPORT AND CONTRIBUTED EXPERTISE

Collaborative street works is supported by the Greater London Authority (GLA), in particular the Mayor of London's Infrastructure High Level Group (IHLG) which includes CEO's of the major utilities, transport providers, regulators and government bodies who serve London.

It is recognised that multi-agency coordination is a burgeoning field with many aspects specific to regional stakeholder groups and priorities. The handbook is therefore intended as a resource to be further developed and evolved by the Greater London Authority.

Subject matter expertise and input has been provided by Thames Water, eight2o, Southern Gas Networks (SGN), UK Power Networks (UKPN), Community Fibre, Street Works UK, Utility Results, Transport for London (TfL), Department for Transport and London Councils.

Andrew Bourne, HSES Lead SMBJV, Balfour Beatty (Gas and Water)

Marcus Jones, *Engineering Manager (Construction Operations) SGN*

Michael McAuliffe, *Contracts Manager (Construction Operations), eight2o/Thames Water*

1.2 THE INFRASTRUCTURE AND DEVELOPMENT COORDINATION TEAM (IDCT)

The Greater London Authority (GLA) is a unique form of local government. It supports the Mayor of London and 25 London Assembly Members to carry out their roles and duties.

In 2018, the Mayor's Infrastructure High Level Group[3] backed the GLA's call to create new ways of coordinating infrastructure throughout London. This would focus on high-growth areas.

With £2.9m investment, the Mayor set up the IDCT. This new team would encourage better working between infrastructure providers, including local authorities, utilities, transport providers, developers and contractors by:

- ***Ensuring that utilities' infrastructure is planned as far ahead as possible, and encouraging collaboration in delivery, focusing first on street works.***
- ***Launching a web tool in 2015 – the London Infrastructure Mapping Application (IMA) that supports this coordination work. This includes identifying opportunities for joint infrastructure delivery and giving infrastructure providers the heads-up on future projects. That way they will not become barriers to housing and other development.***
- ***Using the CICP pilot project as a model for how London boroughs and utilities can collaborate on street works across the city. Read more in this report.***
- ***Working with boroughs on targeted projects to better plan for growth and development (see chapters 4 and 6).***

If you're thinking about collaborating on street works, get in touch with the IDCT.
Email: idct@london.gov.uk

3 *The Mayor's Infrastructure High Level Group is comprised of CEO-level appointees from each of London's Distribution Network Operators (Gas, Water, Sewerage, Electricity, Telecoms and Digital), various layers of government, boroughs, and the regulators.*

02.

WHY COLLABORATE?

What this chapter will cover:

What this chapter will cover:

- The principles of effective street works collaboration
- The ‘Collaborometer’ scale of collaboration – from zero to utopia
- The benefits of collaboration
- Addressing CDM

2.0 INTRODUCTION

The practise of coordinated street works is not new. For decades, the 'dig once' approach has been a murmur in the world of infrastructure delivery. You might remember a TV commercial for Heineken from the early 1980s that jokingly depicted the utopian scenario of multiple contractors in an existing trench. Indeed, there are multiple examples of successful collaborative schemes which we have highlighted later in this handbook. However, collaborative street works projects often fail to get off the ground for a number of reasons including:

- ***There are limited channels of communication between organisations or within an organisation itself.***
- ***Inability to securely share and analyse data between parties.***
- ***There is a lack of buy-in from key individuals within the authority to secure investment and to secure sign-off on a collaborative project.***
- ***There is insufficient resource to drive coordination between teams.***

In this chapter we explain the principles of collaborative street works, what constitutes a collaborative street works project, and what the benefits of the approach are.

Collaboration in street works: Sometimes known as a 'dig once' approach, collaborative street works occur when two or more parties (utilities, developers and/or local authorities) have a dialogue *before* works begin, with the intention to deliver works at the same time and in the same roadspace (either sequentially or in parallel).

What it includes: The process of collaboration begins with identifying opportunities. Once identified, relevant parties initiate a dialogue, and establish governance, commercial and technical arrangements, before undertaking works.

Why collaboration: Collaborative street works reduce the impact of works on road users by reducing the number of days of disruption to the road network. Collaboration brings a multitude of socio-economic benefits: less noise, less pollution and ultimately happier residents.

Equally there are potential financial benefits to utilities. Highway authorities may in some cases waiver charges, such as lane rental. In addition, collaborative works may lead to efficiency savings for utilities and local highway authorities.

See **chapter 2.5** for a detailed list of socio-economic and financial benefits.

2.1 WHAT WE DID DIFFERENTLY

THINK BIG, START SMALL.

Collaborative schemes most often fail because they try to achieve a utopian vision of full collaboration from the outset (e.g. joint procurement, scheme design, construction) when in reality this is not possible. This is largely due to the nature of contractual law today and potential challenges with safety and liability on site.

With the Epsom Road opportunity we took this vision for an entirely coordinated scheme and broke it down into a minimum viable approach, being as collaborative as possible but not halting progress to wait for the 'perfect' solution.

"Taking one massive leap to the end is not the right way. You'll leap and you will fall. Take it step by step, collaborate in small iterative ways."
Alexander Pocklington, Principal Impact Assessment Engineer, London Borough of Croydon

"Underground asset data can quickly become unwieldy and overwhelming. This was not about creating a data repository, it was about experimenting with small subsets of data to understand their value to identify collaboration opportunities. Without this Think Big, Start Small approach we would have quickly found ourselves wading through data and not delivering any tangible benefits."
Jack Metcalfe, Digital and Geospatial Consultant, Atkins

SHOULDER TO SHOULDER.

From start to finish Epsom road was a people-first project and its success is testament to the cross-functional team who worked closely to make it happen.

We convened workshops at key stages, ensuring all key decision makers were present and empowered to outline and own the next steps. We created a working structure that engaged both senior representatives to unblock issues as well as people on the ground who progressed independently at a scheme level. By taking this approach we successfully arrived at a practical solution, while also identifying where improvements could be made in the future (see **chapter 2.2 and 2.3**).

"Never underestimate the power of getting the right people in the room."
Melanie Marchant, Innovation and Engagement Lead, Fluxx

"I think this has been a really good example of how starting small, piloting something and approaching a project in an agile way can lead to much bigger, more ambitious projects across a wider area. But without that initial pilot, none of this would have possible – it allows you to prove the benefits, what does and doesn't work and also bring together a group of people who otherwise wouldn't have worked together!"
Oscar Watkins, Senior Policy Officer, Greater London Authority

2.2 THE PRINCIPLES OF EFFECTIVE STREET WORKS COLLABORATION

Here are some principles of collaboration you can apply in practice to make street works collaboration more successful. These are a mix of mindsets and rules of thumb we have learned from our work on this project.

DATA MEANS DIALOGUE

Transparency: To identify opportunities for collaboration you will need to overlay the forward investment plans of utility providers and highway authorities. We do this using a geospatial mapping tool. At the most basic level you'll need data on the timing of projects and their location (the 'where' and the 'when'). Data is the key to surfacing the opportunities that exist for multi-party collaboration. For this to occur organisations first need to 'lean in' and share all data that will aid the identification of collaboration opportunities. This is a challenge in itself. We must recognise that this data should only be used in the spirit of collaboration. Free and transparent data shouldn't be used to an advantage by one party over another. These behaviours should be enshrined in a Non Disclosure Agreement (NDA). Additionally you may consider creating a Collaboration Charter. In London this work is being promoted by the GLA through the London Infrastructure Mapping Application.

Dialogue: The collaboration process is about getting people to establish clear communication channels and to build a team around a project. Getting the right people together in a meeting to share their planned works in a particular area is an ideal way to make sure that data turns into dialogue and team building. There are a number of collaborative messaging and planning tools available, e.g. Microsoft Teams, Microsoft Planner, Slack, Trello.

JACK'S TOP TIP

Don't underestimate the importance of people in this process, data sharing is the seed but dialogue will deliver the results.

Early data sharing delivers benefit: Extracting the maximum value out of collaboration requires early visibility of investment plans. Early access to data gives the necessary time to coordinate plans and to establish commercial and contractual arrangements before they are locked down through the procurement process. This gives the best chance at digging up roads only once.

PEOPLE NOT PROCESS

Problem-solving mindset: Working collaboratively means working in a new way and stepping outside of 'the day job.' It can and most likely will feel uncomfortable. There will be numerous challenges encountered along the way (financial, technical, operational process, legal, resource etc), but with a problem-solving mindset it is possible to approach these challenges as opportunities rather than thinking

of them as the end of the road. It's important to build a strong project team, put people before the programme, and lean on the collective brainpower of the project team to solve it creatively.

Continuous and balanced communication: One of the most crucial aspects of collaboration is keeping an open and positive channel of communication between all parties. Teams must come together often and have regular conversations throughout the process. Similarly, ensuring all parties have adequate team representation means that all voices are heard and no party feels under represented. In meetings, there should be equal representation across all collaborating parties to keep the balance.

ONE CUSTOMER

One approach: Whether you represent a utility or a local council, it is all about the same end customer: the public, i.e. people who belong to a street and are a part of the community, using the infrastructure in some way. This could refer to residents, busy commuters, retirees, parents of school-going children, or even couriers using the street in their daily job. The public is at the heart of everything and are the beneficiaries of collaborative street works, and it's this common goal that ties the entire project team together.

SUCCESSFUL COLLABORATION IS FAIR COLLABORATION

Benefits for all parties: Collaboration can only be successful when there are benefits for all involved. The benefits should be identified at an early stage, to make sure that they can be monitored and evaluated, and to ensure that all parties involved understand the costs and benefits of a particular project. We believe that once you open the lid on collaborative street works, the benefits keep adding up and siloed working becomes undesirable.

DATA MEANS DIALOGUE

Early visibility through data is the key to surfacing opportunities. Approach this in a spirit of trust, open communication and flexibility if plans change.

PEOPLE NOT PROCESS

With a positive, problem-solving mindset and by leaning on the collective expertise in your team, you'll overcome challenges.

ONE CUSTOMER

Recognise that all parties have the same end customer: the public. Let them be a unifying force.

FAIRNESS = WIN-WIN

The benefits of collaboration are multiple and diverse. Fairly outlining and communicating where parties benefit and make concessions will ensure success.

2.3 THE COLLABOROMETER

WHAT IS THE COLLABORATION SCALE?

- There are several types of street works collaboration. We believe it is helpful to think of these types of collaboration as a 'scale' from business as usual through to complete collaboration.
- The potential benefits of street works collaboration increase further up the scale, with complete collaboration offering the greatest potential commercial savings and public benefits.
- Successful collaboration will most often deliver benefits.
- Collaboration may not be relevant for all schemes.

WHY A SCALE?

We realise that complete collaboration is ideal, but not always achievable. Different projects may require a different approach, and complete collaboration may require companies to make significant changes to how they procure contractors and time for the market to ready itself for multi-utility projects. This scale shows that there are benefits of undertaking each type of collaboration. It's important to establish which approach is best suited to a particular project, and to understand the barriers that may exist to achieving complete collaboration.

If an opportunity for collaboration is found, it's best to open a channel of communication and work across all parties to identify a course of action that meets the parameters of a project. These might be related to legal contractual arrangements, cost and time pressures, and/or governance.

We have found that it is unrealistic to aim for complete collaboration at the outset. Starting small and being realistic will help you to identify challenges while also proving that collaboration works for all, before building up to bigger and better projects.

MAXIMUM BENEFITS

1.

Business as usual

Resulting in

Repeated Works
Frustrated Customers
Difficulty in Planning

2.

Paced Collaboration

Collaborated

Work Timing
Customer Communication

Independent

Design
Commercial
Procurement
Streetworks
Safety, Health & Environment (SHE)
Contracts
Delivery

3.

Semi Collaboration

Collaborated

Design
Commercial
Streetworks
Work Timing
SHE
Customer Communication

Independent

Contracts
Procurement
Delivery

4.

Complete Collaboration

Collective

Design
Commercial
Procurement
Streetworks
Work Timing
SHE
Contracts
Customer Communication
Delivery

THE COLLABOROMETER

THE COLLABORATION SCALE

Business as Usual – ***A typical street works or road works project. In these circumstances multi-utility works rarely take place.***

- Different works promoters operate in silos, and do not consider opportunities for working collaboratively before they start work. In fact when overlaps are discovered, they are sometimes referred to as clashes. These unplanned clashes often create problems for works promoters, as opposed to creating benefits.

Paced Collaboration – ***When two or more utilities and/or a highway authority work in the same site, but one after another or sequentially.***

- In these circumstances works can take place at the same time and in the same road. Works promoters each have separate contractors and separate work sites. This is possible by either: 'chasing' works, whereby one set of works start, and the second set of works follows moving up a stretch of road; or 'spacing' works, whereby each set of works takes place in separate parts of the road at different times.

- Paced collaboration can work for short, medium or long term projects, and is best adopted when parties are unable to change CDM, or cannot find a subcontractor with skills across different utilities, or just prefer to work separately.[4]

Semi Collaboration – ***When a part of the overall process is done collaboratively.***

- This could include engineering design, procurement or coordination with local authorities done collaboratively, but other areas, such as construction or procurement undertaken independently.

- This can be adopted when data is available early on in the process, but companies prefer to keep construction separate.

Complete Collaboration – ***Collaborating every step of the way.***

- From planning, to engineering design, to construction. This is assumed to be the most beneficial, and most utopic type of collaboration, due to the efficiencies it can give rise to.

- It may not be the easiest to execute, especially on smaller projects.

4 *For references on paced collaboration, and how we got here, please refer to* ***chapter 4.2****. Epsom Road Case study*

2.4 CDM

WHAT IS CDM?

Construction Design and Management Regulations (CDM) refers to the law that applies to the whole construction process on all construction projects, from concept to commissioning, operation and decommissioning, and sets out what each duty holder must or should do to comply with the law to ensure projects are carried out in a way that secures health and safety.

Link to regulations: ***http://www.hse.gov.uk/pubns/priced/l153.pdf***

The regulations set out the duties of the client, making them accountable for the impact their decisions and approach have on health, safety and welfare on the project.

Historically CDM has presented a challenge to collaborative street works due to:

- ***Managing risk and liability.***

- ***Planning and coordination between additional stakeholders.***

- ***Allowing sufficient workspace for multiple contractors to safely deliver work in a small footprint, this in turn introduces additional cost for which there will need to be a commercial arrangement in place.***

"A challenge has been the issue of the regulatory environment, Health and Safety and the commercial implications of doing this type of work well. This is not BAU. So how H&S and commercials are set up within a company do not necessarily perfectly lend themselves to collaborative street works – and could in some cases, represent itself as a blocker to this approach."
Oscar Watkins, Senior Policy Officer, Greater London Authority

APPOINTING PRINCIPAL DESIGNERS AND CONTRACTORS

Clients have varied levels of expertise in the construction process and are not necessarily required to actively manage the work. They do, however, retain overall responsibility, and are therefore required to make suitable arrangements by appointing designers (including a principal designer) and contractors (including a principal contractor).

Utilities will have existing arrangements in place to execute CDM compliant work where one client is involved; where works can be clearly demarcated with separate site boundaries.

The level of collaboration will determine the nature of the CDM challenge **(see chapter 2.3 for the collabarometer scale)**.

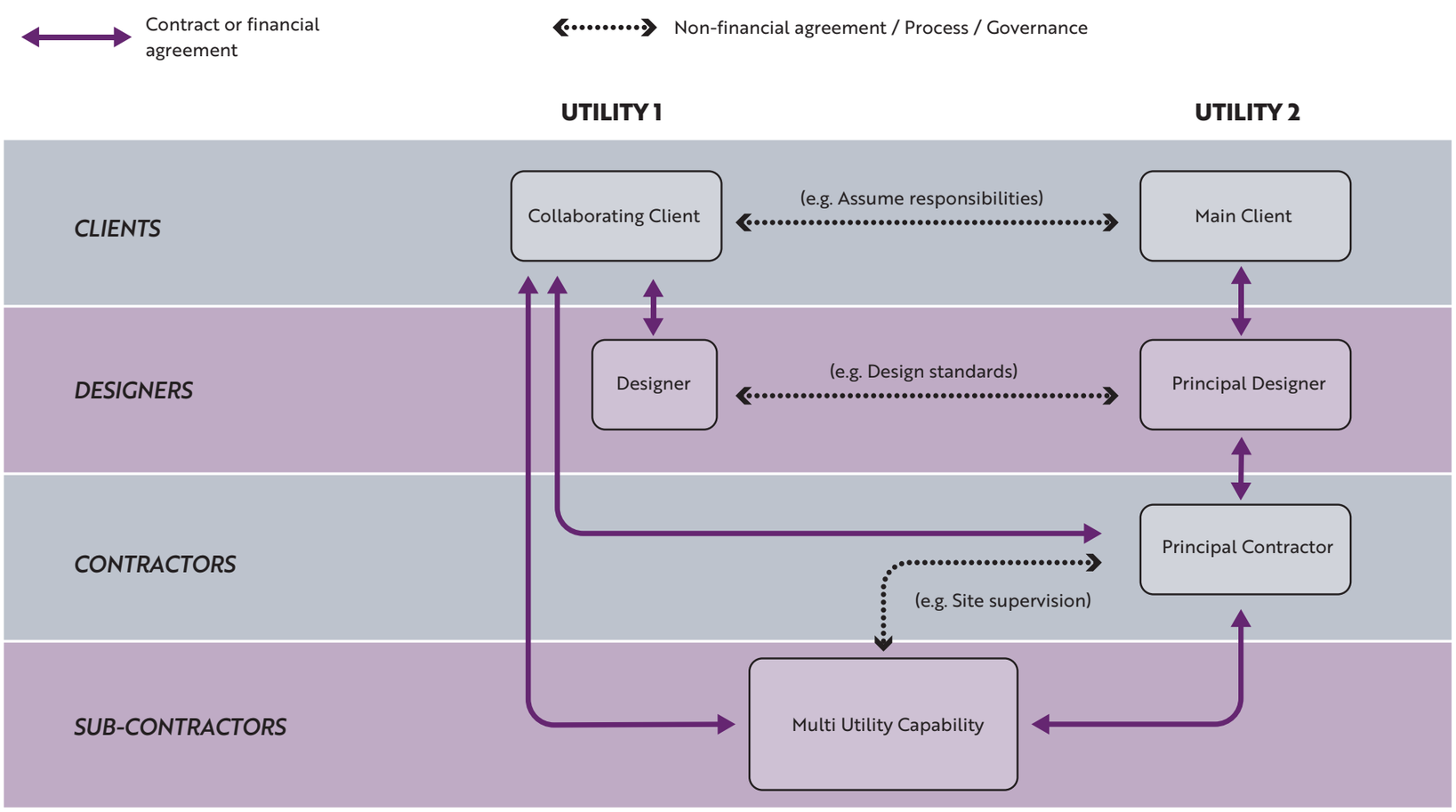
FULL COLLABORATION – MULTI UTILITY SITE SHARING

The CDM regulations recognise that for projects involving more than one client operating within a site boundary, it may not be practicable for every client to assume all of the duties under the regulations, therefore clause 4(8)(a) allow clients to agree that one or more of them can be treated as the main client or clients..

In terms of required actions, this means:

- Agreeing which client will assume the responsibilities of the main client.
- Ensuring vendor assessment criteria conforms to both clients standards when selecting designers (including a principal designer) and contractors (including a principal contractor).
- Design standards and governance will need to be agreed between the principal designers, who should have multi utility capability.
- Construction standards and governance will need to be agreed between clients and the principal contractor (PC) who will have the capability to supervise multi utility works and have a duty to ensure contractor compliance.
- Additional contracts or clauses will be required to mitigate liability placed on the principal contractor from the collaborating client and separate contracts between providers or provider representatives and subcontractors may be required.

The legal and commercial solutions will be specific to each collaborative partnership and are difficult to generalise. Input will be required from specialist legal, commercial and contractual expertise. The figure (above right) illustrates an example of some of the arrangements that would need to be established to enable full collaboration between utilities.



"Fulfilling the roles and responsibilities of the various duty holders set out in CDM 2015 can be a daunting prospect for utility companies and their contractors when collaborative working is considered. However, with good planning, coordination and clear roles and responsibilities being set out it can be achieved, reducing the impact of the work on the local environment, customers and road users while maintaining a safe and healthy workplace."
Andrew Bourne, HSES Lead SMBJV, Balfour Beatty

SEMI OR PACED COLLABORATION

Where separate principal designers (PD) and principal contractors (PC) are appointed and plan to be working in the same general area at the same time, the site must be clearly demarcated to be compliant with CDM.

Under these circumstances, works can be considered as having individual clients and can proceed as per existing processes, as would be the case with *paced collaboration*.

EPSOM ROAD

In the case of Epsom Road, The Safety, Health and Environmental Teams (SHE) and delivery teams evaluated solutions early in the planning stage.

Although works needed by both utilities were required in the same site footprint, the cost of establishing the legal and commercial arrangements required by CDM to permit full collaboration would have outweighed the benefits.

CDM FOOTPRINT HANDOVER

A design and construction solution was established whereby responsibility of demarcated sections of site or CDM footprint was handed over from one party during different phases of construction.

The solution involved regular coordination meetings and supporting documentation to formally identify the duty holders of any given location at any given time, allowing two clients, PDs and PCs to maintain full control and assume their roles and responsibilities under CDM as they would in any other situation.

A copy of the handover template can be found in **appendix 2.4**.

"The biggest challenges (on delivering Epsom Road collaborative works) were from a delivery perspective, in how do we actually meet statutory requirements of CDM 2015 regulations around principal contractor control of the site, putting the teams to work in a safe manner. That really did take some out of box thinking by our delivery teams and our health & safety teams in SGN and eight2o."
Lee Hewitt, eight2o/Thames Water, Epsom Road Project Sponsor

2.5 COLLABORATION BENEFITS

Fewer days of disruption, happier residents, improved infrastructure, substantial financial savings to utility companies. The benefits of collaborative working are many, and can be realised by utilities, local authorities and the public.

The benefits of street works collaboration (assuming more than one utility, supported by a local authority, are working together) are likely to be as follows:

Benefit	Details	WITHOUT COLLABORATION	WITH COLLABORATION			
			Benefits to the Utilities		Benefits to Local Authorities	Benefits to the Public
			Tangible benefits	Intangible benefits		
Environmental	Combined street works reduces the impact on the environment	More days of work, unhappy residents for longer	N/A	Happier residents, better reputation	Happier residents, better reputation	Reduced congestion, less pollution
Lane Rental	Lane rental governance comes into play in 2019	Lane rental to be borne by a utility in full, costing between £800 – £2,500/day	Waivered or exempt lane rental charges	N/A	Reduced road closure duration	Reduced road closure duration; improved public realm
Parking Bay	Road Closures	Complete road closure usually not possible	Larger road closure may be possible, simplified traffic management	Improved health & safety with larger road closures; increased efficiencies owing to more space for roadworks	Fewer parking bay suspensions and less disruption to customers because parking bays are suspended just once instead of twice or thrice	Safer access because larger blocks of the road are closed at a time
	Costs of Parking Bay (CPZ areas)	£50/bay/day borne by the utility (£60 in town centre)	Waived or exempt parking bay charges			Replacement parking bays available, but overall, parking bays are blocked for less time

Benefit	Details	WITHOUT COLLABORATION	WITH COLLABORATION			
			Benefits to the Utilities		Benefits to local authorities	Benefits to the public
			Tangible benefits	Intangible benefits		
Traffic Management	Sharing Traffic Management	Utilities pay individually	Shared traffic management	Safer and more manageable traffic management	Safer streets, more manageable traffic management, less inconvenience and better reputation	Safer streets, blocked off for less time; wellbeing benefits for road users
	Temporary Traffic Order	£2,500/utility	Cost split between collaborating utilities	Wider range of TTRO options		
	Highways Team for site works	High costs, hassle to manage	Competitive costs, access to council rates	Reduced time and effort		
Reinstatement	Temp Reinstatement	Borne by each party	Borne by each party	Reduced time and effort	Reduce disruption caused due to asset failure, and unplanned repairs because of collaborated planning	Safer roads with just one set of permanent road works; better quality road resurfacing leading to smoother road surface for longer
	Permanent Reinstatement	Borne by each party	Borne by council or shared			
	Reinstatement Liability	Borne by each party	Borne by council only			
Communication	Creation of communication to the residents	Borne by each party	Split ⅓	Customers see the benefit, by seeing all 3 logos together	Reduced time and effort in communication	Single clear message about the work, rather than repeated information; better impression of involved parties
	Communications materials distributed	Borne by each party	Managed by council only	Reduced time and effort		

"The impact we make on the communities is fundamental, and this is a better way of doing business; to convince people within Thames, within eight2o was not the hardest thing in the world."
Lee Hewitt, eight2o/Thames Water, Epsom Road Project Sponsor

"We get sponsored to bring new ideas to street works, we share those with other gas networks. We are looking wherever we can to bring new ideas to speed up our works and dig safely."
Drew Reynolds, SGN, Epsom Road Project Sponsor

An additional public benefit is reduced cost of disruption.

TfL economists calculate this by measuring the cost of disruption. This is a cost avoidance to the local economy and collaborative works reduce this cost.

As an example, looking at the effect on commuters alone, the cost of delay per vehicle[5] is: Car = £20.74/hr; LGV = £17.08/hr; Bus passenger = £12.45/hr.

Indeed, once you start thinking collaboratively, and executing on collaborative street works the benefits keep adding up and siloed working is undesirable.

Some examples of headline benefits realised during collaborative projects are to the right:

5 *Based on the WebTag DfT guidance.*

Epsom Road, Croydon – 600-metre road that had Thames Water, SGN and London Borough of Croydon working together:

- *On a project that would have been 30 weeks long, 98 days of disruption were saved by working together.*
- *Parking bay charges were exempt by the local authority thanks to collaborative works which was a saving of £201,000.*
- *The days saved equated to a £678,000 cost to the economy avoided.*
- *Improved Thames Water, SGN and London Borough of Croydon in the eyes of the public, and public bodies.*

Refer to chapter 4.2 for the complete Epsom Road case study

Borough High Street – Thames Water, SGN, UKPN, Network Rail and TfL combining efforts and working collaboratively:

- *Saved more than a whole year in work days, compared with the estimated total time required for carrying out the gas, water and electricity projects separately.*
- *The team required no extension, despite the addition of the electric duct work, and were compliant with highway notices at all times.*
- *Additionally, TfL completed 16 separate highway maintenance jobs within the services boundary of works and BT carried out a remedial repair to some of its apparatus.*

Refer to chapter 4.1 for a more detailed case study

Chicheley Street, Southwark – Utility corridor for gas, power and multiple broadband providers:

- *Programme duration was reduced from 60 weeks to 12 weeks and overall utility costs reduced by 45%.*
- *The scheme avoided road and lane closures and diversions; instead reducing lane width but maintaining 2-way traffic at all times.*
- *A close relationship across local TfL representatives, utility companies and the contractor ensued.*

Refer to chapter 6 for a more detailed case study

ThamesConnect – Web map that helped identify a 128km opportunity to combine programs of works within Thames Water:

- *Helped realise £7.7m in savings.*
- *Saved a decade (3900 days!) of disruption.*
- *A post investment appraisal conducted by the capital delivery alliances commercial team concluded that the initiative delivered a benefit to cost ratio of over 15.*

Refer to chapter 4.3 for a more detailed case study

For information about how to pre-appraise, monitor and evaluate the benefits for your own collaborative project, please refer to **chapter 5**.

03.

PREREQUISITES AND METHODOLOGY

What this chapter will cover:

- What is the overall methodology?
- What are the prerequisites?
- Potential routes to funding
- Sponsorship
- Trailblazers – The core team and the collaboration enabler
- Ways of working
- Communicating with local residents
- Details of data sharing
- Ethical compliance

3.0 INTRODUCTION TO PREREQUISITES

- The financial, social and economic benefits of collaborative street works are extensive, yet there are plenty of challenges that may be faced when introducing collaboration approaches to undertaking street works.
- Local authorities must be confident that utilities will not damage their assets or cause unnecessary disruption and may need to reallocate or acquire additional resources.
- Utilities and developers need to be satisfied that fees or charges are justified and that their timelines and budgets will not suffer. All parties require fair apportionment of liability and assurance that data and intelligence shared in the spirit of collaboration will not be used for unfair advantage.
- To help navigate these challenges, this chapter covers the prerequisites and methodology for planning and executing multi-party collaboration. These are the 'need to know' success factors, from securing funding for your overall programme, selecting and organising teams of people, to ensuring operations occur within an ethical code of conduct.

This chapter could be considered collaboration 101.

3.1 OUR METHODOLOGY FOR CAPITAL WORKS COORDINATION AND COLLABORATION

Setting collaboration up for success is a serious undertaking. Influencing the course of multiple capital investment schemes is a complex challenge involving a large stakeholder group, from a diverse range of organisations, with differing priorities. However, the challenges are not insurmountable.

This section highlights the methodology we used during the Epsom Road, Croydon project. The aim of this chapter is to arm you with the methodology for organising and executing collaboration within your organisation and these learnings can be adapted for further collaborative efforts. This and subsequent chapters will detail the requirements and set-up that are needed to change how an organisation executes and even thinks about collaboration.

The key attributes of a successful initiative to promote stakeholder collaboration will include:

- **Remit –** Granted by a senior sponsor reporting to executive structure.
- **Capability –** Blended team of subject matter experts.
- **Pace –** Ability to rapidly validate and iterate in a cost efficient manner.
- **Credibility –** A proven track record of delivering value.

The process can be broken down into the following stages:

ENGAGEMENT	INSIGHT	TRIAL	EMBED
Access to stakeholders *Articulate need* *Gain sponsorship* *Identify working team*	*Evaluate status quo* *Obstacles* *Data* *Prioritisation*	*Share data (build)* *Evaluate potential (measure)* *Validate assumptions (learn)*	*Scale and maintain* *Embed and change*

ENGAGEMENT

Engagement between stakeholders is integral throughout the entire collaboration process (further explained in **chapters 3.4 and 3.5**). When you are considering collaboration, we found that an initial workshop attended by key stakeholders can help to validate the assumption that collaboration can yield mutual benefits. To begin with, the scale of opportunity should be identified and engagement sought across all levels of the organisation.

We recommend bringing together individuals from the organisations involved with informed perspectives in the following areas:

- Strategic planning
- Operations
- Capital programme delivery
- Contracting and procurement
- Data security and governance
- Innovation
- Portfolio management

We found it helpful to inspire workshop attendees in the art of the possible by considering how other sectors have overcome challenges by adopting disruptive innovation.

The scope of the workshop should be:

- The identification of an area of initial focus or a means to prioritise effort.
- Commitment by stakeholders.
- Access to appropriate resources and data.
- Appointment of a representative working group with sufficient authority to make decisions and to ensure the right level of resource.

INSIGHT

Insight into the stakeholders and their ways of working should be a key part of your collaboration strategy. Only if you have a deep understanding of business as usual, will you be able to identify the changes in mindset and ways of working that are required for collaborative working. The objective of gaining insight is to identify and prioritise obstacles and opportunities to overcome them.

During our project in Epsom Road, Croydon (**chapter 4.2** has further details), we worked closely with various stakeholders at the utility companies to understand their day-to-day roles, and their views on collaboration.

We understood that many mid-level teams believed collaboration to be great in theory, but when it came to their day-to-day working, the amount of time required to plan collaboration with other utility companies did not seem to have an equivalent benefit. As a result they chose to negotiate rather than collaborate with local highway authorities for waivers on planned work.

On the other hand, local highway authorities were left thinking that utilities were not interested in collaboration, just negotiation. This insight helped us work with teams to incentivise both the utilities and local highway authorities, and find solutions that were mutually beneficial.

Additionally, we interviewed residents from across LBC for an appreciation on the impacts of street works for them. The residents' frustration was evident with one quote summarising it: 'There should be more consultation, more forward planning, and coordination.'

While working closely with utilities and local highway authorities, the common point that emerged was that they all had the same end customer: the resident. This insight helped us find solutions that kept the residents at the heart of the entire process.

Several more insights we discovered along the way have been highlighted as learnings, tools and tips throughout this handbook.

TRIAL

Trialling is a key aspect to our test and learn methodology. It is an iterative process that aims to quickly validate an idea and test the key assumptions of ideas generated in the insight phase, in a timely and cost-effective manner. This is best achieved in a time-bound, controlled and manageable scale with outcomes that are measured, and where further iterations are adapted accordingly. The benefits of this approach are that you can verify results on a small scale, make iterations and re-test, all based on evidence. This saves the time, effort and money required for a 'full scale launch' and enables the wider members of the project and organisations involved to be brought into the process and outcomes of this approach.

For our CICP project, we created a geospatial web map that showed forward planning data from different utilities across Croydon. This was the tool that helped us identify the collaboration opportunity in Epsom Road. In the initial phases we trialled various data sets to understand which were more useful, and also trialled different ways in which users would access and make use of the tool. We then measured the success based on the scale of the opportunities (in km) for collaboration and the benefits this presented to residents and utilities.

For capital works to work collaboratively, we have found that successful trials should involve:

- Sharing and using data (build): Identify where investment needs overlap through sharing and mapping and overlaying data sets. A precursor to this stage is setting up a data environment (covered in **chapter 3.7**). Visual access to forward planning data, and adopting a data-led approach allows a collaboration team to effectively highlight, target, and plan for opportunities.
- Evaluating potential benefit (measure): Forecast the potential benefits through the course of the collaboration project. Commercial and procurement teams should be consulted. They would be able to compare the benefits of collaboration to working in silos and help make a robust case for the benefits of collaboration.
- Validate assumptions (learn) : Detail on the types of benefits available to all parties and a guide for measuring success are available in **chapters 2.5 and 5**. Subject matter experts in design, planning and construction should be consulted to validate any assumptions around the means by which potential benefit can be realised. This can be achieved by assessing assumptions around desirability, feasibility (technical/logistical) and viability (commercial/financial). It is with these learnings that implementation is possible.

SCALING AND EMBEDDING

On the strength of the evidence and benefits identified during the trial phase, a number of funding options (outlined in **chapter 3.2**) can be considered to implement the approach.

For our CICP project, scaling and embedding involved scaling the approach and web map, and embedding the new way of working to more people within the organisation, so the benefits are seen more widely. Once we validated the need for the web map, we had to scale it to become usable for more members of the organisation. Most of our efforts during this stage came from what we had uncovered in the insight and trial phases.

SCALING

During our project, scaling was focused on commitment from senior stakeholders and further development of the web map. The key steps involved:

- **Expansion of stakeholder group internally and externally:** Once we validated the need for collaborative working, it was necessary to get more stakeholders educated and motivated.
- **Securing budget:** It was important to ensure that senior stakeholders approved the budget required to scale.
- **Implementation of reporting and benefits evaluation:** This was to ensure that the senior stakeholders saw the benefits of collaboration and were able to justify the investment (see **chapters 2.5 and 5**).
- **Widening of geographical area:** This required us getting data for additional relevant areas, which we then added to the webmap.
- **Incorporating additional datasets:** Based on our understanding of which data sets were of most use, we added additional data sets to the system. For e.g., the addition of Section 58 data (restrictions following substantial roadworks) helped de-risk collaborative working; we realised it was effective not just to show data of forward facing plans, but also the restrictions in those areas for better planning.
- **Improving efficiency of the maintenance and administration of data:** It was important at this stage to get regular data updates to ensure the web map was kept relevant and up to date.
- **Adequate provision of licenses to support any data sharing platforms:** We ensured we had access to summary information relating to NDAs, data sharing licenses and ethics and compliance standards (see **chapter 3.8**) that were of relevance to users.
- **Data maintenance and administration:** Through the experimental phase, data was handled manually. As the approach scaled up, a degree of automation was required. While scaling up, our team was supported with a team member with specialist spatial data management capabilities to maintain the datasets.
- **Platform development:** There were various features that improved usability, and we helped enhance this through platform development . We found it helpful to pay consideration to:
  - The opportunities presented by enriching existing data sets with additional information that could enable an enhanced collaboration approach to streetworks.

- User centric design, intuitive look and feel.

- Development of additional functions as directed by the user group.

A key learning at this stage was that the web map was used to promote collaborative working, but not to change anything else about the way they worked. So while it was tempting to put in every data set that we had access to, we were careful to filter the ones that would help collaborative efforts, and only put those into the web map.

Please see **chapter 3.7** for more detail.

EMBEDDING AND CHANGE

The insight uncovered through the course of the project helps with changing behaviours and embedding a new way of working. While behaviour change takes time, it helps to start small, show teams the benefit of the change and incentivise them to continue the new way of thinking.

As a result of our project in Epsom Road, Croydon, involved teams were able to see collaborative working as something that was practical and not theoretical. Once they saw the potential benefits, they were incentivised to continue to work together and uncover more opportunities for future collaboration.

We found that it involved:

- **Senior/mid-level advocacy for embracing new ways of working:** Users who were uncomfortable making changes in BAU found it helpful and motivating if their seniors were the ones embracing the change.

- **Internal communications, roadshows and clinics:** This was put in place for training and guiding new users so they could get the most out of the new way of working. It involved:

  - Technical training and induction materials for new starters.

  - Communications plans and establishing an appropriate schedule of meetings and forums.

- **Incentivising employees to embrace change:** We found that incentivising this new way of working helped motivate users. Some of the incentives we executed were:

  - *Employee recognition:* Internal recognition is an effective way to incentivise teams. We found that once teams were recognised for the additional effort they put in, they were inspired to repeat their behaviour.

  - *Bonuses/Rewards:* Rewards are also an effective way to ensure teams stay motivated and encouraged to look for systematic collaboration opportunities. In our case we used small prizes to generate competition around seeing who could identify the most opportunities.

Our research also showed us that there was also room to adopt the following incentives (which we were unable to execute in our time frame):

- *Performance management and KPIs:* If adopting change (collaborative ways of working) becomes a part of performance assessments, there will be more motivation for this new way of working.

- *Industry awards:* There are industry awards that exist to encourage collaboration, and getting recognised externally could further encourage teams to work in new ways.

- **Ongoing engagement:** We found that continuous engagement with teams to continue to improve supporting processes, data and tools helped motivate them further.

Over the next few sections, we will further detail the process and requirements and share a series of various case studies.

For an example of how we implemented this process, please refer to the ThamesConnect case study on page 61.

3.2 ROUTES TO FUNDING

The change to enable collaborative working and enhanced coordination requires commitment, support and resources from the participating organisations.

There are three main types of funding available to local authorities looking to fund collaborative working initiatives:

1. **Direct funding:** This funding source is the most straight forward and least time-consuming and is applicable when there are sufficient funds in local authority budgets to fund a collaborative project directly.

2. **Indirect funding:** This funding can be considered when there is no existing budget available. It relies on the use of local authority budgets (that aren't immediately available) as they are raised through alternate channels.

Revenue streams that could be considered include:

- Revolving Infrastructure Fund (RIF)
- Community Infrastructure Levy (CIL)
- New Homes Bonus
- Business Rates Retention

3. **External funding:** These sources of funding are external to the planning council or utilities direct revenue streams. External sources of funding require effort to set-up and run. Examples of sources that could be considered include:

- Infrastructure Development and Coordination Team (IDCT)
- Innovation funding or external funding pots
- Lane rental funding
- Subscription model
- Public Private Partnerships

For detailed information and examples of potential funding streams, **see Appendix 3.2a**.

FUNDING CONSIDERATIONS

The suitability of potential funding options will depend on the stakeholder group, the extent to which their interests interact and the degree to which the scale and distribution of benefit is understood.

Although TfL lane rental funding was appropriate in the case of the Croydon Infrastructure Collaboration Pilot, it is hoped that as the approach to collaborative working matures, other funding options will become more viable as the scale and distribution of benefit is better understood. To that end, it is important to establish a robust evaluation framework at the outset of a collaborative initiative. Further information on the evaluation of benefits from can be found in **chapter 5**.

3.3 SPONSORSHIP

Collaborative working involves a change to business as usual, requiring sanction from a senior sponsor who will play an active enabling role. The lead sponsor will need to be a key influencer within their organisation to overcome resistance to change by embarking on a new approach. A successful sponsor will be competent, credible, committed and engaged, with subject matter expertise in business administration, project delivery and change management.

CHARACTERISTICS OF A SPONSOR

- ***Engenders trust***
- ***Leader***
- ***Comfortable with risk***
- ***Decisive***
- ***Thinks big***
- ***Trusted by their organisation***

THE SPONSOR:

IS ACCOUNTABLE FOR	WILL
Leadership and promoting the vision and benefits within their organisation	Be decisive
Collaboration with other sponsors in other organisations	Sanction remit of decision-making taskforce
Alignment to their wider strategic objectives and business plan	Clarify business case
Business case ownership (to justify any cost or resource in kind)	Communicate business issues, priorities and strategy
Risk Management	Sanctions resources
Benefits realisation and appraisal	Assume direct governance as required
Assurance	Be a point of escalation (resolving issues that are beyond the control of the delivery teams/resolving conflict/ removing obstacles to progress)
Feedback and lessons learned	Engenders trust
Continuity of sponsorship	Manage relationships
	Enable delivery team activities
	Engage executive and other senior stakeholders

The sponsor would be in an existing role in the organisation. Some of the types of job roles that sponsors may have are:

Area managers (Utility), Heads of Service/Delivery (Utility), Statutory post holders, Head of Public Realm (LA), Head of Highways (LA), Development Impact Assessment Officer (Public Body), Assistant Director (Public Body).

ADDITIONAL SPONSORSHIP REQUIRED

One **Evangelist** per organisation (*as applicable).*

This is a pivotal role. The evangelist has a vision for how collaborative working can be of mutual benefit and acts as a champion across their organisation for the project to proceed.

In the case of the CICP our Evangelist (local authority):

- ***Supported a kick off workshop at London Borough of Croydon to explore what collaboration could look like.***
- ***Connected the team with our Lead Sponsor.***
- ***Acted as a sounding board throughout the course of the project.***

One **Lead/Executive Sponsor** per organisation.

It's vital that each organisation has one lead sponsor (and this may be the same individual as the evangelist). They sanction resource and investment, and are an ultimate point of escalation for key challenges.

In the case of the CICP, our Lead / Executive Sponsor:

- ***Attended critical meetings / workshops to show support and reinforce the organisations commitment.***
- ***Were able to resolve critical challenges and blockers.***

TOP TIPS

"As a sponsor you must lead by example. I see the role as spurring my team on to grasp and deliver collaborative street works; albeit at the planning, operations or delivery stage."

"Above all it's belief. You need to believe in the project. If you have passion for it, that passion will radiate through the rest of your team."
Drew Reynolds, SGN Epsom Road Project Sponsor

"If we can leave a legacy of opening doors to wider collaboration and a delivery model, predicated on working together, then that's a great thing."
Lee Hewitt, eight2o/Thames Water, Epsom Road Project Sponsor

3.4 TRAILBLAZERS – THE CORE TEAM AND THE COLLABORATION ENABLER

It takes a number of people across organisations to make a collaboration project happen. Over the page is a list of the key people – a core team of 'trailblazers' who drive a collaboration project. Of course these aren't the only people required to make a project happen, after all as the saying goes, 'it takes a village' and there is an extended team that also needs to be established.

The core team can be best described as the drivers of the process. The following sections will explain roles, responsibilities and interactions across the core and the extended teams in more detail.

It is imperative that each organisation involved in the collaborative effort has at least one representative in this core team. Based on our experience, we have recommendations of who these members could be, but this may differ from organisation to organisation.

There are some team members who are critical to ensuring successful collaboration; we have labelled these team members as 'key player' below. Further, there are some team members who have certain expertise and will be very valuable to the process. However, it is still possible to execute collaboration successfully without them. We have labeled these team members as 'supporting actors'.

The Core Team Components	Roles (***Key Player***, Supporting Actor)
Collaboration Enabler: This role is critical to the core team. This is an (a group of) individual(s) with day-to-day project management responsibility who act as the driving force. Without this role, collaborative projects fail to come to fruition. (Further details on Collaboration Enablers are below this table)	
Local Authority	***Senior Traffic Engineer (Key Player):*** *(or equivalent – Titles vary, e.g. Network Management / Highways)* Review plans, liaise with internal teams, identify the benefits that can be shared with the utilities and interact with the rest of the core team regularly. S/he must be able to make decisions where required.
	Principal Traffic Engineer (Supporting Actor): *(or equivalent)* Similar to the Senior Traffic Engineer mentioned above, but s/he will have more decision-making ability. or **Utility Coordination Engineer (Supporting Actor)**: Responsible for coordinating with other members of the core team. It is important to note that a coordination engineer should always have access to a senior/principal traffic engineer for guidance and decision-making as required. If there is no such person in place, it is necessary for the council to consider getting external support from a consultant (role described above).
GLA and TfL *Note: In case of works happening outside London, the titles may vary but similar roles/decision-making ability should be considered.*	***IDCT Senior Policy Manager (Key Player):*** A team member of the IDCT should be involved in all pilot projects to share learnings from past experiences across a city/region and help with policy support where required. and ***TfL Local Area Network Management Officer (Key Player):*** Where TfL roads are affected, it is necessary to have a local officer who understands the area in a role similar to the senior traffic engineer (as above) and has the ability to support the project.
	TfL Development Impact Management Officer (Supporting Actor): Similar to the role above, but s/he will have more decision-making ability.
Utilities (Water/Electricity/ Gas/Telecoms)	***Program Delivery Manager (Key Player):*** The key point of contact for collaboration within the utility company. It is essential that they have the ability to make decisions within their organisation. and ***Investment Manager (Key Player):*** May be the same person as above. The Investment Manager is responsible for defining the capital investment programme within their organisation.
	Strategic Planning Officer (Supporting Actor): The strategic planning officer would get involved in cases where plans may impact the ability of the organisation to guarantee supply to their customers as a result of collaborative street works.

THE COLLABORATION ENABLER

The Collaboration Enabler is critical to the core team. This is an (a group of) individual(s) with day-to-day project management responsibility who act as the driving force. Without the Collaboration Enabler, collaborative projects fail to come to fruition.

DESCRIPTION OF ROLE:

Collaboration Enabler: Acts like the glue bringing organisations together, facilitating conversations and being the coordinator during the collaborative process from start to finish. S/he has the experience to kick-start the process, maintain momentum, and encourage conversations and communication.

His or her core skills and competencies will be:

- Engenders trust – has great communication skills, yet above all is honest and acts in good faith with all parties.
- Relationship builder – great with people and maintaining good working relationships; both with teams on the ground and C-suite level representatives.
- Creative problem-solver – has a positive, open-minded outlook at all times. Enjoys thinking differently to solve challenges that arise.
- Driven – is determined and motivated for the project to succeed, maintaining enthusiasm from start to finish.
- Project management – keeps project momentum and the wheels in motion.
- Empathetic – beyond typical project management, collaboration requires offering extra support to core and wider team members; coaching them in this new way of working, listening to their concerns, showing understanding and arriving at a way forward together.

TECHNICAL COMPETENCIES TO CONSIDER:

1. GIS / spatial data and data-sharing expertise is key when convincing organisations to share their data and ensuring it's in the correct format to identify collaboration opportunities (see **chapter 3.7** for the Data Sharing-o-meter).

2. Infrastructure delivery expertise, as well as an understanding of the programme definition process, helps to evaluate what 'good looks like' in terms of pounds and pennies for collaboration opportunities.

From our experience these technical competencies can be pivotal. It may also be possible to up-skill a Collaboration Enabler in these by using resource from another department such as Programme Definition or Technical Information (TI).

RECRUITING/IDENTIFYING COLLABORATION ENABLERS

In today's world where collaboration is an evolving way of working, there is no set function for the Collaboration Enabler role within BAU. Hopefully this will change as the benefits are increasingly proven and documented.

Until the industry evolves, here are two options when resourcing the Collaboration Enabler role today.

1. APPOINT A COORDINATION OFFICER

- Local authorities can appoint an individual to identify and coordinate collaboration within their own organisation as well as with utility providers. He or she will sit within or close to the Highways and Growth teams, as these departments are most relevant for collaborative efforts.
- The benefit of this approach is the close contact with and buy-in from core stakeholders that he or she will foster. It also makes negotiating waivers in favour of collaboration more straightforward and brings a resident-centric mindset to the project which is hugely beneficial.
- Croydon Council is piloting this approach, making its first appointment in Q2 2019. This appointment could also be explored by Utilities.

2. APPOINT A THIRD-PARTY CONSULTANT

- Utilities or local boroughs, if lacking the internal resource or investment, can appoint (a group of) individuals to fulfil the role of the Collaboration Enabler.
- In this case, the Collaboration Enabler will act independently and fairly between all parties in order to facilitate collaborative working.
- The benefit is having a dedicated resource to support the project free of internal commitments or political constraints existing within the organisation.
- This option is also a good way to upskill members of the existing team and instigate new, more collaborative ways of working.
- Examples of suitable types of organisations to consider are innovation consultancies, change management consultancies, and engineering and infrastructure companies.

HOW MANY COLLABORATION ENABLERS ARE NEEDED?

- The bigger the scale of the project and the higher the number of collaborating entities, the more Collaboration Enablers will be required.
- In the case of the CICP project there was a core team of five Collaboration Enablers.
- More important than numbers is ensuring the right set of skills. As mentioned above an understanding of geo-spatial data, infrastructure delivery and change management 'people' skills' are essential.

"What I have valued has been the supportive nature of organisations like the Mayor's office and like Fluxx, who have facilitated this (process) and have actually helped steer and keep everyone on track like a PMO would do – focused and delivering. And that's helped the delivery entities of London Borough of Croydon, SGN & eight2o into staying on track."

Lee Hewitt, eight2o/Thames Water, Epsom Road Project Sponsor

"You do need a cross-functional team that is going to make this work. It can't just be a visionary, it can't just be a delivery person, it can't just be a commercial person. It has to be everyone in there together. This isn't one persons' trophy by any stretch, this is a fundamental team effort across multiple disciplines, across multiple organisations."

Lee Hewitt, eight2o/Thames Water, Epsom Road Project Sponsor

"The biggest thing for this project has been the type of individuals who were involved and worked together. Something really unique about this project – which you don't see that often in infrastructure and construction in general – is that we've managed to put people before the programme. Particularly the consultant's team and the Borough have really focussed on building relationships, meeting the right people in the Utilities companies and building a team around those people. It's been striking for us to learn in depth how the utilities work, and for a Public Authority, this is gold dust – it means we work better and share our insights. It's also opened up our eyes to the fact that people are fundamental and the way they are involved too."

Oscar Watkins, Senior Policy Officer, Greater London Authority

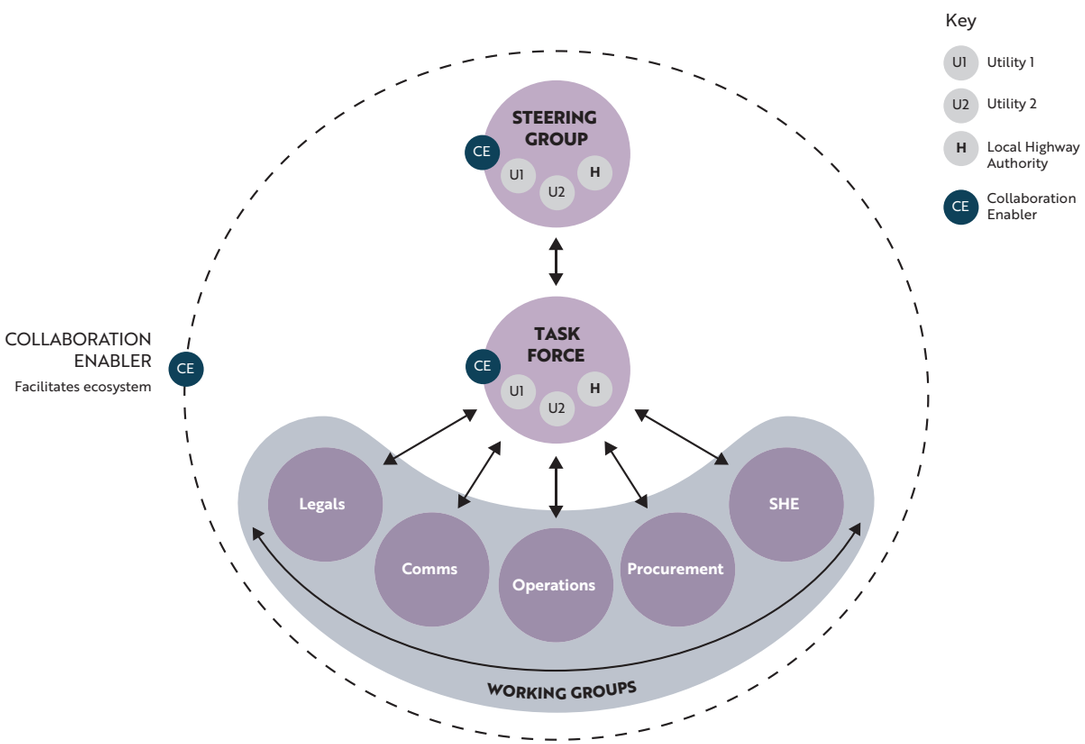
3.5 WAYS OF WORKING

This section overviews ways of organising teams as part of a collaborative infrastructure project as well as how to ensure effective communication.

WORKING STRUCTURES:

Once project Sponsors and Core team members with the correct competencies and characteristics (outlined in **chapters 3.3 & 3.4**) have been selected, you can kick off the project and form working groups.

- The groups below are based on our experience managing collaborative street works at Epsom Road.
- The key working groups that must be formed every time are the Steering Group and the Task Force.
- The rest of the groups requirements will vary from project to project and there may be fewer or more working groups depending on scheme requirements.



GROUP	PURPOSE	MEMBERS	REPORT TO
Steering Group: A senior level team (usually directors or equivalent) who have the role of steering the project.	Set project parameters, provide strategic guidance and step in for senior level support or buy-in as needed.	Sponsors across collaborating parties (as referred to in **chapter 3.3**) and a Collaboration Enabler(s).	Ultimate point of escalation.
Task Force: A team of enablers who lead the project from start to finish. This team must constantly stay in touch with each other and the working groups created, reporting regularly back to the Steering Group.	The group that oversees and manages the project on a day-to-day basis. The Task Force has decision-making ability and is responsible for ensuring all aspects of the project are managed. The Task Force is responsible for addressing any blockers that may arise during the project.	Senior/Principal Traffic Engineer from a local authority, Senior Policy Officer from a public body, Program Delivery Area Manager from the utility companies and Collaboration Enabler(s). *NB: There must be a representative from each entity in the Task Force.*	Steering Group.
Working Groups: Smaller groups with functional expertise, formed to discuss and address key project categories that may arise. The groups may be formed or dissolved during the project, as required. They work closely with the Task Force.	Completes a specialist aspect of the project. *For example* a construction working group would be made up of operations teams directly responsible for the project execution from all collaborating parties. A communication working group will have key communications experts from all organisations.	Discipline / functional managers and Collaboration Enabler(s).	Report back to the Task Force and reports into the Steering Group (as needed).

CASE STUDY: THE WORKING STRUCTURE FOR EPSOM ROAD SCHEME OF COLLABORATIVE WORKS

- The utilities involved were Thames Water and SGN, the local authority was Croydon Council, and as it was London, the GLA was involved. We started with a workshop gathering key senior team members from general management as well as teams from procurement, legal, SHE and operations.
- With this we set up five working groups that operated in parallel.
- Steering Group | Task Force | Operations Working Group | SHE Working Group | Procurement Working Group
- In a typical fortnight, we had a number of different interactions taking place – either meetings or calls.
- Some notes of how they worked together are presented below:

TEAM	INTERACTION
Steering Group: General Manager – SGN, Head of Delivery – eight2o/Thames Water, Director of Public Realm – Croydon Council Enabling Consultants – Fluxx / Atkins	Initially a meeting with one another, and then stayed in touch with the project via the Task Force.
Task Force: General Manager – SGN, Head of Delivery – eight2o/Thames Water, Principal Highways Engineer – Croydon Council, Senior Policy Manager – GLA, 5 Enabling Consultants – Fluxx / Atkins	Fortnightly calls, with a face-to-face meeting every quarter (more if required). During the calls, they shared updates regarding the project status and governance, and any blockers escalated from the working groups. These were discussed in the meetings, and sorted soon after. Possible savings and incentives were discussed during these calls to ensure benefits to all.
Operations Working Group: Engineering Manager – SGN, Contracts Manager – eight2o, Principal Highways Engineer & Highways Manager – Croydon Council (as required), External Consultant (as required), Highways Manager – TfL (as required), Enabling Consultant – Atkins	Fortnightly calls initially. This group planned the construction logistics and how each utilities' construction teams would work best together on site. The highways engineer from Croydon was involved as and when required, and the external consultants formed a key part in kicking-off the group and in starting the discussions.
Procurement Working Group: Procurement Manager SGN, Procurement Manager – eight2o, Principal Highways Engineer – Croydon Council (as required), Enabling Consultant – Atkins	These teams had some discussions at the start and at the end of the project and gave their points of view on what could and couldn't be done (working together in the same trench vs pacing works on the same street). After weekly calls in the first month, the teams took a step back as operations teams worked together.
SHE Working Group: SHE Manager – SGN, SHE Manager – eight2o, Enabling Consultant – Atkins	
Communications Working Group: Communications Manager – SGN, Communications Manager – eight2o/Thames Water, Engagement Lead – Croydon Council, Enabling Consultant – Fluxx	This team was set up during the last two months of the project when letters for residents, drop-in sessions needed to be planned.

CHANNELS OF COMMUNICATION

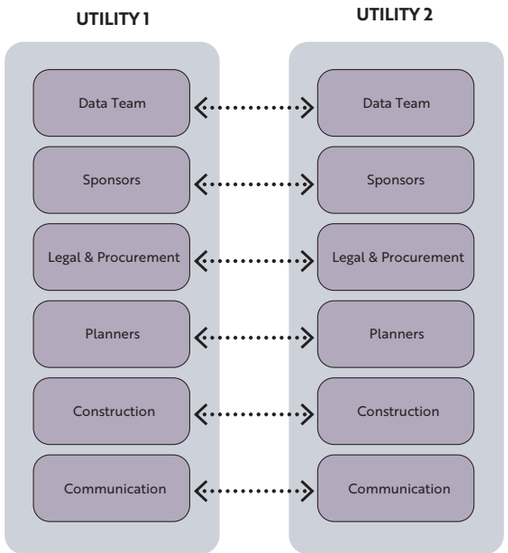
With the right resource identified and with the working and reporting structure in place, the final challenge is maintaining open channels of communication between all parties.

Communication is key to collaboration, therefore it is essential that the various teams are constantly connected.

Here are two vital channels of communication to keep open during the course of a project:

1. COMMUNICATIONS BETWEEN UTILITIES

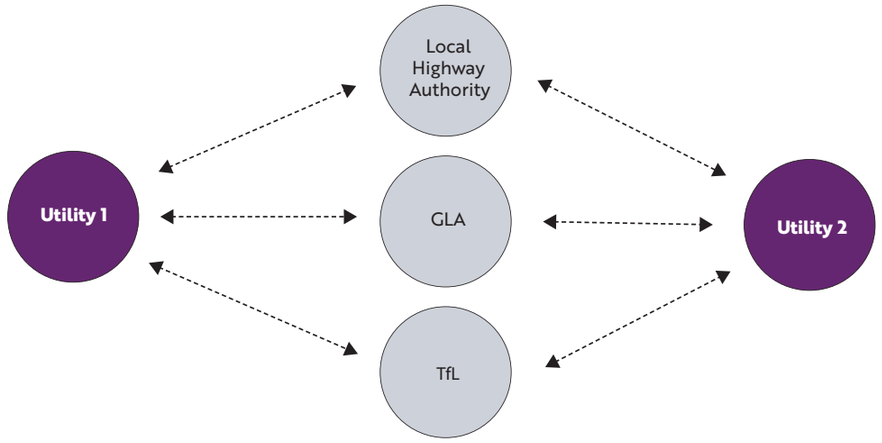
- Once opportunities are identified, the utilities must be connected regularly to ensure collaboration efforts are seamless. This ensures that teams are able to speak the same language and have practical discussions.
- As per the figure, below left, working groups help experts in one function in Utility 1 to be connected to experts in the same function in Utility 2.



Once opportunities are identified between two or more utilities, cross-discipline teams must constantly be in touch to truly make collaboration business as usual.

2. COMMUNICATION WITH THE LOCAL HIGHWAY AUTHORITIES AND PUBLIC BODIES

- Any collaborative project needs to involve the local highway authority – they are key to approving collaborative street works, and have the discretion to waiver charges that would make the collaboration cost-effective for the utilities.
- It is therefore imperative that the core team members from the local highway authority and the utilities stay constantly in touch.
- TfL will need to be specifically consulted if they own the road(s) affected. TfL can also share their learnings and lend a guiding hand to collaborative efforts.
- Further for London projects, the GLAs IDCT coordination team is a new dedicated resource, whose purpose is to enable collaboration within Greater London. They can help you to: channel communication with the utilities and boroughs, ensure that the right people are in the room, to help get your project off the ground, monitor and evaluate pilot projects, to prove the benefits of collaboration, and provide high-level governance and oversight for pilot projects, through the Mayor's Infrastructure High Level Group.



This diagram shows that conversations with the council, the GLA and Tfl must take place in parallel to ensure sufficient communication takes place between parties.

MELANIE'S KEY LEARNING

Early on in the project an opportunity was identified for SGN to undertake some works in an area that would soon be converted to a controlled parking zone (CPZ), however due to insufficient communication within the local highway authority, SGN were unable to complete the works in time and were subject to the relevant car parking suspension charges. This example illustrates how critical communication is within organisations.

3.6 COMMUNICATING WITH LOCAL STAKEHOLDERS

As referenced in **chapter 2.2**, all parties must have the same end customer in mind: residents and anyone impacted, including local businesses and stakeholders. This will change on a project-by-project basis but may include local TfL, local schools (also from neighbouring councils) and ward councillors.

Collaborating parties must ensure that the customer is informed of the benefits of joint street works. Communication about a collaborative scheme should be a coordinated effort between collaborating utilities and local authorities, so that the customer is exposed to one message rather than multiple.

Messaging and communication to local stakeholders can be guided by the below:

BE INFORMATIVE AND CLEARLY CONVEY THE BENEFITS:

- Be as transparent as possible; being as factual with details of the works as is applicable.
- Draw on the corporate objective for carrying out the works.
- It is important to convey how collaboration defines a better quality of life for local stakeholders.
- Further, it is advisable to focus on the visual aesthetics (because people are visual), speaking about how the road will look better including using phrases like 'improved appearance', 'smoother resurfacing'.

When managing comms and direct engagement we advise:

HAVE A JOINT COMMUNICATIONS PLAN:

- Where there are collaborative working schemes, it is advisable for the parties (utilities & local authorities) to have joint communication to the residents. Stakeholders will see all parties as a collaborative entity.
- Have an outlined plan overviewing continued communications and key milestones. Tracking activity using the below format works well: dates required → person responsible → completion status.

Public Information sessions (open sessions):

- It's essential to host public engagement sessions at central locations in easily accessible venues to the public. If possible, organise a drop-in event close to the location of the work. There should be representatives from all parties present.
- These sessions should start prior to work beginning (a week before) and be promoted well in advance of the event.
- Consider organising a few sessions at different times to account for residents with fixed and flexible schedules.
- A copy of the poster used at our session is in **appendix 3.6a**.

Show & Tell:

- Bring to life why the work is beneficial at the above sessions. This could be the utility companies speaking of the work they plan to do, showing the materials and explaining how they will be used.
- Proposed timescales of the works can also be discussed at this stage.

Letter Drops:

- Letter drops to residents (as with all communication during a collaborative utility project) should be seen by residents as combined communication, so that residents are not confused by receiving the same information repeatedly from different parties.
- It would be advisable to start with a common letter from all parties explaining the type, duration and reason for the works. We would advise a combined letterhead from all parties so that it looks like it is truly collaborative.
- When addressing the length of the works it's a smart idea to incorporate a time buffer so we always finish the works earlier than outlined.
- At this point, it would be effective to inform residents of the disruption avoided with collaborative works.
- Residents are never happy about work in their street, but at least if they know the utility and public companies are thinking of their benefit by combining works, they will look at it in a more positive light.
- It is important to send combined FAQs with the letter as well, because different residents consume information about street works differently, and may want to delve further into the details of the works.
- Follow-up letters could be as per BAU communication and be sent out by individual utilities (for example, a water utility temporarily disconnecting supply should be sent by the water company on their letterhead).
- Detailed information can also be put up online, with the link available in the letters in the streetworks area of the website.
- A copy of the letter we used is in **appendix 3.6b**.

Signage:

- Signage in collaborative working is complex, because all parties should have their names up, but this is not the usual practice.
- For the Epsom Road works, we chose to highlight the days of disruption saved and feature the logos of all parties (as per the reference image).
- This was used as lead signage at the head of the site, however the utilities used their individual signage as is usual practice in their area of work at any one time.

- Further research is needed to understand the public perception of this signage and to explore alternatives.

Ward Councillors:

For major works projects and / or collaborative projects it is strongly advisable to meet with ward councillors and get their approval well in advance of disseminating communication.

- Ward councillors are democratically elected local representatives whose role is to provide a bridge between the community and the local authority. There are three per London Borough and they offer an essential local resident-centric perspective.
- Briefing ward councillors should be facilitated by the local authority and happen at least two months before the scheme start date.
- Consider including ward councillors from neighbouring wards in the case of increased traffic in neighbouring streets.

Two resident-specific issues to be aware of and mitigate where possible are:

Parking:

- Lack of parking is a concern for most Londoners, and it is important to be sensitive to their plight.
- If parking is suspended due to roadworks, it is important to give residents notice well in advance along with information of alternative parking access, local authority will have specific protocol in relation to this.

Collection of bins:

- It's a good idea for the local authority to arrange for refuse collection the day before the works start, and work to minimize the windows between collections for residents.

GEMMA'S TOP TIPS

- *Set up a communications working group early on, allowing you to put key deadlines in place.*
- *Reviewing and signing off joint written communications can be a time-intensive process that could take up to eight weeks. Consider agreeing a collective approvals process for communications up front to make this more efficient.*
- *We had a lot of support and guidance from London Borough of Croydon's Stakeholder Engagement Manager. A passionate do-er in a similar role for your communications working group can really help you work more closely with your stakeholders.*

CASE STUDY: EPSOM ROAD

- *Once we confirmed that the project would move ahead (it had passed governance, and the sub contractors were decided) we started thinking about communication.*
- *We (some members of the taskforce) started by creating a rough format of what we expected a joint letter to say.*
- *We then met with ward councillors to understand their input and also get their blessing on the project.*
  - They brought up important aspects like parking, public transport diversions, home deliveries, school access and refuse pick-ups; essentially they asked us to look at how to make disruption the least for the residents.
- *Next, we organised a joint call between communications teams from SGN, eight2o/Thames Water and London Borough of Croydon – thereby setting up the communications working group.*
  - The Task Force members recommended the relevant communication partners from their teams who would be a part of the working group.
  - We (members of the Task Force and enabling consultants) helped explain the project, and we discussed the strategy we would like to pursue.
  - We decided that the communication we used to reach the residents must be seen as a uniform.
- *We shared our first draft of the letter with all parties for their inputs. The teams took a few weeks to feed back.*
  - The teams went back to their operations teams to understand the details of the projects and any queries we raised as a team, and shared their input back with the working group.
  - Once the content was frozen, some teams went back to their branding teams for a final approval on language and branding.
  - It was important that one party (here the enabling consultants) took the lead by collecting feedback and making all required changes in one place.
- *We discussed whether we wanted one party to lead the letter with their letterhead and decided against it. To make it truly collaborative, we created a common letterhead with all 3 logos to ensure that residents did not direct their queries to just one party.*
- *We also organised a joint drop-in session which was to be treated as BAU drop-in sessions, but with three parties sharing their updates on 19th March (the week before works began).*
- *In addition, we planned for Croydon Growth Zone vans to be available on-site on some days during the project so that residents passing by could find out more if they needed it. We would experiment with one session, and see the response and gauge the need for more sessions.*

3.7 DATA ENVIRONMENT AND SHARING

Data is the foundation of collaboration. This is the section on all things data, covering how to prepare data, share data between organisations and ultimately how to utilise it to identify collaboration opportunities.

FIRSTLY, WHAT IS SPATIAL DATA?

Spatial data is any data type with a location or set of coordinates, for example the pathway of a pipe beneath a road or the location of a tram stop. Out of all the data that exists in the world, 80% is said to have a spatial component. Geographic Information Systems ("GIS") are used to integrate spatial data and facilitate the storage, manipulation and analysis of this data to make data-driven decisions.[6]

The increasing need to collaborate has meant GISs now mostly exist over the web, opening geographic information to a larger proportion of users and improving interoperability across and between organisations.

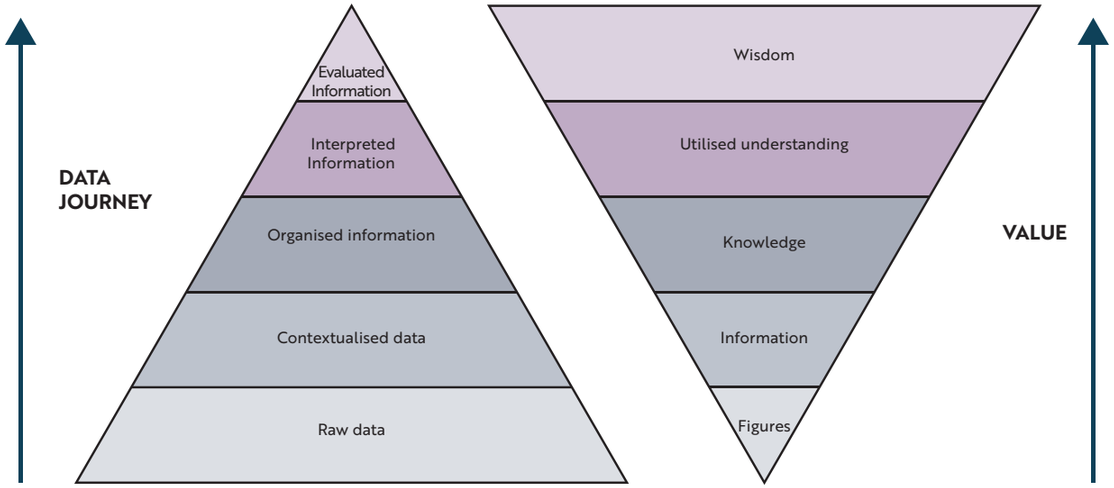
Please refer to **appendix 3.7a** for further information on the UK's key spatial data initiatives.

OUR VISION FOR IDENTIFYING COLLABORATION OPPORTUNITIES USING SPATIAL DATA

Having the means to represent, visualise and query future investment data from utility and local authorities is the first step to identifying opportunities to collaborate on street works. Future investment data in local authorities and utilities often exists in silos and is not shared on a common platform either within the organisation or externally. Ensuring your organisation has an appropriate platform (see step 1.4 below) that can host and visualise spatial data, and be accessible, is an important first step to systematically delivering multi-utility collaboration.

Our vision is for organisations to turn data into dialogue. This journey involves transforming raw data into evaluated information through the enrichment of attributes and overlaying with other datasets. As raw data is enriched, evaluated and analysed, this in turn increases the added-value through which collaborative working opportunities can be identified and pursued. For example, only when the necessary evaluated information exists can the relevant person make the decision on the most appropriate and feasible collaborative opportunities to pursue. This is what we are defining as wisdom.

6 *Longley et al. (2011)*



TURNING DATA INTO TANGIBLE OPPORTUNITIES TO COLLABORATE

STEP 1 – PREPARING AND SHARING SPATIAL DATA INTERNALLY

Before your organisation can start sharing future investment data externally, it is important that the relevant data has been shared and socialised within your organisation. For example, if you are a utility, explore the value of sharing future investment data across different business units and/or programme teams.

To achieve this you may want to consider the following steps:

1. **Understand** what data exists, the format it is in and its importance for identifying collaborative working opportunities. Consider answering the following questions when assessing the suitability of a dataset to avoid creating 'just a data repository':
   a. How could this dataset help identify opportunities to collaborate and/or realise efficiencies?
   b. Is this dataset applicable to more than one team?
   c. Does this dataset only help deliver my day-to-day work more effectively?
2. **Transform into spatial format:** Often spatial data resides in non-spatial formats such as spreadsheets or in CAD formats. Ensure that this data can be transformed into a spatial format (E.g. Shapefile). Consider using data transformation software to do this. These packages are often called Extract, Transform, Load (ETL) software.
3. **Standardise attributes:** Different datasets often have varying degrees of attribute detail depending on their internal uses. For the purposes of collaboration, we should limit the number of attributes to only those which bring value to identifying collaborative opportunities. (See **appendix 3.7b** for an example.)
4. **Establish a Spatial Common Data Environment (sCDE):** To lift the identified disparate datasets out of silos it is critical data is hosted in a single, controlled web-based GIS environment. Evaluate existing software-as-a-service packages as well as open-source alternatives to determine which is most appropriate for your organisation. You may want to utilise an existing corporate GIS system. Ensure that appropriate spatial data management procedures are enforced such as naming conventions, the maintaining of a data register and a process for assuring incoming data.
5. **Develop mechanisms for updates:** Within the sCDE, ensure that there are appropriate mechanisms for updating data. Users will lose faith in the platform if they know the data isn't up to date.
6. **Visualise** datasets in a series of web maps. At this stage, you shouldn't worry about running complex analytics on your data, rather focus on the value of visualising, previously undiscoverable datasets in one place.

CASE STUDY: INTERNAL DATA SHARING IN THAMES WATER (eight2o).

- *Thames Water embarked on a project in 2016 to reduce road disruption and improve the efficiency of delivering asset upgrade works in Greater London. The project focused on sharing existing data within Thames Water and eight2o to identify coincident investment needs and realise potential value.*
- *Through delivery alliance eight2o, the team worked with design consultants Atkins and innovation consultants Fluxx to develop a forward planning web map.*
- *Data sets showing asset health and a water quality programme were overlaid and presented using Esri's ArcGIS Online (now called 'ThamesConnect'). Considerable overlaps were identified and Thames Water's water mains replacement programme was subsequently defined around its synergies with a water quality programme.*
- *This systematic collaboration amounted to efficiencies of more than 15% programme cost savings and a decade (3,900 days) of disruption to highways avoided.*
- *The platform is now used by planners, designers, network engineers and programme definition managers across Thames Water and its capital delivery partners to define and de-risk programmes.*
- *The data stored in 'ThamesConnect' is managed in an automated and controlled environment with standardised attribute schemas and the means to share with external stakeholders when appropriate.*

STEP 2 – PREPARE AND SHARE SPATIAL DATA EXTERNALLY

Alongside your internal collaboration journey, to highlight and pursue collaboration opportunities between organisations, data must be shared externally. Data sharing involves both the publishing of your organisation's data but also consuming datasets from other organisations. There are varying degrees to which data can be shared and you should find the appropriate level for your organisation, and also for each specific dataset you plan to share, taking the time to consider the risks and opportunities at each stage.

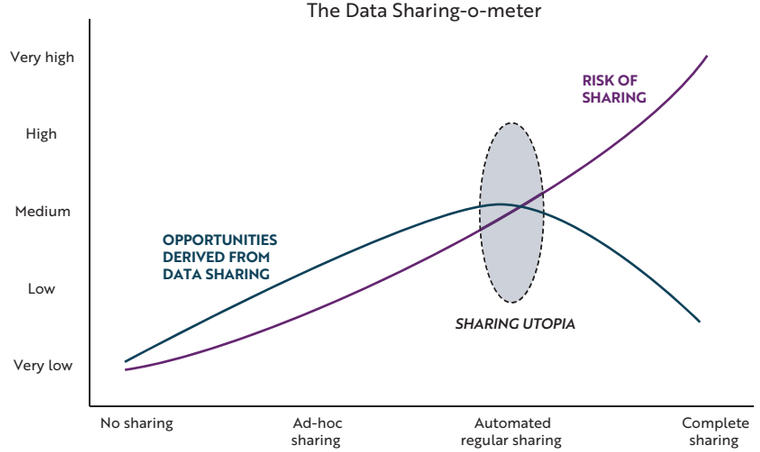
Before any data sharing can take place, prerequisite Non Disclosure Agreements (NDAs) and data sharing licenses need to be drawn up in consultation with provider data security representatives. For reference of a Non Disclosure Agreement, please reach out to idct@london.gov.uk.

Consider the following steps when looking to share data externally:

1. Identify appropriate datasets to share externally (see the data sections in **chapter 4**). These may be different to those which are shared internally.
2. Circulate and sign appropriate NDAs and data licences between all parties.
3. Apply a standard attribute schema (see **appendix 3.7b** for example attribute schema).
4. Establish most appropriate mechanism to share, and consume, data externally (consider using data sharing-o-meter below). This may be using direct web services between platforms or ad-hoc sharing via a File Transfer Protocol.

The data sharing-o-meter demonstrates the importance of *finding the appropriate level of data sharing* for your organisation, primarily balancing risks with willingness to share. Risk increases as a function of the level of data sharing at each stage but the primary risks transition from missing collaborative opportunities at the ad-hoc level to increased security and privacy risks towards complete sharing level. Don't try to jump straight to automated, regular data sharing. Start with ad-hoc sharing, evaluate the number of collaborative opportunities identified and risks at this stage and then build a case to move up a level. The table below highlights some of the key requirements for the ad-hoc and regular, automated sharing levels.

The Data Sharing-o-meter



	Ad-hoc Sharing	*Automated, Regular Sharing*
Minimum System Requirements	Desktop GIS	Web-based Spatial Common Data Environment
Data Quality and Storage	Ad-hoc data assurance and storage	Spatial Data Management Process
Means of sharing	Via Email/File Transfer Protocol/ Download from web-based system	'Live' web services between organisations
Requirement for Schema/ Standards	Not necessary	Conform to coordinating entity data standards

Factors and mitigations that should be considered when sharing data externally:[7]

Privacy: data protection.
Mitigate by: ensuring that your datasets and/ or platform do not contain any personal data. Considering who *should* have visibility of specific datasets that you plan to share and determining the most appropriate level of sharing for each dataset.

Security: protection from accidental or malicious damage or unauthorised access.
Mitigate by: ensuring the chosen platform has robust security protocols.

Integrity: avoid data corruption as data is handled, copied, processed and transported.
Mitigate by: applying appropriate spatial data management procedures to ensure corrupted data can be retrieved.

Availability: the degree to which data needs to be available to meet a purpose.
Mitigate by: agreeing update schedules within data licence agreements (an example data licence agreement can be found in the **appendix 3.2b**).

Quality: completeness, validity, consistency, timeliness, accuracy, precision and tolerance. Ask yourself, is the quality sufficient for the data to be reused for a new purpose?
Mitigate by: having a process for assuring incoming data.

Provenance: traceability of data from collection, through each transformation, analyses and interpretation.
Mitigate by: establishing a spatial common data environment with appropriate data management procedures.

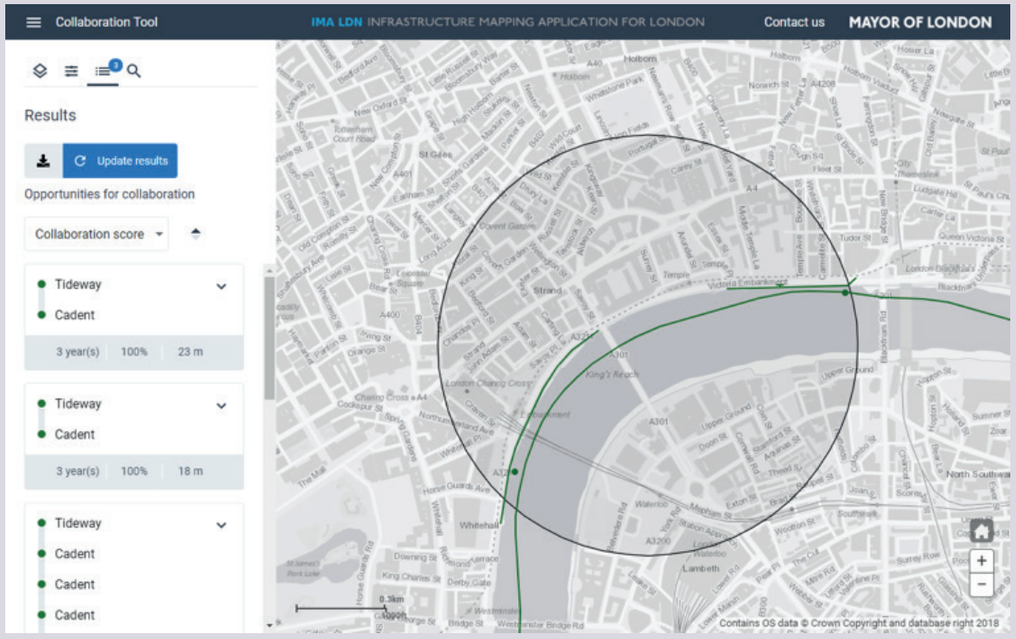
7 *'Barriers to Interoperability' – Page 6, PAS182 Executive Summary, British Standards Institute*

CASE STUDY: *EXTERNAL DATA SHARING BETWEEN INFRASTRUCTURE MAPPING APPLICATION AND CROYDONCONNECT*

- *To enable organisations to share data amongst each other in a controlled and coordinated way, a centralised data warehousing platform should exist for a given region to avoid duplicating data sharing mechanisms between all participating organisations. This platform will facilitate data sharing between utilities, local authorities and highway authorities.*
- *In London, the Greater London Authority have been developing the London Infrastructure Mapping Application ("IMA") to address this. The IMA allows organisations to publish and consume future investment data. Soon it will also allow organisations to systematically identify opportunities to collaborate by providing functionality that highlights overlaps in space and time between these future investments.*
- *To compliment this, the London Borough of Croydon has recently invested in an Esri ArcGIS Online platform to support, and promote, multi-utility collaboration works in the borough with a view to sharing data with, and consuming data from, the London Infrastructure Mapping Application (IMA). LBC plans to automatically share its carriageway condition data with the IMA using this platform and also use this link with the IMA to consume utility future investment data for the borough.*
- *This direct data sharing between Croydon and the IMA is expected to commence during 2019.*

EXAMPLE OF FUNCTIONALITY: IMA COLLABORATION TOOL

An example of functionality can be found in the IMA's Collaboration Tool. This tool calculates the viability of two or more planned capital works projects being undertaken simultaneously, ideally with a 'dig once' approach. This data can be exported, or visualised in the tool, and provides contact details for all infrastructure providers that could potentially be involved in a coordinated programme. The tool is being used to support a number of coordinated street works pilot projects across London in 2019.



STEP 3: DEVELOP FUNCTIONALITY TO IDENTIFY COLLABORATION OPPORTUNITIES AND SCALE YOUR PLATFORM

Once your data exists in a spatial common data environment and can be visualised on a map, you should consider developing functionality to identify collaboration opportunities more easily. Though manually interrogating a web map can highlight numerous opportunities, regularly reporting on current opportunities requires a degree of automation.

Examples of functionality could include:

- A link to a list of relevant contacts to ensure that users have the means to follow up on opportunities.

- Intersect spatial query between datasets of the same or similar class.
- A more complex algorithm that considers a range of factors to prioritise opportunities.
- A time-slider to view data through time and reduce the amount of data on screen at one time.
- Automated report generation to highlight pertinent collaboration opportunities.
- Filters to interrogate datasets based on a particular attribute.
- Means to integrate with existing internal corporate systems.

Most importantly, focus on understanding your users to ensure you develop functionality that will deliver value and increase adoption.

"My advice for those interested in implementing collaborative street works is to start early on. Plan for this stuff as far ahead as you can, be smart about bringing together the data teams, colleagues in Utilities, we need more data on planned works for this approach to work. We need data from Boroughs and Local Highways Authorities on highways resurfacing – so bringing that together at an early stage is really key. Something important especially for Epsom Road was having open-minded approach that all parties have taken – we had individuals on this team who didn't just say no for the sake of it, didn't allow some of the basic hurdles get in their way and had a drive to go beyond their day-to-day work to chase benefits."
Oscar Watkins, Senior Policy Officer, Greater London Authority

COMMON CHALLENGES AND MITIGATIONS:

1. Knowing which datasets to prioritise and visualise in a sCDE:

Consequences:
- Large volumes of data to consider.
- Difficulty understanding interrelationships.

Mitigation: Start by looking at data holistically and use lean methodologies to experiment with the value of visualising different data themes in your organisation.

In practice: At Thames Water, we started overlapping datasets in a small geographical area of London; when overlaps were identified we convened meetings between the respective programme owners to understand whether this opened up opportunities.

Our learnings: Lean experimental approach quickly identifies those datasets that deliver most value. These datasets are highlighted in **chapters 4 and 5**.

2. Barriers to sharing data externally (Commercial Sensitivities and Cultural Reluctance):

Consequences:
- Data is shared last minute.
- Duplication of effort from all parties (time and cost) to mine the same data.
- Reduced ability to align and coordinate activities foregoing potential benefit.
- Reluctance to share data that is not 'absolutely accurate' or set in stone.

Mitigations:
- Use NDAs and data licences to control the sharing and use of data.
- Define caveats, commitments and risks through the project life cycles.
- Senior technical information representative accountability required to support Task Force and be answerable to sponsor. **Contact your Technical Information Manager to obtain a data licence agreement**.

In practice: Thames Water and SGN started sharing future investment data in the borough of Croydon under the common understanding that plans may change. They soon found that overlaying speculative investment data would derive the most value.

Our learnings: Potential benefits increase the longer the planning horizon. Sharing data at the asset planning stage yields maximum benefit.

3. Data administration burden (Time, Cost and Quality).

Consequences:
- Data is not in a discoverable state.
- Risk of failure to systematically identify risk and opportunity.
- Inconsistent formats and storage mechanisms.

Mitigations:
- Apply/enforce standardised and interoperable attribute schemas.
- Establish a controlled spatial common data environment to manage data.
- Automate data transformation and ingestion to automatically assure data and reduce time/cost burden.

In practice: At Thames Water, standardised attribute schemas and automated data processes have been implemented to ensure that data quality is maintained and the administration burden is minimised.

Our learnings: Benefits associated with improved spatial data management are available to all participants irrespective of external collaboration.

JACK'S TOP TIP

Data transformation and sharing is an important first step to delivering systematic infrastructure collaboration – in London, the IMA exists to support and promote this.

3.8 ETHICAL COMPLIANCE

Collaborative working is underpinned by trust and requires the adoption of appropriate business practices which ensure ethics and compliance.

To promote and maintain ethical standards you must:

- Build and foster a culture of integrity.
- Create awareness of participant codes of conduct.
- Consult with ethical compliance teams within participating organisations.
- Set up measures to prevent, detect and respond to risks.
- Regularly table ethics during minuted engagement sessions considering the following:
  - Are issues under consideration legal, fair, ethical and morally acceptable?
  - What is the 'gut feeling'?
  - Could reputation be negatively affected?
  - Could there be a perceived conflict of interest?
- Sign post access to support, advice, information and resources.
- Support people who come forward in good faith with compliance-related concerns.

AVOIDING CONFLICTS OF INTEREST (COI)

A conflict of interest, whether it is actual, potential or perceived, can expose organisations to certain risks, such as decreased shareholder value, legal liability or reputational damage and can undermine the promotion of joint working. When COIs, either actual, potential or perceived, do occur, measures can be implemented to mitigate negative impacts.

As such, all stakeholders have an ongoing disclosure obligation and should be advised to immediately disclose any COI when they arise using their primary employer's governance procedures. Failure to disclose will likely breach stakeholder codes of practice and contractual obligations.

Examples of potential COIs include:

- Through the course of seconded employment, being party to information which could be perceived as providing an advantage prior to a competitive tender to primary employer.
- Individuals or primary employers are establishing a business relationship with a competitor, business partner, supplier or client.
- Individuals who have an immediate family member or close personal relationship with competitor, business partner, supplier or client.
- Individuals who have an immediate family member is/was a government official in the last five years.

When an actual, potential or perceived COI is deemed to exist, the ethics and compliance specialists should be consulted to outline the measures required to remedy the situation. Information should be treated confidentially and made available only to individuals directly involved in assessing or managing the COI. Individuals should be encouraged to:

- Act and make decisions in accordance with ethics and compliance standards.
- Completely and truthfully disclose, in a timely manner, all information related to an actual, potential or perceived conflict of interest.
- Abide by any mitigating measures implemented to remedy a COI.

Individuals should be advised not to:

- Be guided by personal benefit or that of a family member or close personal contact;
- Be placed in a position which compromises objectivity toward a family member or close personal contact, either by supervising them or doing business with a company they fully or partially own or work for.
- Proceed when known or unsure to be in a situation which constitutes a COI.

For consideration:

- Drive awareness and accountability from the Task Force, create a culture of awareness, make arrangements to circulate and promote standards, contacts and training.
- Include ethical compliance as an agenda point at key meetings to discuss potential risks, for example, forthcoming tenders/procurement events.
- Arrange periodic consultations with your ethics and compliance team to update them on progress and invite feedback.

04.

CAPITAL WORKS

What this chapter will cover:

- A general guide to enabling joint capital working
- The current arrangements and challenges in relation to long-, medium- and short-term planning horizons.
- The data, stakeholder stakeholder group and priorities that were found to be relevant to each planning horizon.
- A detailed case study on Epsom Road

4.0 INTRODUCTION

Capital works refer to the upgrade and replacement of aging infrastructure and strategic upgrades to meet rising demand in general, as opposed to connections to new developments or works carried out for maintenance and repair.

CONTEXT

There is ever greater political pressure on the regulators to promote value for money and efficiency.

Working in an urban environment is challenging, the subsurface is becoming ever more congested, competition for road space is increasing, and the cost of labour and materials is rising.

The impact associated with capital works is likely to become more severe as infrastructure ages and the demands growth places on it increases.

The consensus view from industry, following a detailed consultation[8] is that multi utility coordination and collaboration, promoted by an impartial entity, could help mitigate some of these adverse impacts.

A key conclusion of the consultation report was that a clear need exists to bring the capital's infrastructure providers together with other stakeholders, including local authorities, to coordinate and improve infrastructure delivery.

CHALLENGES

Although a consensus is developing within the sector, collaborative working is not routinely practised as relevant data tends not to be shared, dialogue between stakeholders is limited, prerequisite arrangements are not in place, and there is a perception that it would be too costly to establish for individual projects.

Collaborative working can be seen as a risky departure from business as usual within project and construction teams, who have budgeted for inefficiencies, are compelled to control for risk and do not have the remit or capacity to innovate.

Examples of utilities trialling a more transparent and collaborative approach to capital works are starting to surface. Such initiatives have driven significant benefit in terms of cost savings and reduced disruption but require senior sponsorship and dedicated resources to overcome the challenges highlighted above.

8 *Source: London Infrastructure Plan 2050 Update.*

PLANNING HORIZONS

This chapter considers capital works over the short- and medium-term planning horizons, as the opportunities to promote collaborative working, the stakeholder groups involved and their priorities differ across each planning horizon. The long-term planning horizon is out of scope for this document.

Investment cycles don't perfectly align between local highway authorities and the utilities, and the timescales will vary between sectors, the definitions of the three planning horizons are therefore generally described as:

- **Short-term** Budgets allocated to work packages. Detailed design, procurement, planning and construction occur within the short-term period.
- **Medium-term** Within strategic periods, outcomes and budgets established, programmes still to be fully defined, design yet to be finalised.
- **Long-term** Strategic priorities, budgets and programme outcomes yet to be fully defined.

"The advice I'd give if you were looking to set up a collaborative street works project is that it is really about early engagement, give yourself enough time. If you stress yourself by giving yourself too short a window, you will default to the easy approach and you will negate your collaborative opportunities. Given time pressures of delivery we end up not taking the more difficult route of collaboration."
Lee Hewitt, eight2o/Thames Water, Epsom Road Project Sponsor

4.1 SHORT-TERM PLANNING

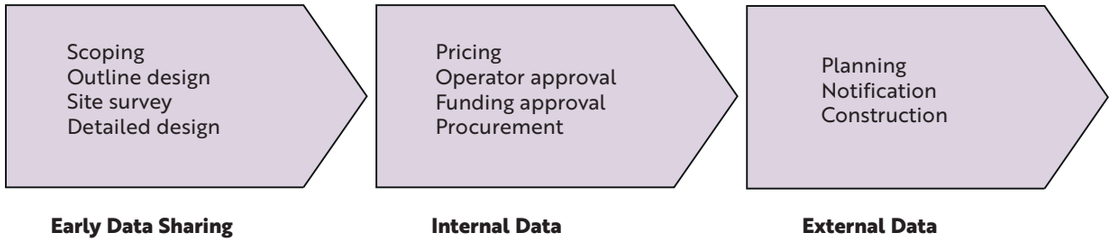
The short-term planning horizon can be thought of as:

- Sitting within the current investment cycles, with programmes defined, budgets allocated and supply chain engaged.
- Pre construction surveys and outline design activities have commenced.
- There is still a degree of flexibility and opportunity for collaboration, as design approval and planning will be completed through the course of the short-term planning horizon, providing data is shared early.
- Benefits can be achieved if the organisational and commercial structure of the collaborating entities allows (see chapters **2.5 and 5** for further information), or if works are planned in such a way as to accommodate paced collaboration.

CURRENT ARRANGEMENTS – PROJECT LIFE CYCLE

- Funding will often be released on a periodic basis (often annually or biannually) after being agreed by internal governance.
- The Programme Delivery team then has the responsibility to deliver against the funding levels to achieve the outcomes agreed by internal governance (cost and asset health).
- Projects will have first passed through a number of internal check points before being considered.
- The timescale for this process varies widely depending on the nature of the project and the level of complexity, however, it is not uncommon for this process to take between 12–24 months.

The below diagram illustrates the typical stages of the short-term planning horizon:



- Internal sharing of project data does not generally occur until the asset operator or owner has approved the design and funding has been agreed. External sharing of project data tends not to occur until the planning stage.
- The ability to change the scope or timing of a project to accommodate collaborative opportunities at a later stage is more likely to be cost prohibitive.
- Instances of project overlap can often be perceived as risks within project teams as opposed to opportunities.

ORGANISATIONAL FACTORS

- Providers have differing procurement and delivery models; some tender on an individual basis, others may agree pipelines of work with specific contractors on a periodic basis.
- Some utilities appoint Joint Ventures or Alliance partners as principal contractors, others appoint supply chain partners as principal contractors. This impacts the degree to which collaborative working can be undertaken, due to CDM regulations **(see chapter 2.4)**.
- In general, the ability to adapt governance, legal, procurement and organisational arrangements to facilitate joint working opportunities identified late in the short-term planning horizon is limited. The costs associated with such change are difficult to justify on a project-by-project basis.

CURRENT ARRANGEMENTS – COORDINATION

- Providers have dedicated resource to manage external engagement. However, they are often acting on data released at the planning stage and do not have a consistent view of early stage data.
- Planned works are depicted on geospatial platforms such as roadworks.org and London Works. Quarterly statutory coordination meeting chaired by local boroughs under the New Roads and Street Works Act provide frequent touch points for providers, developers and local boroughs.
- 'Clashes' highlighted by the manual analysis of notification data are discussed often presented in spreadsheet format, obscuring the wider geographical context.
- The outputs of the quarterly meetings are often relayed back to provider organisations via a 'send to all' email.
- Existing arrangements limit the degree to which local boroughs and providers can optimise the coordination of their planned activities and provide insufficient time to plan for joint working. The existing arrangements react to proposals for currently planned programmes of work but do not proactively help shape them.

The table below summarises some of the existing measures and challenges we have encountered.

Existing measures	Challenges
Dedicated teams tasked with coordinating external engagement.	Inconsistency in early stage data.
Corporate systems and data platforms for project data.	Project data environments are commonly used for project control and administration as opposed to sharing information, designing and planning.
Existing planning process identifies project overlap.	Overlap often identified too late in the project life cycle, resulting in disruption rather than benefit, increasing risk and inflating overheads.
Statutory coordination meetings provided touchpoints between utilities, developers and local boroughs.	Provider representatives can struggle to provide specific insight, owing to the wide range of programmes, often electing to take matters offline. Follow on actions can be unclear.
Consensus around the need to be collaborative and transparent.	Perceived as risky departure from business as usual within project and construction teams.

The case studies below illustrate the benefits of coordination in the short-term planning horizon:

CASE STUDIES

1. Epsom Road was our key project and the case study is detailed in **chapter 4.2**.
2. Borough High Street.

CASE STUDY: BOROUGH HIGH STREET

- *Collaborative working in Borough High Street, Southwark, London, during 2009 and 2010 saved more than a whole year in work days, compared with the estimated total time required for carrying out the gas, water and electricity projects separately.*
- *The time-saving of 384 days was calculated independently by Transport for London, who acted as an enabler to a voluntary collaboration between Thames Water, Southern Gas Networks and UK Power Networks, with Morrison Utility Services as the contractor for all three.*
- *Dubbed 'The Borough High Street Blueprint', the project has become a model for future works not only in the London Borough of Southwark, but across the region as new permits are introduced.*
- *The project was completed in nine months. The team didn't need to apply for an extension, despite the addition of the electric duct work, and at all times were compliant with any highway notices in force.*
- *While the project was in progress, Transport for London also completed 16 separate highway maintenance jobs within the Morrison Utility Services boundary of works and BT carried out a remedial repair to some of its apparatus.*

4.2 EPSOM ROAD CASE STUDY

In the Croydon Growth Zone, there are 20 major developments which are currently consented and will be completed within the next 10–15 years. Each of these projects will require five utilities connections (gas, water, electricity, sewerage, and telecoms). If each of these connections is accompanied by a separate street works scheme, this could lead to a total of 100 major street works projects in the growth zone.

Epsom Road is an arterial road located slightly outside of the Croydon Growth Zone. It has over 1,200 residents. It was due for major gas, water and re-surfacing works.

EPSOM ROAD CASE STUDY

Collaboration in gas, water and re-surfacing streetworks

Nov '17 – Call for data sharing between multiple utilities

Jan '18 – Thames Water & SGN : forward looking asset data
Croydon council : carriageway condition data

Mapped data on our web map - CroydonConnect

Mar '18

> "Seeing the plans of all parties in one place through the GIS tool, it was visible that we were due to resurface the road 6 months before utilities were to do their replacement works. That is where Epsom Road stood out – our interests clearly coincided and we thought, get the utilities in first, then we resurface it. Moreover, get them to go in at the same time and reduce disruption to residents by hopefully 50% with a shiny new road with no patchwork!"
>
> Alexander Pocklington
> Principal Impact Assessment Engineer,
> London Borough of Croydon

Apr '18 – Attended Sprint '18 coordination meeting with utilities and street works coordinators

Spotted Epsom Road as an opportunity needing gas, water and resurfacing works

May '18 – Took it forward to the task force (senior teams identified from Thames Water and SGN)

June '18 – Issued an instruction to the design office for SGN & Thames Water

July '18 – Sought initial validation from construction teams

Submitted proposal, to the promise for trial schemes

Aug '18 – *Procurement Strategy Workshop 1*

Attendees -
General management, procurement, legal teams from SGN, Thames Water & Croydon council

Discussions -
How to collaborate, who would be principal contractor

Feedback -
Great theory discussed. Positive approach to collaboration. Agreed to the benefits of collaboration

Outcome -
Created a working diagram for semi and complete collaboration

Sep '18 – Internal discussions on way forward

Oct '18 – ***Project almost cancelled***

Epsom Road was not meeting governance, the information had not filtered to the relevant teams, the construction teams were not involved, so there was no visibility of possible savings or ownership of the project

Task force involved, workshop 2 planned

Oct '18 – *Procurement Strategy Workshop 2*

Discussions to proceed:

Way of working
1. Director Labour
2. Working in the same closure
3. Using separate contractors – paced collaboration

Benefits Assessment:
Discussions within Croydon on savings/waivers of parking charges etc. created an incentive for the utilities

Road closure plans
Work in sequential sections to achieve maximum benefit

Attendees -
General management, procurement, legal, construction

Discussions -
Primarily about plans for Epsom Road

Feedback -
Practical session, great to have the doers (construction & operations managers) in the room - makes the conversation practical

Outcome -
Working groups across all key teams

Nov '18 – Worked out benefits assessment (time/money) saving

£201,000	£678,000	98 DAYS
waived/exempt in parking bays	saved for the economy	of disruption saved

Improved perception

Kick off meeting to get more parties involved/excited

Teams who originally discussed cancelling the project were now identifying more collaboration opportunities thanks to the visibility of the savings

Jan '19

Governance finalised:
Epsom Road was part of the year 5 plans for eight2o/ Thames Water mains rehabilitation program, savings on Epsom Road helped make the entire scheme more affordable

SGN had governance approved in advance

Principal Contractor:
Discussions between parties to finalise principal contractors

Feb '19

Final way of working:
Croydon council and operations teams from SGN & Thames Water finalised way of working

Communication for Residents:
Communications teams from all 3 parties worked together to present a common front to residents with resident letters and drop in clinics

Mar '19 – Drop in session hosted by all 3 parties
Epsom road works commenced

> "We managed to get to a solution which at first seemed a long way off, but when we started to break it down we got to a place where we could control the safety on site which is paramount in any organisation...Hopefully this can be a trailblazer as to how these projects can be released into the wider London arena"
>
> Lee Hewitt
> Project Sponsor, eight2o/Thames Water

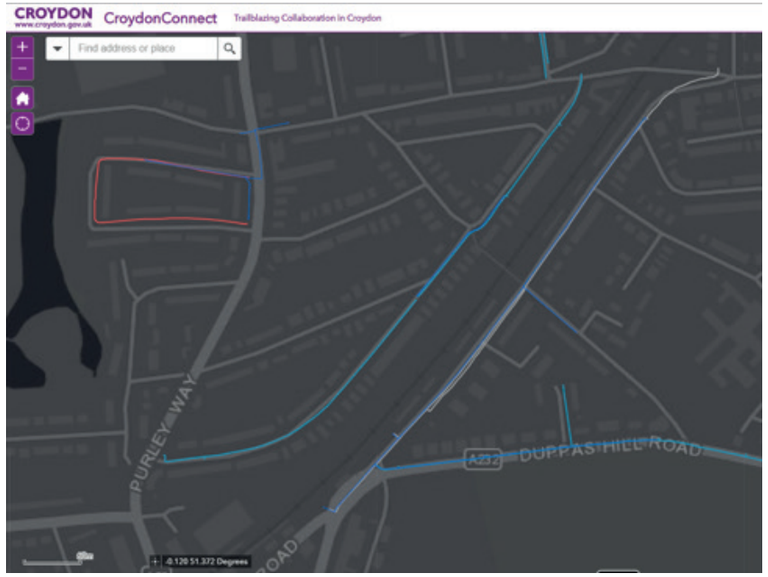


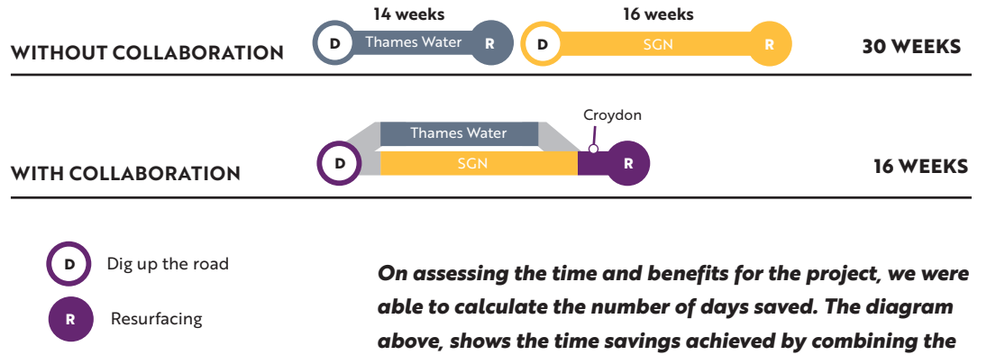
Image of web map showing an overlap of works required by Thames Water and SGN.

THE WAY OF WORKING CHALLENGE

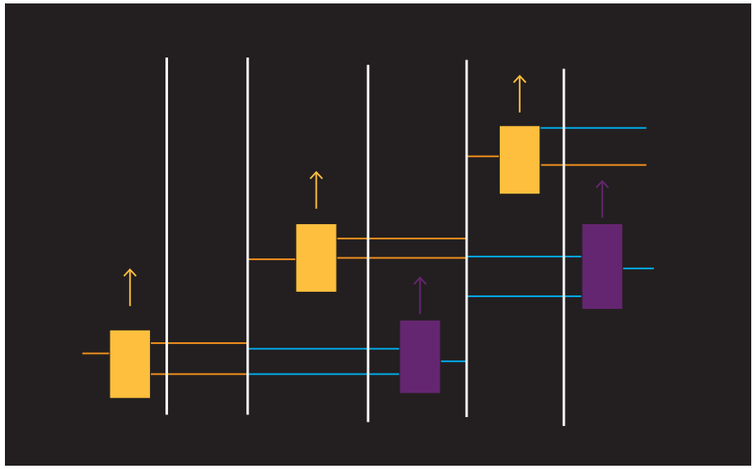
- Being idealistic, we started with two options – semi and complete collaboration. In a workshop with cross-functional teams from Thames Water, SGN and London Borough of Croydon, we drew out two solutions which looked great in theory.
- However, once we started working with the procurement teams and construction managers, we realised that the existing contracting formats eight2o allow for a single sub contractor. (Thames Water assigned their delivery partner SMB as a principal contractor, but SGN appointed an eight2o sub contractor as their principal contractor, so if we were to work with one delivery (sub) contractor – who would take the role as principal contractor?).
- Further, CDM (construction, design & management) presented a substantial challenge (please refer to **chapter 2.4**) for collaborative street works as the roles under CDM set out specific responsibilities for duty holders to deliver. (This is because each of the primary roles in CDM can only be fulfilled by one organisation in any one workplace, and cannot be split between companies). This makes it challenging to decide which individual can take on each role.
- If we were to change contracting terms for this particular project, we would have lost out on time, failing to deliver the works within the completion window.

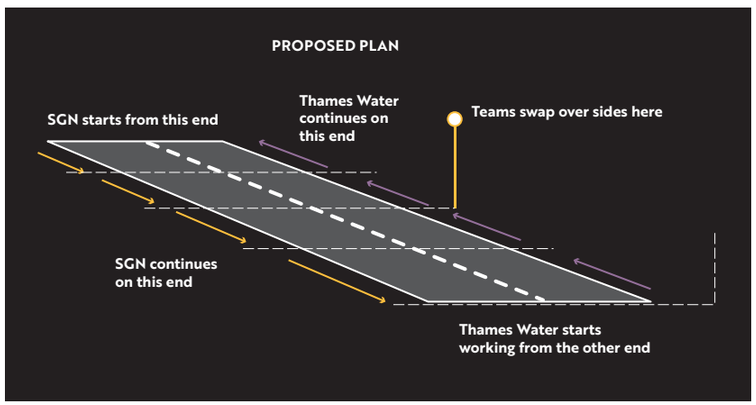
NAT'S TOP TIP

Know what you mean when you are talking about collaboration – it's not always utopia!



On assessing the time and benefits for the project, we were able to calculate the number of days saved. The diagram above, shows the time savings achieved by combining the three programs of work is almost half the original duration.





Images above left and left, represent two options for paced collaboration: in the first option (above left), one utility company follows the other with their works (referred to as 'chasing' works); in the second option (left), they approach the road from different sides (referred to as 'spacing' works). Site management and timing must be collaborated to make paced collaboration successful.

- We explored the Direct Labour option through a shared contractor (one subcontractor to excavate the gas trench and lay a pipe to SGN standards, then SGN to have direct labour to come in and do all the technical gas works.) However, not all contractors can do both gas and water works, so this limited our options. Chiefly, SGN also focuses its Direct Labour efforts on repair works as opposed to replacement, therefore this wasn't a viable option.
- Our takeout was that the most efficient way forward was to separate the water and gas works, but deliver them at the same time. This meant that one utility could follow the other without using the same contractor, the CDM responsibilities for each work stream would remain clear, and the contractors could still plan their work in a coordinated way to save time, money, and re-laying the road.
- In essence, each contractor would set out their work space adjacent to one another, establishing boundaries to their work area giving clear ownership. If at any point the work space is needed by the other contractor a simple process was developed to allow the area and the CDM responsibilities for that area to be formally handed over.

MAXIMISING THE IMPACT OF WORKS FOR RESIDENTS

With residents in mind, as the working teams moved into each staggered section, the spill-over roads were opened (see image) enabling re-surfacing by London Borough of Croydon's highways. This showed residents that we put their interests first by delivering our promise to improve the aesthetics of Epsom Road and remove potholes.

LEARNINGS ALONG THE WAY:

- **Get the right people in the room:** It's amazing how much you can achieve by getting the right people in the same room. As soon as we had operations teams from different utilities, they were able to discuss the practicalities straight off. Further, having council representatives present made discussion about savings and incentives possible.
- **Change management:** One of the biggest challenges of getting people to move out of business as usual is that people don't like change. Whenever a change is being made for the first time, you may find negative attitudes to it. It is important to work through these attitudes by identifying the incentive of the necessary parties to go through with the change.
- **Stay motivated:** All parties – utilities and LAs need to be engaged and motivated – you cannot do this without any of them. There are advantages for all parties – financial time saving – but all of these need to be realised. If teams aren't incentivised to put in the extra effort for collaboration, they won't.
- **Stay on top of it:** Constant follow ups are required, especially in the early stages. Summarise all conversations, use shared working documents and ensure all parties feel up to date and included.
- **Collaborate, don't negotiate:** Utilities already negotiate with LAs regularly to reduce costs on parking bays and other costs, so for collaboration to start being executed, there needs to be a significant (time/money) advantage over negotiation.
- **Top-level sponsorship is needed**, but middle level operations need to believe in it as well as they will be on the ground, day-to-day scheme leads.

- **Different companies have different ways of governance and rates:** Some companies may work with scheduled rates, while others may negotiate rates every time which are defined by the number of schemes. As a result there may be dependencies on other projects. This must be kept in mind if utilities choose to work together.
- **Support from the local authority** (London Borough of Croydon) through the project was key. If Croydon had been unwilling to offer waivers in favour of collaboration, neither utility would see the benefit in collaborative working.
- **An unexpected advantage was stronger relationships:** Once the teams started talking with each other regularly, relationships developed, and they started looking for more ways to work collaboratively with each other and share future planned works. The channel of communication will stay on in spite of the project coming to an end.
- **A risk:** Don't declare victory too early. A conversation about collaboration does not mean the project will go through. Teams must strike a balance to see that motivation, enthusiasm, and momentum are maintained. Care should also be taken not to put too much pressure on the operational team as they will only be able to move forward once they have governance in place.
- **Have milestones in place:** It is important to put milestones together in the beginning of the project, but revisit them throughout, and change where needed. Collaborative projects won't have a fixed timeline, and a flexible mindset is needed to approach these types of projects.

"All the organisations we have worked with are frustrated by the impacts of siloed working and have serious concerns around the perfect storm of growth, ageing infrastructure, heightened customer expectations and tighter regulation.

Despite the obvious benefits, collaborative working remains outside of BAU because the level of change and risk can seem daunting.
We found that these barriers can be overcome by working on a small and manageable scale, supported by shared data and an impartial team working with ringfenced resources.

Under these conditions, organisations were able to unlock the creative potential within their own teams who were keen to proactively address some of their key frustrations and who just needed the remit, support and the means to do so."
Angus Kelly, Infrastructure Consultant, Atkins

MELANIE'S TOP TIP

It is important to know what the governance process is, or needs to be; without this, there is a risk of the project being stopped at the first hurdle.

4.3 MEDIUM-TERM CAPITAL INVESTMENT PLANNING

The medium-term planning horizon can be thought of as sitting within strategic periods, with programme outcomes agreed and budgets allocated but programmes still to be fully defined and projects yet to be designed. Outline design and early contractor engagement will occur throughout the medium-term planning horizon.

Our experience of working with utility infrastructure providers suggests that the medium-term planning horizon is the optimal period to plan for collaborative working as there is sufficient time to establish the necessary arrangements to realise significant benefits.

STATUS QUO

The typical medium-term planning scenario can be described as thus:

- Medium-term planning across asset classes and between organisations is not consistently practiced.
- Internal sharing of project data does not generally occur until detailed design and funding has already been agreed.
- External sharing of project data does not occur until the short-term planning stage. This can be a barrier to collaborative working as the necessary changes required to exploit opportunities can be more costly if identified later on in the project life cycle.

In spite of these barriers, planning and coordination remain an essential component of any organisation's operation. Some of the existing measures to promote coordination and collaboration are summarised in the table opposite, with the corresponding challenges:

As evidenced by the case study which summarises Atkins' and Fluxx's work with Thames Water (page 87), the medium-term planning horizon provides sufficient time to overcome the above challenges and realise significant benefit through:

- Executing a comprehensive engagement programme.
- Sharing data and systematically identifying opportunity.
- Validating the mechanisms by which benefit can be realised.
- Evaluating potential benefit.
- Negotiating commercial arrangements.
- Initiating delivery.

EXISTING MEASURES	CHALLENGES
Data-led approach to asset management.	Data tends to be internally focussed and could be improved with visibility of external risks or opportunities.
Pre-existing corporate systems and data platforms for asset data.	Reluctance to share asset health data or early stage asset investment options.
Collaboration is actively promoted. More than 600 joint working schemes have been undertaken on TfL's road network since 2015	Best practice is in evidence across the sector, however there is inconsistency between providers some of whom have limited ability to systematically identify early stage opportunity due to data management maturity. The evaluation of benefits are not widely publicised or understood.
Internal and external engagement actively promoted.	Often on a short-term project-by-project basis, a programme overview or a more extensive pipeline of investment is not readily available.
Broad consensus around the need to be collaborative and transparent. Most providers are open and receptive to trialling new ways of working.	It can be challenging to ring fence funding and resource. Legal and managerial spend required to draft pre-requisite agreements can only be justified when benefits scale to a programme level. There can be a lack of clarity around which organisation has the remit to take the lead.

DATA SHARING

The following datasets identified medium-term capital investment opportunities when shared geospatially:

- Asset health (utilities and local authority carriageway condition).
- Schemes in Scope (including LA highways resurfacing).
- Schemes in Design.
- Highway notices such as Section 58.
- Planned block closures and other planned highway openings.

Further information on data can be found in **chapter 3.7.**

STAKEHOLDER PRIORITIES

The role of stakeholders is covered in more detail in **chapter 3**. The below table summarises some of the stakeholder priorities that were found to be applicable specifically to the medium-term planning horizon.

STAKEHOLDER GROUPS	PRIORITIES
Director/Executive	Ring fence legal, commercial, and contractual teams to ratify potential modelled benefit and to lead in commercial negotiations.
Programme teams	Provide data and personnel, define extent of programme deliverable over the medium-term. Promote early engagement with the supply chain.
Design teams	Co-produce and share outline designs and optioneer, advise on design standards, advise on pertinent data that impact project viability.
Delivery teams	Validate benefit assumptions (construction efficiencies, traffic management options, site layout efficiencies), identify risks and opportunities to streamline the construction process.
Commercial teams	Advise on cost levers, model potential benefit, determine evaluation framework, identify risk, lead commercial negotiations. Consider arrangements required for CDM (see in **chapter 2.4**), as directed.
Procurement	Establish contracting strategies, control for risk and equitable distribution of benefit. Consider arrangements required for CDM and liability, as directed.
Legal teams	Draft NDAs. Consider arrangements required for CDM and liability (see in **chapter 2.4**), as directed.
Data & Standards	Administer NDAs and data sharing licenses, ensure data security compliance, consider asset standard revisions as requested by the programme team.

CASE STUDY: THAMES CONNECT

- *Thames Water had been piloting new ways to make street works less disruptive and more efficient. Through delivery alliance eight2o, the team worked with design consultants Atkins and innovation consultants Fluxx to develop an innovative forward planning web map.*
- *The web map visually showed where upcoming works were planned. This helped identify 'clashes' where street works were planned in the same location by different programs within Thames and other utilities, and showed where collaborative works could be executed.*
- *Following the principle of 'data means dialogue' teams across Thames used existing data to make better decisions about future planned street works.*
- *The medium-term planning horizon afforded sufficient time from the proof of concept to be conducted and evaluated, the approach to be scaled and for the necessary governance and agreements to be put in place to realise benefit.*
- *A commercial balance was struck and contracts adjusted between the utility provider and the Alliances.*
- *There was sufficient time in the medium-term planning horizon to re-define projects, such that multiple programme objectives could be addressed in individual digs.*
- *The web map helped identify plans of two long-term programs that required works in the same area. By combining the work plans over 128 km, Thames saved a decade (3,900 days) in disruption.*
- *A post investment appraisal conducted by the capital delivery alliances commercial team concluded that the initiative delivered a benefit to cost ratio of over 15.*

4.4 LONG-TERM CAPITAL WORKS

The long-term planning horizon can be thought of as a period where the strategic priorities, budgets and programme outcomes have yet to be fully defined. Our scope has not been focused on the long-term, however, our assumption is maximum benefits can be achieved when collaborating with long-term projects as demonstrated in the case study below:

CASE STUDY: OLD OAK PARK ROYAL DEVELOPMENT CORPORATION ANTICIPATORY INVESTMENT IN ELECTRICITY NETWORKS FOR HS2

The Old Oak and Park Royal Development Corporation (OPDC) is the Local Planning Authority and regeneration agency for London's largest Opportunity Area, Old Oak and Park Royal.

Old Oak North falls within the franchise boundary of UKPN and SSE networks. Working with AECOM as Infrastructure Advisors, OPDC engaged extensively with both UKPN, SSE and HS2 to understand the 'spare' capacity, loads and phasing of OPDC related activities and HS2.

The approach enabled UKPN to secure board approval to make opportunistic reinforcement at one of the sites required by HS2 tunnel boring activity to subsequently meet OPDC's power needs following completion of the tunnel boring operations.

This collaborative working will ultimately save the public purse significant capital costs (circa £10–12m) and ensures timely and cost-effective connections are available to developers. It also reduces disruption to the built environment and provides an opportunity for the coordinated delivery of electrical infrastructure, meaning that roads will not need to be dug up multiple times.

THE COLLABORATIVE STREET WORKS CHEAT SHEET

Planning for collaboration during short, medium and long term can be challenging. Based on our experience, we have created a cheat sheet for recommended datasets, people involved, governance required and benefits that can realised based on the planning horizon of the project.

The below table is intended to be a quick visual reference providing some key areas of focus relating to the promotion of collaborative working in each planning horizon. This may change depending on the project, so please use this as a guide only.

		Planning Horizon								
		Short-term			**Medium-term**			**Long-term**		
	See chapter 2.2 for description of collaboration types	Paced	Semi	Complete	Paced	Semi	Complete	Paced	Semi	Complete
Dataset	Repair – reactive work	x		**N/A**						
	Maintenance – planned Work	x	x							
	Highway Access – e.g. Section 58	x	x		x	x	x			
	Project – planned upgrade	x	x							
	Programme – cohorts of projects		x		x	x	x	x	x	x
	Asset Condition – assets in need of maintenance or upgrade					x	x	x	x	x
	Future Asset Condition – modelled rate of deterioration								x	x
	Growth and Development – infrastructure/major projects							x	x	x

		Planning Horizon								
		Short-term			Medium-term			Long-term		
	*See **chapter 2.2** for description of collaboration types*	Paced	Semi	Complete	Paced	Semi	Complete	Paced	Semi	Complete
People (Those who need to be involved)	Project Delivery Team – on the ground teams	x	x	N/A						
	Project Management Team		x		x	x				
	Programme Team				x	x	x			
	Local Authorities (Highways/Permitting)	x	x							
	Local Authorities (Growth)				x	x	x	x	x	x
	Asset Planners							x	x	x
	Regional Authority (GLA/ TfL)							x	x	x
	Regulators							x	x	x
	Sector-wide consultees (e.g. Project 13, Future Cities Catapult)							x	x	x
	Collaboration Enabler(s)/ Coordinating Officer	x	x		x	x	x	x	x	x
Governance (Agreements and plans that need to be kept in place)	NDA/Data Licence		x	N/A	x	x	x	x	x	x
	Legal/Contractual arrangements (CDM, Liabilities)		x			x	x		x	x
	Site Management (SHE)	x	x		x	x	x			
	Delivery Models/ Frameworks (FAC1)						x	x	x	x
Benefit priorities	Time saving	x	x	N/A						
	Overhead costs				x	x	x			
	Socioeconomic							x	x	x
	Construction costs	x	x		x	x				
	Environmental impact	x	x		x	x		x	x	x
	Reputational	x	x		x	x		x	x	x

05.

MEASURING SUCCESS

What this chapter will cover:

- Techniques for the pre-appraisal, monitoring and evaluation of collaborative efforts.

CAPTURING THE BENEFITS OF STREET WORKS COLLABORATION

In this chapter we provide a framework for monitoring and evaluating street works collaboration projects. We've tried to make this flexible, so that highway authorities and utility companies can use the framework to pre-assess collaboration opportunities.

While the advantages of street works collaboration seem logical, there are still relatively few well – documented examples of collaborative street works.

In order to make collaborative street works business as usual, we need to monitor and evaluate the benefits to all parties involved in pilot projects.

Based on our experience in Croydon, we have developed a framework for properly monitoring and evaluating the impact of street works collaboration. We've highlighted the expected benefits of the Epsom Road, Croydon, project in **chapter 4.2**, and in September 2019 the GLA will update this handbook with a full post-project appraisal for the Epsom Road project.

MONITORING AND EVALUATING STREET WORKS COLLABORATION PROJECTS

Utilities companies and local authorities will be interested in the financial/budgetary impacts of collaborative works. In London, utility companies should work with the GLAs IDCT team to calculate the estimated savings (and additional costs) of joint works using a methodology that is as robust as possible, monitoring the time and resource spent on collaborative works compared to 'business as usual' sequential works.

From the perspective of public bodies, there is a need to assess the overall social and economic impacts of the project and whether public funding to facilitate collaborative works represents good value to the public purse. This means the evaluation should seek to capture both private and wider social benefits and costs (including externalities) of the project. The evaluation could also help to inform whether the coordination of utilities' street works should be encouraged within the relevant regulatory frameworks.

A range of stakeholders may need to be involved in street works collaboration projects.[9] Each of these organisations will play a role in the evaluation of a pilot project:

- Independent evaluation expert
- Utility providers
- Local authorities
- Transport for London
- The Infrastructure Development Coordination Team (IDCT)
- IDCT Evaluation Technical Steering Group

9 *Refer to **chapter 3.3** for further details on stakeholders involved*

HOW TO MONITOR AND EVALUATE A STREET WORKS COLLABORATION PILOT

The benefits of collaborative working are many, and can be realised by utilities, local authorities and the public as detailed in **chapter 2.5**.

For London projects, your first port of call should be to contact the GLA's Infrastructure and Development Coordination Team. The IDCT is resourced to support highway authorities and utilities with the monitoring and evaluation of pilot projects and can be contacted at idct@london.gov.uk.

You should start by clarifying the objectives for any planned monitoring and evaluation. Understanding the objectives will help you to choose the right approach, and to identify the resources you need, and the most appropriate approach.

The main objectives of the evaluation should include:

- What changes occurred, and to what extent can these be attributed to the pilot project?
- What were the economic impacts of the project, did the benefits exceed the costs?
- What were the financial impacts of the project to each party; did the savings exceed the investment in the project?

Once you have clarified your objectives, you should identify any opportunities for capturing benefits that may need to be monitored, or whether there is a need to capture a 'baseline' assessment of a particular metric of importance to your evaluation.

These metrics might include:

- Vehicle time delay – measured via automatic traffic counters.
- Vehicle emissions – measured via sensors such as diffusion tubes.
- Length of works – measured by comparing the duration of uncoordinated versus coordinated works.

FRAMEWORK FOR MONITORING AND EVALUATING BENEFITS

We've outlined some of the potential benefits in the table below and how they could be monitored and evaluated. There may be more benefits that we have not yet documented. In London, utility companies and London boroughs should work with the IDCT/GLA to agree the methodology for assessing their cost savings and the wider socioeconomic impacts. To see the incurred efficiencies on the Epsom Road Pilot scheme of collaborative street works, see **chapter 4.2**.

"The reduction in the parking bay suspension brings huge financial savings to us. If we can do that more, we can drop our costs and pass that saving onto the gas customer."
Drew Reynolds, SGN, Epsom Road Project Sponsor

Potential benefit	Method/Calculation	Key challenges/Issues	Monitoring/Data requirements	Data sources / Responsibility
		Economic Benefits		
Time savings to road users. Fewer days of street works means fewer vehicles queuing in traffic which has an opportunity cost in terms of productivity Times savings to all road users, including. pedestrian and cyclists, should also be estimated where possible.	Value of time savings = Number of days of disruption saved x Cost of delay per day		One approach would be to model the behavioural response of road users to the works, e.g. use TfL's road traffic model to estimate the delay per vehicle. Calibration of the model using data gathered from the local area will be required.	
	Number of days of disruption saved = Duration of individual works (counterfactual) – Duration of collaborative works	Reliably estimating the counterfactual, i.e. how many days would the sequential works have taken?	Number of days the combined works take.	Utilities providers / local authorities
	Cost of delay per day (£) = a x b x c			
	[a] Traffic count on the road Traffic count on a typical weekday by vehicle type.	Acquiring baseline traffic count on the road to calibrate TfL's (or another) traffic model.	Traffic counter/cameras on the route and surrounding roads, ideally set up before the project commences.	TfL / Borough depending on Highway Authority
	[b] Avg. length of delay per vehicle Modelled estimate of the average length of delay by vehicle type.	Modelling the behavioural response of drivers to arrive at estimate – calibrate the model using real world data. Disaggregate by vehicle type.	Calibration of the model using available data, e.g. camera data, GPS data, mobile phone data, DfT TrafficMaster data.	TfL DfT
	[c] Cost of delay per vehicle/day		Not required	TfL Business Case Data Book /Adapted from DfT WebTag Car = £20.74/hr LGV = £17.08/hr Bus passenger = £12.45/hr Based on WebTag DfT guidance of willingness to pay.

Potential benefit	Method/Calculation	Key challenges Issues	Monitoring/Data requirements	Data sources / Responsibility
		Environmental benefits		
Reduction in carbon emissions	Value of carbon savings = days of disruption saved (additional carbon emissions per day x carbon price)	Monitoring of carbon emissions before and during works.	Carbon emissions on road before and during works.	GLA/TfL Estimated increase in fuel consumption.
Reduction in Nitrous Oxide	Value of reduction in NOx Reduction in NOx = days of disruption saved x additional NOx during works Value of reduction in NOx calculated using Defra Air Quality Damage Cost Toolkit.	Monitoring of NOx before and during works.	Particulate matter on road before and during works.	Diffusion tubes deployed /collected by the borough. Defra Air Quality Damage Cost Appraisal Toolkit valuing health and other impacts.
Reduction in particulate matter	Value of reduction in PM2.5 Reduction in PM2.5 = days of disruption saved x additional PM2.5 during works Value of reduction in NOx calculated using Defra Air Quality Damage Cost Toolkit.	Monitoring of PM2.5 before and during works.	Monitoring of PM2.5 before and during works.	Diffusion tubes deployed /collected by the borough. Defra Air Quality Damage Cost Appraisal Toolkit.
	Benefits to the utilities companies. To be identified and monitored by utilities companies. Potential benefits could include:			
Analysis and design	To be identified and monitored by utility. Early identification of issues that would render potential works non viable, avoiding unnecessary design and pre construction spend. Mapping of historic and modelled asset anomalies improving the efficiency of pre construction asset surveys.			

Potential benefit	Method/Calculation	Key challenges/Issues	Monitoring/Data requirements	Data sources / Responsibility
Health and safety	To be identified and monitored by utility: Reduced exposure to health and safety risks (eg cable strikes) through the reduced number of excavations afforded by programme synergies.			
Reduced Overheads	To be identified and monitored by utility: Larger de-risked work packages identified through the approach and the early contractor involvement			
Lane Rental cost savings	To be identified and monitored by utility: Waived or exempt lane rental charges (or shared by utilities) Lane rental charges would normally be borne by a utility in full, costing between £800 – £2,500/ day			
Parking bay suspensions waiver (see below)	To be identified and monitored by utility and local authority Parking bay charges can either be waived by the borough or shared between utilities Parking bays are generally £50/bay/day in any CPZ. Savings = no. of bays/road closure X cost/bay X no of days of disruption saved	Boroughs have to be willing to waive the charge for maximum benefit		Borough

Potential benefit	Method/Calculation	Key challenges/Issues	Monitoring/Data requirements	Data sources / Responsibility
Traffic Management cost savings	To be identified and monitored by utility and local authority. Savings could include: Shared traffic management costs Shared Temporary Traffic Order *c.* £2,500/utility Highways Team for site works – potential access to local authority contractors and rates. Joint signage			
Communications cost savings	To be identified and monitored by utility and local authority. Comms creation and distribution costs shared between utilities and the local authority.			
Reinstatement	To be identified and monitored by utility and local authority. Reduce disruption caused due to asset failure, and unplanned repairs because of collaborative planning. Potential shared costs of: • temporary reinstatement • permanent reinstatement • reinstatement liability			

Potential benefit	Method/Calculation	Key Challenges/Issues	Monitoring/Data requirements	Data sources / Responsibility
Benefits to the Borough Council / Highway Authority To be identified and monitored by the Borough Council / Highway Authority. These could include:				
Traffic Order cost savings	Cost savings from shared Traffic Order.			
Traffic management cost savings	Traffic management cost savings = Number of TM days saved x cost per day of TM (£)			Borough Council / Highway Authority
Communications cost savings	Shared with utilities, see above.			
Road resurfacing savings	Financial saving to the council. If utilities pay for road resurfacing then this is a direct benefit to the council.	This is a financial saving to the council but an additional cost to the utilities. There is no net economic benefit unless the road resurfacing quality is improved or costs less.		Borough Council / Highway Authority Need to talk to highways maintenance department about cost over time for cost of maintenance.
Fewer parking bay suspensions Parking bays are suspended for fewer days due to reduced length of works. [Ordinarily utilities would have to compensate the council for parking bays suspended. As part of an incentive to take part in the collaborative works, some councils may choose to waive these charges).	Financial savings to utilities / cost to council If parking bay suspension costs are waived: Cost per day of suspension = number of bay suspensions x cost per day (however the borough calculates it)	This is a financial saving to the utilities from not having to pay for the parking bay suspensions. However, this also represents a loss of revenue to the council. The economic benefit is that the parking bays are available for additional days to the general public.	Parking bay suspensions during works.	Local Authority/ Utilities
	Economic benefits. Value of increased parking bay availability = Number of additional days parking bays available x revenue per bay (£)	A lower-bound estimate of the benefits associated with the parking bay suspension (reduction thereof) is assumed to be the additional revenue generated by the parking bays being available for extra days. Consumer surplus of people parking must be greater or equal.	Parking bay suspensions during works.	Borough Council / Highway Authority

OTHER POTENTIAL BENEFITS

The following benefits may be harder to quantify and monetise but should nevertheless be described in the evaluation where applicable and evidence can be provided to substantiate them.

BENEFIT	POSSIBLE METHOD OF EVALUATION
Development brought forward/ unlocked: If evidence can be provided that a site is unlocked rather than just brought forward by coordinated works then a greater proportion of the land value uplift could be claimed as a benefit of the joint works.	• Visual survey of development sites in the local area by the local authority and discussions with developers where applicable. • Quantify and monetise if evidence can be provided the site was brought forward (or unlocked). • Use DCLG Appraisal Guide to estimate Land Value Uplift combined with an estimate of the number of months the site is brought forward.
Wellbeing benefits to road users: Fewer delays should lead to a reduction in road-user stress.	(See literature on driver stress) and assess whether this can be quantified. Otherwise reference the evidence and describe the potential benefits.
Other benefits to local residents	Any additional benefits from less disruption to local residents not already captured, e.g. reduction in noise pollution or improvements in wellbeing.
Safety improvements: Fewer days of delay/ works should mean probability/risk of accident is diminished (assuming there is evidence that street works are more hazardous).	• See TfL Business Case Tool for estimates of costs per incident • Can the probability of an accident be estimated?
Better quality road resurfacing	• Benefit of resurfacing (as opposed to patch up) cannot be claimed if this was planned anyway. • However, there may be efficiency savings by combining the road resurfacing with the joint street works.
Better quality traffic management: The hypothesis is that local authority/jointly procured traffic management will be better quality than individually procured.	If evidence can be provided that average delay per vehicle is improved in the joint works then quantify in value of time-savings estimate.
Reputational benefits: Public perceptions of public bodies/utilities.	Opinion research / survey of local residents or other methods. (e.g. Net Promoter Score (NPS) Score)
Employee satisfaction	Improved access to data, reduced instances of rework and attrition. Assess through employee survey if deemed relevant.
Spillover benefits to other projects from bringing organisations together to work collaboratively.	Assess through interviews with utilities providers. Quantify where evidence can be provided of learning from collaborative works being used on other projects..

MONITORING AND EVALUATING COSTS

The benefits framework outlined above attempts to quantify many of the benefits in terms of cost savings to utilities or local authorities. The evaluation framework needs to quantify and monitor the additional costs associated with collaborative works over and above 'business as usual' sequential works.

Additional costs incurred by the public sector are likely to include:

- IDCT time and resource spent on facilitating collaborative works.
- Local Authority time and resource spent facilitating collaborative works.

Additional costs incurred by the private sector could include:

- Staff time and resource facilitating joint works.
- Professional and legal fees for developing joint contracts and procuring joint works.

For an economic appraisal, the costs of using assets and resources should be defined by the value which reflects the best alternative use a good or service could be put to – its opportunity cost. Market prices are usually the starting point for estimating opportunity costs.

The respective parties should therefore monitor the additional staff time and organisational resource spent on the collaborative works. It may be helpful to distinguish between fixed, variable and other costs. As this approach is breaking new ground some of these costs will inevitably be higher in the pilot phases when new ways of joint working are being pioneered. Costs would be expected to fall if joint works becomes common practice across London. It would be helpful to identify those costs you would expect to fall in the future.

VALUE FOR MONEY ASSESSMENT

A value for money assessment should be provided in line with HM Treasury Green Book guidance. The Green Book recommends presenting results in summary form, supported by more detailed tables and written analysis.

The summary should include key measures such as Net Present Social Value (NPSV), Benefit Cost Ratio (BCR), and significant non-monetised costs and benefits or other non-quantifiable factors. For the purposes of the Benefit Cost Ratio calculation, the GLA is interested in the Net Benefit per £1 of IDCT investment.

06.

GROWTH AND DEVELOPMENT

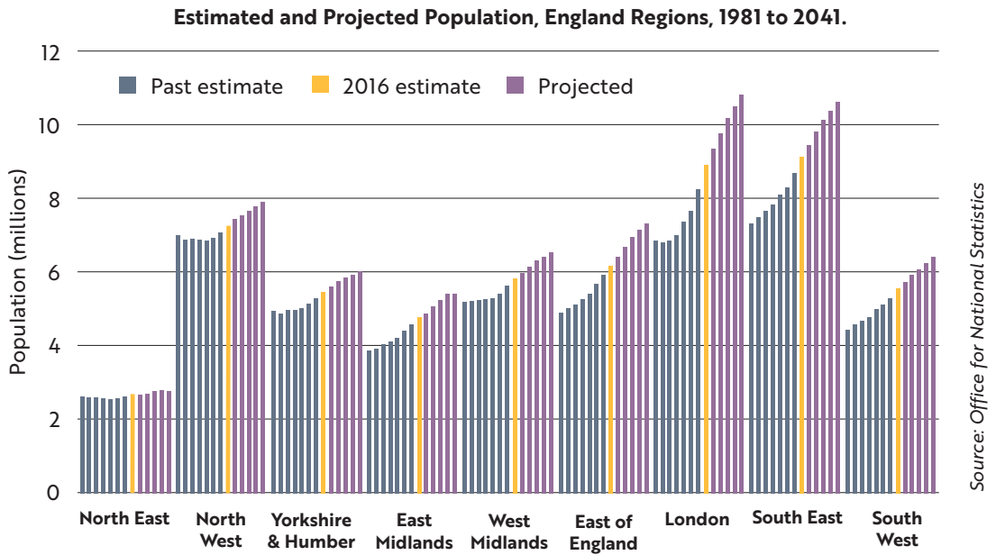
What this chapter will cover:

- Context: The Growth and Development Challenge facing London
- The end-to-end process from Local Plan to Utility Connection of a development; inefficiencies and frustrations
- Opportunities for improvement: incremental and transformative

6.0 INTRODUCTION

This chapter is concerned with the planning and delivery of utility connections and infrastructure required by new development, as opposed to the upgrade of existing infrastructure covered in **Chapter 4**.

Every year, London's growing population is forecast to require at least 66,000 new homes, the space for tens of thousands of new jobs and development for retail, community and leisure until the 2040s. These levels of development are putting pressure on land, housing, infrastructure and the environment. The graph opposite illustrates the scale of the challenge faced not only by London, but also other areas throughout the UK.



Source: Office for National Statistics

Our aim has been to understand the end-to-end process that underpins the planning of utility connections for new developments, and in doing so identify inefficiencies and opportunities to reduce impact, such as reducing the number of highway incursions.

The scope of this project enabled the team to identify opportunities to improve planning and delivery of utility connections and infrastructure required by new development. In order to develop this further, however, these will need validating through further experimentation.

CASE STUDY: EXAMPLE OF CONTEXT – THE CROYDON GROWTH ZONE

The London Borough of Croydon is set to experience high levels of growth and development from a £5.25 billion regeneration programme over the next 16 years.

At June 2019, the Croydon Growth Zone comprises the following investment:

- 46 infrastructure projects across public realm, culture and transport.
- 14,500 new homes planned.
- 20 planned major development projects, including a £1.4 bn Westfield shopping/leisure centre.
- The creation of 23,500 new jobs with 5,000 of these during the construction period.
- 28 new public squares and spaces.
- 2.8m feet of new grade A office space.

"Better collaboration will allow us to facilitate a lot more growth and development compared to BAU, if we can encourage utilities and developers to collaborate on installations; it's less disruptive in and around the site and more installations can be done at the same time."
Alexander Pocklington, Principal Impact Assessment Engineer, London Borough of Croydon

Croydon Growth Zone

The findings and recommendations presented in this chapter have been derived from consultation with the following organisations: Thames Water, UKPN, SGN and Utility Results (a 3rd party infrastructure planning consultant).

6.1 APPROACH

Through a period of consultation with stakeholders including utilities, developer representatives and local highway authority planning and highways officers, we identified the end-to-end journey from a vacant plot of land through to it becoming a connected development.

Four key stages were identified:

- Formulation of the Local Plan.
- Pre-planning and planning application process.
- Developer connection application process (the process undertaken by developers when applying for utility connections).
- The utility application, construction and commissioning process (the process undertaken by utilities in receipt of a developer application).

During a workshop, representatives from each stakeholder group identified: on a journey map:

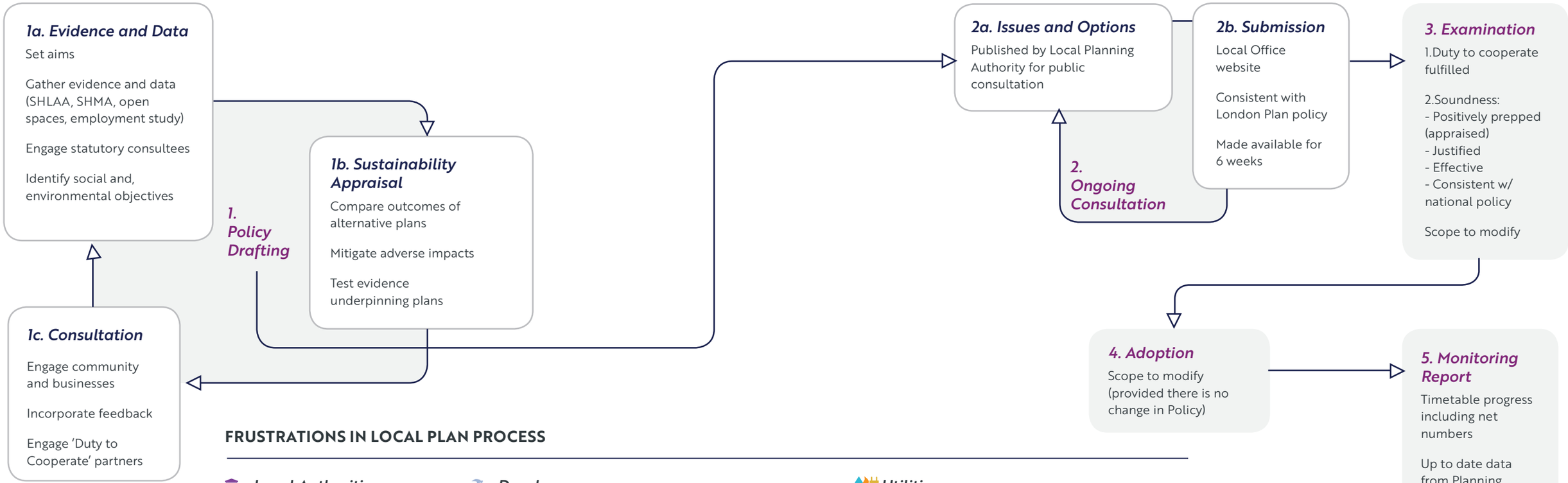
- Their key actions.
- How and where decisions are made.
- What data is generated.
- Where frustrations and inefficiencies arise.

The stakeholder group then identified opportunities to address these and instigate different ways of working to reduce highway incursions.

The process diagrams presented below detail a description of each stage with the corresponding frustrations felt by local highway authorities, developers and utilities.

LOCAL PLAN PROCESS

A set of strategic documents prepared by district and local planning authorities containing priorities for the development and use of land in an area.



FRUSTRATIONS IN LOCAL PLAN PROCESS

Local Authorities

- Planning and investments are usually reactive rather than proactive, this can hinder their stipulated commitments i.e., delivery of 65,000 new homes annually
- Utilities have no due requirement to regard the London Plan
- Mixed approach to how utilities invest in the area: Often third parties foot the bill to make the development viable

Developers

- Big developers need to interrogate several local authorities, local plans and wards to identify investment opportunities

Utilities

- Not consulted when gathering evidence and data
- Progress data not discoverable: difficult to forecast for growth (e.g. how many of the 65,000 houses have actually been built)
- Investments come in multiple formats and degrees of detail: PDFs not machine discoverable
- Geography – in addition to multiple LAs, each sub ward might release their own info under one LA. With just under 10,000 wards in the UK, finding planning information is a pain

PRE-PLANNING PROCESS

A voluntary and iterative process between a developer and a local authority and/or utility at the speculative stages of applying to build a new development.

Decision made by borough

Decision made by borough

1. Pre-application submission

Interim presentation of scheme drafted

Submitted via borough website

2. First pre-application meeting

Discuss key principles of the scheme

Outline land use (residential/ commercial)

3a. Community + member engagement

3b. Collate Application

3c. Ongoing consultation

Design development

Scheme progression

Bring other disciplines as required

EIA (on larger applications)

Written communication throughout

PLANNING PROCESS

The developer and local authority gather detailed information to support a planning application from a series of consultations which culminate in a conditional decision being issued.

Decision made by borough

1. Submission

Validation checklist (statutory local list per borough)

2a. Consultation

With statutory and non-statutory consultees

2b. Assessment

Reviewing submission + consultee responses

Conduct site visit

3. Recommendation

Consensus

Report – delegated or planning committee

Planning condition set

4. Decision

Section 106 normally only on any major developments

Long delay can occur if decision is referred to planning committee

FRUSTRATIONS IN PRE-PLANNING & PLANNING PROCESS

Local Authorities

- Pre-application process does not match reference number
- Last-minute changes from developers can undo the good aspects of a scheme
- Lead time between pre-planning and planning can induce lack of confidence in the development for utilities

Developers

- Don't have means to see available capacity and level of reinforcement required
- Utilities have poor asset info/ records
- Constantly changing utilities points of contact, no forum to talk to utilities about general issues

Utilities

- Multi-utility site references in the same organisation create confusion
- Pre-planning stage needs to be implemented more carefully by developers so planning can start
- No single language to understand what different stages in the development process mean

DEVELOPER APPLICATION PROCESS

The process undertaken by developers when applying for gas, power and water connections.

1. Initial Assessment

Context (adjacent development)

Statistics (DNO, private, other)

Capacity

Planned Work

Outline Cost Comparison (DNO, ICP, IGN)

Network Reinforcement (risk, time, cost)

2. Connect Strategy

Loads

Design, route, program, phasing

Procurement

3. Utility Application

Understand requirements

Submit application

Apply for point of connection

4. Utility Liaison

Establish dialogue with Utility Designer

Produce coordinated services drawing

Review quotes, validate, raise orders

Conduct site meetings, agree date

5. Construction

Site management (compliant with requirements)

Project management (Logistics, charge, QA, etc.)

Commission

FRUSTRATIONS IN DEVELOPER APPLICATION PROCESS

Local Authorities

- Proliferation of connection providers means more challenges on infrastructure, especially where the road network is highly sensitive
- See multiple road incursions that could have been avoided as multiple sites require connections
- Cannot stop developers from reserving unnecessary capacity
- Capacity bagging 'gaming the system' triggers additional reinforcements when capacity should be in place
- Collaboration is not a decider in investment programmes
- Reactive / piecemeal design solutions result in retro-fits, this means delays to new housing roll outs
- Aspirations of HLG not translating to actions at mid level/operational tiers within organisations

Developers

- Worry their competition will bag connections before them
- Developer has no control over non-contestable works contractor
- Developers can wait up to 6 months for a connection after it's confirmed causing delays to timeline and budget
- Developers have limited understanding of the true cost of connections
- Tension between developer technical (design) and Construction (delivery) teams

Utilities

- Duplicated effort in responding to multiple developer enquiries for the same site
- Info available is often not detailed enough to determine cost, often leading to delays
- Site is not up to the standards required by non-contestable works contractors, causing scheduled connection works to be cancelled

UTILITY APPLICATION PROCESS

The process undertaken by utilities in receipt of a developer application.

FRUSTRATIONS AT EACH STAGE IN THE PROCESS

	1. Developer provides info	*2. Developer applies for connection*	*3. Capacity investigation & asset protection*	*4. Quotation provided*	*5. Scheduling*	*6. Connection*	*7. Construction*
U	Developers aren't clear on what they need to share Info comes in the wrong format Invest lots of time in customer support	Quality of information is poor / inconsistent which generates admin	Get multiple enquiries from different developers and obligated to fulfil them all Modelling can cause time delays Complexity of asset = time cost to investigate	Back and forth on costs It's not always clear who is applying due to CO 'care of'	6–8 week rolling notices Subject to the availability of gangs in line with productivity Need the right info before digging (i.e. chlorination certificate)	Don't always know where / how assets will be laid Or how they intersect with other assets 'Service strikes' POC not compliant with utility spec More delays, more modelling (up to 6 months)	New resident struggles to register property as utility has no record of development completion Resulting in a low NPS score
D	Different utilities ask for different info	Might not possess the required info (i.e. schematic drawing) in the right format	Feel poorly communicated with and 'passed around the houses' Why the delay?	Back and forth on costs Want a more transparent breakdown of these costs	Traffic management scheduling notices cause delay loop Last minute cancellations ruin timelines	'Service strikes' More delays, more modelling (up to 6 months) Lack of ability to influence the timing of non contestable connections	
LA					6–8 week rolling notices		Aren't notified by developer of completion

FRUSTRATIONS IN UTILITY APPLICATION PROCESS

Local Authorities (LA)

- Public are frustrated by volume of roadworks

Developers (D)

- Difficult to control Utilities, costly for connections, less reliable
- Non contestable works often subject to delay

Utilities (U)

- Capacity Bagging
- IDNO's often preferred as lower cost, back office sunk costs associated with enquiries borne by utilities
- When non contestable works are to be undertaken, often the connection site will be unsuitable

6.2 STATUS QUO

Today, it is common place for repeated and multiple highway incursions to be undertaken in the same road space to connect developments to utilities, this is because:

- The timescales required by the different utilities can be out of sync with the pace of development – which can lead to delays in connections required to commission developments.
- Much of the information required by utilities to understand growth and make sound asset investment decisions is siloed, unstructured and undiscoverable.
- Opportunities presented through collaboration are not systematically identified and exploited because the means and incentives to do so are not yet established resulting in excess noise, pollution and congestion on London's road network.
- Anticipatory investment is inconsistently applied. Regulatory frameworks primarily focused on lowering customer bills encourage utilities to be risk-averse, setting a high evidence threshold to justify future investment.

OUR REFLECTIONS

- The planning system in place today is built on legacy requirements, policies and systems that have evolved over a long period of time. As such, the overall process has become convoluted and unwieldy. In addition, the consultation process is outdated and does not involve utilities as early as it could do.
- There is no single sense of 'what good looks like'. Accounts of performance are anecdotal as opposed to measurable.
- Though there are many experts in specific parts of the process, there is an absence of individuals with an overall view of the total process responsible for 'joining the dots'.
- Forward planning and early stage data sharing could alleviate a multitude of issues that occur further down the line.

Siloed → *Parties operate individually without sharing information.*

Manual → *The majority of data is inputted and stored without digital or integrated systems.*

Static → *Minimal policy or operational innovation in the last century.*

Short-termism → *Reluctance and inability to plan ahead.*

6.3 OPPORTUNITIES FOR IMPROVEMENT

Opportunities for improvement are divided the incremental and transformative opportunities:

- Incremental opportunities address issues that could be resolved by improving existing processes to help promote a more efficient, collaborative way of working.
- Transformative opportunities require more fundamental change that will be made possible by future innovation and have been identified by evaluating current trends.

INCREMENTAL OPPORTUNITIES

COMPEL DEVELOPERS TO CONTACT UTILITIES AT THE PRE-APPLICATION STAGE (PRE-PLANNING).

THE PROBLEM:

- Developers often forego the opportunity to engage early with utilities. They know that utilities are obliged to provide a connection, and therefore take the point of connection for granted. As a result, utilities often have limited foresight of future demand on their network.
- Similarly, developers have insufficient visibility of potential issues that could cause delays.
- The local authority's highway network end up suffering because the likelihood of disruptive works and highway incursions increases.

MITIGATION:

- Local highway authority planning team should add an additional paragraph to the Pre-Application letter (as well as continued written comms) to incentivise developers to contact utilities earlier on and to engage in utility-led pre-planning services.
- Letter to provide details of relevant utilities and points of contact.

REVISE PLANNING CONDITIONS IN FAVOUR OF COLLABORATION (IF IN PUBLIC HIGHWAY)

THE PROBLEM:

- Developers are under no obligation to work collaboratively, even in high growth areas. Local highway authorities want to decrease highway incursions yet cannot enforce collaboration.
- Developers may need to request and wait for connections from multiple different utilities, leaving them subject to delays and higher overall cost.
- Utilities receive multiple, isolated connection requests, sometimes for the same site – making planning for additional capacity challenging.
- When applying for a connection, developers are not always clear on what information is needed and in which format. To add further complication, different utilities request different information from developers.

- Therefore the quality of information received by utilities is often poor or arrives in various formats. As a result they invest a lot of time and customer support to piece together the information received.

MITIGATION:

Local highway authority amends planning conditions stipulating that developers must participate in the planning of coordinated connections.

- Updated planning conditions oblige developers to provide information about points of connection required. These requests for information could include:

  - Type of Utility
  - Supplier name
  - Existing Connection / Required new connection
  - Connection required by (date)
  - Location of connection (coordinates)[10]

- Using this additional information, the local highway authority can identify opportunities for coordinated connections and consequently outline these to developers and the relevant utilities.
- Identify the stages at which developers are required to share information which correspond with pivotal points in their programme.
- Local highway authority may be able to use Section 106 contributions to enable collaborative work or infrastructure installation ahead of need.

USE 'ZONING' TO CONVENE LOCALISED DEVELOPER AND UTILITY FORUMS (PLANNING / UTILITY APPLICATION AND CONNECTION)

THE PROBLEM:

- In areas of high growth, the resilience of the road network (i.e. the ability of the road to cope with disruption and still function) limits the degree to which connection programmes can run concurrently.
- Developers tend not to share the information and data required to better coordinate their programmes which could reduce the overall period of disruption.
- Developers can be reluctant to engage in 'growth zone' forums that do not directly relate to their work programmes.

MITIGATION:

- Consider coordinating works notifications by traffic resilience zones:

  - A zone is defined as the minimum area by which you can operate one piece of major road works at any one time.
  - Ensure there is always a significant road that can act as a diversion. Bordering by a trunk road is ideal but may not be possible. However, the bordering road should be capable of sustaining its own traffic flow and that of diverted traffic from within the zone.
  - Each zone should have two or more traffic entry or exit points for the necessary diversions.
  - Zones are bound by physical restrictions (eg railway lines or rivers) or significant through-roads. If works need to take place on a defined zone boundary road then other works cannot take place in either adjacent zone.

10 *see appendix 6.1 for more examples*

- As an example, through zoning Croydon by road network resilience (in Croydon's case we created zones 1–9) it was possible to assess how connection works will impact upon one another and the local area.

- Draw up a letter of authority to permit a third party to have access to future investment data to enable planned coordination within a specific zone.

- Establish forums between developers and utilities by zone so that issues directly impacting each party can be tabled and discussed.

UTILITY SEARCHES OF UNDERGROUND ASSETS (UTILITY APPLICATION AND CONNECTION)

THE PROBLEM

- Searches for the same data on underground assets are undertaken by multiple parties, duplicating effort and creating unnecessary delays for developers and utilities alike.

- The quality of data relating to underground asset location is variable, and opportunities to validate the location of buried assets during excavation activities are not taken up.

MITIGATION

- Local authority could undertake a comprehensive utility search and provide a map of underground assets available to utilities and developers.

- Solutions such as digdat® exist today. Digdat uses crowdsourcing to offer asset and service information in an easy, visual way and claims to have protected over half a million kilometres of assets. http://www.digdat.co.uk.

- Establish a means to attach data from excavations or to 'red line' plans.

CONSTRUCTION PLANNING AND COORDINATION (UTILITY APPLICATION AND CONNECTION)

THE PROBLEM

- If the point of connection is not compliant with the utility specifications, contractors working on behalf of utilities may refuse to undertake work, resulting in delays associated with re-planning.

- Developers complain of a lack of ability to influence the timing of non contestable connections.

- Parties undertaking utility connections on behalf of developers often plan and execute work in isolation, leading to multiple highway incursions and forego opportunities to realise efficiencies.

- This can compromise the local authorities ability to deliver growth across multiple sites. Street works permits and clash checks with other works need.

- For local highway authorities there are also additional costs, additional disruption time and increased levels of pollution associated with multiple works at the same location over multiple periods. There is an additional social and political cost associated with repeated disruption to the highway, especially if these issues multiply across an area with multiple developments.

MITIGATION

- Ensure individual utility asset standard documents are held onsite and site supervisors are adequately trained.

- Provide visibility of upcoming highway opening notices on an accessible platform to enable connection contractors early sight of opportunities tocoordinate planned activities to reduce the number of highway incursions.

UTILITY CAPACITY AND DEVELOPMENT HEATMAP (LOCAL PLAN / PRE-PLANNING)

THE PROBLEM:

- Utilities struggle to prioritise areas for investment ahead of need because no single 'source of truth' exists containing future demand on their network.

- Utilities need earlier sight of network reinforcement requirements thus providing the ability to prioritise resources for complex/problematic connections.

- Developers have no sight of the relative level of complexity and programme risks associated with proposed connection points.

- Local highway authorities often do not have data sharing agreements and therefore lack sight of utility capacity. It is therefore hard to identify areas requiring specific planning requirements (e.g. additional time) to accommodate network reinforcements.

- Local highway authorities do not necessarily have the tools or capabilities to rapidly interrogate the data.

MITIGATION:

- Accessible heatmap of utility asset capacity overlaid with forecasted growth data (which could be further enhanced by mapping the remaining life and criticality of assets, under an NDA).

- Link data processing solutions to wider data sharing initiatives such as the IMA (or the regional equivalent).

- Flag capacity issues to developers early on.

TRANSFORMATIVE OPPORTUNITIES

When considering opportunities that could be enabled through innovation, we began by understanding the limitations of existing processes and identifying the prevailing trends.

PROVIDE LOCAL PLAN SITE ALLOCATIONS (LOCAL PLAN)

THE PROBLEM:

- Utilities need to interact with multiple Local Plan formats.

- Anticipatory investment – limited understanding of the status of planning applications and confidence in development being brought forward

- Siloed working, reactive versus proactive ways of working due to stretched resources leading to an increase in highway incursions.

- Planning applications contain the vast majority of data required by planning authorities to monitor the planning process and coming development, as well as for public use. However, this information is held in supplementary documents and free-text fields that make it difficult to locate and synthesise

- The Local Plan is available to and shared with utilities today, however each local authority's plan is in a different format and standard of comprehensiveness.

- Utilities view Local Plans as 'too speculative' and fail to plan or act around them, for risk of over-investment in their regulatory cycle.

- Local authorities often have a Local Plan describing objectives but individual projects and guidelines on achieving this can be scattered across multiple departments and exist in several formats. This can lead to opaqueness even internally to an organisation, which can result in conflicting information being given to utilities.

MITIGATION:

- Local authority to provide Local Plan Site allocations as a discoverable spatial dataset and share with utilities and developers as one single source of truth.

UNIQUE, INTEROPERABLE DEVELOPMENT ID (LOCAL PLAN, PRE-PLANNING, PLANNING, CONNECTION)

THE PROBLEM:

- Although plots of land have unique IDs (UPRNs) complications arise when developments span multiple sites. There is no consistent way to track particular developments all the way through the planning system: historically, through construction, and into commissioning.

- Utilities and local authorities have their own conventions for assigning reference numbers to developments, further compromising the ability to track progress of development enquiries.

"Every stage creates multiple reference numbers. There can be over 100 reference numbers per site."
John Hernon, Strategic Development Manager, Thames Water

MITIGATION:

- Requirement to establish a consistent data standard for enquiries involving a unique ID for a plot of land when it is identified and to use this throughout the pre-planning and planning processes.

- Ensure that this single, unique ID is used within existing systems across local highway authorities and utilities.

SEAMLESS HANDOVER TO UTILITIES ONCE A DEVELOPMENT IS COMPLETED (UTILITY APPLICATION AND CONNECTION)

THE PROBLEM:

- There can be a lag between the commissioning of a development and the local highway authority records being updated.

- Utilities may receive calls from new tenants (residents or business tenants) attempting a connection. With no record of the completed development utilities have difficulties in registering a new account and as a result utilities' reputations with customers suffer.

MITIGATION:

- A unique, interoperable development ID flags the completion of a development to utilities.

- Utilities can proactively help the residents and business tenants by providing a brochure with a unique ID to facilitate a seamless registration.

ESTABLISH STANDARD TERMINOLOGY (PRE-PLANNING, PLANNING, CONNECTION)

THE PROBLEM:

- Utilities, local authorities and developers have different terminologies and stage-gates to describe the process a development goes through.

- For example, developers are accustomed to the RIBA stages though these are not currently used / understood by utilities or local authorities.

MITIGATION:

- Agree a standard terminology which is understood by utilities, local highway authorities and developers.

THE LONDON DEVELOPMENT DATABASE (LDD)

THE PROBLEM:

The LDD was set up in 2004 in a partnership between the Mayor of London and the London Boroughs to better monitor development across the capital. The LDD details certain planning consents and details on commencements and completions only. These are entered by London's planning authorities and checked by the GLA for consistency. This takes time and human error means that data can be inaccurate. Local highway authority planning websites often have more details on applications contained in supplementary documents, which are time-consuming to collate.

MITIGATION:

The ingestion of development data into the LDD is currently being automated. The new improved database, set to launch in 2020 will automatically collect, map and share numerical, text, spatial and monitoring data for all planning applications. The LDD will allow for the following:

PLANNING AUTHORITIES, UTILITIES, DEVELOPERS, RESEARCH BODIES

- Visualise and extract data to create dashboards, do analysis, run queries.

- Link to other platforms like the IMA and local planning portals.

- To incorporate legacy data.

- To be extendable for future UK-wide applications and systems.

CITIZENS (THE PUBLIC, CITIZEN CODERS AND SME DEVELOPERS)

- To interact with the planning process through an open and easy to use platform.

- To have access to data and code to push innovation.

The LDD upgrade project aims to provide up-to-date planning application data to support, and provide an evidence-base for, decision making and policy development. It will also create the foundations for innovation around how better development pipeline data can be used to improve infrastructure planning and coordination. If successful, the approach could be adopted UK-wide.

GLOSSARY

A

AMP Period (Asset Management Plan Period) A five-year time period used in the English and Welsh water industry used to set allowable price increases for the privately owned water companies and for the assessment of many key performance indicators (like water quality, customer experience, etc). Water companies often hold their contractors to it.

B

BAU (Business As Usual) The work an organisation, business unit or department would complete on a daily basis.

BRR (Business Rates Retention) A scheme whereby councils bear a proportion of the real-terms change in business rates revenues in their areas, offering an opportunity to access new and flexible financial resources.

C

CAD (Computer Aided Design) Software used for computers to aid in the creation, modification, analysis, or optimization of a design. Helpful for increasing the productivity of the designer, improve the quality of design and improve communications through documentation.

CDE (Common Data Environment) A digital place in which large amounts of digital data, created and shared during a project, comes together. It becomes an ideal environment in which to promote a collaborative working culture.

CDM (Construction Design Management) Regulations placed for the safe operation of UK construction sites- legal duties on clients, designers and contractors, to plan their approach to health and safety.

CHP Unit (Combined Heat and Power Unit) A co-generation system that simultaneously produces heat and electrical power from gas. A CHP unit is used for supplying power to buildings and hot water for heating or cooling through high efficient heat and power generation.

CICP (Croydon Infrastructure Coordination Pilot) A collaborative working initiative delivered alongside the London Borough of Croydon by partners – design consultancy Atkins and innovation consultancy Fluxx.

CIL (Community Infrastructure Levy) A planning charge, introduced by the Planning Act 2008 as a tool for local authorities in England and Wales to help deliver infrastructure to support the development of their area.

CityGML (City Geography Markup Language) An open standardised data model and exchange format to store digital 3D models of cities and landscapes. It defines ways to describe most of the common 3D features and objects found in cities (such as buildings, roads, rivers, bridges, vegetation and city furniture) and the relationships between them.

CLP (Construction Logistics Plan) An important management tool for planners, developers and construction contractors put forth by TfL. It focuses specifically on construction supply chains and how their impact on road networks can reduce congestion, cost and road and environmental risks.

COI (Conflict of Interest) A set of circumstances which creates an actual, potential or perceived risk that the stakeholder's professional judgment/actions toward their primary interest will be unduly influenced.

CPZ (Controlled Parking Zone) An area where parking is only allowed on certain parts of the road for a limited time, unless you have a permit.

D

DevCo (Infrastructure Development Collaboration Partnership Fund) DevCo is part of the Private Infrastructure Development Group, and receives funding from the Ministry of Foreign Affairs of the Netherlands, the Swedish International Development Cooperation Agency, and the UK Department for International Development.

DfT (Department for Transport) The online tool was intended to bring together data on planned future investments in infrastructure and development, along with relevant context and capacity information.

DMCS (Department of Digital, Media, Culture and Sport) This department in the Government helps to drive growth, enrich lives and promote Britain abroad. Its aim is to protect and promote cultural and artistic heritage and help businesses and communities to grow by investing in innovation.

DNO (Distribution Network Operators) Companies licensed to to distribute electricity in Great Britain by the Office of Gas and Electricity Markets.

E

Eight2O The largest alliance in the water sector partnered by Thames Water and two design and build joint ventures made up of Costain, Atkins, Black & Veatch (CABV); and Skanska, MWH and Balfour Beatty (SMB).

ESO (Electricity System Operators) In the wholesale electricity market, they manage the security of the power system in real time and co-ordinate the supply of and demand for Electricity System Operators electricity, in a manner that avoids fluctuations in frequency or interruptions of supply. The System Operator service is normally specified in rules or codes established as part of the electricity market.

F

FME (Feature Manipulation Engine) It is a platform that streamlines translation of spatial data between geometric and digital formats. It is intended for use with geographic information system, computer-aided design and software.

G

GDS (Government Digital Service) A part of the Cabinet Office, this body's job is digital transformation of government. They are a centre of excellence in digital, technology and data, collaborating with departments to help them with their own transformation.

GIS (Geographic Information System) A system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

GLA (Greater London Authority) Regional governance body – comprised of Greater London and City of London.

H

HAUC-UK (Highways Authorities and Utility Committee UK) A committe dedicated to work together with other interested bodies to drive forward continual improvement in road and street works to minimise the impact of works on the surrounding communities and public travelling to work.

I

ICP (Independent Connections Provider) An accredited company that carries out works on behalf of clients on the electricity network. These networks are normally owned by either a Distribution Network Operator (DNO) or an Independent Distribution Network Operator (IDNO).

IDCT (Infrastructure and Development Coordination Team) Set up by the Mayor, it is a new team to encourage better working between the different parties that are involved in delivering infrastructure - including local authorities, utilities, transport providers, developers and contractors in order to minimise disruption for local communities and better plan for London's growth.

IDNO (Independent Distribution Network Operators) A company licensed to develop, operate and maintain local electricity distribution networks. Their networks are directly connected to the Distribution Network Operator (DNO) networks or indirectly to the DNO via another IDNO.

IHLG (Infrastructure High Level Group) Supporters of this handbook including CEO's of the major utilities, transport providers, regulators and government bodies who serve London.

IMA (Infrastructure Mapping Application) An online tool delivered by TfL, intended to bring together data on planned future investments in infrastructure and development, along with relevant context and capacity information.

J

JAG (UK) (Joint Authorities Group (UK)) A body representing organisations, like Local Authorities and similar others whose principal activities are governed by highways, streets, roads and traffic management legislation. It focuses on the daily operation, coordination of works for asset or utility network management and other events taking place on the highway.

L

LBC (London Borough of Croydon) A London borough in the southern-most region of Greater London and is the largest London borough by population.

LDD (London Development Database) A collaborative project between the Mayor and the London boroughs to monitor planning permissions, starts and completions across London and has been running since 2004.

LEP (Local Enterprise Partnerships) A public and private partnership set up to enable better delivery of infrastructure and economic growth. It is an example of the Public Private Partnership Funding option.

LRF (Lane Rental Fund) The funds raised by the TLRS (TfL Lane Rental Scheme) form the Lane Rental Fund which is intended to fund innovative measures to reduce disruption.

LRGC (Lane Rental Governance Committee) A committee formed of senior TfL and utility companies managers to invest in infrastructure innovations and manage surplus income generated from the Lane Rental scheme by ensuring that expenditure is in accordance with Department for Transport (DfT) regulations.

N

NAO (National Audit Office) An independent Parliamentary body in the United Kingdom which is responsible for auditing central government departments, government agencies and non-departmental public bodies.

NDA (Non-Disclosure agreement) A confidential contract between 2 or more parties that outlines a confidential relationship between the parties to protect any type of confidential and proprietary information or trade secrets. As such, an NDA protects non-public business information.

NHB (New Homes Bonus) A grant paid by central government to local councils for increasing the number of homes and their use.

NPV (Net Present Value) It is the difference between the present value of cash inflows and the present value of cash outflows over a given period of time. It is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project.

O

Ofcom (Office of Communications) The Government-approved regulatory authority for the broadcasting, telecommunications and postal industries of the United Kingdom. It has wide-ranging powers across the television, radio, telecoms and post services.

ODI (Open Data Institute) An organisation that works with companies and governments to build an open, trustworthy data ecosystem, where people can make better decisions using data and manage any harmful impacts.

Ofgem (Office of Gas & Electricity Markets) The Government regulator for the electricity and downstream natural gas markets in Great Britain.

Ofwat (Office of Water Services) The Government water services regulation authority responsible for economic regulation of the privatised water and sewerage industry in England and Wales.

P

POC (Point of Connection)

R

RIF (Revolving Infrastructure Fund) Purpose of this fund is to establish initial seed funding (e.g. through public sector grant) which is added to and paid back incrementally through future revenue streams.

Road Works Road works are different from street works. They are works carried out to repair or improve the highway including footways, pavements and street lighting.

S

sCDE (Spatial Common Data Environment) A centralised storage and management environment for spatial data that adheres to BS1192 standards for integration with a design Common Data Environment (CDE).

SCR (Significant Code Review)

SDLT (Stamp Duty Land Tax) A tax on land transactions in all of the UK except Scotland that was introduced by the Finance Act 2003.

SDS (Safety Data Sheets) A document that lists information relating to occupational safety and health for the use of various substances and products.

SGN (Southern Gas Network) A UK gas distribution company which manages the network that distributes natural and green gas to 5.9 million homes and businesses across Scotland and the south of England.

SHE (Safety, Health and Environment) A discipline/department that outlines and implements practical aspects of environmental, health and safety protection at work. It varies among organisations and regulatory bodies but it is what must be done to make sure that their activities do not cause harm to anyone.

SSE (Scottish and Southern Energy) Energy company part of the SSE Group, headquartered in Scotland, United Kingdom.

Street Works Street works means works of any of the following kinds (other than works for road purposes) executed in a street in pursuance of a statutory right or a street works licence: (a) placing apparatus; or (b) inspecting, maintaining, adjusting, repairing, altering or renewing apparatus, changing the position of apparatus or removing it, or works required for or incidental to any such works (including, in particular, breaking up or opening the street, or any sewer, drain or tunnel under it, or tunnelling or boring under the street.

T

TfL (Transport for London) A local government body responsible for the transport system in Greater London, England.

TLRN (TfL Road Network) TfL's network of principal road routes across London.

TLRS (TfL Lane Rental Scheme) A scheme introduced in June 2012 to incentivise behaviour change and minimise highway occupation, by applying a daily charge. It applies to the most traffic-sensitive locations and the most traffic-sensitive times of day.

TM (Traffic Management)

TTRO (Temporary Traffic Regulation Order) A legal process which must be used to introduce any temporary restrictions such as a temporary road closure, suspending a one way street or suspending parking.

U

UKPN (UK Power Networks) A distribution network operator for electricity covering South East England, the East of England and London. It manages three licensed distribution networks which together cover an area of 30,000 square kilometres.

APPENDIX 2.4: PRINCIPAL CONTRACTOR RESPONSIBILITIES HAND OVER DOCUMENT

PURPOSE

The purpose of this document is to facilitate the collaborative working on Epsom road in Croydon between Thames Water and SGN delivering works on gas and water assets under a road closure controlled by the Local Authority (Croydon Council).

This document will ensure that duty holders under the Construction Design and Management (CDM) regulations 2015 are identified, specifically the CDM Principal Contractors (PC), and control the transfer of PC responsibilities for CDM footprints (worksites) though out the works to ensure there is clear demarcation between the work streams, and clear ownership of any given worksite.

HAND OVER CRITERIAL

Each Principal Contractor (PC) will nominate a responsible person for the handing over and or acceptance of a work site, each PC will also have a deputy to cover leave and absence, these nominees will be identified in the Construction phase plan for each PC and recorded in Fig 1 of this document.

The handover document its self requires the identification of:

- The worksite, its boundary/footprint, and reference points to clearly pinpoint its location.
- A sketch or drawing of the worksite layout (with reference points).
- The nature of the worksite, including, structures, materials, excavations or equipment being handed over.
- Identify any significant residual hazards that are being handed over.
- The PC and the PC representative handing the worksite over.
- The PC and the representative accepting the worksite.
- The date and time of handover.
- Any additional comments.

The work area can be handed back and forth between PC's as often as required, however a new handover document will be drafted for each handover.

Once a handover has been carried out the handing over PC will duplicate the handover document and pass the copy to the accepting PC for their records.

1. PRINCIPAL CONTRACTOR REPRESENTATIVES

PC Organisation	PC Representative	PC Representative (Deputy)

2. SITE LAYOUT AND LOCATION DRAWING/SKETCH

(Including points of reference to pinpoint location and boundary)

3. THE WORKSITE NATURE

(Identify the nature of the worksite, boundary fencing, structures, materials, equipment, plant or excavations etc. being handed over).

4. SIGNIFICANT HAZARDS

(Identify all significant hazards within the worksite)

5. COMMUNICATION

Upon completion of this handover document, each PC will deliver a brief to their respective workforce describing the constraints of this handover and the limits of their worksite.

The briefing MUST clearly communicate that Workers are not permitted to enter a worksite not under the control of their Organisation as PC.

The workers MUST stop and seek advice if they are unclear if a worksite is under the control of their Organisation as PC.

6. ADDITIONAL INFORMATION

(Any additional relevant information)

7. FORMAL HANDOVER

PC Organisation	PC Representative	Date of Handover	Time of Handover	Representative Signature

APPENDIX 3.2a FUNDING OPTIONS

A sustainable funding plan is required to secure the resources to effectively promote collaboration and maintain momentum.

Funding options include:

- Lane rental funding
- Subscription model
- Public Private Partnerships
- Alternative funding sources, including
  - Business Rate and Council Tax Supplement
  - Revolving Infrastructure Fund (RIF)
  - DevCo
  - Community Infrastructure Levy (CIL)
  - New Homes Bonus
  - Business Rates Retention
  - Stamp Duty land tax

LANE RENTAL FUNDING

In 2019, the Department for transport granted statutory powers for Local authorities to charge lane rental in order to reduce disruption to the road network, with a fee structure aimed at encouraging operators to coordinate and collaborate.

The roll out followed a successful implementation of the approach on TfL's road network. The TfL Lane Rental Scheme (TLRS) was introduced in June 2012 to reduce obstructions to the TfL Road Network (TLRN).

To achieve this utilities, developers and other companies are charged a daily fee for any obstruction to affected highways (including cycle ways and carriageways). It applies to 56% of the TLRN, covering the most traffic-sensitive locations at the most traffic-sensitive times of day.

The funds raised by the scheme form the Lane Rental Fund (LRF) which is intended to fund innovative measures to reduce disruption. More information can be found on the TfL website.

THE 'SUBSCRIPTION MODEL'

If the evaluation of collaborative street works demonstrate stakeholder groups benefit significantly from coordination, and assuming the benefits of coordination are accepted by beneficiaries, a form of 'subscription' could be introduced for these groups to contribute to the sustained funding of the initiative.

A clear and straightforward means of distributing the costs between subscribers in a manner that is perceived to be fair would be required for the subscription model to work well and be sustainable.

The approach could take the form of a 'promotional or sponsorship model' involving a relatively small number of private-sector partners who would consider it to be of value (both from a promotional and commercial perspective) to contribute financially.

The specification and targeting of the initiative would need to be clearly aligned to the business operations and priority areas of activity of sponsors likely to contribute to encourage support. In order to minimise

risk to the successful establishment, it would be appropriate to aim for no more than approximately 10 key sponsors. In the main, these are most likely to include utilities companies and developers.

One of the key issue with the long-term financing sustainability of the initiative relates to a subscription model's reliance on the 'goodwill' or commitment of utilities providers and developers. If this stopped there is no mechanism to lock in the commitment. It is also not clear whether the subscription model would be subject to 'free-riding' where developers and utilities choose not to pay because they feel they can benefit from the work of the Coordination PA regardless. We would recommend the GLA to investigate powers or other forms of influence whereby a commitment to pay can be guaranteed over fixed time periods (e.g. in 5-year blocks). Irrespective of this constraint, if those paying the subscription consider to be receiving consistent, on-going benefits whilst getting promotional gain from sponsorship status, the model could be self-sustaining.

THE PUBLIC PRIVATE PARTNERSHIP MODEL

There are numerous examples of public and private partnership organisations set up to enable better delivery of infrastructure and economic growth. The overarching principle for these organisations is that they help to 'fill the gap' that the private sector is not currently addressing. These organisations help deliver a 'public good' e.g. faster delivery of infrastructure, housing and jobs at the same time as benefits to the private sector partners, e.g. revenue to the companies that deliver the development or infrastructure. In theory as both sectors benefit these organisations are both administered and funded by the public and private sector. The technical detail on how these organisations are constituted varies on a case by case basis with some bodies informal, unincorporated bodies, while others set up as legal entities.

A relevant London example is the Nine Elms Vauxhall Partnership. The Partnership was created in 2010 to coordinate and drive forward the transformation of an entire district of Central London. It is an informal unincorporated partnership. It is co-chaired by the leaders of Wandsworth and Lambeth Council and includes the area's main developers and landowners, the Mayor of London, Transport for London and the Greater London Authority. It is responsible for setting and delivering the strategic vision for the area, including the £1 billion infrastructure investment package. It also includes numerous private sector partners including, amongst others major developers, contractors, landowners and occupiers such as Battersea Power Station, Vinci, Ballymore, Berkeley Homes, Taylor Wimpey, Sainsburys and Royal Mail.

According to the 2016/17 Nine Elms Vauxhall Business Plan the five-year budget to administer the running costs (i.e. staff and operations) of delivering the infrastructure fund is £2.5m. This cost is 100% covered by Wandsworth Borough Council (75%) and Lambeth Borough Council (25%).

Local Enterprise Partnerships (LEPs) are another example of public and private partnerships set up to enable better delivery of infrastructure and economic growth. It is intended that LEPs wil fund their own running costs primarily by drawing upon the resources of local authorities and private sector partners. LEPs are entitled to £500,000 in core funding for administrative purposes, subject to LEPs securing £250,000 in match funding from local partners. All LEPs received the same core funding, regardless of size or structure.

ALTERNATIVE FUNDING APPROACHES

Business Rate and Council Tax Supplement

The principles that are applied to RIFs provide a potential option to enable the long term, sustainable funding for Coordination. LBC successfully set up a £60m RIF to forward fund infrastructure investment. The key principle of a RIF is to establish initial seed funding (e.g. through public sector grant) which is added to and paid back incrementally through future revenue streams generated by mechanisms such as developer contributions, new homes bonus, business rate retention and land value capture instruments.

The RIF model is not a realistic option for financing in the short-term. However, it could be considered for the longer term on the back of a successful initial period financed through alternative means.

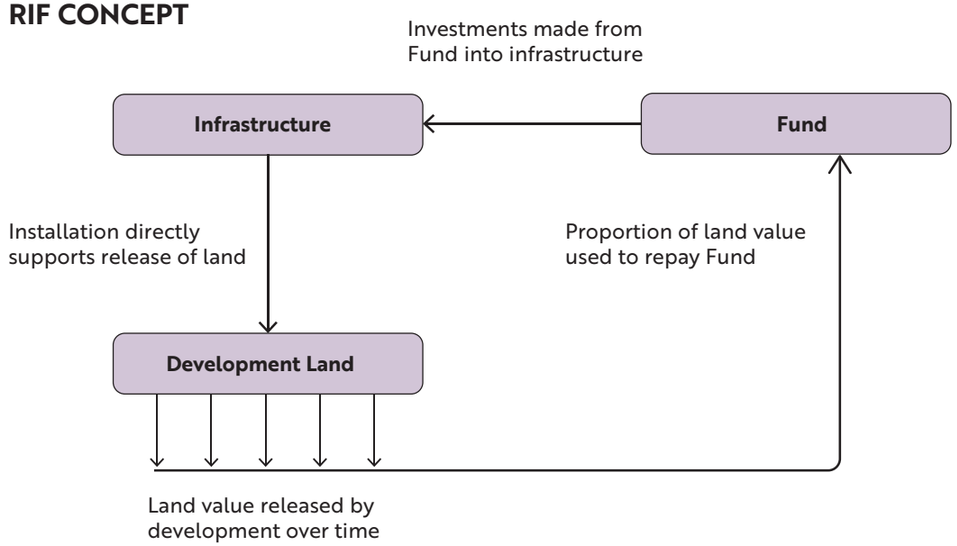
Revolving Infrastructure Fund (RIF) Principles

The main constraint with the RIF model for the longer term is that it is not widely used as yet in the UK and can be perceived to be complex and potentially unfair. Furthermore, in pooling a range of funding sources into a single infrastructure pot, it is unlikely to be effective in solely funding the Coordination initiative. In other words, such a mechanism would need to be introduced for a range of infrastructure interventions including some transport schemes.

DevCo

The DevCo is a funding model that was developed by the GLA through the course of the Old Oak Park Common Development. Network investment is financed by A third party who has an interest in the commissioning of the development (eg developer consortia, Local Boroughs or independent Providers).

RIF CONCEPT



Once the infrastructure is installed and commissioned and stranding risk decreases or is removed altogether, the asset can be transferred at an appropriate premium to the utility, to remunerate the DevCo from taking on the stranding risk.

While the approach for Old Oak Park Common was applied to physical infrastructure, it could be contended that enhanced coordination is an essential component of infrastructure delivery, in the same way that a PMO overhead is included into the overall cost of physical infrastructure.

Community Infrastructure Levy (CIL)

CIL is a mechanism for collecting development contributions, from new development in an area, in order to fund a wide range of infrastructure items, based on a tariff structure. Previously, contributions from new development could only be secured by Section 106 ('S106') agreements, designed to address impacts directly arising from the development.

CIL is intended to work alongside planning obligations, and to pool development contributions in an area in order to fund a wide range of infrastructure items – which may include roads, other transport facilities, flood defences, schools, medical facilities etc. CIL charges are based on a tariff structure adopted by each local authority. There is a powerful imperative for setting CIL locally as it is not possible for local authorities to use S106 on a pooled basis for non-site-specific infrastructure. A local authority must publish a list of items in respect of which it wishes to levy the charge. That list is subject to examination by an independent inspector.

A critical issue is the question of whether or not CIL can realistically be used to fund Coordination as it is not physical infrastructure but a revenue cost. The CIL regulations do allow 5% of collected revenue to be 'ringfenced' to pay for administrative costs, but this is generally to specifically administer the CIL. Other important considerations include:

- Additional or increased tariffs may be negatively perceived by developers whilst losing sight of the benefits to be gained through Coordination.
- Developers may argue that additional tariffs will undermine viability of some schemes, particularly affordable housing developments.
- CIL is applicable only to new developments which raises the issue of fairness given that existing residents and businesses will benefit from improved coordination.
- CIL is applicable only to developers and is not set up to generate funds from utility companies.

Another aspect of CIL is the potential for a proportion of the Mayoral CIL to be used to fund Coordination. Currently the Mayoral CIL is collected in addition to Borough level CIL. The first tranche of Mayoral CIL (MCIL1) was 'ringfenced' to help fund Crossrail and is estimated to have collected around £600m. The second tranche of Mayoral CIL (MCIL2) is expected to fund Crossrail 2 and is estimated to raise around £4.5billion of receipts. It is not clear whether it would be politically or legally acceptable to use a small element of the MCIL2 to fund Coordination but it clearly represents a significant potential funding source that in principle is used to fund strategic London wide infrastructure.

New Homes Bonus

New Homes Bonus (NHB) is the government's flagship housing policy, aiming to start "… a local house building revolution where communities who go for growth by building new homes reap the benefits and at the same time deliver a much-needed economic boost to their local area".

The NHB is a grant paid by central government to local councils for increasing the number of homes and their use. The bonus is paid each year for 6 years and is based on the amount of extra Council Tax revenue raised by new-build homes, conversions and long-term empty homes brought back into use. There is also an extra payment for providing affordable homes. Therefore, the additional growth in NHB receipts as a result of the infrastructure unlocking development could potentially be utilised to pay for the infrastructure.

However there are a number of constraints with using the NHB:

- Given the scale of revenue generated by the NHB, there are too many other demands on it.
- Revenue generated is spatially concentrated and not representative of all parts of the country.
- It relates generally only to new housing development so any revenue generated by NHB to fund coordination would need to be supplemented by other sources.

Business Rates Retention

The aim is that by the end of the current Parliament, local government will retain 100% of taxes raised locally. The Government recognises that a centralised system of business rates (where business rates are collected by local authorities, paid over to HM Treasury and then redistributed back to Councils based on a formula grant calculation) act as a disincentive for growth.

Business Rates Retention (BRR) could in theory represent an important strand in delivery of infrastructure across London assuming that proposed investments successfully unlock industrial/commercial development and generates associated growth in business rates income in London. It offers an opportunity to access new and flexible financial resources. However, a particular challenge associated with BRR will involve the difficulty of accurately forecasting economic and business rate growth and the inevitable lag between investment in infrastructure and associated BRR income.

LB Croydon and the GLA are proposing the use of a Tax Incremental Finance model over a designated area within the Croydon Opportunity Area as a means of funding the delivery of critical infrastructure required to unlock the potential for housing and economic growth in the Croydon Opportunity Area. The 39 critical infrastructure projects planned include key transport improvements to the tram and bus network, highways including the A232/A23 and schemes at West Croydon station, public realm, walking and cycling improvements as well as energy and health projects.

LB Croydon intends to borrow £309m to fund its share of the design and construction costs of these projects. The borrowing will be financed and repaid using the expected growth in business rates in the Croydon Growth Zone area over a period of up to 16 years with an option for a 3-year extension if required. The GLA's share of business rates will go directly towards funding the critical infrastructure costs.

The Mayor is requested to endorse the proposed funding arrangements including the creation of a designated area under the 1988 Local Governance Finance Act by the Secretary of State for Communities and Local Government which will allow LB Croydon to

retain 50% of the business rates growth in the area for up to 16 years with an option for a 3-year extension if required. This will in effect result in the GLA forgoing 20% of the uplift in business rates it would otherwise have received during the period of the designation through the existing retained business rates regime and avoid this growth being partially removed by the Secretary of State through the expected regular reset process.

Whilst BRR could offer a significant opportunity to part-fund coordination, it would be one of many potential recipients of revenue from this source. This issue of 'competition' brings with it complexities in terms of procedure, accountability and political prioritisation. Furthermore, BRR clearly is targeted a raising funds from the existing and future business base of a locality based on increased property values stimulated by infrastructure investment. Consequently, it does not provide the appropriate vehicle for revenue collection from developers and utility companies.

Stamp Duty Land Tax

Stamp Duty Land Tax (SDLT) is a tax on land transactions in all of the UK except Scotland that was introduced by the Finance Act 2003. Each time a property is purchased, a tax is paid, calculated on the value of the property being acquired. Currently SDLT is collected by central government and is not available as a local funding resource. However, with the devolution agenda and the push for new funding deals for local government, SDLT could prove to be a significant tax revenue available to help fund local services but more importantly local infrastructure.

Whilst retention of SDLT is more likely to occur in London before other parts of England, it will remain politically sensitive and improbable to be implemented in the short-term.

ASSESSMENT OF VIABILITY OF POTENTIAL FUNDING OPTIONS

The below table summarises an assessment of each of the options outlined above in terms of relative level of complexity, applicability and viability for the near and longer term.

Near term is understood to be in the order of 1–2 years.

The assessment considered viability of each option in terms of the following factors:

- Is the establishment of the mechanism achievable in the timescales?
- Is the cost of administration of the fund affordable?
- Can the funding be recurring and sustainable in the long-term?
- If sourced from beneficiaries, is the structure of contributions fair and proportionate to the benefit?
- If sourced from beneficiaries, will the contributions impact on the viability of existing business operations or planned development projects?

GEOSPATIAL COMMISSION

The Geospatial Commission was set up in November 2017 to unlock up to £11 billion for the economy from using spatial data more innovatively and productively. The commission aims to drive more effective and coordinated decision making across the public and private sectors (https://www.gov.uk/government/news/chair-and-deputy-chair-appointed-to-the-geospatial-commission).

LOCAL DIGITAL DECLARATION

In addition, the Local Digital Declaration has been signed by 143 councils and is driving a number of digital initiatives across the public sector, including the Infrastructure Mapping Application being developed by the Greater London Authority. A principal part of the declaration is to *"try new things from new digital tools to experiments in collaboration with other organisations"* as well as to adopt *"open standards to give a common structure to the data we create" (https://localdigital.gov.uk/wp-content/uploads/2018/07/declaration-jul18.pdf).*

Example NDA from London's Infrastructure Mapping Application

The IMA adopted a 'Multi Party NDA', specifically with an 'Accession Agreement', allowing additional parties to join without everyone resigning the NDA. All those who have signed the NDA already are given the opportunity to veto additional members before they join.

ASSESSMENT OF FUNDING OPTIONS

Funding approach	Complexity	Near term viability	Long Term Viability
Subscription Model	Low	Medium	High
Public Private Partnership/Local Enterprise partnership	High	Low	Medium
Business Rate & Council Tax Supplement	High	Low	Low
Revolving Infrastructure Fund (RIF)	High	Low	High
DevCo	High	Low	High
Community Infrastructure Levy (CIL)	Medium	Low	Medium
New Homes Bonus	High	Low	Low
Business Rates Retention	High	Low	High
Stamp Duty Land Tax	High	Low	Medium

Lane Rental Funding	Low	High	Medium
Network Innovation Allowance (NIA)	Medium	Low	Medium
Network Innovation Competition (NIC)	Medium	Low	Medium
Innovation Roll- out Mechanism (IRM)	High	Low	Medium

APPENDIX 3.2b DATA LICENCE REFERENCE

DATA LICENCE AGREEMENT

BETWEEN

(1) **[Insert Company Name]** a company registered in England and Wales under company number **[enter number here]** whose registered office is at **[Insert Address]**; and

(2) **[Please confirm company of subsidiary name]** a company registered in England and Wales under company number (**enter number here**) whose registered office is at **OR** whose principal office is at **[Address]** ("**Licensee**").

This Data Licence Agreement ("Licence") sets out the basis upon which **[Insert company name]** has agreed to license the use of certain of its data, including, but not limited to the data as set out in the Schedule to this Licence and to the Licensee. This is as follows:

1. INTERPRETATION

1.1 In this Licence the following words and expressions shall have the following meanings:

"Business Day" means a day that is not a Saturday, Sunday or public or bank holiday in England when banks in London are open for business.

"Data" means the data specified in the Schedule;

"Effective Date" means the date on which this Licence is executed by or on behalf of the last of the parties to execute;

"Equipment" means the Licensee's server at its principal office, which has been approved by **[Insert company name]** and which satisfies **[Insert company name]** reasonable technical pre-requisites;

"Intellectual Property Rights" means all intellectual property rights including, without limitation, patents, registered designs, trade marks and service marks (whether registered or not), rights in the nature of unfair competition rights, copyright, database rights, design rights and all similar property rights including those subsisting (in any part of the world) in inventions, designs, drawings, performances, computer programs, semi-conductor topographies, confidential information, business names, goodwill and the style and presentation of goods or services and applications for protection of any of the above rights;

"**Licence Fee**" means the fee payable for the use of the Data, being the sum of 0.01 pound sterling (one penny).

"Permitted Purpose" means **[e.g. proactively identify opportunities to coordinate works during planned lane closures];**

"Term" means the period commencing on the Effective Date until termination of this Licence in accordance with Clause 9.

"Update" means either a release of the Data to rectify an error in a previous version, or a release of the Data which is otherwise to modify or replace the previous version;

"Use" means to store, run and display the Data on the Equipment solely for and to the extent necessary to achieve the Permitted Purpose in accordance with the terms of this Licence.

2. LICENCE

1.1 In consideration of the payment of the Licence Fee by the Licensee to **[Insert company name]**, receipt of which is acknowledged by **[Insert company name]**, **[Insert company name]** grants to the Licensee a non-exclusive, non-transferable, revocable licence to Use the Data during the Term of this Licence solely for the Permitted Purpose.

1.2 This Licence will come into effect on the Effective Date and will continue unless terminated earlier by agreement between the parties or in accordance with the provisions of this Licence.

1.3 **[Insert company name]** will deliver the Data to the Licensee via **[e.g. a published web service]** within **[7]** Business Days from the Effective Date**.** The Licensee will be responsible for installing the Data. The Data will be in **[e.g. Online Feature service]** or such other format specified by **[Insert company name]**

2.1 The Licensee shall:

(a) supervise and control all Use of the Data including by providing and enforcing reasonable security procedures to safeguard the Data from use by any unauthorised persons and/or for any unauthorised purpose;

(b) only provide access to the Data to such of its employees who need to have such access for the Permitted Purpose and ensure that such employees comply fully with the terms of this Licence;

(c) not attempt to rectify or permit any persons other than **[Insert company name]** or its agents to rectify any fault or inaccuracy in the Data;

(d) be entirely responsible for the interoperability, interface and performance of the Data with any other software or equipment used by Licensee;

(e) use its own skill and judgement when using the Data for achieving its purposes and be solely responsible for all opinions, recommendations, forecasts, actions or omissions made when using the Data;

(f) not resell or grant any sub-licences of the Data;

(g) not use or permit use of the Data in any manner which in any way prejudices **[Insert company name]** legitimate interests or conflicts with the normal exploitation of the Data by **[Insert company name]**;

(h) maintain an accurate and up-to-date record of the number and location of all users of the Data and allow **[Insert company name]** to inspect these records on demand during normal business hours;

(i) notify **[Insert company name]** as soon as the Licensee becomes aware of any unauthorised use of the Data by any person;

(j) promptly notify **[Insert company name]** if, subject to Clause 3.4, the Licensee discovers a material error which substantially affects the Licensee's Use of the Data.

3. WARRANTIES

3.1 **[Insert company name]** makes no warranties, express or implied regarding the accuracy or completeness of the Data or its fitness for any purpose and expressly excludes any liability in respect of it. Any use by the Licensee of the Data shall be at the Licensee's sole risk.

3.2 **[Insert company name]** does not warrant that the Data has been tested for Use by the Licensee or any third party or that the Data will be suitable for or be capable of being used by the Licensee or any other party.

3.3 To the extent permitted by law, **[Insert company name]** disclaims all warranties with respect to the Data, either express or implied, including any implied warranties of merchantability.

3.4 Although **[Insert company name]** does not warrant that the mode of delivery of the Data is free from all known viruses, it has used commercially reasonable efforts to check for the most commonly known viruses before packaging, but the Licensee is solely responsible for virus scanning the Data.

4. LIABILITY

4.1 **[Insert company name]** will not be liable to the Licensee by reason of any representation (unless fraudulent) or any implied warranty, condition or other term, or any duty at common law, or under the express terms of this Licence, for:

(b) any loss of profit, business, contracts, opportunity, goodwill, revenues, anticipated savings, wasted expenditure (including management time) or other similar loss;

(c) any indirect, special or consequential loss or damage (whether for loss of profits or otherwise);

(d) any loss or liability (whether direct or indirect) under or in relation to any other contract; and/or

(e) any loss or corruption (whether direct or indirect) of data or information;

whether caused by the negligence, breach of contract, tort, breach of statutory duty of **[Insert company name]**, its employees or agents or otherwise, arising out of or in connection with this Licence.

4.2 Except as provided in Clause 4.3 any other liability of either party to the other in contract, tort, breach of statutory duty or otherwise arising out of or in connection with this Licence, is limited to an amount equal to the Licence Fee.

4.3 Nothing in this Licence will operate to exclude or restrict a party's liability to the other for:

(f) fraud or fraudulent misrepresentation

(g) death or personal injury caused by negligence;

(h) a breach of any obligations arising under section 12 of the Sale of Goods Act 1979 or section 2 of the Supply of Goods and Services Act 1982;

(i) any matter in respect of which it would be unlawful for the parties to exclude liability.

4.4 Neither party is liable for any failure or delay in performance of this Licence which is beyond the reasonable control of that party.

4.5 The Licensee shall indemnify and keep indemnified **[Insert company name]** against any and all losses, damages, liabilities, claims, costs and expenses (including legal costs and expenses) which may arise as a result of the Use of the Data by the Licensee, its agents and employees, or the Licensee breaching any of the terms of this Licence;

5. INTELLECTUAL PROPERTY RIGHTS

5.1 The Licensee acknowledges that:

(j) any Intellectual Property Rights subsisting in or used in connection with the Data, including all documentation relating to it, are and will remain the sole property of [Insert company name] (or its third party licensor);

(k) the Licensee shall have no rights in or to the Data other than the right to Use the Data in accordance with the express terms of this Licence; and

(l) the Licensee will not during or at any time after the expiry or termination of this Licence in any way question or dispute the ownership by [Insert company name] (or its third party licensor) of those Intellectual Property Rights.

5.2 The Licensee further warrants, represents and covenants that it will not:

(a) decompile, disassemble or reverse engineer the Data or otherwise attempt to derive the underlying ideas, algorithms, file formats, programming of the Data or any files contained in or generated by the Data, nor shall it permit, whether directly or indirectly, any third party to do any of the foregoing;

(b) alter, obscure, remove, conceal or otherwise interfere with any printed or electronic machine readable marking on the Data that refers to **[Insert company name]** as the author or developer of the Data or the copyright or other Intellectual Property Rights of **[Insert company name]** in respect of the Data;

(c) re-format or otherwise change the Data in any manner so as to affect the copyright of **[Insert company name]** in the Data nor merge the same so that the Data ceases to be readily identifiable as that of **[Insert company name]**.

6. LICENCE FEE

6.1 In consideration for **[Insert company name]** granting the Licence to the Licensee, the Licensee has paid to **[Insert company name]** the Licence Fee.

6.2 The Licence Fee is inclusive of VAT.

7. SUPPORT AND UPDATES

7.1 **[Insert company name]** will use its reasonable endeavours to respond to any queries the Licensee may have regarding any material errors or omissions in the Data. The Licensee will give all reasonable assistance to **[Insert company name]** in providing this support.

7.2 **[Insert company name]** shall provide the Updates to the Data in accordance with the Schedule. Unless otherwise agreed in writing and signed on behalf of the parties, this Licence shall extend to any Update(s) from the date of delivery to the Licensee of the media on which such Update is recorded, and all terms and conditions of this Licence shall apply to such Update as if the same were incorporated within the definition of Data.

8. CONFIDENTIALITY

8.1 The Licensee shall keep confidential all information (including without limitation the Data specified in Schedule 1), obtained from **[Insert company name]** in connection with this Licence, whether obtained prior to the Effective Date and/or during the period of this Licence. Accordingly, the Licensee agrees that it will not (subject to Clauses 8.2 and 8.3) disclose any such information to any third party other than its agents and employees and then only to the extent required for the Permitted Purpose and having obtained suitable confidential undertakings from the recipients of the information.

8.2 Subject to Clause 8.3, Clause 8.1 does not apply to any information the Licensee is required by law to disclose (but only to the extent that the Licensee is so required).

8.3 **[Insert company name]** acknowledges that the Licensee may be subject to the Freedom of Information Act 2000 and/or the Environmental Information Regulations 2004 and may be required to disclose information in response to requests within the terms of that legislation. Wherever possible the Licensee shall rely on any applicable exemptions in that legislation to justify not disclosing such information. The Licensee agrees to consult **[Insert company name]** as soon as reasonably practicable after receiving any such request and before disclosing any information (including the Data) provided to the Licensee by **[Insert company name].**

9. TERM AND TERMINATION

9.1 This Licence shall commence on the Effective Date and shall continue into force until the time it is terminated in accordance with this Clause 9.

9.2 The Licensee may terminate this Licence by giving **[Insert company name]** notice in writing at any time.

9.3 **[Insert company name]** may terminate this Licence immediately at any time where the Licensee is in material breach of its obligations under this Licence and either such breach is

incapable of remedy or the breach continues unremedied for 30 days after receiving written notice requiring it to remedy such breach.

9.4 **[Insert company name]** may terminate this Licence on any anniversary of the Effective Date by giving at least 3 months prior written notice to the Licensee.

9.5 As soon as is reasonably possible and in any event within 30 days after the date of termination of this Licence for any reason, the Licensee will destroy the Data and all Updates, upgrades or copies, in whole and in part, in any form including partial copies or modifications of the Data received from **[Insert company name]** or made in connection with this Licence, and all documentation relating to it.

9.6 The right to terminate this Licence is without prejudice to any other right or remedy of the party exercising such right, and the termination of this Licence for any reason is without prejudice to any rights or obligations that have already accrued before the date of termination, including the right to claim damages in respect of any breach of this Licence which existed at or before the date of termination.

10. GENERAL

10.1 Any notice required under this Licence shall be in writing and will be validly given if delivered personally or sent by registered post or by fax (subject to the receipt of confirmation printout) to the address of the parties set out at the beginning of this Licence or such other address as may be notified by a party to the other party.

10.2 For the purposes of this Licence, any notice shall be deemed to have been received:

(d) if delivered by hand, on signature of a delivery receipt;

(e) if sent by registered post, forty-eight hours after posting (disregarding non Business Days);

(f) if sent by fax after 6.00 p.m. on a Business Day or on a non Business Day, at 8.30 a.m. on the next Business Day after transmission.

10.3 This Licence sets out the entire agreement and understanding between the parties, and supersedes any previous discussions, correspondence, negotiations, understandings and agreements relating to the subject matter of this Licence.

10.4 Each of the Parties acknowledge that in entering into this Licence, it does not rely on, and will have no remedy in respect of, any statement, representation, warranty or understanding (whether negligently or innocently made) of any person (whether party to this Licence or not) other than as expressly set out in this Licence.

10.5 Each of the parties' rights and remedies under this Licence or by law are cumulative so a reference to or the exercise of one remedy does not affect any of the others, and any failure to exercise or delay in exercising any rights or remedies will not operate as a waiver or prevent any further exercise of them.

10.6 The Licensee cannot assign, establish a trust or otherwise transfer all or part of the benefit of this Licence, but **[Insert company name]** may freely assign the benefit of this Licence and if it does so then references to **[Insert company name]** will include its assigns.

10.7 If any term of this Licence is found by any court or body or authority of competent jurisdiction to be illegal, unlawful, void or unenforceable, such term will be deemed to be severed from this Licence and this will not affect the remainder of this Licence which will continue in full force and effect.

10.8 This Licence and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the law of England and Wales. Each party irrevocably agrees

that the courts of England and Wales shall have exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this Licence or its subject matter or formation (including non-contractual disputes or claims).

10.9 A person who is not a party to this Licence has no right under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this Licence but this does not affect any right or remedy of a third party which exists or is available apart from that Act.

Signed by for and on behalf of)
[Insert company name])
)
Dated)

Signed by for and on behalf of **LICENSEE**)
)
Dated)

SCHEDULE

[Specification of the data to be licensed]

APPENDIX 3.6a EPSOM ROAD IMPROVEMENT WORKS – RESIDENTS LETTER

CROYDON
www.croydon.gov.uk

Thames Water

SGN
Your gas. Our network.

Monday, 11 March 2019

Notification of water, gas and road improvement work at Epsom Road

Dear Resident,

As part of ongoing improvement works in the Croydon area, Croydon Council, SGN and Thames Water will be working collaboratively to upgrade infrastructure along Epsom Road from the end of March. During this time:

- **Thames Water** will be replacing old water pipes with new stronger ones. This is to ensure that Thames Water continue to provide a reliable service now and in the future
- **SGN** will be replacing old metal gas mains with new plastic pipes to ensure a continued safe and reliable gas supply for many years to come
- **Croydon Council's** highways team will resurface the road once the two utilities have completed their upgrades to improve the appearance of the road surface and ensure there are no potholes.

When we're working
These essential gas and water pipe upgrades and road resurfacing works will be carried out simultaneously to help minimise the length of disruption and impact on the local community. Work will start on **Monday 25 March** and last approximately 16 weeks. By working collaboratively, the project will save **98 days** of disruption to residents and road users.

Work will begin at the southern end of Epsom Road and progress northwards in three phases. Each phase will take approximately 5 and a half weeks to complete:

- Phase 1: between Duppas Hill Road and Duppas Road
- Phase 2: between Duppas Road and Warrington Road
- Phase 3: between Warrington Road and Waddon Road

Working hours are between 8am and 6pm on weekdays and between 8am and 1pm on Saturdays.

How you're affected
To ensure everyone's safety, Epsom Road will be closed to vehicles in both directions around each phase of the work. Access will be maintained for residents, but signed diversions will be in place for through traffic. Some parking bays will not be accessible as these will be within the works area, to allow engineers to dig safely. Active parking bays will be clearly marked out at the time. Thames Water and SGN will write to you with more information about any potential interruptions to your gas or water supply.

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Thames Water

SGN
Your gas. Our network.

Drop-In Session
A drop-in session has been arranged for you to meet with all three organisations and find out more about the upcoming works. You're welcome to come along anytime between **5pm and 8pm** on **Tuesday 19 March** at **The Minster Nursery & Infant School, Warrington Road, Croydon, CR0 4BH.**

Queries or concerns?
Teams on site are always happy to answer questions about our work. Further information can also be found in the FAQs. If you have any queries or concerns, do contact us on the details below.

Croydon Council	Call	Tweet
Streetworks@croydon.gov.uk	**0208 726 6000** For Pollution or Noise Disturbance: Office hours contact (9am – 5pm): 0208 760 5483	@CroTravelAlerts

Thames Water	Call	Tweet
customer.feedback@thameswater.co.uk	**0800 316 9800** Select option one and quote reference number **279791**. If you are a business customer you may wish to contact your Retailer for any additional information relating to the work.	@ThamesWater

SGN	Call	Tweet
customer@sgn.co.uk	**0800 912 1700** Our Customer team is available to answer any questions about our work. Please use reference number **SEN28270.**	@SGNgas

CROYDON
www.croydon.gov.uk

Thames Water

SGN
Your gas. Our network.

Frequently Asked Questions

Why are these works required on Epsom Road?
These essential improvement works are taking place as part of a commitment to keeping local communities safe with reliable gas and water supplies, as well as a smoother road surface, for many years to come.

When will the work begin and how long will it take to complete?
The improvement work project will begin on **Monday 25th March** and last approximately 16 weeks. By working collaboratively, the project will save **98 days** of disruption to residents and road users.

What about vehicles and public transport on Epsom Road?
For everyone's safety, Epsom Road will be closed to vehicles in both directions, closing sections of the road in phases between junctions. While Epsom Road is closed, a signed diversion route will be in place for through traffic.

In consultation with Transport for London (TfL), bus route 157 will be diverted around the site and the Epsom Road bus stop will be suspended during our work. The nearest alternative stop is located at Waddon New Road (Southbound) and Stafford Road (Northbound). For the latest bus travel information, please visit: https://tfl.gov.uk/plan-a-journey/

Pedestrians will be able to access Epsom Road throughout the work.

What about special access requirements?
If you require special access to and from your property, please contact alexander.pocklington@croydon.gov.uk or call **0208 726 6000** to support you accessing your property safely during the work.

Where can I park my vehicle while the road is closed?
While Epsom Road is closed in sections around the work area, we'll be establishing temporary parking spaces near the work area and on neighbouring streets (where possible). More information on parking your vehicle will be available on-site.

How will the road closure affect emergency services accessing the area?
The closure does not apply to statutory emergency vehicles including the Police, London Fire Brigade and the London Ambulance Service. Full access will be given in the case of any emergency.

Will access to Minster Junior School be affected during the work?
Footpaths around the works area will remain open as usual allowing pedestrians to safely access the school during our work. We're continuing to liaise with the school to establish alternative temporary entrances for parents, pupils and staff while the work is carried out.

CROYDON
www.croydon.gov.uk

Thames Water

SGN
Your gas. Our network.

Will deliveries to my property and refuse collections be affected while the road is closed?
Deliveries by postal services will still operate as normal. Refuse collections will also operate as normal as far as possible. Please report any missed collections via the LB Croydon website.

APPENDIX 3.6b EPSOM ROAD DROP-IN CLINIC – POSTER

APPENDIX 3.7a UK KEY SPATIAL DATA INITIATIVES

GEOSPATIAL COMMISSION

The Geospatial Commission was set up in November 2017 to unlock up to £11 billion for the economy from using spatial data more innovatively and productively. The commission aims to drive more effective and coordinated decision making across the public and private sectors.[1]

LOCAL DIGITAL DECLARATION

In addition, the Local Digital Declaration has been signed by 143 councils and is driving a number of digital initiatives across the public sector, including the Infrastructure Mapping Application being developed by the Greater London Authority. A principal part of the declaration is to 'try new things from new digital tools to experiments in collaboration with other organisations' as well as to adopt 'open standards to give a common structure to the data we create.'[2]

1 *https://www.gov.uk/government/news/chair-and-deputy-chair-appointed-to-the-geospatial-commission*
2 *https://localdigital.gov.uk/wp-content/uploads/2018/07/declaration-jul18.pdf*

APPENDIX 3.7b EXAMPLE ATTRIBUTE SCHEMA

EXAMPLE ATTRIBUTE SCHEMA (GLA'S INFRASTRUCTURE MAPPING APPLICATION)

Attribute name	Required by provider	Description
programme_id	Desirable	unique alphanumeric identifier for an individual programme of works
project_id	Essential	unique alphanumeric identifier for individual projects within a programme of works
source	Essential	data provider name
title	Essential	name/title of the project
scheme	Essential	detailed description of the project
leading_organisation	Essential	organisation primarily responsible for the project/programme of work
funding_status	Essential	the funding status of a project
more_url	Desirable	url to further programme details
simple_theme	Essential	the primary theme of a project
multi_theme	Desirable	If a project contains multiple themes of work, additional themes can be added in the format: "Water | Transport | Education"
programme_value	Desirable	cost of the overall programme of work in GBP. If value is not known, leave the cell empty.
programme_range	Desirable	The cost range that the overall programme of work falls into
programme_value_meta	Desirable	description of how certain the cost value is
project_value	Desirable	cost of the project in GBP. If value is not known, leave the cell empty.
project_range	Desirable	The cost range that the project falls into
project_value_meta	Desirable	description of how certain the cost value is
planning_status	Desirable	the status of the project within the planning system
start_date	Desirable	date project is due to start. If uncertain, the first day of a year/ quarter would be helpful
start_date_meta	Desirable	description of how certain the start date is.
start_date_yy	Essential	year the project is due to start

Attribute name	Required by provider	Description
completion_date	Desirable	date project is due to complete
completion_date_meta	Desirable	description of how certain the complete date is.
completion_date_yy	Essential	year the project is due to complete
dates_yy_range	Desirable	the range of years the project will be in delivery
site_area	Desirable	project site area in hectares
northing	Essential	Grid reference of project/programme (based on British National Grid projection). This is relevant for project point data only.
easting	Essential	Grid reference of project/programme (based on British National Grid projection). This is relevant for project point data only.
pcode	Desirable	postcode of project/programme
location_meta	Desirable	how accurate the location of a project is known
comments	Desirable	free text string to add any additional information
collaboration	Essential	This field defaults to 'yes' – indicate 'no' if a project is unsuitable for collaborative work with other providers.
flexibility	Desirable	a measure of how flexible a project can be in terms of delivery time e.g. 1 = must be delivered by a specific date, 2 = must be delivered in this business cycle, 3 = can be delivered anytime
restrictions	Desirable	text string to indicate any restrictions on the data provided
contact	Desirable	project contact name
department	Desirable	project contact department
tele	Desirable	project contact number
email	Desirable	project contact email
downloadable	Essential	indicates if the project data is downloadable by registered IMA users - downloadable from the Private application if only shown there, or the Public open version if data is shown there.
web_map	Essential	indicates if the project data should be presented in the Private version of the application or in the open Public version
provider_db_date	Essential	date the data was extracted from the providers database/system

APPENDIX 6.1 SHOPPING LIST – 2019

UTILITY RESULTS

UTILITY INFRASTRUCTURE PLANNING & UTILITY PROJECT MANAGEMENT

New Supplies Application - List of UR Requirements

Site Details	Provided
Full Site Address	☐
Contact Details	☐
Provisional Start Date	☐
Envisaged date of site completion	☐
Date when first connection is required	☐

Drawings	Provided
Drawings must be supplier in PDF and CAD format (.dwg)	☐
A clean, scaled black and white site layout plan minimum size A3. The plan needs to be suitable for use as a background layer for the distributor proposal drawing and show the new development and site boundary clearly in relation to existing properties. The plan must be free of any unnecessary details (i.e. shading, trees, landscaping etc).	☐
Full set of floor plans	☐
Full set of elevation drawings if meters are not being installed on the ground floor	☐
Site wide incoming service layout/routes is available	☐
Detailed accommodation schedule	☐

Utility Meter Locations	Provided
Provide a marked up drawing showing the proposed meter locations	☐
Electric internal meter positions for flats Inc. landlord supplier - one of the following must be provided:	
1. Meters at communal position on ground floor - please show meter group position on site plan	☐
2. Meters at communal position on each floor - please provide floor plans, showing group meter positions	☐
3. Individual position in each flat - please provide floor plans showing each meter position and riser routes	☐
Gas Meter Positions - if internal please provide floor plan showing the meter position and riser/lateral routes	☐
Water Meter Positions - if internal please provide floor plan showing the meter positions and riser/lateral mains	☐

Utility Loads	Provided
We require Gas, Electric and Water loads for domestic units and landlord supplies	☐
Loading details for commercial units (if any)	☐
Confirmation on whether the units will be heated using gas or electricity	☐
Details of any lifts/pumps/motors/welders/ground or air source heat pumps/air conditioning units/cranes/silos.	☐
We will require the following details: Size kW/horse power, single or three phase, starting method, starting/running current and whether it will be frequent or infrequent use	
Will there be a CHP installed, if so a detailed form will need completing	☐
Book and manage stats in regards to carrying out Diversionary Works	☐
Any details of renewable solutions on the development	☐
Water loading details and schematic	☐
Schedule of materials to carry out the construction of the mains design, detailing size material where applicable	☐

Telecommunication requirements	Provided
Will you require fibre or copper?	☐
Please provide the following information:	
1. Planning application number	☐
2. Has the site received outline planning permission - if so please provide the date	☐
3. Has the site received detailed planning permission - if so please provide the date	☐

Other information	Provided
Soil report	☐
Details of phasing	☐
Details of may rainwater harvesting of Grey Water reuse systems	☐
Details of any new offsite main design by the SLP	☐
Sewer Proposals	☐
Roadway, Footpath and service strips	☐
Land ownership	☐
Existing utility apparatus	☐
Grid reference for the midpoint of the site	☐
Fire Service Liaison: evidence that the fire and rescue authority has been consulted on the fire hydrant positions. A copy of the Fire and Rescue Authority response, when available.	☐

London Borough of Croydon, Fluxx and Atkins would like to thank the Trailblazers Epsom Road team.

Thank you for championing the approach, drawing up collaborative plans and working together from start to finish. Without your creativity in the face of blockers in the road, perseverance and belief this body of knowledge would not exist.

Thank you and here's to a more collaborative future for London.

TrailBlazers

FURTHER SUPPORT:

If you are interested in participating in a street works collaboration in London, please contact us at IDCT@london.gov.uk.

To find out more on the CICP project please contact alexander.pocklington@croydon.gov.uk.

To find out more about our test and learn approach to collaboration and street works please contact embrace@fluxx.uk.com or info@atkinsglobal.com.

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"To make sure we can cater for London's growth with minimal disruption, we need the capital's new infrastructure to be planned and delivered effectively. This means considering essential utilities and transport infrastructure before demand materialises – not as an afterthought in response to new development. It also means building infrastructure in a way that minimises disruption to Londoners and London businesses."

Jules Pipe,
London Deputy Mayor for Planning, Regeneration and Skills

"It is essential that London's local authorities continue to work closely with developers and utility companies to ensure that our roads and pavements are only dug up when absolutely necessary. Croydon's collaborative approach has delivered significant benefits and this handbook is designed to help others achieve similar results."

Councillor Julian Bell,
Chair of London Councils' Transport and Environment Committee

"Road works are unavoidable, but we work closely with our contractors to try and minimise and mitigate any disruption to our residents, businesses and road-users. I'm glad the trial has gone so well and we'll continue to take a joined-up approach to managing works in our borough."

Councillor Stuart King,
Cabinet Lead for Environment and Transport, London Borough of Croydon

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