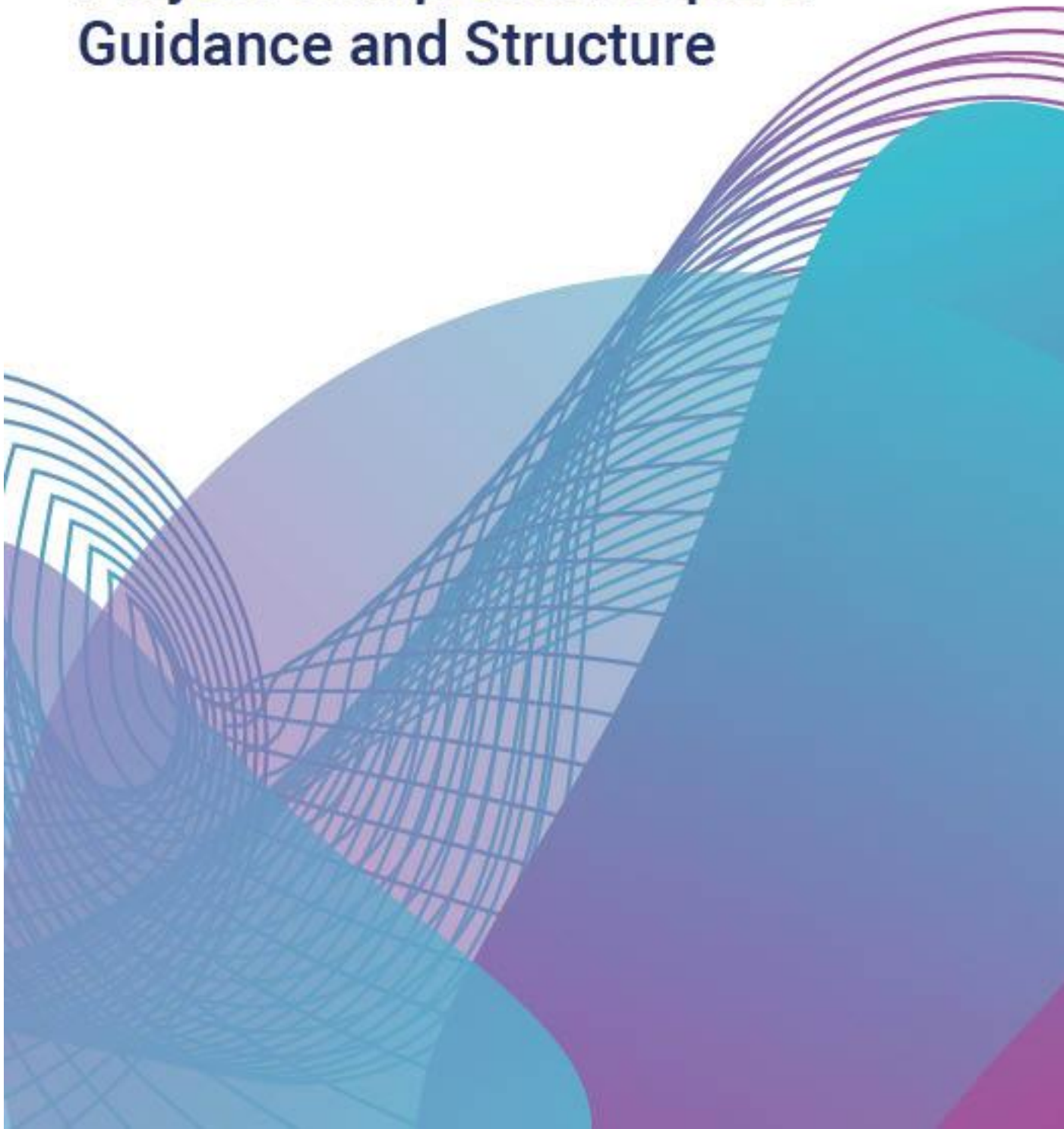




Department for  
Science, Innovation  
& Technology

# Smart Infrastructure Pilots Programme (SIPP) Project Completion Report: Guidance and Structure



## Project Completion Report: Guidance and Structure

The Project Completion Report is your opportunity to document your project's approach and highlight key findings. It should weave together benefits, lessons learned, and outcomes in a clear narrative.

### Purpose of the Report

The report provides a high-level overview of the project team's approach, covering design, build, management, and operational aspects. It should be written in plain English, accessible to a general audience.

Be aware that this document, or parts of it, may be published for public consumption. DSIT values insights into both successes and challenges. If any sensitivities arise, please discuss these with your DSIT portfolio manager to ensure knowledge is captured while maintaining appropriate safeguards.

### Completion Report Objectives

DSIT views the completion process as both an audit trail and an opportunity to:

- Celebrate achievements.
- Document experiences to guide future projects.
- Inspire innovation and further activity in this field.

When emailing the completed report to your DSIT portfolio manager, please feel free to attach any relevant supporting documents.

## Sections to complete

### Project summary

The Smart City Team in collaboration with the Street Lighting Team have successfully bid for £165,000 of Smart Infrastructure Pilots Programme funding from the Department for Science, Innovation and Technology to test PAS 191 multifunctional minor structure.

A PAS 191 column is a multifunctional minor structure that has additional weight loading capabilities and power capacity so that it can support multiple use cases. The use cases proposed in the bid were:

- Small Cell Connectivity (improve mobile connectivity)
- Wi-Fi
- Fixed Wireless Access Broadband
- EV Charging
- Sensors (Air Quality, Noise, etc)
- CCTV
- Non-tech use cases (festive lights & hanging baskets)

The aim of the project was to deploy 15 PAS 191 columns within Westminster and explore multiple use cases on the column, one of which must be a small cell to address mobile phone not-spots. This figure has subsequently been revised to 12 PAS 191 columns.

The initial timeframe to deliver this project is up until March 2025 but was subsequently extended to August 2025. From a mobile connectivity perspective we will use our partner Ontix and from a street lighting perspective we will use Conway's.

We selected the intervention area based on a number of different criteria, including:

- Our scheduled post replacement programme, to reduce the environmental impact,
- Areas with known poor connectivity,
- Locations where we have lower density of AQ monitors,
- Areas where other use cases can be tested too,
- Low risk areas.

We are using the posts for small cell connectivity and to install air quality sensors.

### Project partners

Please specify your project partners names and roles below:

| Name | Role in project |
|------|-----------------|
|------|-----------------|



|                 |  |
|-----------------|--|
| Anakha Nambiar  | WCC Project Co-ordinator                         |
| Dean Wendelborn | WCC Project Manager – Street Lighting            |
| Ken Seeley      | WSP/WCC Project Manager/Consultant               |
| David Wilkins   | Head of Smart City                               |
| DSIT            |  |
| FM Conways      | Highways Contractors                             |
| Ontix           | Small Cell Concessionaire – connectivity partner |
|                 |  |
|                 |  |
|                 |  |
|                 |  |
|                 |  |
|                 |  |
|                 |  |

## Benefits realisation

### **Benefit: Large smart multi-purpose columns installed**

Description: Number of large smart multi-purpose columns installed

Outcome: As part of the project we deployed 12 smart multi-purpose columns. These included:

- 1 x Double Door Large Grey Wornum.
- 8 x Aultron Columns
- 2 x Connected Urbans
- 1 x 219 Base Column

### **Benefit: Small cells deployed**

Description: Number of small cells deployed

Outcome: The locations for the columns were selected based on areas where there was poor mobile capacity. Here is an example for Northumberland Avenue:

## Northumberland Avenue



### Mobile Phone Coverage and Capacity

- EE Pain Point
- O2 Pain Point
- Vodafone Pain Point
- Three Pain Point

As a result of the project the following small cells are to be deployed on the posts:

Circus Road, 6 – Small Cell (Nokia Flexi-zone O2 Small Cell) (1)  
 Northumberland Avenue, 2 – Small Cell (Ericsson 4G/5G Small Cell EE) (2)  
 Northumberland Avenue, 5 – Small Cell (2 x Nokia Flexizone O2 Small Cell) (2)  
 Northumberland Avenue, 13 – Small Cell (Nokia Flexizone O2 Small Cell) (1)  
 Northumberland Avenue, 19 – Small Cell (Ericsson 4G/5G Small Cell EE) (2)  
 Harrow Road, 7 – Small Cell (Nokia Flexizone O2 Small Cell) (1)  
 Harrow Road, 40 – Small Cell (Nokia Flexizone O2 Small Cell) (1)

Total small cells – 10.

### Benefit: Mobile capacity increase

Description: 20% increase in mobile phone capacity in areas surrounding the PAS 191 column as measured by average download speed based on speed tests carried out by our waste truck capacity monitoring project.

Outcome: Due to delays in the project we have not been able to repeat the mobile capacity performance in areas we have installed PAS191 posts. We will continue to measure capacity post project to understand how effective these small cells are. Anecdotally we have heard that mobile network operators have been impressed at how effective these small cells are in addressing mobile capacity problems within the city.

### Benefit: Use cases tested

Description: Number of use cases tested. Please give information on the type of use cases and the number of each type

Outcome:

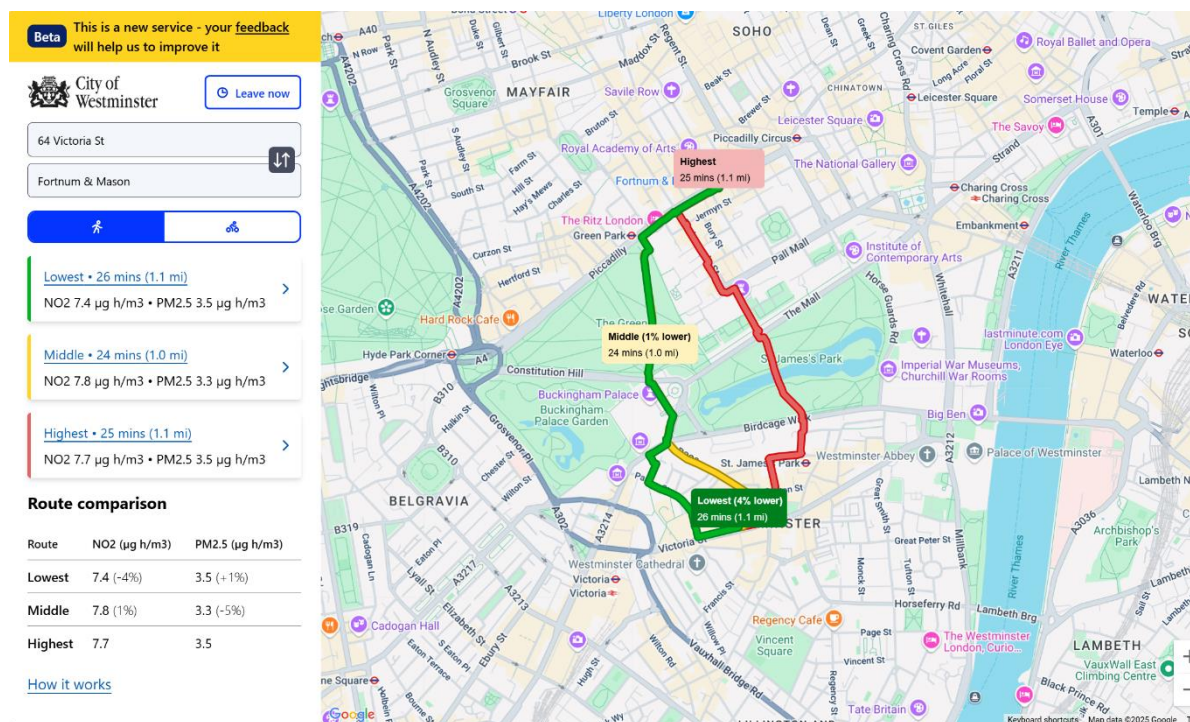


This is a breakdown of the attachments installed by asset type. We have particularly focused on deploying small cells and other connectivity infrastructure. Additional use cases will be deployed post project, like AQ monitors.

**Small Cells** – We have seen two types of small cell deployments on PAS191 posts. Nokia 4G small cell deployments which contain a single small cell unit to improve capacity. We have also seen a Ericsson deployment which consists of a 4G and 5G small cell alongside an alpha wireless antennae.

**CCTV/WiFi** – Some posts we deployed onto had existing CCTV/Wi-Fi installed on the posts. The intention is to reattach this equipment onto the PAS191 posts.

**Air Quality Monitors** – Although not deployed yet we are expanding our AQ monitoring network within Westminster and will use one of the posts for this purpose. This data will feed into our Smart City Operating System and power citizen tools like our Clean Air Routes London tool that enables citizens to navigate Westminster with the cleanest air, not just the quickest route.



### Benefit: Dissemination events

**Description:** Number of dissemination events (e.g. workshops, presenting at conferences).

**Outcome:** The following events have been attended as part of the project:

City Telecoms Association – Westminster City Council are a member of the City Telecoms Association that brings together cities from across Europe to discuss challenges in relation to telecoms. The PAS 191 project was shared with participants as small cell deployments are of particular interest to the audience.



Once the project concludes there will be greater opportunity to share our findings with a wider audience.

**Benefit: FWA improvement**

Description: We will measure and report on the number of white premises within the range of the Fixed Wireless Access point capable of receiving gigabit capable broadband. Measured based on data from Westminster City Council's Open Market Review.

Outcome: This opportunity was going to be explored by Ontix our Small Cell Concessionaire. This was not pursued, and their focus has instead been on their core business of deploying small cell infrastructure.

**Benefit: Reduced column deployment time**

Description: We will monitor the reduction in time taken to deploy a small cell on a PAS 191 column.

Outcome:

Delays to deploying small cells sites are not in relation to the post type, these can typically be replaced or the existing post utilised. Delays arise from transmission installs that can typically take 6 months plus.

There benefits of the PAS 191 posts are that they are designed to take additional load which translates to a time saving of c.4-6 weeks for BSEN40.

An additional benefit to deployment time can be space utilisation inside which reduces/omits the need for a feeder pillar which reduces the need for additional street clutter. This benefit was seen on Northumberland Avenue where a feeder pillar was no longer requires as a result of the column being PAS191.

NAL sockets shallow foundations. Historically those NAL sockets have one duct entry. Operators wont share transmission duct we have to opt for a feeder pillar. PAS191 has 2 duct entries, 1 power, 1 data.

## Procurement

To procure these columns Westminster City Council used its Highway's Contractor, FM Conway to procure these PAS191 posts. This was part of their existing contract with us for public lighting maintenance management and mechanical and electrical works. Delays were in relation to initiating procurement as our trial holes indicated insufficient depth for the foundation so we had to work with the supplier to amend their standard specification.

## Overview of sustainability

*Written in continuous pros, include the following points in your overview:*

- *Financial sustainability: how will the use case(s) continue beyond the capital funding provided by the project*
- *How do you envisage increasing scale of use cases deployed (within your region or widening adoption (across other LAs, regions)*

### Small Cells

The small cells that were deployed as part of the project were fully funded by the mobile network operators and they are delivering capacity improvements for their networks. Having smalls cells attached to lamp columns do impact asset life and as a local authority we expect that the use case provider compensate the council for that loss of asset life. Within Westminster these costs are recovered through our small cell concession contract which provides a revenue share and a guaranteed revenue.

We propose scaling the use of small cells to address capacity problems within Westminster through our small cell concessionaire, Ontix. The installs on our PAS191 posts make up a small proportion of a wider programme of work to install small cells within Westminster. PAS191 posts will be considered in locations where there is high demand for other use cases and where columns fail their structural assessments.

### Other use cases

As part of the PAS191 project we have deployed use cases that are not reliant on funding from the project. The council has a CCTV and Air Quality network that has council budgets assigned and delivers value to the organisation. The use cases installed on the PAS191 posts will remain until the need for monitoring is no longer required.

## Investment stimulation/costs

The costs for the project are as follows:

| <b>Q2 2024</b> | <b>35.8% Indexation</b> |
|----------------|-------------------------|
| Labour Cost    | £5,222.00               |
| Material Cost  | £7,640.80               |
| Sub Contractor | £4,489.00               |



|                |                         |
|----------------|-------------------------|
| <b>Q2 2025</b> | <b>38.8% indexation</b> |
| Labour Cost    | £34,860.00              |
| Material Cost  | £112,800.41             |
| Sub Contractor | £24,724.90              |
| <b>Total</b>   | <b>£189,737.11</b>      |

A per column breakdown is as follows:

| Street Name        | Column number           | Proposed Column Type | Cost       |
|--------------------|-------------------------|----------------------|------------|
| Circus Road        | 6                       | Double Door LGW      | £11,170.16 |
| Circus Road        | 7                       | Aultron Column       | £11,697.00 |
|                    |                         |                      |            |
| Northumberland Ave | Old No. 3 / New No. 2   | Aultron Column       | £13,099.30 |
| Northumberland Ave | Old No. 7 / New No. 4   | Aultron Column       | £13,099.30 |
| Northumberland Ave | Old No.8 / New No. 5    | Aultron Column       | £13,099.30 |
| Northumberland Ave | Old No. 26 / New No. 13 | Aultron Column       | £13,099.30 |
| Northumberland Ave | Old No. 49 / New No. 19 | Aultron Column       | £13,099.30 |
| Northumberland Ave | Old No. 51 / New No. 20 | Aultron Column       | £13,099.30 |
| Northumberland Ave | Old No. 60 / New No. 23 | Aultron Column       | £13,099.30 |
|                    |                         |                      |            |
| Harrow Road        | 7                       | Connected Urban      | £34,496.60 |
| Harrow Road        | 40                      | Connected Urban      | £34,496.60 |
| Harrow Road        | 58                      | 219 Base column      | £6,181.64  |

#### Match funding contributions

##### BTEE Ericsson 4G/5G Small Cell deployment per site

- Cost to design and build the site (£7,500)
- Cost for the small cells and aerials (£4,000 to £5,000)
- Cost for transmission (£3,000 to £10,000)
- Total = £14,500 - £22,500

##### Nokia Flexizone Small Cell deployment per site

- Cost to design and build the site (£8,000)
- Cost for the small cells and aerials (£1,500 - £2,000)
- Cost for transmission (£3,000 to £10,000)
- Total = £12,500 - £20,000

##### Nokia Flexizone 2x Small Cells deployment per site

- Cost to design and build the site (£8,500)
- Cost for small cells and aerials (£3,000 - £4,000)
- Cost for transmission (£3,000 to £10,000)
- Total = £14,500 – £22,500



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Total = £94,500 - £147,500

## Overview of lessons learnt

### **Implications of EV installation as a use case**

We've had ample discussion around EV charging as a use case for the PAS191 columns. Our current EV provision deprioritised this, but there are significant implications for powering the column if installing EV charging that go beyond the structure itself. Installing a metered connection may not be appropriate for this project due to the length of the installation process, and installing multiple meters in close proximity is a practise unfollowed in many LAs. Virtual meters also have significant cost implications as they can lose around 20% of energy in transmission.

### **Difficulty in production of GIS visualisation**

In map creation, we had difficulties getting data from connectivity surveyors, and from other council services, to plot locations of "notspots" and overlay them with current attachments to columns. Delays to this have made use case identification harder.

### **Use case identification as a critical task**

Allowing for wider consultation amongst services before drafting the application to fully understand the wider needs of the council of the lamp columns. Delays in identifying the specific use cases has prevented some of the finalisation of the specification. This dependency was not immediately clear before commencing works.

### **Trial Holes**

Westminster grounds hold many different pipes and wires which make it difficult to install columns at any locations, trial holds need to take place in order to ensure no disruptions to existing ground works. In Harrow Road live wires existed where we initially planned to have the columns installed, so location needed to change. Contingency time needs to be added to ensure that if we plan to do any trial holds in Westminster we need to ensure we have multiple locations incase there are existing groundworks.

### **Power Supply**

PAS columns have their own DNO supply. It would be beneficial for columns to have a separate main supply to ensure each column can be turned on and off when necessary.

### **Structural Design**

Following trial holes the depth of ground is limited to a certain length and width for the lamp column foundations, the manufacturer must ensure the lamp column design can suit the ground level.

### **Foundations**

Due to difficult foundations, had to work with lamp column manufacturers to agree alternative and innovative foundation standard. This piece of work will enable other Local authorities to procure PAS191 columns with the new specs we have worked on.

### **Transmission**

Having a PAS post does not solve the driver of the longest delays for the installation of small cells on lamp posts which is the time take to deliver transmission. This can typically take 6 months plus.

## Future plans

### Post project activities:

- *What is the forward plan for the PAS 191-compliant poles deployed through this project?*
  - *Which department will own and manage them?*
  - *What are the commercial agreements with the pole users and over what period?*
  - *What happens upon the conclusion of that period?*
- *How you intend on capturing the outputs and learnings of this project to ensure you can make informed decisions on whether PAS 191-compliant poles will be used?*
- *Has this project promoted an update to your street lighting/digital strategy?*
- *Do you, as a council, have a clearly documented understanding / business case / decision tree on when it is appropriate to deploy PAS 191 poles?*
- *It is the intention that when replacements are needed (or even before) all projects will be able to follow logic to ascertain what to use, i.e.:*
  - *Is it an area of strategic importance (what does that mean for each), are your neutral host partner or MNOs interested in the specific area?*
  - *Are your EV charging partners interested? Is there fibre? Do you need sensors etc?*
  - *From there you will also know the cost to deploy, cost recovered (via small cell rental, EV rental) and the other non-monetary benefits*
    - *i.e. better connectivity for businesses, residents, visitors*
    - *i.e., the business case to the council as well as the individual business cases that the NH / MNO, EV companies will make in isolation.*
- *Have you updated your T&C's to account for multiple stakeholders working on a single piece of hardware? i.e. what happens if there is an issue, who gets called first etc.*

The PAS191 posts will be the responsibility of the Highways Street Lighting Team and will be managed like other assets the council owns. Here is a guide that is used for any third party attachments to posts: [Street Lighting Column Guidance | Westminster City Council](#). The guide also sets out the fee for attaching something onto a Westminster which is a flat fee of £300. Once the use case is no longer required it is the responsibility of the use case owner to decommission the use case.

The telecoms use cases are managed by the Head of Smart City and are charged separately. Westminster City Council has a long term small cell concessionaire, Ontix. They have exclusive rights to Westminster City Council's posts and deploy small cells on behalf of mobile network operators. For this right the council receives a guaranteed annual revenue and a revenue share of between 20%-70%. Ontix have these rights up until 2035.

This project has not yet prompted an update of our digital strategy or street lighting plan, we will assess the performance of the poles and update guidance accordingly. As the costs of PAS191 posts are higher than our standard lamp column we have added an entry into our Infrastructure Delivery Plan so Community Infrastructure Levy can be leveraged to fund the additional costs of these posts,

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwih58OK8KePAXURQEEAHWB4Lt0QFnoECAoQAQ&url=https%3A%2F%2Fwww.w>



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[estminster.gov.uk%2Fmedia%2Fdocument%2Fev-gen-006-draft-infrastructure-delivery-plan&usg=AOvVaw1pL5OaKOYOrc1nBGxFk1lI&opi=89978449](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/611111/estminster.gov.uk%2Fmedia%2Fdocument%2Fev-gen-006-draft-infrastructure-delivery-plan&usg=AOvVaw1pL5OaKOYOrc1nBGxFk1lI&opi=89978449).

Increasingly the city are receiving multiple request for the same column. Within the last month there has been conflicts between banner advertising, CCTV and small cells. The result of this is failed structural tests for the additional load meaning current posts can only support one set of infrastructure. In these scenarios going forward we will be requesting a column swap to a PAS191 post where possible so the post can accommodate both use cases.