

## West London Electricity Capacity Constraints

### June 2023 - GLA Update Document

This document is issued as a further update to the West London Electricity Capacity Constraints published in [July](#) and [November 2022](#).

These documents set out the background to the electricity capacity constraints in West London, the GLA's role in addressing these issues and the impact on development delivery in the three affected London Boroughs of Hounslow, Hillingdon and Ealing.

This third document focuses on progress against the immediate, short, medium and long-term solutions set out by Scottish and Southern Electricity Networks (SSEN), National Grid Electricity System Operator (NGESO) and National Grid Electricity Transmission (NGET) to resolve the constraints and unlock delivery over the next 15 years.

This update document sets out:

- **Network capacity updates from SSEN, NGET, NGESO, and UK Power Networks (UKPN)**
- **GLA update**
- **Update on progress against proposed solutions**
- **Next steps**

#### **Appendix:**

Clarity on connections process  
Outcomes & updates from the Collaboration Workshops  
SSEN & NGET capacity maps  
Securities Deposits

# West London Electricity Capacity Constraints Update

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## Summary

Since the last update, SSEN has seen wider uptake of the immediate-term 1MVA solution in West London—where developments that can proceed with under 1MVA of electricity can move forward (assuming there are no additional Distribution-level constraints in the area).

SSEN also introduced the 1MVA ramping solution on 1 April 2023—where developments can proceed if they are able to ramp up their electricity use at under 1MVA per financial year, totalling no more than 10 MVA in 10 years (again, assuming there is no additional Distribution-level constraint in the area); the ramping solution is still new, but uptake has been limited to date.

**These immediate solutions, agreed between SSEN, NGET and NGESO – and supported by Ofgem - are encouraging and have allowed many housing developments to progress that would otherwise have been stalled.**

SSEN reports that since the introduction of the new 1MVA threshold, it is estimated that 20 housing or mixed housing/commercial projects, equating to circa 8MVA (or around 1,350 homes) have accepted connection agreements within a short-term timeframe.

SSEN is now also introducing an additional Distribution level ramping solution for smaller developments that are otherwise unable to proceed due to a Distribution network constraint. Developments requiring up to 500kVA per year will soon be able to proceed faster through this route.

**However, there remains a challenge for schemes in West London that require over 1MVA per financial year. These schemes cannot currently proceed and are stalled behind Transmission network upgrades in the area that are now expected to be completed in 2037, representing a significant delay in some cases.**

Given current limitations that are affecting the ability to accelerate physical infrastructure upgrades, and the fact that the Transmission system is 'contractually' at capacity but not 'physically' at capacity, NGESO has introduced a 5-Point Plan to address the contractual queue. In May, Ofgem also [set out proposals](#) to go further in reforming the connections queue as a whole.

This, alongside the Energy Networks Associations' related work on coordinated reforms to speed up connections at the Distribution level, could free up capacity in West London sooner than 2037, and is a step in the right direction.

**However, the GLA remains concerned about how quickly these reforms will take effect and show results; and how much impact they will have in West London, compared to other parts of the UK.**

It remains the GLA's view that proactive investment ahead of demand is needed across London to support the delivery of Net Zero by 2030, as well as affordable housing delivery.

In the interim, the GLA is supporting developers to liaise with SSEN and resolve site-specific challenges in West London where the 1MVA / 1MVA ramping solutions apply.

For those developers where this is not possible, some have chosen to explore other options, such as instead connecting into the adjacent Network Operator. In these cases, the GLA is convening developer-developer conversations around collaborative streetworks into the adjacent distribution network, that would avoid undue disruption for Londoners.

# West London Electricity Capacity Constraints Update

## Electricity Network Capacity Update

### West London Asset Upgrade timeline

Since the first update document was circulated in November 2022, both Transmission (NGET) and Distribution (SSEN) asset upgrade timelines have been reviewed, with reinforcements to Grid Supply Points (GSPs) being further delayed.

Whilst the below table shows the current timelines confirmed, as of June 2023 – **SSEN, NGET & NGET have made it clear that they are confident that the cumulative impact of solutions outlined in this document will accelerate the dates by which customers can connect** – updated timelines will be confirmed in future publications.

Fig 1. West London Asset Upgrade timeline, by GSP (SSEN, NGET & NGET) June 2023

GSP	Transmission reinforcement completion date (NGET)	Distribution Reinforcement completion date (SSEN)
Amersham*	2037 (previously 2035)	2028
Iver (66kv and 132kv)	2037 (previously 2035)	2027
Laleham	2037 (previously 2031)	No reinforcement triggered to date
Ealing	2037 (previously 2025)	2026 (previously 2024)
North Hyde	2037 (previously 2033)	No reinforcement triggered to date
Willesden	2037 (previously 2026)	No reinforcement triggered to date (previously 2025)

#### \*SSEN Note

Amersham GSP does not receive direct connections from connectees in the Greater London area. It has been included in analysis as there is a relationship between Amersham GSP and Iver GSP, in terms of interconnection at a Transmission level and to a smaller extent, Distribution. At this stage, this is not having a material impact on West London connection dates.

# West London Electricity Capacity Constraints Update

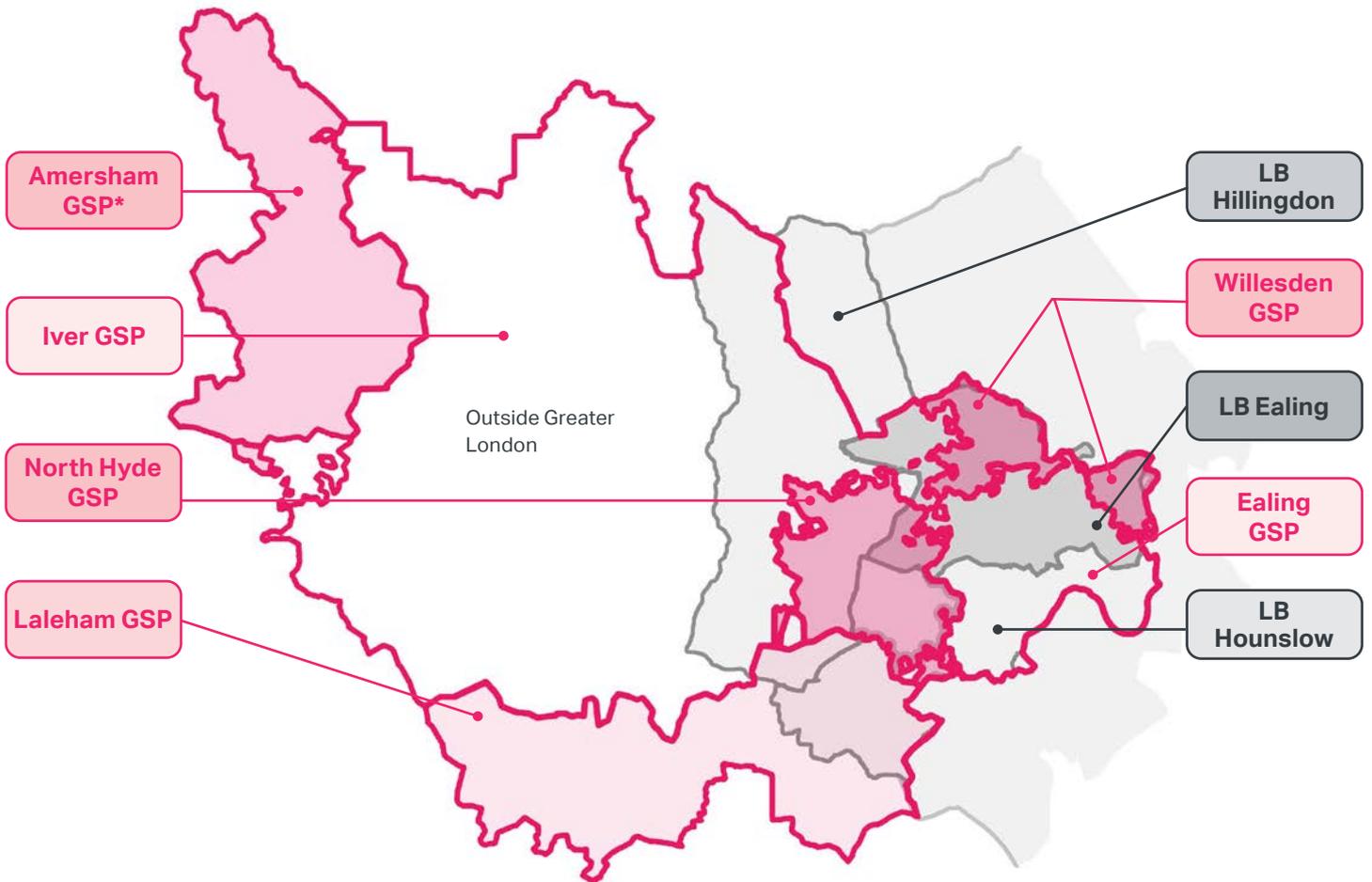
## West London Capacity Mapping

Since the initial document was issued, there have been some updates to the network capacity maps put forward by SSEN and NGET. These maps incorporate changes to the network as a result of new demand since July 2022.

These updates are a reflection of the contracted network as of April 2023 and do not include projects that have been quoted for but not yet confirmed. A further update from SSEN is due in Summer 2023, which they anticipate will show more change than is visible here.

GSP boundaries are shown in the map below.

Fig 2. West London SSEN Grid Supply Points location



# West London Electricity Capacity Constraints Update

## SSEN Capacity Mapping update

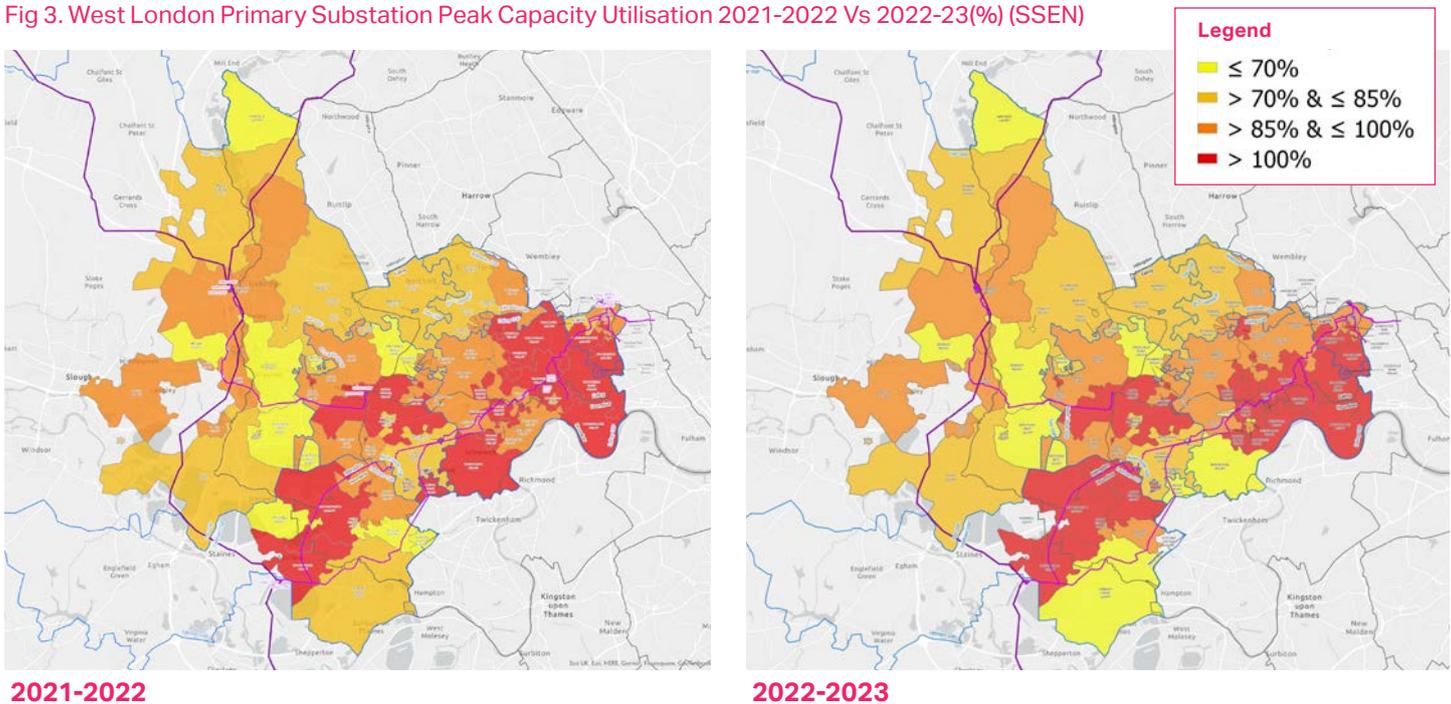
### SSEN Update

SSEN has six Grid Supply Points (GSPs) located in the West London area where the Transmission network meets the Distribution network. West London has always been a very busy part of the SSEN network but applications for Distribution capacity have recently increased dramatically primarily from large sources of demand such as data centres due to telecommunications links.

The increase in Distribution applications, combined with an increase in applications to the Transmission system, has triggered the need for significant network upgrades to the upstream Transmission network and the local Distribution network.

As a result, some customers seeking electricity connections with more than 250kVA capacity in the West London area have been advised of delays of up to fourteen years due to National Grid's Transmission network upgrades.

Fig 3. West London Primary Substation Peak Capacity Utilisation 2021-2022 Vs 2022-23(%) (SSEN)



Given the nature of the West London area, where land and economic factors mean electricity generation schemes are less prevalent, the majority of these applications are for import (demand) only.

### Applications made to SSEN 22/23

- 3037 applications made at the 6 GSPs from April 2022 – March 2023 **Up 70% from 21/22**
- 2389 import only applications **Up 46% from 21/22**
- 648 export and import applications **Up 310% from 21/22**

**Whilst demand and generation requests have increased over the past 12 months, the updated map also reflects 'improvements' in network capacity where scheduled network investment upgrades have taken place.**

### Applications accepted by SSEN 22/23

- 1327 acceptances at 6 GSPs from April 2022 – March 2023 **Up 250% from 21/22**
- 1037 acceptances for projects requiring import only connections **Up 230% from 21/22**
- 290 acceptances for projects requiring export and import connections **Up 320% from 21/22**

# West London Electricity Capacity Constraints Update

## NGET Capacity Mapping update

### NGET Update

NGET are committed to connecting projects to the grid as fast as possible and are working with the regulator (Ofgem) and industry on near-term measures, and wider reform of the process, to accelerate connection timescales.

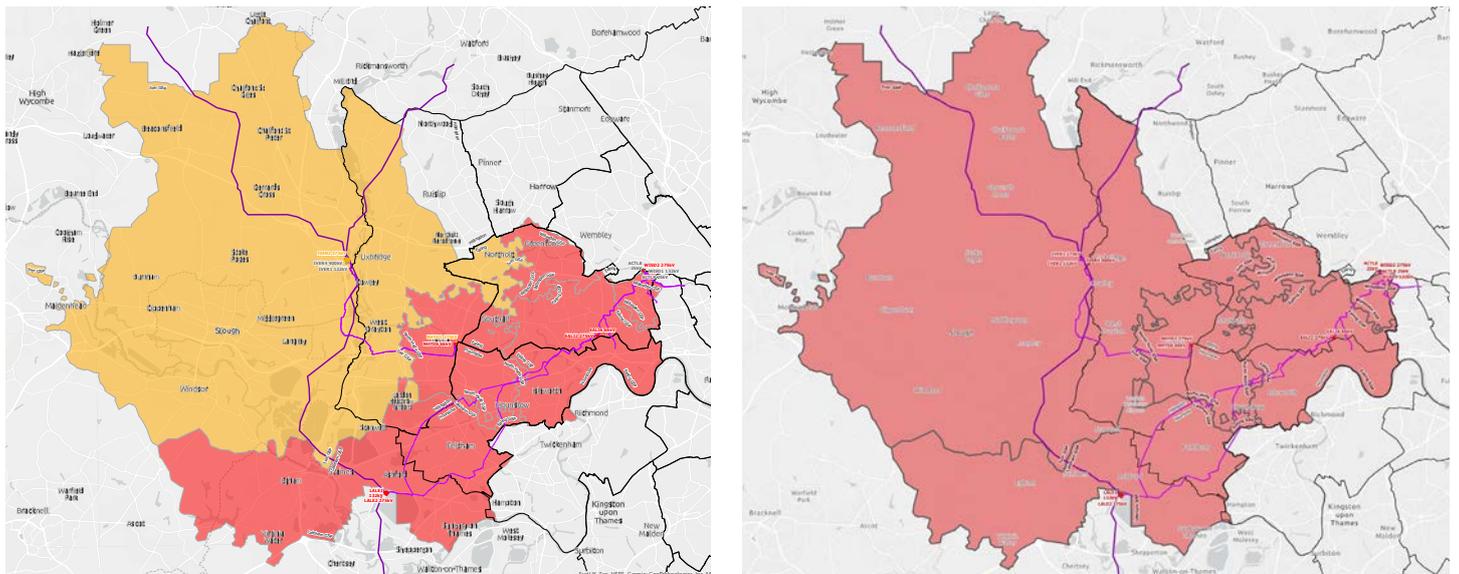
In the short term we have developed alongside the Distribution Network Operator's (DNO) policies where sub 1MVA (or projects that will ramp under 1MVA per annum - generally residential and smaller scale commercial projects) can connect in timescales which are driven by their DNO.

However as a result of the increasing volume of customer applications in this area, the earliest Connection Date for larger scale new projects (above 1MVA) will be 2037.

The timescales are linked to the need for new Transmission system reinforcements in the area. Typically these require a Development Consent Order (DCO) planning process which typically takes 8 – 10 years to complete.

We recognise that further solutions need to be developed to accelerate Transmission connection timescales in this area and continue to work in partnership with the GLA, government, Ofgem and the energy industry to deliver these.

Fig 4. West London Peak Capacity Utilisation 2021-2022 Vs 2022-23(%) (NGET)



2021-2022

2022-2023

Applications to NGET in 22/23

- **23 Applications received**
- **5 applications have been signed**
- **Number of applications signed is less than the previous 12 months**
- **All of the West London GSPs are at capacity**
- **The newer applications have caused more system constraints and have therefore triggered additional Transmission reinforcement works**

### Legend

- Some headroom currently available
- No headroom currently available
- National Grid Overhead Line
- National Grid Cable
- Grid Supply Point Boundary
- London Borough Boundary

Larger versions of the 2022-2023 SSEN & NGET maps are included in the appendix

# West London Electricity Capacity Constraints Update

## UKPN Network Capacity

Through the GLA's engagement with developers, Boroughs and others, a consistent question raised is on the available headroom within the UKPN Distribution network - either bordering West London or throughout the rest of the city.

### UKPN comment

There is a sufficient level of capacity forecast by UK Power Networks in other areas of London. Maps of capacity for these areas are available at [UK Power Networks Open Data Portal](#).

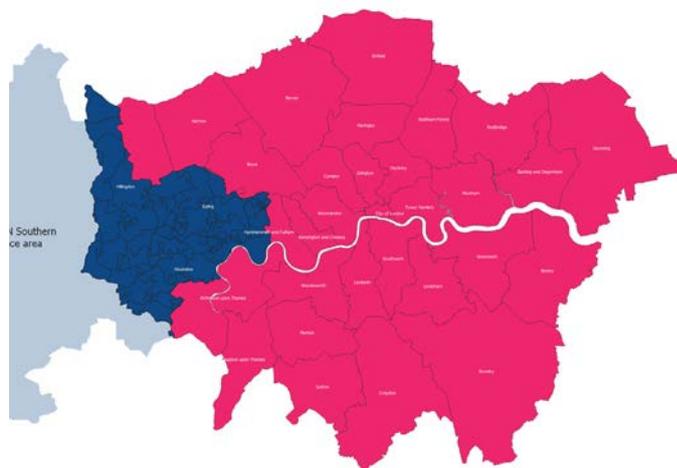


Fig 5. UKPN Distribution Network (pink)  
SSEN Distribution Network (blue)

## GLA Update

### Engagement with Network Operators

Since being alerted to the West London constraints in April 2022, the GLA has continued positive and regular engagement with SSEN, NGET and NGENSO – progressing solutions and raising new opportunities that could help resolve the situation.

Whilst the GLA does not have any regulatory powers over electricity networks, all parties appreciate that the current timelines for connecting in West London are unacceptable and have prioritised resolving these challenges as a priority.

Immediate solutions from SSEN, NGET and NGENSO have already been successful in unlocking several projects through detailed reviews with the GLA, developers and their delivery partners. Whilst some smaller-scale residential projects (up to 1MVA in certain areas) have been unlocked, the GLA remains concerned that there are still a significant number of larger-scale projects (requirements over 1MVA per year) that may be delayed, or in some cases may not progress due to the current Transmission upgrade timelines.

Through our market engagement, it is clear that these constraints do not affect only affordable housing delivery, but all types of development in these three boroughs – with education, health care, EV charging, and district heating being highlighted through our questionnaires and collaboration workshops.

Many of these developments will be unable to wait for future Transmission-level upgrades, now delayed to 2037, in order to progress.

NGESO has announced a [five-point plan](#) intended to unpick a number of issues in order to create more Transmission capacity ahead of physical asset upgrades. This may result in schemes over 1MVA being able to progress more quickly than currently quoted. The progress from NGENSO on creating the five-point plan is a positive step, and its focus on queue management, among other interventions, is welcome.

The GLA remains concerned however, about how quickly NGENSO's five-point plan will see results in West London, how much additional capacity will be released there, and the impact on developments currently stalled.

It remains the GLA's view that proactive investment ahead of demand is needed across London to support the delivery of Net Zero by 2030, as well as affordable housing delivery. This was the subject of a recent Business, Energy and Industrial Strategy (BEIS) [Committee hearing](#) held in Parliament, March 2023.

# West London Electricity Capacity Constraints Update

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## The Department for Energy Security and Net Zero (DESNZ), Ofgem & Energy Networks Association

The GLA continues to regularly meet with National Government departments and Ofgem to discuss network operators' progress in establishing solutions.

This recognises the need for coordinated action to ensure the connections regime is making progress and acting in the best interest of customers.

An industry taskforce, the Energy Networks Association (ENA), are using the West London constraints as a case to improve regulation. The ENA have convened three working groups focused on proposals for regulatory change, triggered by the West London case.

This has the potential to form a template for mitigation, if similar issues occur in Great Britain going forward.

Ofgem published its open letter on future reforms to the electricity connections process in May. This recognises that major reform is needed to reduce waiting times to connect to the electricity network.

It has pledged significant changes to speed up low carbon energy and demand connecting to the grid.

### Ofgem Comment

The pace of electricity connections in West London and other areas is not compatible with ambitions for low cost, secure energy and net zero, as well as wider economic and social development. We are taking steps to accelerate network investment through the Transmission and Distribution price controls and to reform queuing arrangements to help speed up connections.

### Government Comment

Government will publish a joint action plan in the summer with Ofgem to accelerate electricity network connections, which will build upon the work by industry that is already underway.

### NGESO Comment

Similar capacity constraint issues are being experienced across Britain. Led by NGESO and the Electricity Network Association, action plans are being put into place Great Britain wide to speed up the connections process and to make it more efficient.

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## West London Boroughs

The GLA continues to regularly engage with the three affected London Boroughs of Hillingdon, Hounslow and Ealing as well as OPDC – focusing on delivery concerns, such as the infrastructure solutions outlined later in the document and the potential planning implications of these issues.

# West London Electricity Capacity Constraints Update

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## Data Centres

Data Centres support digital innovation and multiple sectors of the economy by providing the digital infrastructure organisations use to store, process and analyse data. The demand for these services is growing and the role of Data Centres in society is becoming increasingly important.

The GLA is undertaking research to understand Data Centres' impact on infrastructure, including substantial utilities demands, which may place pressure on the capacity of energy and water infrastructure networks.

The GLA has also engaged with the Data Centre industry body TechUK at multiple workshops in 2022, with key points of focus being utilities requirements, urban design, locations of existing and planned Data Centres in London and future growth in the sector.

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## Data Centre Workshop

In December 2022 the GLA collaborated with TechUK on a West London energy-focused workshop, attended by multiple Data Centre representatives and SSEN. Key points of discussion were (also summarised in [this TechUK publication](#)):

### Using excess electrical capacity for other nearby developments

Do any existing Data Centre sites in West London have any excess capacity contracted that is not currently being used? This includes comparatively small amounts of power, i.e. 1-5MVA, that could be temporarily redistributed to residential developments nearby – potentially unlocking hundreds of homes.

### Applications Process

The GLA queried whether data centre operators in the affected boroughs were applying for the electrical capacity that they need or asking for more than is ultimately required. This included discussions around Battery Energy Storage Systems (BESS) and if a similar way of thinking could be applied to data centre usage (see below, page 23).

### Electricity usage

SSEN outlined that the current industry assumptions around data centre energy usage was that their demand was relatively continuous throughout the day. There is an awareness that the energy required to cool servers had a seasonal variation, but that there is no daily cycle between peak and off-peak demand.

Data Centre representatives set out that there was in fact a daily cycle in data centre energy usage, which could be incorporated into SSEN's (or any DNO's) network management. We requested that teams provide the GLA with any daily / seasonal data on sites' power consumption for SSEN's review.

### Follow-up

The GLA have received a limited response on these specific queries to date and ask Data Centre teams to [get in contact](#) with any further information that they could provide.

# West London Electricity Capacity Constraints Update

## Developers

In July 2022 the GLA put out a call via our website, as well as direct communication with developers, the affected boroughs and industry bodies, to [collect information](#) on development projects that may be affected by the West London capacity constraints.

While the initial focus of this request was to house builders, we received multiple responses from other types of development, including education, health care and EV charging hubs.

In total we were made aware of 77 different projects potentially affected by the capacity constraints in the West London area.

## Collaboration Workshops

From this information received, the GLA established five collaboration workshops between multiple developers and SSEN. The aims of these workshops were for:

- SSEN to present a detailed overview of the electricity challenges and network upgrade processes
- Developers to understand the network capacity constraints in their specific GSP area
- Developers' project teams to better understand quoted connection timelines
- Developers to raise any immediate project-specific concerns with SSEN
- SSEN to be informed about specific projects and establish an initial understanding of current project viability
- To strengthen relationships between developers and SSEN for future detailed project surgeries as required

In total 44 different project teams attended, with groups being established from responses received. Three initial workshops were held in November 2022 representing three distinct clusters of development.

The fourth workshop brought together all remaining projects in the affected boroughs that we were aware of, with the fifth being specific to OPDC and its development trajectory – both held in February 2023.

Throughout all these sessions, we asked for as much transparency as possible from project teams – whilst being aware of potential commercial sensitivities.

We were encouraged by the engagement and clear communication provided by SSEN and the open and productive input from all the attendees, with some project-specific issues being resolved on the day.

**A summary of the outcomes and updates from these workshops are in the Appendix.**

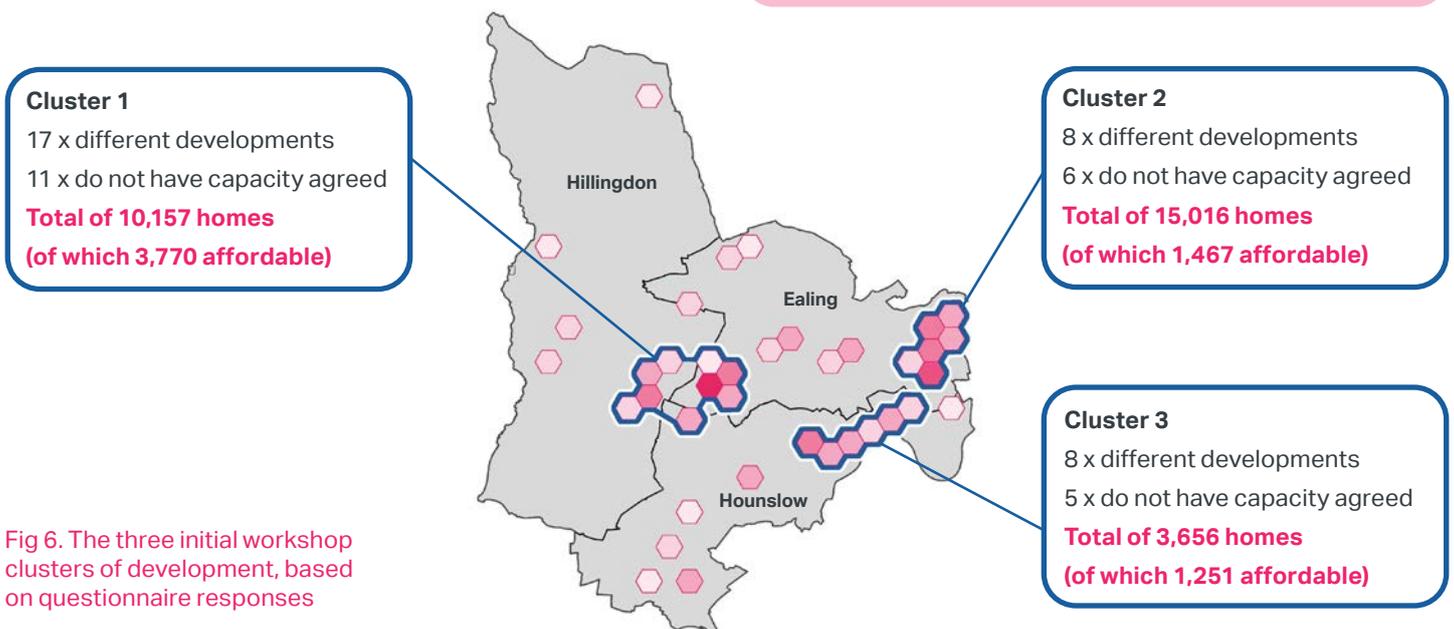


Fig 6. The three initial workshop clusters of development, based on questionnaire responses

# West London Electricity Capacity Constraints Update

## Update on solutions proposed by Network Operators and NGENSO

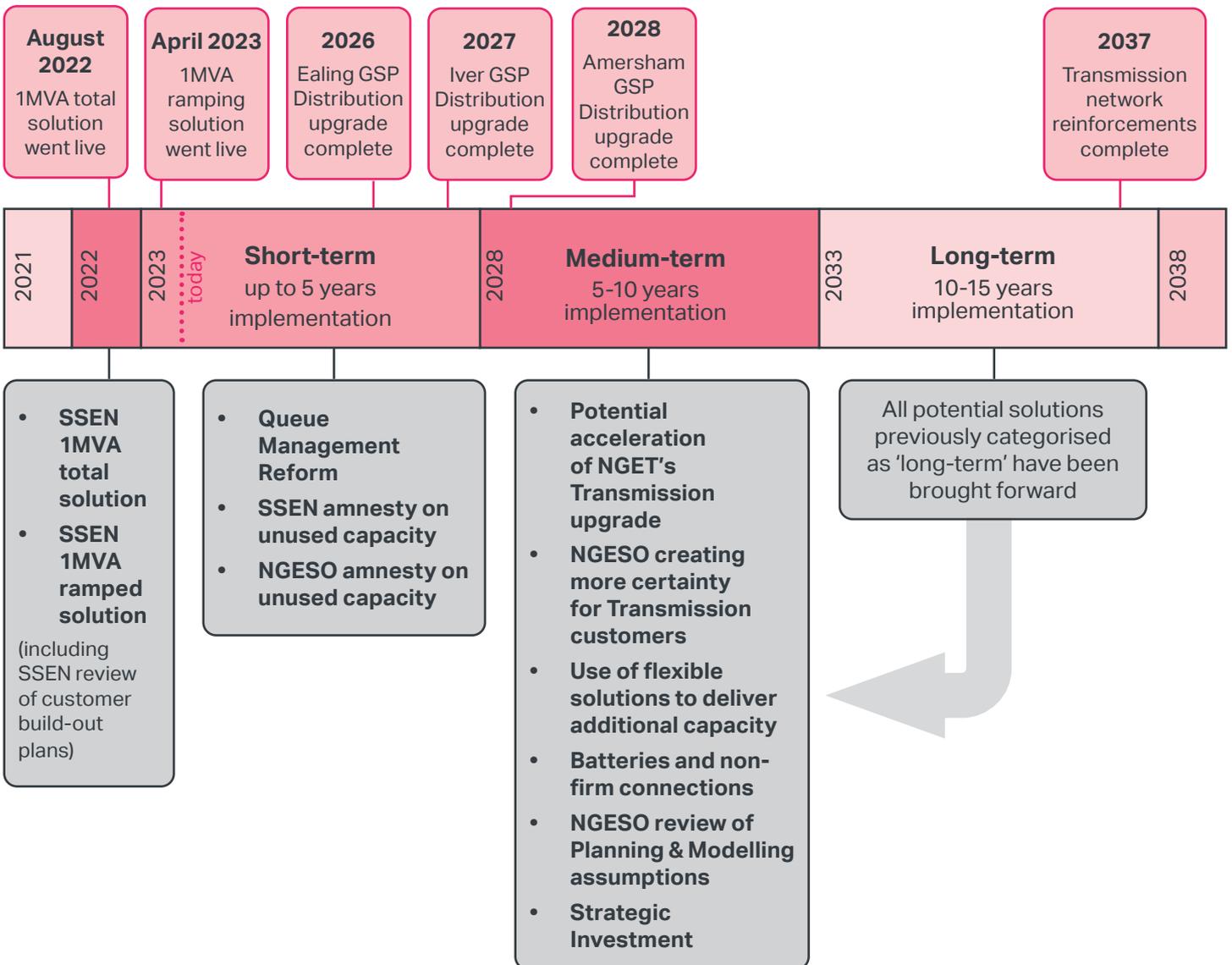
### SSEN, NGET & NGENSO

The second West London electricity capacity document (published in Nov 2022) set out immediate, short, medium and long-term solutions, guided by our regular meetings with SSEN, NGET and NGENSO.

Since then, these proposed solutions have continued to be developed, many alongside the ENA, with the following summarising how they have progressed to date.

The timeline below outlines when these solutions can be implemented – i.e. at which point they should have an impact on the capacity constraints in West London. Through this positive and continued collaboration between network operators, all solutions that were previously identified as long-term have been accelerated to have an impact within the next 10 years.

Fig 7. Timeline of proposed solutions to the West London Capacity constraints



# West London Electricity Capacity Constraints Update

## Immediate solutions

### 1MVA solutions

There are two different 1MVA solutions outlined by SSEN: **1MVA total and 1MVA ramping.**

These solutions (agreed with NGENSO and NGET) allow customers seeking to connect to SSEN's Distribution network to proceed with applications below 1MVA without requiring SSEN to apply to NGENSO for a modification application (the previous threshold was 250kVA and below). **Both solutions are now live.**

### 1MVA Total

The 1MVA total solution went live in August 2022 in the three affected West London Boroughs, unlocking projects with an electricity need between 250kVA - 1MVA.

**For clarity: Whilst the trial of 1MVA solutions has been made available by NGENSO & NGET across all six of the West London GSPs, they are only accessible to projects whose closest point of connection is within a GSP that is restricted by a Transmission network upgrade only. It does not apply to projects within an area that is reliant on Distribution upgrades.**

Fig 8. GSPs that can currently access the 1MVA solutions (as of June 2023) within Greater London

GSP	Are the 1MVA solutions currently accessible?
Amersham	No
Iver (66kV and 132kV)	No
Laleham	Yes
Ealing	No
North Hyde	Yes
Willesden	Yes

### Trial basis

These changes have been implemented on a trial basis only across the six West London GSPs, within the three affected West London Boroughs. There is no established limit to how many different projects can be accommodated within the current system, but SSEN have been clear that this trial will continue as long as NGET & NGENSO can manage these incremental capacity increases.

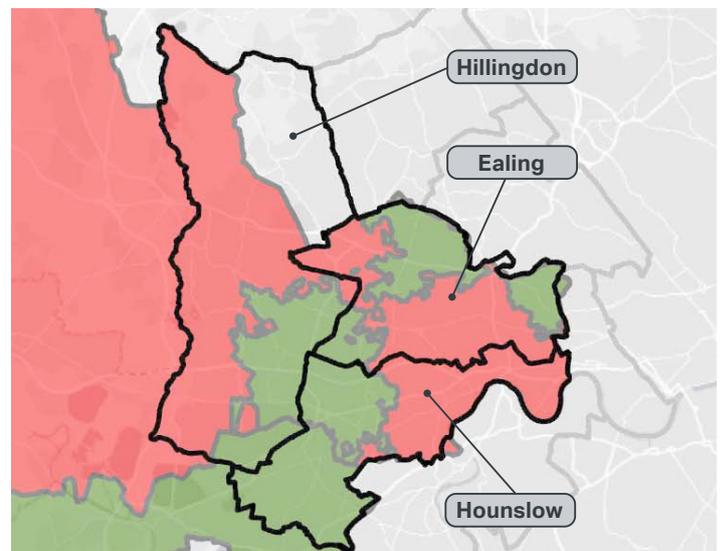
**This is not a long-term solution, as the network becomes more and more 'physically' full – rather than 'contractually' full.**

### 1MVA Ramped

In the November 2022 update, SSEN set out that they were working to engage with customers in the earliest stages of the development pipeline, to review the ability for projects to phase their delivery – subsequently allowing their electricity requirements to be ramped over time.

This review has allowed SSEN to better understand forecasted demand requirements, as the existing connections system assumes that the full capacity is required at the initial date of connection. SSEN went live with the 1MVA ramped solution in April 2023.

This solution has been widely communicated by both the GLA and SSEN, with productive discussion continuing with a number of connectees. However since going live, we understand that there have been limited customer applications (as of end May 23).



# West London Electricity Capacity Constraints Update

## In summary:

- GSPs that do not have a Distribution level upgrade triggered to date can access the 1MVA solutions today.
- 1MVA solutions cannot be accessed in GSPs where Distribution level upgrades are currently scheduled
- Access to more than 1MVA per year will only be accessible once Transmission level upgrades are completed (currently 2037)

The dependency is noted on quote offers issued – if a customer’s letter mentions dependencies on 11kV, 22kV, 66kV, 132kV, these refer to a Distribution upgrade.

If an upgrade is stated at 275kV or 400kV, it relates to the Transmission system which is owned by NGET and operated by NGENSO.

Current upgrade and connection timelines for the Transmission and Distribution networks are set out below, with both NGET and SSEN confident that these figures will be improved in the coming months.

Fig 9. SSEN & NGET GSP Reinforcement programmes (June 23)

SSEN West London GSPs	Type of reinforcement required	Transmission Reinforcement completion date	Distribution Reinforcement completion date	When are the 1MVA solutions available to applicants	Current contract offer dates for over 1MVA per year*
Amersham	Transmission (NGET) & Distribution (SSEN)	2037	2028	2028 after Distribution upgrades completed	2037
Iver (66kV and 132kV)	Transmission (NGET) & Distribution (SSEN)	2037	2027	2027 after Distribution upgrades completed	2037
Laleham	Transmission up-grade (NGET)	2037	None triggered to date	Today	2037
Ealing	Transmission (NGET) & Distribution (SSEN)	2037	2026	2026 after Distribution upgrades completed	2037
North Hyde	Transmission up-grade (NGET)	2037	None triggered to date	Today	2037
Willesden	Transmission up-grade (NGET)	2037	None triggered to date	Today	2037

\*NGESO & SSEN expect that these connection timelines should improve as a result of contractual queue reforms underway

For example, under the current proposed timelines, if a project’s **total requirement is 5MVA** and could be **ramped at 1MVA per year**:

- If the nearest GSP was **Amersham** – you will be waiting for the **Distribution upgrade in 2028** – plus **five years of ramping** meaning the total 5MVA would be provided in **2033**.
- If the same project’s nearest GSP was **Willesden**, **1MVA ramping could begin now** – meaning that the total 5MVA would be reached in **2027/2028**.

If the project **cannot ramp** at 1MVA per year and requires 5MVA total, it will need to **await Transmission level upgrades** to be completed in **2037**.

## Project teams will need to make a separate submission for this 1MVA ramping approach

Customers wishing to take up the option of a ramped offer will be required to reapply.

The customer does not have to cancel their previous offer in advance, as they may wish to have visibility of the ramped offer before cancelling down the previous offer.

Security payments on the original offer (if applicable) can be transferred to the new offer, but queue positions will need to be re-established to the newest offer.

**These examples represent the current position, but reforms underway are expected to substantially improve connection timings.**

# West London Electricity Capacity Constraints Update

As reviewed in the Collaboration Workshops, the 1MVA ramping solution is applied per financial year (April to March). Teams are not restricted to ramping with a 12-month gap between but can do so only once in the financial year.

I.e. you can add 1MVA in Feb and May of the same calendar year but would then need to wait until the next financial year for the subsequent 1MVA application. **The ramping solution is limited to a total of 10MVA.**



Fig 10. An example of the 1MVA ramping solution accessibility over financial years

## Distribution network ramping

Further to ideas raised by Developers at the Collaboration workshops, SSEN is now also introducing an additional ramping solution for the Distribution network.

This will allow smaller developments to be unlocked ahead of asset upgrades.

### SSEN Follow-up

While there is less flexibility than at Transmission level given the limitations of the system, SSEN has explored if a similar capacity ramping solution to that introduced to manage Transmission constraints is possible on its Distribution network.

Following initial analysis, SSEN is in the process of revising the demand thresholds at which network impact is considered across its network area.

**For the 11kV and 33kV network a process will be introduced for ramping at 287kVA and 500kVA respectively.**

Once these products are created, communication will be issued to those customers who may benefit such as projects that are dependent on a major Distribution network reinforcement.

Ramping may be also considered at the Extra High Voltage (EHV) 132kV network but would need to be considered on a case-by-case basis dependent on the network capability and current demand forecast.

# West London Electricity Capacity Constraints Update

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## SSEN Update on benefits of immediate-term solutions

The collaborative solutions identified from the discussions between GLA, SSEN, NGET and NGENSO are having a positive impact in allowing a significant number of small demand projects to connect to SSEN's network, including housing, that would otherwise have been stalled.

In particular, two solutions related to adjustment of the thresholds whereby SSEN as the DNO needs to take into account Transmission constraints is expected to provide benefits into the medium-term while other connections reform solutions are being progressed.

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### Uplift of threshold for Transmission impact to 1MVA

What benefit has been realised?

Since the introduction of the new 1MVA threshold it is estimated that 20 housing or mixed housing/commercial projects, equating to c. 8MVA or c. 1,350 homes<sup>1</sup>, have accepted connection agreements within a short-term timeframe<sup>2</sup>.

### Introduction of 1MVA ramping solution to allow projects to phase capacity

What benefit has been realised?

Positive and proactive discussions are under way with a number of connecting customers to assess suitability for ramping but given the recent nature of the product launch, no applications are fully accepted at this stage. A further update will be given in due course.

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**Future outlook:** Based on analysis of contracted or pipeline customers, it is expected that around 80%<sup>3</sup> of all pipeline housing projects will be able to proceed on a short-term timescale either directly as under 1MVA or through the ramping solution.

It should be noted that, in line with their duties as Electricity System Operator, NGENSO will keep the ability to offer these arrangements under regular review.

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<sup>1</sup> Assumed level of housing and housing/mixed use projects where the connecting customer is a third party to be 70% and modelled electricity demand of c. 7kVA per home

<sup>2</sup> Under 18 months

<sup>3</sup>This estimate is provided based on a number of factors; the scale of the pipeline (inc. GLA questionnaire data), the scale of the contracted queue and threshold levels whereby over 80% of projects are <1MVA, the theoretical ability for projects over 1MVA to ramp capacity which is estimated at 50% (queue shows average 2.4MVA with the smallest 1.06MVA and the largest 8.8MVA) and an assessment of a likely attrition rate of projects that will not progress for non-grid reasons such as planning or financial reasons, which is around a third.

# West London Electricity Capacity Constraints Update

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## Collaborative Connections

Through direct engagement with developers, the GLA has been made aware of several projects that cannot utilise either of the 1MVA solutions.

The reasons for this vary, but include capacity need, size of development, delivery dates, planning requirements (i.e. EV charging points), construction programme and funding deadlines.

For projects that cannot currently connect to SSEN's network - due to either Transmission or Distribution upgrade timelines - some developers have chosen to explore contracting with UKPN, the adjacent Distribution Network Operator.

Through the workshops, collaborative opportunities around two different types of connection were discussed:

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## Across DNO boundary connections (large distances, ~8-15km)

This type of connection would consist of digging up many miles of roads to lay electricity cables and directly connect a project located within the SSEN boundary to a power supply point within the UKPN boundary.

This is only feasible because UKPN's network is currently less constrained than SSEN's. **Both SSEN & UKPN are clear** that this type of connection should **only be a last resort** and only be considered:

- Where projects either sit within a GSP that is Distribution restricted
- Or it cannot reduce its requirement to 1MVA total or 1MVA per year within a Transmission restricted GSP

It is important to note that if a project within the SSEN boundary connects to UKPN, the adoption, ownership and maintenance of the cable will remain with UKPN. Any future requests for increases in power will need to be made to UKPN and not SSEN.

- Awaiting Distribution / Transmission level upgrades is not possible
- No other solutions are viable (i.e. novating existing power, etc.)

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## Across GSP connections (potentially large distances, ~8-10km)

This would consist of a similar type of connection, but potentially over shorter distances, remaining within the SSEN Distribution network but between different GSPs.

This type of connection is only advantageous where a project's nearest Point of Connection is within a Distribution constrained GSP, and the project could have proceeded using the 1MVA solutions in a Transmission constrained SSEN GSP.

In this scenario, a developer will apply to SSEN for a 'point of connection only' application – to a GSP which is not Distribution restricted, and then similarly undertake significant roadworks to physically connect the project to this further-away GSP.

### SSEN Comment

Any connection which is not deemed by a DNO to be minimum scheme (e.g. not the most cost-effective option) will also attract Operation and Maintenance charges.

The GLA also recognises that the most cost-effective option for a DNO – may not be the most feasible / programme / cost effective option for a house-builder – be it a Borough, Housing Association or private developer, considering the long connection lead-times presented.

# West London Electricity Capacity Constraints Update

## Collaborative approach

Both of these types of connections may be extremely costly, will incur significant roadworks and disruption to communities, will create pollution - impacting air quality - and may require complex agreements with landowners or stakeholders such as TfL, or even necessitate new river crossings.

However – some developers are proceeding with hopes that these connections could allow them to connect their developments to power sooner than the current programme –rather than waiting for long Transmission upgrade timelines to complete (e.g. 2037).

Significant parts of these connections may be considered contestable works, and so can be undertaken by Independent Distribution Network Operators (IDNOs) if desired.

The GLA is not encouraging this type of connection, but where developers choose to undertake them, the GLA will seek to help developers reduce disruption to Londoners wherever possible.

## These points were further discussed at the Collaboration Workshops:

- We considered a consortium approach where multiple developers pay for the same cable / infrastructure.
- However, this would create a combined capacity ask too high, triggering the need for additional upgrades and potentially the building of a new substation.
- Instead –each interested developer could apply for a stretch connection separately and employ an IDNO / Independent Connection Provider (ICP) / SSEN to deliver individual cables.
- The GLA would work with developers, IDNOs and ICPs on excavation of a single trench to house multiple cables.

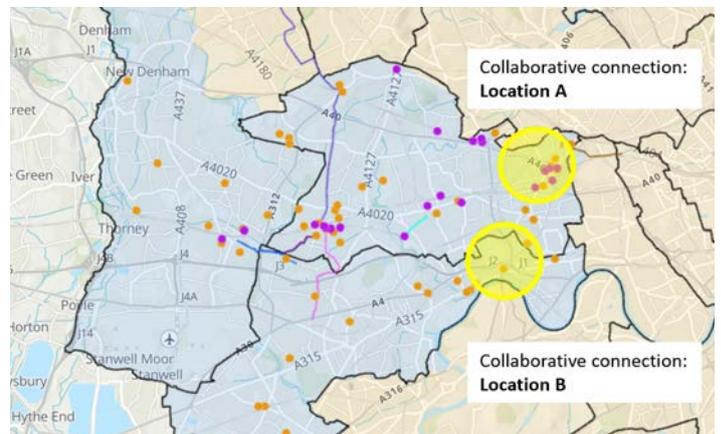
Subsequently, the GLA are approaching developers who are considering this to present a model that can mitigate the impact on the affected communities.

By acting as a convener between different development teams, the GLA can enable a programme of trench-sharing, where individual developments have cables laid for their needs – either across the DNO boundary, or across GSP.

This will mean that roads will only need to be dug up once but can serve multiple developments. This could significantly reduce impacts on traffic management, air quality and improve community wellbeing – whilst also giving developers the opportunity to share trenching and roadworks costs.

Due to the nature of certain project timelines and capacity requirements, the GLA are currently speaking to 25 different project teams regarding ongoing issues. For 9 of the projects that have been deemed unsuitable for the 1MVA solutions, the GLA are exploring collaborative connections over potentially 2 different clusters into the neighbouring DNO area.

Fig 11. GLA project mapping and potential collaborative clusters



# West London Electricity Capacity Constraints Update

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## Short-term solutions (1-5 years)

Since the November 2022 publication, SSEN, NGESO and NGET have re-assessed their connections queue with the aim of identifying unutilised capacity that could unlock projects further down the waiting list as well as participating in industry-wide work to reform the connections process. This includes:

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## Queue Management Reform

### Industry-wide action through the ENA

The Energy Networks Association (ENA) has brought together senior representatives of electricity Transmission and Distribution network companies, NGESO, the Department for Energy Security & Net Zero and Ofgem to explore and implement connections reform, with the intention of making rapid changes to improve how customers connect to the grid. With the oversight of the CEOs of all of Britain's electricity network companies, [this work](#) is focusing on implementing 'quick win' changes to the connection process for customers seeking connection to the Distribution network, in three priority areas:

- Reforming the Distribution network connections queue
- Changing how Transmission & Distribution coordinate connections
- Greater flexibility for storage customers

Work includes exploring whether smaller projects can connect to the distribution network, where there is distribution headroom available – even where these may be queued behind larger projects, which may be waiting on Transmission level upgrades.

This builds on a range of existing and wider initiatives seeking to improve the process and outcomes for connections customers, including harmonising connections best practice and the recent reform of how access to the network is charged to connections customers.

The ENA has explained that this work is prompted by an unprecedented level of connection requests across Great Britain:

*'164GW of new connection requests were received in the year to October (2022) – more than twice the entire grid's worth of capacity looking to connect. The boom in applications, spurred on by the government's net zero target, means a modern approach to managing connections is needed.'*

SSEN is an active participant in the group focused on Distribution networks.

These ENA working groups complement work under way by NGESO, which continues to undertake a fundamental reform of the process to connect to the Transmission system, due to be delivered in Q3 of 2024. NGESO have committed to deliver an outline of this proposal in Q2 of 2023.

### SSEN Update

Queue audits are completed on a regular basis and take place to ensure that records and data is up to date so that demand can be sufficiently considered by network planners and analysts.

SSEN completed an initial queue audit in Summer 2022 which released 200MVA of connection requests from the contracted queue in the affected GSPs.

Although some projects have been cancelled due to incomplete milestones, the benefit to housing projects has been negligible, due primarily to queue positioning. Further work to prioritise projects that are ready to connect rather than those higher in queue, with other barriers, is being progressed as part of industry reform.

# West London Electricity Capacity Constraints Update

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## **NGESO comment:**

The ESO is working collaboratively across each of the three points of the ENA's plan to deploy tactical solutions to speed up connections. This work is proceeding at pace and the group is now working towards a methodology that will enable the most efficient use of available capacity at the Transmission and Distribution interface. We will be seeking to build in our learning from the Regional Development Programmes and will be considering relevant overlaps with the ESO's own five-point plan.

Queue Management [CUSC Modification CMP376] is one of the deliverables under this five-point plan

- The introduction of queue management milestones and possible retrospective introduction to all existing contracts is dependent on a decision by Ofgem, following the submission of the final proposal by ESO on the code modification.
- The level of impact is dependent on how the decision is made by the Regulator on implementation strategy. However, we hope that this will enable projects that are currently holding a contracted connection which is no longer viable to be removed from the queue - therefore our expectation is that this will impact both demand and generation connections.

The timescales for when this impact will be known or understood is also dependent on the implementation approach to be decided on by Ofgem.

# West London Electricity Capacity Constraints Update

## SSEN amnesty on unused capacity

In November 2022 SSEN set out that they were developing plans to engage with large, connected customers – such as data centres and battery storage systems. The aim of this engagement was for large customers to reduce their contracted capacity – to their actual ‘in use’ capacity - in exchange for a reduction in their Distribution Use of System (DUoS) charges. This could release capacity back into the queue.

This SSEN project was in the scoping stage in November 2022, with analysis being conducted on recently connected parties to assess usage versus contracted position.

### SSEN Update

SSEN hope that by educating customers about how a reduction in capacity requirements can result in a reduction in their Distribution Use of System (DUoS) charges, customers may then seek to reduce their contracted capacity, which they can then release back to the queue.

## NGESO amnesty on unused capacity

NGESO also invited industry to bring forward projects that are no longer progressing, to leave the connections queue or to reduce their Transmission Entry Capacity, with no, or reduced cancellation charges.

This has since formed part of NGESO’s Feb 2023 [5-point plan](#) to speed up the connections queue. This amnesty was originally due to close at the end of November 2022.

### NGESO Update

The TEC Amnesty window has now closed and 8.1GW of capacity was received. NGESO is now working with Ofgem to conclude the process ahead of contracts being updated.

Due to the nature of projects that have expressed interest in terminating their contract, we don’t believe this initiative will have a direct impact on enabling release of demand capacity in the West London region, but this does support the ESO’s drive to meet Net Zero ambitions.

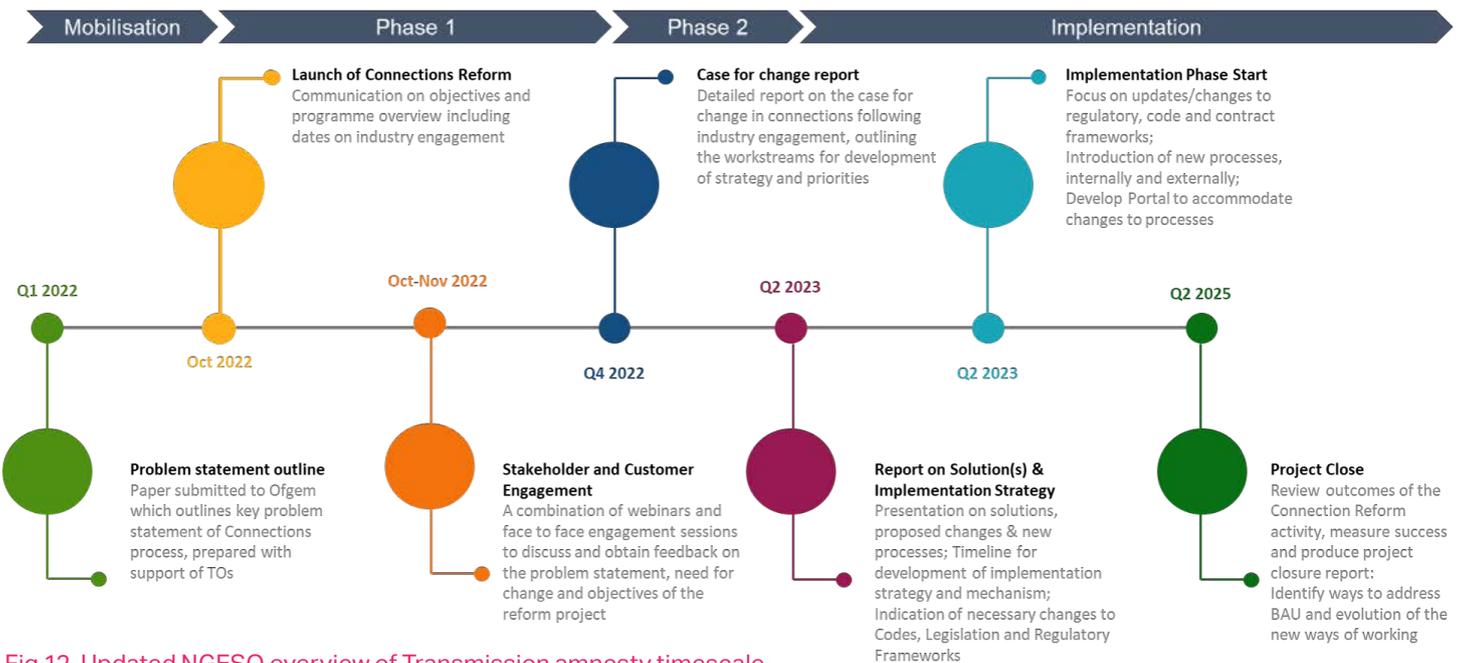


Fig 12. Updated NGESO overview of Transmission amnesty timescale

# West London Electricity Capacity Constraints Update

## Medium-term solutions (5-10 years)

### Potential acceleration of NGET's Transmission upgrade

In November 2022, the GLA set out that it was in discussion with Ofgem, NGET and NGENSO to better understand the technical limitations associated with the long upgrade lead-times.

Since November 2022 the timetable for Transmission level upgrades have been delayed, with all 6 West London GSPs now programmed to be completed in 2037.

This creates a risk that larger development schemes requiring over 1MVA per year will be delayed until the ESO's five point plan yields further capacity within the existing system, or until the physical upgrades have been completed.

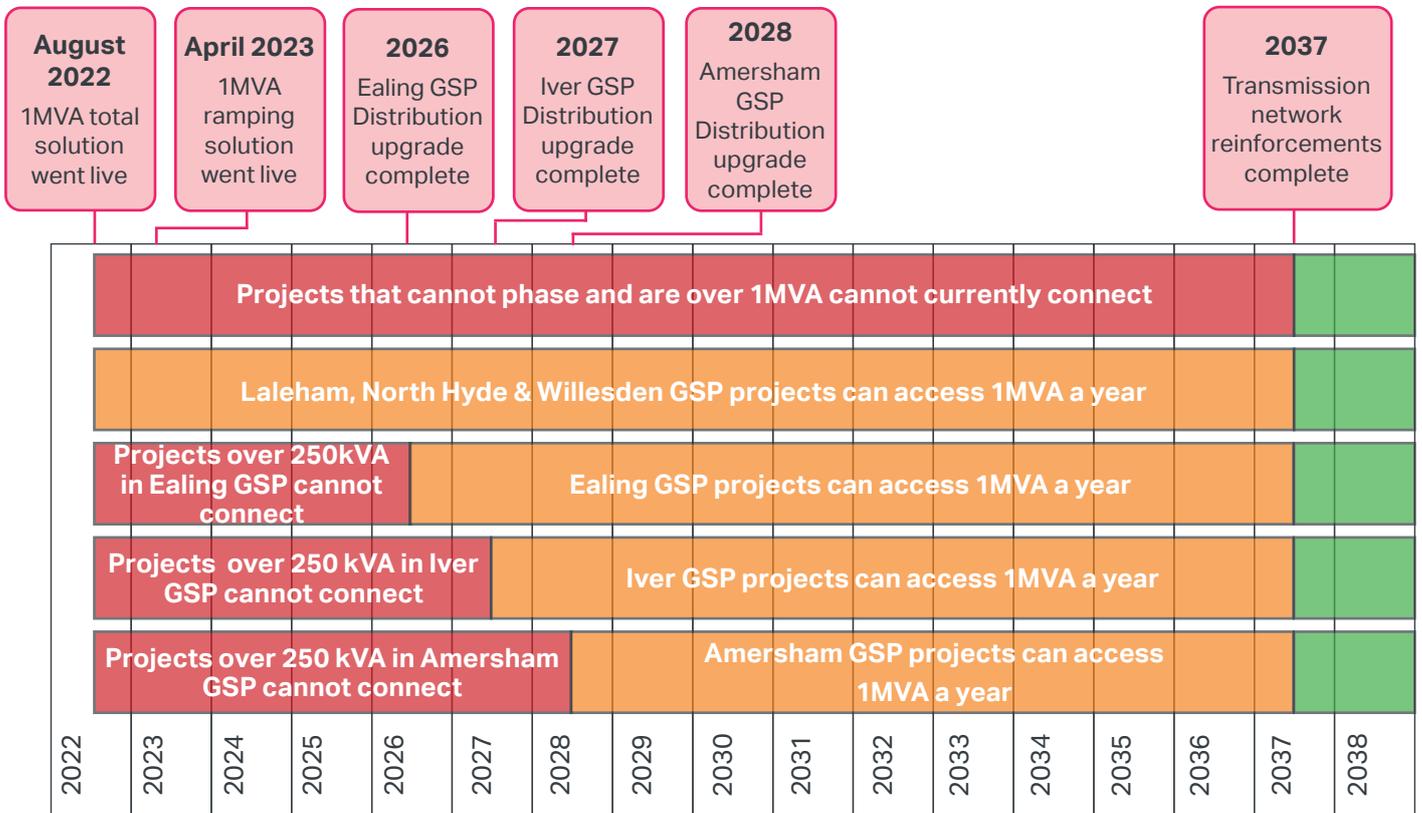


Fig 13. Current proposed timelines for asset upgrades and development connection potential

Whilst the above diagram illustrates the current timelines confirmed by NGET, NGENSO & SSEN, as of June 2023 - all parties have made it clear that they are confident that the cumulative impact of solutions outlined in this document will accelerate these connection dates – updated timelines will be confirmed in future publications.

# West London Electricity Capacity Constraints Update

## Use of flexible solutions to deliver additional capacity

### SSEN Update

As outlined in the last update, SSEN has been exploring the use of flexibility tenders, where it will contract with connected customers (such as batteries or suppliers who can aggregate changes to domestic customers' usage) to reduce the 'peak' demand on the network and potentially facilitate more connections capacity where Distribution constraints exist.

An initial tender in October 2022 demonstrated that there was the potential of 59.1MVA in available flexibility across all six of the GSPs that feed West London including 16.8MVA in the three GSPs where the majority of the area is in the Greater London boundary.

In a follow up tender round this summer, SSEN will issue a targeted tender for a 'Sustain<sup>4</sup>' service across all six West London GSPs: Amersham, Ealing, Iver, Laleham, North Hyde and Willesden.

SSEN are therefore encouraging potential flexibility providers connected to these GSPs to register on SSEN's Dynamic Purchasing System (DPS) to be notified of further information on this tender.

Contracts will be awarded during the tender process, as well as on completion, to allow the benefits of the service to be implemented quickly and built into capacity modelling assumptions.

Grid Supply Point (GSP) Area	Potential Demand Side Response (DSR) Availability (MVA)
Ealing	7.09
Iver	31
Laleham	11.3
North Hyde	6.29
Willesden	3.57

Fig 14. Potential DSR availability by SSEN GSP

Please note that these proposed works are unlikely to have an impact on Transmission level constraints.

<sup>4</sup>'Sustain' service definition: where a network operator procures, ahead of time, a pre-agreed change in input or output over a defined time period to prevent a network going over its firm capacity.

# West London Electricity Capacity Constraints Update

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## Batteries and non-firm connections

Battery Energy Storage Systems (BESS) are currently seen by the industry in a similar way to large-demand customers (such as data centres) – the modelling assumes that a battery might take power out of the grid at the times of highest demand.

However, battery storage is intended to do just the opposite: help the energy grid cope at times of high demand, and store energy at times of low demand.

A new connection approach to batteries would mean that batteries' balancing effect on the grid would be considered when assessing their connection requirements.

To address this, NGENSO is introducing 'non-firm' connections offers—where the customer does not require continuity of supply—for BESS, as well as other types of connections.

This work is being led by NGENSO, in collaboration with all GB Transmission Owners, as this is not only a West London issue. NGENSO hope that this new way of modelling BESS will enable it to support with management of the electricity Transmission system.

Non-firm connections are expected to have limited application for residential developments – as a guaranteed electricity connection is required 24/7. However, where other types of customers—like batteries—can accept non-firm connections, this might leave greater electricity capacity available for residential development.

**In West London however, NGENSO noted that there were only 2 BESS, potentially limiting the positive impact there; however, other types of customers in the area may wish to make use of non-firm connections, which could free up capacity for others.**

### NGESO Update

On 22 February 2023, NGENSO released its 5-point plan confirming their commitment to changing the way they model BESS and progressing non-firm connections.

The initial focus is on BESS because our analysis suggests that storage technologies have the potential to support operability needs during times of system stress, for both generation and demand. This reduces the carbon and cost impact of operating the system.

On 24 March 2023, NGENSO reached out to the industry to get a better understanding of BESS schemes that would be prepared to connect under a non-firm arrangement where constraints to system access may remain [Expression of interest window closed on 30 of April 2023].

The ESO is in the process of reviewing the replies, to better understand the possible impact on connections across Great Britain, including West London.

Further updates on this are expected late Summer 2023.

More information will also be released to industry by ESO on the work we are doing soon via an upcoming policy paper.

Updates can be found [here](#).

# West London Electricity Capacity Constraints Update

## NGESO Review of Planning and Modelling assumptions

As part of the work on BESS and non-firm connections, NGESO has been reviewing the underlying planning and modelling assumptions to reflect the most up to date technological advances, including a customer engagement process.

Fig 15. NGESO timeline for review of Planning and Modelling assumptions



### NGESO Comment

From 1 March 2023, the NGESO have initiated the Transmission Reinforcement Works review in collaboration with the relevant Transmission Owners, which will run until March 2024. This will enable NGESO to apply new background modelling and battery assumptions to projects within the queue and identify opportunities for the acceleration of connection dates and reinforcement works.

This review, which is currently underway, is being facilitated by the Two-step process which is enabling NGESO and NGET to focus on implementing the revised Construction Planning Assumptions (CPAs) reflecting

new modelling approaches for storage as well as updated assumptions relating to the connection rate of projects that actually connect to the Transmission and Distribution networks.

The hope and expectation is that this review will mean that new and existing customers with projects whose connection dates stretch into the mid 2030s will be able to connect sooner, and with reduced securities making their projects more viable and so helping us move closer to our Net Zero targets.

# West London Electricity Capacity Constraints Update

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## NGESO creating more certainty for Transmission customers

NGESO are collaborating with Transmission Operators to urgently focus on a more coordinated approach to reviewing the connections offer process. The aim is to provide customers with certainty of connection, date and scope of works earlier than current processes allow.

### NGESO Update

The NGESO Two-Step offer process is a key enabler for the Transmission Reinforcement Works (TRW) review, as it creates the opportunity to allow the new probabilistic approach for demand and generation in Great Britain to be applied and consequently enable a review of all existing contracted connections with a connection date beyond 2026 to ascertain where improvements on time, scope and costs can be made.

The complex task of carrying out all necessary assessments using new probabilistic assumptions and review of the terms of existing contracts is underway, and we expect to be in a position to update customers on outcomes in the Autumn of 2023, where impact to distributed connections will be communicated by DNOs following the engagement between ESO and DNOs with regards to their contracts.

- The Two Step process started 1st March 2023 and will continue for 12 months. Any customers who have been identified that can benefit from this review will be given an updated agreement by 29th February 2024.
- This new offer process, carried out by NGET and the ESO will enable them to identify where customer connection dates can be accelerated and or works be reduced, therefore decreasing securities.

- The two-step process is a key enabler for the TRW review, as it creates the firebreak to free up resource to allow the new probabilistic assumptions to be applied. The CPA's are being sent from NGESO to NGET and the TRW review has begun. We don't expect any results from this until Autumn 2023.

We have also been out to industry via an Expression of Interest Letter asking customers both at Transmission and Distribution level if they would like to be considered under this review for an earlier connection date. This will mean that we ensure that we focus our efforts on those that have expressed an interest in earlier dates and can accelerate their works as well to meet any new dates offered.

This EOI was open for two months and has recently closed. There were 230 projects who expressed an interest in having an earlier date in England and Wales at Transmission level; we are working through the Distribution level data now but suffice to say there are a lot more projects who have registered an interest here.

We are sharing this data when it has been processed and cleansed with the relevant organisations to aid the process.

More information and regular updates can be found [here](#).

## Strategic Investment

The GLA continues to regularly engage with Ofgem regarding the need for strategic investment, ensuring that London is prepared to meet its 2030 Net Zero targets—including the electrification of heat and vehicles, both of which will have significant capacity impacts on electricity networks.

In collaboration with London's boroughs, DNOs, and other key stakeholders, the GLA is facilitating subregional Local Area Energy Planning to arrive at a unified view of upcoming demand and capacity across London, and investigating innovative area-based solutions.

This work can help make the case for targeted investment ahead of demand.

The first subregional LAEP is currently being completed in partnership with SSEN, UKPN, and the West London Alliance boroughs, with engagement from London Councils—focusing on West London.

# West London Electricity Capacity Constraints Update

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## Next Steps

Please get in contact if:

- Your project is still struggling with power constraints
- The solutions set out in the workshops have unlocked your project
- You would like to discuss collaborative connections
- You would like to provide feedback
- You would like to provide further information related to data centres

We will continue to provide updates going forward.

## Appendix

- Clarity on connections process
- Outcomes & updates from the Collaboration Workshops
- SSEN & NGET capacity maps
- Securities Deposits

## Press

For press enquiries please contact:

[MayorsPressOffice@london.gov.uk](mailto:MayorsPressOffice@london.gov.uk)

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## Collaboration Workshop outcomes & updates

A key outcome of these workshops was the positive collaboration between SSEN and multiple developers.

Whilst existing solutions were reviewed, discussion and debate also revealed other potential avenues for unlocking sites. Slides and workshop summaries were circulated with attendees, summarised below.

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### A site's existing electrical connection

Many teams raised that they are building on sites that previously had an electricity connection. If this connection has not been formally disconnected, teams can make an agreement with the former landowner to novate this electricity capacity over to the new site owner.

This additional capacity (dependent on the size) could be sufficient to unlock projects that are falling just over the 1MVA phasing solution. This power will be accessible in addition to any capacity that teams are currently requesting from SSEN.

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I.e. – if there is 250kVA on the site already - **do not disconnect but novate.**

This could mean that projects have immediate access to 1.25MVA total in the first year.

### Temporary building supply (TBS)

Questions were raised by teams around the application and connection location of TBS and whether that capacity could be continued to permanently feed the project.

#### SSEN Follow-up

SSEN have since reviewed and confirm that 'a Temporary Building supply is quoted on the basis that it will only be utilised temporarily and therefore we believe that TBSs cannot be used as permanent supplies.'

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### Life safety / emergency backup

SSEN agreed to review if life safety systems / emergency backup systems that would never be demanding electricity in parallel to an 'everyday' connection, is in effect double counting demand – if so, they will be reviewing if this approach can be amended. This was primarily raised by Health Centre project teams.

#### SSEN Follow-up

We reviewed this and confirmed that our quoting teams are providing offers on the basis of customer applications and therefore it is highly unlikely that we are double counting capacity as part of contracts.

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### Sustainable Systems - Usage Guidelines

Teams outlined that guidelines for electricity consumption by heat pumps, EVs, etc. would be welcome to allow developers to consistently model these. Multiple different products are on the market, each with different capacity needs – which is causing challenges.

GLA is going to look into the existing guidelines and explore what might be possible in this space.

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# West London Electricity Update 2 - Appendix

## Network clarity

All the Collaborative Workshops highlighted that the connections applications process and operation/ownership of the electricity network itself was, for many, opaque and hard to understand.

In response to this, we have set out some applications process and network diagrams towards the end of this document.

## SSEN Links

SSEN also provided some useful links as discussed in the workshops.

[Demand estimate tool for After Diversity Maximum Demand \(ADMD\)](#)

[Long Term Development Statement \(0 – 5 year outlook\)](#)

[Network Development Plan \(5 – 15 years outlook\)](#)

[Heat Maps](#) – Showing Capacity availability and constraints

SSEN also outlined that they hold [project specific surgeries](#)

Fig 16. Screen shot from the SSEN Open Data Portal (May 2023)

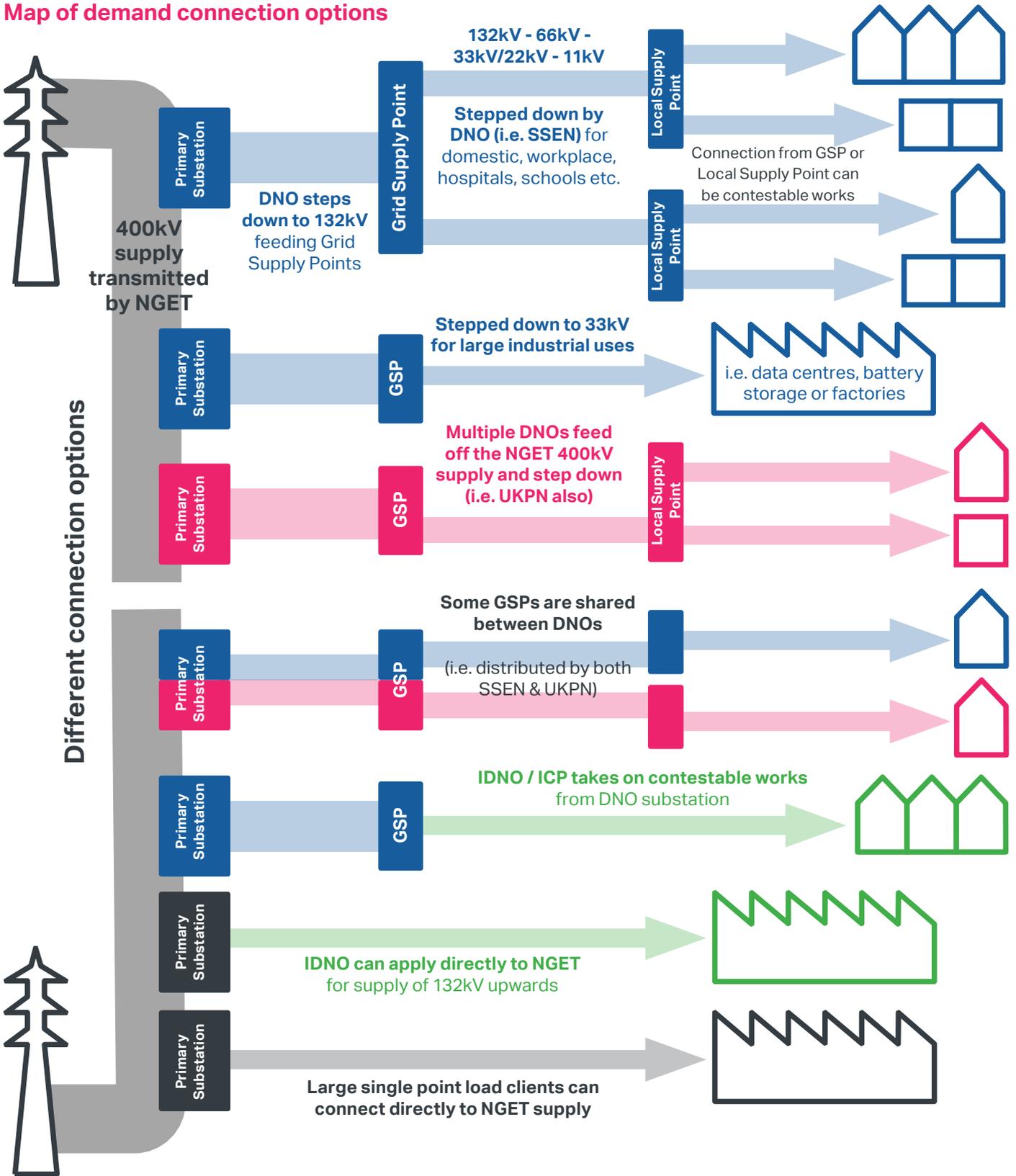


## Ongoing Project Engagement

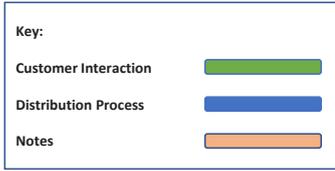
Further Collaboration Workshops have not currently been requested, however the GLA continues to enable direct engagement between SSEN and development teams, with reviews already unlocking some projects.

## Appendix: Connections Clarity

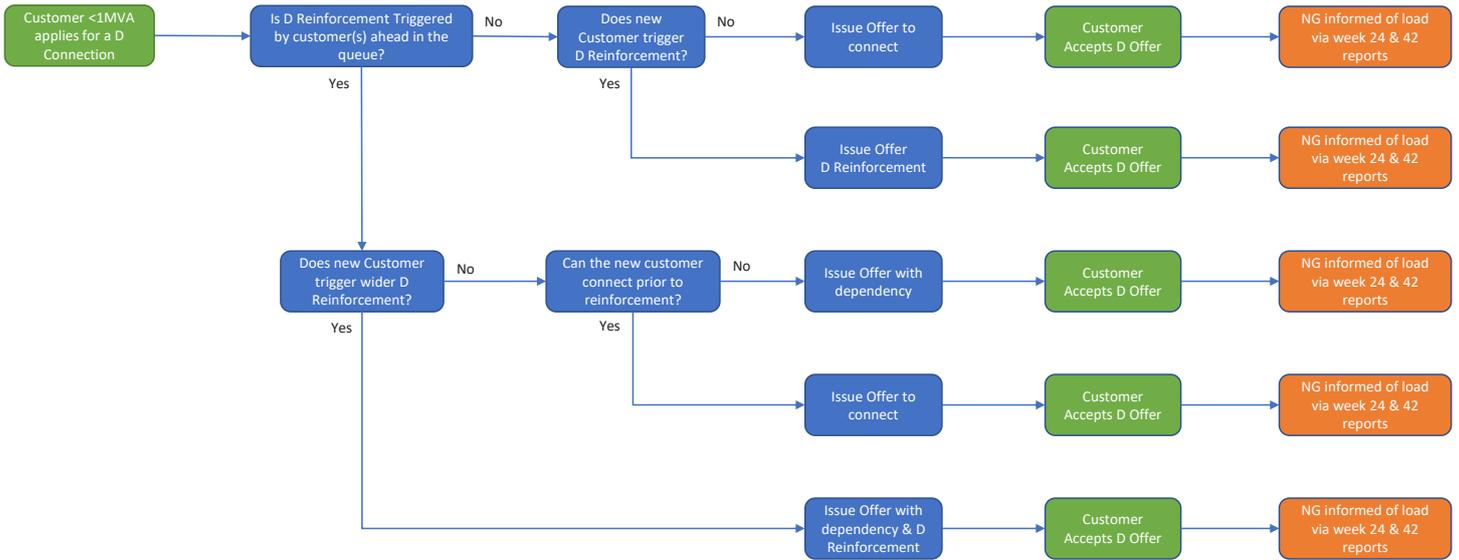
### Map of demand connection options



## Demand Customer Journey



### DEMAND CUSTOMER JOURNEY *Customers that are below the materiality threshold*

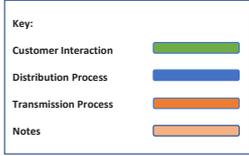


Note: 1MVA is the current materiality threshold advised for West London GSPs. It is anticipated that GSPs outside of London will have different materiality thresholds; most likely higher limits.

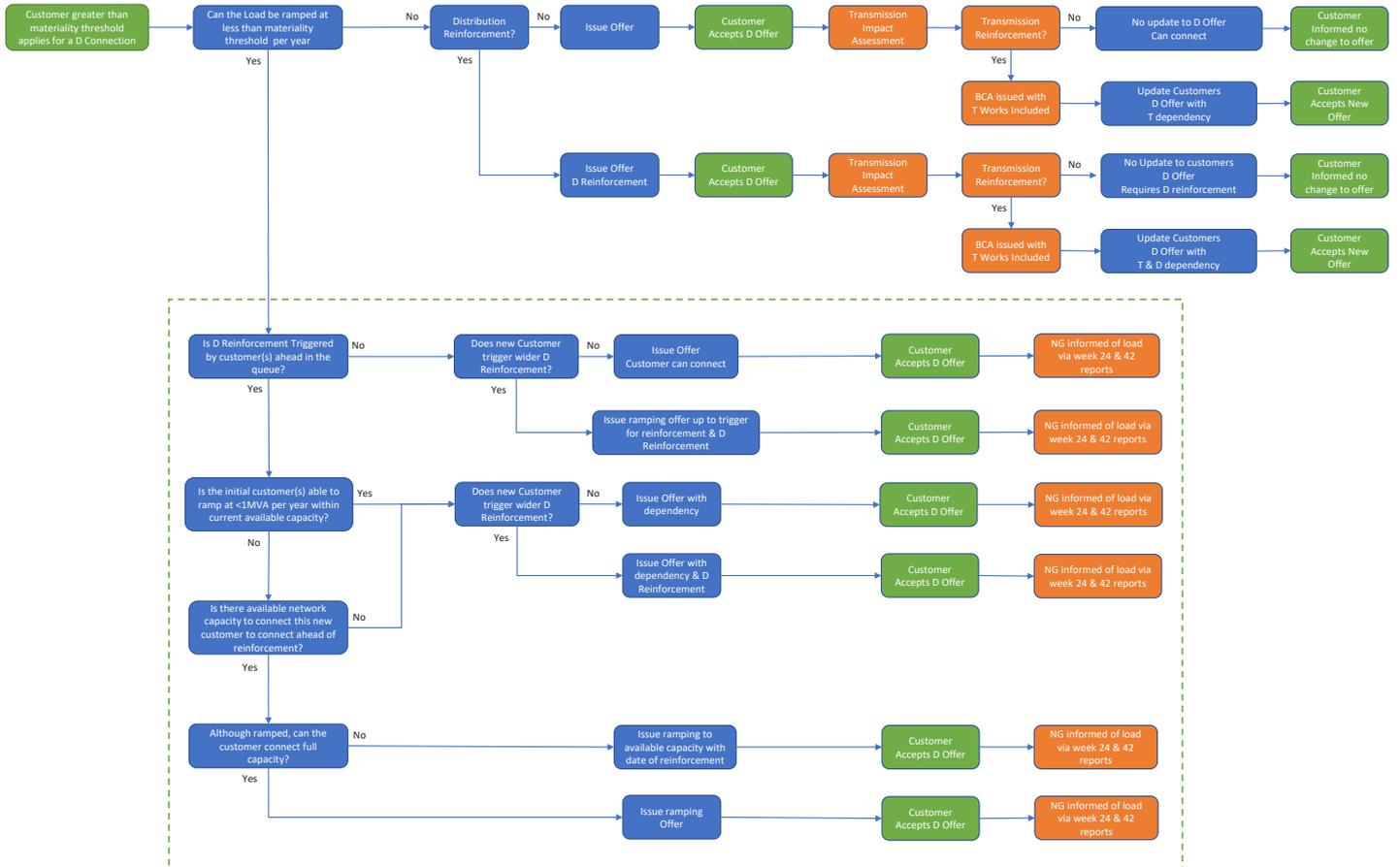
**This process is subject to available capacity on the Transmission network at each GSP, as determined by National Grid, and their agreement to the principle being applied**

# West London Electricity Update 2 - Appendix

## Connections process



### DEMAND CUSTOMER JOURNEY Customers that require a capacity greater than the agreed materiality threshold

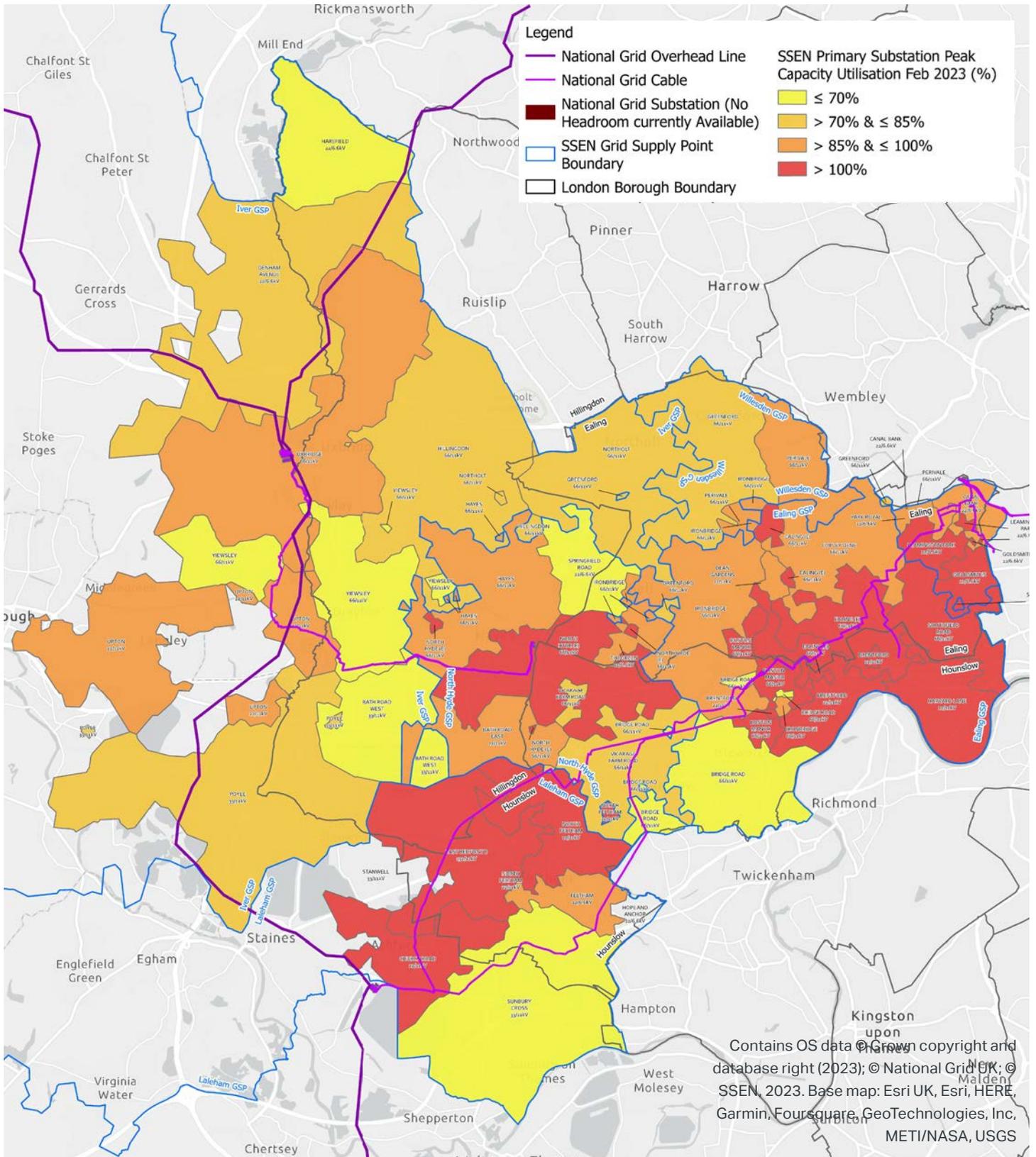


Note: 1MVA is the current materiality threshold advised for West London GSPs. It is anticipated that GSPs outside of London will have different materiality thresholds; most likely higher limits. Assumption: Customers that are unable to ramp under a materiality limit will not be able to connect at D until T works are completed; therefore, no requirement to undertake the check within the green box.

**This process is subject to available capacity on the Transmission network at each GSP, as determined by National Grid, and their agreement to the principle being applied**

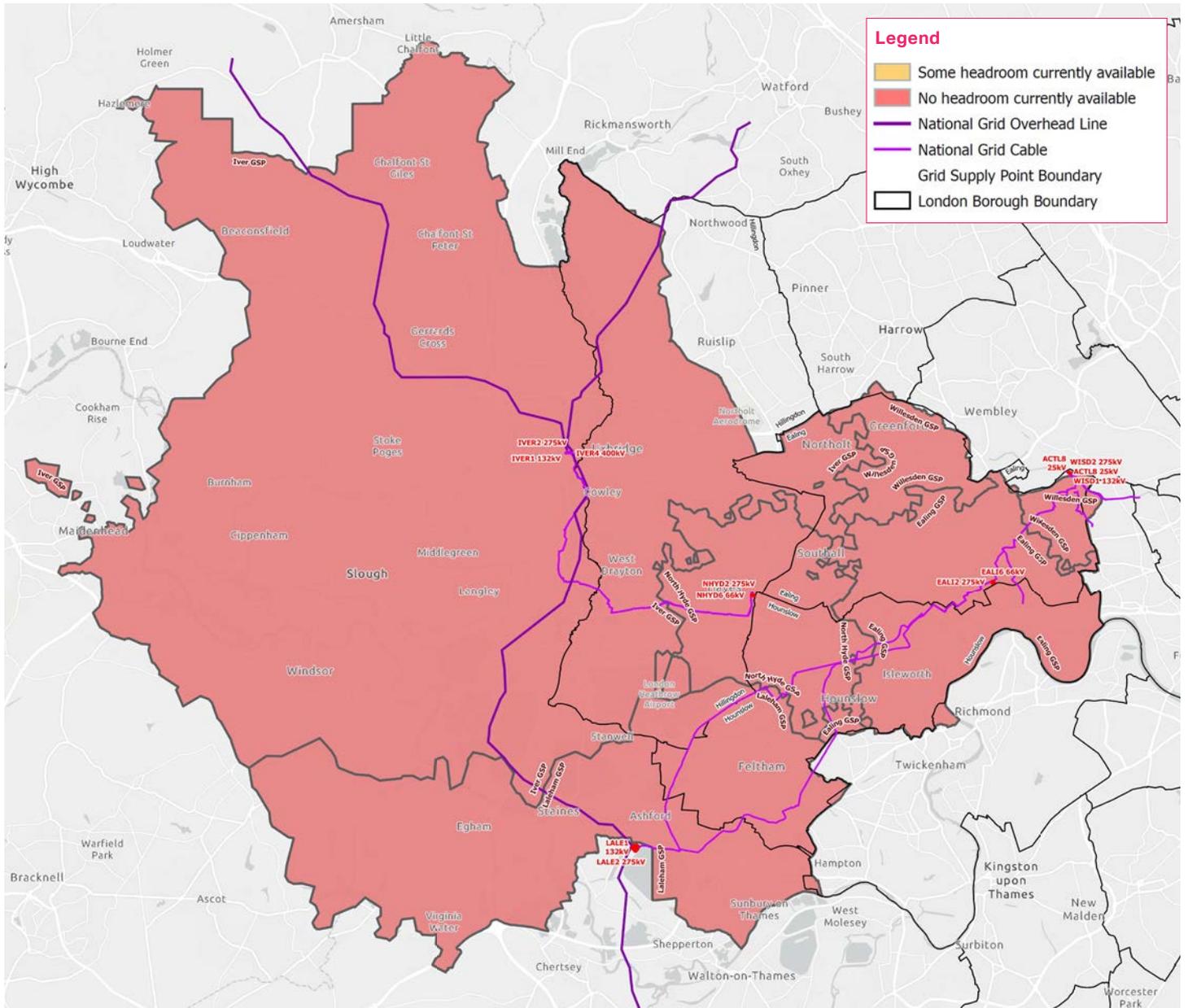
# West London Electricity Update 2 - Appendix

## Appendix: Updated SSEN Capacity map 2022-2023



# West London Electricity Update 2 - Appendix

## Appendix: Updated NGET Capacity map 2022-2023



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# West London Electricity Update 2 - Appendix

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## Securities deposits

Through our engagement with SSEN, NGET and NGENSO – and separate to the West London Capacity constraints (but potentially compounding investment concerns) - the GLA have been made aware of new concerns regarding Securities deposits.

Currently, when new applications trigger Transmission reinforcements in West London - which is happening more often as a result of capacity constraints - customers who accept quotes from the DNO may also be liable for a securities deposit relating to the Transmission level upgrades.

These deposits are currently not proportional to the amount of power requested, but instead reflect the full sum of the Transmission costs – i.e. an applicant requesting 200 MVA would require the same deposit amount as someone requesting 2 MVA.

This creates a risk that comparatively small developments are liable for very high securities. While these deposits would be returned once works are completed, the high amount could render development financially unviable.

NGESO is exploring reforming this approach, so that securities are proportional to the amount of power being requested for a particular development.

### NGESO summary

Within Connection and Use of System Code (CUSC) currently, Demand (Transmission and Distribution connected) and DNO (whereby works are not triggered by Distributed Generation) users are required to place security deposits for their Connections via Final Sums methodology. This means that users are financially liable for the total of a Transmission Owners (TO) spend until works in the users Construction Agreement has been completed.

Generation users (Transmission and Distribution connected) have reducing factors applied to their securities and liabilities. More information on this can be found in CUSC Section 15 (User Commitment Methodology).

The NGENSO are currently developing a code modification to look at the disparity in securities and liabilities for the different user categories and bring forward a fairer approach. Our preferred solution is to include all users into CUSC Section 15, and apply the principle detailed within it.

In the short term, ESO are working with all 3 TOs to map out an appropriate interim solution for Demand users, due to the recent significant securities we've seen in their connection agreements

NGESO will write to Customers once a decision on the interim solution has been achieved, including engagement with Ofgem, and the CUSC modification work shall be updated also in the relevant sections of our website and ongoing communications from NGENSO to customers.