

London Infrastructure Plan to 2050

Copenhagen April 2016

Jeremy Skinner
Mathieu Mazenod

- 1. Setting London in context**
- 2. The London Infrastructure Plan 2050**
- 3. Delivering the Plan**
 - A series of programmes
 - Providing better information about infrastructure demand and delivery
- 4. Case Study**



1. Setting London in context

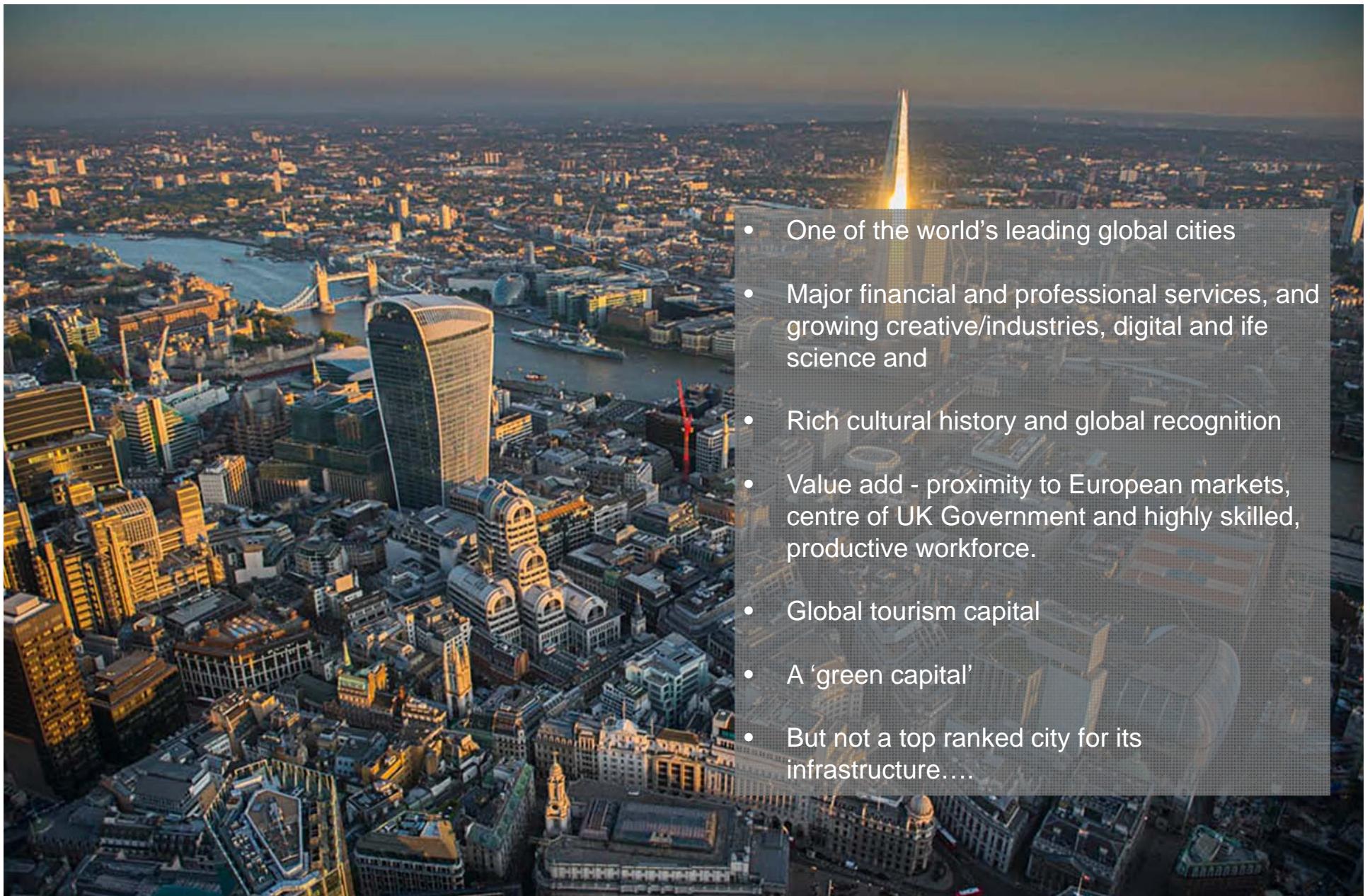
2. The London Infrastructure Plan 2050

3. Delivering the Plan

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4. Case Study





- One of the world's leading global cities
- Major financial and professional services, and growing creative/industries, digital and life science and
- Rich cultural history and global recognition
- Value add - proximity to European markets, centre of UK Government and highly skilled, productive workforce.
- Global tourism capital
- A 'green capital'
- But not a top ranked city for its infrastructure....

London's population is growing...

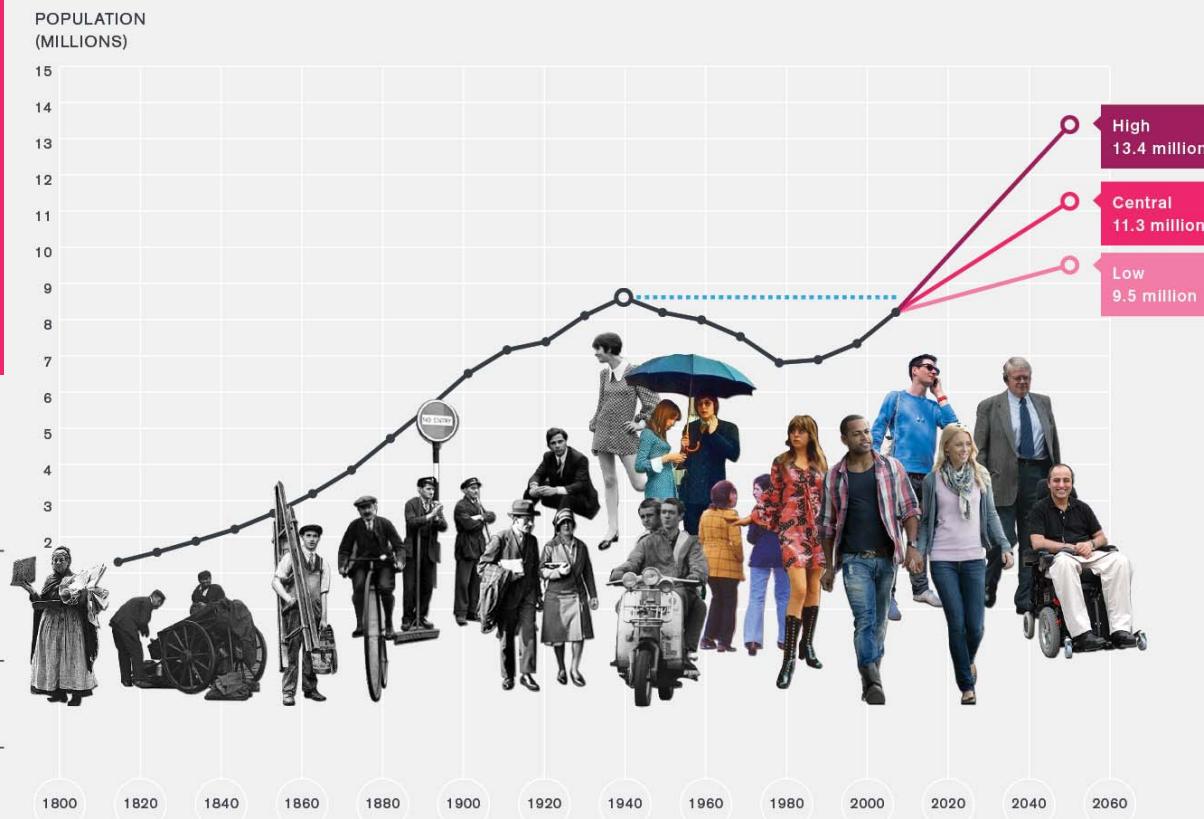
We estimate that London's population became bigger than ever in February 2015. - 8.6 million people, the same as the last peak in 1939.

It is projected to rise to 10 million by 2030 and perhaps 11.3 million, more or less, by 2050

Projections show growth to 11.3 million inhabitants by 2050

An overall increase of 37% from 2011 to 2050

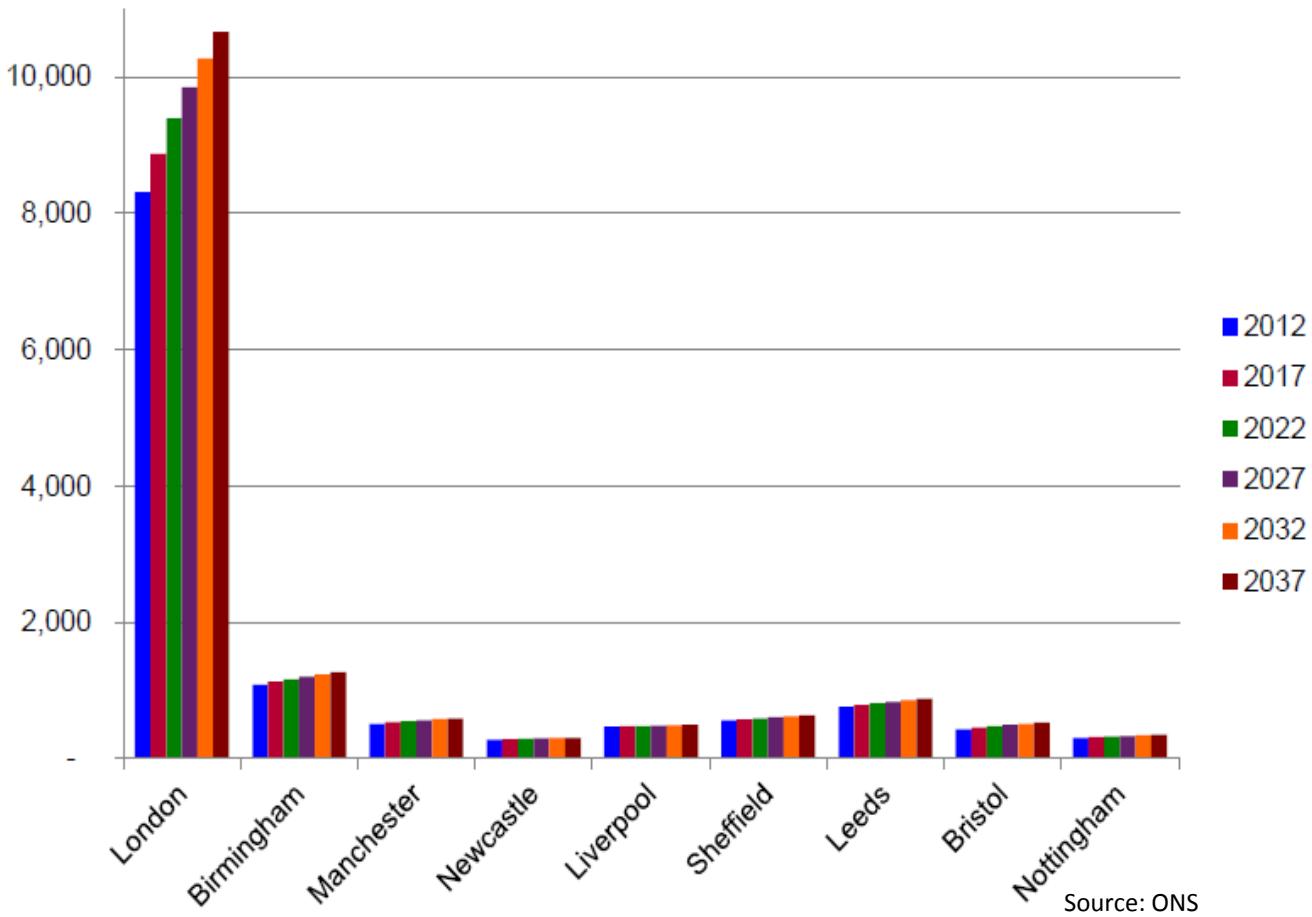
Source: GLA Intelligence Unit



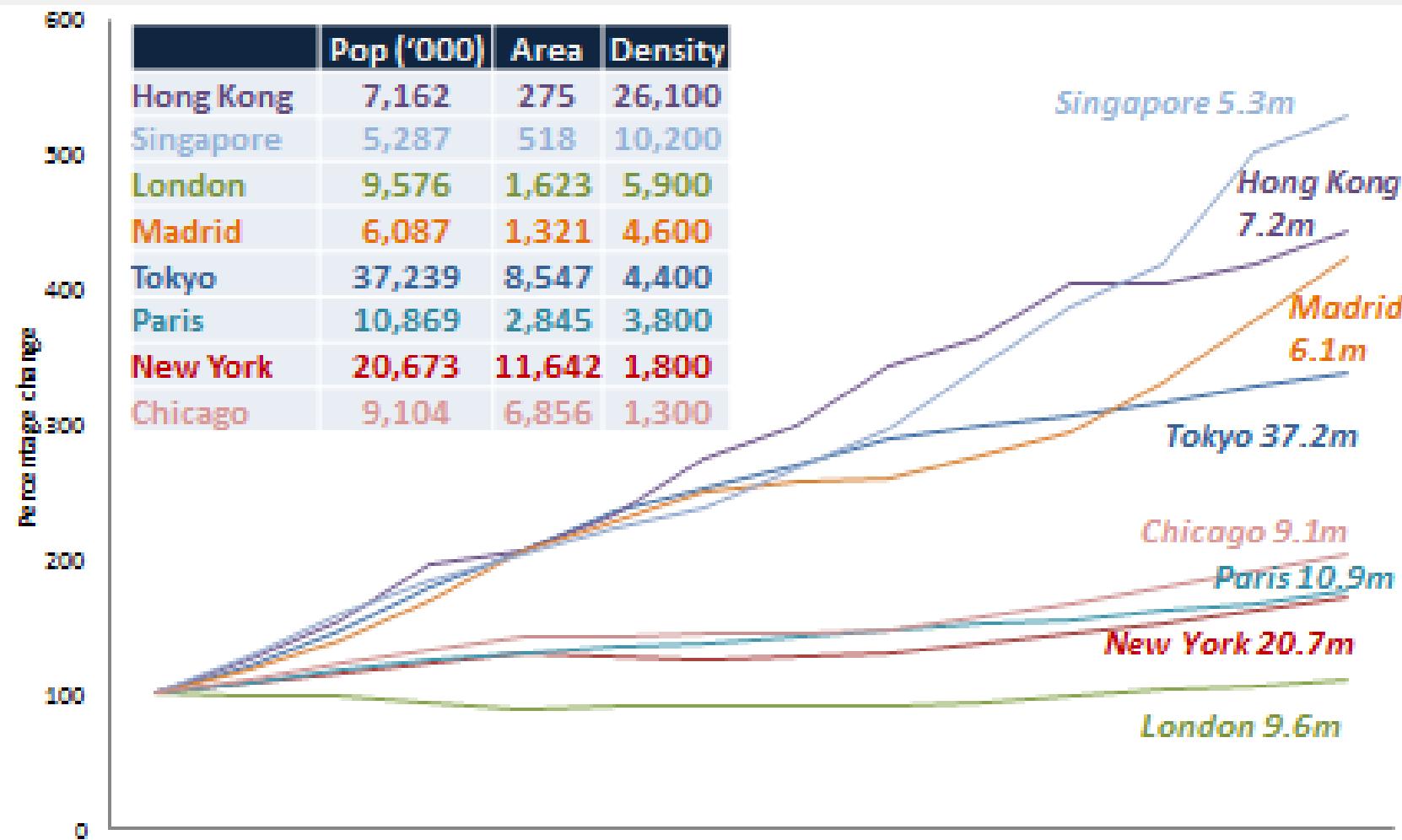
Approximately 100,000 per annum

Over the last decade the rate of population growth in London has been twice as high as that of the rest of the UK. Even if efforts succeed to rebalance the economy, which we support, London's likely growth will dwarf that of other cities.

Population Projections for selected English cities through to 2037



Population growth in leading Global Cities



Source: Using UN Population Estimates

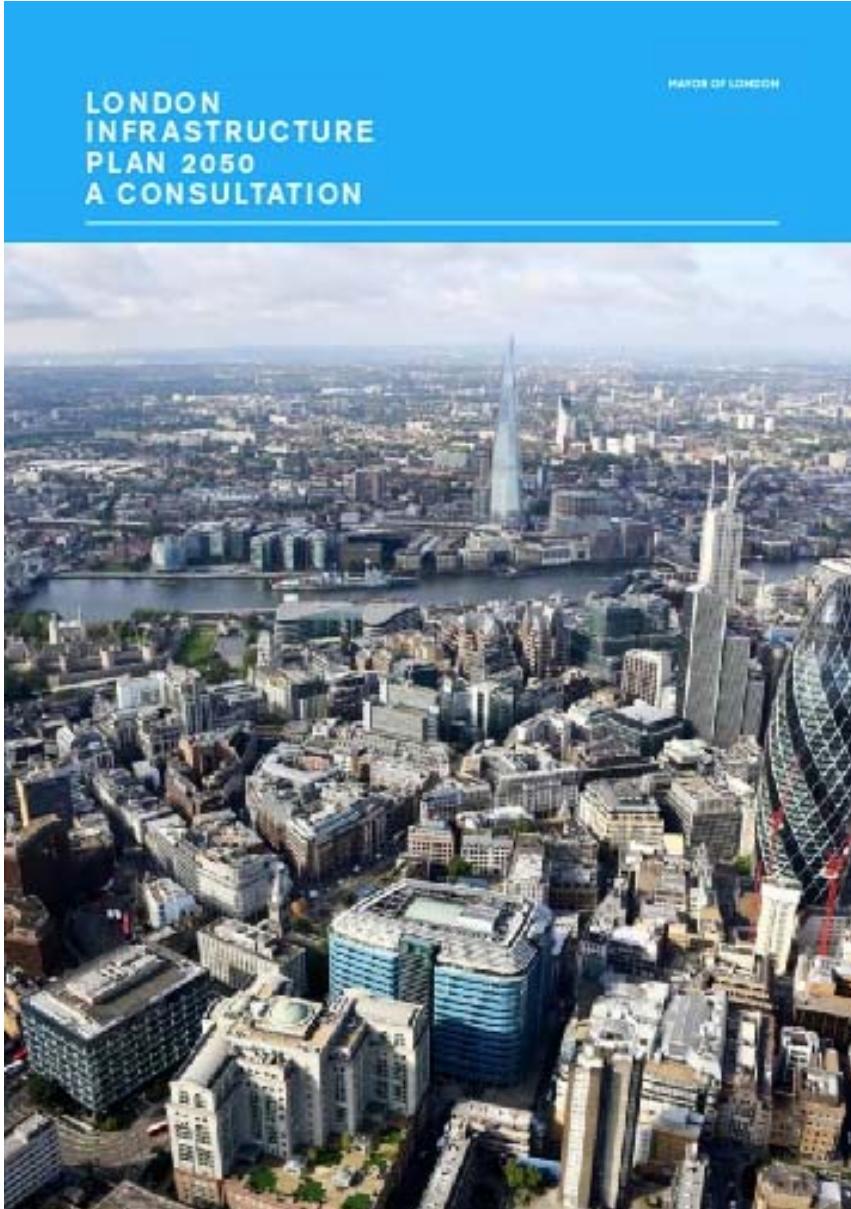
GREATER LONDON AUTHORITY

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THE LONDON INFRASTRUCTURE PLAN

MAYOR OF LONDON



The London Infrastructure Plan 2050 was commissioned by the Mayor to ensure that London has the infrastructure it needs to remain one of the best cities in the world in which to live, work and do business.

Identifies strategic requirements.

An evidence base document for an ongoing dialogue about London's growth and infrastructure needs.

Underpinned by comprehensive cost model – assists with investment prioritisation and spatial planning.

WE ASKED OURSELVES FOUR BASIC QUESTIONS BEFORE STARTING WORK ON AN INFRASTRUCTURE PLAN...



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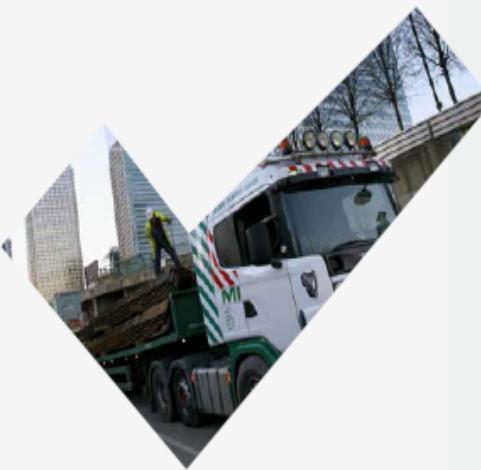


What infrastructure
will we need?

Where will it go?



How will we deliver it?



How will we pay for it?



THE LIP 2050

In the context of growth, London's overall infrastructure requirements over the period 2016 - 2050 are significant.

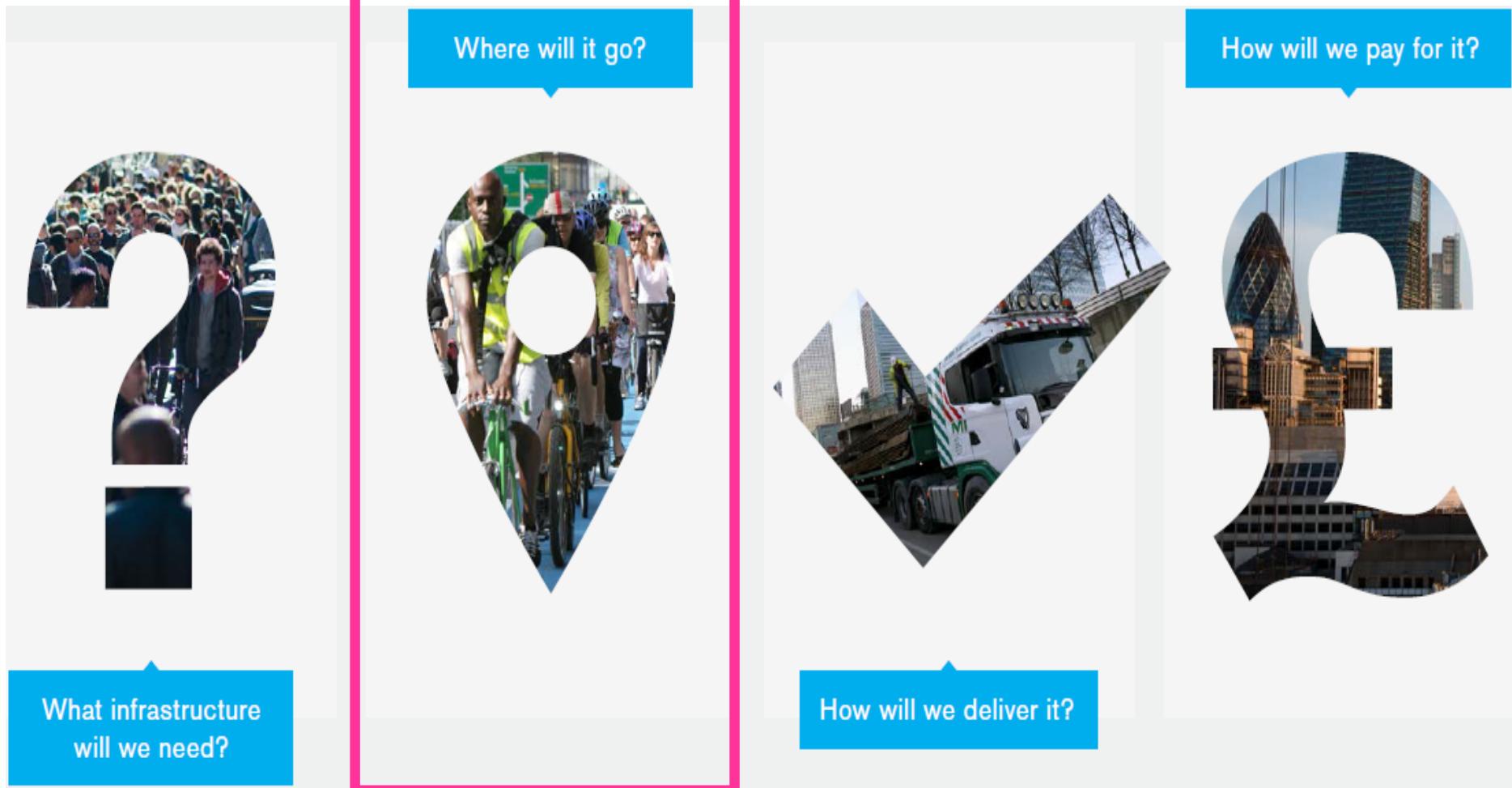
We will need approximately:

- 1.5 million new homes
- New school places equivalent to around 600 new schools
- c. 70% increase in public transport capacity. Further shift to cycling and walking.
- 20% increase in energy supply capacity.
- Further investment - and significant regulatory and cultural change - to respond to climate change
- Improved digital connectivity – fixed broadband and 4g-5g mobile plus supporting backhaul infrastructure
- Storm water sewage capacity improvements
- New runway capacity
- Access to increasing port capacity
- A new tunnel to take effluence out of the River Thames (the Thames Tideway Tunnel)
- Long term – new water supply (reservoir, transfer or saline water treatment)
- Very long term – new river flood defences

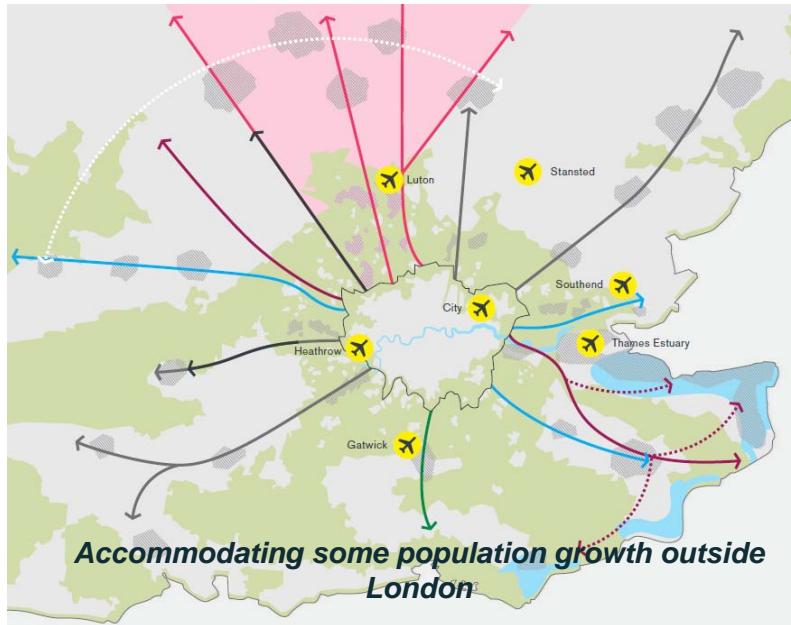
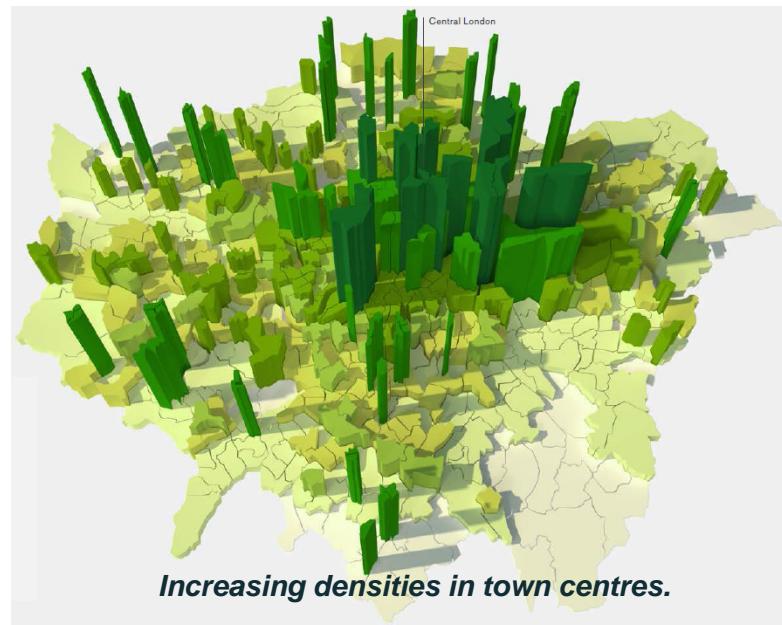
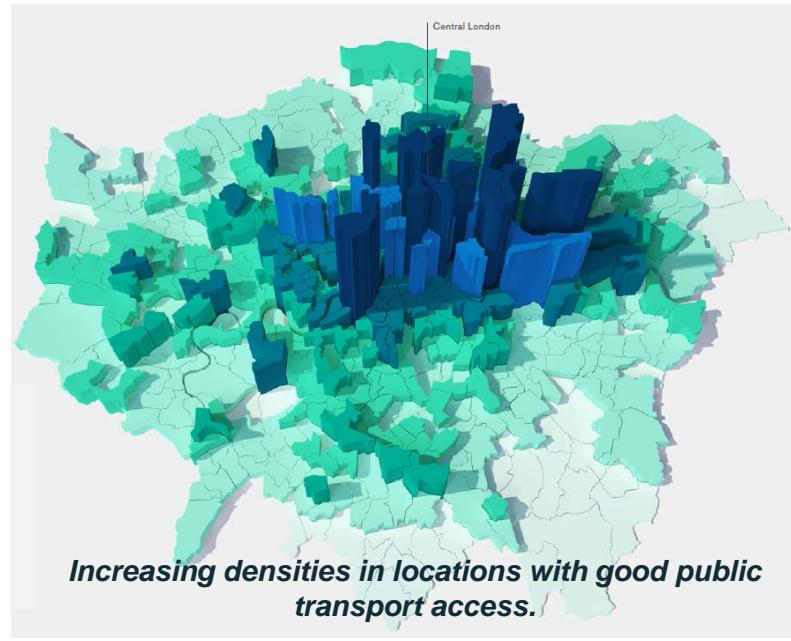
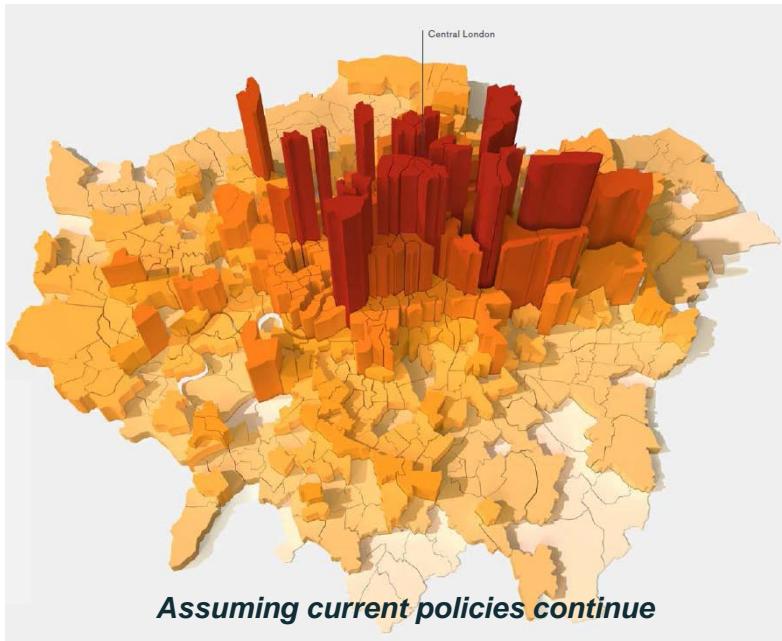
Technological and cultural shifts

- Energy storage and new modes of energy production
- Personal transport and health
- Digital communications

WE ASKED OURSELVES FOUR BASIC QUESTIONS BEFORE STARTING WORK ON AN INFRASTRUCTURE PLAN...

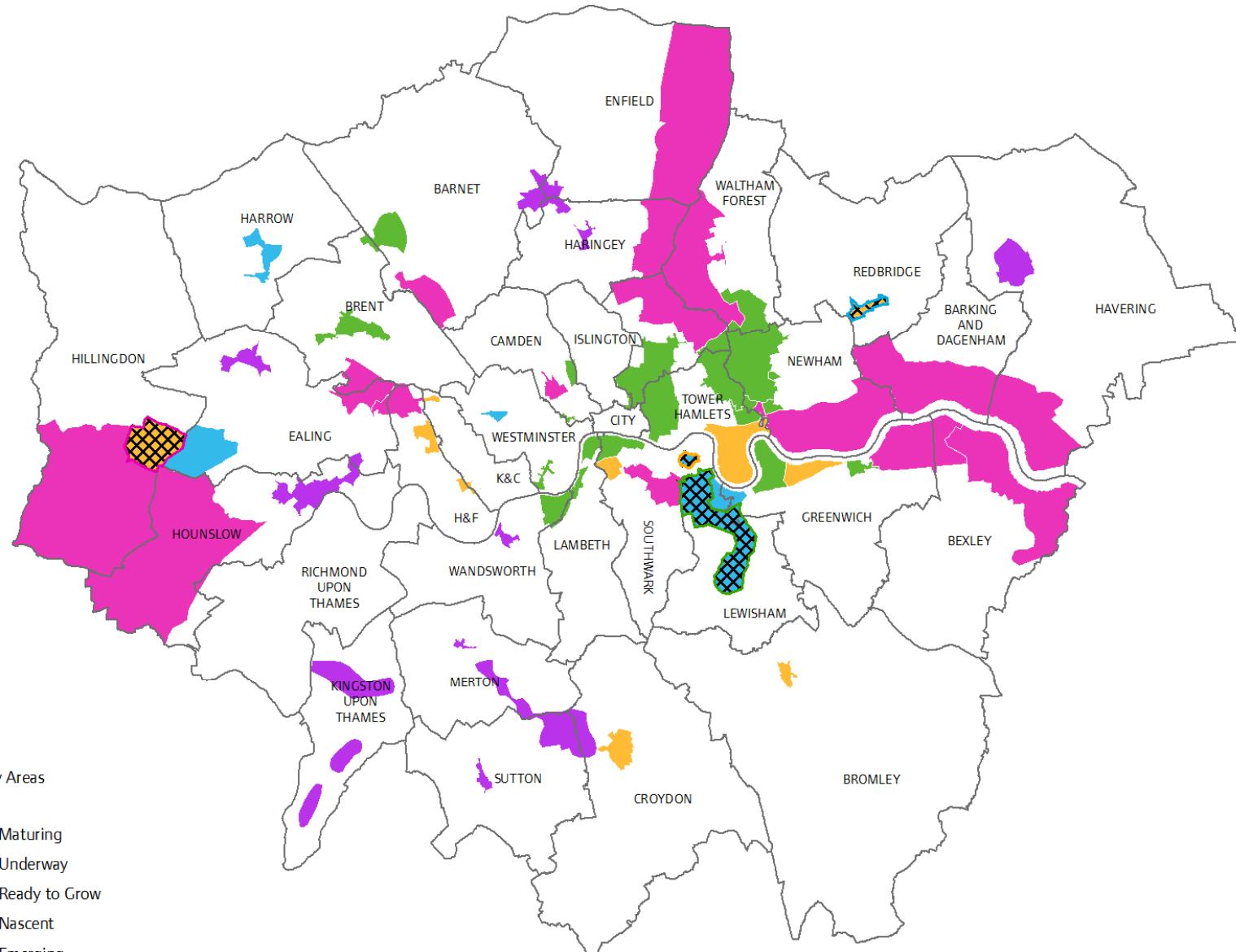


WHERE WILL IT GO?



OPPORTUNITY AREAS STATUS – MARCH 2017

MAYOR OF LONDON



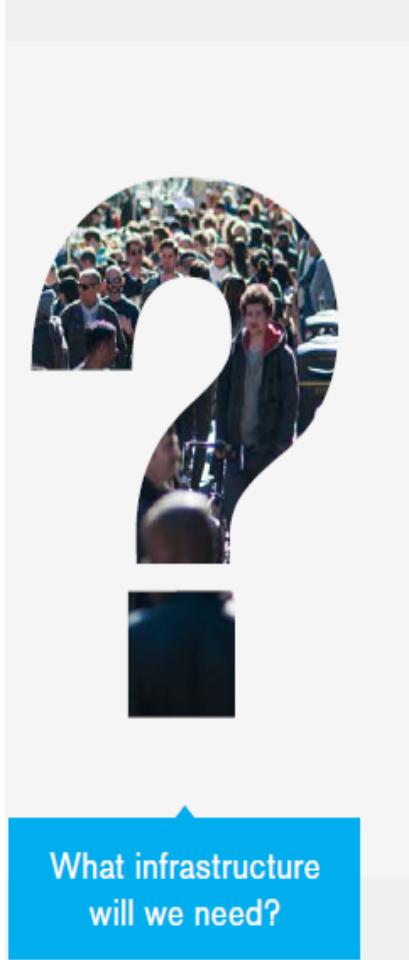
Opportunity Areas Status

- Maturing
- Underway
- Ready to Grow
- Nascent
- Emerging

Undergone change (boundary colour indicates former status)

London Borough Boundary

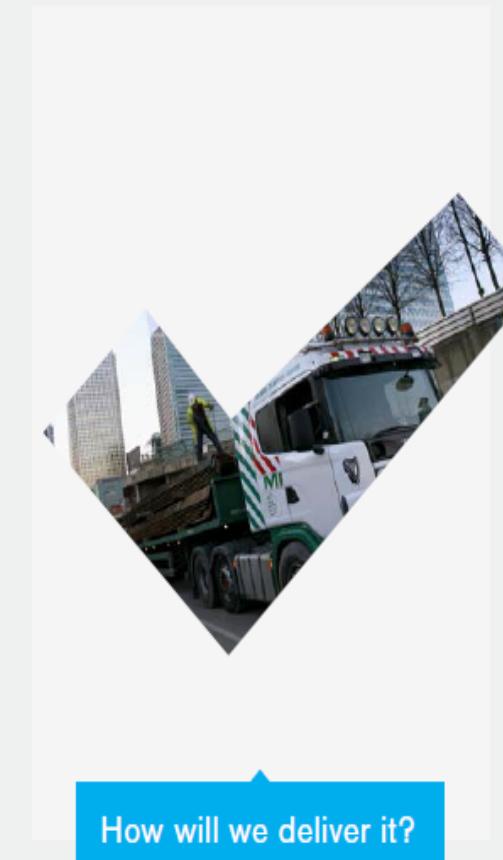
WE ASKED OURSELVES FOUR BASIC QUESTIONS BEFORE STARTING WORK ON AN INFRASTRUCTURE PLAN...



What infrastructure
will we need?



Where will it go?



How will we deliver it?



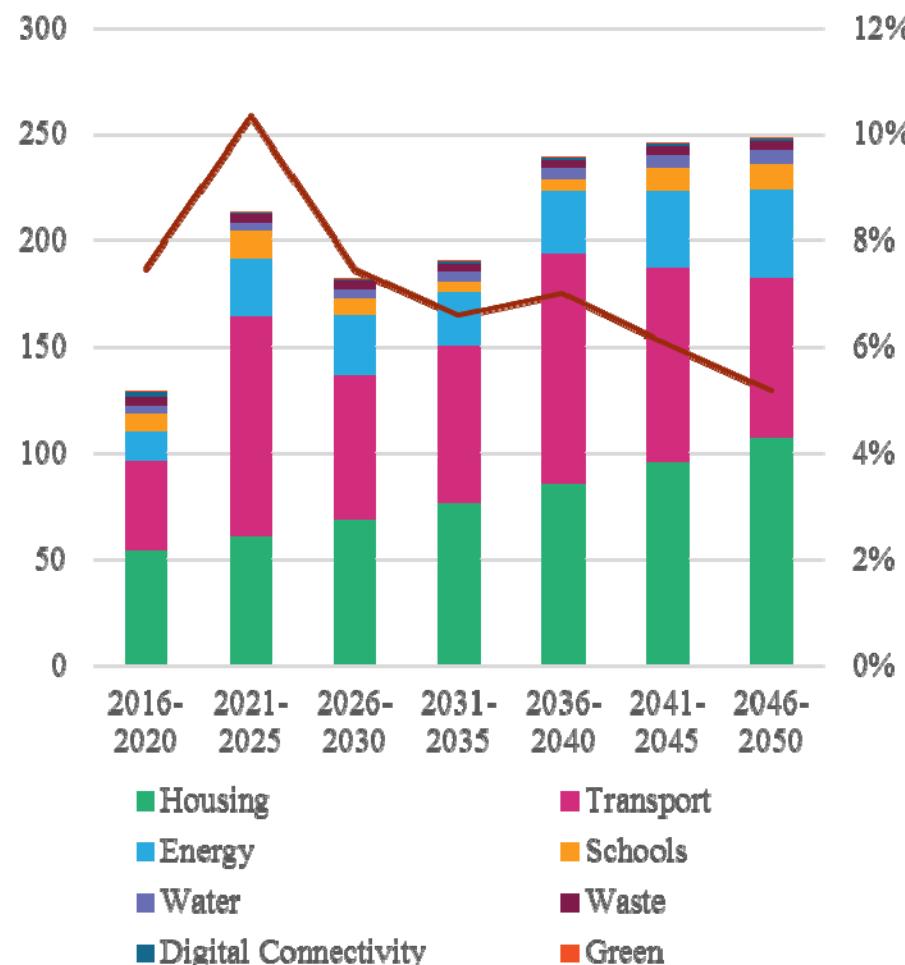
How will we pay for it?

FUTURE GOVERNANCE CHALLENGES: FUNDING

MAYOR OF LONDON

Costing London's infrastructure requirements

Total capital expenditure (£ bn) and % of London GVA (Arup analysis 2016)

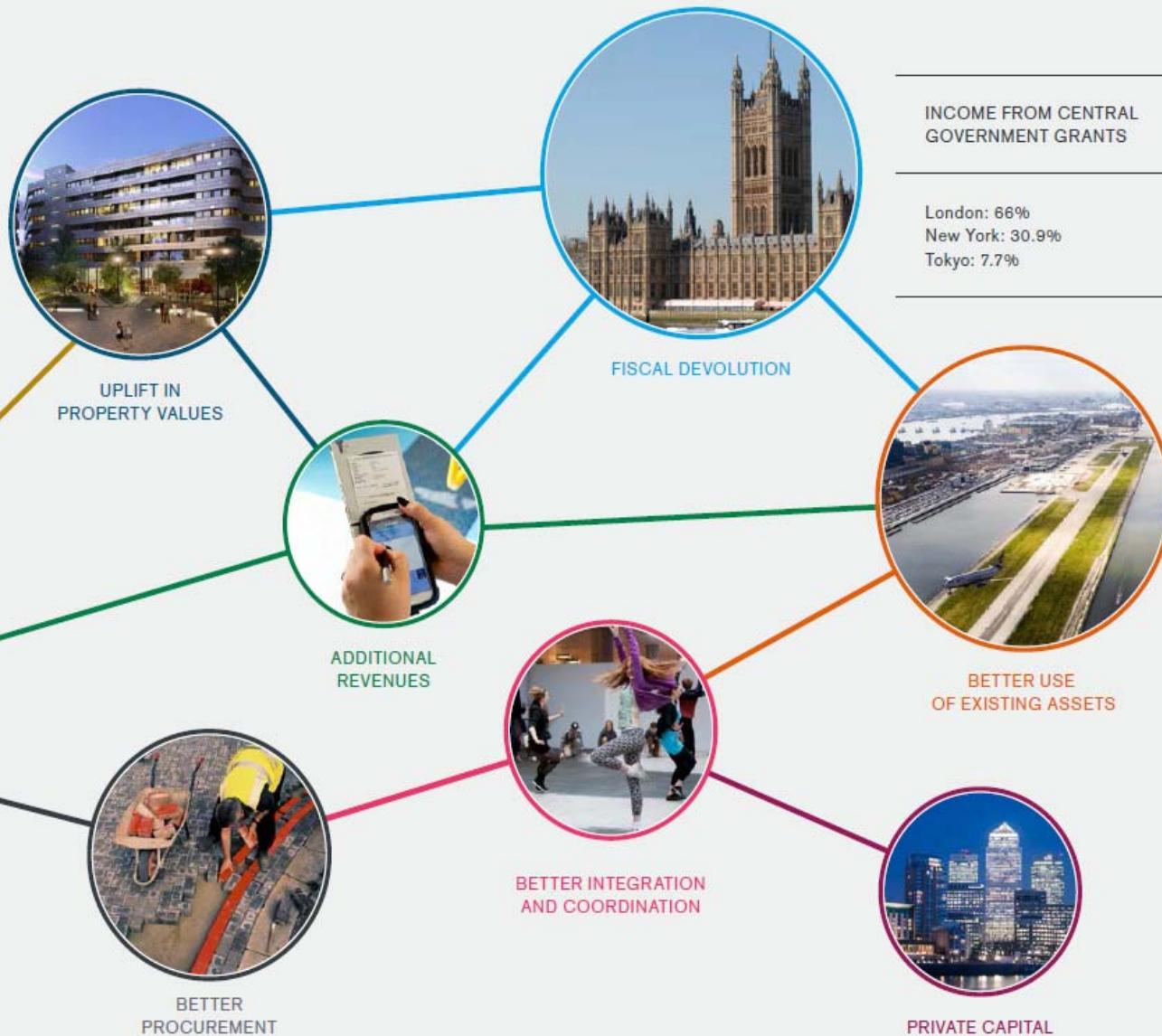


Who Pays?

Such a level of investment cannot be sustained doing things in the traditional way.

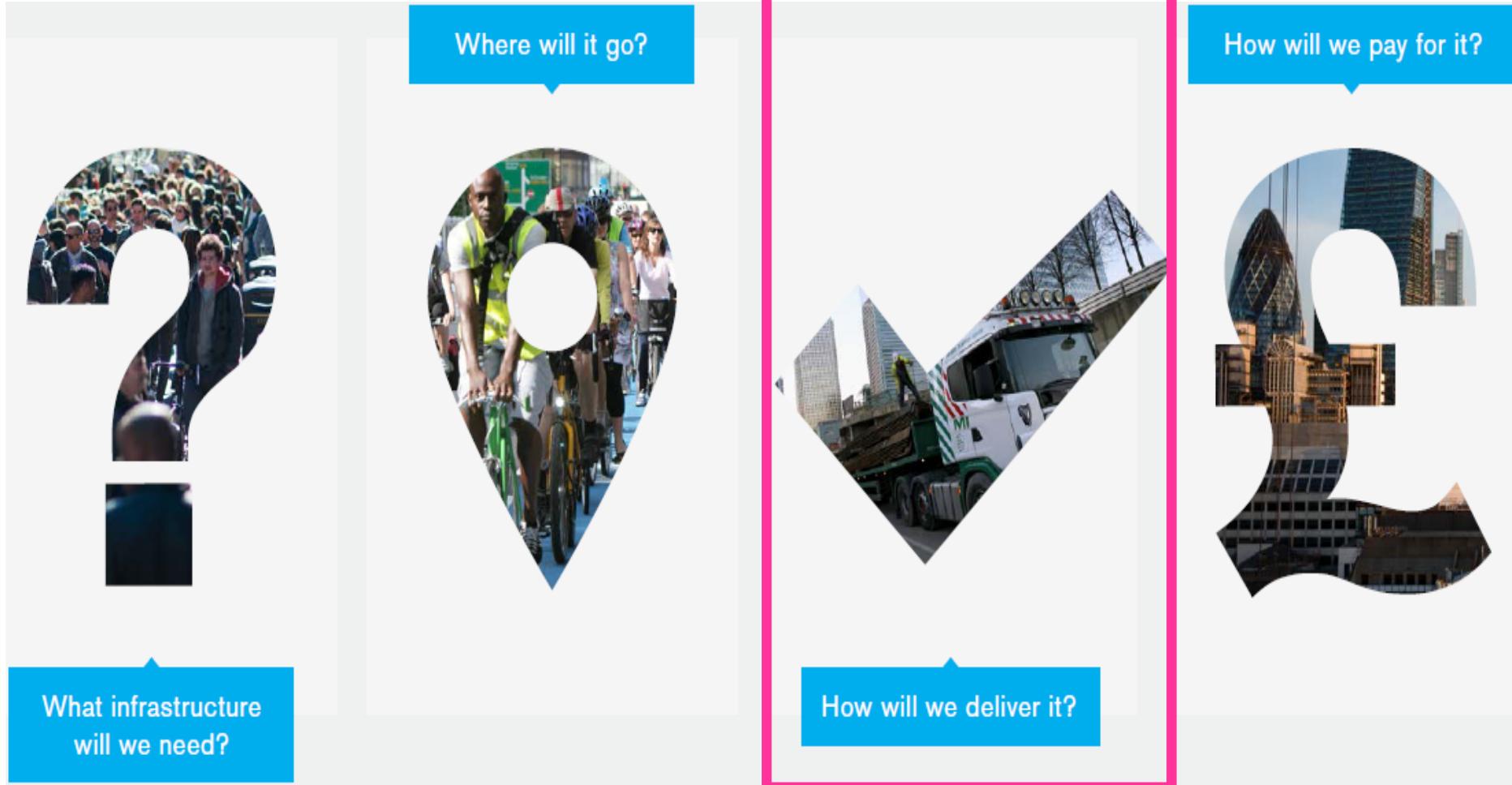
We need a combination of better coordination and integration, better asset utilisation, more use of data and private capital.

More spending powers for London will be key.



Above: journey segments between two Oyster card 'taps' by Michael Batty.

WE ASKED OURSELVES FOUR BASIC QUESTIONS BEFORE STARTING WORK ON AN INFRASTRUCTURE PLAN...



Need for an integrated Programme of Infrastructure investment for London

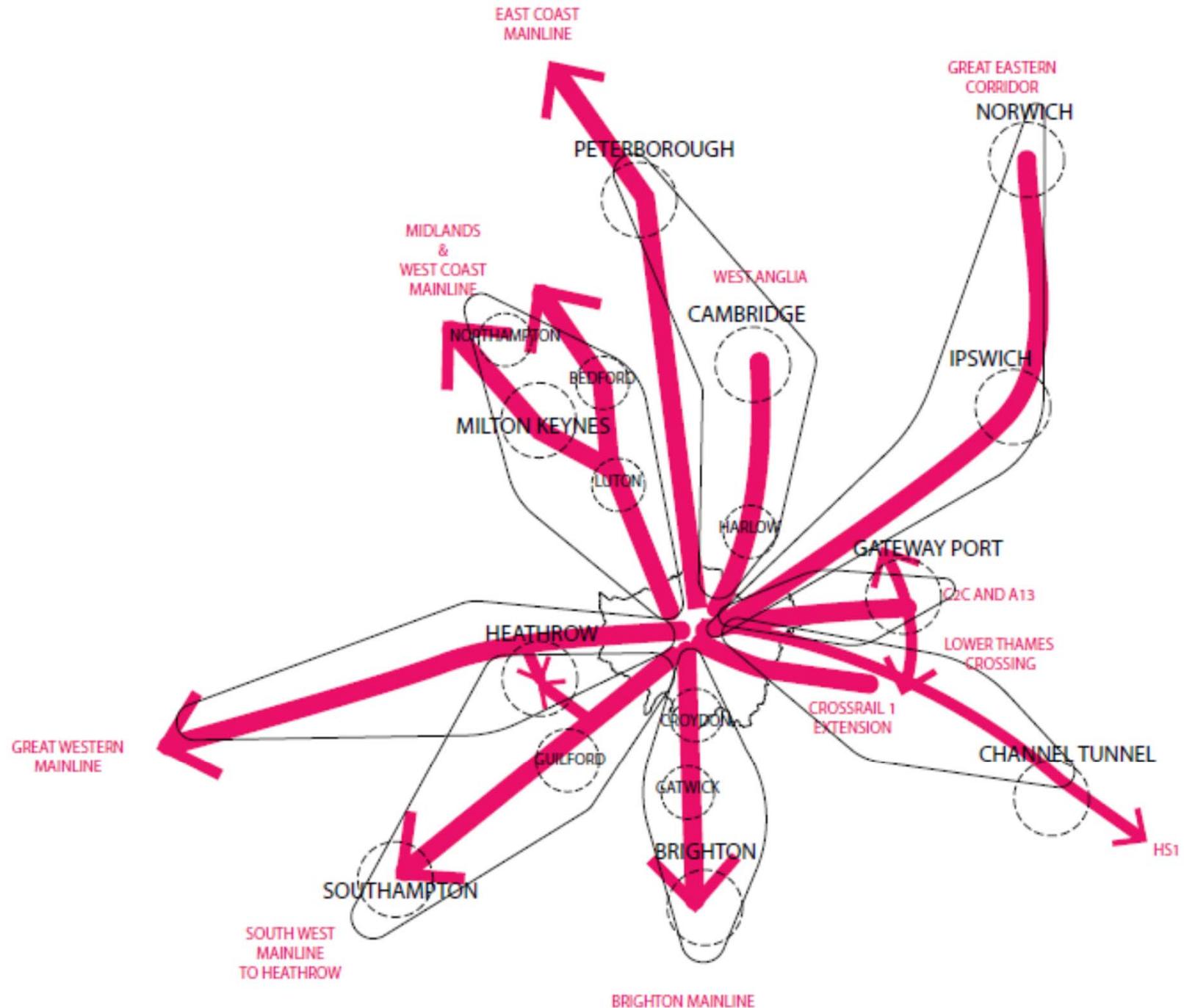
- **Align investment decisions** – through a better consideration of interlinkages between projects and integration with spatial policies (London Plan)
- **Increase certainty of growth** for stakeholders (utilities, developers, boroughs, investors)
- **Increase levels of investment** – through better identification of specific requirements

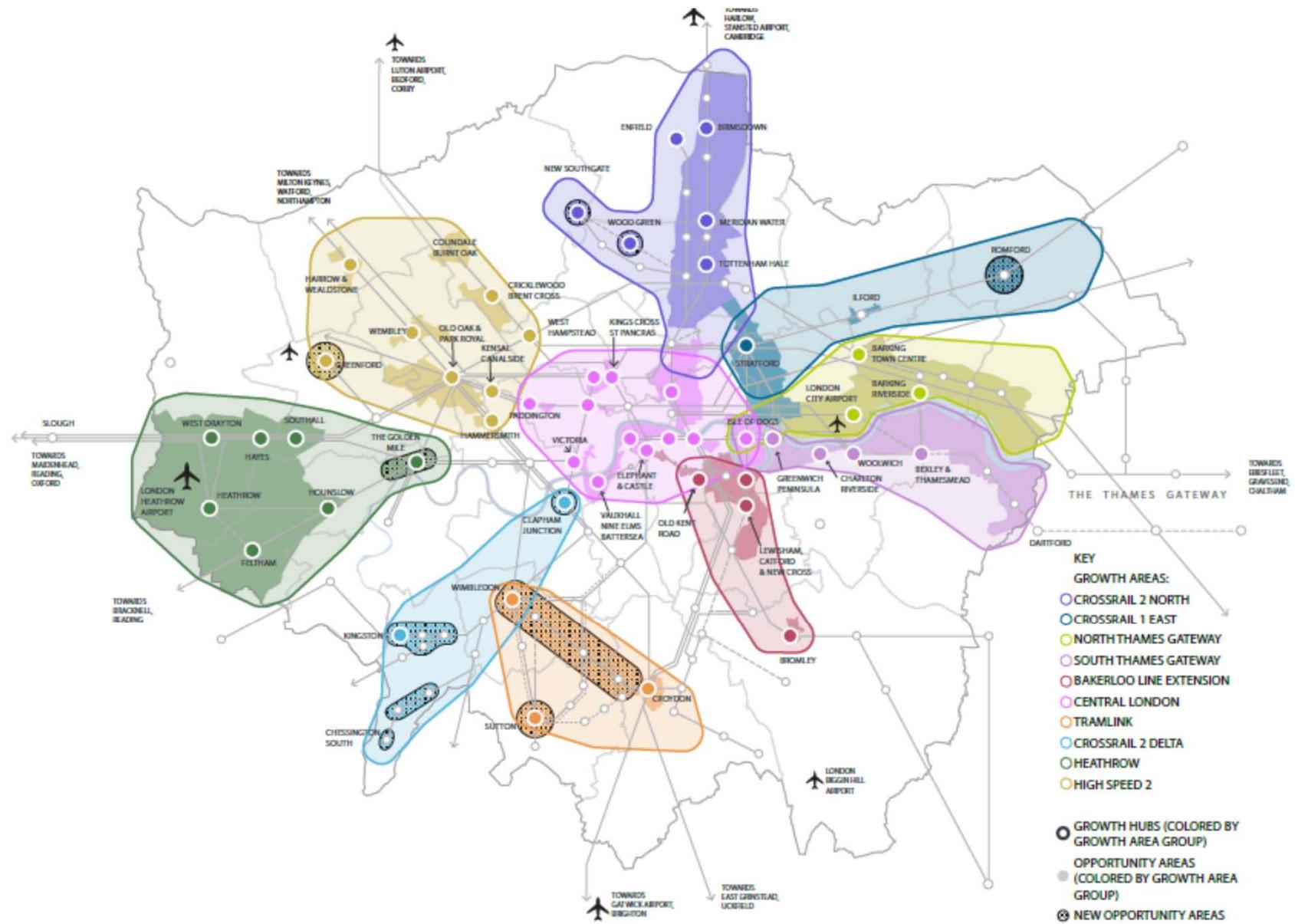
All important in the context of:

- EU Referendum result – need for London to remain competitive
- Government's likely focus on investment spending to support the economy
- The Mayor's devolution agenda

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Strategic Infrastructure Needs Analysis

Crossrail 2 North

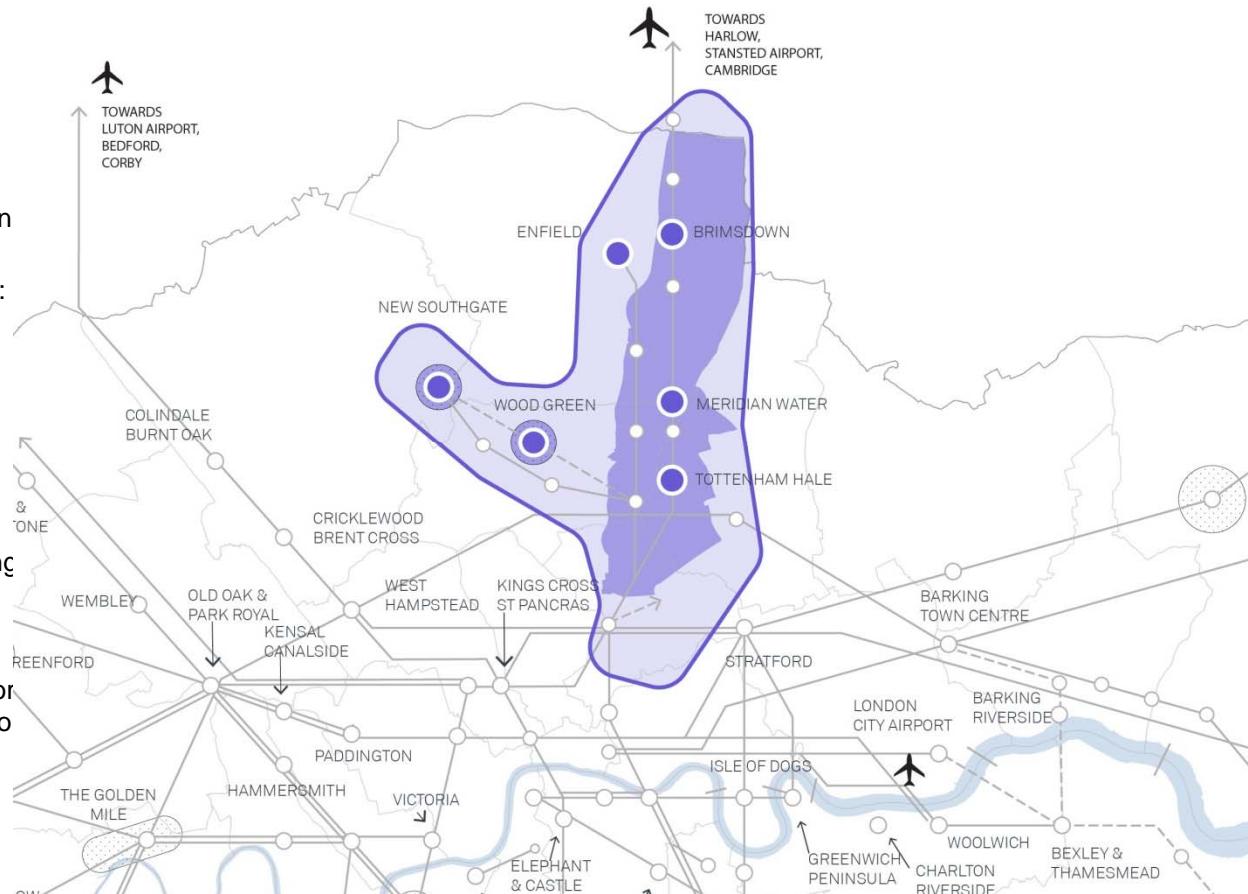
The Crossrail 2 North (C2N) growth corridor is contiguous with the northern section of Crossrail 2 across the Upper Lee Valley Opportunity Area. It encompasses some 3,900 hectares.

In addition, the western arm of the corridor includes New Southgate and Wood Green town centres, which will both be new Opportunity Areas (OAs) in the new London Plan.

It encompasses the following growth areas: Blackhorse Lane, Tottenham Hale, Northumberland Park, Meridian Water, Edmonton Green, Woodberry Down, Ponders End, A10/A1010 Corridor.

These are within the following boroughs: Enfield, Haringey, Waltham Forest and Hackney.

C2N is planned to rapidly urbanise – moving from an industrial centre to one which supports significant new mixed-use development. This housing-led mix use regeneration is primarily supported by major transport projects – including four tracking on the West Anglia Main Line, a necessary precursor to Crossrail 2.

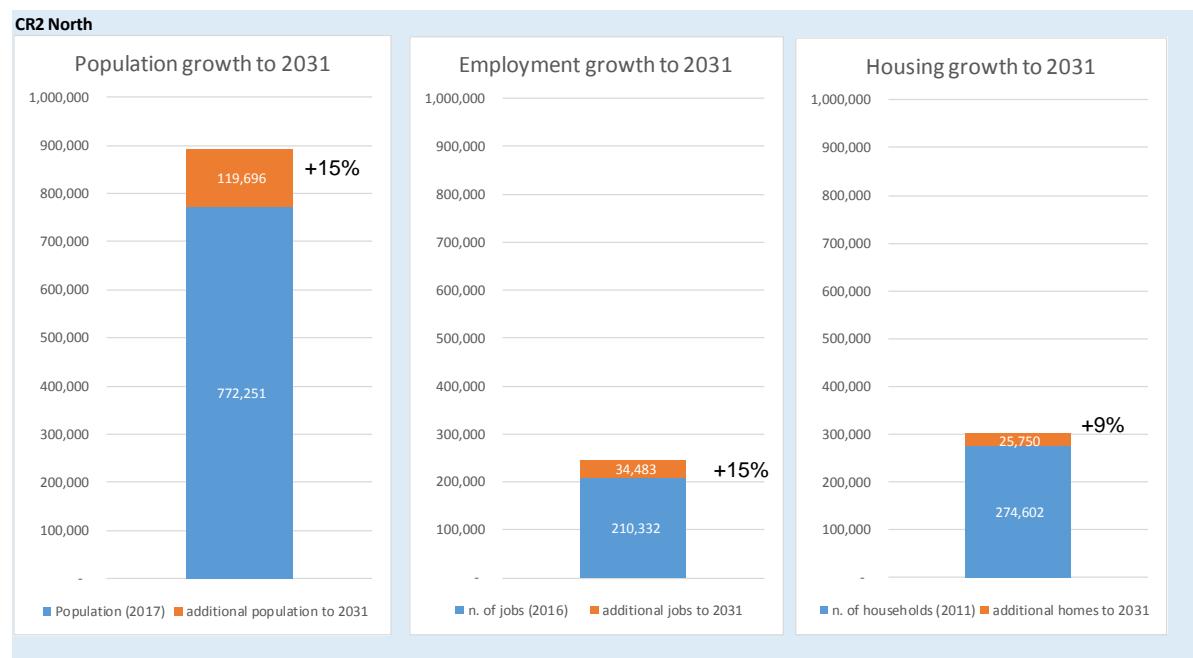


Strategic Infrastructure Needs Analysis

Crossrail 2 North

Projected growth scenarios

The Crossrail 2 North growth corridor is projecting growth of 15% in population, 15% in employment and 9% in housing by 2031.



Note: Population and employment projections are from the GLA Datastore and have been provided at MSOA level. Baseline data is also from the GLA Datastore. Housing projections are from the City in the East/City in the West planning documents, and baseline data is from the 2011 census. Housing projections are likely to be significantly understated since they are only based on Opportunity Area figures and do not include MSOAs which do not lie within Opportunity Areas. These projections will be updated based on the 2017 SHLAA (anticipated to be released in June 2017).

Strategic Infrastructure Needs Analysis

Crossrail 2 North

Strategic infrastructure projects in pipeline: map

Growth Drivers

C2N has three growth driver projects.

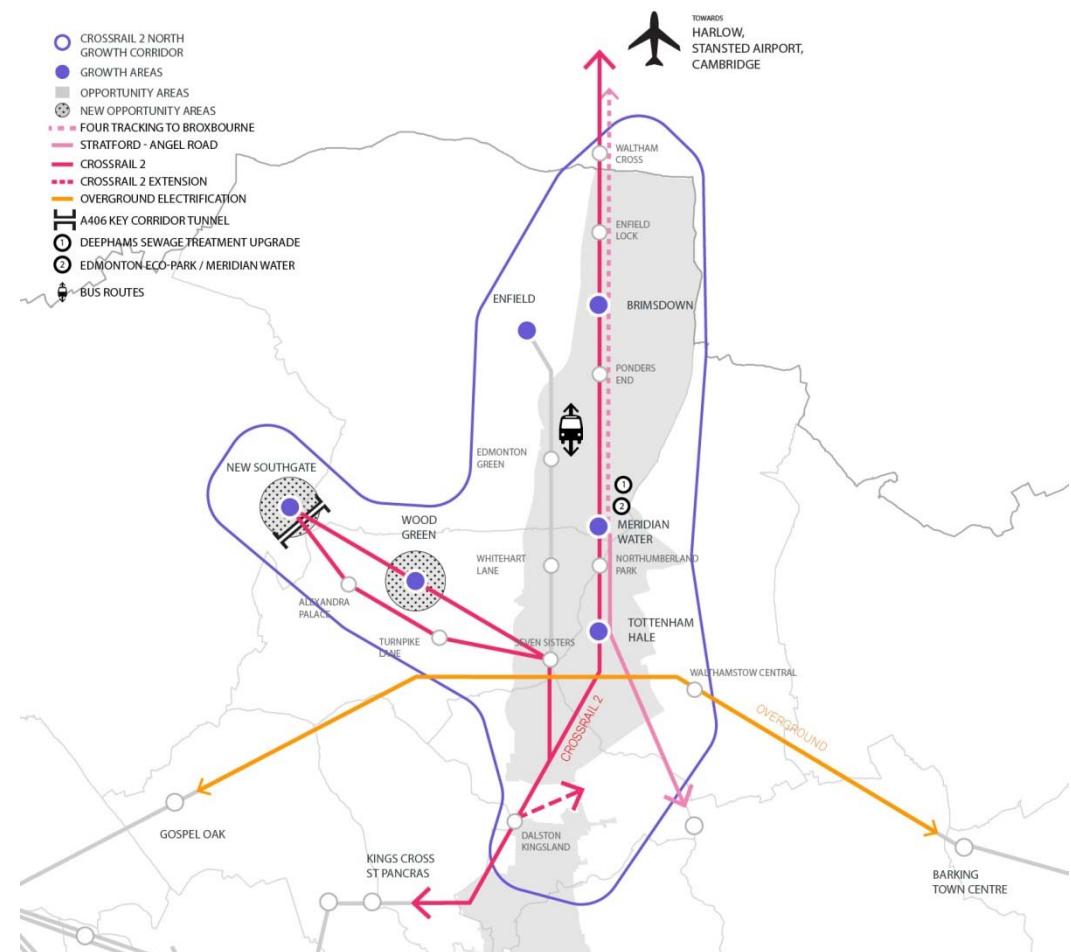
These are:

- STAR (Stratford-Angel Road)
- Four tracking to Broxbourne (West Anglia Line)
- Crossrail 2 (northern section)

Upgrades to the West Anglia Line are comprised of the first two projects:

- The first is the delivery of a 4tph service between Stratford and Angel Road (the STAR scheme) through adding a third track. This project is already confirmed, funded and to be delivered between 2017 and 2019.
- The second is the four tracking project between Coppermill Junction to Broxbourne – a necessary precursor to Crossrail 2. Funding and detailed planning approvals need to be further investigated whilst the project is planned to be delivered between 2017 and 2025.

Crossrail 2 is proposed to link the four-tracked West Anglia line to Broxbourne to the central and southern sections of Crossrail 2. A start date hasn't been agreed yet but Crossrail is planned to be completed by 2033.



Crossrail 2 North strategic infrastructure projects
(Source: Arup; Basemap: GLA City in the West Plan)

Strategic Infrastructure Needs Analysis

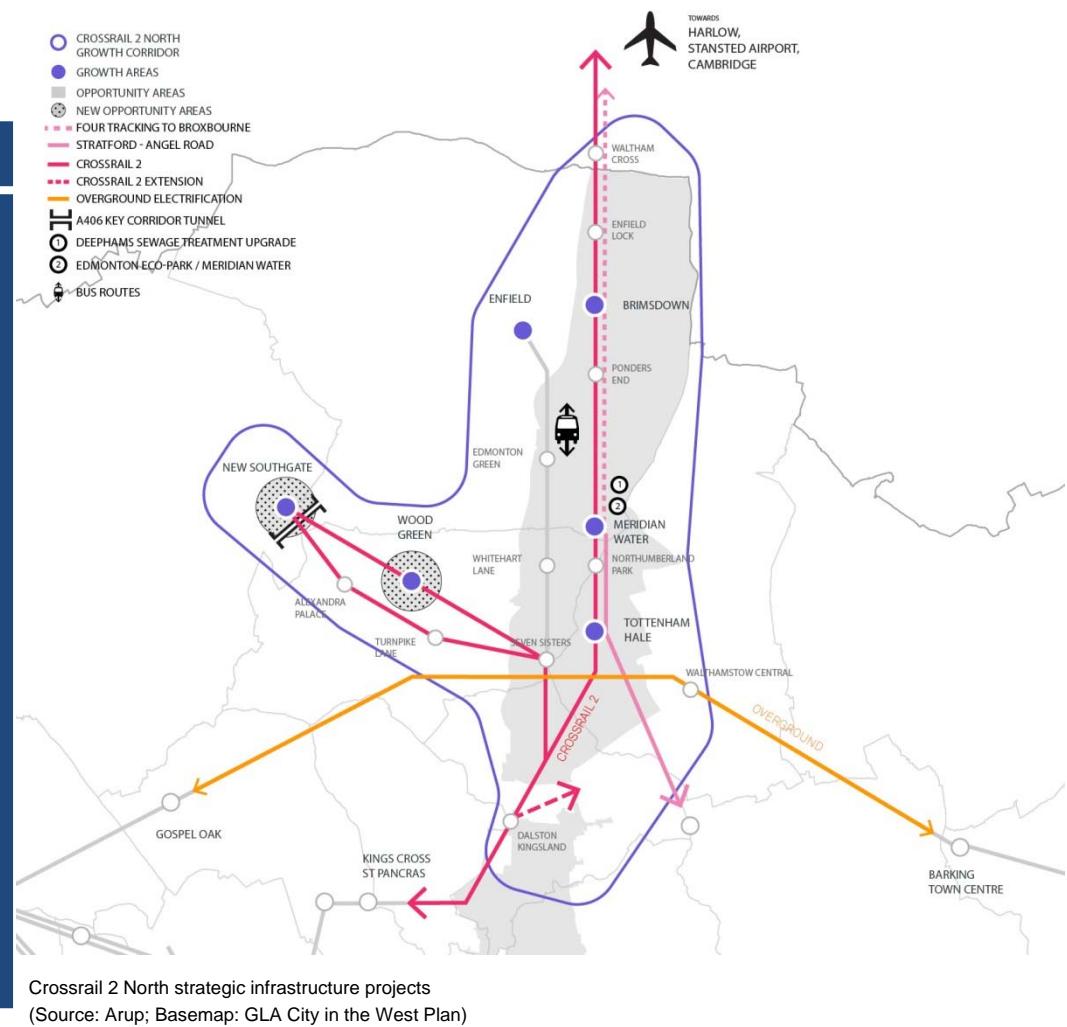
Crossrail 2 North

Strategic infrastructure projects in pipeline: map

Growth Enablers

C2N has six growth enabler projects:

- **Electrification of Barking to Gospel Oak London** Overground line works have started in 2016, due to be completed by 2018.
- **The redevelopment of the Edmonton Eco Park** (North London Heat and Power Project) likely to start construction in 2017/8 and is set to complete in 2025. This will be a renovated Energy Recovery Facility which generates energy (heat and power) from waste.
- **Additional routes and bus** infrastructure identified in the DIFS study for the Upper Lee Valley to be fully implemented by 2031.
- **Deephams sewage treatment upgrade** of the wastewater treatment facilities started in 2015, expected to be completed by 2018.
- **A406 key corridor tunnel** is a TfL project to fix the congestion issues at New Southgate. The project is still in the early stages of planning development but is expected to be delivered between 2021 and 2031.
- **Northern Gateway Access Programme** is a proposed project (by TfL and Enfield) to provide a relief road link between the growth corridor (North South Road A1055) and the M25 (at Junction 25 and/or 26) but currently has no start/end dates.



Strategic Infrastructure Needs Analysis
Crossrail 2 North

Strategic infrastructure projects in pipeline

Project	Driver / Enabler	Cost band (£m)	Sponsor	Funding status	Planning status	Timeline						
						2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050
STAR (Stratford - Angel Road)	Driver	0 - 100	Network Rail	Secured	Detail approved							
Four tracking to Broxbourne	Driver	501 - 1,000	Network Rail	Uncertain	Outline submitted							
Crossrail 2	Driver	5,001+	TfL / Network Rail	Uncertain	Outline submitted							
Overground Barking to Gospel Oak electrification	Enabler	101 - 250	Network Rail	Secured	Detail approved							
Deephams sewage treatment upgrade - Phase 2	Enabler	101 - 250	Thames Water	Secured	Detail approved							
Additional bus routes and infrastructure	Enabler	101 - 250	TfL	Secured	Uncertain							
Redevelopment of Edmonton Eco Park	Enabler	0 - 100	North London Waste Authority / Enfield	Secured	Outline submitted							
Northern Gateway Access Programme (NGAP)	Enabler	N/A	Enfield	Uncertain	Uncertain							
A406 key corridor tunnel at New Southgate	Enabler	1,001 - 5,000	TfL	Speculative	No permission							

Strategic Infrastructure Needs Analysis
Crossrail 2 North

Strategic opportunities and challenges for growth

Strategic Opportunities for growth	Strategic Challenges for growth
<ul style="list-style-type: none">Major new residential developments and town centres unlocked by Crossrail 2. Investment and land-use changes will open up significant opportunities for the corridor.Transformation of connectivity between the growth corridor and the CAZ will support new employment opportunities for existing and new residents.Opportunities to introduce “good growth” principles into new developments such as Meridian Water, with investment in cycling and pedestrian infrastructure to alleviate severance issues.Link into broader London-Stansted-Cambridge corridor which is being supported by the West Anglia Taskforce.	<ul style="list-style-type: none">Much of the expected growth is predicated on the successful funding and planning agreement for Crossrail 2, which currently is unfunded.Lack of permeability/severance caused by predominance of reservoirs, high voltage electricity lines, railway lines, roads and large industrial uses.

Strategic Infrastructure Needs Analysis

Crossrail 2 North

Crossrail 2 North

Category	Is there a significant need?	Are needs planned for?	Are projects deliverable?	Description	Priority action
Rail	High	Well Identified	Uncertain	Significant investment in rail infrastructure needed to support development, including Crossrail 2.	Unlikely to be resolved until funding secured for Crossrail 2.
Bus	Medium	Incomplete Assessment	Uncertain	Needs are not fully defined for the projected growth scenario. Costs likely to be between £100-500m.	Bus strategy for Crossrail 2 North.
Highways	Medium	Incomplete Assessment	Uncertain	Needs are not fully defined for the projected growth scenario. Costs are likely to be over £100m.	Highways plan for Crossrail 2 North.
Electricity	High	Incomplete Assessment	Under Conditions	UKPN has estimated infrastructure cost of £36.5m in the projected growth scenario.	Energy strategy for Crossrail 2 North.
Heat	Medium	Incomplete Assessment	Under Conditions	Recent gas network upgrades for high-pressure. Low pressure upgrades are likely to be needed in projected growth scenario.	Energy strategy for Crossrail 2 North.
Water Supply	Medium	Incomplete Assessment	Under Conditions	Needs are not fully defined for the projected growth scenario	Water supply strategy for Crossrail 2 North
Water management	Medium	Incomplete Assessment	Under Conditions	Needs are not fully defined for the projected growth scenario	Water management strategy for Crossrail 2 North.
Flood risk	Medium Risk	Well Identified	Uncertain	Medium flood risk along the River Lea.	Flooding infrastructure investment at undefended areas through the Lea Valley.
Waste	Medium	Well Identified	In Progress	New capacity planned and project in pipeline	Delivery of Edmonton Eco Park
Digital - NGA	Low			Above 90% NGA availability (see data caveats)	N/A
Digital - SFBB	Low			Above 90% SFBB availability (see data caveats)	N/A
Digital - UFBB	High			Only 3% UFBB availability in corridor at present (see data caveats)	Support roll-out of UFBB and/or support obtaining better data on UFBB provision
Open space	Low			Crossrail 2 North ranks in top third of growth corridors in terms of household access to open space.	N/A

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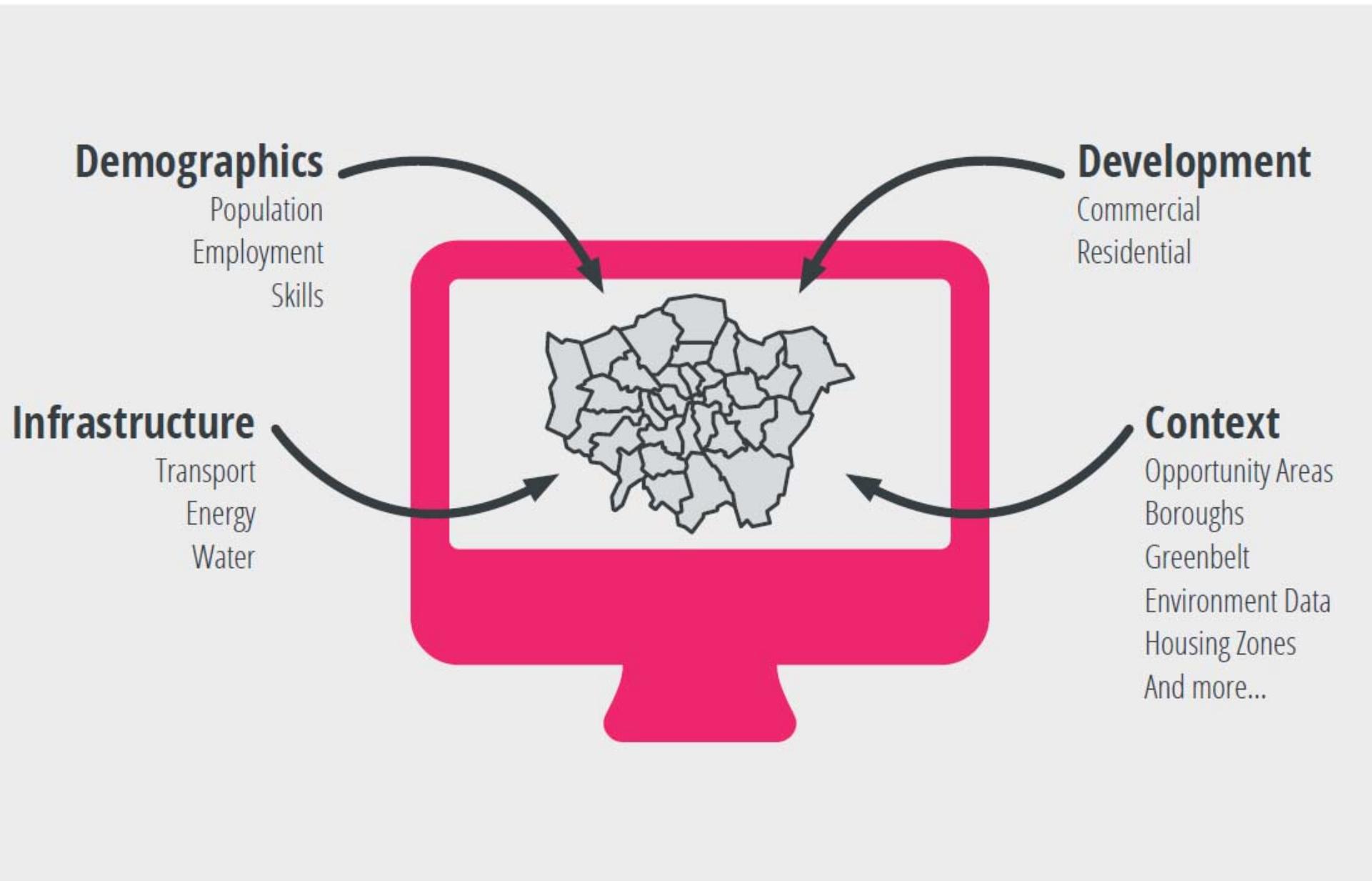


London Infrastructure Mapping Application

An interactive mapping tool designed to visualise data that will support improved infrastructure planning, delivery and coordination throughout the Capital.

Key Aims:

- Provide forward insight and increase certainty
- Visualise a range of previously disconnected datasets, and act as single ‘source of truth’ for infrastructure stakeholders.
- Provide a stronger mechanism for infrastructure to be delivered jointly by providers due to long term horizon of up to 35 years
- Promote increased stakeholder awareness of changing development dynamics across the city.

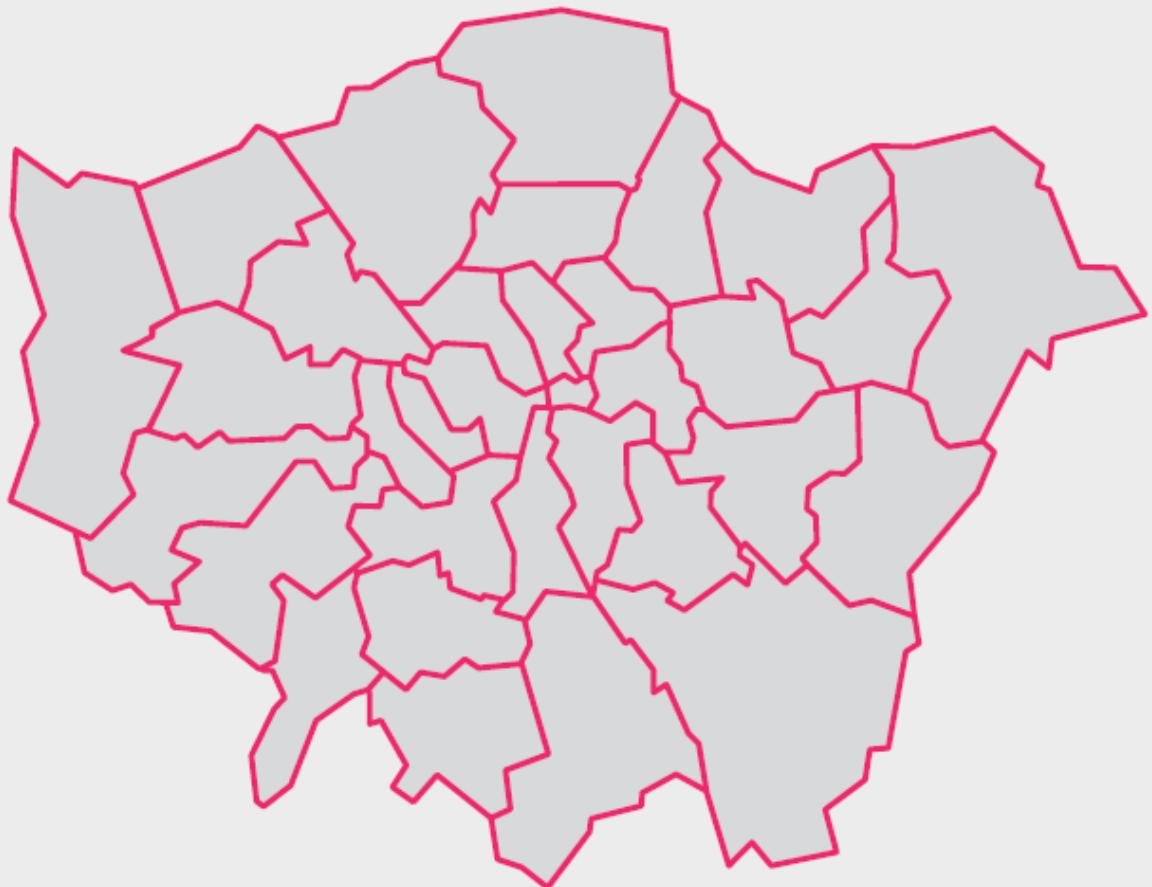


IMA
LDN INFRASTRUCTURE
MAPPING APPLICATION
FOR LONDON

Innovate UK

Scalability. From the big picture to the detail.

Greater London



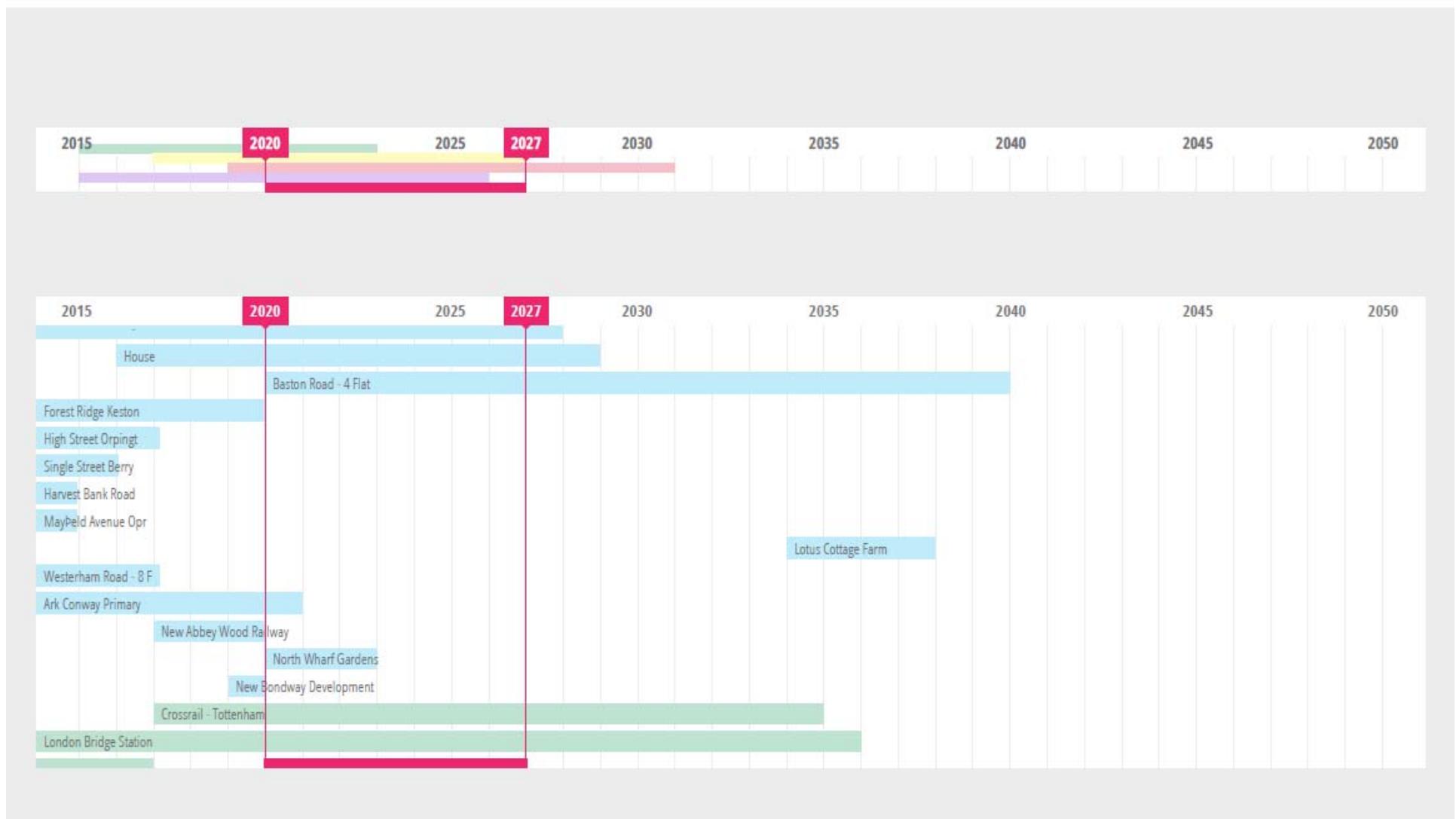
Borough



Draw your
own polygon



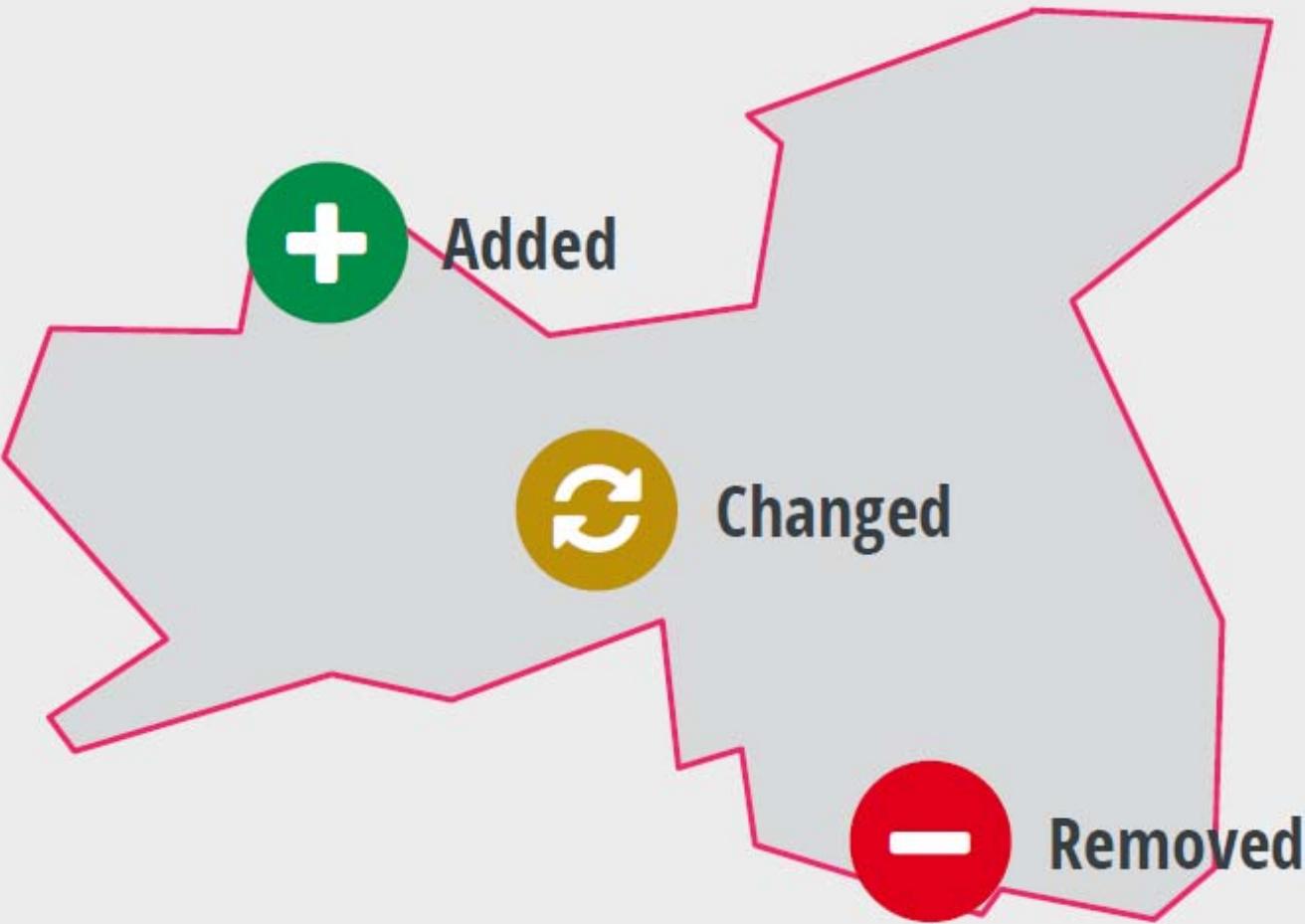
Projects in relation and over time.



Funding: Speculative
In Business Plan
Secured
Out to Tender

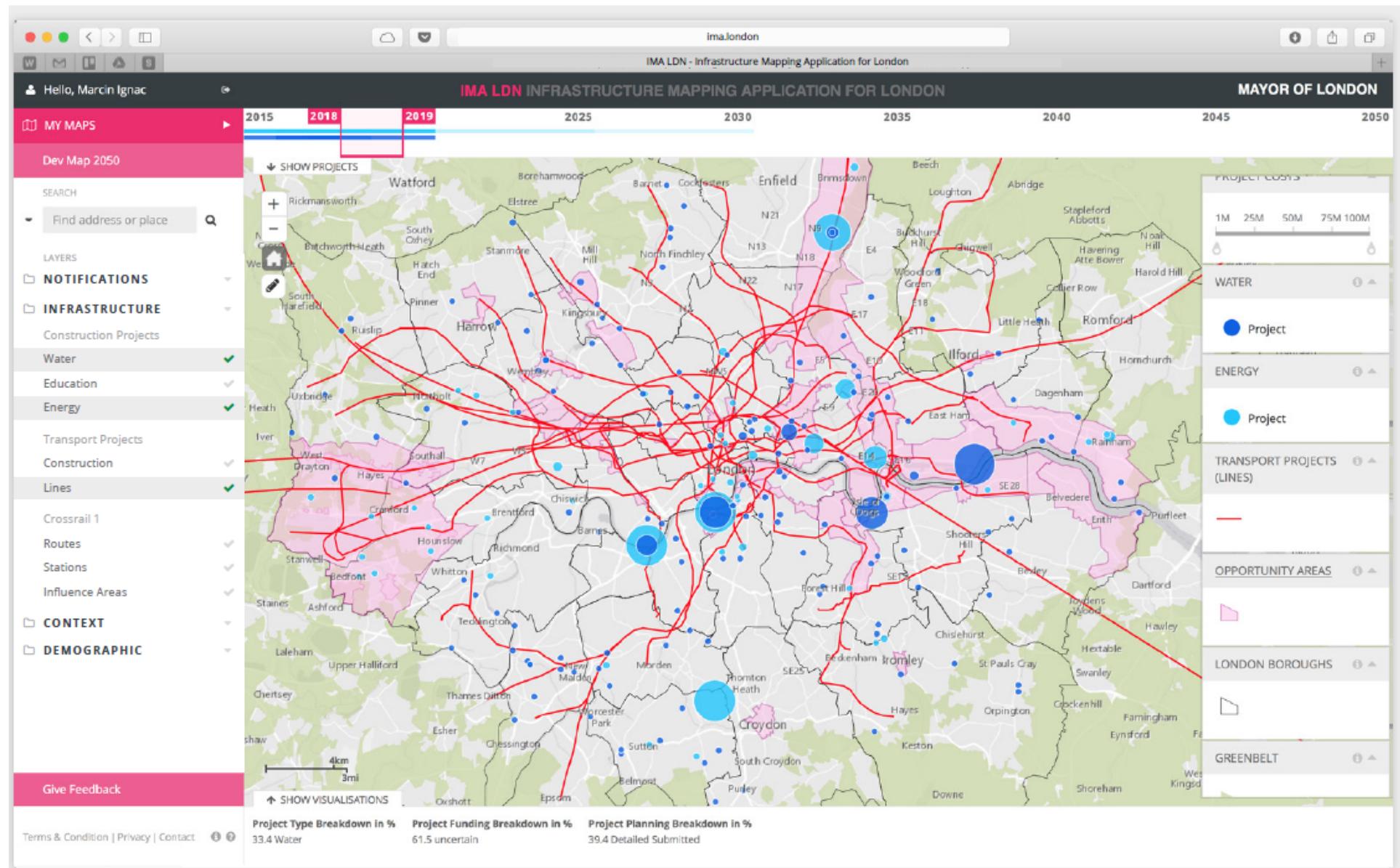
Planning: 





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The application shows a diverse range of infrastructure related layers on a map that can help to form better decision making & future plans.



Incentivise collaboration between different infrastructure providers in a specific area.

The screenshot shows the IMA LDN Infrastructure Mapping Application for London. The interface includes a sidebar with user information, a timeline from 2015 to 2050, a search bar, and various project categories. A central map displays infrastructure projects across London, with a callout box providing details about the 'Thames Tideway Tunnel - Lot 2/C410 Main Works Central' project.

IMA LDN INFRASTRUCTURE MAPPING APPLICATION FOR LONDON

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Dev Map 2050

SEARCH: Find address or place

LAYERS: NOTIFICATIONS, INFRASTRUCTURE, Construction Projects, Water, Education, Energy, Transport Projects, Construction, Lines, Crossrail 1, Routes, Stations, Influence Areas, CONTEXT, DEMOGRAPHIC

GIVE FEEDBACK

Project Type Breakdown in %: 28.5 Education, 57.1 uncertain, 35.7 Detailed Submitted

Project Funding Breakdown in %:

Project Planning Breakdown in %:

Timeline: 2015, 2018, 2019, 2025, 2030, 2035, 2040, 2045, 2050

Map Callout (Thames Tideway Tunnel - Lot 2/C410 Main Works Central):

1 of 3

Thames Tideway Tunnel - Lot 2/C410 Main Works Central

Description: Two tunnels with shafts and connections. A tunnel from Kirtling Street to Carnwath Road Riverside (West) and a tunnel from Kirtling Street to Carnwath Raod Riverside (East)

Funding: Uncertain

Duration: 2018 - 2023

Source: Barbour ABI

Project ID: 12018472

WATER: Project

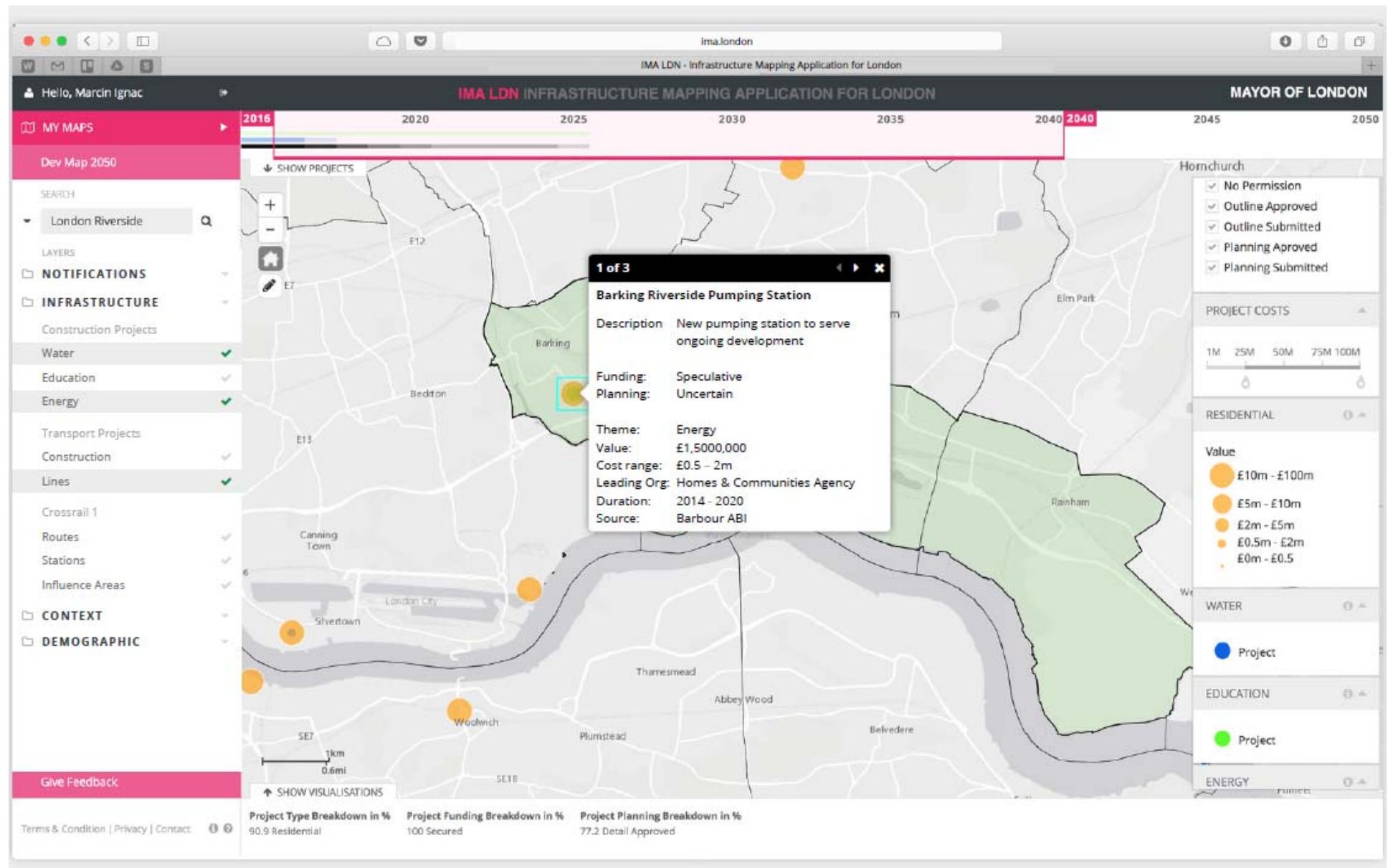
EDUCATION: Project

ENERGY: Project

LONDON BOROUGHS: [empty]

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Detail the level of certainty of large and smaller future projects in London.



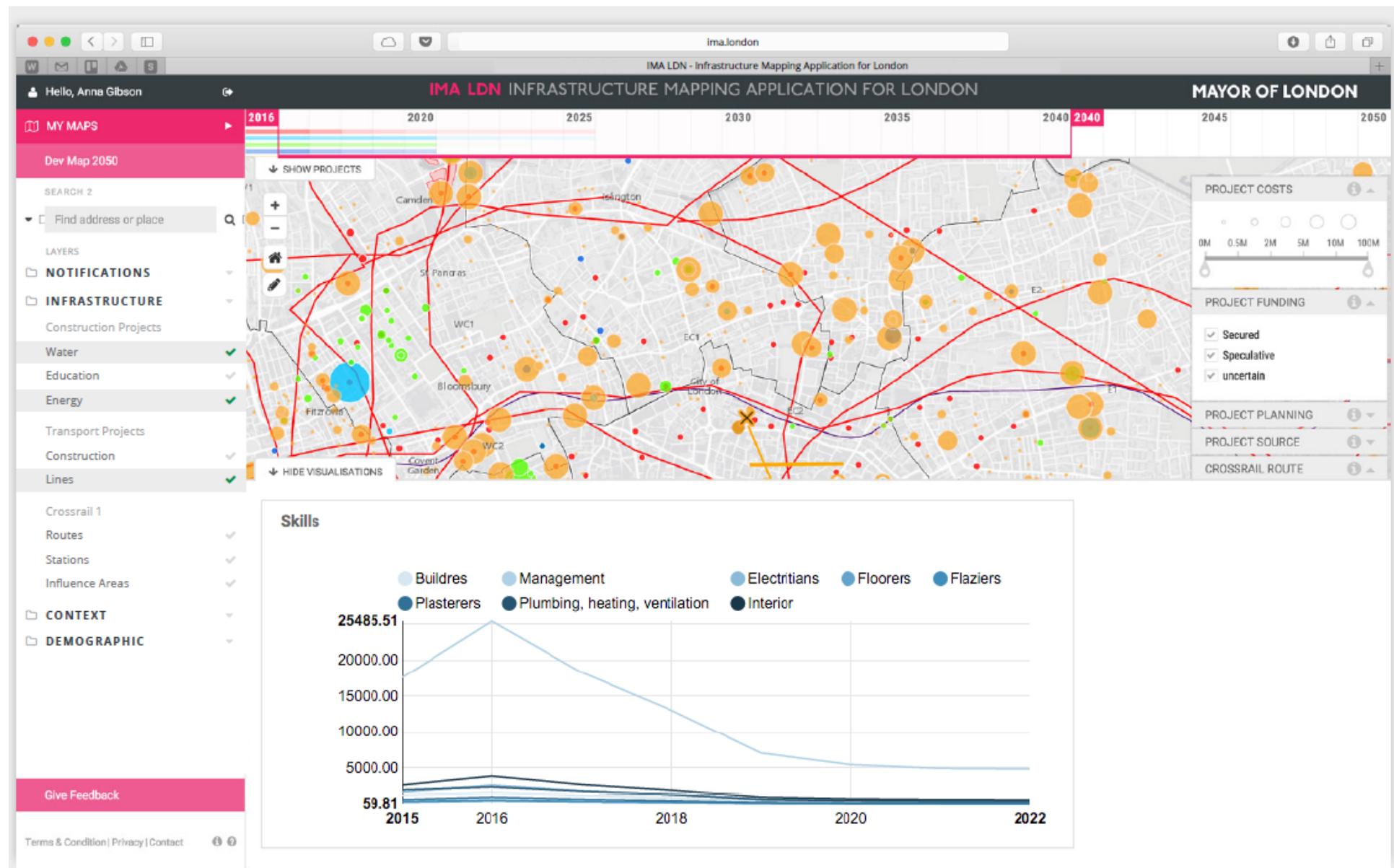
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Compare infrastructure data on the map and as charts and graphs, exportable for offline use.

The screenshot shows the IMA LDN Infrastructure Mapping Application for London. The interface includes a top navigation bar with the URL ima.london, a title "IMA LDN INFRASTRUCTURE MAPPING APPLICATION FOR LONDON", and a "MAYOR OF LONDON" logo. A timeline at the top shows years from 2015 to 2050, with 2040 highlighted. On the left, a sidebar menu lists "MY MAPS" (Dev Map 2050), "SEARCH 2", "LAYER", "NOTIFICATIONS", "INFRASTRUCTURE" (selected), "Construction Projects", "Water" (selected), "Education", "Energy", "Transport Projects", "Construction", and "Lines". Below these are sections for "Crossrail 1", "Routes", "Stations", "Influence Areas", "CONTEXT", and "DEMOGRAPHIC". A "Give Feedback" button is at the bottom left. The main content area features a map of London with numerous orange and green circular markers representing projects, overlaid with red lines. To the right of the map are several filter panels: "PROJECT COSTS" (0M to 100M), "PROJECT FUNDING" (Secured, Speculative, uncertain checked), "PROJECT PLANNING" (Crossrail Route), "PROJECT SOURCE" (Crossrail 1), and "CROSSRAIL ROUTE". At the bottom are three charts: "Project Type Breakdown in %" (Residential 70.8%, Other 7.0%, Commercial and Retail 14.8%, Transport 2.2%, Education 4.2%), "Project Funding Breakdown in %" (Secured 95%, Speculative 5%, Other 0%), and "Project Planning Breakdown in %" (Planning Approved 50%, Detailed Submitted 40%, Detail Approved 10%, Other 0%).

Innovate UK

Projected skilled workforce requirements based on Construction Industry Training Board labour force modeling.



Innovate UK

The infrastructure work highlights the scale of London's challenge and opportunity

Future directions: rethinking regulation, innovation, sweating existing assets, data... being smart.

Huge investment pipeline for London – need to maintain pressure on national government and think of new ways of funding our infrastructure requirements given the legacy of the 'Great Recession'

We can accommodate growth effectively – it is about productivity, resilience and sustainability – London Plan

www.london.gov.uk/infrastructure

Jeremy.Skinner@london.gov.uk



Extending the London Underground to Battersea Power station





