

**NETWORK
TOURIST
INFORMATION
CENTRE**

— JACOB BOLTON



1 — INTRO

Lately I've been thinking a lot about the internet as something very physical.

By that I mean 4G antenna screeching our locations through the air, data centres hidden in plain sight, and most of all, cables: snaking through our homes and under our streets and stretched between continents across the sea bed, flickering with billions of pulses of light per second

It is an unbroken, planetary-level infrastructure, and like all infrastructure it is deeply political: it has the capacity to determine the flow of information, opportunity and capital.

In short, it is a system that distributes power.



Telehouse, London. Photo taken June 2019.

As more and more people are driven to working from home, and public participation is increasingly moved online, fast, cheap internet connectivity becomes a major driver of socio-economic equality. Without reliable, affordable, convenient connectivity, we cannot get access to education, job opportunities, social activities, support forums, welfare, news, immigration support, savings on travel, and, increasingly, healthcare.

Early visions of the world wide web foresaw a public site for knowledge exchange, with the capacity to become private for the purposes of protecting users. It was a space upon which people possessed and practiced neutrality.

Increasingly, the reverse is becoming true: the internet is becoming a privatised space in which individuals' right of access and basic privacy are breached for the purpose of entrenching the power of those who own or manage the virtual space.

The internet of commons is being bulldozed for an internet of enclosures. Access is distributed unevenly, and it is leading to growing imbalances in opportunity and participation.

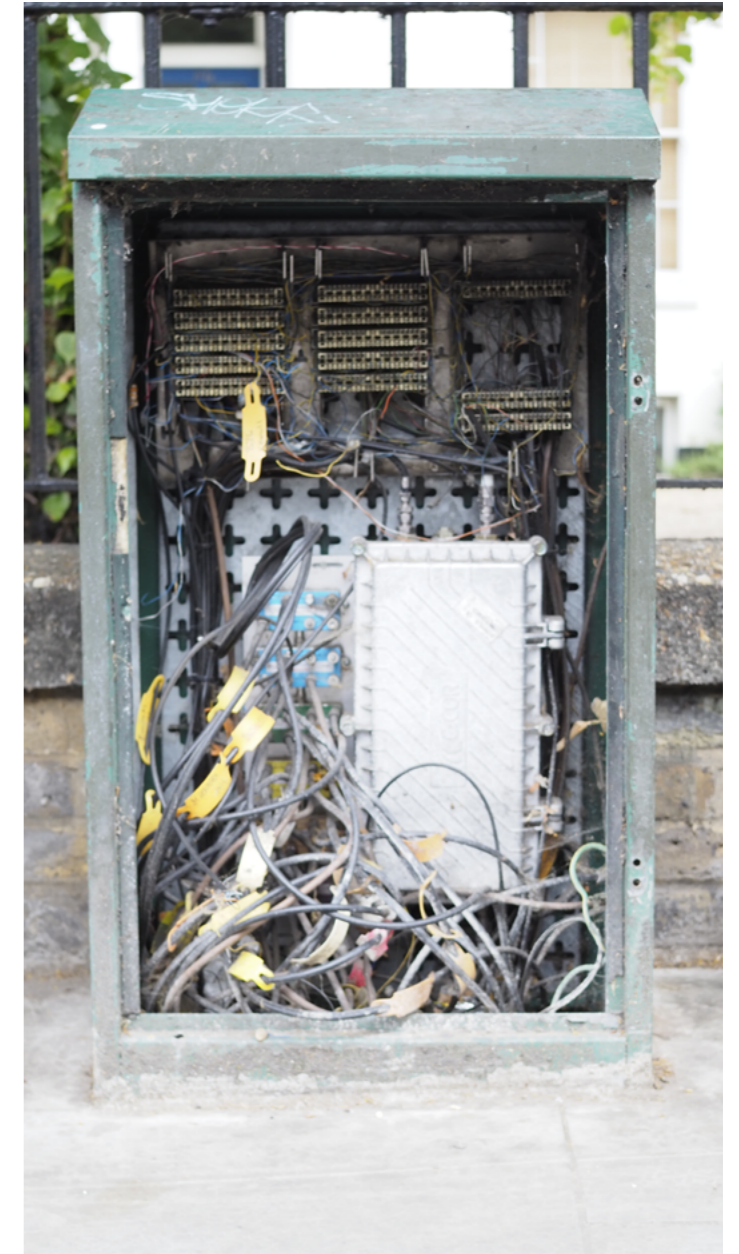


Euston Station, June 2019

Distribution and (dis)investment in public infrastructure has a pretty big part to play in this.

UK and European government investment in digital infrastructure is overwhelmingly weighted towards sites that have business potential, at the expense of residential access, lower socio-economic urban districts, and rural areas. Many of the businesses that benefit from this are profit-oriented tech startups that grow through privatising online space and commodifying our online exchanges and interactions.

Government initiatives to overcome digital divides repeatedly shift the onus of administrating, fundraising and installing fibre networks onto residents, who lack the technical knowledge and understanding of the internet's essential physicality to comprehend the extent to which they are being disinvested. Residential access to fibre networks require, as a minimum, 100 signatures and a participating business – in this model, businesses become the gateway (or gatekeeper) to a fast connection, leading to a heavily financialised internet.

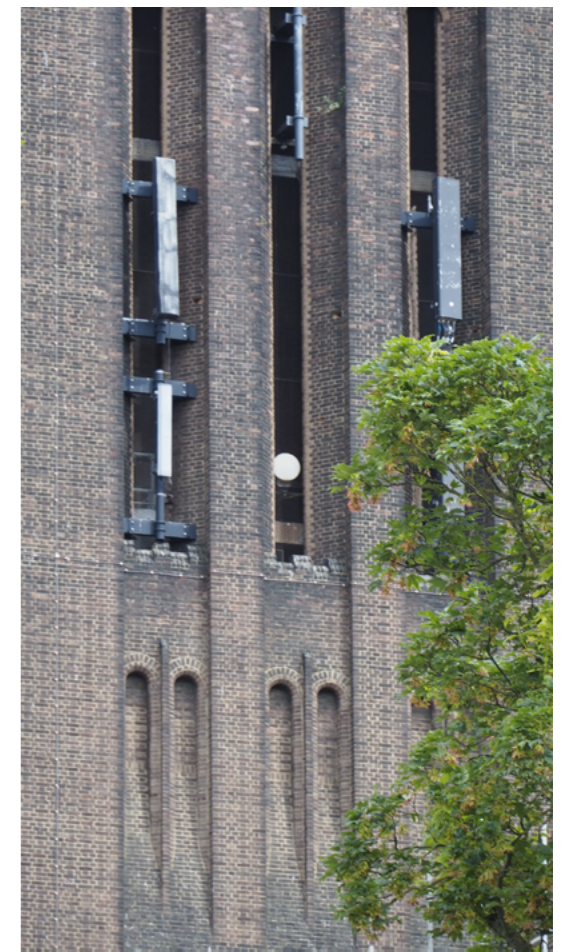


Damaged signal box. Camberwell, June 2019

More and more, it is an internet that looks and feels like Canary Wharf. There is a slow, long-term civic violence to this process: unbalanced power dynamics become locked into the fabric of a city at an infrastructural level.

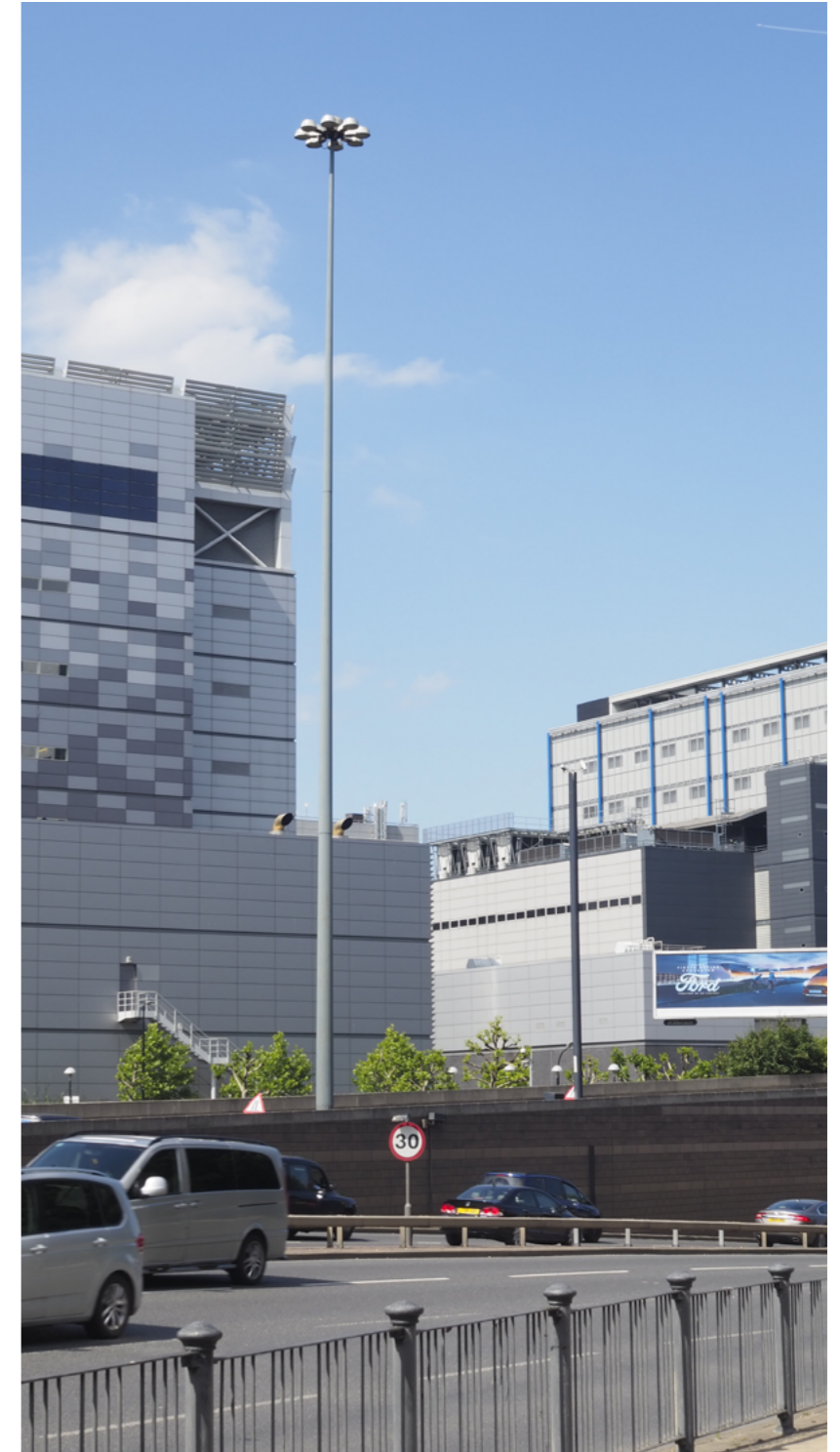
This process plays out behind a widespread lack of infrastructural literacy; we talk about the disinvestment of railways or healthcare (rightfully so), but not so much about digital infrastructure, maybe because its apparatus is less familiar to us. But the internet is hidden in plain sight, all around us, in 4G towers, signal boxes, under manhole covers, and once you learn to see it you begin to see it everywhere. With that comes a new way of reading a city: in terms of

connectivity, not consumption, resisting the experience of viewing a city carefully planned by commercial property developers.



4G towers semi-disguised in the church on Denmark Hill.
June 2019

Imbalances in visibility lead to imbalances of power; raising awareness of how the internet operates at an infrastructural level (and who it operates for) is the first step in building vital conversations about digital equality, and reclaiming the internet as a neutral public space.

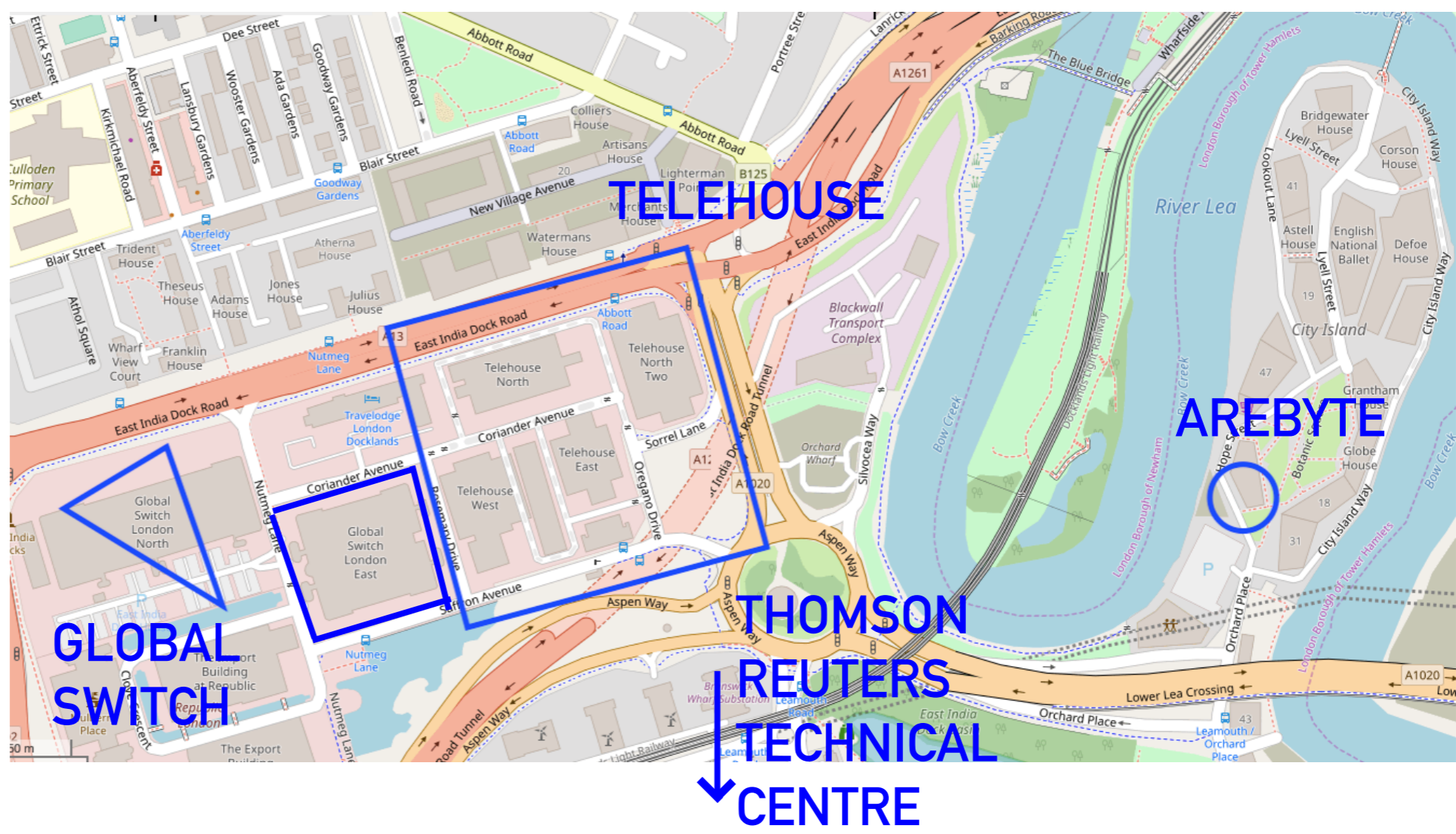


Telehouse, London. June 2019

2 – PROPOSAL

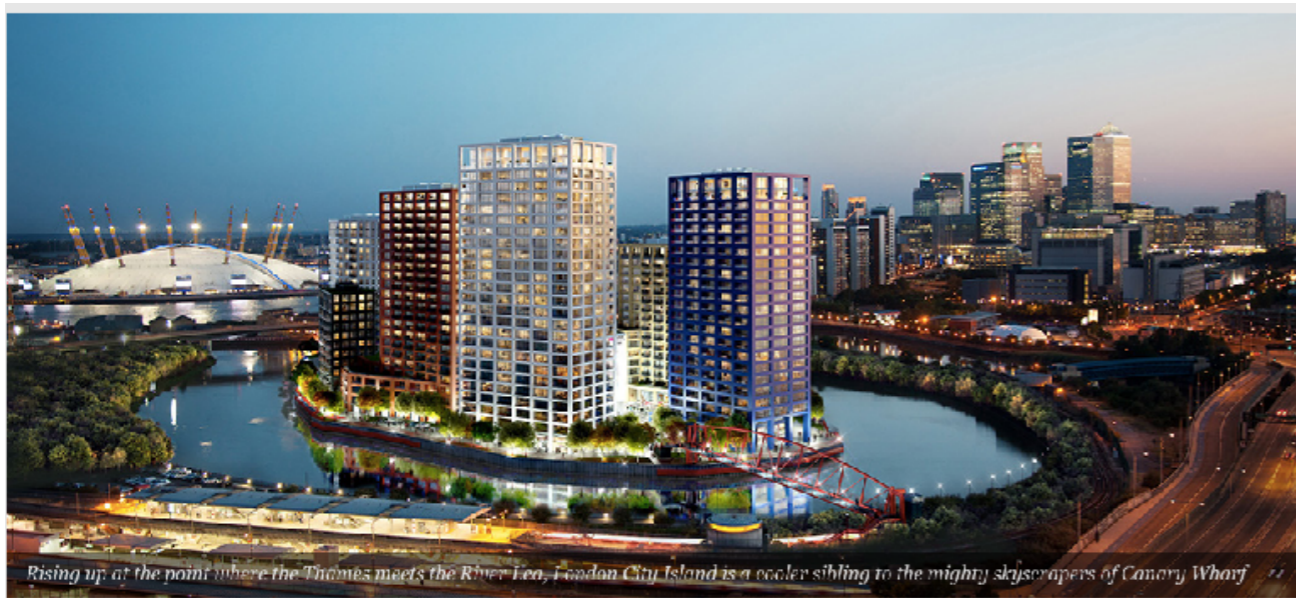
I propose to turn arebyte Gallery into a public centre for network-spotting, and a site on which to accelerate the conversation around infrastructural neutrality: a network tourist information centre. The full exhibition will take place across three spaces: in-gallery, in the surrounding area, and online. The intention is to make an exhibition that is useful, accessible, and critically engaged.

The situation of the gallery is ideal for this. It sits just 250m away from Telehouse, an internet colocation spot and the backbone of the UK's digital infrastructure. It is one of the most connected and critical buildings on the planet, fittingly perched atop the former docklands through which the British Empire funded and consolidated its power – the streets surrounding it are named after the spices extracted from colonised countries on which the area built its wealth: Saffron Avenue, Nutmeg Lane, Coriander Drive.

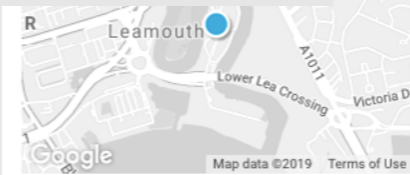


The gallery's situation as a cultural tenant in a new development is also fitting. London City Island is described by developers Ballymore as 'one of the best-connected sites in London' and an 'exclusive island neighbourhood': a space that is ostensibly public yet looks and feels like a private one, much like the increasingly gentrified internet.

I propose to turn the gallery into a site of quiet resistance against the privatisation and remapping of space in the surrounding area.



Rising up at the point where the Thames meets the River Lea, London City Island is a cooler sibling to the mighty skyscrapers of Canary Wharf



Key Facts

A new benchmark in large-scale placemaking

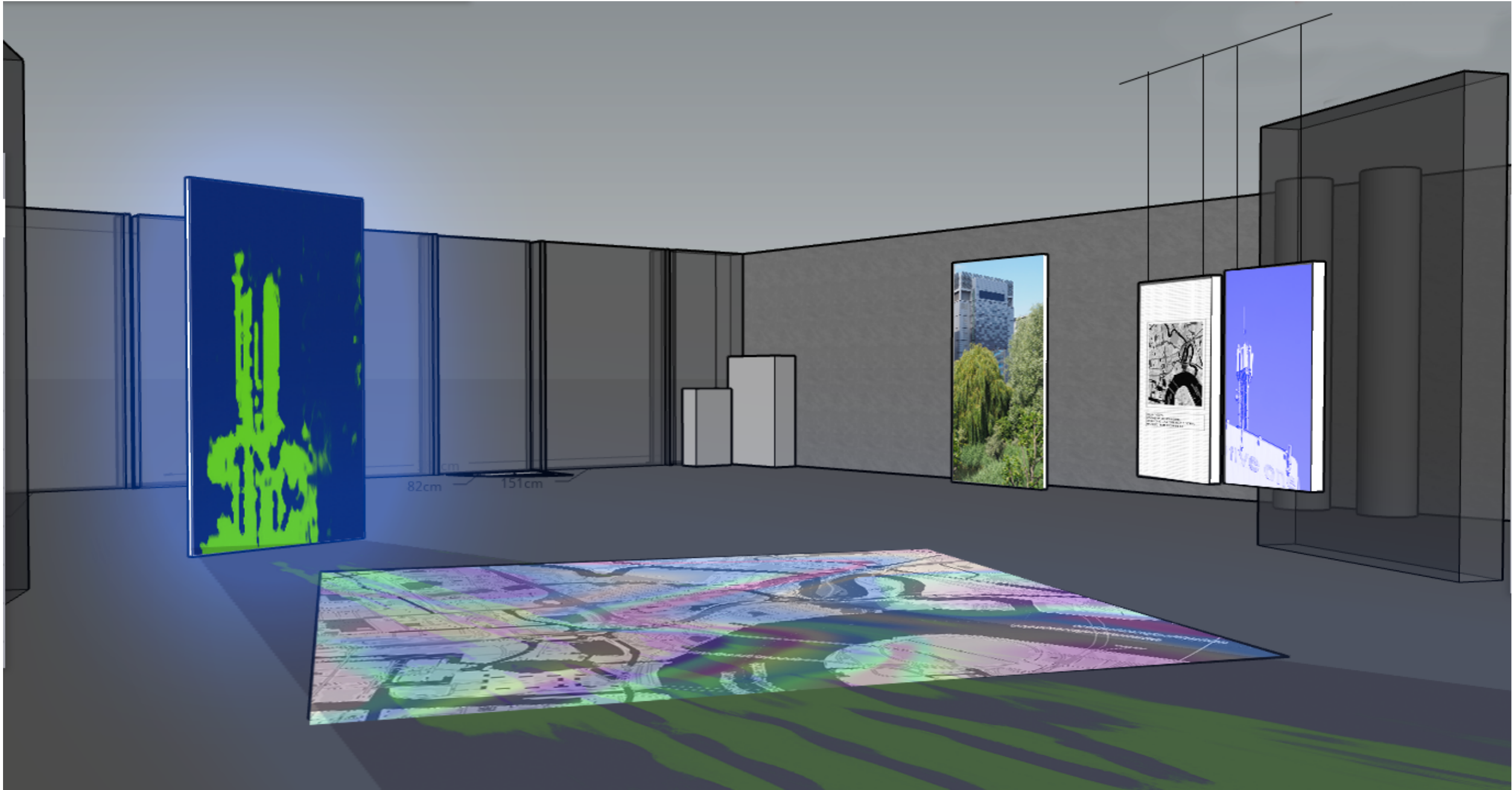
The creation of an exclusive island neighbourhood on one of the best-connected sites in London was once just an ambitious vision. Now, it is a stunning reality. Bridging the business might of neighbouring Canary Wharf and the cultural energy of East London, London City Island is one of the most important waterside projects London has seen in recent years. Taking inspiration from the best elements from metropolitan islands across the world, the project combines bold architecture and pioneering landscape design to create a spectacular landmark in riverside living.

“Highlights including English National Ballet’s new home and a brand new footbridge bringing Crossrail and DLR transport links to within a short stroll away.”

In the gallery space, I will present an installation of AI-generated images, an interactive map on the floor, and a short film/ visual essay.

The gallery will also be the starting point for a browser-based walking tour of the surrounding area. By doing this, the gallery will be turned inside out: the space is a kind of primer for an engagement with the 'outside' world. The tour will be self-led, and trace the path of an internet signal through various pieces of infrastructure. It will consist of 5 points, with each stage of the essay revealed by scanning a hidden QR code at each point.

Finally, I'll build an online space, either on arebyte on screen or on a hand-coded website. It will hold a written essay and photos on the issues running throughout the show: network literacy, visibility imbalances and infrastructural power dynamics. Once the exhibition is over, the full visual essay will be uploaded for anyone to view freely.

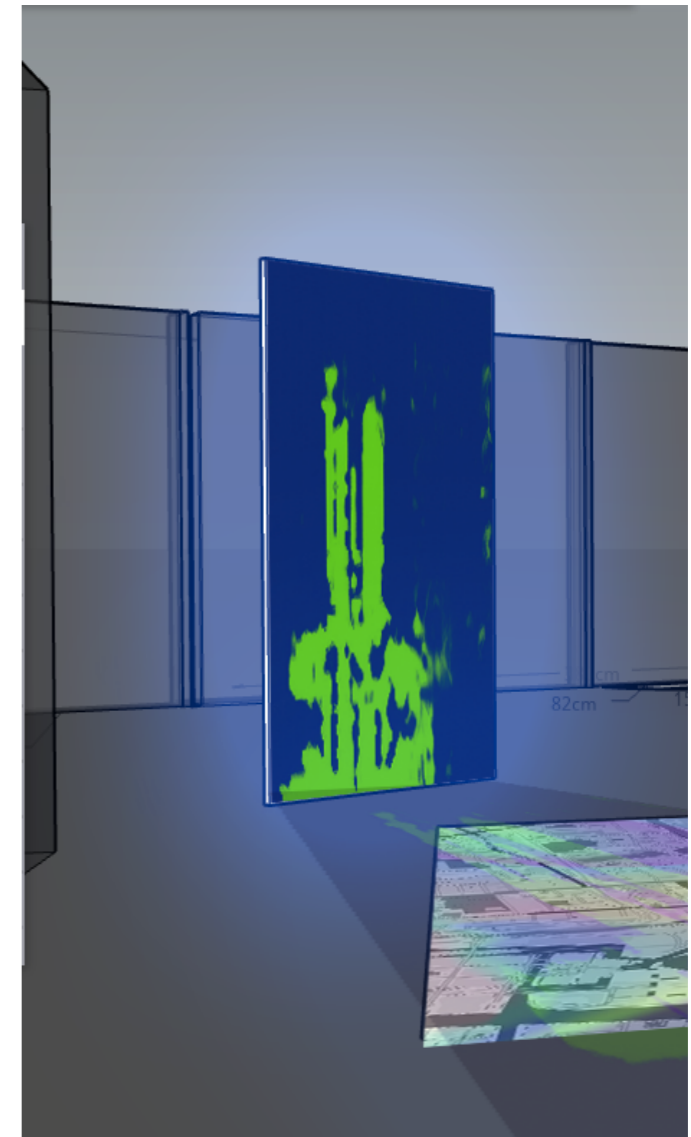


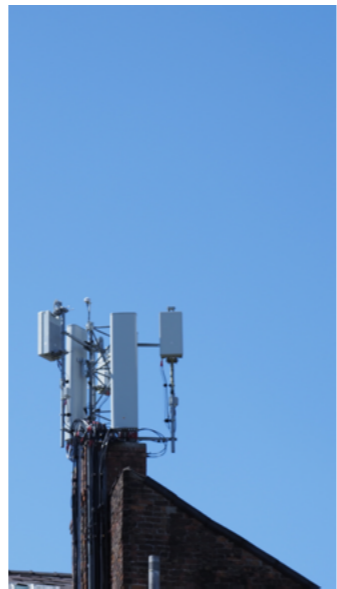
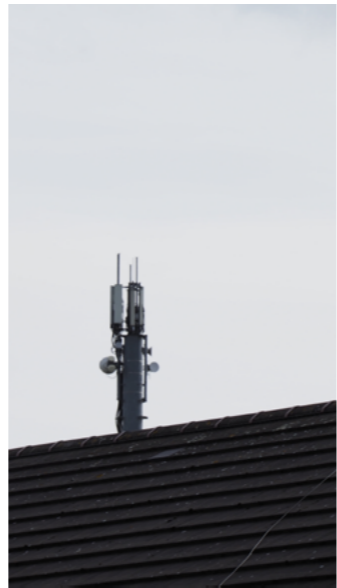
INSTALLATION: NETWORK DREAMING

Frame animations made from artificially generated images, created by training neural networks on an original photo dataset of 1000 4G signal towers (shot in Liverpool). These images are then given increased resolution through a browser-based AI, and recoloured.

The neural networks use the signal tower IDs of 4G towers surrounding arebyte gallery as the 'seed', the number the algorithm is based off. The images show chronological samples from the neural network's learning process. As the animations progress, the ai becomes more developed and capable of creating convincing images of signal towers.

All images for this are generated using artificial intelligence and then processed through a browser-based image resolution AI program. The data transit happens through a mobile device, meaning the data passes through the 4G signal towers the AI is attempting to create images of. Through this process, the internet learns to conjure up images of its own physicality. An audience can watch neural networks as they learn to dream their body.





Samples from original dataset of 1k images.
Shot in Liverpool city centre.

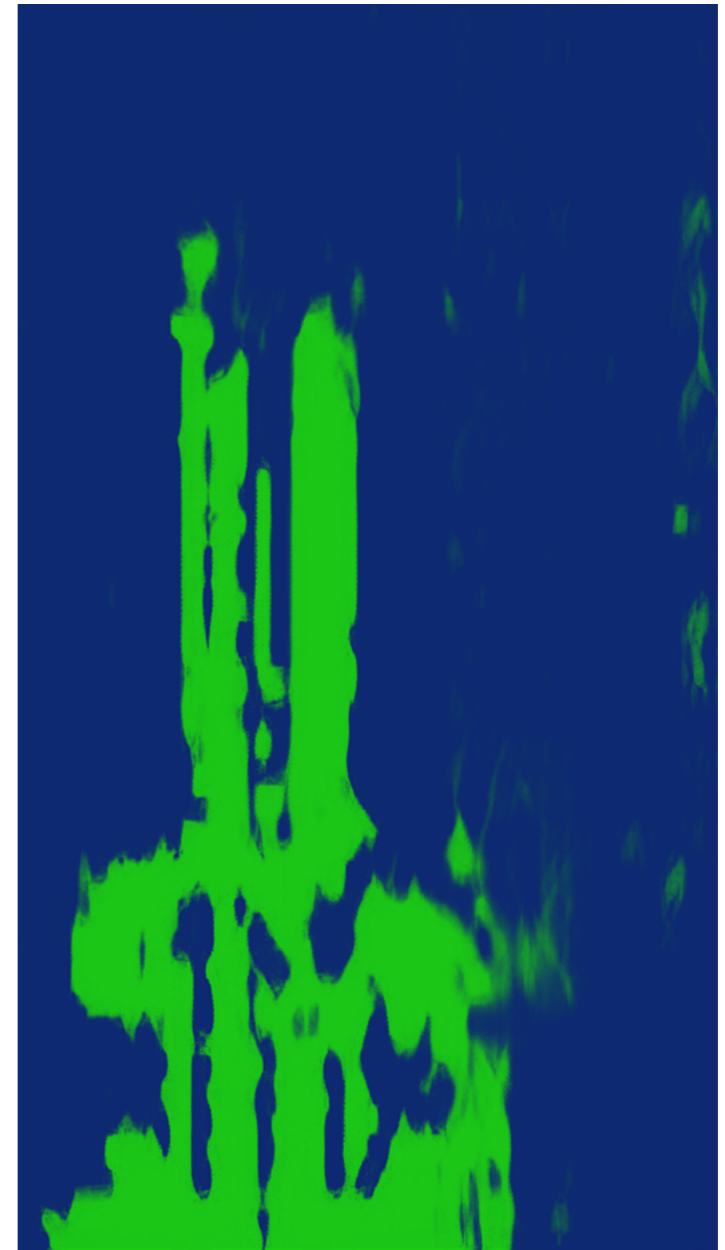


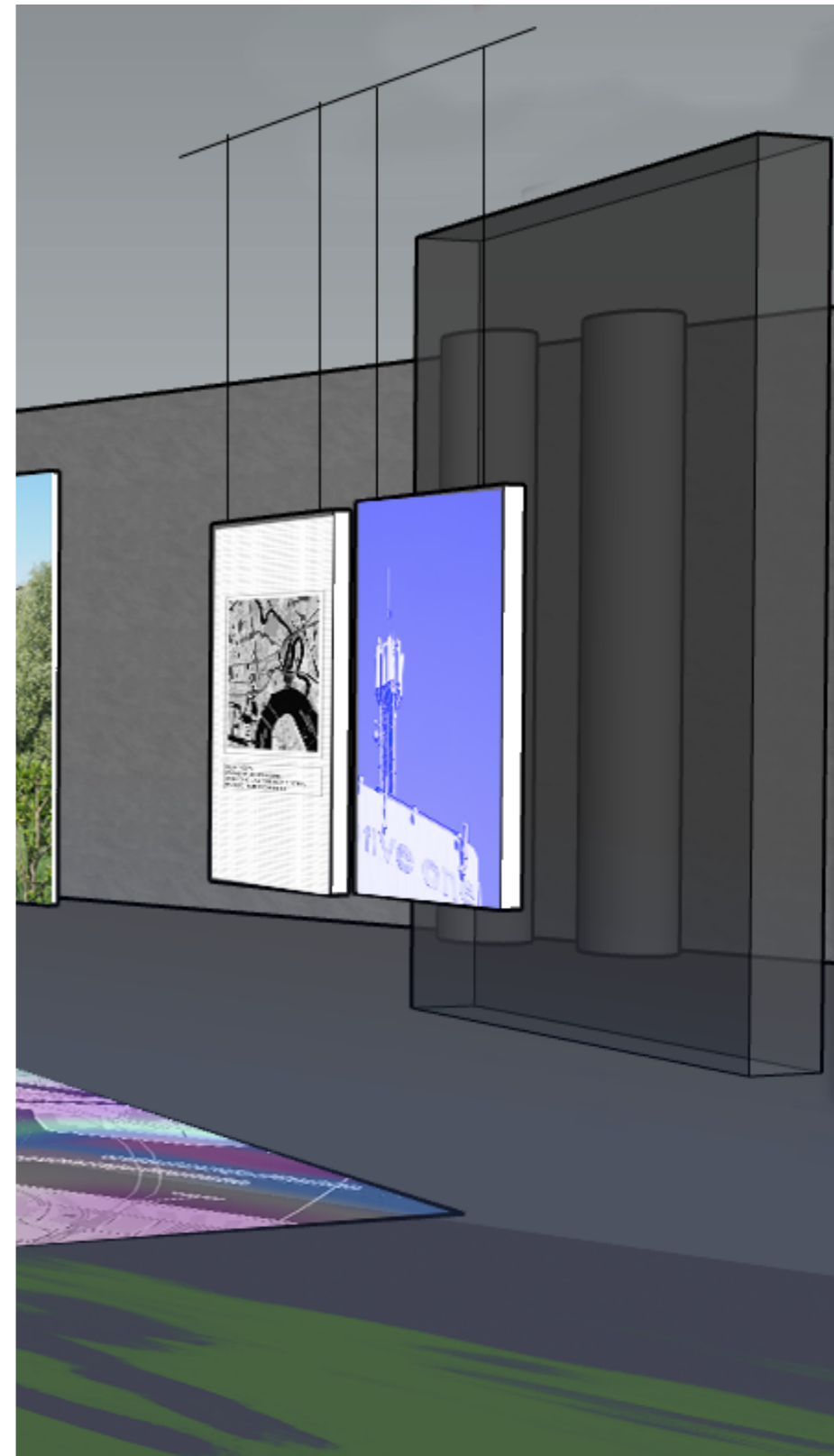
Image made by trained
neural networks, AI
upsampling and automated
recoloring.

All the images use an aspect ratio of 16:9, to recall the devices that are mostly pumping data through 4G towers. It will be projected onto a large sheet of clear perspex, backed with fine muslin cloth to create a thin, double-sided screen that allows another image to travel through. This image will light a holographic vinyl map on the floor.

Another smaller screen (ripped out of its bezel) will show the tower's location and network ID, plus details of the physical path the data took around the planet, obtained by running a traceroute (a way to track the movement of data packets through servers).

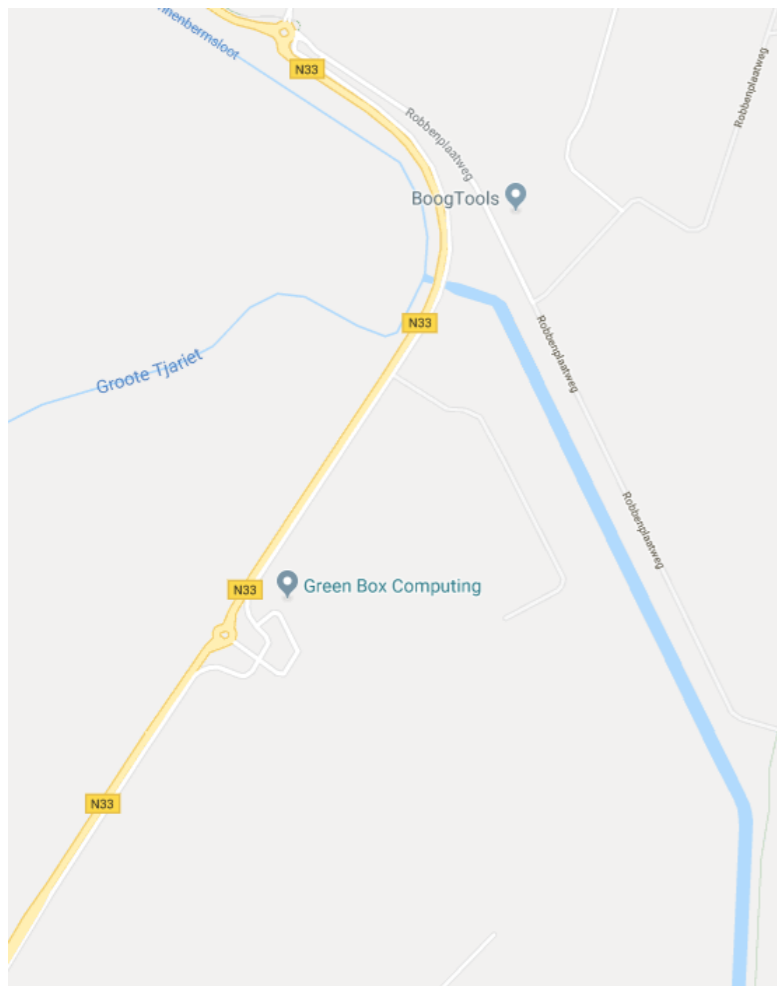
A final screen will show the original dataset: about 1000 high resolution photos of 4g towers shot on a long telephoto lens.

To create an ambient atmosphere, I will create a soundscape using data mined from the airwaves using a RTLSDR radio (a modified TV dongle) to 'listen in' on live 4G radio frequencies, and convert this into a soft ambient soundscape. If this isn't possible due to the gallery's location, I'll compose a gentle ambient soundtrack with some data from the towers incorporated into the synthesis, to encourage people to slow down and spend time with it.

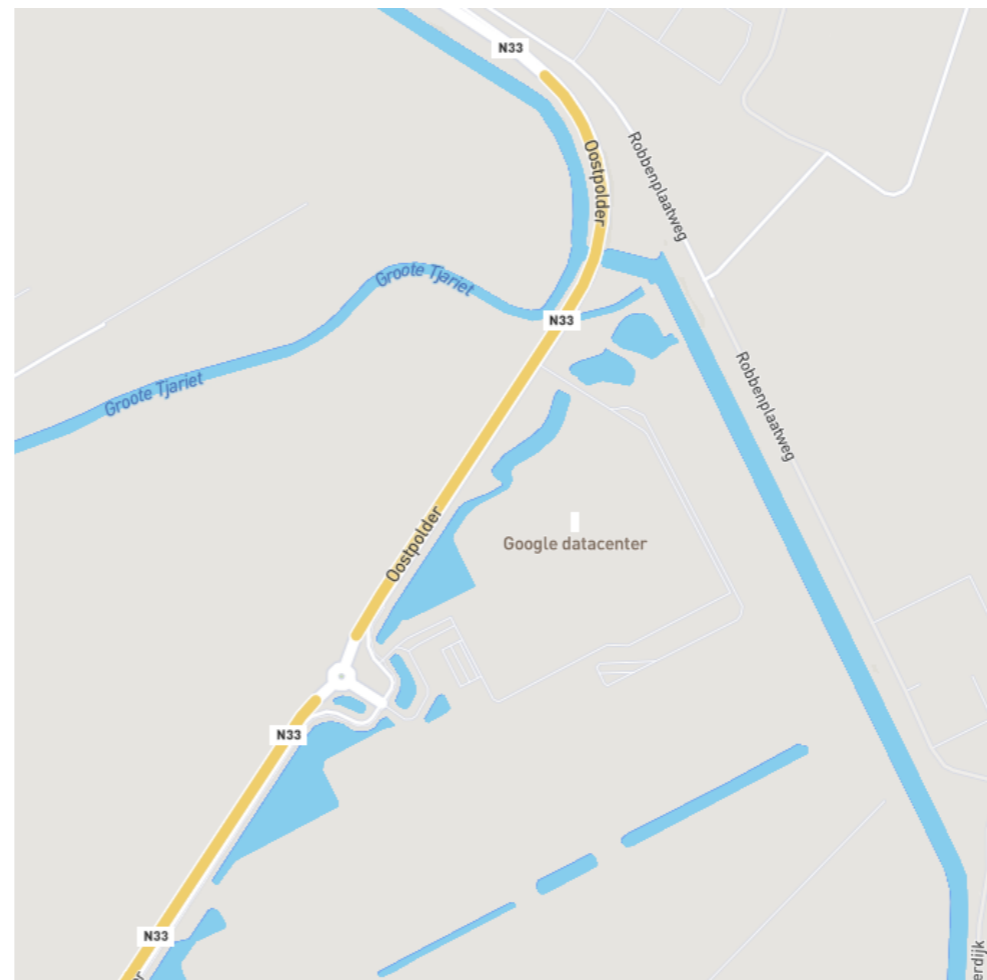


INSTALLATION: MAP

Maps are weapons. By this I mean that maps can be (and pretty much always are) warped to political and private agendas, in order to control the visibility of and access to an area. Internet infrastructure is notoriously uncartographed – Google renders its own data centres as blank spots or fake businesses on Google Maps.



Google Maps screenshot: 'Green Box Computing', no buildings shown.



Apple Maps screenshot: 'Google datacenter', buildings shown.

No self-respecting tourist information centre is complete without a huge map: I'm going to make a 3.6m square map of the surrounding area in holographic cut vinyl and apply it to the floor of the gallery for anyone to walk on. I'll annotate it partially with pieces of infrastructure, and provide stickers for people to add their own after going on a planned network tourist walk of the surrounding area. By doing this, the exhibition will become a collective public mapping of a privately disguised system, kind of like a wiki.

Another screen will show the locations of the towers from which the images in NETWORK DREAMING draw their cell IDs, highlighting them on the map.



Holographic cut vinyl used in exhibition at Open Eye Gallery in Liverpool. Sticks directly to wall/floor/perspex.

VISUAL ESSAY

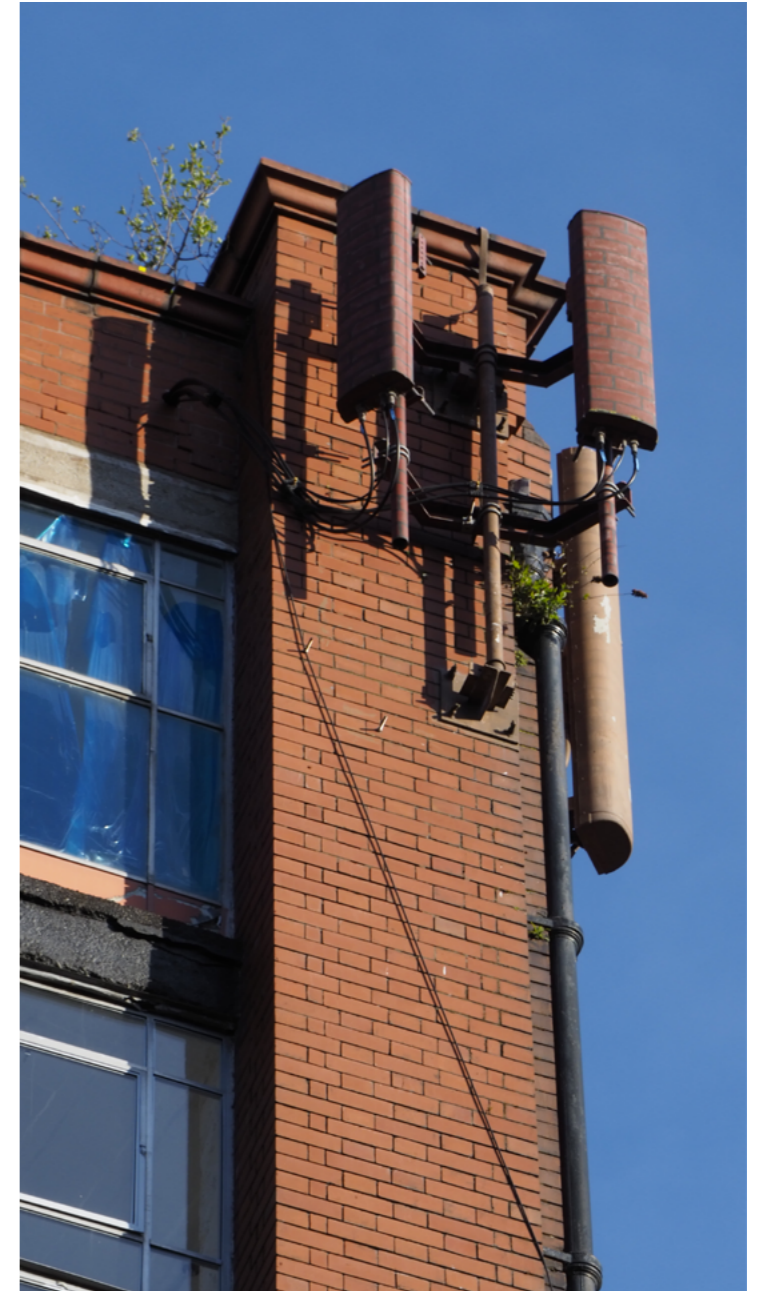
A short film, shot in vertical 16:9 (smartphone dimensions), using a HD camera and projected in the gallery. It will be 12 minutes long, and feature interviews, footage of interesting network apparatus (such as stealth towers – badly hidden infrastructure) with voiceover, and, where necessary, original diagrams and illustrations.

Three parts:

Part one: reading the internet in the city: visibility in urban digital infrastructure.

Part two: Power dynamics. Looking at distribution of powerful network infrastructure, and imbalances in access to it.

Part three: future networks: 5G, how that's going to change how we interact with space, and how public space is used, valued and controlled.



Hidden 4G towers. Liverpool, April 2019.

Agreed Interviews:

Amit — A systems administrator and critical network engineer. Background in working with hacklabs and setting up or maintaining radical servers. Extremely knowledgeable on global internet infrastructure and its critical flaws.

Jess — A systems administrator, server expert and coder. She is also a moderator for the UK transgender reddit, so has plenty of experience in administrating and facilitating public space on the internet.

Alex — a leading figure in the Internet of Things and sensor technology. Very much on the market's side of technology, but sceptical of 5G.

Kyle — A Liverpool-based network engineer, working on physically installing the new fibre lines in Liverpool. Someone with a very material relationship to the internet.

Interviews I'm pursuing:

A representative from B4RN (Broadband 4 Rural North), a grassroots community-led internet provider in the Lake District. They self-administrate and install their own network, and are one of the only initiatives in the country to successfully make use of the government's labyrinthine funding structures. They are a non-profit, and provide the fastest residential internet in the country.

SELF-LED WALK

A self-led browser-based walking tour of the area. Follows the path a data packet might take from using 4G at arebyte gallery. Five waypoints, each of which comes with a piece of apparatus, a brief history on its usage and local installation, and the implications of the technology.



The tour will involve:

A 4G tower – antenna that beams data to and from devices to the physically connected internet.

An underground fibre optic cable.

A suite of networked surveillance devices (including a License Plate Registration Reader).

A “fun” history of UK telecommunications through reading the names emblazoned on clusters of manhole covers surrounding Telehouse, including destroyed histories (yes, people really do gouge brand names off metal manhole covers following corporate takeovers).

A data centre (Global Switch)

A data centre/colocation spot behemoth (Telehouse).



Bow Creek Ecology Park, next to arebyte.
The woods hide signal towers.
June 2019



Manhole covers around Telehouse. They mark the places where the fiber enters the complex, and there are hundreds. Mostly UK/ US telecomms companies. Some of the names have been deliberately gouged out following corporate takeovers. Brand identity is real.
2 June 2019

PUBLIC PROGRAMME

ENGINEER'S TALK

Amit — is a network engineer with a background in radical systems administration, activism and working with artists. He will deliver a crash course in how the internet works. It will include a quick guide to both physical and visual infrastructure. From this, we'll have an informal in-conversation about privacy and online gentrification.

GUIDED TOUR

The director's cut: an expanded version of the self-led network tourist tour on the opening weekend, in which I'll take people around the area and talk through network apparatus, its history, and its implications for society. It will start at the gallery, and end back there, where people can add pieces of apparatus that they've spotted to the floor map, using stickers provided.

3 – BUDGET & LOGISTICS

TIMELINE

AUGUST AUGUST AUGUST AUGUST AUGUST AUGUST AUGUST AUGUST AUGUST AUGUST

9th	Arrange dates for the pre-agreed interviews with artists.
9th	Skype Rebecca — firm up details on materials and timings. Give a progress report.
9th-16th	Storyboard/ write script for the visual essay
25th - 10th September	Away — out the country

SEPTEMBER SEPTEMBER SEPTEMBER SEPTEMBER SEPTEMBER SEPTEMBER SEPTEMBER

Throughout	Record Interviews — in Rural Lancashire, Liverpool (2), Bolton and via Skype (Glasgow)
10th	Back in UK!
19th/20th	London. Finalise route of Infrastructure tour. Take photos of area for navigation. Shoot b-roll of area for film. Visit gallery and confirm all tech/hardware requirements/ test projector throws, et cetera.
23 - 27th	Finalise interviews, design graphics for the rest of the video. Download and edit a vector-based map of the area and design up holographic cut vinyl.

OCTOBER OCTOBER OCTOBER OCTOBER OCTOBER OCTOBER OCTOBER OCTOBER OCTOBER OCTOBER

First Week	Progress report via Skpye/email. Talk about text/design for accompanying booklet.
Second Week	Editing Video
Third Week	Send Alan Warburton cut of video for feedback (if possible)
end	Promotion begins — pitch to long lead press contacts. Create graphics/short videos/stills for social media and share with arebyte. Contact Communications Worker's Union and other relevant parties. Design and order stickers to put on street-level networked infrastructure. Write text for booklet.

NOVEMBER NOVEMBER NOVEMBER NOVEMBER NOVEMBER NOVEMBER NOVEMBER NOVEMBER NOVEMBER NOVEMBER

1 Nov	Progress Report	
First week	Create AI-generated animations from arebyte signal tower IDs. Build and publish web pages to host the guided tour. Consolidate other digital materials — original looping dataset, locations of sinal towers on map.	
Second week	Order perspex, vinyl and cloth. Design and order stickers for the guided tour and for people to add to the map. Finalise edit of video.	
23-24	Install begins! Attach muslin cloth to one side of perspex. Mount with wire from ceiling (perspex will have pre-drilled holes). Install projector behind it. Set up projector and headphones for film, against the back wall. Set up speakers for soundscape.	Technician required
25-27	Set up soundscape — using live software designed radio on a Raspberry pi or compose an ambient soundtrack (field recordings/synth) and play from media player and speakers.	
29-30	Get supporting screens in place. Install cut vinyl on floor.	Technician required

DECEMBER DECEMBER DECEMBER DECEMBER DECEMBER DECEMBER DECEMBER DECEMBER DECEMBER DECEMBER

3-4th	Install stickers in area. Finalise any outstanding details of install.	
5th December	Exhibition launch night	
7th December (daytime)	Guided Walk	
7th December (evening) OR later in the year	Engineer's talk	

BUDGET

MATERIALS	SUPPLIER	COST	In-kind Value
Perspex — 2040 X 1147 4mm polished edges	plasticsheets.com	127	
Muslin cloth	Abakhan	9.98	
Holographic Vinyl	Vyniline	495	
Sticker Budget	Vyniline	50	
Automated image enhancement API (8000 images)	Letsenhance	50	
Contingency		250	
EQUIPMENT	SUPPLIER	COST	In-kind Value
ZOOM h4n Audio Recorder	Gear4Music	174.5	
RTL-SDR Radio	rtl-sdr	in-kind	30
Projector	arebyte	in-kind	
Screens	arebyte	in-kind	
Olympus Om-D EM-10 Miii 4k Camera (+lenses)	JB	in-kind	548.41
TRAVEL	SUPPLIER	COST	In-kind Value
Interviews travel stipend (to Rural Lancashire/ Bolton)		50	
London travel stipend (3 journeys)		150	
Train from London to Glasgow for Amit (engineer's talk)		147.5	
Fees		COST	
Artist Fee	JB	1163.78	7 days @ 166.24 (artist union guidelines)
Artist/Engineer's Fee	AMIT	100	
Comms Support	JB	IN-KIND	750 (3 days @ £250 day rate)
Technician (2 days @ 150)	arebyte	300	
Developer fee	JB	150	1 day @ £150 day rate
TOTAL		3217.76	1375.36

COMMS PLAN

I'm keen to make this show popular to as wide an audience as possible, particularly as it's partly animated by people contributing to the space (via adding to the map).

I work for an NPO visual arts organisation leading their communications and design, and I'm keen to put this experience to use in enabling people to access the show. As a freelance arts writer, I've got a lot of contacts in press, both in London and the North, and I'll work with arebyte to put together a strong press release and pitch it to editors and writers.

I'll also supply arebyte with images and graphics to use across social media, such as stills from Network Dreaming, images of disguised/hidden infrastructure around London, and short clips from the film.

I'd also be interested in making stickers with short messages about the networked built environment and a QR code linking to the exhibition page, and putting these on pieces of street-level internet infrastructure around the area and in central

London: quick facts like 'Last year the transfer and storage of data worldwide had a larger carbon footprint than the airline industry', or 'The majority of the internet in the UK is owned by just three companies', or even just 'This is what the internet looks like'. I'll put these on signal boxes and free-standing antenna. Some areas around the gallery have a large Bengali and Polish population, so I'd also like to make translations of the stickers in these languages (I've done bilingual political poster campaigns before in Liverpool, in English and Arabic).

The Communications Workers Union headquarters is also within walking distance of the gallery, so I'll reach out to them and invite them to come along to the launch, and see if we can put promotional materials in their HQ.

Having components of the exhibition online will also help its dissemination, as we have more to link to/ gain traction with than just the exhibitions listings page.

I'd also be interested in making stickers with short messages about the networked built environment and a QR code linking to the exhibition page, and putting these on pieces of street-level internet infrastructure around the area and in central London: quick facts like 'Last year the transfer and storage of data worldwide had a larger carbon footprint than the airline industry', or 'The majority of the internet in the UK is owned by just three companies', or even just 'This is what the internet looks like'. I'll put these on signal boxes and free-standing antenna. Some areas around the gallery have a large Bengali and Polish population, so I'd also like to make translations of the stickers in these languages (I've done bilingual political poster campaigns before in Liverpool, in English and Arabic).

The Communications Workers Union headquarters is also within walking distance of the gallery, so I'll reach out to them and invite them to come along to the launch, and see if we can put promotional materials in their HQ.

Having components of the exhibition online will also help its dissemination, as we have more to link to/ gain traction with than just the exhibitions listings page.

BIO

Jacob Bolton writes, designs and makes art. His big interest is public space – both digital and IRL – and how we understand, access, and interact through it. He writes exhibition reviews for ArtReview, The Double Negative and a few other places.

He also designs websites, books, and exhibitions, and does other text and design-based commissions. Other things he's into include physical internet infrastructure, prejudice encoded into AI, net-based political climates, and the hidden environmental footprint of digital exchange.

<https://satellitedishemoji.com/>

EXHIBITIONS

Brighton Photo, with FORM Collective
wiremass (online)

SELECTED WRITING

USE THE CITY (like you use the internet) forthcoming in book 'PRESENT TENSE'
Slow Violence: Madiha Aijaz at Nelson Library (The Double Negative)
Hannah Perry at Somerset House (Art Review)
Review: CTM Festival 2019 (The Double Negative)
Review: Abandon Normal Devices (Corridor8)

PUBLICATION DESIGN

TILT Volumes I-VIII, Open Eye Gallery

THANK YOU

This work is indebted to Ingrid Burrington and her excellent work in mapping digital infrastructure in public space. It also draws on thinking and research from James Bridle, Benjamin Bratton, Andrew Blum, Trevor Paglen, Metahaven, Shoshana Zuboff, Addie Wagenknecht and the whole DEEPLAB collective, Bruno Latour, plus many conversations with friends (new and old) throughout the process of putting it all together.