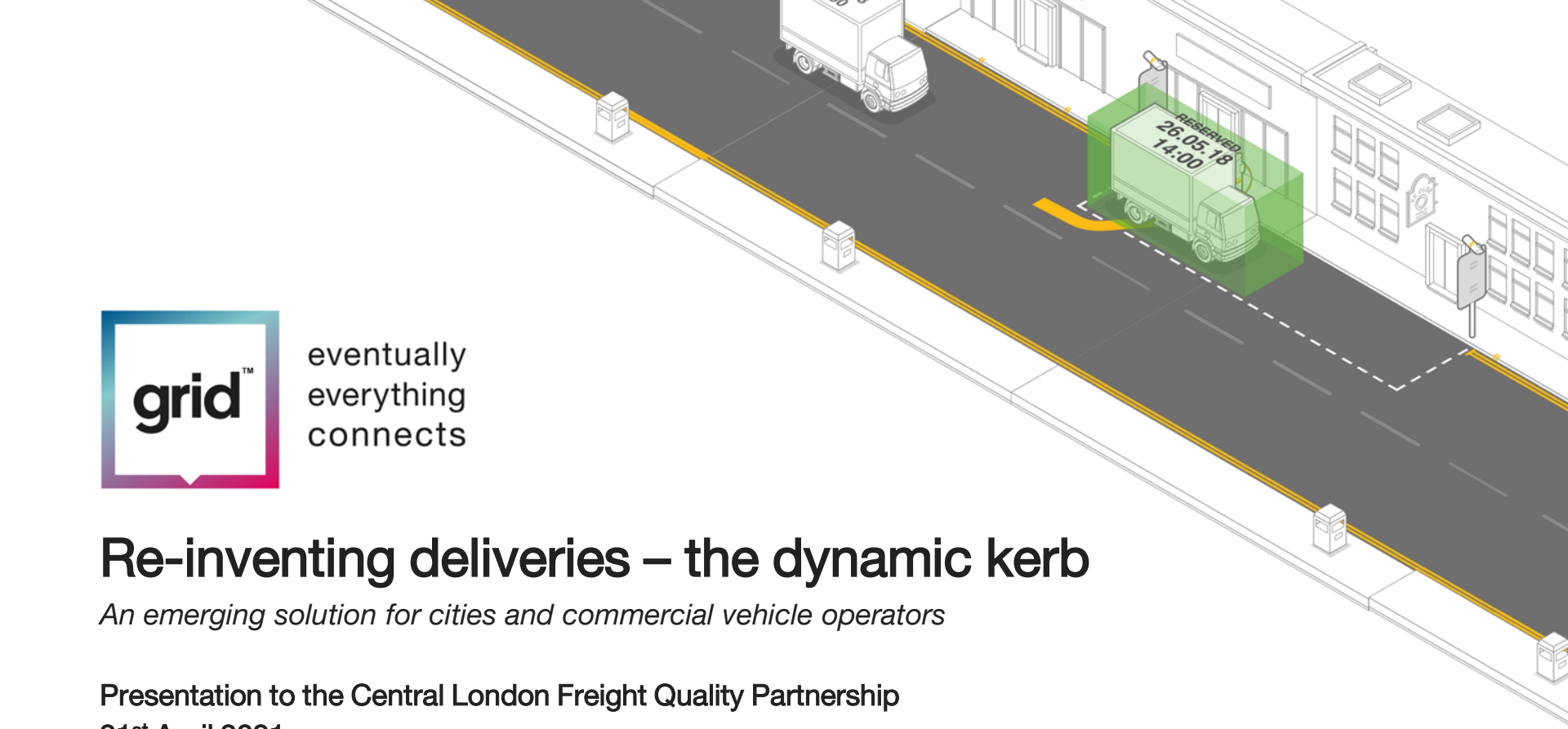

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Re-inventing deliveries – the dynamic kerb

An emerging solution for cities and commercial vehicle operators

Presentation to the Central London Freight Quality Partnership
21st April 2021

The Problem

Cities contribute 72% of global CO_2 ...

Cities are growing, population is expanding, congestion is increasing, **impacting on...**

Health

40,000
extra deaths
in the UK caused by poor air quality

Economy

Congestion costs the UK economy
£6.9bn per annum

Environment

CO2 is responsible for **60%** of the greenhouse effect

And it is forecast to get worse. By 2030 it is predicted that there **will be...**

+21%
More Congestion

+60%
People living in cities

+78%
last mile deliveries

Freight challenge – London context

Road freight and servicing vehicles in London

33% of road transport NOx emissions

29% of road transport PM2.5 emissions

23% of road-related CO2 emissions

Over **1,000** KSI between 2015 and 2017

Over **50%** of cycling fatalities

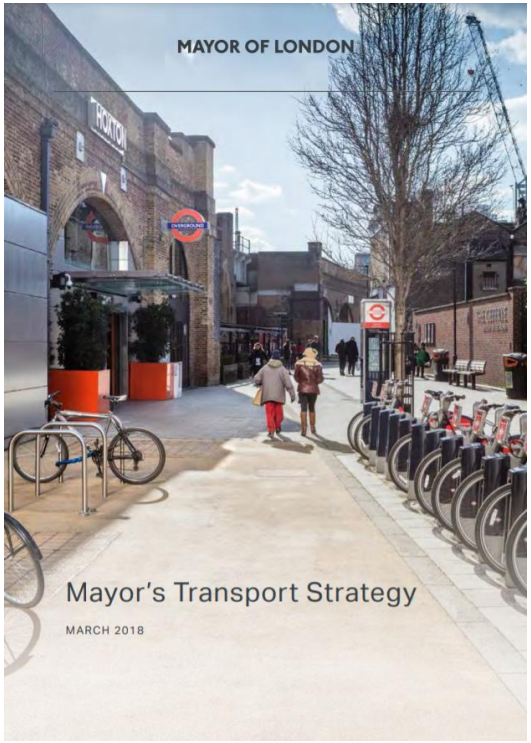
HGVs **3%** of road traffic

Vans **13%** of road traffic

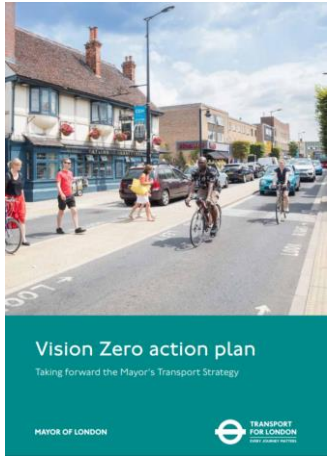
400,000 freight trips in London each day

54% increase in van km in past 25 years

London's policy context



Reduce total London traffic by 10-15 per cent by 2041



Safer roads particularly for the most vulnerable road users

Improve the environment particularly air quality

Reduce freight traffic in the morning peak by 10% by 2026

Air pollution and the climate change emergency

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- Road transport is the biggest emissions contributor at **34%**
- Between 1990 and 2010 HGV emissions rose by **36%**
- HGV emissions could increase by a further **22%** by 2030

- CO_2 is responsible for **60%** of the greenhouse effect
- CO_2 stays in the atmosphere for around **100 years**

- Public Health England states that **28,000 – 36,000** premature deaths in the UK are attributed to poor air quality
- Mayor of London states that **9,500** premature deaths in London are attributed to poor air quality

"Air pollution is a public health emergency costing £22.6 billion per year"

Environment, Food and Rural Affairs Select Committee

Ella Kissi Debrah – A landmark case

- Nine year old Ella Kissi Debrah **died in February 2013** after three years of seizures and breathing problems
- In 2020, an inquest was held under Article 2 of the Human Rights Act 1998 which **scrutinises the role of public bodies** in a person's death
- The inquest concluded that **dangerous levels of air pollution made a material contribution** to Ella's death
- Ella's **cause of death** was recorded as acute respiratory failure, severe asthma and **air pollution exposure**

"I will conclude that Ella died of asthma, contributed to by exposure to excessive air pollution"

Coroner - Philip Barlow

Grid Smarter Cities as part of the solution

The freight and servicing sector keeps cities working and businesses thriving.

To mitigate the negative effects of freight, initiatives are being scaled up to reduce **emissions**, **road risk**, **congestion** and **miles travelled** by freight sector vehicles.

Examples of best practice that mitigate negative effects include:

Cleaner fuels	Safer vehicles	Mode shift	Out of hours deliveries
Consolidation	Traffic restrictions	Traffic management measures	Best use of available road space

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Grid Smarter Cities makes a direct contribution to 50% of a city's freight solution set

The business case for change

Through its Kerb solutions, Grid Smarter Cities has demonstrated a **20% efficiency** saving across final mile deliveries in urban areas

Achieved by improving the likelihood of finding **legal loading space** at the right place and at the right time whilst reducing vehicles circling

In London this equates to:

6.6%
reduction in NO_X emissions from all road transport

5.8%
reduction in $PM_{2.5}$ emissions from all road transport

4.6%
reduction in CO_2 emissions from all road transport

12,000
reduction in London freight trips each day

Grid Smarter Cities - *bringing order to the kerbside*

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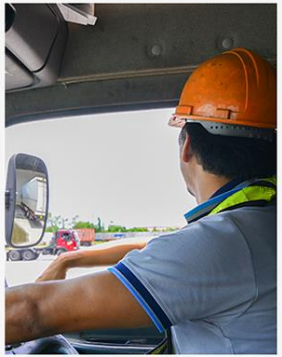
Kerb Platform solution provider enabling the dynamic, bookable kerb to revolutionise the urban realm.



Kerb Users

Commercial vehicle operators, freight and logistics, delivery drivers, service and maintenance vehicles

Kerb Owners

Local authorities with the legal responsibility for highway and kerbside management, congestion, planning and air quality.

*Bringing order to the kerbside with a **flexible, user management tool** enabling **prioritisation** and a **permissions hierarchy** approach to turn a static 2 dimensional piece of real estate into a **3 dimensional flexible and dynamic asset***

A Kerb *'solution'* for every sector

Recognising the different, nuanced access needs and the platform elements required to bring order to the kerb

Consolidation Electrification Low / Zero emission Air Quality

*and ensuring that kerbside management strategically and operationally **complements** decarbonisation and electrification policies and **integrates** with consolidation, e-cargo bike and zero carbon deliveries, low and zero emission zones and route optimisation, scheduling and load planning and **addresses** congestion and air quality targets.*

Grid Smarter Cities

Kerb Playbook

How to implement dynamic kerbside management solutions

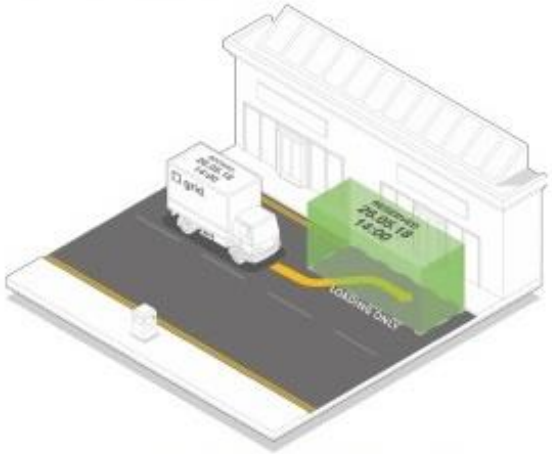
Kerb Delivery

Dynamic Kerbside Solutions

Bookable Loading Bays (BLBs)

BLBs are the digital management of existing bays, using the same system that manages VLBs.
Exposing existing bays to the same management system brings two benefits. Firstly, operators can utilise these assets with the same certainty as a VLB, through a booking. And secondly, by managing BLBs alongside VLBs, you get to see operational usage data for the two asset types in one location.
Access to BLBs can be managed through digital permits.
Generating the BLBs requires the same information as a VLB, and all booking information can be shared with parking enforcement in as near real time as possible, either via a stand alone mobile application or through integration to their existing mobile handsets.
Details of any users utilising a BLB, can be shared with parking enforcement in as near real time as possible, either via a stand alone mobile application or through integration to their existing mobile handsets.

BLBs would be well suited for use by Parcel Companies, Brewery Logistics, Chilled Goods Delivery, Service Vehicles and Care Vehicles.



Bookable Loading Bay Illustration

Kerb Delivery

Dynamic Kerbside Solutions

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VLBs use a digital dispensation to generate guaranteed, time-spliced kerb slots for delivery vehicles. VLBs are generated in areas that are identified as having a positive impact on operational efficiency, while minimising impact on traffic flow. The certainty of the location, which the user books via a mobile application, prevents circling for the limited existing loading bay network.

VLBs can be used in isolation as an individual bay or in conjunction with other elements - for example, pre-approved risk assessed areas adjacent to physical bookable bays to cope with issues such as overrunning bookings or rogue vehicles.

VLBs are digital, and are therefore not marked on the highway.

The VLBs can be quickly and easily generated for use in a mobile application. Once a location has been approved, it's physical location is all that is required for it to be created. Operational parameters can be added at the same time, so any consumer can easily see when a VLB can be used and at what cost. As this new asset is digital, it's operational parameters and indeed any of it's attributes can be changed or amended in as close to real time as possible.

Details of any users utilising a VLB, can be shared with parking enforcement in as near real time as possible, either via a stand alone mobile application or through integration to their existing mobile handsets.

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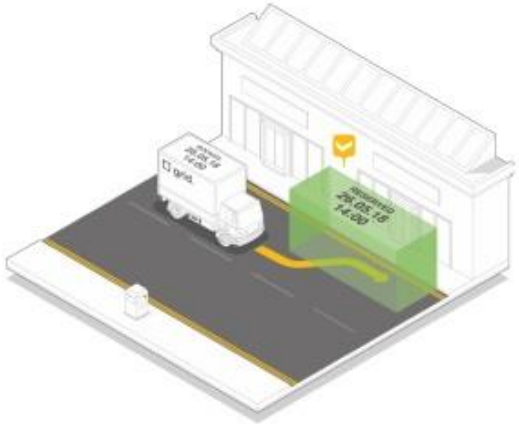

Figure 2. Virtual Bay Illustration

Kerb Delivery

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Dynamic Kerbside Solutions

Virtual Loading Extensions (VLEs)

A VLE is an area where loading is already permitted, but time limited. By using a mobile application, a registered user can utilise a permitted time extension, in order for the user to complete their loading / unloading. The permitted time extension can prevent alternative, illegal behaviour by the vehicle, or inefficient and unnecessary movement to a new location to complete their job.
The creation of a VLE would mimic that of a VLB and BLB. All that is required is the location information and operational parameters for the VLE to be visible on a mobile application. Details of users using the VLE can be shared in real time, either via a stand alone mobile application or through integration to their existing mobile handsets.

VLEs are most suited to support delivery by large HGV or consolidated loads, the latter of which is being seen more and more in Brewery Logistics.

Virtual Loading Extension Illustration

Kerb Delivery

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Dynamic Kerbside Solutions

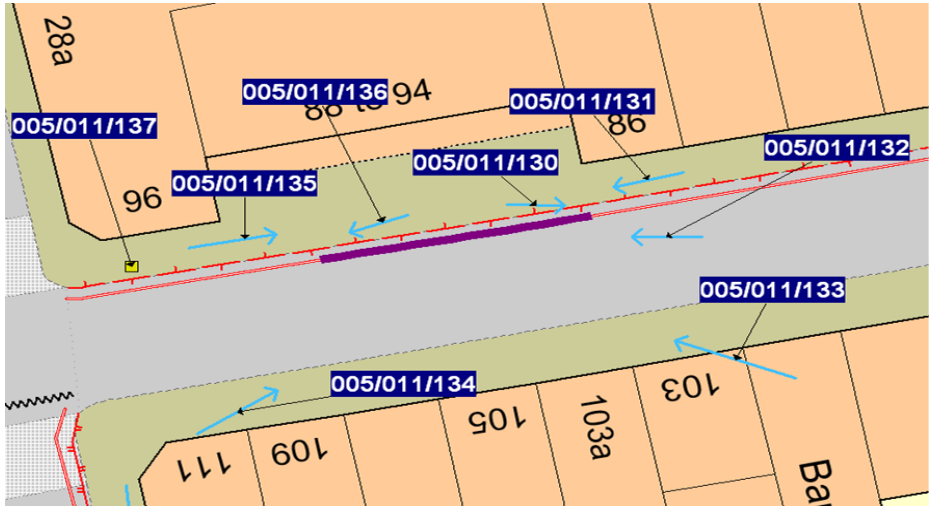
Virtual Permit Zones (VPZ)

A VPZ is an area, within which users with a digital permit, utilise parking assets that would normally require a permit, alongside the ability to extend dwelling for extended time (where loading and unloading is already permitted). The digital permit is held on a mobile application, and using geofence technology, it will record when a user enters the zone, making the registered vehicle information can be shared with parking enforcement in real time, either via a stand alone mobile application or through integration to their existing mobile handsets.

Virtual Permit Zone Illustration

Identify & risk assessing locations

Loading restricted	Yes
Restricted times	Monday – Saturday 7.30-10am and 4-6.30pm
Location	86-94 Westbourne Grove W2 5RT
Side of Street	North
Length - metres	16m
Start description	From a point 16 metres east of its junction with Hereford Road
Finish description	For a distance of 16 metres in an easterly direction



Key to Plans:

- Virtual Parking Bay
- VPB in Loading Break
- Sign Plate Location
- Direction of Photo
- No waiting
- No waiting AAT
- No loading
- No loading AAT
- Parking Place
- Taxi Rank
- Bus stop
- Ped. Crossing

Kerbside on demand

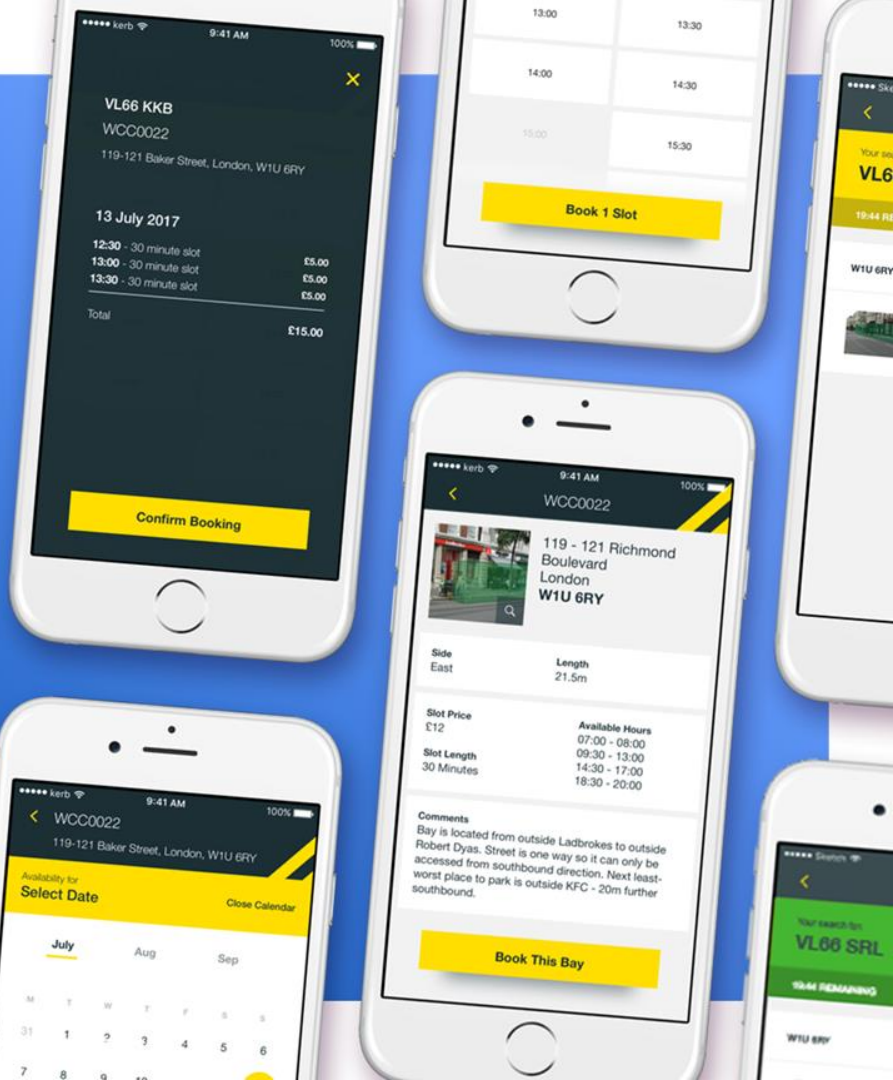
Booking | Payment | Management

Management
Enforcement - back office - highways - planning

Management
Routing and scheduling - delivery planning - resource management

Pay as you go
Mobile app - real time space availability and booking

Fleet account
Depot booking - planned activity - regular slots - client account



Questions?

Neil Herron
Founder and CEO
neil.herron@gridsmartercities.com
Mob. 07776202045

Kerb Delivery - DPD Sunderland

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dpd

Challenge

To understand and help address the increase of express parcel deliveries in Sunderland city centre.

Solution

The deployment of a virtual loading bay in Sunderland city centre. Used daily by a single operator/driver/route as a trial to test high volume o deliveries across a small geographical area. Phase 2 added a 2nd virtual loading bay to introduce a zone, where a user can utilise virtual loading bays and/or permit bays without booking, like a permit approach

Results

User benefits shown to be using a bookable VLB as a mini depot, reducing miles driven per delivery. Allowing a 20% time efficiency saving, and/or 20% more deliveries per vehicle route. User commented on how they had a better relationship with enforcement. Data on expanded and new use to help inform further use, and identification of other zones in Sunderland

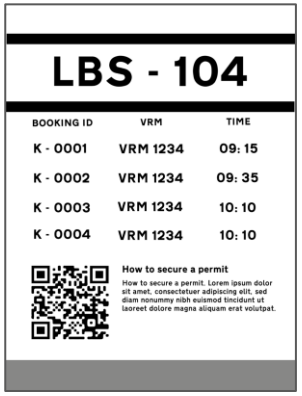
It was great, easy to use handset, the parking space was always free and made my life easier

DPD Driver

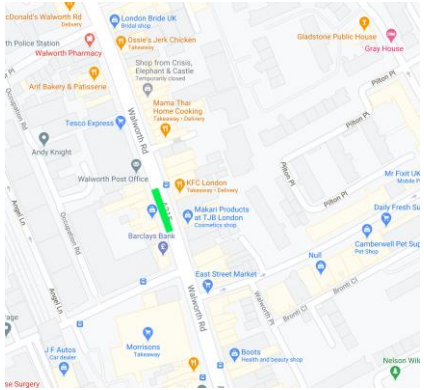
Kerb Delivery & ‘Smart Sign’ case study - Southwark

- Can operate with a booking system to ensure time slots can be allocated to operators
- An advisory sign can inform other road users and businesses of the booked slots
- Integrated into routing and scheduling and navigation systems

Regulatory Plate



Advisory Plate



Walworth Road, Southwark

Kerb Delivery – Dublin

kerb™ for Dublin

Grid and Smart Dublin identified locations for VLBs in key city centre locations for the trial users;

- Temple Bar
- Nassau Street
- College Green

VLB use data to also inform DCC of potential revenue from kerbside

COVID-19 halted implementation yet Dublin City Council have expressed the desire for a Solutions playbook, a guide on how to implement the Kerb platform.

Grid worked with Coord to survey the locations

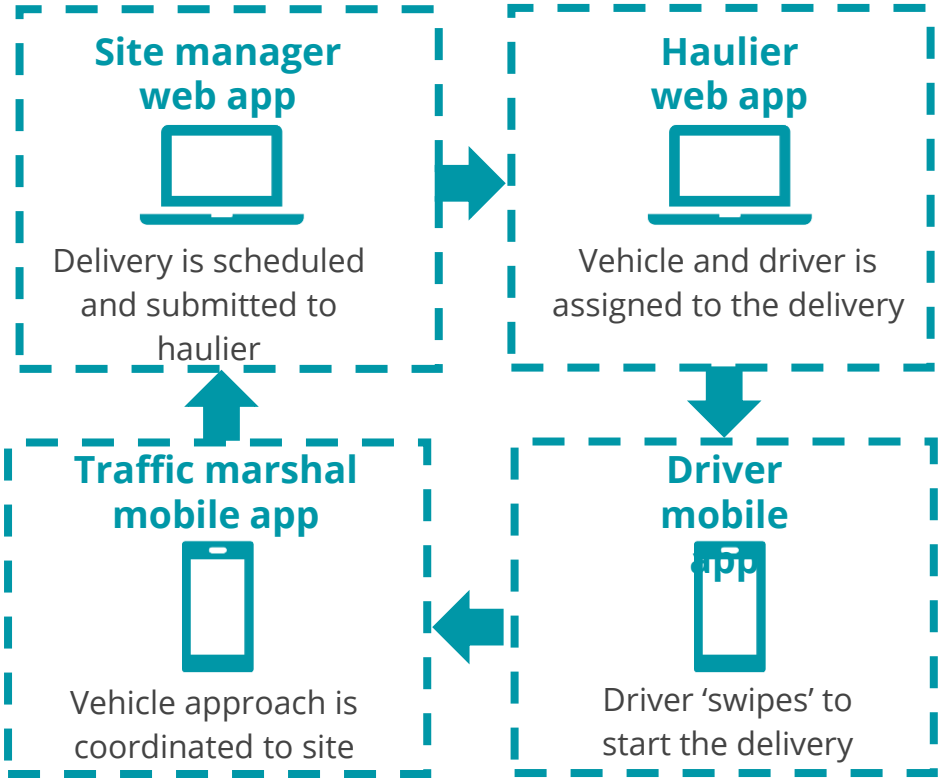
Kerb Construction

Kerb Construction coordinates last mile vehicle movements to a construction site via series of ‘Virtual Holding Bays’.

It incorporates a web app for site management and haulier, and a mobile app for drivers and traffic marshals.

Traffic Marshals direct a driver’s approach to site through a sequence of Virtual Holding Bays.

This is supported by automatic geofence breaches triggered by the driver app GPS signal as they progress to site.



Case study – L&Q Croydon

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L&Q

Challenge

Addiscombe Road is 137 new homes in Croydon town centre as part of its growth area. The development includes 53% affordable housing and consists of two towers; an eight storey and 18 storey. There are numerous community considerations affecting HGV routing and tram lines adjacent to one of the delivery gates.

Solution

L&Q was trial site for an Innovate UK supported Construction Freight Traffic Control project in partnership with the London Borough of Croydon. The solution was the refinement and implementation Kerb Construction for the early stages of the development.

Results

Outcomes included increased communication around delivery management, improved routing compliance and efficiency of construction freight and reduced surplus vehicle mileage.

Innovate UK ELECTRIC BLUE CROYDON www.croydon.gov.uk SenSat WHITE WILLOW TRANSPORT INTELLIGENCE AtoH

Case study – Tideway Greenwich

Challenge

Tideway is a £4.2billion construction programme to provide London with a new 25-kilometre, 7.2-metre-wide sewer system. It will generate eight million tonnes of excavated material and around 280,000 vehicle movements.

Solution

Tideway engaged in a Kerb Construction trial at Greenwich Pumping Station to help determine its feasibility and benefits realisation on major infrastructure projects. The trial required engagement with Tideway East Main Works Contractor, S Walsh and Sons as logistics operator and the Royal Borough of Greenwich.

Results

Six week trial conducted using Kerb Construction, helping manage 200 vehicle movements per day. Final results on efficiency and air quality benefits are due in April 2021.

Case study – HS2 stations

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HS2

Challenge - Euston & Old Oak Common (trial Q2 2021)

Grid selected from 100+ bids for one of only 5 places on the HS2 Accelerator scheme.

Euston Station will have 11 new 400m long platforms, and a new concourse. Old Oak Common Interchange will be a station with 14 platforms, 6 high-speed platforms underground. They are both located in heavily used and congested areas so coordination and adherence to routing & plans are essential

Solution

Digital coordination & digital holding bays to reduce fractured deliveries & supply chain logistics, improve adherence to prescribed routes for scheduled vehicles, better manage unscheduled vehicles, whilst reducing the environmental and community impacts from site

Results (expected)

Large scale trial including Modelling & Visualisation tool to assess project lifetime efficiency improvements (Operational, Air Quality, Unplanned Delivery Management and Dynamic Lifetime Bay Allocation)

Data and analytics to evidence scheduling and compliance with agreeing routing and vehicle movements.

Increased transparency and accountability leading to fewer community impacts

Examples of Kerb's Suite of Solutions

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These include:

- Bookable Loading Bays
- Virtual Loading Bays
- Virtual Permit Zones
- Virtual Loading Extensions
- Chargerie
- Smart Loading Zone
- Zonal access Permit
- Pick-up Drop-Off Zone

Kerb Solutions – Playbook

Dynamic Kerbside Solutions

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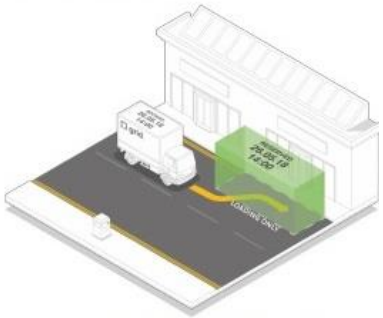

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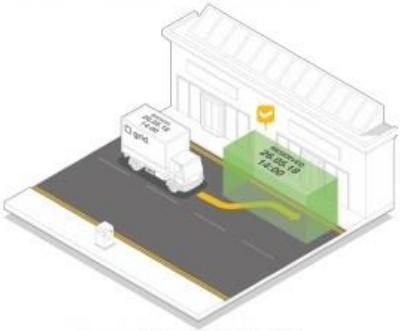

Virtual Bay Illustration

Kerb Solutions - Playbook

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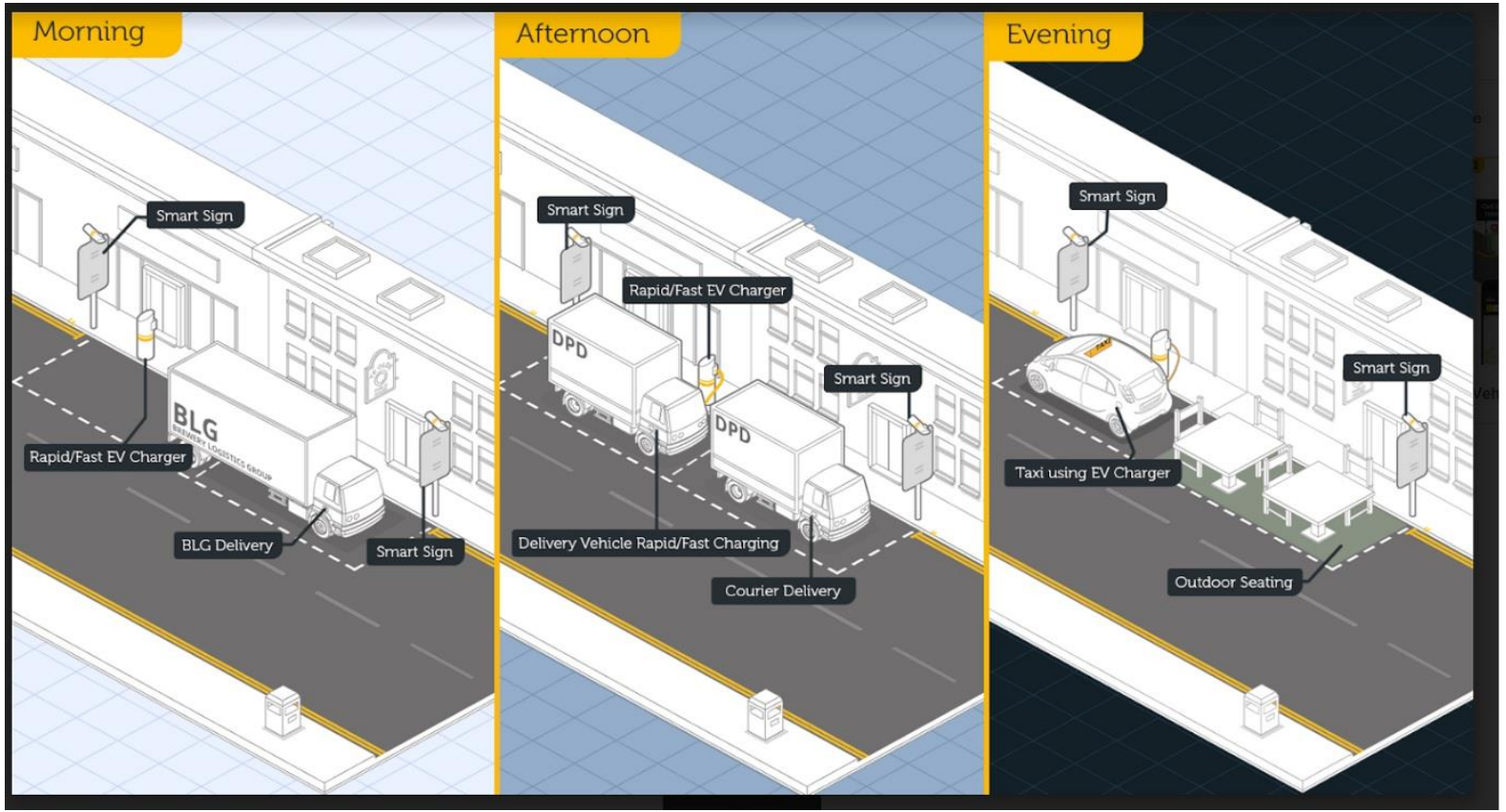
Virtual Permit Zone Illustration

Kerb Solutions – Playbook - Chargerie



Smart Loading Zone

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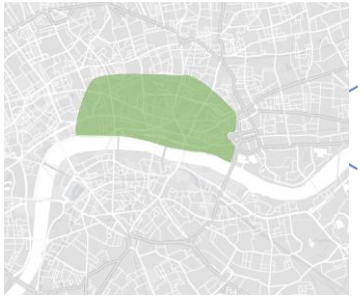


Define the geography of the zone

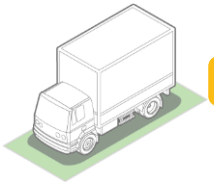
Understand existing restrictions, enforcement protocol and design amendments

Permission to load and unload on single yellow and double yellow lines for longer periods.

If required, holding bays can be utilised by vehicles waiting to enter the zone.

Creation of Virtual Loading Bays as bookable bays.

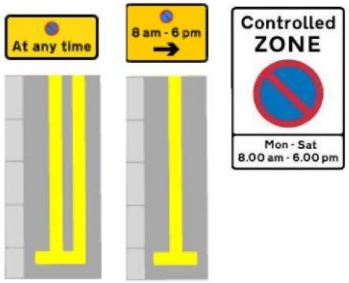
Create a geofence for the zone



Variable tariffs can be applied depending on vehicle type

Zonal Access Permit

Define the geography of the zone



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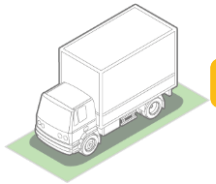
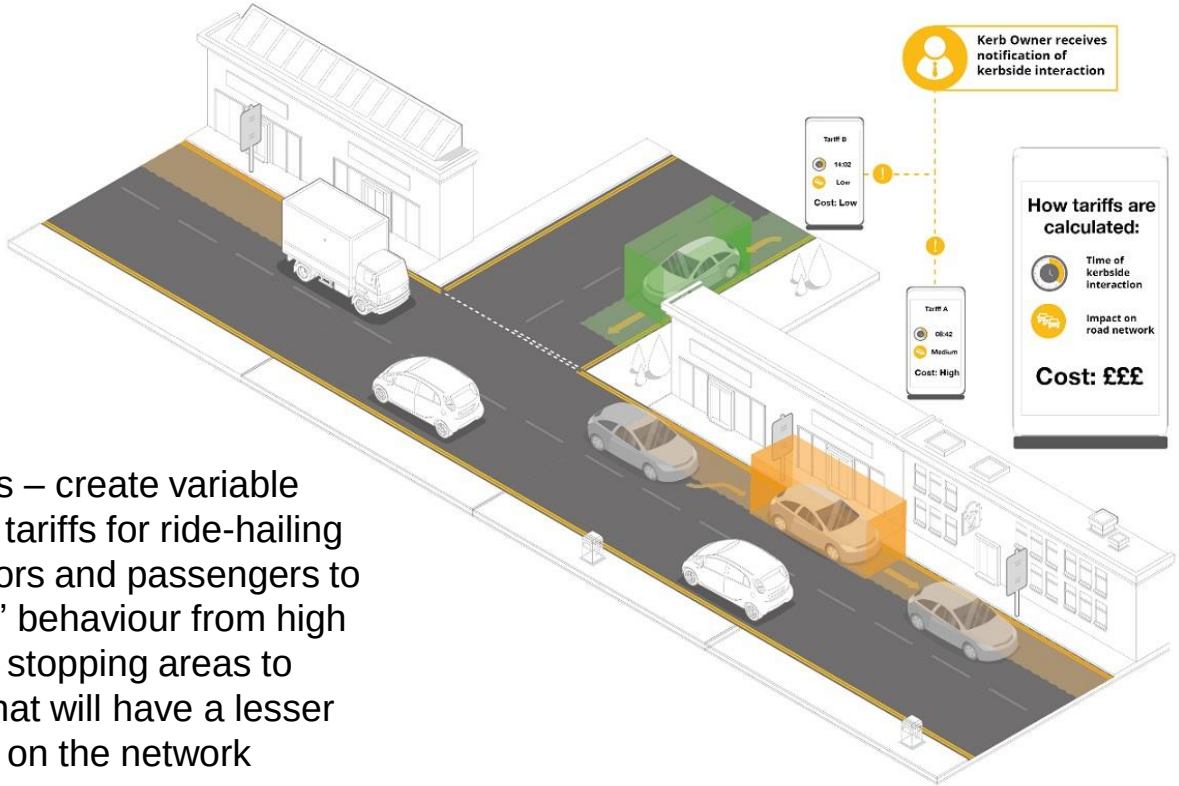


Variable tariffs can be applied depending on vehicle type

Kerb PUDO – Pick-Up Drop-Off Zones



PUDOs – create variable spatial tariffs for ride-hailing operators and passengers to ‘nudge’ behaviour from high impact stopping areas to ones that will have a lesser impact on the network

Enables micro-transactions at a hyperlocal level to ensure that ride-hailing services are paying towards the upkeep of the assets and infrastructure in the areas that they operate.