Electric Vehicle Charging Strategy

Halton Borough Council

November 2023

Confidential

This page left intentionally blank for pagination.

Halton Borough Council
Municipal Building
Kingsway
Widnes
WA8 7QF

Electric Vehicle Charging Strategy

Halton Borough Council

November 2023 Confidential

Issue and Revision Record

Revision	Date	Originator	T. Checker	Checker	Approver	Description
A	November 2023	L Liu / S Stephen	M Joyce	R Ramshaw	C Jolley	Final Version for Client Review
B	November 2023	L Liu / S Stephen	M Joyce	R Ramshaw	C Jolley	Final Version following Client Review

Document reference: 411511-MMD-ETM-XX-RPT-U-XX-004

Information class: Standard

Contents

Page

Tables

Figures

1 Introduction

1.1 Overview

This report outlines a strategy for implementing Electric Vehicle Charging Infrastructure (EVCI) which supports Halton Borough Council (the Council) in its efforts to reach net zero and meet the future needs of Electric Vehicle (EV) demand across the local authority area.

1.2 Background and Scope

The report sets out the likely requirements for EVs and associated charging infrastructure as part of a wider need to decarbonise and mitigate the impacts of climate change. In advance of a Liverpool City Region Combined Authority (CA) application to the UK Government's LEVI fund, The Council commissioned Mott MacDonald to create an EVCI strategy document for the full Halton Borough Council local authority area.

A baselining exercise was undertaken to establish levels of existing EVs and EVCI within Halton. A demand forecasting exercise was then completed to estimate EV uptake to 2032, followed by analysis indicating the extent of the public charging network required to support the forecast uptake with potential grid impacts noted.

A high-level overview of likely private sector investment has been provided for EVCI. The strategy concludes with several recommendations and a series of suggested next steps to support EV uptake and future rollout and deployment of EVCI.

1.3 Report Structure

This strategy is structured as follows:

- **Section 2:** Background and Context of Electric Vehicles
- **Section 3:** Policy and Strategy
- **Section 4:** Baseline Position
- **Section 5:** Stakeholder Engagement
- **Section 6:** Network Vision
- **Section 7:** Demand Forecasting
- **Section 8:** Proposed Charging Network
- **Section 9:** Implementation Consideration
- **Section 10:** Commercial Delivery
- **Section 11:** Next Steps

2 Background and Context of Electric Vehicles

Clear and continuing evidence of climate change now necessitates an urgent reductio in greenhouse gas emissions across all sectors to mitigate its potential impacts. This urgency is reflected by the declaration of a climate emergency by the UK Government in 2019 to highlight the level of change required[1].

2.1 Introduction

In response to the climate emergency declaration and to address the scale of the challenge in Halton, the Council published its Climate Change Action Plan (CCAP)[2] in February 2022. The plan outlines a range of priorities across the Council's responsibilities to reduce carbon emissions. Three key themes summarise the challenges in reducing emissions from Council operations by 2040, as follows:

- **Climate Friendly** – focus on activities which reduce carbon emissions from services, works and partners to achieve net zero by 2040 using buildings, land and energy.
- **Climate Ready** – increase the resilience of Council operations in communities and local economy to minimise the impacts of climate change, specifically adaptation to climate change.
- **Climate Just** – ensure all of Halton benefit from the net zero transition, ensuring fairness and social justice form the centre of the action plan in achieving climate goals.

These principles form the basis of emission reduction measures across the Council, with "Climate Ready" and "Climate Just" being key themes towards reducing emissions across council services.

When considering the sources of emissions within Halton and the UK, data released by the Department for Business, Energy and Industrial Strategy[3] (at the time of writing, the department is undergoing a machinery of government change, and the relevant new department will be the Department for Energy Security & Net Zero) detail the total UK greenhouse gas emissions since

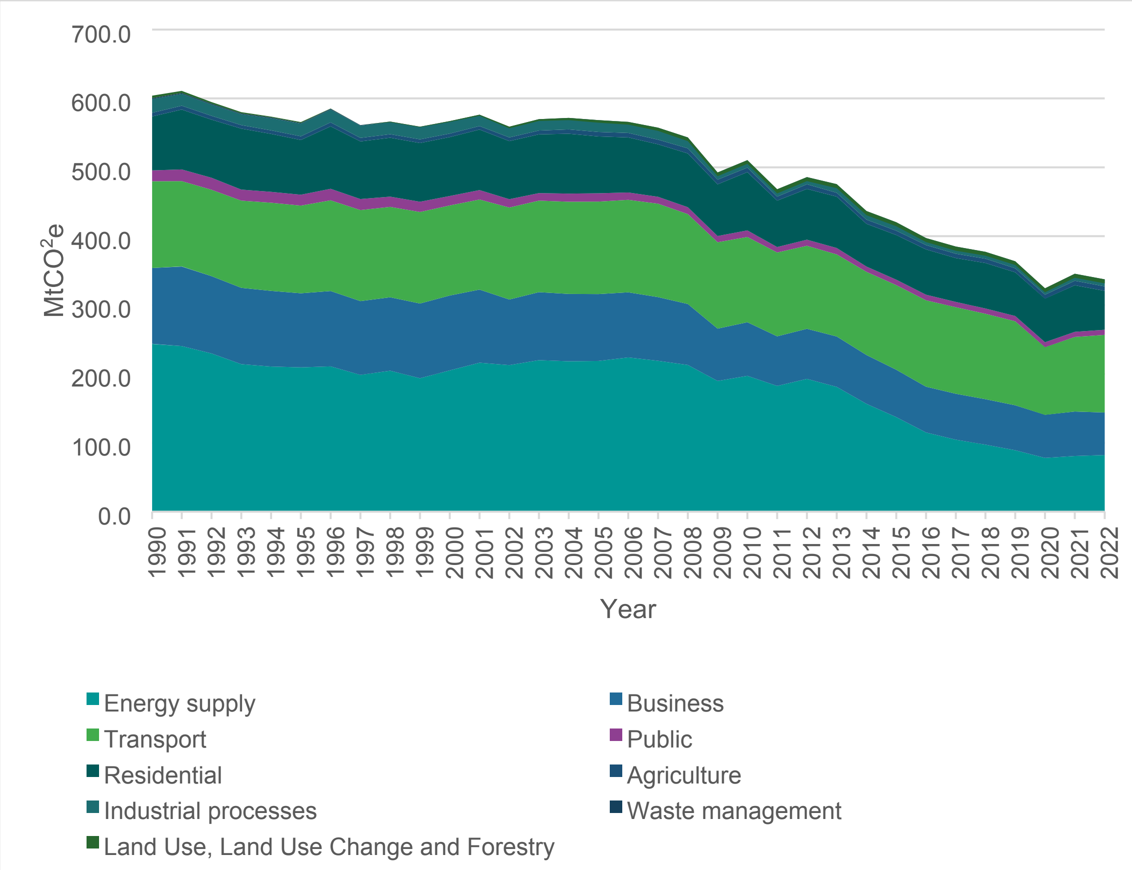
[1] UK Parliament, 2020. Climate and Ecological Emergency Bill. EDM 832: tabled 2nd September 2020.

[2] Halton Borough Council, 2022. Climate Change Action Plan 2022 – 2027. Available at: https://councillors.halton.gov.uk/documents/s68214/Climate%20Change%20Action%20Plan%20Strategy%20Template%20-%20Layout%20JT%2028.2.22.pdf

[3] Department for Business, Energy and Industrial Strategy, 2022. Provisional UK greenhouse gas emission national statistics 2021, Table 3. Available at: Provisional UK greenhouse gas emissions national statistics 2021 - GOV.UK (www.gov.uk)

1990, by sector. The data, shown in Figure 2.1, indicates a general decline in emissions across most sectors since 1990.

Figure 2.1: UK Annual Greenhouse Gas Emissions by Sector (MtCO2e)



Source: Department for Business, Energy & Industrial Strategy

It is evident that while the energy sector in particular has reduced emissions by over a third since 1990, emissions from transport have remained relatively consistent, aside from a decline during the Covid-19 pandemic. Transport now represents the sector with the greatest emissions in the UK. Despite efficiency improvements in petrol/diesel vehicles, and the growth of hybrid vehicles, these appear to have minimal impact on the total emissions. These improvements have largely been offset by the consumer trends towards larger, heavier SUVs and an overall increase in private car use.

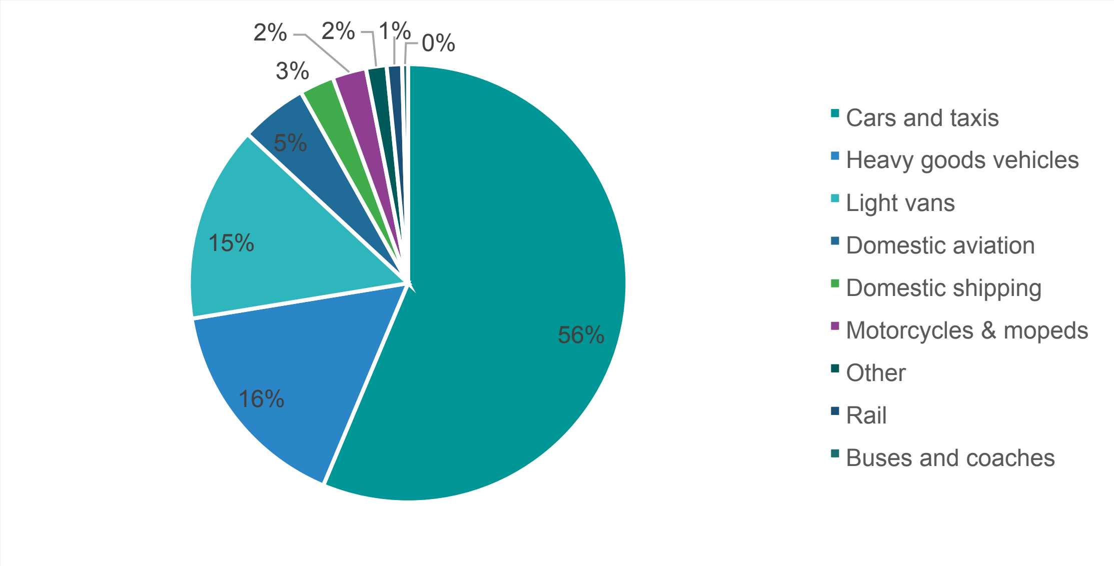
To tackle the challenges presented by the ongoing climate emergency, the UK's transport system must decarbonise.

2.2 Decarbonising Transport

The decarbonisation challenge is acutely evident in the transport sector. There are numerous benefits to reducing emissions from transport, such as economic growth, improved population health, equitable transport systems and the creation of cleaner, more efficient transport systems[4].

To understand the modes of transport contributing most to emissions, Figure 2.2 illustrates the greenhouse gas emissions by transport mode pre-pandemic in 2019.

Figure 2.2: Greenhouse gas emissions by transport mode: United Kingdom (2020) (MtCO2e)



Source: Department for Transport [5]

The graph illustrates that light vehicles including cars and taxis represent the largest source of emissions in transport within the UK, with light vans also representing a similar proportion to HGVs. As such, the transition to electric, low-carbon and zero emission vehicles provides a viable and credible pathway to decarbonisation and Green House Gas (GHG) reduction in the UK, as set out in the 2021 Transport Decarbonisation Plan.

2.3 Context of Electric Vehicles

There are two broad types classified by the Department for Transport, Ultra Low Emission Vehicles (ULEV) and Internal Combustion Engine (ICE) vehicles.

ICE vehicles are primarily reliant on petrol or diesel for fuel and propulsion, within which category we also include Hybrid Electric Vehicles (HEV). This is due to the pure electric range of this type of vehicle being very low; these vehicles are otherwise known as 'self-charging hybrids' meaning they are recharged using petrol or diesel, with some energy regenerated through braking to charge a very small battery to power an electric motor. These have a very limited electric-only range typically at low speeds only.

[4] Department for Transport, 2021. Decarbonising Transport: A better, Greener Britain. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf

ULEVs are a collective term including some reliant on petrol and diesel still via an ICE, namely Plug-in Hybrid Electric Vehicles (PHEV). These are essentially the same as HEV, but with a small battery and the ability to run on electric-only power for up to 40 miles with a primary ICE also. However, these are complex vehicles with two powertrains. Due to the electric-only range, these are also classified as an EV as they can be recharged using EV charging facilities or a standard plug socket.

Battery Electric Vehicles (BEV) use energy stored in a large battery used to power an electric motor, with no other supplementary fuel. Typically, BEVs now have at least 200-mile ranges in car and van form, over double the range of first generation BEVs. These are recharged at EV charging facilities or using a standard plug socket and emit zero emissions at the tailpipe. At Q4

[5] Department for Transport, 2022. Energy and environment data tables: ENV0201. Available at: Energy and environment: data tables (ENV) - GOV.UK (www.gov.uk)

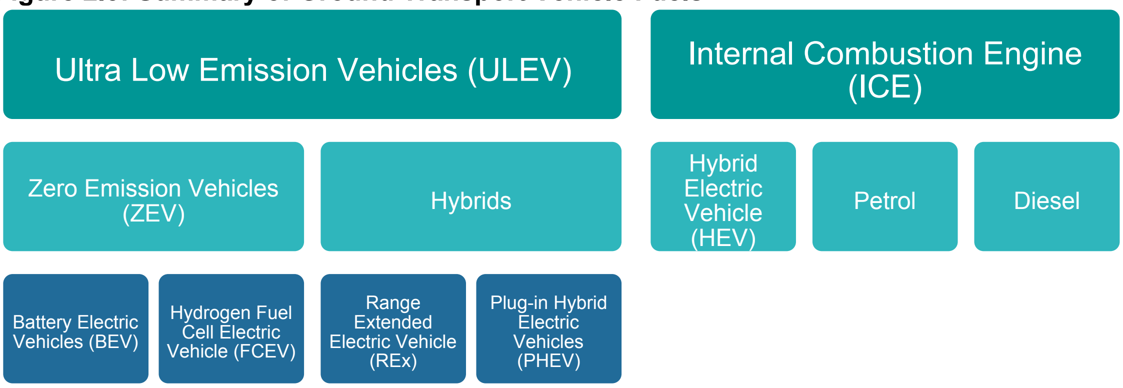
2022 there were over 200 models of electric cars and vans on sale in the UK, plus truck and bus models. There are some EVs which include a supplementary petrol motor which act as a generator, known as a Range Extended (REx) Electric Vehicle. The primary powertrain is still electric, but the generator recharges the battery when it is low on charge or the user can plug in to recharge.

BEV, PHEV and REx can all be classified as Plug-in Vehicles (PiV) all of which have an ability to recharge via a cable. These types of vehicle can use the public charging network or be recharged using a standard 3-pin plug or specialised EV charging device.

Hydrogen vehicles are also a ULEV technology, known as Fuel Cell Electric Vehicles (FCEV). Gaseous hydrogen is stored in pressurised tanks within a vehicle, and the fuel is then converted to electricity using a fuel cell to power a small battery and electric motor.

The context for different fuel types of ground transport vehicles is illustrated in Figure 2.3.

Figure 2.3: Summary of Ground Transport Vehicle Fuels



Source: Mott MacDonald

For the purposes of this study, BEV and PHEV have been included within this EV Strategy.

2.4 Other Decarbonisation Pathways

To decarbonise the transport sector, collaboration is required across multiple sectors that are required to occur simultaneously to collectively achieve the shared outcome.

EVs alone are one aspect in the decarbonisation pathway, however other strategies such as behaviour change, other zero emission technologies and modal shift are also required. Each of these potential options are examined in the following section.

2.4.1 Alternative Fuels

EVs broadly align with the climate change mitigation, decarbonisation and sustainability initiatives of the Council, LCR and the UK Government, recognising the many opportunities EVs can provide[5]. However, there are alternative fuels to EV technology in transport and other decarbonisation pathways include hydrogen and Low Carbon Fuels (LCF).

Hydrogen

There are several potential benefits that hydrogen FCEVs have over current EVs, with typical greater ranges and reduced recharging times. The majority of hydrogen, however, is sourced from fossil fuels (blue hydrogen) as opposed to renewable energy (green hydrogen). The process of producing hydrogen requires significant amounts of energy, with energy losses being incurred from the electrolysis process, distribution and conversion to electricity. Comparing FCEV and BEV, the overall energy efficiency from production to wheel is approximately 80% for BEV and 30% for FCEV, only marginally greater than ICE at around 20%[6].

Refuelling options for hydrogen vehicles are also still limited. Currently there are eight hydrogen refuelling stations also across the UK, with the nearest located in Sheffield (a hydrogen refuelling station for buses is currently planned in St Helens)[7]. Conversely, there are over 48,000 EV charging points, as of 31st August 2023, of which nearly 9,000 are rapid/ultra-rapid chargers with a growth of 75% since 2021[8].

Therefore, weighing up the potential benefits and drawbacks of hydrogen, the International Energy Agency Hydrogen Future paper states that hydrogen will likely have a significant role in the future. However, in terms of transport, it will likely be focused on the decarbonisation of haulage, shipping and aviation, but with limited use-cases for smaller vehicles[9].

A separate Hydrogen Strategy proposes the use of hydrogen as an energy source for transport within Halton. That study initially focuses on public transport services, however future opportunities for wider application are also considered.

The House of Commons has outlined the role of hydrogen in achieving Net Zero in their Committee Report[10], including recommendations to the UK Government.

[5] Liverpool City Region Combined Authority, 2019. Combined Authority Transport Plan: Facilitating Inclusive Economy Available at: https://www.liverpoolcityregion-ca.gov.uk/wp-content/uploads/LCRCA-TRANSPORT-PLAN.pdf

[6] Transport and Environment, 2022. Rewarding renewable efficiency: The energy efficiency of charging Electric Vehicles with renewable electricity must be rewarded in the RED. Available at: https://www.transportenvironment.org/wpcontent/uploads/2022/02/TE-Briefing-Rewarding-renewable-efficiency.docx.pdf

[7] UKH2Mobility, 2023. Refuelling Stations. Available at: https://www.ukh2mobility.co.uk/stations/

[8] Zap-Map, 2023. How many electric charging points are in the UK 2023. Available at: https://www.zapmap.com/statistics/#points

[9] International Energy Agency, 2019. The Future of Hydrogen. Available at: https://www.iea.org/reports/the-future-ofhydrogen

[10] 'The role of hydrogen in achieving Net Zero', House of Commons, December 2022, The role of hydrogen in achieving Net Zero - Science and Technology Committee (parliament.uk)

Low Carbon Fuels

LCFs, while not zero emission, can provide GHG savings compared to fossil fuels across the lifecycle of the fuel. The two largest categories being electro-fuels (e-fuels) and biofuels:

- Biofuels are sourced from biomass including wastes, residues and crops.
- E-fuels are synthetic fuels that are generated using renewable energy sources.

Currently, LCFs are blended into standard petrol and diesel through bioethanol and biodiesel with relatively small content. However, LCFs can be used as complete replacements for petrol and diesel provided the vehicle is adapted for this purpose.

E-fuels however are not yet commercially viable due to the high cost of production, although there have been some promising trials demonstrating technology capability. To be widely adopted however, e-fuels are reliant on large-scale green hydrogen production to produce the fuel. As such, the efficiency of e-fuels is higher than petrol and diesel. However, e-fuels also rely on carbon capture off-setting as combustion still takes place in an engine, emitting some greenhouse gas emissions.

LCFs are potentially advantageous in that most require limited or no vehicle adaptation meaning potential high embedded carbon savings. Further, user experience is similar, if not identical, to ICE vehicles. Nevertheless, there are major limitations around the cost of production and/or supply. As such, the DfT predicts that demand for existing LCFs for cars and vans will decrease over time as BEV become the dominant zero emission technology[11]. The UK Committee for Climate Change (CCC) advice for the sixth carbon budget produced recommendations on LCFs. They suggested that biofuels should be phased out from usage in cars and vans by 2040, in order to prioritise limited production of LCFs for other vehicle types and sectors which are considered more challenging to decarbonise[12].

2.4.2 Behaviour Change

There are a range of behaviour change and modal shift options which should also form part of transport decarbonisation. In addition to decarbonising transport, reducing the need to travel can also result in significant emission savings. Examples of behaviour change can include, trip shortening through urban planning (e.g. 20-minute neighbourhoods) and car sharing.

2.4.3 Modal Shift

Another key decarbonisation pathway in transportation is increasing the modal share of public transport and active travel use. Reducing the reliance on private vehicles will result in reduced greenhouse gas emissions through zero emission travel options (walking and cycling) or low emission travel through public transport use. In turn, this will also result in lower private vehicle mileage and help reduce congestion.

Transitioning the private car market to EV is a key part of the overall picture of modal shift and behaviour change, with alternative fuels where required.

---

[11] Department for Transport, 2022. Low carbon fuels strategy. Call for ideas. Available at: Low carbon fuels strategy. Call for ideas. (publishing.service.gov.uk)

[12] Climate Change Committee, 2020. The Sixth Carbon Budget: Fuel Supply. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Fuel-supply.pdf

2.5 Electric Vehicle Charging Overview

The scope of the EV strategy accounts for the requirements of publicly available infrastructure for cars and Light Goods Vehicles (LGVs). No other vehicle types have been included in the EVCI analysis, such as Heavy Goods Vehicles (HGVs), Passenger Service Vehicles (PSVs) or motorcycles.

HGVs and buses are likely to be depot based, and so charging requirements are assumed to be largely undertaken at depots. The public requirement is therefore assumed to be minimal, mostly consisting of en-route journey charging. There are also uncertainties in the timescales for the decarbonisation pathway for heavier vehicles, where hydrogen could be a more viable fuel. However, battery-based HGVs are available, albeit with limited ranges suitable for urban environments, with uncertain timescales for availability of longer range HGVs and PSVs. Due to this uncertainty, only cars and LGVs have been analysed as part of this study.

The scope of the work includes the identification of public charging infrastructure. There are four types of publicly accessible EVCI, based on the power output, which are detailed in Table 2.1.

Table 2.1: Types of EV Charging

Charger Type	Output (kW)	Typical Time to Fully Recharge BEV	Examples of Location Suitability
Slow (AC)	Up to 7kW	6 to 12 hours	Residential on-street, workplace, private driveway, car parks, transport hubs.
Fast (AC)	7kW to 22kW	2 to 5 hours	Destinations including car parks, supermarkets, leisure centres, retail parks, transport hubs.
Rapid (DC)	43kW to 100kW	20 to 60 minutes	Destinations such as supermarkets, retail parks and transport hubs, or en route journey charging like motorway services and service stations
Ultra-rapid (DC)	100kW to 350kW	15 to 30 minutes	En route journey charging such as motorway services and service stations.

Source: Mott MacDonald

The above chargers can be grouped into Alternating Current (AC) and Direct Current (DC).

- AC chargers use power directly from the electricity grid and typically output 22kW or less. AC charging is dependent on the capacity of the EV's onboard AC charger, which converts AC to DC to recharge the battery. A Type 2 socket is standard for AC charging, with AC chargers typically untethered, meaning the supplied cable with an EV must be used.
- DC charging is faster as there is no AC to DC conversion between the charging station and car battery and the speed of charging is only limited by the battery's voltage and current. Rapid chargers have tethered cables, typically with CHAdeMO[13] or Combined Charging Standard (CCS) plugs. CCS is the preferred EU standard with CHAdeMO now being phased out.

The higher the charger output, the greater capacity required in the local electricity grid. AC chargers (slow and fast) utilise existing single and three phase power supplies. Therefore, AC

[13] The name is an abbreviation of Charge to Move. A non-profit company made up of a group of Japanese vehicle manufacturers.

chargers typically have lower installation costs compared to DC chargers (rapid and ultra-rapid), which typically require significant electricity grid upgrades.

There *are* ongoing advancements in technology relating to charger types and battery power which will likely reduce charge times in the future. Additionally, other innovations such as wireless charging may also become more commonplace as vehicle manufacturers implement the technology on a common charging standard.

3 Policy and Strategy

This policy review sets out the applicable national, regional, and local policies/strategies relating to Electric Vehicles (EVs) and associated infrastructures for Halton. The range of policies and strategies have been reviewed to inform the future EVCI vision for the region.

3.1 Overview of Policy and Strategy

Figure 3.1 below highlights a summary of the strategies and policies applicable to EV infrastructure within Halton which have been included in the document.

Figure 3.1: Overview of Policies and Strategies Relating to EVCI

National Strategy and Policy	Regional Policy	Local Policy
The UK Electric Vehicle Infrastructure Strategy	Liverpool City Region's 4th Local Transport Plan	Halton Borough Council's Climate Change Action Plan 2022-2027
The Plugged-In Places scheme	The Liverpool Local Plan 2013-2033	Halton Delivery and Allocations Local Plan 2022
Transport Decarbonisation Plan of 2021	The Third Local Transport Plan for Merseyside Part One	Halton Third Local Transport Plan 2011-2026
The Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan	The Third Local Transport Plan for Merseyside Part Two	
Net Zero Strategy (Build Back Greener)	TfN Electric Vehicle Framework	
UK Government Climate Change Act		
Ten Point Plan for the Green Industrial Revolution		
Incorporating EV Charge points into Local Planning Policies for New Developments		

Source: Mott MacDonald

3.2 National Strategy

3.2.1 UK Electric Vehicle Infrastructure Strategy

The UK Electric Vehicle Infrastructure Strategy[14] sets out the vision and action plan for EVCI in the United Kingdom. The vision for 2030 is that barriers for EVCI will be removed and that EV charging will become cheaper and more convenient than petrol fuelling. Specific aims include ensuring:

- Everyone can find and access reliable public chargepoints irrespective of where they live
- Effortless on and off-street charging for commercial and private drivers
- Fairly priced and inclusively designed public charging that is accessible to all
- A market-led EV rollout for most chargepoints
- Infrastructure is seamlessly integrated into a smart energy system
- Continued innovation to meet drivers' needs

Whilst the UK has been a leader in the transition to EVs and accelerated the pace of their deployment, significant challenges remain. These include the slow pace of EVCI rollout, reliability concerns on public chargers, difficulties in use, and price. In addition, EVCI can be a challenge to deliver financially, due to uncertainties on utilisation levels, the cost of grid connections and delays with grid connections especially in more rural locations. Long distance driving in EVs can also be unreliable due to the availability of charging infrastructure on key road network corridors. Many motorway service areas were never designed to have high powered grid connections that could support EVCI rollout. These issues have further contributed to difficulties in expanding the public charging network. Finally, the strategy states that local engagement, leadership, and planning needs further development.

To address these challenges, the following actions have been outlined:

[14] Department for Transport, 2022. Taking Charge: The Electric Vehicle Infrastructure Strategy. Available at: https://www.gov.uk/government/publications/uk-electric-vehicle-infrastructure-strategy

- Accelerate the rollout of high-powered chargers along the strategic network via the £950m Rapid Charging Fund
- Transform local on-street charging by ensuring local authorities are obliged to develop and implement local charging strategies
- Address barriers to private sector EV rollout
- Ensure the public EV network is reliable and easy to use
- Ensure chargepoints are seamlessly integrated within the energy system
- Support innovation is business models and technology

3.2.2 Local Electric Vehicle Infrastructure (LEVI)

The LEVI fund[15] supports local authorities in England to help plan and deliver EVCI for residents without off-street parking. The fund also aims to work with the chargepoint industry to improve the roll out of local EVCI.

The fund is comprised of:

- Capital funding to support chargepoint delivery
- Capability funding to ensure that local authorities have the funding to employ and train new staff to plan and deliver EVCI

The LEVI fund has two objectives:

- Deliver a step-change the deployment of local and primarily low-power, on-street charging infrastructure across England
- Accelerate the commercialisation of and investment in the local charging infrastructure sector

Funding is available for county councils, unitary authorities or combined authorities and will support infrastructure delivery across the entire authority. To date, the Liverpool City Region Combined Authority (CA) has indicatively been allocated circa £9.6 million[16].

3.3 National Policy

The Transport Decarbonisation Plan 2021[17] sets out Britain's plans to decarbonise the transport system. Amongst the many commitments detailed to achieve this vision, developing a zero-emission fleet of cars, vans, motorcycles, and scooters is outlined as a key objective. Examples of actions that will be taken to achieve this commitment are listed below:

- Deliver petrol and diesel phase out dates for new vehicles
- Offer incentives to support demand for zero emission vehicles
- Support and nurture innovation in the UK automotive sector

[15] Department for Transport, 2023. Apply for Local Electric Vehicle Infrastructure (LEVI) funding. Available at: Apply for Local Electric Vehicle Infrastructure (LEVI) funding - GOV.UK (www.gov.uk)

[16] Department for Transport, 2023. Local Electric Vehicle Infrastructure (LEVI) funding amounts: capital. Available at: Local Electric Vehicle Infrastructure (LEVI) funding amounts: capital - GOV.UK (www.gov.uk)

[17] Department for Transport, 2021. Decarbonising Transport: A better, Greener Britain. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf

The National Planning Framework 2021[18] states that sustainable transport modes opportunities should be exploited, and developments should be designed to incorporate “adequate provision of spaces for charging plug-in (infrastructure) and ultra-low emission vehicles”.

The Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan[19] outlines the requirements needed to enable the phasing out of new petrol and diesel cars by 2030 and the commitment for new cars and vans to be fully zero emission at the tailpipe by 2035. Pathways to realise this commitment include increasing the uptake of zero emission vehicles, making zero emission cars more affordable and improving EV drivers’ experience of public chargepoints.

The Zero Emission Vehicles Transition Council: 2022 Action Plan[20] and the Net Zero Strategy (Build Back Greener)[21] further delineate the UK government’s commitment to making EVs accessible, affordable, and sustainable in all regions by 2030. The plan highlights how the transition to EVs is vital to decarbonise road transport.

3.4 Regional Policy

Liverpool City Region’s 4th Local Transport Plan[22] states that one pathway to achieve the UK government’s zero emissions target by 2050 is by taking 30,000 fossil-fuel powered cars off the road, increasing public transport use and active travel or switching to electric vehicles. It is also noted that decarbonising the transport system through scaling up ultra-low emission vehicles would be advantageous for health and economic opportunities. It is important to note that whilst the plan acknowledges the benefits of greater EV uptake, it also highlights the importance of changing the fundamental aspects of how we travel to avoid “switching from a culture often dependent on private petrol and diesel vehicles, to a culture that is dependent on electric or zero emission vehicles”.

The transport plan also notes that the shift to EVs has several barriers to overcome such as cost of purchasing vehicles, EVCI availability, negative impacts of production, such as resource use and emissions, and concerns around the range of mileage.

Transport for the North’s (TfN) Electric Vehicle Charging Infrastructure Framework[23] has been developed to support national government partners and local authorities with the deployment of EVCI. The two key objectives of the framework are to:

- Support delivery of an integrated EV network based on a robust and data-driven evidence base of demand and requirements
- Provide a collective route map towards an effective, attractive, and inclusive network The EVCI framework provides key information regarding the:
- Right charging infrastructure, at the right time, in the right place across the region

[18] Ministry of Housing, Communities and Local Government, 2023. National Planning Policy Framework. Available at: National Planning Policy Framework - GOV.UK (www.gov.uk)

[19] Department for Transport, 2021. Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan. Available at: Transitioning to zero emission cars and vans: 2035 delivery plan - GOV.UK (www.gov.uk)

[20] Department for Business, Energy and Industrial Strategy, 2022. Zero Emission Vehicles Transition Council Action Plan. Available at: Zero Emission Vehicles Transition Council: 2022 action plan - GOV.UK (www.gov.uk)

[21] Department for Business, Energy and Industrial Strategy, 2022. Net Zero Strategy - Build Back Greener. Available at: Net Zero Strategy: Build Back Greener - GOV.UK (www.gov.uk)

[22] Liverpool City Region Combined Authority, 2022. Our 4th Local Transport Plan: Issues, challenges, and goals: Developing a vision for local transport to 2040. Available at: LTP4-VISION-090522.pdf (liverpoolcityregionca.gov.uk)

[23] Transport for the North, 2022. Electric Vehicle Charging Infrastructure Framework. Available at: https://transportforthenorth.com/wp-content/uploads/TFN_EVCI_Doc_Oct2022_02.pdf

- Mixture of charging infrastructure needed to support the region's travel movements and decarbonisation aims
- Strategic assessment of suitable sites for rapid charger hubs on our major roads network

Data from the associated TfN EV framework data explorer has been utilised in the demand forecasting process to provide high-level requirements for the Halton Borough Council area. These include variables such as charger preferences and forecast EV uptake. These elements are detailed in Section 7.

3.5 Local Policy

In the Council's Climate Change Action Plan 2022- 2027[24], it states that available procurement options for electric vehicles will be reviewed as part of their aim to reduce carbon emissions by 50%. This supports the longer-term Climate Change ambitions for the borough in 2040.

Projects that the council has worked on to contribute to emissions reduction include the installation of "EV chargers at Council locations and throughout residential areas". However, as of 2022, there are only "two electric vehicles in the Halton Borough Council fleet". A future key action highlighted by the plan is to "continue the rollout of EV charging infrastructure" with a time frame for delivery of 2022/2026 (Action reference F2, p19).

Halton's Delivery and Allocations Local Plan 2022 (DALP)[25] outlines the importance of ensuring electric and alternatively fuelled vehicle capacity is "built into new development" to allow for "long term climate change mitigation as well as improvements in local air quality". A target and requirement outlined in the plan is the need to ensure EV charging points are installed and promoted, expressed in policy C2 (parking standards) and C1 (transport network and accessibility).

Halton's Third Local Transport Plan 2011-2026[26] recognises the opportunities for electric vehicle technology to address climate change. Proposed strategies include:

- Ensuring new developments "cater for emerging vehicle technology such as electric vehicle charging points)
- Developing development control policy on EV charging points
- Considering the provision of parking for electric and hybrid vehicles to provide battery charging facilities, located on-street, private car parks, in council, residential properties and places of employment
- Working with local businesses that wish to establish greater fuel efficient, low carbon vehicle technologies or install EV charging points on their grounds
- Pursue governmental bids for the provision of EV charging points
- Reflect on financial incentives for fuel efficient vehicles, especially EVs
- Consider policy on the use of fuel-efficient vehicles for the council's own fleet ● Publicise governmental incentives for the purchase of fuel-efficient vehicles

[24] Halton Borough Council, 2022. Climate Change Action Plan 2022- 2027. Available at: https://www4.halton.gov.uk/Pages/planning/climate/climate-change.aspx

[25] Halton Borough Council, 2022. Halton's Delivery and Allocations Local Plan. Available at: https://www3.halton.gov.uk/Documents/planning/planning%20policy/newdalp/DALP%20Adopted.pdf

[26] Halton Borough Council, 2011. The Third Local Transport Plan for Halton – Transport: Providing for Halton's Needs. Available at: https://www3.halton.gov.uk/Documents/council%20and%20democracy/transport/Final_LTP3_Web_Version.pdf

- Primary transport strategy no.12 which sets out the case for supporting alternative fuels and vehicles

The Local Transport Plan states how improving traffic and network management will not only reduce emissions, but also, journey time. As such, greater confidence in the use of EVs can be realised – a Halton transport goal.

4 Baseline Position

This section provides an overview of the Halton local authority area and presents the challenges and opportunities around the uptake of EV. The data used in this section comprises of population and housing estimates from the Office for National Statistics (ONS) 2021 Census.

4.1 Study Area

Statistics from the Census 2021 for Halton are provided below in Table 4.1 by Middle Layer Super Output Areas (MSOA) from the ONS[27]. Household deprivation is expressed in a multitude of dimensions which include education, employment, health and housing and is presented below for households which are deprived in one dimension.

Table 4.1: Halton Area Statistics

MSOA	Population Density (Peron/km2)	Household Deprivation (% of all households)	Social Housing Tenure (% of Total Housing Stock)
Farnworth	1,771	29.1%	3.4%
Upton Rocks	3,921	30.9%	3.5%
Halton View	2,247	33.7%	20.2%
Hough Green	5,210	35.8%	44.0%
Victoria Park	3,572	33.6%	19.6%
Ditton	5,376	34.1%	31.6%
Widnes Riverside	2,036	34.3%	34.6%
Hale Bank	511	35.2%	12.3%
Sandymoor, Daresbury & Preston Brook	443	31.6%	2.9%
Halton Castlefield	1,450	33.1%	57.7%
Runcorn Halton Road	4,685	33.9%	20.0%
Runcorn Town & Westfield	1,479	33.4%	17.5%
Grange, Halton Brook & Hallwood Park	3,881	34.0%	44.4%
Norton	3,187	34.5%	34.5%
Halton Lea & Brookvale	3,653	34.9%	43.4%
Beechwood & Heath	1,590	35.0%	1.6%

Source: ONS

On average across all MSOAs, social rented housing represents 25% of the total housing stock. Given the prevalence of social renting and the higher density of dwellings in some suburbs,

[27] Office for National Statistics, 2022. Census 2021. Available at: Population density - Census Maps, ONS

additional consideration will need to be given to EV charging in communal parking areas or onstreet.

4.2 Existing Electric Vehicle Ownership

The need for EVCI will be determined by the uptake of EVs in the study area. As of the end of 2022, there were a total of 1,412 ULEVs registered within Halton[28]. This had increased from 78 in 2015, with an annual growth rate from 2015 to 2022 of 44%.

By comparison, there were a total of 1,011,475 ULEVs registered in England in 2022, with an annual growth rate from 2015 to 2022 of 46%, which is 2% greater than Halton's annual growth rate during the same period.

Table 4.2 shows the total registered ULEVs in Halton and England.

Table 4.2: Total Registered ULEVs in Halton and England

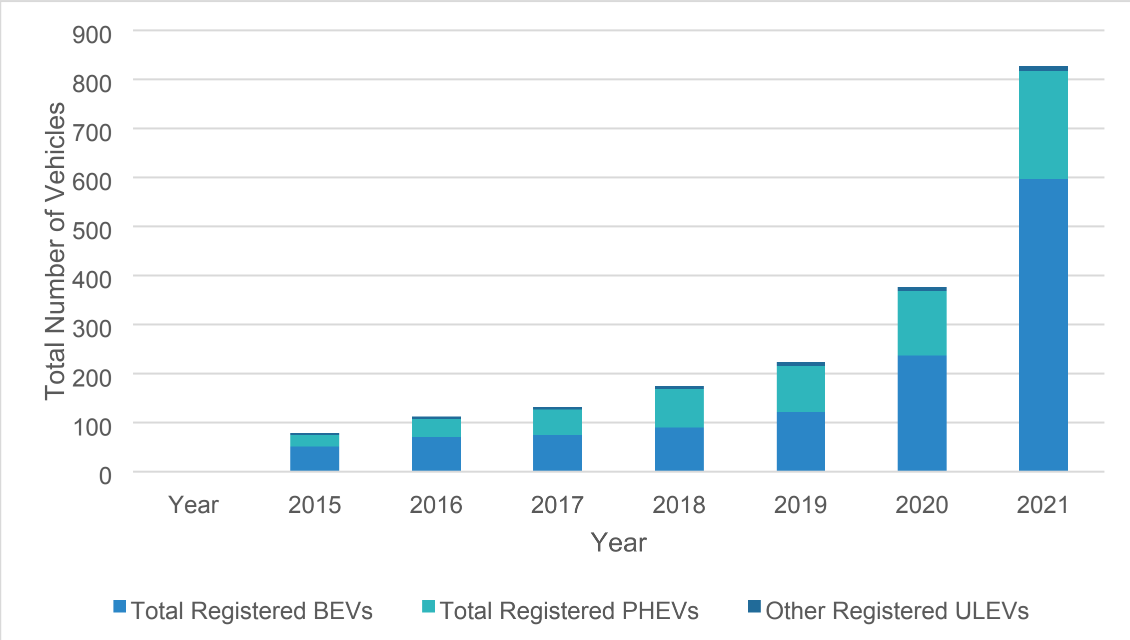
Year	Total ULEVs Registered in Halton	Halton ULEV Registrations – Year on Year Growth	Total ULEVs Registered in England	England ULEV Registrations – Year on Year Growth
2015	78	N/A	49,691	N/A
2016	112	44%	83,872	69%
2017	132	18%	125,217	49%
2018	174	32%	176,287	41%
2019	223	28%	240,474	36%
2020	376	69%	395,663	65%
2021	827	120%	679,887	72%
2022	1,412	71%	1,011,475	49%

Source: DfT VEH01 Statistical Data

This shows that from 2015 to 2019, the ULEV year on year growth in Halton was less than that of England's, however from 2020 to 2022 it has exceeded England's ULEV year on year growth. BEVs and PHEVs represented 99% of the total ULEV registered in Halton in 2022, as illustrated in Figure 4.1. BEVs made up 77% of the total ULEV registered in 2022, whilst PHEVs made up 22%.

figure 4.1: Total Registered ULEV, BEV and PHEV in Halton

[28] Department for Transport and Driver Vehicle Licensing Agency, 2023. Vehicle Statistics Collection. July 2022. Available at: https://www.gov.uk/government/collections/vehicles-statistics



Source: DfT VEH01 Statistical Data

4.2.1 BEV Ownership

An analysis of the BEV growth rate within Halton and England is summarised in Table 4.3.

Table 4.3: Total Registered BEVs in Halton and England

Year	Total BEVs Registered in Halton	Halton BEV Registrations – Year on Year Growth	Total BEVs Registered in England	England BEV Registrations – Year on Year Growth
2015	51	N/A	24,165	N/A
2016	71	39%	32,632	35%
2017	75	6%	44,375	36%
2018	90	20%	58,462	32%
2019	122	36%	93,546	60%
2020	237	94%	193,730	107%
2021	597	152%	378,850	96%
2022	1,092	83%	625,914	65%

Source: DfT VEH01 Statistical Data

This shows that the BEV growth rate in Halton has been gradually increasing, with significant increases between 2020 and 2022.

BEV uptake within Halton was slower than that of England's from 2015 to and including 2019, but the annual growth rate from 2019 to 2022 in Halton (73%) was 12% greater than that of England's (61%).

4.2.2 PHEV Ownership

An analysis of the PHEV growth rate within Halton and England is summarised in Table 4.4.

Table 4.4: Total Registered PHEVs in Halton and England

Year	Total PHEVs	Halton PHEV	Total PHEVs	England PHEV

	Registered in Halton	Registrations – Year on Year Growth	Registered in England	Registrations – Year on Year Growth
2015	24	N/A	21,958	N/A
2016	37	54%	46,005	110%
2017	52	41%	73,588	60%
2018	79	52%	107,734	46%
2019	94	19%	134,646	25%
2020	132	40%	188,790	40%
2021	220	67%	285,844	51%
2022	309	40%	368,209	29%

Source: DfT VEH01 Statistical Data

This shows that PHEV uptake in both Halton and England were decreasing, with a similar annual growth rate from 2015 to 2022 of 38% and 42%, respectively. However, from 2020 onwards England's PHEV year on year growth has been reducing at a greater rate compared to Halton's.

4.3 Existing Electric Vehicle Charging Infrastructure

A desktop study was undertaken to review the number of council and privately owned, publicly accessible EVCI within Halton. This exercise identified the number of charging devices across the Halton area, with the number of sockets per device also recorded. Typically, 7kW to 22kW chargers have either a single or dual socket to enable one or two vehicles to charge simultaneously, while 50kW rapid chargers typically only allow one vehicle to be recharged at full speed.

The following sources were used to determine the number of EVCI and associated sockets:

- Department for Transport National Chargepoint Registry[29] ● PlugShare[30]
- Open Charge Map[31]
- Halton Borough Council

As of October 2023, these sources indicate that there were approximately 56 chargers within Halton. These consist of a single Council-owned unit and 55 privately-owned units, which have a combined total of 74 sockets. These figures exclude private household or private business charging infrastructure.

Table 4.5 below summarises the total number of EVCI in Halton.

Table 4.5: Existing EVCI within Halton	7kW	22kW	50kW+	Total

[29] Department for Transport, 2023. Accessed September 2023. Available at: https://www.gov.uk/guidance/find-and-usedata-on-public-electric-vehicle-chargepoints

[30] PlugShare, 2023. Accessed September 2023. Available at: PlugShare - EV Charging Station Map - Find a place to charge your car!

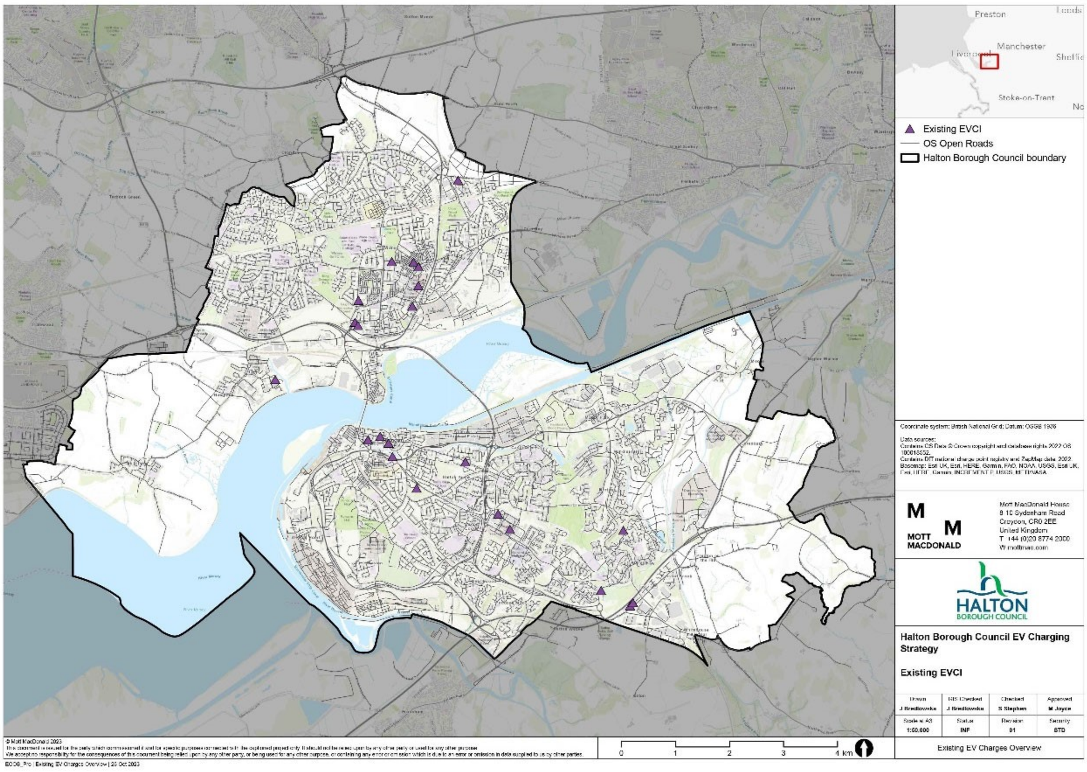
[31] PlugShare, 2023. Accessed September 2023. Available at: PlugShare - EV Charging Station Map - Find a place to charge your car!

Halton Borough Council	38	13	5	56

Source: Halton Borough Council, DfT National Chargepoint Registry, PlugShare, and Open Charge Map

Figure 4.2 shows the current distribution of publicly accessible EVCI locations across the Halton Borough Council local authority area. This assessment does not consider any private charging infrastructure that may be used domestically (i.e. household charging), fleet charging infrastructure, or infrastructure located in staff-only car parks. A higher resolution version of the image is included in Appendix B.2.

Figure 4.2: Halton Borough Council EVCI Locations



Source: Mott MacDonald, Ordnance Survey, Halton Borough Council, DfT National Chargepoint Registry, PlugShare, and Open Charge Map

Most EVCI are concentrated within Runcorn and Widnes, with some fast destination chargers located at key trip attractors such as train stations, supermarkets, and hotels.

4.4 EV to EVCI Ratio

At the time of writing, there is no preferred ratio of PiV to EVCI in the UK. A summary of the total registered PiV compared to the total number of EVCI within Halton is shown in Table 4.6.

Table 4.6: Halton Borough Council EVs Compared to EVCI

	Total Plug-in Vehicle Registrations (2023 Q1)	2022 EV Chargers	2022 PiV to EVCI Ratio
Halton	1,412	56 (as of Sept. 2023)	29
England	1,105,169	34,203 (as of March 2023)	32

Source: Department for Transport, and IEA

This illustrates that the PiV to EVCI ratio for Halton was approximately 29, which was lower than that of England's ratio of 32. Whilst using a ratio of PiV to EVCI allows charging provision levels to be compared, it only accounts for EV uptake and vehicle ownership and not for other regional differences.

Given the rate of change indicated in Section 4.2, EVCI provision would need to keep pace at a similar rate to ensure users have sufficient access to charging devices across the area.

4.5 Electricity Network

The location of EV charging infrastructure is highly dependent on the available electricity grid capacity within a locality. For many commercial EV charger installations there is a requirement to contact the Distribution Network Operator (DNO) to understand the available grid capacity in the locality and to identify any required upgrades or existing capacity constraints.

Scottish Power Energy Networks (SPEN) are the local DNO in the Merseyside area and have a unique role in connecting renewable generation with the local network.

SPEN have several publicly available resources to provide an indication on the grid capacity within areas of Merseyside, North Wales, and parts of Cheshire (MANWEB). One such resource is the distributed generation heat map available on the SPEN website[32]. This provides an indication on the available network capacity on the 33kV and 132kV network in MANWEB. 5 Stakeholder Engagement

5.1 Engagement with Charge Point Operators

Through our engagement with CPOs while developing a number of similar strategies for local authorities across the UK, we have been able to establish a series of consistent findings on a number of key topics of interest to CPOs. These are set out in detail in Table 5.1.

Table 5.1: Key Findings Identified through CPO Engagement

Topic	Key Findings
Interest	CPOs welcome joint LA opportunities, as this enables profitable sites to be used to cover unprofitable sites. Joint tenders are associated with efficiencies from economies of scale.

[32] Distributed Generation Heat Maps - SP Energy Networks. Available at: https://www.spenergynetworks.co.uk/pages/connection_opportunities.aspxconnection

Length of Contract	15-20 years is preferable as a concession length as this provides sufficient time for CPOs to recoup their investment where wholly funded, particularly for less profitable sites. Some CPOs indicated they would accept 10 year periods.
Adoption of Existing Assets	Some CPOs are open to contracts that require adoption of previous CPOs hardware, others stated that they may replace existing assets with their own at the start of the concession
Site Selection	CPOs want to be involved in site selection. CPOs like LAs to have an idea of their requirements and sites that they own where development will be easier than noncouncil owned sites. But some level of flexibility is desirable so the CPO can be confident sites have power and usage potential required to get return on investment and cover cost of unprofitable sites. CPOs like to be guided on site selection by their in-house models, giving room for them to do this is an important aspect of CPO and LA collaboration.
Exclusivity	Some CPOs request to be the only provider in a geography but others noted this could stifle competition in the long term. Others who specialise in ultra-rapid charger often look to work with A/C charger providers to meet needs of a LA – so they also warn against exclusivity. Multiple CPOs can increase transaction costs / confusion for consumers.
Tariffs	CPOs want some control over tariffs as this is a significant factor in their business model, but some are open to discussions with the LA. Some CPOs stated they would prefer to fully fund the service to reduce any LA control on tariffs.
Revenue Sharing	CPOs are open to collaborative discussions with LAs on potential revenue share agreements. Potential approaches to profit share in a concession model include a fixed annual bay fee, net income share or profit shares. However, they noted that there is usually no profit in the early stages of the concession.

Source: Mott MacDonald

As a result of this engagement it has also been possible to derive a set of key site selection criteria which should be considered as 'core' requirements for any future site selection process. The following are those characteristics identified by CPOs:

- Sites accessible 24 hours a day 7 days a week with no restrictions.
- Adequate grid capacity nearby, determined through engagement with the DNO.
- Ideally 20,000 vehicle movements per day on the local road network for large rapid charging hubs.
- Close proximity to the strategic road network.

5.2 Engagement with Arms-Length Management Organisations

Initial discussions have also taken place with Halton Housing, a key Arms-Length Management Organisation (ALMO) based within Halton which – similar to Halton Borough Council – has indicated an interest in procuring EVCI.

Halton Housing is a housing association based in Widnes which provides affordable housing to approximately 7,000 households in the Halton area. Their stated mission is to address housing needs within their communities and contribute to the overall wellbeing of their tenants. The organisation is committed to sustainability and reducing its carbon footprint, with initiatives like retrofitting properties to improve the energy efficiency in its buildings. Initial discussions with Halton Housing identified the future provision of EVCI as one specific strand of these efforts.

An initial conversation with Halton Housing took place in September 2023, confirming that the organisation was in the initial stages of considering the provision of EVCI at its properties, and would welcome further information on potential procurement routes – particularly if there were joint opportunities for procurement with the Council.

The modelling outputs provided later in this report (see Section 8.1.1) cover the full Halton local authority area and consider all housing types within the analysis. As such, any Halton Housing association properties which are located within the Halton local authority area have automatically been considered within the forecasting exercise and subsequent identification of charging locations. This ensures that initial demand associated with EV users living in housing association properties will, to an extent, have been catered for (noting that the continued rollout and locations of EVCI will likely be informed through discussions with the eventual suppliers once the Council has identified/on-boarded a CPO).

This provision, however, only considers publicly accessible EVCI for residential (on-street) locations in line with the stated aims of the LEVI fund and assumes that those with off-street parking will see future EVCI provision through private means. Halton Housing are likely to own a sizeable number of properties with private off street parking facilities (either single spaces or communal parking lots) which could form part of their own future EVCI provision for tenants. The explicit use of LEVI funding to procure EVCI at these locations would therefore potentially be contingent on sharing private parking infrastructure with non-housing association residents. This would therefore require further detailed discussions on the nature of any future arrangement between Halton Housing, the Council and possibly the Office of Zero Emission Vehicles (OZEV); the administrators of the LEVI fund.

Engagement as part of this strategy has only been undertaken with Halton Housing, and there may be other Housing Associations within the Halton local authority area who may similarly aspire to provide EVCI for their tenants. Again, the use of LEVI funding to procure EVCI at locations owned by other Housing Associations would be contingent on sharing private parking infrastructure with non-housing association residents. Further discussion between interested parties (i.e. other Housing Associations) and the Council would therefore be required to establish the nature of any such arrangement.

More broadly, the Council has advised that a combined authority-wide framework may be established to procure EVCI. It is not uncommon for housing associations (as ALMOs) to procure services through local authority frameworks or Dynamic Purchasing Systems (DPS) similar to local authorities themselves. This potential framework could therefore represent a streamlined means of enabling the future rollout of EVCI solutions for Housing Associations within Halton, possibly allowing for cost and time savings. Similar to the Council, each Housing Association would first need to establish the commercial basis upon which they would seek to procure EVCI. These considerations (including procurement and the use of frameworks) are covered in greater detail in Section 10.

5.3 Engagement with Distribution Network Operators

At the time of writing, the study team has made initial contact with the DNO for the Halton local authority area, SPEN, in order to present the initial outputs derived from the modelling exercise. This includes the potential locations identified as part of both the residential and destination charging analysis, as well as the associated grid capacity assessments. Suggested next steps for the Council are set out in Section 11.

6 Network Vision

This section sets out a suggested vision to guide Halton Borough Council in the future provision and rollout of EVCI across the Halton local authority area. A range of policies and strategies (covered in Section 3) has been reviewed to inform the proposed vision for the region.

6.1 Context for Developing Halton Borough Council's Vision

Following the policy and strategy review set out in Section 3, a draft vision statement was developed to help shape the public charging network for the Halton Local Authority area. Halton's vision draws upon local and regional policies while ensuring alignment with broader national sustainability and transport policy arena. It acknowledges that local authorities must demonstrate leadership regarding sustainable transport and for EVCI, envisages an equitable approach with provisions in place to ensure that EV users have a consistent, affordable and accessible charging network.

Halton's vision sets out a clear commitment to support the expansion and improvement of the publicly available chargepoint network within the region at a rate that is both manageable and accommodates the forecasted rise in EVs. Ultimately, this vision acknowledges the Council's views that enabling greater EV use is a potentially major solution to meeting the demand for low emission personal vehicles. Crucially, however, it must not detract from wider commitments to challenging the current model of personal vehicle ownership that have dominated transport in across the region in previous decades.

6.2 Vision Statement

"The EV Charging Network for Halton will provide a resilient, accessible, equitable and reliable network that works for all users. It will help meet the Liverpool City Region Combined Authority Net Zero target by 2040 and support the Halton Borough Council's Climate Change Action Plan 2022-2027.

The continued development of EV charging will consider the local needs and context of Halton, and ensure that it supports inclusive growth, sustainable economic development while complementing the City Region, and UK Government's broader transport decarbonisation objectives.

As with the sustainable travel hierarchy, active travel and public transport must remain the preferred modes of travel across Halton, and any future Charging Network will be planned, designed and delivered to support these modes."

7 Demand Forecasting

This section sets out the methodology, along with research and data inputs, that feed into both the EV and EVCI forecasts for Halton.

7.1 Overview of Demand Forecasting

Several existing EV demand forecasts and associated literature have been collated and analysed. Together with applying local data and local contextual adjustments, a range of forecasts were derived to understand the potential low, central and high future EV uptake in the study area. From this, associated EVCI requirements were produced to understand the required supporting infrastructure.

An overview of the high-level methodology is shown in Figure 7.1 below.

Figure 7.1: EVCI Forecast Methodology Overview

Source: Mott MacDonald

7.2 Electric Vehicle Uptake Projection

Sources from the energy industry, vehicle manufacturing industry and national transport policies were reviewed to gain an understanding in the variance in EV forecasts, across multiple sectors, up to 2032. The following existing national forecasts were analysed:

- National Grid – Future Energy Scenarios (FES) 2023[33]
- Society of Motor Manufacturers and Traders' (SMMT) New Car Market Outlook to 2035[34]
- Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan[35]

7.2.1 Methodology

The forecasting process involves four separate forecasts, each with several sub-scenarios. The National Grid FES, SMMT New Car Market Outlook and DfT 2035 delivery plan forecasts were rebased using a baseline established using DfT vehicle licensing data[29], from 2015 to 2022, on the Halton Borough Council area. Additionally, the DfT baseline was extrapolated to derive a further forecast.

A summary of the forecasting approach for Halton is detailed as follows:

- **Forecast based on DfT:** A line of best fit was applied to the historic DfT data (2015 to 2022) and extrapolated to forecast the total number of BEVs and PHEVs 5 and 10 years into the future to 2027 and 2032. A low and high forecast was produced.
- **Forecast based on National Grid's FES 2023:** The annual growth rate was calculated from the dataset for the four different scenarios ('consumer transformation', 'system transformation', 'falling short', and 'leading the way') detailed within the FES document and applied to the baseline data.

[33] National Grid ESO, 2023. Future Energy Scenarios (FES), July 2023. Available at: https://www.nationalgrideso.com/future-energy/future-energy-scenarios

[34] Society for Motor Manufacturers and Traders (SMMT), 2021. New Car Market and Parc Outlook to 2035 by Powertrain Type. 11th June 2021.

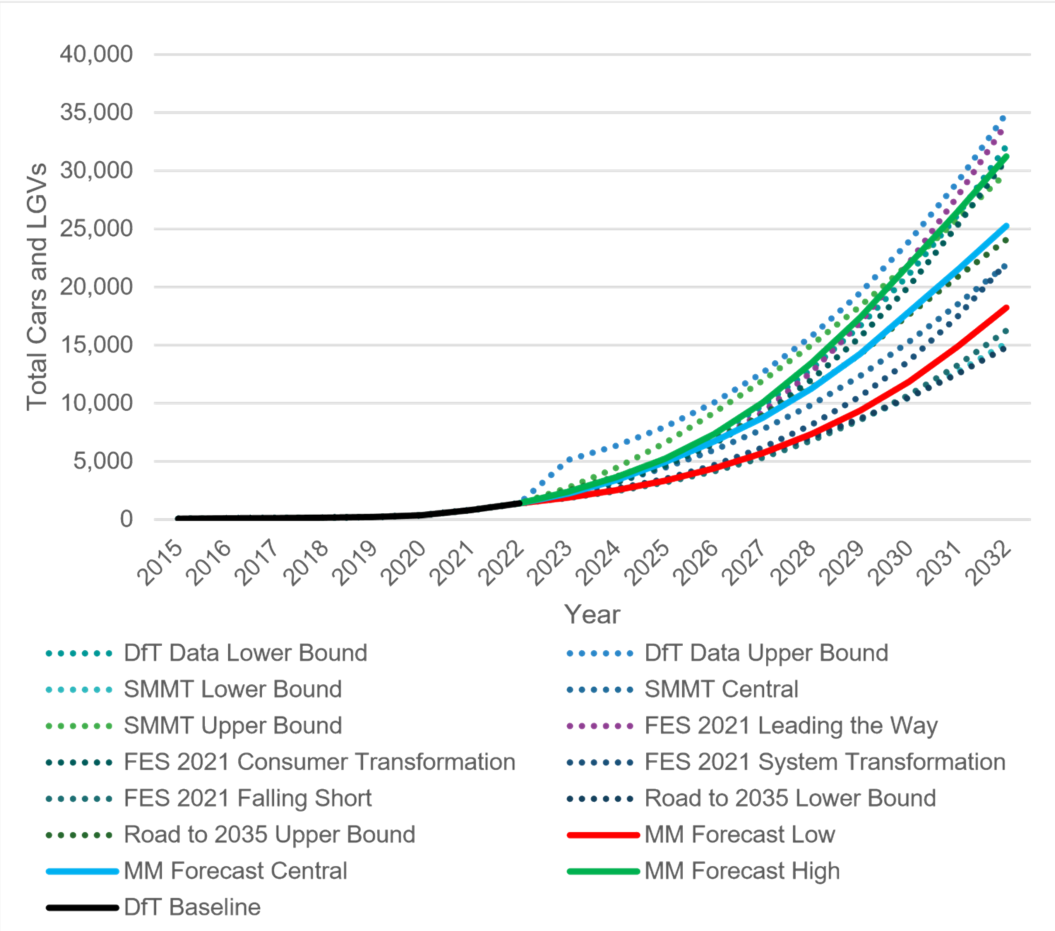
[35] HM Government, 2021. Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan

- **Forecast based on SMMT New Car Market Outlook to 2035:** The annual growth rate was calculated from the dataset for the three different scenarios ('low', 'central', and 'high') detailed within the SMMT report and applied to the baseline data.
- **Forecast based on Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan:** This forecast estimates the percentage of new vehicles that will be either be zero emission and ULEV up to 2035. The baseline based on the total first-time registered vehicles was extrapolated and the percentages from the 2035 Delivery Plan applied.

7.2.2 Output

The result of the forecast for Halton is illustrated in Figure 7.2, which shows all potential forecast outcomes for BEVs and PHEVs cars and LGVs based on the outlined analysis.

Figure 7.2: Potential Forecasts of Plug-in Vehicles in Halton



Source: Mott MacDonald

The graph illustrates that there is a wide range between forecasts, with the lowest forecast total in 2032 being 15,000 compared to the highest of 35,000, thus indicating that there is a highlevel of uncertainty in the uptake of BEVs and PHEVs.

To account for the notable variation in results, a low, central and high forecast were derived by taking the 25th, 50th and 75th percentiles.

Table 7.1: Forecast Number of BEVs in Halton

	2027	2032

	Low	Central	High	Low	Central	High
Cars	4,235	6,424	7,105	14,130	19,069	23,462
LGVs	723	1,050	1,417	2,603	4,091	4,499

Source: Mott MacDonald

Table 7.2: Forecast Number of PHEVs in Halton

	2027			2032		
	Low	**Central**	**High**	**Low**	**Central**	**High**
Cars	739	1,260	1,515	1,480	2,067	3,193
LGVs	9	15	19	17	33	87

Source: Mott MacDonald

Table 7.3: Forecast Number of Total PiVs in Halton

	2027			2032		
	Low	**Central**	**High**	**Low**	**Central**	**High**
Cars	4,974	7,684	8,620	15,610	21,136	26,655
LGVs	732	1,065	1,436	2,620	4,124	4,586

Source: Mott MacDonald

Table 7.3 shows that the high forecast (75th percentile); the more optimistic scenario where potential policy levers are required and implemented to achieve net zero transport, is approximately double that of the low forecast (25th percentile) for both 2027 and 2032.

Given the uncertainties with the low and high forecasts, the EVCI forecast was progressed based on the central forecast as it provides a more cautious approach, accounting for a range of potential policy outcomes.

7.2.3 Comparison

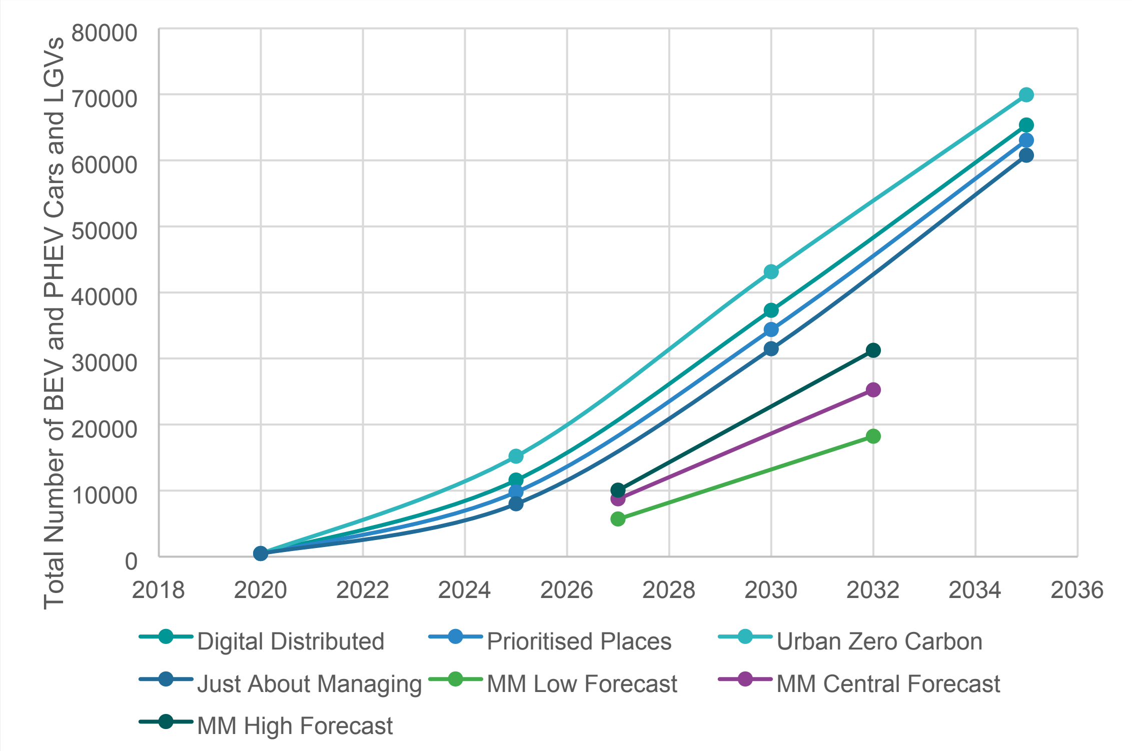
The forecast outputs were compared with Transport for the North's (TfN) Electric Vehicle Charging Infrastructure Framework[36] forecast. TfN's forecast shows four potential pathways:

- **Just about managing** – assumes that travel behaviour remains the same as present.
- **Digitally distributed** – assumes advances in digital and technology will advance the way people travel and live.
- **Prioritised places** – assumes political and economic intervention will ensure no place is left behind.
- **Urban zero carbon** – assumes the most radical changes in public behaviour on climate change, and strong national policies.

Figure 7.3 illustrates all four of the TfN's EV uptake scenarios for the behavioural scenario 'baseline', which is defined as charging behaviour that follows current observed trends.

[36] Transport for the North, 2022. Electric Vehicle Charging Infrastructure Framework. Available at: Electric Vehicle Charging Infrastructure Framework | Report - Transport for the North

Figure 7.3: Halton EV Demand Forecast Comparison with TfN Data



Source: Transport for the North

This shows that all four of TfN's forecasts are greater than Mott MacDonald's high forecast. The 'just about managing' scenario forecasts a total of 17,380 and 43,185 PiV cars and LGVs, in 2027 and 2032 respectively, which are approximately 73% and 38% greater than the Mott MacDonald's high forecast.

Such discrepancy is likely due to this specific range of scenarios having been based upon work originally undertaken as part of TfN's Future Travel Scenarios report in 2019. Following an initial update in 2020 to address the economic uncertainty following the UK's response to the Covid19 pandemic[37], this update was subsequently used as the basis of the scenarios included in the Charging Infrastructure Framework forecast. As such, these scenarios may not take into consideration societal and economic impacts which are likely to have only been felt in the last two years, such as the war in Europe and the ongoing 'cost of living' crisis; demonstrating that that there is degree of uncertainty surrounding EV forecasting. Our own forecasts, derived from recent DfT data, have been taken forward as part of this study and represent a more conservative approach.

7.2.4 Potential Limitations

Although the EV forecasts outlined provide a high-level overview of potential EV uptake scenarios, there are numerous factors that might impact the uptake of EVs in the study area. Factors include, but are not exhaustive to:

- Average vehicle age, which may vary depending on household income and vehicle models.
- Daily vehicle mileage.

[37] Transport for the North, 2020. Future Travel Scenarios. Available at: Future Travel Scenarios – Transport for the North

- Date of price parity of EV to ICE vehicles.
- The addition or removal of government incentives or taxation.
- Availability of public charging infrastructure.
- Number of households with off-street parking availability.

7.3 Electric Vehicle Charging Infrastructure Forecast

An overview of the EVCI forecasting process has been included in Figure 7.4 below.

Figure 7.4: EVCI Forecasting Process

1. Total Energy Usage by Vehicle Type
   - Estimated based on annual vehicle mileage by type of vehicle.
   - Derived based on average EV energy consumption by vehicle type.
2. Total Energy Usage by Type of Chargepoint
   - Estimated based on usage preferences of different chargepoint types
   - Calculated based on how much electricity each type of chargepoint can provide.
3. Total Number of Chargepoints Required
   - Total energy usage by chargepoint is then divided by the utilisation factor
   - This is the annual amount of electricity the charger can provide - the estimated demand.

Source: Mott MacDonald

The following types of EV chargers have been considered as part of the analysis:

- **Residential:** these are assumed to be slow charging with a power output of up to 7kW, typically located within residential areas. These are either installed at the kerbside utilising lampposts or bollards or in private residential car parks (as charging hubs). These should be located in areas with limited and no access to off-street parking. The expected length of charging would be overnight or ad-hoc throughout the day.
- **Destination:** these are assumed to be fast charging with a power output of between 7kW and 22kw, typically located in trip attractor locations such as supermarkets, retail parks, leisure centres and country parks. The expected length of stay is upwards of one hour, up to eight hours.
- **Rapid:** these are assumed to have a power output of at least 50kW, and are typically installed as hubs, located in areas where it would form part of a journey, such as a service station, or be the destination of the journey (sole purpose for the journey to charge the vehicle). The expected length of stay is up to one hour.

Off-street private charging (garages, driveways, and workplaces) has been calculated separately, as it is assumed that this type of charging will have a lower demand on the public electricity network. However, the number of private chargepoints required has not been included as part of this analysis.

To determine the required numbers of each charger type, there are several key variables. These variables are discussed in the following section.

7.4 Chargepoint Types

Several factors have been considered when calculating the preferred chargepoint mix and the required number of EVCI by 2027 and 2032, within Halton. The following sections detail the variables and their subsequent impacts on the forecast.

7.4.1 Distributions

Key distributions within the EVCI forecast include the car and van ULEV composition, and the household parking availability.

Table 7.4 summarises the 2022 car and van BEV and PHEV composition for cars and vans, based on observed DfT data, and compares this with the 2027 and 2032 vehicle forecast.

Table 7.4: Halton Car and Van ULEV Composition

	Car and Van ULEV Composition	
	PHEV	**BEV**
2022	22%	78%
2027	15%	85%
2032	8%	92%

Source: Department for Transport Vehicle Statistics (Fuel Type Composition)

The ULEV composition for 2022 is based on DfT data, whereas the compositions for 2027 and 2032 are based on the EV demand forecast. BEV and PHEV are separated as PHEV have different power demands, as the ICE provides most of the energy required for a PHEV, and the majority of PHEV are not compatible with rapid chargers. Therefore, BEV and PHEV users have different charging requirements.

In addition, the household parking availability influences the type of chargepoints used. For those with off-street parking, vehicles are likely to be recharged at home and not wholly rely on the public EVCI network. The household parking availability for Halton are shown in Table 7.5.

Table 7.5: Household Parking Availability Assumed for Halton

	Household Parking Availability	
	Off-Street	**On-Street**
England	44%	56%

Source: English Housing Survey (Dwelling Sample)

It has been assumed that the household parking availability for Halton is the same as England, which has been derived from the English Housing Survey[38]. This is based on the second most deprived quintile data, which matches the overall deprivation value for Halton[39].

7.4.2 Charger Preferences

Charging preferences were calculated based on outputs for Halton from the TfN EV Charging Infrastructure Framework[40] and have been considered for both future year scenarios: 2027 and 2032. Given the outputs from the framework model have been calculated in 5-year segments,

[38] Department for Levelling Up, Housing and Communities, 2023. Table DA2202: Parking and Mains Gas. Available at: https://www.gov.uk/government/statistical-data-sets/amenities-services-and-local-environments

[39] Ministry of Housing, Communities & Local Government, 2019, Indices of Deprivation 2019 Interactive Dashboard. Available at: English indices of deprivation 2019: mapping resources - GOV.UK (www.gov.uk)

[40] Transport for the North, 2022. TfN EV Charging Infrastructure Framework. Available at: TfN EV Charging Infrastructure Framework (windows.net)

the closest output year to each of the assessed future years has been used to calculate the distribution of charging preference. Years used were 2025 and 2030.

Cars and LGVs were considered separately and were categorised by type of PiV; specifically, PHEVs and BEVs. The preference towards different chargers depends on the type of vehicle, and whether the user has access to off-street parking at their home address. Charging preferences were then distributed across four different types of charging, as follows:

- **Privately Charged:** Charging which occurs privately either at home or at the driver's private place of work. We assume the use of a 7kW charger.
- **Residential:** Charging which occurs on-street near a driver's home location, for example while parked on a local road or in a public car park. We assume the use of a 7kW charger.
- **Destination:** Charging which occurs in locations such as supermarkets, gyms, etc. This is assumed to take place at a 7kW charger where a user stays for upwards of an hour.
- **Rapid Charging:** Charging which occurs during a journey, similar to refuelling with petrol at a motorway service station. Chargers tend to support at least 50kW, and sometimes 150 - 350kW charging, allowing for short charging times.

To calculate the appropriate distribution of charging infrastructure preferences listed above, charger preferences assumed in TfN's 'Just About Managing' scenario were adopted; the 'Just About Managing' being the more conservative of TfN's forecasts and closest to our own. Table 7.6 and Table 7.7 summarise the modelled charging preferences for both 2027 and 2032 scenarios respectively. The tables indicate the assumed percentage of electricity demand which will be met by different vehicles and charger types.

Table 7.6: Forecast EVCI Charing Preference (2027), by % of Demand

Vehicle Type	Primary Parking Location	Vehicle Category	Charger Preference			
			Privately Charged	Residential Slow/Fast (<22kW)	Destination Slow/Fast (<22kW)	Rapid Charging (>43kW)
Cars	Off-Street Parking	PHEV	87%	0%	13%	0%
		BEV	79%	0%	13%	8%
	On-Street Parking	PHEV	15%	59%	25%	0%
		BEV	13%	51%	22%	13%
LGVs	Depot-Based	PHEV	100%	0%	0%	0%
		BEV	80%	0%	0%	20%
	On-Street Parking	PHEV	67%	23%	10%	0%
		BEV	62%	21%	9%	8%

Source: Mott MacDonald

Table 7.7: Forecast EVCI Charging Preference (2032), by % of Demand

Vehicle Type	Primary Parking Location	Vehicle Category	Charger Preference			
			Privately Charged	Residential Slow/Fast (<22kW)	Destination Slow/Fast (<22kW)	Rapid Charging (>43kW)
Cars	Off-Street Parking	PHEV	87%	0%	13%	0%
		BEV	79%	0%	13%	8%
	On-Street Parking	PHEV	15%	60%	25%	0%
		BEV	13%	51%	22%	14%
LGVs	Depot-Based	PHEV	100%	0%	0%	0%
		BEV	80%	0%	0%	20%

Vehicle Type	Primary Parking Location	Vehicle Category	Charger Preference			
			Privately Charged	**Residential Slow/Fast (<22kW)**	**Destination Slow/Fast (<22kW)**	**Rapid Charging (>43kW)**
	On-Street Parking	PHEV	67%	23%	10%	0%
		BEV	64%	22%	9%	4%

Source: Mott MacDonald

7.4.3 Utilisation

Charger utilisation, per charger type, has been estimated using the International Council On Clean Transportation's (ICCT) formulas[41], as utilisation data was not available for all local EVCI within Halton. The methodology of the ICCT aggregated existing charger data from across the UK.

The methodology estimates the daily charger utilisation, based on the forecast number of PiV per million people. The daily utilisation is then calculated based on whether the charger is public fast charging, or rapid charging in non-metropolitan areas. This resulted in the following daily utilisation in hours, summarised in Table 7.8.

Table 7.8: Forecast Daily Utilisation in Hours per Charger for Halton

	Residential/Destination (7kW to 22kW)	Rapid (50kW+)
2027	4.20	2.26
2032	5.13	2.80

Source: Mott MacDonald

The estimated utilisation values for each charger type based on the above are summarised in Table 7.9.

Table 7.9: Annual Utilisation Values per Charger for EV Charging Infrastructure by Charger Type

	2027 (kWh)	2032 (kWh)
Residential (7kW)	10,497	12,824
Destination (22kW)	16,495	20,151
Destination (50kW)	40,398	50,046

Source: Mott MacDonald

The calculated utilisation values were then compared with the Demystifying Utilisation report[42] to cross check the calculated values with observed energy-based utilisation values reported by the UK public charging network in Q4 2022. Fast chargers (7kW to 22kW) reported utilisation values at 9,671kWh in Q4 2022, while rapid chargers (50kW) were 45,499kWh. Therefore, the calculated annual utilisation values using the ICCT methodology for 2027 are similar to the aggregated data reported by the Green Finance Institute report for Q4 2022.

[41] International Council On Clean Energy, 2022. Quantifying the electric vehicle charging infrastructure gap in the United Kingdom. August 2022.

[42] Green Finance Institute, 2023. Demystifying Utilisation. Available at: https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2023/06/GFI-DEMYSTIFYING-UTILISATION.pdf

7.4.4 Assumptions

The key assumptions behind forecast of EVs and EVCI which impact the associated commercial and financial modelling are detailed in this section.

- **Vehicle efficiency:** this is the efficiency of a vehicle's ability to convert electrical energy into kinetic energy. Therefore, the higher the value the more efficient the vehicle is. It is measured by the distance the EV can travel per unit of electricity (miles per kWh). The efficiency value for the EVCI forecast has been assumed to remain constant throughout the forecast years, which has been based on the average vehicle efficiency for the current vehicle models.
- **Annual vehicle kilometres travelled:** annual vehicle kilometres travelled for Halton was calculated for 2022 using DfT data, and then uplifted for 2027 and 2032 using DfT's road traffic forecast (scenario 7 shift to EVs: traffic in England and Wales). This assumes that the national growth rate is the same for Halton.
- **Charger utilisation:** it is expected that charger utilisation will be lower during the early stages of EV adoption and will rise over time. The charger utilisation values have been based on ICCT's research, which accounts for the increase in utilisation over time.
- **Residential charger catchment:** this is the walking distance that residents are willing to walk to access a public charger, which has been set to 400m or approximately a 5-minute walk.
- **Existing petrol stations:** it has been assumed that existing petrol stations will make provisions for rapid charging in the future, as the demand for EVs increases.

A full list of the outlined assumptions from the forecasting exercise is provided in the Assumption Log in Appendix A.

7.5 Forecast EV Charging Infrastructure Requirements

Table 7.10 summarises the estimated number of EVCI required within Halton by 2027 and 2032, based on the outlined demand forecast for BEVs and PHEVs for 2027 and 2032. The values represent the overall number of publicly accessible chargers required (including existing), and do not distinguish between public or private ownership or the number of sockets provided.

Each device may have two sockets, but it is not always possible to charge two cars simultaneously.

Table 7.10: ERC Forecast EVCI Requirements (Total Devices)

	2027 Forecast Requirement			2032 Forecast Requirement		
	Low	Central	High	Low	Central	High
Residential (Slow)	379	574	662	1,088	1,520	1,842
Destination (Fast)	143	217	248	402	556	679
Rapid	52	78	94	151	219	255
Total Devices	**574**	**869**	**1,005**	**1,640**	**2,295**	**2,776**

Source: Mott MacDonald

8 Proposed Charging Network

Following the EV demand forecast to determine the likely number of publicly accessible chargers required by 2027 and 2032, variables from the forecast were analysed using the Mott MacDonald in-house EV Optimisation tool (ECOS). This tool helps determine likely locations where demand for EV charging will be high, for residential charging and destination-based charging.

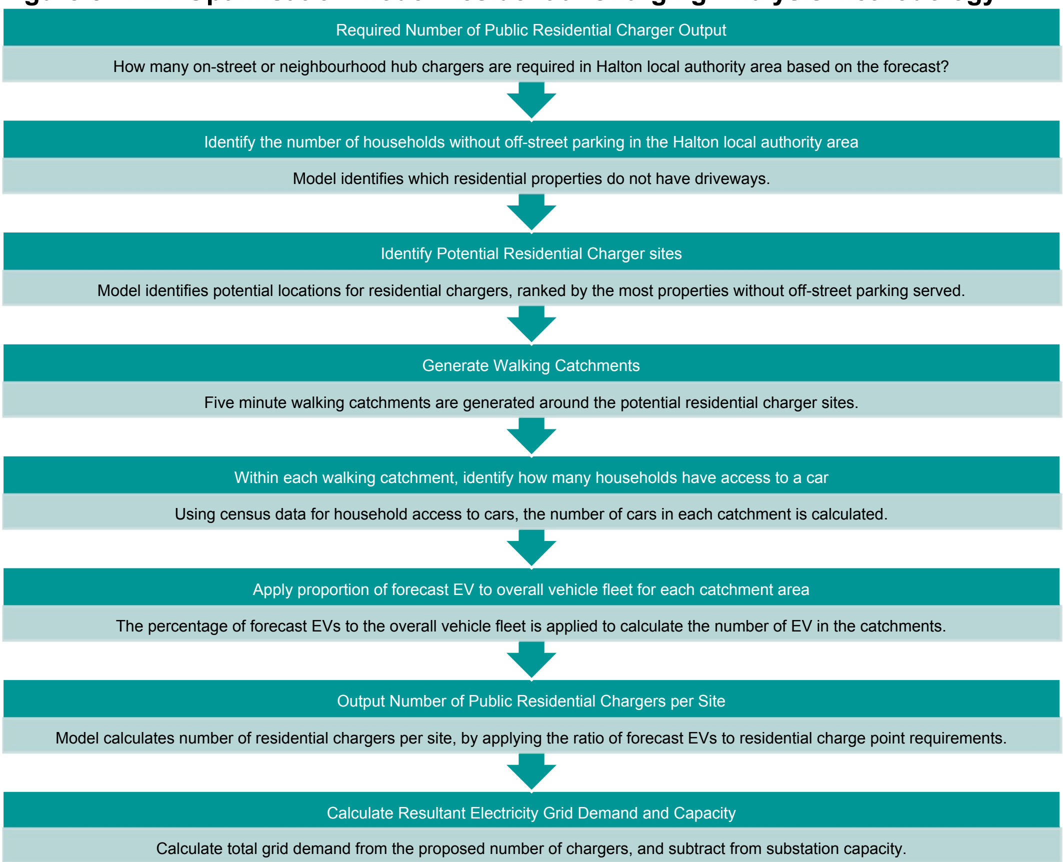
8.1 EV Model

The residential, destination and rapid charging EVCI forecast outputs were input to the Mott Macdonald in-house EV Optimisation tool, ECOS. The tool uses a range of information and sources, such as existing EVCI locations, primary substation capacity data from the DNO and Ordnance Survey AddressBasePlus data to generate a proposed EVCI charging network. There is a two stage analysis to this, one to identify on-street charging in residential locations and the other, destination (trip-attractor) charging. This section describes the analysis process.

8.1.1 Residential Charging Analysis

The residential charging analysis model process is shown in Figure 8.1 below. In summary, the model identifies households, without access to off-street parking and locates potential charging sites in close proximity based on walking distance and existing electricity grid capacity.

Figure 8.1: EV Optimisation Model Residential Charging Analysis Methodology



Source: Mott MacDonald

8.1.2 Destination Charging Analysis

The destination charging analysis model process is shown in Figure 8.2 below. Similar to the residential charging analysis, locations (public sector and commercial properties), such as car parks and service stations are identified based on the existing electricity grid capacity.

Figure 8.2: EV Optimisation Model Destination Charging Analysis Methodology

Required Number of Public Destination and Rapid Charger Output
How many destination and rapid chargers are required in the Halton local authority area based on the forecast?

↓

Identify public sector or commercial properties suitable for destination or rapid charging
Data from Ordnance Survey is used to identify public sector or commercial properties.

↓

Generate 2km (5 minute) driving radius around each identified site
A 2km driving distance, based on a five minute drive is generated around the potential charger sites.

↓

Within each catchment, identify how many households have access to a car
Using census data for household access to cars, the number of cars in each catchment is calculated.

↓

Apply proportion of forecast EV to overall vehicle fleet for each catchment area
The percentage of forecast EVs to the overall vehicle fleet is applied to calculate the number of EV in the catchments.

↓

Output Number of Public Destination and Rapid Chargers per Site
Model calculates number of chargers per site, by applying the ratio of forecast EVs to destination/rapid charge point requirements.

↓

Calculate Resultant Electricity Grid Demand and Capacity
Calculate total grid demand from the proposed number of chargers, and subtract from substation capacity.

Source: Mott MacDonald

8.2 Identification of Potential Sites

Using the 2032 central-case forecast, the ECOS tool was run to identify potential destination and residential on-street EVCI locations. The central forecast was run as it provides a balanced approach between optimistic and pessimistic forecasts. The identification process was based on the methodology outlined in the previous section, with further criteria also considered in the analysis as outlined below.

- **England Indices of Multiple Deprivation (IMD)** – ensure that charging infrastructure is available for all, regardless of sociodemographic background and to not favour higher deciles over lower deciles.
- **Existing petrol stations** – likely future hosts of rapid and ultra-rapid charging devices, as observed in other local authority areas.
- **Existing supermarkets and retail parks** – where destination and rapid charging is likely to be provided.
- **Other trip attractors** – including key public buildings such as community centres, schools, hospitals, leisure centres and country parks as other potential sites which may require support from the Council.
- **Trunk Roads** – proximity to well-trafficked routes (over 20,000 vehicle movements per day) which are likely to be key locations targeted by the private sector.
- **Electricity grid capacity** – using data provided by SPEN, the available primary substation capacity in the locality.

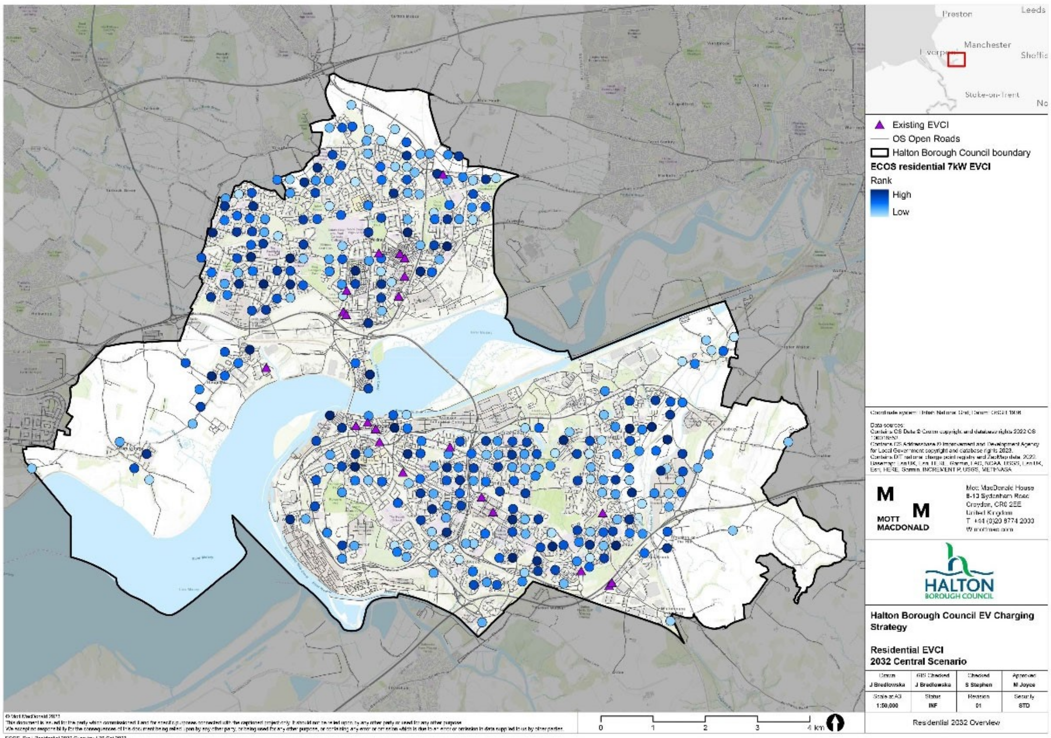
These criteria were considered in the analysis of potential sites for hosting EVCI forming a key part of the selection criteria. The locations identified by the ECOS tool are potential areas of high EV charging demand using the above criteria.

The outputs of the analysis are split between residential charging locations and destination charging catchments and are described in greater detail in Section 8.2.1 and Section 8.2.2 below.

8.2.1 Residential (On-Street) Charging Sites

The proposed locations for residential chargers identified by the ECOS tool are illustrated in Figure 8.3. The proposed locations are provisional and will be subject to further refinement through discussions with local authority officers, SPEN and charge point operators. A full list of locations identified from the analysis is provided in Appendix C.1. A higher resolution version of Figure 8.3 is included in Appendix C.2.

Figure 8.3: Potential Residential Charger Catchments – ECOS Model Output



Source: Mott MacDonald

Although 1,520 residential charge points have been identified within the central forecast (see Table 7.10), the model has 'capped' the number of potential residential charging locations at 316, as the model has effectively 'optimised' the local authority area to the degree that no other locations are required. Therefore, in order to reach the targeted provision, the model has assigned multiple charge points to each of the potential residential charger locations (a total of 1,520 devices spread across 316 locations). Each location has been ranked based on the availability of off-street parking, the numbers of private cars per household and the forecast EV uptake within the study area.

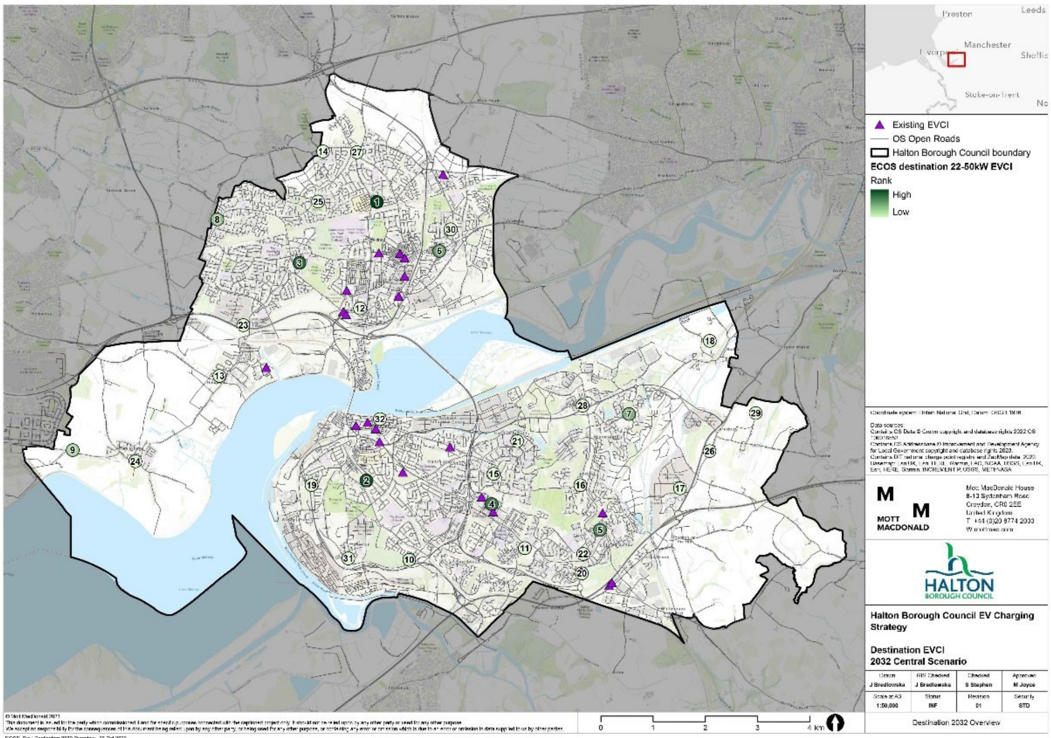
Each identified site is assumed to have a minimum of four 7kW devices, with many of the locations shown to support more than this based on the forecast demand levels. The highest ranked sites identified (sites 1 to 10) have been calculated to support between 12 and 16 7kW devices due to the high number of EVs forecasted for that particular area.

In light of the above, we suggest a more minimal provision at each site initially (for example one or two devices per site), ensuring coverage of the full local authority area. From there, the continued provision can be based on a demand-led approach; phasing and future rollout are likely to be heavily dependent on the inputs of any potential future operators. Further considerations for potential phasing have been described within later sections on commercial delivery and procurement (please see Section 10.4.2).

8.2.2 Destination Charging Catchments

The proposed catchments for destination chargers identified by the ECOS tool are illustrated in Figure 8.4.

Figure 8.4: Potential Destination and Rapid Charger Catchments – ECOS Model Output



Source: Mott MacDonald

For destination charging, the model identified 32 catchments within the study area where tripattractor based charging would likely have high demands and is based on the forecast number of EVs registered within a 2km catchment area.

As part of our analysis, each catchment area was reviewed, and potential destination or rapid charging sites were identified. For rapid charging sites, petrol stations, drive-throughs and supermarkets were identified as a potential host locations for a charging hub. Similarly, for slower destination charging sites, civic centres (community centres, town halls, leisure centres), train stations, hospitals and retail parks were identified, as these locations are likely to have longer dwell times.

The destination charging analysis has identified a total estimated provision of 496 7kW-22kW devices spread over 17 catchments. Rapid charging analysis has identified a further 228 50kW+

devices spread over 18 catchment areas. Some of the 32 catchments identified by the ECOS model did not have suitable locations for destination chargers, with EVCI demand assumed to be met by charging locations in neighbouring catchments.

The potential list of identified destination and rapid charging sites is summarised in Table 8.1 and Table 8.2 respectively. A higher resolution version of Figure 8.4 is included in Appendix C.5.

Table 8.1: Potential Destination (7kW to 22kW) Charger Sites (by Catchment)

Catchment ID	Potential Rapid Charging Site(s)	Estimated Destination Charging Provision
1	Widnes Station, Lunt's Heath Primary School, Saints Peter and Paul Catholic High School, Fairfield Primary School, Wade Deacon High School, Kingsway Leisure Centre, Widnes Vikings, St Bede's Catholic Junior School, Appleton Village Parking, Highfield Hospital, Widnes Town Hall, St Bede's Church	96
2	The Heath School, St Chads Catholic & Church of England High School, Runcorn Train Station Car Parks 1, 2, and 3, Runcorn Hill Car Park, Runcorn Town Hall, The Grange Academy, Runcorn Hill Park.	72
3	Ditton Community Centre, Ormiston Chadwick Academy, Oakfield Community Primary School, Queen's Avenue Shops, Hale Road Parking, Ashley High School, Chestnut Lodge School, St MICHAEL'S Parish Centre	64
4	Halton General Hospital x2, St Luke's Care Home, Runcorn Shopping City, Trident Retail Park, Hallwood Park Primary School	48
5	Runcorn East Station Car Park, Murdishaw West Community Primary School, Murdishaw Community Centre, St Martin's Catholic Primary School, Murdishaw Health Centre	40
6	Warrington Road Nursery School, St John Fisher Catholic Primary School, Warrington Road Car Park, Bridges Learning Centre	32
7	Cheshire Constabulary Custody Suite, Sandymoor Community Hall x2, Sandymoor Ormiston Academy	32
8	Hough Green Station, All Saints Upton Church of England V.C. Primary School	16
9	Wellington Hotel, Hale Park	16
10	The Church of Jesus Christ of Latter-Day Saint, The Cavendish High Academy	16
11	Our Lady Mother of the Saviour Catholic Church, Palace Fields Primary Academy	16
12	N/A	0
13	Pickering's Pasture	8
14	Cronton Sixth Form College	8
15	The Brow Community Primary School, St Mary's Church Hall	8
16	Windmill Hill Primary School	8
Catchment ID	**Potential Rapid Charging Site(s)**	**Estimated Destination Charging Provision**
17	N/A	0
18	Moore Primary School	8

19	Weston Point Community Primary School	8
20	N/A	0
21	N/A	0
22	N/A	0
23	N/A	0
24	N/A	0
25	N/A	0
26	N/A	0
27	N/A	0
28	N/A	0
29	N/A	0
30	N/A	0
31	N/A	0
32	N/A	0

Source: Mott MacDonald

Table 8.2: Potential Destination (50kW+) Charger Sites (by Catchment)

Catchment ID	Potential Destination Charging Site(s)	Estimated Destination Charging Provision
1	Aldi, Widnes Market, Widnes Shopping Park, Tesco Extra, Asda, Widnes Station	36
2	Co-op Food Grangeway, Costa Coffee, BP, B&M Store, Texaco, Heron Foods	36
3	Widnes SSC, Gulf Petrol Station, SPAR, Coop Food Ditton	24
4	Runcorn Shopping City, Trident Retail Park, Asda, McDonald's	24
5	Co-op Food Murdishaw, Runcorn East Station Car Park	12
6	Planet Ice Widnes, B&M Home Store	12
7	Sandmoor Local Centre x2	12
8	Upton Community Centre, Morrisons Daily	12
9	Ivy Farm Court	6
10	Ascot Stores	6
11	Shell	6
12	Caldwell Road Car Park	6
13	Co-op Food - Hale Bank	6
14	Cronton Garden Centre	6
15	Peva Petroleum	6
16	Co-op Food - Runcorn	6
17	Daresbury Park	6
18	N/A	0
19	N/A	0
20	Aldi	6
21	N/A	0
Catchment ID	**Potential Destination Charging Site(s)**	**Estimated Destination Charging Provision**
22	N/A	0
23	N/A	0

24	N/A	0
25	N/A	0
26	N/A	0
27	N/A	0
28	N/A	0
29	N/A	0
30	N/A	0
31	N/A	0
32	N/A	0

Source: Mott MacDonald

8.3 Grid Analysis

When the ECOS tool identifies a potential location or catchment, it records the nearest primary substation to analyse any high-level capacity constraints at that location. This provides an insight into whether there are limitations at the identified location. However, the model does not actively *avoid* a site if the potential demand is high and there is insufficient grid capacity. It merely illustrates where grid upgrades are likely to be required by SPEN, potentially with financial contributions from the Charge Point Operator (CPO).

The data on the electricity grid was obtained from the SPEN distributed generation data for the MANWEB area[43]. The spare capacity was calculated by subtracting the maximum recorded load, as a worse case, from the firm capacity to derive the remaining leeway. This remaining capacity was then compared with the total power draw of the required EV charging infrastructure from both the residential and destination charging analysis. This resulted in a new value for the remaining capacity.

The analysis identified some primary substations where grid capacity would be potentially constrained, where the resultant remaining capacity was under 2MVA. This would require some upgrades in the location by the DNO to support the 2032 demand.

The substations requiring capacity upgrades are shown in Table 8.3 below. **Table 8.3: Primary Substations Identified with Limited Capacity**

Primary Substation	Capacity (MVA)	Existing Substation Maximum Load (MVA)	Estimated Additional Load due to EV Charging (MVA)	Total New Load (MVA)	Spare Capacity (MVA)	Status
FRODSHAM LOCAL	8.17	6.54	0	6.54	1.63	Close to Capacity
RTZ	30	17.78	10.6	28.38	1.62	Close to Capacity
LUGSDALE	20	18.15	0.39	18.54	1.46	Close to Capacity

[43] Scottish Power Energy Networks, 2022. Distributed Generation Heat Map data. Available at: https://www.spenergynetworks.co.uk/pages/sp_manweb_heat_maps.aspx

Primary Substation	Capacity (MVA)	Existing Substation Maximum Load (MVA)	Estimated Additional Load due to EV Charging (MVA)	Total New Load (MVA)	Spare Capacity (MVA)	Status
MANOR PARK	10	8.34	0.34	8.68	1.32	Close to Capacity
NORTON CHAINS	10	8.34	0.62	8.96	1.04	Close to Capacity
APPLETON	20	18.15	1.42	19.57	0.43	Close to Capacity
RUNCORN CENTRAL	25	20.32	4.68	25	0	Over Capacity
HORNSBRIDGE	20	18.15	2.46	20.61	-0.61	Over Capacity

Source: Mott MacDonald

The model identifies the closest geographical primary substation to the site or catchment identified, therefore the actual primary substation which may be used at the site could be different.

Modelling outputs suggest that both the Runcorn Central and Hornsbridge primary substations may have particularly strained capacity in future; likely due to the close proximity of nearby amenities which in turn place higher (future) destination and rapid charging demand at these locations.

It is therefore recommended that as the charging network expands, EVCI which connect to the primary substations with potential capacity are prioritised over those with potentially constrained supply. That is, until upgrades can be made to the constrained primary substations to accommodate the potential additional load.

Further details on the assessed primary substations are summarised in Appendix D.

8.3.1 Grid Assessment Disclaimer

The potential number of EVCI that the primary substation could support is only an approximation, and no forecasting assessment was carried out on the potential future maximum load for other purposes such as residential developments or industrial uses. In addition, while a primary substation may theoretically accommodate additional load, the local grid infrastructure in the vicinity may require upgrades to support the proposed locations to provide sufficient power to a charging site.

Any future developments such as housing schemes or new National Grid connections have not been considered for the potential impact on the grid capacity. Therefore, ongoing engagement with SPEN is highly recommended throughout the infrastructure planning phases to ensure aspirations are aligned. Where constraints have been identified in the analysis, this information will be shared with SPEN to ensure clarity.

9 Implementation Considerations

This section outlines factors to be taken into account when identifying suitable sites for installing new EV chargers. Creating a comprehensive and efficient EVCI network that is available for all, regardless of sociodemographic background, entails an understanding of the end user (e.g. residents and visitors).

9.1 Residential On-Street Charging

Residential chargers usually have an output of up to 7kW and are expected to be used for extended periods of time, i.e. overnight or ad-hoc throughout the day.

When selecting a site for a new on-street residential charger, the charger should be placed closer to households that are more reliant on them i.e. households with no off-street parking, to improve accessibility, and meet the local / national parking standards guidance in place at the time of installation.

Residential on-street chargers should ideally be located within walking distance from the vehicle owner's residence. Whilst there is no national standard for the 'ideal walking distance' between an EV charger and a home, it can be assumed that most people are willing to walk 5 minutes, which is equivalent to approximately 400m.

The aim is to increase the number of households with no access to off-street parking to be within a 5 minute walk of a residential on-street charger. This can be done in two parts. Firstly, by improving the charger 5 minute walking catchment area; when choosing a location for a new charger, the catchment area should maximise the number of households without off-street parking within its boundary. Secondly, by improving the overall charger coverage within the local authority area; ensuring that the coverage of 5 minute walking catchment areas capture as many households as possible without off-street parking.

From the forecasted EVCI requirements in Table 7.10, the total required residential on-street chargers can be calculated by subtracting any existing residential EVCI (public and independently provided).

Some challenges involved with installing on-street EV chargers include a lack of space for a charging unit, and the hazards associated with trailing charging cables across pavements. However, there are emerging technologies that can be utilised in areas where installing a typical EV charger is required, but not practicable. Two examples of such technology are discussed in greater detail below.

9.1.1 Gully Charging

Households that do not have off-street parking but could charge by extending a cable from their property across a public footway, could benefit from installing a gully system to mitigate trip hazards associated with running a cable across a public footway. A gully system would enable a household to run a charging cable beneath the footway surface so that the footway remains uninterrupted. In addition to mitigating trip hazards, the benefit of a gully system is that it utilises home charging, which reduces the investment in on-street EVCI, and the number of public electricity grid connections and potential grid capacity upgrades required.

Additionally, this would benefit households as home charging is usually cheaper than public charging. However, unless parking spaces can be designated to specific vehicles and/or households, there is no guarantee that a household can park directly in front of their property to charge their vehicle.

Examples include:

- Gul-e[44], which was developed by Oxford City Council, and has been piloted in Oxfordshire and is currently being trialled in Bromley Borough, in London, and in Central Bedfordshire Council. Installation costs approximately £250 to £350 depending on location and programming, and the Gul-e units are between £329 to £499 each depending on quantity order. Wall charging units are not included.
- Kerbo Charge[45] which is currently being trialled in Durham County Council. The cost for the channel unit and installation, excluding the cost of a home charger, is £999 including VAT.
- Pavecross[46], which is currently being trialled in Shropshire Council. The cost for the channel unit, charger and cable, and installation is approximately £1500 including VAT.

9.1.2 Lamppost and Bollard Charging

Existing lampposts can be upgraded and utilised as ‘slow’ chargers. They typically have an output of up to 5.5kW, and therefore would suit residential charging. They typically integrate a chargepoint socket into the lamppost, thus removing the need for additional street infrastructure. Additionally, by using the existing electricity infrastructure, no upgrades or new connections to the electricity grid are required. Existing bollards that are situated near lampposts, can be turned into a ‘slow’ charger by utilising existing power from a nearby lamppost.

The location of lampposts and bollards will have to be taken into consideration to avoid trailing cables. They should be ideally located on the kerb of the pavement, though if they are located at the back of the pavement a gully system could be used in conjunction.

Two providers that have already implemented this solution throughout multiple local authorities across the UK are Ubitricity[47] and CityEV[48].

9.2 Destination and Rapid Charging

The process for identifying suitable locations for destination and rapid chargers is similar to the process for residential on-street chargers; locating chargers where there will be greater demand and ensuring good overall coverage within the local authority area.

From the forecasted EVCI requirements in Table 7.10, the total required destination and rapid chargers can be calculated by subtracting any existing fast and rapid EVCI (public and independently provided).

Considerations for implementing destination and rapid chargers include:

- Site ownership:
  - Private sector ownership includes sites such as petrol stations, which are likely future hosts for rapid and ultra-rapid chargers, based on observations in other local authority areas; and supermarkets and retails parks, where destination and rapid chargers are likely to be provided. Additionally, well trafficked routes, such as trunk roads, will be likely key locations for the private sector.

[44] Gul-e, Home - Gul-e | No Driveway? No Problem!
[45] Kerbo Charge, Kerbo Charge | Electric Car Street Charging
[46] Pavecross, Pavecross™ - An Introduction | Cross Pavement EV Charging
[47] Ubitricity, All you need to know when charging with ubitricity | EV driver hub
[48] CityEV, CityEV Charge Points for Business, Home & Public | UK Manufactured

  – Public sector ownership sites includes sites such as council-owned car parks, transport hubs, community centres, schools, leisure centres, parks, and health centres.

- Multiple use cases: for example, schools could have staff and visitors charging through the day, and local resident charging overnight.
- Dwell time: for example, council high street car park could have a mix of speeds; rapid chargers for short shopping trips and fast chargers for longer stays; and schools would have longer dwell times through the day, so lower output chargers would be more suitable.
- Placemaking: consider the placement of EVCI in promoting high streets and town centres, such as in public car parks near high streets instead of out-of-town retail. In addition, avoid placing EVCI in locations to encourage additional vehicle demand such as directly on a high street. Additionally, consider locating chargers in transport hubs to integrate EVs with other modes of transportation.

9.3 Cost Estimates

There are several variables that can impact the cost of EVCI installation, including civil works (which can vary significantly between sites), DNO connection and wider grid upgrades.

Once suitable charger locations have been identified, site surveys will be required for each site to ensure that the proposed infrastructure can be accommodated.

High-level cost estimates for hardware and installation, and DNO connection have been calculated for both 2027 and 2032 central charger forecasts. These are shown in Table 9.1 and Table 9.2, and exclude VAT.

Table 9.1: 2027 Central Forecast Cost Estimates (ex VAT)

	7kW	22kW	50kW	Total
Hardware and Installation	£3,700,000	£1,400,000	£500,000	**£5,600,000**
DNO Connection	£2,200,000	£800,000	£300,000	**£3,300,000**
Total	**£5,900,000**	**£2,200,000**	**£800,000**	**£8,900,000**

Source: Mott MacDonald

Table 9.2: 2032 Central Forecast Cost Estimates (ex VAT)

	7kW	22kW	50kW	Total
Hardware and Installation	£9,900,000	£3,600,000	£1,400,000	**£14,900,000**
DNO Connection	£5,900,000	£2,100,000	£800,000	**£8,800,000**
Total	**£15,800,000**	**£5,700,000**	**£2,200,000**	**£23,700,000**

Source: Mott MacDonald

These figures represent the hypothetical costs associated with the delivery of the forecasted number of chargers required to meet the anticipated EV demand in Halton, as set out in Section 7.5. This is irrespective of whether EVCI would be funded by the Council, private sector, or a combination of both. As stated in our approach to identifying charger locations (set out in Section 8), it is likely that at least some of the future forecasted requirement will be provided independently of public sector intervention, with a proportion of the above costs borne by private sector entities such as supermarkets or petrol station chains (i.e. locations likely to host EVCI in future).

Other costs to consider includes operational costs, which include network operating costs (such as payment processing), maintenance and repair costs, electricity costs, contract management costs and inflation.

As detailed in Section 5, the local DNO, SPEN, should be engaged to provide accurate connection costs for each charger location, once identified, as this is dependent on grid capacity in the locality and existing capacity constraints. SPEN has a connection cost estimator[49] available online, which generates cost estimations for connecting to a specific point on their electricity network.

[49] SP Energy Networks, ConnectMore EV connection Cost Estimator, available at: ConnectMore EV Connection Cost Estimator - SP Energy Networks

Assumptions made are detailed in Appendix A.

10 Commercial Delivery

This section explores and assesses different commercial models for the delivery of a public charging network in Halton. The Local Electric Vehicle Infrastructure (LEVI) Fund encourages local authorities to improve the expansion and commercialisation of local EVCI, through engaging with the chargepoint industry. A range of commercial arrangements can be used as part of the LEVI Fund criteria, including but not limited to 'own and operate', 'public private commercial partnership', 'joint venture', and 'land lease'.

10.1 Scope of Commercial Delivery

The installation and operation of an EVCI network is comprised of different components, all of which need to be considered by any future commercial model. The main components are summarised in the Table 10.1.

Table 10.1: EVCI Components

Assets	Asset Life-Cycle Costs	Operating Costs	Income Sources
1. Underground Connection: • One-off cost • Cost uncertainty • Potentially high costs **2. Above Ground Chargepoint:** • Technology sensitive • Operator specific • Cost certainty	• Purchase • Installation • Maintenance • Upgrade • Renewal	• Land Lease • Power Chargers • Customer Interface • Back Office • Enforcement	• User Tariffs • Grant Support

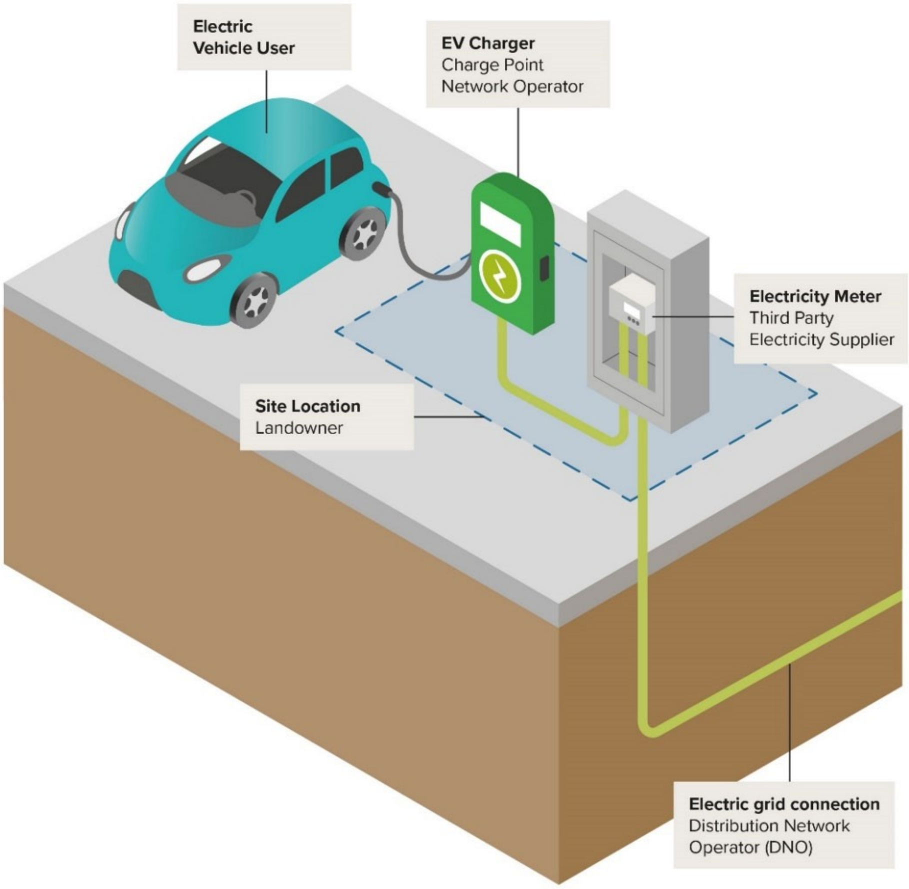
This shows that the infrastructure itself is comprised of two relatively independent components:

- **The underground connection** – this provides the power supply from the grid to the chargepoint. It is a one-off expense, but can be a relatively high cost and subject to variability depending on distance to the grid etc. However, from March 2023[50], that variability will be reduced by the DNO bearing the cost of any network upgrades required to support new chargepoint demands, e.g. by upgrading substations etc. The cost of the connection to the network will still be the responsibility of the applicant. This will reduce cost uncertainty for the overall underground infrastructure requirement.
- **The above-ground chargepoint** – this provides the interface between the power supply and the EV user. Chargepoints are consumable items, being much more subject to wear and tear than the underground connection and also to technical obsolescence as standards and technology changes over time. Conversely, the cost of a chargepoint is lower than the underground connection and much less subject to uncertainty.

The infrastructure components and their typical ownership are summarised in Figure 10.1.

[50] Access and Forward-Looking Charges Significant Code Review: Decision and Direction | Ofgem

Figure 10.1: Chargepoint Infrastructure Components and Typical Ownership



Source: Mott MacDonald

10.2 Commercial Delivery Models

As noted in Table 10.1 above, the EVCI network that the Council chooses to implement will generate capital and operating costs as well as operating revenue. The commercial model determines how these costs and revenues are distributed across public and private sector parties.

On that basis, there are a minimum of three potential commercial models to consider, as follows:

- Fully private-sector-led model;
- Fully public-sector-led model, and
- Some form of public-private partnership hybrid.

In the following table, we identify four main commercial delivery models to consider, which include the first two of the above models (Model A and Model D) plus two types of hybrid models (Model B and Model C).

Table 10.2: Commercial Delivery Model Options

	A Privately Owned and Operated	B Privately Operated	C Privately Operated (with Risk Share)	D Public Sector Owned and Operated
Approach	Private sector ownership and operation of network	Public sector ownership (at end of concession contract) with private sector operation and investment	Public sector ownership (at end of concession contract) with private sector shared risk/revenue operation	Public sector ownership and operation of network
Existing and New EVCI Asset Ownership	Private	Public (concession model)	Public (concession model)	Public
Loss Making Assets	Bundled with profit-making assets	Bundled with profit-making assets	Bundled with profit-making assets	Public
Operator	Private	Private	Private	Public
Risk to Council	No	No	Yes	Yes
Revenue Stream to Council	No	No	Yes	Yes
Tariff Setting	Private	Private / Public	Private / Public	Public
LEVI Eligibility	Yes	Yes	Yes	Yes

Source: Mott MacDonald

Some initial observations from this table are as follows:

- Model A assumes that the private sector would own and operate all existing and new assets, giving them greatest control over tariff setting and charger locations.
- Model B assumes that the private sector would invest in the network via a concession model, meaning the public sector would ultimately own all existing and new assets. However, as the network would be leased via a concession model to a private sector operator, the operator would receive all revenue but assumes all asset and operating risk.
- Model C is the same as Model B, except that the public sector also enters into a risk and revenue sharing agreement with the operator (as part of the terms of the concession), receiving a level of income for assuming a level of operating risk.
- Model D assumes that the public sector would own and operate all existing and new assets, giving them full control over tariff setting and charger locations.

Further detail on each of the commercial delivery models has been included in Sections 10.2.1 to 10.2.4 below.

10.2.1 A (Privately Owned and Operated)

Description	Pros	Cons	Example
Full market-led network, with private sector funding, owning, operating and maintaining all existing and new EVCI assets. Operator collects all revenue and assumes all commercial risk. Long concessions or lease arrangements required to cover high initial capex, and local authority retains	• No capital or revenue risk to local authority • Minimal local authority resource commitment	• Little or no local authority control over charger location or tariff • No user revenue share for local authority (may be lease payment) • Potential contestability issues over longer term	• **Local Authority:** *Mid-Devon* • **Type of contract:** *Supplier fully funded and owned installation* • **Revenue:** *Local authority received small*

Description	Pros	Cons	Example
little/no control over either charger locations or tariff level. Private sector retains control of belowground asset beyond commission lifespan, unless specified in contract.		• Potentially unviable to private sector	*rental income as landowner* • **Contract length:** *20-year lease agreement*

10.2.2 B (Privately Operated)

Description	Pros	Cons	Example
Local authority ownership of all EVCI assets with private sector operation of network. Assets funded through combination of private sector concessionaire investment and grant subsidy. Operator collects all revenue and assumes all commercial risk (including of existing assets). Likely long concessions required to recover high initial investment, Local authority retains full control over charger location and partial control over tariff level.	• Greater LA control over charger specification, location and tariff • Limited capital and no revenue risk to local authority • Low local authority resource commitment • Likely to be viable to private sector depending on terms	• No user revenue share for local authority (may be concession payment)	• **Local Authority:** *Hampshire County Council* • **Type of contract:** *Based on combination of grant and private funding* • **Revenue:** *Revenue to supplier, except for 1% standing charge to Council* • **Contract length:** *Up to 15 years*

10.2.3 C (Privately Operated with Risk Share)

Description	Pros	Cons	Example
As Model B, but local authority also take share of revenue in exchange for share of risk.	• Greater LA control over charger location and tariff • No capital risk to local authority • Potential revenue stream to local authority	• Local authority exposed to commercial risk, which could exceed revenue gain • Higher resource commitment than models A and B • Potentially unviable to private sector	• **Local Authority:** *Oxford* • **Type of contract:** *Concession agreement covering on-street charge points funded by Go Ultra Low Cities Scheme grant* • **Revenue:** *Most to supplier with a revenue share to the Council once charge points are profitable* • **Contract length:** *Sites leased to operators for 4 + 4 years*

10.2.4 D (Public Sector Owned and Operated)

Description	Pros	Cons	Example
			• **Local Authority:** *West of England*

Fully local authority funded, owned, operated and maintained network, with public sector funding all infrastructure installation, collecting all revenue and assuming all commercial risk. Local authority retains full control over charger location and over tariff level.	• Full local authority control over charger location and tariff • Full revenue stream income	• Upfront capex for full asset base • Full resource commitment on local authority • Full CAPEX and OPEX risk • Required grant subsidy or borrowing levels potentially unavailable to local authority	• **Type of contract:** *Own and operate model funded by Go Ultra Low Cities funding with maintenance carried out by charge point supplier* • **Revenue:** *All revenue goes to local authorities* • **Contract length:** *5 years*

10.3 Existing Commercial Arrangement

Halton Borough Council currently has a public-private commercial partnership with Connected Kerb for the deployment of on-street EVCI throughout the local authority area.

At the time of writing, the Council has not identified a preferred commercial delivery model under which future EVCI would be delivered across the Halton local authority area. It is therefore recommended that the Council undertake further work to establish its own appetite to financial risks, views on the importance on revenue generation as well as establishing the likely available resources to be able to support the future provision of EVCI.

10.4 Procurement Considerations

Local authorities can procure EV charging infrastructure through one of two approaches:

- A bespoke contract award process under public procurement rules, for example through a restricted procedure; or
- Via a framework or dynamic purchasing system (DPS).

While the first option allows the local authority maximum flexibility in setting the terms of the contract, frameworks and DPSs provide a proven off-the-shelf procurement route which can reduce resources, time and costs.

10.4.1 Collaboration

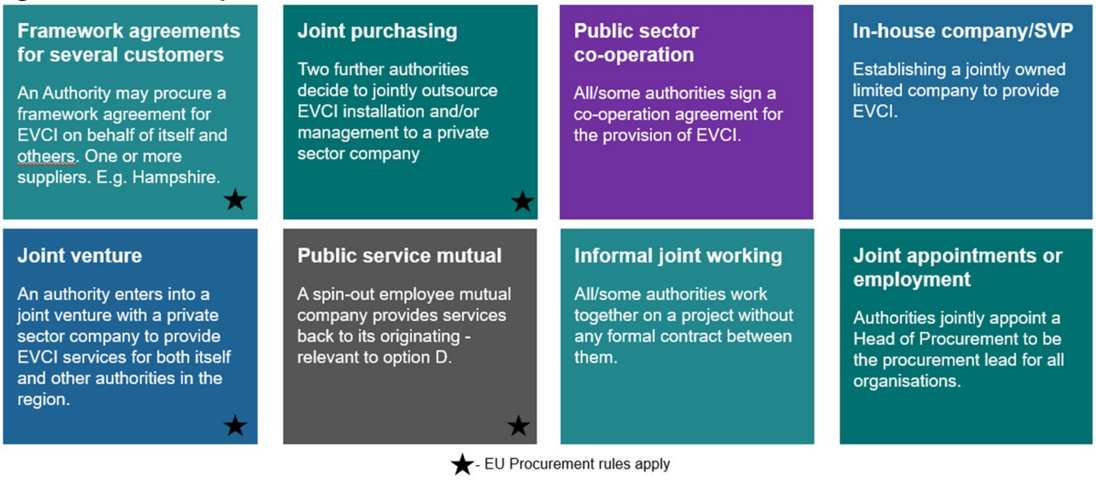
Collaborative or joint procurement means combining the procurement actions of two or more contracting authorities or organisation. Collaborative procurement has benefits, such as:

- Lower resource requirements for member authorities and reducing the duplication of efforts (e.g. tendering, managing)
- Possible lower prices, this is because combining purchasing activities can lead to economies of scale. This is likely to lead to more attractive offers from suppliers who are benefiting from lower unit costs. This benefit may be particularly for small contracting authorities these advantages can be quite significant.
- Joining the procurement actions of several authorities also enables the pooling of different skills and expertise between the authorities, this has the potential to foster innovation but also to give local authorities access to expertise they may otherwise have not had access to.
- Under certain procurement routes (detailed later in this section) there is potential to provide income to the lead authority

- If a sole supplier framework is chosen there will be consistency of provision) across authorities.

However, there are also disadvantages such as relatively high resourcing demand for the lead authority in terms of time and skills, and legal risks including limitation of liability, data protection and tax treatment. Collaborative procurement can be structured in a number of ways. Figure 10.2 summarises the main options.

Figure 10.2: Example Structures of Collaborative Procurement



Source: Mills and Reeve, Shared Services, Shared services | Procurement Portal | Mills & Reeve

10.4.2 Contract Scope

The procurement process will need to specify the scope of the contract. This could be for a single supplier to provide all chargers over the full geography, or to split the contract across more than one supplier by charger type, sub-geography, or both. Multiple contracts increase administrative complexity and potentially lose economies of scale, but they could increase market competition and generate interest from a wider pool of suppliers.

Similarly, the proposed network could be rolled out in one of two ways:

1. Sequentially by geography;
2. In parallel across the full district

There are pros and cons to each approach, and these are summarised in Table 10.3.

Table 10.3: Pros and Cons of Phasing Approaches

Approach	Pros	Cons
Sequential by under sub-area	Increases likely pool of bidders concession models (lower upfront capital commitment) • Allows time to understand market dynamics and allows adaptation as you go	• Risk of "cream skimming" – will a concessionaire ever get round to the more difficult/remote sites? • May lead to slower adoption of EV in areas which are later to receive EVCI
Approach	**Pros**	**Cons**
	Possibility of multiple concessions, allowing some degree of more localised competition	

Parallel across district	- Gets infrastructure in place rapidly, and limits scope for 'cream skimming' - Addresses any accessibility concerns in regional / rural communities, and supports social equity objectives	- High cost – may limit market participation under concession models and/or lead to higher cost to LA - May lead to overprovision before local market dynamics are understood

Source: Mott MacDonald

Details on concession duration can be developed during the procurement phase of the project. Generally, shorter concession periods are likely to need a greater level of subsidy due to their shorter payback period. Some concerns around longer-concession periods around:

1. Excessive concessionaire earnings; and
2. Lack of asset renewal can be addressed via contract terms e.g. via revenue sharing mechanisms and specified maximum periods before renewal.

11 Next Steps

Having established the strategy for the future provision of EVCI across the Halton local authority area, the final section of this report looks ahead to the next steps required to enable the Council to realise its ambitions in delivering EVCI.

11.1 Continued DNO Engagement

As stated in Section 5, initial efforts have been made to engage SPEN, however, more in-depth discussions are now required in order to better understand how the EVCI proposed as part of this strategy will impact upon the distribution network.

Discussions should highlight any risks in delivering EVCI where current distribution networks are at or near to distribution capacity. As stated within Section 8, while an initial grid capacity assessment has been undertaken using publicly available data sources, the outputs will require detailed validation and review by SPEN.

Once confirmed, this can help facilitate discussions and crucially in identifying upgrade pathways in the coming years to support the levels of EV demand forecasted across the Halton local authority area. For the Council, DNO engagement will assist in prioritising prioritise EVCI investment in line with planned upgrades to the distribution network. This would mitigate any potential issues resulting from installing EVCI which is then unable to be connected to the network, impacting commercial agreements and warranties.

11.2 Detailed Charge Point Operator Engagement

While broad engagement has been undertaken to understand CPO preferences around key elements of EVCI provision, further detailed engagement with potential suppliers is recommended. This could include a PIN exercise which specifically demonstrates the suppliers' appetite for operations within the region and could therefore be used to guide Council preferences on commercial delivery models and establish greater detail around technical specifications and preferred contract terms.

If a regional approach is decided, it may also be beneficial for the combined authority to engage in a similar market engagement activity, allowing for an understanding of the best options available for regional and joint commercial and procurement approaches.

11.3 Establish Commercial Preferences

At the time of writing, the Council has not identified a preferred commercial delivery model under which future EVCI would be delivered across the Halton local authority area. It is therefore recommended that the Council undertake further work to establish its own appetite to financial risks, views on the importance on revenue generation as well as establishing the likely available resources to be able to support the future provision of EVCI.

11.4 Establish Funding

The Council should now seek and confirm available public sector funding and continue to investigate how this could be supported through leveraging private sector investments; either through a concession basis, or through leasing. Further market engagement and establishing a preferred commercial and procurement route may support different funding mechanisms.

11.5 Continued Refinement of Site Identification

Using the outputs from the ECOS modelling, further detailed work should be undertaken to identify feasible locations within Halton. This may include:

- Consider any relevant Place-Based principles, such as low traffic neighbourhoods and ensure proposed locations support these aims.
- Confirm the feasibility of hosting EVCI at council-owned facilities.
- Develop relationships with local businesses and the private sector to understand future plans for the provision of charge points in existing developments.
- Continue to engage with social housing providers such as Halton Housing to support the installation of EV charge points for residential use.
- Using the ranking identified by the ECOS model to prepare a detailed phasing/delivery plan which identifies high priority sites for implementation in specific future years (likely informed by future discussions with SPEN).
- Develop a process to monitor the registered number of EVs within the council area against the forecasts outlined in this strategy to identify opportunities for further interventions in charging infrastructure, if for example the pace of installation does not keep up with EV registrations. It is recommended EV uptake is monitored yearly, with a full review in two years' time and then at five-year intervals thereafter.

Appendices

A. Assumptions Log

ID	Workstream	Subject	Assumption Description	Any supporting data?	Date Identified
1	Demand Forecast	Forecasting of the total number of EVs	No vehicle fleet age/survival rate has been applied.	N/A	September 2023
2	Demand Forecast	Proportion of first-time registered vehicles in Halton	It has been assumed that the proportion of first-time registered vehicles in Halton to first-time registered vehicles in the UK, is the same as the proportion of the total number of cars registered in Halton to the total number of cars registered in the UK.	N/A	September 2023
3	Demand Forecast	BEV cars and LGVs	All first-time registered cars and LGVs in 2036 will be BEVs due to the ban of petrol and diesel cars and LGVs in 2030 and PHEV cars and LGVs in 2035.	N/A	September 2023
4	Infrastructure Forecast	Plug-In Hybrid Vehicle Energy Demand	PHEVs are assumed to have 37% of electricity requirements than BEV due to driving in electric only mode 37% of the time.	International Council on Clean Transportation	September 2023
5	Infrastructure Forecast	On/Off-street Parking Percentages	No localised data available specific to HBC area, therefore utilised the second-most deprived area (in line with HBC) for the proportion of on/off-street parking at 54% on-street.	England Housing Survey - Table DA2202 (SST2.5)	September 2023
6	Infrastructure Forecast	ULEV Annual Vehicle km	The calculated annual average vehicle km driven is assumed to be the same as BEV - i.e. no behaviour change based on fuel type.	N/A	September 2023
7	Infrastructure Forecast	Vehicle Efficiency	Assumed that current BEV efficiency does not improve and remains the same in the future forecast years as current vehicle models available in 2022, as a conservative assumption.	N/A	September 2023
8	Infrastructure Forecast	Vehicle Mileage	Assumed the DfT UK vehicle mileage by vehicle type is the same distribution as the Halton.	N/A	September 2023
9	Infrastructure Forecast	Proportion of Vehicle Types	Assumed the future proportion of vehicle types for Halton remains the same as per the 2021 data.	N/A	September 2023
10	Infrastructure Forecast	Charger Utilisation	The average daily charge time has been calculated based on the methodology outlined in the ICCT document for public and fast charging infrastructure. This approach is based on the forecast number of EV per million population using an evidence-based formula.	International Council on Clean Transportation	September 2023
11	Infrastructure Forecast	Annualisation Factor	Annualisation factor assumed to be 362 days	N/A	September 2023

ID	Workstream	Subject	Assumption Description	Any supporting data?	Date Identified
12	Infrastructure Forecast	LGV Ownership	Assumed Halton LGV ownership is the same as UK wide - 48% are privately owned.	DfT Vehicle Licensing VEH0105	September 2023
13	Infrastructure Forecast	Forecast Traffic Volumes	DfT Table 1 Road Traffic Forecasts: Scenario 7 Shift to EVs - traffic in England and Wales used to derive future traffic volumes in the HBC area.	RFT18	September 2023
14	Cost Estimate	Hardware and Installation	Hardware and installation costs have been derived from Energy Saving Trust's Electric Vehicle Infrastructure Guide. The values have been factored up by 17% (inflation from 2021 to July 2023 – using Bank of England's inflation calculator).	https://evinfrastructureguide.com/chapter/powering-yourchargepoints/costconsiderations/	September 2023
15	Cost Estimate	DNO connection	DNO connection costs have been derived from SP Energy Networks' Electric Vehicle Handbook. The values have been factored up by 17% (inflation from 2021 to July 2023 – using Bank of England's inflation calculator).	https://www.spenergynetworks.co.uk/userfiles/file/Electric_Vehicle_Handbook.pdf	September 2023
16	Grid Capacity	Primary substation data	Data taken from the SPEN Distributed Generation Heat maps. Spare capacity is calculated as follows: Spare_Capacity_MVA = Group_Firm_Capacity_MVA - Group_Maximum_Load_MVA. This is a worst-case scenario for spare capacity at primary substations as Maximum_Load_MVA is the highest recorded load. In reality the load may very rarely reach this level.	N/A	September 2023
16	Grid Capacity	Primary substation data	Data taken from the SPEN Distributed Generation Heat maps. Spare capacity is calculated as follows: Spare_Capacity_MVA = Group_Firm_Capacity_MVA - Group_Maximum_Load_MVA. This is a worst-case scenario for spare capacity at primary substations as Maximum_Load_MVA is the highest recorded load. In reality the load may very rarely reach this level.	N/A	September 2023

B. Existing EVCI

B.1 List of Existing EVCI Locations

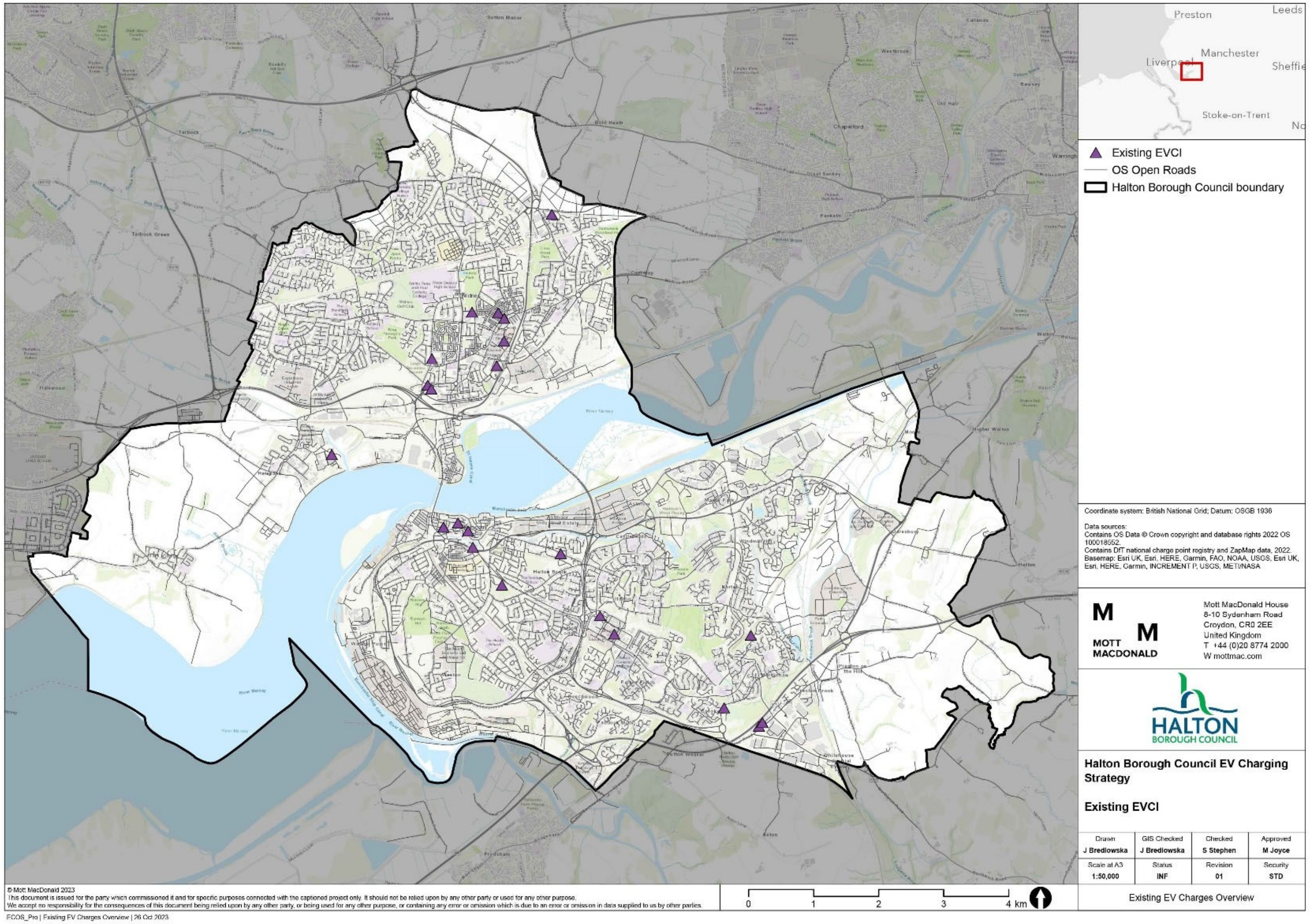
Site	Operator	Postcode	X	Y	Location	Private/ Council	Sector	EVCP	Sockets	Max Output
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Wellington Street, Halton	Connected Kerb	WA7 1LB	351058	383045	Car Park	Private	Destination	1	1	7kW
Church Street	LiFe	WA7 1LL	351283	383111	On-Street	Council	Destination	1	2	7kW
High Street	Other	WA7 1AP	351438	382985	Car Park	Private	Destination	1	1	22kW
High Street	Other	WA7 1AP	351438	382985	Car Park	Private	Destination	1	1	22kW
High Street	Other	WA7 1AP	351438	382985	Car Park	Private	Destination	1	1	22kW
High Street	Other	WA7 1AP	351438	382985	Car Park	Private	Destination	1	1	22kW
Ten Lock Flight Pub & Restaurant	Osprey	WA7 5TW	351511	382738	Car Park	Private	Journey	1	2	50kW
Runcorn Town Hall/Heath Road	Swarco E.Connect	WA7 5TD	351958	382154	Car Park	Private	Destination	1	2	22kW
Halton Road	Connected Kerb	WA7 5RW	352861	382638	On-Street	Private	Destination	1	1	7kW
Halton Road	Connected Kerb	WA7 5RW	352861	382638	On-Street	Private	Destination	1	1	7kW
Pentagon Motor Group Ltd Runcorn	Mer	WA7 2XP	353466	381678	Car Park	Private	Destination	1	2	22kW
Queen of Hearts Pub	Unknown	WA7 6SA	355372	380265	Car Park	Private	Destination	1	2	22kW
Shopping City	Pod Point	WA7 2PE	353685	381395	Car Park	Private	Destination	1	2	7kW
Runcorn East Railway Station	bp pulse	WA7 6EP	355784	381376	Car Park	Private	Destination	1	2	7kW
Premier Inn Runcorn	Pod Point	WA7 3BB	355909	379982	Car Park	Private	Destination	1	2	7kW
Wellfield Business Park	Unknown	WA7 3FR	355962	380039	Car Park	Private	Destination	1	1	7kW
Wellfield Business Park	Unknown	WA7 3FR	355962	380039	Car Park	Private	Destination	1	1	7kW

Site	Operator	Postcode	X	Y	Location	Private/ Council	Sector	EVCP	Sockets	Max Output

Site	Operator	Postcode	X	Y	Location	Private/ Council	Sector	EVCP	Sockets	Max Output
Wellfield Business Park	Unknown	WA7 3FR	355962	380039	Car Park	Private	Destination	1	1	7kW
Wellfield Business Park	Unknown	WA7 3FR	355962	380039	Car Park	Private	Destination	1	1	7kW
Everglass Park Hotel	Vend Electric	WA8 3UJ	352726	387858	Car Park	Private	Destination	1	1	22kW
Everglass Park Hotel	Vend Electric	WA8 3UJ	352726	387858	Car Park	Private	Destination	1	1	22kW
Appleton Village Halton	Connected Kerb	WA8 6SE	351498	386354	Street	Private	Destination	1	1	7kW
Appleton Village Halton	Connected Kerb	WA8 6SE	351498	386354	Street	Private	Destination	1	1	7kW
Appleton Village Halton	Connected Kerb	WA8 6SE	351498	386354	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Routledge Street Halton	Connected Kerb	WA8 6LG	351900	386342	Street	Private	Destination	1	1	7kW
Albert Road Halton	Connected Kerb	WA8 6LG	351993	386258	Street	Private	Destination	1	1	7kW
Albert Road Halton	Connected Kerb	WA8 6LG	351993	386258	Street	Private	Destination	1	1	7kW
Albert Road Halton	Connected Kerb	WA8 6LG	351993	386258	Street	Private	Destination	1	1	7kW
Albert Road Halton	Connected Kerb	WA8 6LG	351993	386258	Street	Private	Destination	1	1	7kW
Albert Road Halton	Connected Kerb	WA8 6LG	351993	386258	Street	Private	Destination	1	1	7kW
Albert Road Halton	Connected Kerb	WA8 6LG	351993	386258	Street	Private	Destination	1	1	22kW
Morrisons Widnes	Genie Point	WA8 6UA	351990	385912	Car Park	Private	Journey	1	2	50kW
Tesco Extra Widnes	Pod Point	WA8 7YT	351877	385529	Car Park	Private	Journey	1	2	50kW
Tesco Extra Widnes	Pod Point	WA8 7YT	351877	385529	Car Park	Private	Destination	1	2	7kW
Tesco Extra Widnes	Pod Point	WA8 7YT	351877	385529	Car Park	Private	Destination	1	2	22kW
Widnes Vikings Stadium	LiFe	WA8 7DZ	350881	385638	Car Park	Private	Destination	1	2	7kW
McDonald's Widnes Moor	InstaVolt	WA8 7AP	350817	385231	Car Park	Private	Journey	1	2	50kW
McDonald's Widnes Moor	InstaVolt	WA8 7AP	350817	385231	Car Park	Private	Journey	1	2	50kW

Foundry House	Unknown	WA8 8GT	349341	384161	Car Park	Private	Destination	1	2	22kW
Foundry House	Unknown	WA8 8GT	349341	384161	Car Park	Private	Destination	1	2	22kW
Bristol Street Motors Nissan Widnes	Nissan Dealerships	WA8 7AL	350872	385172	Car Park	Private	Destination	1	2	7kW

B.2 Plan of Existing EVCI Locations



Source: Mott MacDonald

C. ECOS Modelling Outputs

C.1 List of Proposed Residential Charging Locations

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
1	Greenway Road	WA7 4NT	253	0	0	16	112	PICOW FARM ROAD
2	Actons Wood Lane	WA7 1GX	187	0	0	16	112	NORTON CHAINS
3	Bridge Street	WA7 1BL	142	0	0	12	84	MERSEY ROAD
4	Warrington Road	WA8 0AU	141	0	0	12	84	USAC
5	The Glen	WA7 2TA	133	0	0	12	84	RUNCORN CENTRAL
6	Old Coach Road	WA7 1GQ	132	0	0	12	84	PICOW FARM ROAD
7	Hale Road	WA8 8SD	128	0	0	12	84	DITTON
8	Abbey Road	WA8 8AD	121	0	0	12	84	GAVIN ROAD
9	Tilbury Place	WA7 6JE	119	0	0	12	84	MURDISHAW
10	Squires Avenue	WA8 7LZ	114	0	0	12	84	APPLETON
11	Ansdell Road	WA8 6RQ	110	0	0	8	56	APPLETON
12	Harrison Lane	WA8 8TN	107	0	0	8	56	RTZ
13	The Uplands	WA7 2UB	105	0	0	8	56	RUNCORN CENTRAL
14	St Austell Close	WA7 6AN	102	0	0	8	56	MURDISHAW
15	Lockgate West	WA7 6LE	102	0	0	8	56	MANOR PARK
16	-	WA7 1DY	102	0	0	8	56	DARESBURY NPL
17	-	WA4 6SS	101	0	0	8	56	DARESBURY NPL
18	Terrace Road	WA8 0EZ	101	0	0	8	56	PITT STREET
19	Hough Green Road	WA8 4XN	97	0	0	8	56	HOUGH GREEN
20	Woodhatch Road	WA7 6AF	97	0	0	8	56	RUNCORN CENTRAL
21	Kenview Close	WA8 8XA	95	0	0	8	56	RTZ
22	Page Lane	WA8 0AE	94	0	0	8	56	LUGSDALE
23	Stenhills Crescent	WA7 5EE	94	0	0	8	56	HALTON ROAD
24	Liverpool Road	WA8 8HA	92	0	0	8	56	DITTON

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
25	Alderwood Court	WA8 9DR	92	0	0	8	56	DITTON
26	Cunningham Road	WA8 8EE	89	0	0	8	56	DITTON
27	-	WA7 1QY	88	0	0	8	56	DARESBURY PARK
28	Grangeway	WA7 5YW	86	0	0	8	56	CLIFTON
29	-	WA7 5HJ	85	0	0	8	56	CLIFTON
30	-	WA7 4HY	84	0	0	8	56	PERCIVAL LANE
31	Halton Brook Avenue	WA7 2NW	84	0	0	8	56	HALTON ROAD
32	Farnworth Street	WA8 9LH	82	0	0	8	56	HORNSBRIDGE
33	Crown Avenue	WA8 8AT	82	0	0	8	56	GAVIN ROAD
34	-	WA4 4AW	80	0	0	8	56	DARESBURY PARK
35	-	WA8 9PA	79	0	0	8	56	DITTON
36	Ireland Road	L24 4AP	76	0	0	8	56	ALDERWOOD AVE
37	Barnfield Avenue	WA7 6DT	74	0	0	8	56	MURDISHAW
38	Haddon Drive	WA8 4PP	73	0	0	8	56	HOUGH GREEN
39	St Wilfreds Road	WA8 3AP	72	0	0	8	56	HORNSBRIDGE
40	Catherine Street	WA8 7AJ	72	0	0	8	56	MERSEY BRIDGE
41	-	WA8 6PH	71	0	0	8	56	LUGSDALE
42	Hampton Court Way	WA8 3ET	70	2	0	6	56	HORNSBRIDGE
43	Cherrysutton	WA8 4TF	70	0	0	8	56	HOUGH GREEN
44	Hill Top Road	WA4 4GA	69	0	0	8	56	DARESBURY PARK
45	Mansell Close	WA8 9WL	68	0	0	8	56	HORNSBRIDGE
46	Marina Lane	WA7 6HJ	67	0	0	8	56	MURDISHAW
47	Fox Street	WA7 5BP	66	0	0	8	56	PICOW FARM ROAD
48	Meadway	WA7 2DX	65	0	0	8	56	RUNCORN CENTRAL
49	Chester Close	WA7 2HY	61	0	0	8	56	MACKAMAX

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
50	Edendale	WA8 4YD	61	0	0	8	56	HOUGH GREEN
51	Brindley Street	WA7 1EF	59	9	0	3	84	PICOW FARM ROAD
52	Crow Wood Lane	WA8 3LY	59	0	0	4	28	HORNSBRIDGE
53	Mill Green Lane	WA8 3UP	59	0	0	4	28	HORNSBRIDGE
54	Delph Lane	WA4 6SS	58	0	0	4	28	DARESBURY NPL
55	-	WA7 6QT	57	0	0	4	28	DARESBURY PARK
56	Cradley	WA8 7PJ	56	0	0	4	28	DITTON
57	Birchfield Road	WA8 7TE	56	0	0	4	28	APPLETON
58	Acacia Grove	WA7 5JT	54	0	0	4	28	HALTON ROAD
59	Lakeside Close	WA8 8RH	54	0	0	4	28	GAVIN ROAD
60	Crossway	WA8 8SJ	54	0	0	4	28	DITTON
61	St Michael's Road	WA8 8TF	54	0	0	4	28	GAVIN ROAD
62	Stalbridge Drive	WA7 1LY	51	0	0	4	28	NORTON CHAINS
63	Main Street	WA7 2AB	49	0	0	4	28	RUNCORN CENTRAL
64	Castlefields Avenue North	WA7 2LE	48	0	0	4	28	ASTMOOR IND EST
65	Coney Grove	WA7 6BT	48	0	0	4	28	RUNCORN CENTRAL
66	-	WA8 9YP	47	0	0	4	28	DITTON
67	Heath Road	WA8 7NL	44	0	0	4	28	DITTON
68	Norton Lane	WA7 2PR	44	0	0	4	28	RUNCORN CENTRAL
69	Palace Fields Avenue	WA7 2RD	44	0	0	4	28	RUNCORN CENTRAL
70	Delph Lane	WA4 4AN	44	0	0	4	28	DARESBURY NPL

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
71	Cypress Grove	WA7 5HX	43	0	0	4	28	CLIFTON
72	Cotton Lane	WA7 5ND	42	0	0	4	28	RUNCORN CENTRAL
73	Ashton Close	WA7 4RU	42	0	0	4	28	CLIFTON
74	Quadrant Close	WA7 6DW	42	0	0	4	28	MURDISHAW
75	Main Street	WA7 2AT	41	0	0	4	28	RUNCORN CENTRAL
76	Ireland Street	WA8 0TS	41	0	0	4	28	USAC
77	Cambridge Street	WA8 6DF	40	0	0	4	28	LUGSDALE
78	De Lacy Row	WA7 2ND	40	0	0	4	28	MACKAMAX
79	Nortonwood Lane	WA7 6QQ	39	0	0	4	28	MURDISHAW
80	Gorsewood Road	WA7 6HZ	39	0	0	4	28	MURDISHAW
81	-	WA8 8LY	38	0	0	4	28	RTZ
82	Fleetwood Walk	WA7 6EA	38	0	0	4	28	MURDISHAW
83	Calvers	WA7 2EN	37	0	0	4	28	RUNCORN CENTRAL
84	Sinclair Avenue	WA8 7LU	36	0	0	4	28	MERSEY BRIDGE
85	St Marys Road	WA8 0DP	35	0	0	4	28	MERSEY ROAD
86	-	WA8 9DU	35	0	0	4	28	DITTON
87	Woodridge	WA7 6LW	35	0	0	4	28	MANOR PARK
88	The Uplands	WA7 2UE	35	0	0	4	28	RUNCORN CENTRAL
89	Gleadmere	WA8 4YQ	35	0	0	4	28	HOUGH GREEN
90	-	WA7 6PE	34	0	0	4	28	MURDISHAW
91	Strafton Park	WA8 9FA	33	0	0	4	28	HORNSBRIDGE
92	-	WA7 4BE	33	0	0	4	28	PICOW FARM ROAD
93	Holloway	WA7 4TN	32	0	0	4	28	PICOW FARM ROAD
94	Heather Close	WA7 3HW	32	0	0	4	28	CLIFTON
95	Pitts Heath Lane	WA7 1UE	31	0	0	4	28	NORTON CHAINS

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
96	Lockett Road	WA8 6QF	31	0	0	4	28	APPLETON
97	Russell Road	WA7 4BG	29	0	0	4	28	PERCIVAL LANE
98	Windmill Hill Avenue South	WA7 6QZ	29	0	0	4	28	MANOR PARK
99	Weates Close	WA8 3XY	29	0	0	4	28	HORNSBRIDGE
100	Palace Fields Avenue	WA7 6AQ	29	0	0	4	28	RUNCORN CENTRAL
101	Kingshead Close	WA7 2GL	28	0	0	4	28	MACKAMAX
102	-	WA7 2UL	27	0	0	4	28	RUNCORN CENTRAL
103	Wyncroft Road	WA8 8PZ	27	0	0	4	28	GAVIN ROAD
104	Northwood Road	WA7 5RQ	26	0	0	4	28	ASTMOOR IND EST
105	-	WA4 4GD	26	0	0	4	28	DARESBURY PARK
106	Crawford Avenue	WA8 8XP	26	0	0	4	28	GAVIN ROAD
107	Maricopa Close	WA7 2UU	26	0	0	4	28	MACKAMAX
108	Cowanway	WA8 9AG	26	0	0	4	28	HORNSBRIDGE
109	-	L24 4EA	25	0	0	4	28	ALDERWOOD AVE
110	-	WA7 1YE	25	0	0	4	28	NORTON CHAINS
111	Haddon Drive	WA8 4SE	24	0	0	4	28	HOUGH GREEN
112	Buckland Close	WA8 8YD	24	0	0	4	28	DITTON
113	-	WA8 8AA	24	0	0	4	28	DITTON
114	Claremont Avenue	WA8 9NB	24	0	0	4	28	HORNSBRIDGE
115	Camborne Close	WA7 6AZ	24	0	0	4	28	MURDISHAW
116	Lobelia Grove	WA7 3HX	24	0	0	4	28	RUNCORN CENTRAL

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
117	Fernhurst	WA7 2NJ	23	0	0	4	28	HALTON ROAD
118	Spinney Avenue	WA8 8LB	23	0	0	4	28	GAVIN ROAD
119	Cunningham Drive	WA7 4DY	23	0	0	4	28	PERCIVAL LANE
120	Wycliffe Road	WA7 5XB	23	0	0	4	28	HALTON ROAD
121	Norland's Lane	WA8 5AL	23	0	0	4	28	HORNSBRIDGE
122	Clap Gate Crescent	WA8 8UN	22	0	0	4	28	RTZ
123	-	WA7 1GU	22	0	0	4	28	MERSEY ROAD
124	Liverpool Road	WA8 7ER	22	0	0	4	28	APPLETON
125	Hale Bank Road	WA8 8NQ	22	0	0	4	28	RTZ
126	-	WA7 6ER	22	0	0	4	28	MURDISHAW
127	Delph Lane	WA4 6SU	22	0	0	4	28	DARESBURY NPL
128	Chester Road	WA4 4AZ	22	0	0	4	28	DARESBURY PARK
129	Netherfield	WA8 8DA	22	0	0	4	28	DITTON
130	-	WA7 1XW	21	0	0	4	28	DARESBURY PARK
131	Coulton Road	WA8 3DX	21	0	0	4	28	HORNSBRIDGE
132	Biddlestone Cross	WA8 9AU	21	0	0	4	28	DITTON
133	Finsbury Park	WA8 5AA	21	0	0	4	28	HORNSBRIDGE
134	Mckinley Way	WA8 9QH	21	0	0	4	28	APPLETON
135	Norleane Crescent	WA7 5ET	21	0	0	4	28	CLIFTON
136	Whitby Road	WA7 5PS	21	0	0	4	28	PICOW FARM ROAD
137	King Oswald Crescent	WA8 5AB	21	0	0	4	28	HORNSBRIDGE

138	Bankfield Road	WA8 7XB	20	0	0	4	28	DITTON
139	The Glen	WA7 2TD	20	0	0	4	28	RUNCORN CENTRAL
140	Green Oaks Path	WA8 0BU	19	0	0	4	28	USAC
141	Littlegate	WA7 2EE	19	0	0	4	28	RUNCORN CENTRAL
142	Castlefields Avenue South	WA7 2LT	19	0	0	4	28	RUNCORN CENTRAL
143	Hale Road	WA8 8XQ	19	0	0	4	28	RTZ
144	-	WA7 2XG	19	0	0	4	28	MACKAMAX
145	Murdishaw Avenue	WA7 6DL	19	1	0	3	28	MURDISHAW

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
146	Runcorn Road	WA4 6TZ	18	0	0	4	28	DARESBURY NPL
147	Boston Avenue	WA7 5JP	18	0	0	4	28	HALTON ROAD
148	Twyford Close	WA8 9RN	18	0	0	4	28	HORNSBRIDGE
149	Sandy Lane	WA7 3AW	18	0	0	4	28	BASS CHARRINGTON
150	St Patricks Close	WA8 0QS	18	0	0	4	28	PITT STREET
151	Warrington Road	WA7 2JP	17	0	0	4	28	ASTMOOR IND EST
152	Danescroft	WA8 4TE	17	0	0	4	28	HOUGH GREEN
153	-	WA4 4AW	17	0	0	4	28	DARESBURY NPL
154	Kestrels Way	WA7 2FB	17	0	0	4	28	RUNCORN CENTRAL
155	Deepdale	WA8 4NN	16	0	0	4	28	HOUGH GREEN
156	-	WA8 3LJ	16	0	0	4	28	HORNSBRIDGE
157	Appleton Village	WA8 6EQ	16	3	0	1	28	APPLETON
158	St Luke's Crescent	WA8 9HU	16	0	0	4	28	HORNSBRIDGE
159	Red Brow Lane	WA4 4AA	15	0	0	4	28	DARESBURY PARK
160	Moorfield Road	WA8 3HL	15	0	0	4	28	HORNSBRIDGE
161	Ash Lane	WA8 8JQ	15	0	0	4	28	GAVIN ROAD

162	Hollybank Road	WA7 2AW	15	0	0	4	28	RUNCORN CENTRAL
163	Lonsdale Close	WA8 8EZ	15	0	0	4	28	GAVIN ROAD
164	Croasdale Drive	WA7 2RJ	13	0	0	4	28	CLIFTON
165	Linnets Park	WA7 1SA	13	0	0	4	28	HALTON ROAD
166	Murdishaw Avenue	WA7 6JD	13	0	0	4	28	MURDISHAW
167	-	WA8 8UU	13	0	0	4	28	RTZ
168	Brandon	WA8 4SY	13	0	0	4	28	HOUGH GREEN
169	-	WA4 6SU	13	0	0	4	28	DARESBURY NPL
170	Cartmell Close	WA7 4YS	13	0	0	4	28	CLIFTON

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
171	Hollybank	WA4 6UE	13	0	0	4	28	DARESBURY NPL
172	Moughland Lane	WA7 4TF	12	0	0	4	28	PICOW FARM ROAD
173	Stonehills Lane	WA7 5XU	12	0	0	4	28	HALTON ROAD
174	Rosewood Grove	WA8 8GL	12	0	0	4	28	GAVIN ROAD
175	-	WA7 1XY	12	0	0	4	28	DARESBURY PARK
176	-	WA8 9EE	12	0	0	4	28	APPLETON
177	Chapel Lane	WA8 4NU	12	0	0	4	28	HOUGH GREEN
178	Cedardale Park	WA8 3JU	12	0	0	4	28	HORNSBRIDGE
179	Waterford Way	WA7 6DY	12	0	0	4	28	MURDISHAW
180	Duxford Close	WA7 1WD	12	0	0	4	28	DARESBURY NPL
181	Coppice Close	WA7 2XE	12	0	0	4	28	RUNCORN CENTRAL
182	Wheatlands	WA7 2DS	12	0	0	4	28	HALTON ROAD
183	Weston Road	WA7 4LJ	11	0	0	4	28	PERCIVAL LANE
184	-	WA8 8LS	11	0	0	4	28	RTZ
185	-	WA8 3UP	11	0	0	4	28	HORNSBRIDGE
186	Troutbeck Close	WA7 3JG	11	0	0	4	28	RUNCORN CENTRAL
187	-	WA7 6TB	11	0	0	4	28	MURDISHAW

188	Foxley Heath	WA8 7EB	10	0	0	4	28	DITTON
189	-	WA7 1YE	10	0	0	4	28	DARESBURY PARK
190	-	WA7 1QY	10	0	0	4	28	DARESBURY PARK
191	Rathlin Close	WA8 3YW	10	0	0	4	28	HORNSBRIDGE
192	Dukes Wharf	WA7 3AE	10	0	0	4	28	DARESBURY PARK
193	Hazel Grove	WA7 1UT	9	0	0	4	28	NORTON CHAINS
194	Mersey Road	WA7 1DG	9	0	0	4	28	MERSEY ROAD
195	-	WA7 6UT	9	0	0	4	28	RUNCORN CENTRAL
Rank	**Site**	**Postcode**	**Forecast EV in 400m Catchment (2032)**	**Existing AC Chargers**	**Existing DC Chargers**	**Required Residential Chargers**	**Estimated Residential EVCI Demand (kW)**	**Primary Substation**
196	Malmesbury Park	WA7 1XD	9	0	0	4	28	NORTON CHAINS
197	-	WA7 2LG	9	0	0	4	28	MACKAMAX
198	Upton Lane	WA8 9DJ	9	0	0	4	28	DITTON
199	-	WA8 9PB	9	0	0	4	28	DITTON
200	Chester Road	WA4 4FX	9	0	0	4	28	DARESBURY NPL
201	Bankes' Lane	WA7 4LL	9	0	0	4	28	CLIFTON
202	Wolverton Drive	WA7 6PQ	9	0	0	4	28	MURDISHAW
203	Whernside	WA8 4YW	9	0	0	4	28	DITTON
204	Masefield Avenue	WA8 7BJ	8	1	0	3	28	MERSEY BRIDGE
205	-	WA7 4PT	8	0	0	4	28	PICOW FARM ROAD
206	Preece Close	WA8 9WQ	8	0	0	4	28	DITTON
207	Castle Rise	WA7 5XW	8	0	0	4	28	HALTON ROAD
208	Grangemoor	WA7 5YB	8	0	0	4	28	CLIFTON
209	Hampton Court Way	WA8 3EQ	8	2	0	2	28	HORNSBRIDGE
210	Calvers	WA7 2EW	8	0	0	4	28	RUNCORN CENTRAL
211	Elkan Close	WA8 3JW	8	0	0	4	28	HORNSBRIDGE
212	Kingsway	WA8 7JQ	7	3	0	1	28	APPLETON
213	Goldcrest Close	WA7 3JT	7	0	0	4	28	CLIFTON

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
214	-	WA7 2NA	7	0	0	4	28	MACKAMAX
215	Chatterton Drive	WA7 6RG	7	0	0	4	28	MURDISHAW
216	St Mary's Road	WA7 2BW	7	0	0	4	28	RUNCORN CENTRAL
217	-	WA7 4XW	7	0	0	4	28	CLIFTON
218	Clayton Crescent	WA7 4TR	7	0	0	4	28	PICOW FARM ROAD
219	Cherrysutton	WA8 4TN	7	0	0	4	28	HOUGH GREEN
220	Edinburgh Road	WA8 8BE	7	0	0	4	28	GAVIN ROAD
221	Liverpool Road	WA8 7AN	7	0	0	4	28	DITTON
222	-	WA7 5YH	7	0	0	4	28	CLIFTON
223	Maple Avenue	WA7 5LJ	7	0	0	4	28	HALTON ROAD
224	-	WA4 4BU	6	0	0	4	28	DARESBURY PARK
225	Montpelier Avenue	WA7 4QY	6	0	0	4	28	CLIFTON
226	Carlow Close	L24 5RS	6	0	0	4	28	ALDERWOOD AVE
227	Rivenmill Close	WA8 3FJ	6	0	0	4	28	HORNSBRIDGE
228	-	WA7 5DX	6	0	0	4	28	HALTON ROAD
229	Caernarvon Close	WA7 2JZ	6	0	0	4	28	RUNCORN CENTRAL
230	Durlston Close	WA8 4GJ	6	0	0	4	28	DITTON
231	Clifton Road	WA7 3FW	5	0	0	4	28	CLIFTON
232	Finsbury Park	WA8 3FJ	5	0	0	4	28	HORNSBRIDGE
233	Tame Court	WA8 5BY	5	0	0	4	28	HORNSBRIDGE
234	Roscoe Crescent	WA7 4ER	5	0	0	4	28	PERCIVAL LANE
235	Badger Close	WA7 2QW	5	0	0	4	28	RUNCORN CENTRAL

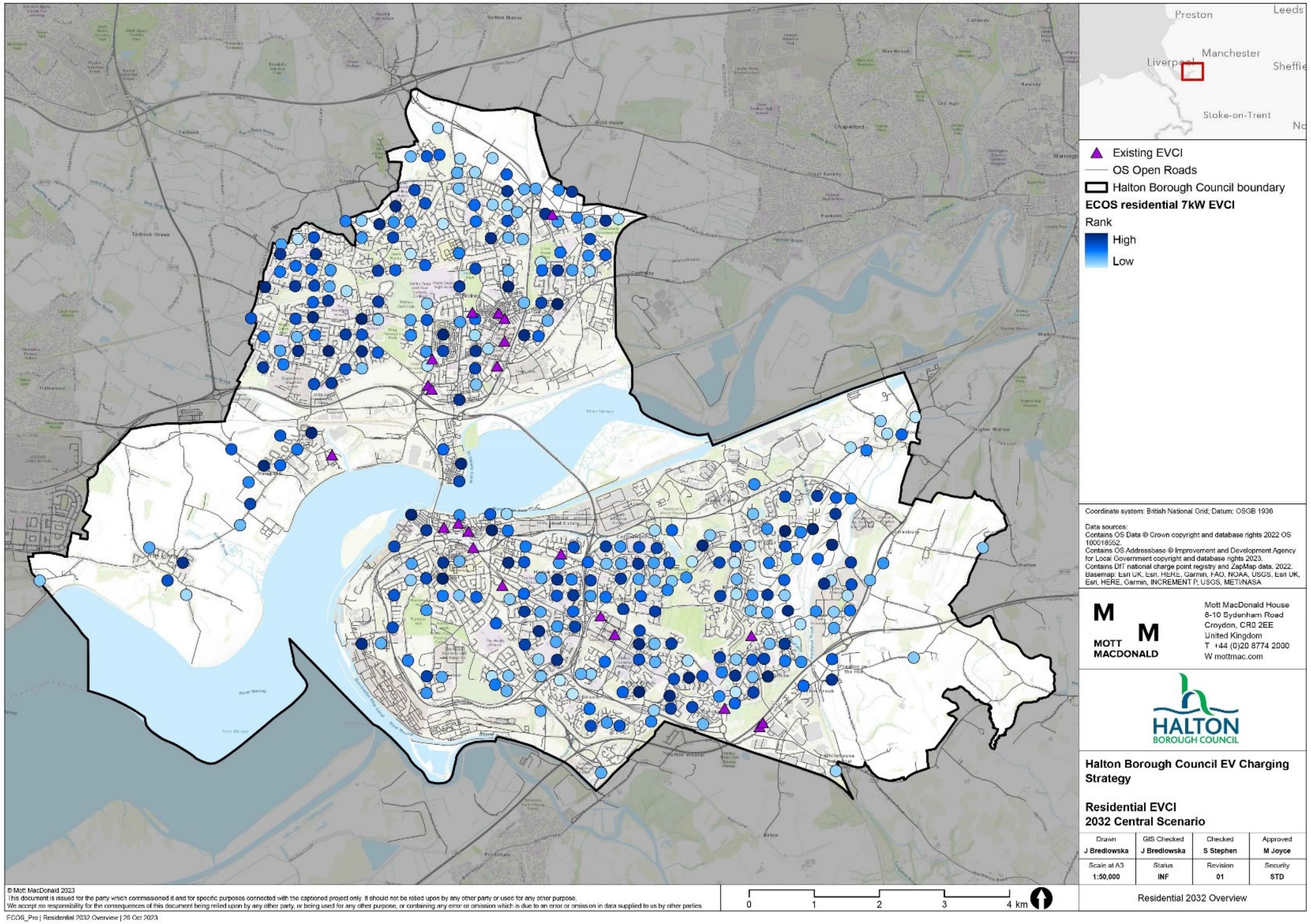
Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
236	Gaunts Way	WA7 2FW	5	0	0	4	28	CLIFTON
237	Sandown Close	WA7 4YU	5	0	0	4	28	CLIFTON
238	-	WA8 6TY	5	0	0	4	28	APPLETON
239	Castle Street	WA8 0BP	5	0	0	4	28	USAC
240	Victoria Road	WA7 5BN	5	0	0	4	28	PICOW FARM ROAD
241	Chester Road	WA4 4GD	5	0	0	4	28	DARESBURY NPL
242	-	WA7 6QR	5	0	0	4	28	MURDISHAW
243	Castlefields Avenue East	WA7 2LN	5	0	0	4	28	RUNCORN CENTRAL
244	Wallis Drive	WA8 9NH	5	0	0	4	28	HORNSBRIDGE
Rank	**Site**	**Postcode**	**Forecast EV in 400m Catchment (2032)**	**Existing AC Chargers**	**Existing DC Chargers**	**Required Residential Chargers**	**Estimated Residential EVCI Demand (kW)**	**Primary Substation**
245	-	WA8 5BH	5	0	0	4	28	HORNSBRIDGE
246	Mevagissey Road	WA7 6BD	5	0	0	4	28	MURDISHAW
247	Hale Gate Road	WA8 8LU	4	0	0	4	28	PERCIVAL LANE
248	Mill Brow	WA8 6RT	4	0	0	4	28	APPLETON
249	Moorland Drive	WA7 6HL	4	0	0	4	28	MURDISHAW
250	Royal Avenue	WA8 8HN	4	0	0	4	28	GAVIN ROAD
251	Rawdon Close	WA7 2QQ	4	0	0	4	28	RUNCORN CENTRAL
252	Langley Beck	WA8 9NQ	4	0	0	4	28	HORNSBRIDGE
253	Kemberton Drive	WA8 9FD	4	0	0	4	28	HORNSBRIDGE
254	Aldershot Close	WA8 9BS	4	0	0	4	28	HORNSBRIDGE
255	Bittern Close	WA7 6ST	4	0	0	4	28	MURDISHAW
256	Anchor Close	WA7 6DD	4	0	0	4	28	MURDISHAW
257	Rudheath Lane	WA7 1GD	4	0	0	4	28	NORTON CHAINS
258	-	WA7 2SR	4	0	0	4	28	ASTMOOR IND EST

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
259	Elizabeth Court	WA8 6DH	4	0	0	4	28	LUGSDALE
260	-	WA7 4SB	4	0	0	4	28	CLIFTON
261	Oxford Road	WA7 4NX	4	0	0	4	28	PICOW FARM ROAD
262	Clifton Road	WA7 4TD	4	0	0	4	28	CLIFTON
263	Montgomery Road	WA8 8EB	3	0	0	4	28	DITTON
264	St Elphin's View	WA4 4FW	3	0	0	4	28	DARESBURY NPL
265	-	WA7 2HX	3	0	0	4	28	RUNCORN CENTRAL
266	Canal Reach	WA7 6LA	3	0	0	4	28	MANOR PARK
267	Bailey's Lane	L24 7SD	3	0	0	4	28	ALDERWOOD AVE
268	Summer Lane	WA4 4BH	3	0	0	4	28	DARESBURY PARK
269	Parkgate Way	WA7 6DX	3	0	0	4	28	MURDISHAW
Rank	**Site**	**Postcode**	**Forecast EV in 400m Catchment (2032)**	**Existing AC Chargers**	**Existing DC Chargers**	**Required Residential Chargers**	**Estimated Residential EVCI Demand (kW)**	**Primary Substation**
270	Cawfield Avenue	WA8 7HF	3	0	0	4	28	DITTON
271	Westfield Road	WA7 4DD	3	0	0	4	28	PICOW FARM ROAD
272	Boston Avenue	WA7 5JN	3	0	0	4	28	HALTON ROAD
273	-	WA8 7DW	3	0	0	4	28	APPLETON
274	-	WA7 6RG	3	0	0	4	28	DARESBURY PARK
275	Red Brow Lane	WA4 4BT	3	0	0	4	28	DARESBURY PARK
276	-	WA8 9GS	3	0	0	4	28	HOUGH GREEN
277	-	WA4 6UU	3	0	0	4	28	DARESBURY NPL
278	Wilmere Lane	WA8 5UP	3	0	0	4	28	N C B SUTTON MANOR
279	Roemarsh Court	WA7 2GG	3	0	0	4	28	RUNCORN CENTRAL
280	Grosvenor Road	WA8 9RE	3	0	0	4	28	HORNSBRIDGE
281	St Wilfreds Road	WA8 3AE	3	0	0	4	28	HORNSBRIDGE
282	Camrose Close	WA7 5NS	3	0	0	4	28	CLIFTON
283	Palace Fields Avenue	WA7 6BS	3	0	0	4	28	RUNCORN CENTRAL
284	Redacre Close	WA4 4JU	2	0	0	4	28	BASS CHARRINGTON

Rank	Site	Postcode	Forecast EV in 400m Catchment (2032)	Existing AC Chargers	Existing DC Chargers	Required Residential Chargers	Estimated Residential EVCI Demand (kW)	Primary Substation
285	Stromford Close	WA8 5BN	2	0	0	4	28	HORNSBRIDGE
286	-	WA8 5BE	2	0	0	4	28	HORNSBRIDGE
287	-	WA7 1SG	2	0	0	4	28	HALTON ROAD
288	Marsh Brook Road	WA8 5DZ	2	0	0	4	28	HORNSBRIDGE
289	Finsbury Park	WA8 9WN	2	0	0	4	28	HORNSBRIDGE
290	St Wilfreds Road	WA8 3TX	2	0	0	4	28	HORNSBRIDGE
291	Church Road	L24 4BZ	2	0	0	4	28	ALDERWOOD AVE
292	-	WA4 4AW	2	0	0	4	28	DARESBURY PARK
293	Astmoor Road	WA7 2SN	2	0	0	4	28	MACKAMAX
294	Frederick Street	WA8 6PE	2	3	0	1	28	APPLETON
Rank	**Site**	**Postcode**	**Forecast EV in 400m Catchment (2032)**	**Existing AC Chargers**	**Existing DC Chargers**	**Required Residential Chargers**	**Estimated Residential EVCI Demand (kW)**	**Primary Substation**
295	Swinford Avenue	WA8 3YF	2	0	0	4	28	HORNSBRIDGE
296	Midwood Street	WA8 6BA	2	0	0	4	28	LUGSDALE
297	Gigg Lane	WA4 6UW	2	0	0	4	28	DARESBURY NPL
298	Tabley Avenue	WA8 7PF	2	0	0	4	28	DITTON
299	-	WA7 1QY	2	0	0	4	28	DARESBURY PARK
300	Greenhouse Farm Road	WA7 6PP	2	0	0	4	28	MURDISHAW
301	Six Acre Lane	WA4 6UJ	2	0	0	4	28	DARESBURY NPL
302	Haywood Crescent	WA7 6NF	2	0	0	4	28	NORTON CHAINS
303	Highgate Close	WA7 6GH	2	0	0	4	28	MURDISHAW
304	-	WA4 4BS	2	0	0	4	28	DARESBURY PARK
305	Cherrysutton	WA8 4TJ	2	0	0	4	28	HOUGH GREEN
306	Ashbourne Avenue	WA7 4YL	2	0	0	4	28	CLIFTON
307	Bishops Way	WA8 3LN	2	0	0	4	28	HORNSBRIDGE
308	Milton Avenue	WA8 7BG	2	1	2	1	58	MERSEY BRIDGE
309	Bridgeway West	WA7 6LQ	2	0	0	4	28	MACKAMAX
310	Upton Bridle Path	WA8 9HG	2	0	0	4	28	HORNSBRIDGE

311	Prestwick Close	WA8 9DY	2	0	0	4	28	DITTON
312	Windmill Hill Avenue South	WA7 6QE	2	0	0	4	28	MANOR PARK
313	Buttermere Grove	WA7 2RE	2	0	0	4	28	CLIFTON
314	-	WA7 6DH	2	1	0	3	28	MURDISHAW
315	Runcorn Road	WA4 6TX	2	0	0	4	28	DARESBURY NPL
316	Betchworth Crescent	WA7 2YA	2	0	0	4	28	CLIFTON

C.2 Plan of Proposed Residential Charging Locations



Source: Mott MacDonald

C.3 List of Potential Destination Charging Locations (7kW to 22kW)

Site ID	Example Sites Potentially Suitable	Existing AC EVCI	Possible AC EVCI	Estimated Grid Demand (MVA)
1	Widnes Station, Lunt's Heath Primary School, Saints Peter and Paul Catholic High School, Fairfield Primary School, Wade Deacon High School, Kingsway Leisure Centre, Widnes Vikings, St Bede's Catholic Junior School, Appleton Village Parking, Highfield Hospital, Widness Town Hall, St Bede's Church	1	96	2.1
2	The Heath School, St Chads Catholic & Church of England High School, Runcorn Train Station Car Parks 1, 2, and 3, Runcorn Hill Car Park, Runcorn Town Hall, The Grange Academy, Runcorn Hill Park.	3	72	1.7
3	Ditton Community Centre, Ormiston Chadwick Academy, Oakfield Community Primary School, Queen's Avenue Shops, Hale Road Parking, Ashley High School, Chestnut Lodge School, St MICHAEL'S Parish Centre	1	64	1.4
4	Halton General Hospital x2, St Luke's Care Home, Runcorn Shopping City, Trident Retail Park, Hallwood Park Primary School	0	48	1.1
5	Runcorn East Station Car Park, Murdishaw West Community Primary School, Murdishaw Community Centre, St Martin's Catholic Primary School, Murdishaw Health Centre	0	40	0.9
6	Warrington Road Nursery School, St John Fisher Catholic Primary School, Warrington Road Car Park, Bridges Learning Centre	0	32	0.7
7	Cheshire Constabulary Custody Suite, Sandymoor Community Hall x2, Sandymoor Ormiston Academy	0	32	0.7
8	Hough Green Station, All Saints Upton Church of England V.C. Primary School	0	16	0.4
9	Wellington Hotel, Hale Park	0	16	0.4
10	The Church of Jesus Christ of Latter-Day Saint, The Cavendish High Academy	0	16	0.4
11	Our Lady Mother of the Saviour Catholic Church, Palace Fields Primary Academy	0	16	0.4
12	N/A	20	0	0.4
13	Pickering's Pasture	2	8	0.2
14	Cronton Sixth Form College	1	8	0.2
15	The Brow Community Primary School, St Mary's Church Hall	0	8	0.2
16	Windmill Hill Primary School	0	8	0.2
17	N/A	0	0	0.0
18	Moore Primary School	0	8	0.2
19	Weston Point Community Primary School	0	8	0.2
20	N/A	6	0	0.1

Site ID **Example Sites Potentially Suitable** **Existing AC EVCI** **Possible AC EVCI** **Estimated Grid Demand (MVA)**

21	N/A	0	0	0.0
22	N/A	0	0	0.0
23	N/A	0	0	0.0
24	N/A	0	0	0.0
25	N/A	0	0	0.0
26	N/A	0	0	0.0
28	N/A	0	0	0.0
29	N/A	0	0	0.0
30	N/A	0	0	0.0
31	N/A	2	0	0.0
32	N/A	0	0	0.0

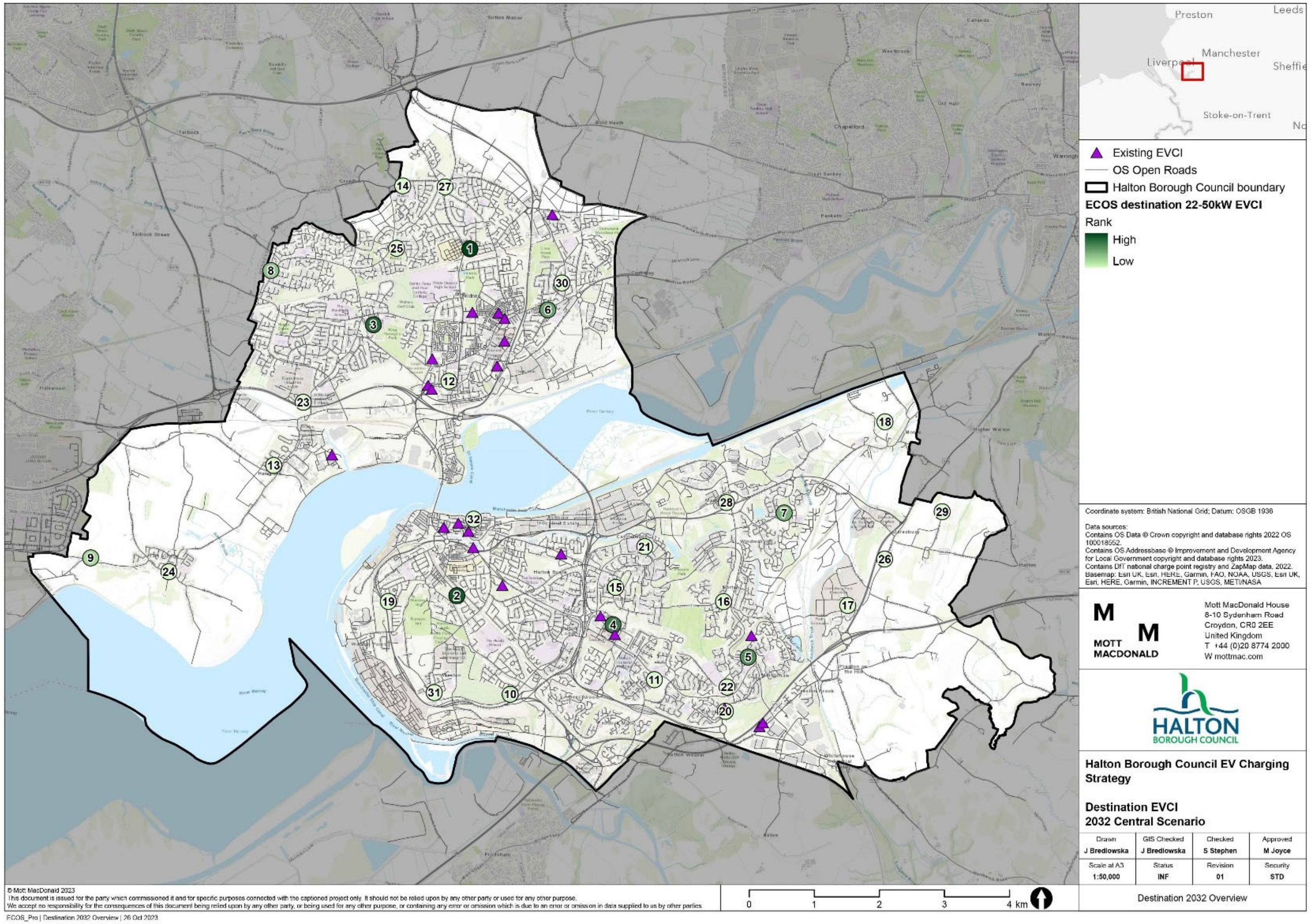
C.4 List of Potential Destination Charging Locations (50kW+)

Site ID	Example Sites Potentially Suitable	Existing DC EVCI	Possible DC EVCI	Estimated Grid Demand (MVA)
1	Aldi, Widnes Market, Widnes Shopping Park, Tesco Extra, Asda, Widnes Station	0	36	1.8
2	Co-op Food Grangeway, Costa Coffee, BP, B&M Store, Texaco, Heron Foods	0	36	1.8
3	Widnes SSC, Gulf Petrol Station, SPAR, Coop Food Ditton	0	24	1.2
4	Runcorn Shopping City, Trident Retail Park, Asda, McDonald's	0	24	1.2
5	Co-op Food Murdishaw, Runcorn East Station Car Park	0	12	0.6
6	Planet Ice Widnes, B&M Home Store	0	12	0.6
7	Sandmoor Local Centre x2	0	12	0.6
8	Upton Community Centre, Morrisons Daily	0	12	0.6
9	Ivy Farm Court	0	6	0.3
10	Ascot Stores	0	6	0.3
11	Shell	0	6	0.3
12	Caldwell Road Car Park	4	6	0.5
13	Co-op Food - Hale Bank	0	6	0.3
14	Cronton Garden Centre	0	6	0.3
15	Peva Petroleum	0	6	0.3
16	Co-op Food - Runcorn	0	6	0.3
17	Daresbury Park	0	6	0.3
18	N/A	0	0	0.0
19	N/A	0	0	0.0
20	Aldi	0	6	0.3
21	N/A	0	0	0.0
22	N/A	0	0	0.0
23	N/A	0	0	0.0
24	N/A	0	0	0.0
25	N/A	0	0	0.0

Site ID **Example Sites Potentially Suitable** **Existing DC EVCI** **Possible DC EVCI** **Estimated Grid Demand (MVA)**

26	N/A	0	0	0.0
28	N/A	0	0	0.0
29	N/A	0	0	0.0
30	N/A	0	0	0.0
31	N/A	0	0	0.0
32	N/A	0	0	0.0

C.5 Plan of Destination Charging Location Catchments



Source: Mott MacDonald

D. Grid Capacity Assessment Results

Primary Substation	Capacity (MVA)	Maximum Load (MVA)	Residential (7kW)	Destination (22kW)	Rapid (50kW)	Total Additional Load (MVA)	Total New Load (MVA)	Spare Capacity	Load/ Capacity
AIRPORT	30	10.35	0	0	0	0.00	10.35	19.65	0.35
ALDERWOOD AVE	30	10.35	336	5280	3000	8.62	18.97	11.03	0.63
APPLETON	20	18.15	770	352	300	1.42	19.57	0.43	0.98
ASTMOOR IND EST	30	11.78	224	0	0	0.22	12.00	18.00	0.4
BASS CHARRINGTON	30	15.05	112	0	0	0.11	15.16	14.84	0.51
CLIFTON	30	15.05	1400	1408	900	3.71	18.76	11.24	0.63
CLOCKFACE	30	13.76	0	0	0	0.00	13.76	16.24	0.46
CONIX	20	7.51	0	0	0	0.00	7.51	12.49	0.38
DARESBURY NPL	10	5.38	1064	0	0	1.06	6.44	3.56	0.64
DARESBURY PARK	10	5.38	1232	0	0	1.23	6.61	3.39	0.66
DESOTO ROAD	20	5.26	0	0	0	0.00	5.26	14.74	0.26
DITTON	30	17.78	1792	2112	900	4.80	22.58	7.42	0.75
ESTUARY COMMERCE PK	30	9.64	0	0	0	0.00	9.64	20.36	0.32
FRODSHAM LOCAL	8	6.54	0	0	0	0.00	6.54	1.63	0.8
GATEWARTH SEWAGE	30	11.6	0	0	0	0.00	11.60	18.40	0.39
GAVIN ROAD	30	17.78	840	0	0	0.84	18.62	11.38	0.62
GEC ST HELENS	30	13.76	0	0	0	0.00	13.76	16.24	0.46
GREAT SANKEY	20	11.89	0	0	0	0.00	11.89	8.11	0.59
HALTON ROAD	25	20.32	896	0	0	0.90	21.22	3.78	0.85
HAREFIELD ROAD	30	10.35	0	0	0	0.00	10.35	19.65	0.35

Primary Substation	Capacity (MVA)	Maximum Load (MVA)	Residential (7kW)	Destination (22kW)	Rapid (50kW)	Total Additional Load (MVA)	Total New Load (MVA)	Spare Capacity	Load/ Capacity
HILLCLIFFE	30	19.53	0	0	0	0.00	19.53	10.47	0.65
HORNSBRIDGE	20	18.15	2464	0	0	2.46	20.61	-0.61	1.03
HOUGH GREEN	30	17.78	952	1408	600	2.96	20.74	9.26	0.69
HUNTS CROSS	30	18.34	0	0	0	0.00	18.34	11.66	0.61
KENTON ROAD	30	18.34	0	0	0	0.00	18.34	11.66	0.61
LEEWARD DRIVE	30	9.64	0	0	0	0.00	9.64	20.36	0.32
LUGSDALE	20	18.15	392	0	0	0.39	18.54	1.46	0.93
LUGSDALE	20	18.15	392	0	0	0.39	18.54	1.46	0.93
MACKAMAX	30	11.78	560	704	300	1.56	13.34	16.66	0.44
MANOR PARK	10	8.34	336	0	0	0.34	8.68	1.32	0.87
MEDEVA	20	7.51	0	0	0	0.00	7.51	12.49	0.38
MERSEY BRIDGE	20	5.26	224	352	0	0.58	5.84	14.16	0.29
MERSEY ROAD	30	11.78	336	704	300	1.34	13.12	16.88	0.44
METAL BOX	30	10.35	0	0	0	0.00	10.35	19.65	0.35
MURDISHAW	25	20.32	1708	0	0	1.71	22.03	2.97	0.88
N C B SUTTON MANOR	30	13.76	56	0	0	0.06	13.82	16.18	0.46
NORTON CHAINS	10	8.34	616	0	0	0.62	8.96	1.04	0.9
NWW CAMPUS	40	13.24	0	0	0	0.00	13.24	26.76	0.33
PENKETH	20	11.89	0	0	0	0.00	11.89	8.11	0.59
PERCIVAL LANE	25	20.32	392	704	300	1.40	21.72	3.28	0.87

Primary Substation	Capacity (MVA)	Maximum Load (MVA)	Residential (7kW)	Destination (22kW)	Rapid (50kW)	Total Additional Load (MVA)	Total New Load (MVA)	Spare Capacity	Load/ Capacity
PICOW FARM ROAD	30	11.78	1050	352	300	1.70	13.48	16.52	0.45
PILK SULLIVAN	30	13.98	0	0	0	0.00	13.98	16.02	0.47
PITT STREET	20	5.26	168	0	0	0.17	5.43	14.57	0.27
RAINHILL LOCAL	30	14.66	0	0	0	0.00	14.66	15.34	0.49
RTZ	30	17.78	560	7040	3000	10.60	28.38	1.62	0.95
RUNCORN CENTRAL	25	20.32	2072	1408	1200	4.68	25.00	0.00	1
SOMERFIELD DISTRIBUTION	20	14.05	0	0	0	0.00	14.05	5.95	0.7
SPEKE SKY PARK	30	9.64	0	0	0	0.00	9.64	20.36	0.32
THAMES BOARD MILL	30	15.69	0	0	0	0.00	15.69	14.31	0.52
USAC	30	13.98	336	0	300	0.64	14.62	15.38	0.49
WIDNES ROAD	20	11.89	0	0	0	0.00	11.89	8.11	0.59
WOODEND AVENUE	30	18.34	0	0	0	0.00	18.34	11.66	0.61
YKK	30	15.05	0	0	0	0.00	15.05	14.95	0.5

mottmac.com

411511-MMD-ETM-XX-RPT-U-XX-004 | November 2023