Scaling on Street Charging Infrastructure

D4.8 Final report on installations

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1. Introduction

This section describes the final situation with the installations and how this compared to the original model developed as part of the bidding process.

The original conception was of a standard model across the entire project territory – this did not prove to be the case mostly due to the partners involved on either side of the Pennines and the resulting response from the local communities.

In fact, the different ways in which the two areas developed their installations has created a much larger experience base and therefore enhanced the lessons learned and the ability to provide evidential models for other LA and Community-led projects.

2. Design of Sites

East

Design start of project

Bay Marking, Signage and Access

During the length of SOSCI, Mer has standardised a EVCP design for fast charging sites. Figure 1 below shows an example of one of the earliest installations and Figure 2 one of the last to demonstrate how our designs have improved throughout the project.

Figure 1 - Albert Road, Consett

Figure 1 above demonstrates an installation typical of some of our Batch 1 of SOSCI installations across County Durham. Key design areas to note include:

- Signage mounted on separate post behind chargers, adding clutter
- Bay widths remain unchanged from existing parking bays - circa 2.4/2.5m in width
- Charge points are mounted on the kerb to the front of the bays, with impact protection.
- Bay marking - we have standardised the above design with logo and wording across County Durham.

Figure 2 - Blake Street, Shildon

Figure 2 above demonstrates an installation typical of later batches of SOSCI installations across County Durham where Mer were granted the opportunity to convert 3 existing parking bays into 2 new wider charging bays. Key design areas to note include:

- Signage mounted on an extended post attached to the charger, reducing clutter/additional street furniture. Please note - this solution is only appropriate where members of the public should not be walking behind the charger due to the mounting height.
- Parking bay widths have been extended by 40cm to circa 3m in width, allowing easier use of chargers for vehicles with side mounted charging.
- New footpath circa 1.6m in width created between bays to the charger - allowing easier access for disabled drivers.
- Charge point is mounted on the parking service level to the front of the bays, with impact protection. This has removed the kerb barrier for wheelchair users to access the charge point.
- Bay marking - we have standardised the above design with logo and wording across County Durham.

Bay Layout

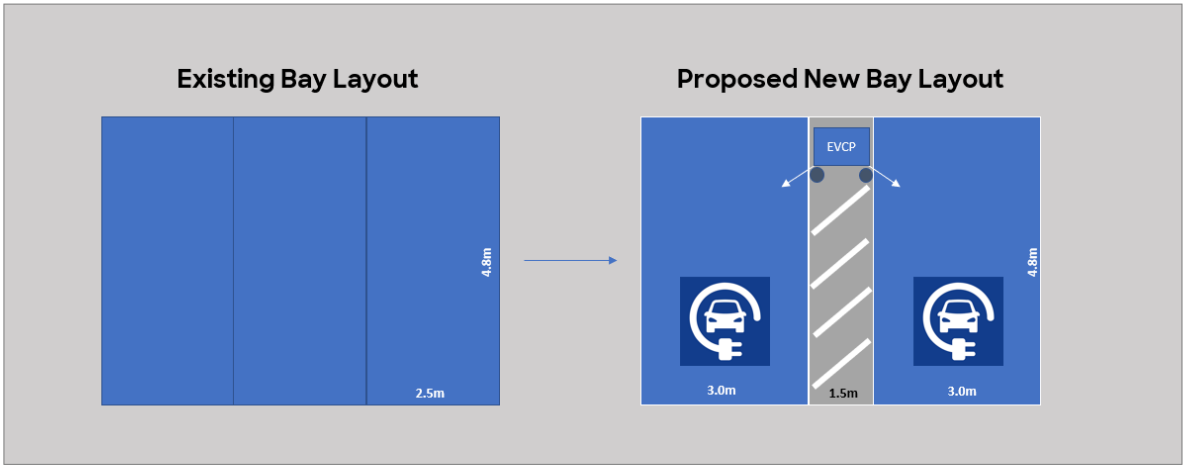


Figure 3 - Example of new bay layout design and improved accessibility.

Equipment

Throughout the project, Mer and DCC have aimed to standardise fast charging equipment to the use of Alfen Proline chargers, to offer the end user consistency and familiarity across the county. SOSCI has also allowed us to experiment with some DC charging stations and explore where alternative stations and power could provide the end user with a more suitable charging experience. One example of this is shown in Figure 4 below for a new semi-rapid 25kW DC charger at Hardwick Park. As the majority of electric vehicles are limited to 7-11kW charging speed on AC chargers, we wanted to compare usage side by side between a fast charger and a 25kW DC semi-rapid charger, which could in theory charge most cars on the market at faster speed and yet remain suitable for locations with a dwell time of 1-2 hours. We do not have enough usage data on this solution to offer any insight yet, but we aim to conduct an exercise to gauge customer feedback on this alternative solution.

Figure 4 - a 25kW DC CCS Semi-Rapid charger at Hardwick Park, installed next to a 22kW dual AC.

West

Design start of project

Communications

Apart from electrical considerations, by far the biggest challenge, both in terms of installation and ongoing operation has been maintaining a steady comms connection. Where possible, a hard-wired connection into an existing broadband connection has been preferred, particularly in areas where mobile data coverage is limited, but this has only been available in fewer than a third of sites so far. This also has the drawback that in order to reset comms access to the host building is often required.

Initially, a third-party router and single network SIM were trialled, but these proved unreliable and when connection was lost these wouldn't reconnect automatically. Subsequently, EO routers and multi-network SIMs were deployed, and these generally performed much better, but manual reboots have been required in around 50% of problem situations.

The inherent problem with this second approach was highlighted on 18th Jan 2022 when the whole of our network on EO SIMs went offline due to a problem with the KPN network - a problem suffered by several other network operators here in the NW. The outage lasted most of the day, around 7 hours, and when the KPN network came back online many sites failed to reconnect without manual rebooting. It was several days before we were back to near 90% operation, with a couple of sites still presenting problems today.

With the requirement under new guidelines for all new chargers to be smart, the challenge of connectivity should not be underestimated, particularly in rural areas which have struggled for ages to have any sort of mobile signal.

Bay Marking

Suitable bay marking and signage is essential to educate all drivers and to avoid ICEing. Traditional methods of bay marking are very expensive, and when added to all other costs can push a site beyond viability. We decided on a new solution whereby pre-frabricated markings could be taken to site and be heat applied without specialist equipment - this proved both quicker and cheaper.

3. Installation of Sites

Common Issues

- Interaction with DNOs - see below for east and west specifics
- High DNO costs, compared with those in the south of England
- Long lead-times
- Local opposition once groundworks start
- Unexpected sub surface conditions

Specific issues for East Installations

Appendix of sites, use OZEV form for east and west.

When installing EVCPs there are many checks required internally from each section or service within the council. The checks for title deeds with our assets team can take 4-6 weeks to return with a clear indication of whether a charge point can be installed on the land. Quite often we found that the installation of an EVCP needed checks with a few representatives from the same team to be sure if wasn't hitting any problems. The areas for checking involved.

- Assets
- Highways
- Health and Safety
- Planning
- Street Wise

We needed to make sure the assets officers spoke internally in their team to each other.

One issue we hit was that although Durham County Council owned a car park, they rented out some parking spaces to business tenants. The spaces were right where wanted to put the EV charge point, nearest to the point of connection. We didn't realise the car parking spaces were rented out as one team within assets hadn't made a clear check with another – this was a lesson learnt going forward.

Wayleaves

Private Land - On two sites within Batches 4 and 5, we encountered wayleave issues with private land. Upon exploration of land ownership and contact to the landowner for one of these sites, the landowner requested a payment of £50,000 to grant a wayleave for us to connect to an NPG supply cable on their land and dig 3 metres across the soft ground to the DCC adopted highway. A work around solution was discovered by moving the NPG point of connection further up the same cable to an area of land owned by DCC, but further from the parking bays and hence, a higher DNO cost and groundworks. An issue from an installer perspective is that NPG ask for payment for every point of connection request, so getting this right first time is important.

Public Land - Even on sites and land owned by DCC, NPG have required a wayleave themselves with Durham County Council to grant them access rights to maintain the new cable and connection. This has presented a delay in batches 4, 5 and 6 sites due to the internal authorisation process of these documents within DCC.

Section 50 and Road Closures

On installations in the public highway or adopted highway, Mer have needed to obtain Section 50 licences from Durham County Council. There is a set time period and process required for approvals which has lengthened our delivery on some sites. Occasionally a bond payment has also been requested by DCC (£2000-5000).

We have aimed to avoid road closures wherever possible with effective traffic management, but on some sites a road closure is unavoidable. This again, has a legal time period of notification and approval process before works can commence.

Use of DNO vs ICP

Mer has used Northern Power Grid and three different Independent Connection Providers for new power connections across the North East. Our experience and recommendation for future installations for small connections have been to use NPG directly, as NPG have the designated powers to work on the highway and avoid the need for Section 50 licences. For larger connections, ICP providers can sometimes provide an asset value, however, given the size of sites deployed on SOSCI this was not explored further and assets have been adopted by NPG.

Common Issues for West Installations

Location

At the start of the project, each survey looked for the most economical approach regarding close proximity of the electrical supply, whether connecting to a building supply or a new service connection. This has continued throughout. However, locations of chargers were likely to be in the first 2 parking bays, ie: chargers located between Bay 1 and 2. Taking advice from the 'Orkney Guidelines', if there is space available, the general location would now be between Bays 2 & 3 so that the chargers could be reached by cars parked in Bays 1 & 4. Parking bays are now fitted with

signage fixed to either 1250mm posts or on the wall in front of the parking bays. EV logos have been marked on the ground wherever possible.

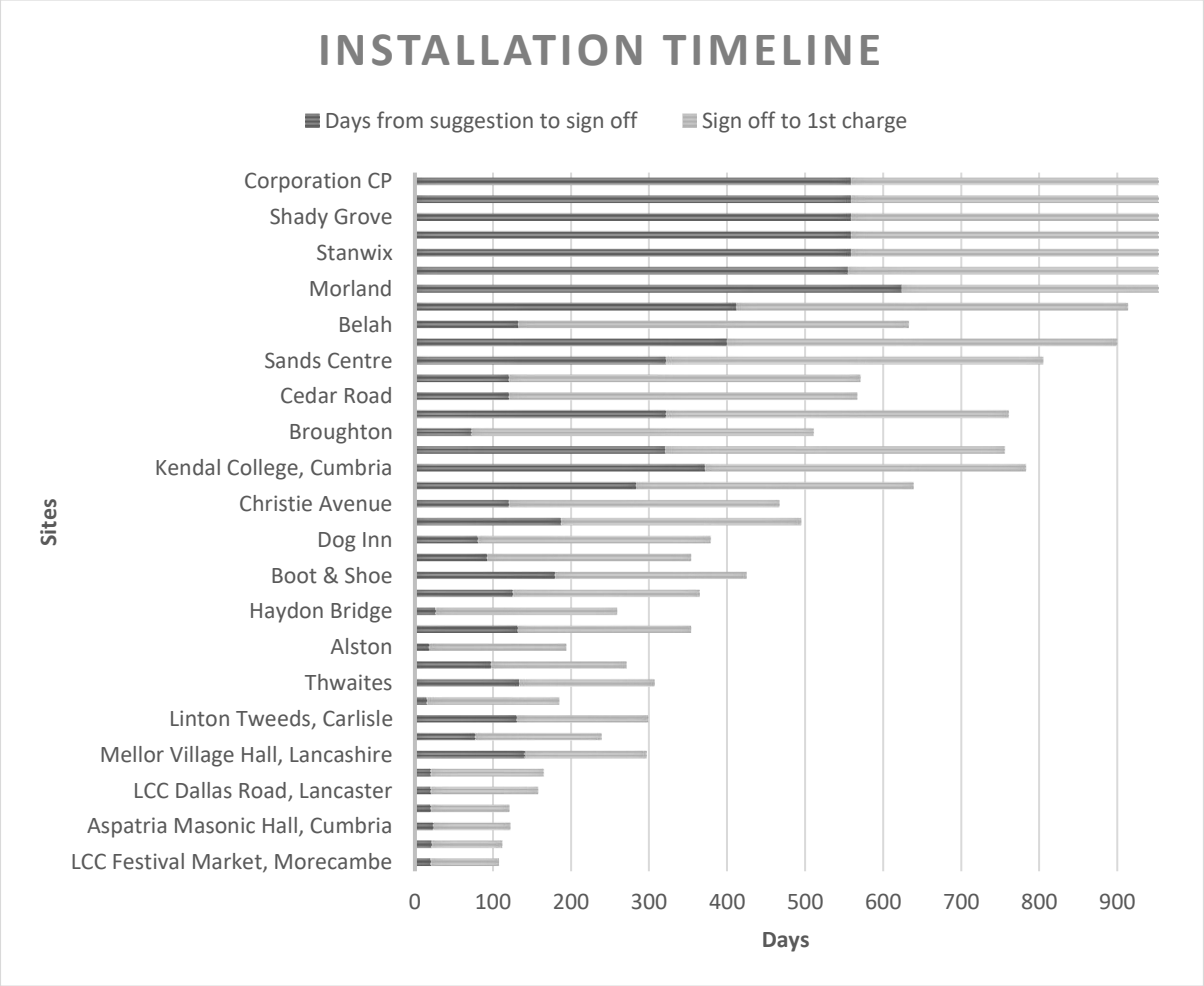
Electrical design

Electrical design has been changeable from the start of the project. Originally TT ground earthing was the only feasible method, however, early in the project, other products called O-Pen devices, have come to the market which enable connection to PME earthing systems provided by the supply authority. This is particularly useful in areas of difficult ground conditions where rock or poor ground conditions prevent the use of earth rods being driven into the ground - particularly relevant in the Lake District. It also overcomes issues with other metallic electrical installations in close proximity (touching distance), items such as lamp posts and other feeder pillars etc. However, O-pen devices do come at a considerable cost and often require a larger feeder pillar, increasing costs further. The O-Pen devices are basically a safety switch which cuts out when the neutral conductor is lost on the mains supply. One problem is that they need to be manually re-set when a supply fault causes them to drop out. Only very recently has an automatic version been developed and we are trialling these on two of the most recent sites.

Security

Security has become an increasingly important factor in assessment of suitable sites, not just because of the high price of EVs themselves. If part of the SOSCI approach is to encourage overnight parking for local residents, then adequate lighting needs to be in place so that EV drivers, and particularly female ones, feel confident not only setting a charge session going, but then walking away from site. Using parking bays that benefit from existing lighting is of course preferable, but at several sites extra lighting has been installed.

Timelines



As can be seen in the above table, the timelines from first contact to operational vary widely. Contractual issues have to be overcome, as well as technical ones from the site itself. The swiftest and easiest sites to install are those that meet a quite narrow set of technical / location criteria and have owners / site hosts closely aligned with the Charge My Street ethos. The sites which took the longest were those in Carlisle City Council, due to lengthy contractual and procurement and DNO connections. The Lancaster was fastest to install due to the clear requirements and specification from the Council. The sites which have been operational quickest are those hosted by business or community organisations. A full case study regarding the installation process can be found in the Q9 reports folder or linked to Appendix 2.

If a new DNO connection is required, then CMS are at the mercy of the DNO's processes and increasing lead times. In spring and summer 2021 it could be up to two weeks for a site with first works complete to be inspected and then a connection date offered, which itself would be a further 6-8 weeks away (with 4 weeks to be added to this if a road closure was required). After this, a meter installation is required which can take some time, and in the case of The Dog Inn took a further four months. ENWL lead times are now in the 12-15 weeks bracket, although with local authority sites a programme of pre-inspections has been agreed, i.e. before a site is completely ready for a new connection.

To ensure that host expectations are satisfied, that ENWL requirements are fully met, and that efficient use of on-site time is made, having groundworkers familiar with the specific aspects of EV infrastructure installation is essential. In this respect, the procurement processes for Carlisle City

Council and SLDC resulted in suitable, high-quality contractors completing the works. For the other Charge My Street sites, a group of three groundworks contractors have proved their worth, providing a pool from which we can allocate jobs depending on availability and price as our rollout continues.

Future Methodology

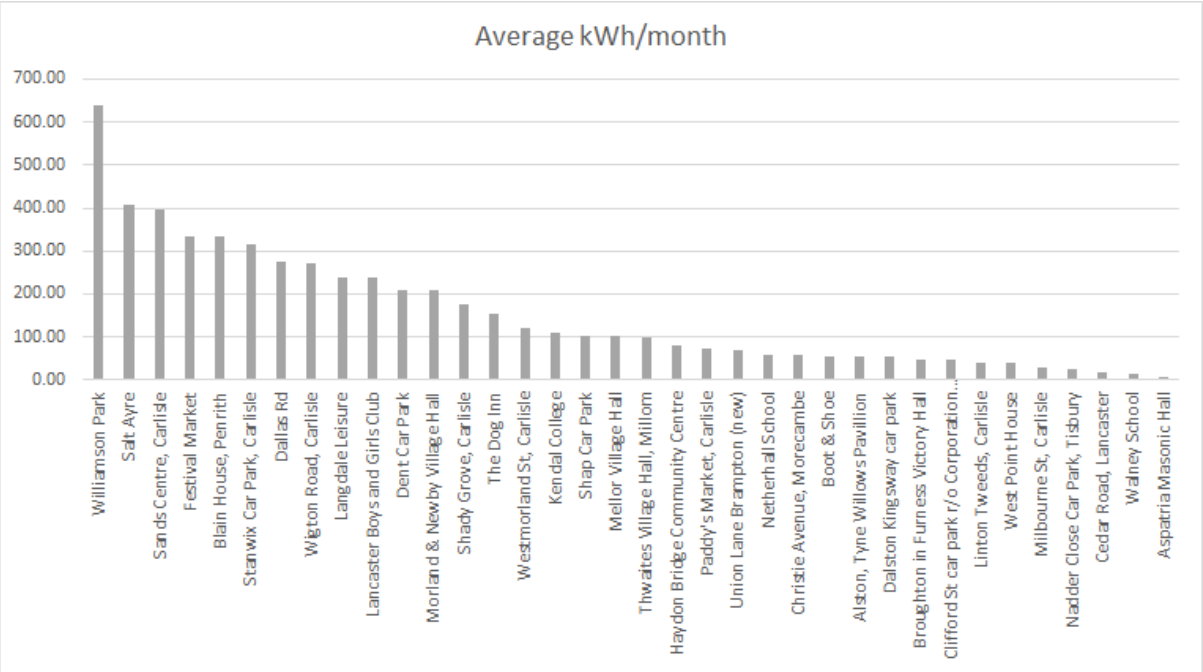
While the picture of usage is developing across our network it is difficult to pin down an approach that will be successful in the future. Langdale Leisure met all criteria and were enthusiastic hosts and could have been predicted as a high usage site given its location and the predominantly tourist userbase, and the site is consistently a top performer. Morland and Newby Village Hall also met the criteria in technical and host-engagement terms, but appeared less promising, yet it often surprises with its usage. Other sites, such as Walney School, appeared well-placed and were simple installs, but have failed to live up to expectations so far. A couple of Lancaster-based sites in low-income areas have seen low usage, confirming what our analysis of the locality had suggested. A future strategy needs to be aimed at those sites in the middle of the scale so that Charge My Street can balance difficulty and cost with expected long-term usage, while sticking to its social inclusion ethos.

The ideal site will have:

1) Location of parking bays within 5m of the building to reduce cabling costs and groundworks
2) Sufficient building power to avoid the requirement for a new DNO connection
3) Sufficient space within the building to accommodate equipment like hubs and electricity meters

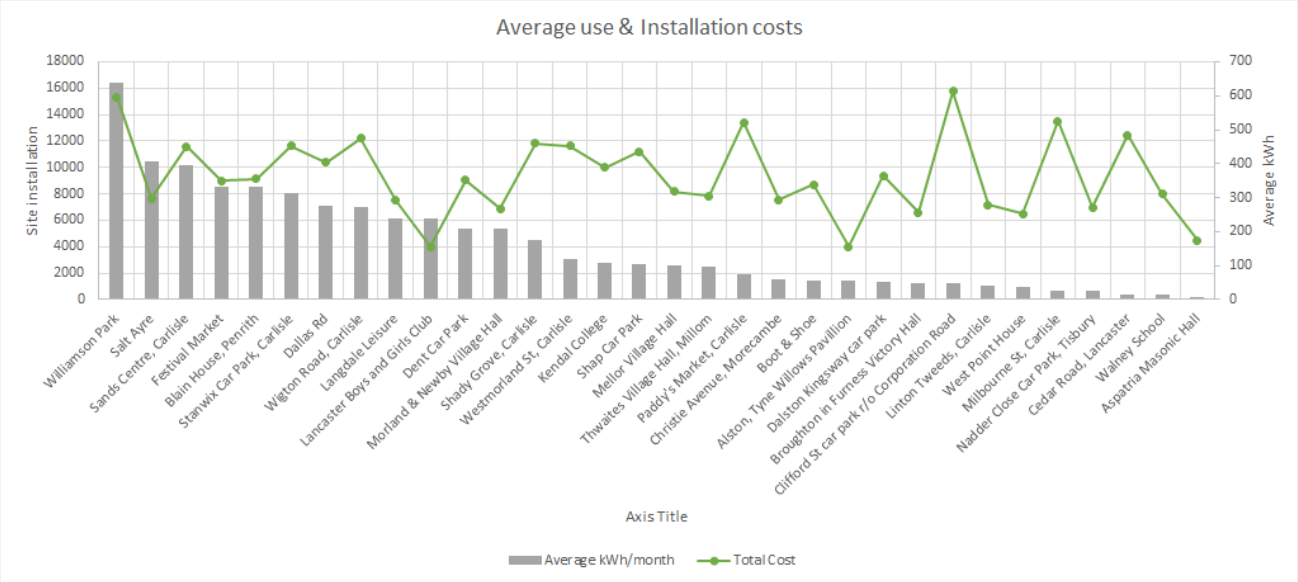
Sites without this will be more expensive and the host will be given the chance to contribute towards the additional costs. The average cost of sites which have not needed significant groundworks is £8,150. Including project management and contingencies, these sites would be £10K. With additional DNO connections, the cost rises to £11,244 and with additional project management and contingencies close to £14K.

4. Site Performance



The performance of a sample of sites in the West is shown on the graph above. The benchmark of 210kWh / month is used as a break-even scenario. Approximately one third of sites fit this profile, with the remainder proving challenging.

The sites that have been in operation the longest are well established (Lancaster Boys and Girls Club & Langdale Leisure) fit into this category. The newer sites that have been installed >1 year are generally below this level, but it is expected that usage will grow with time.



The graph above shows the cost of installation of sites and the average monthly usage. Ideally, we would like low-cost sites with high usage, rather than high cost sites which are barely used.

The Williamson Park site has very high usage but was also one of the most expensive to install. Clifford St Car Park had a similar cost but has much lower usage. The 3 sites where chargepoints have been attached to the walls of buildings are the cheapest, with Aspatria Masonic Hall receiving the lowest use. A full set of install costs can be found in Appendix 3.

5. Management of installed Sites

As sites have been operational several challenges have arisen in keeping them working.

Brampton Crash, Boxing Day 2021

By far our most serious incident, involving the complete destruction of the site by a drunk driver with the site being left in a dangerous state for several days. Full report is in Appendix 1, Near Miss report has been submitted to the HSE, ENWL report pending, actions pending.

Vandalism

During the months of operation of chargers across County Durham, we have experienced around 5 or 6 instances of vandalism on the charge points. This has mostly consisted of damage to the charger socket protection flaps (snapping them off) and damage to signage at one site. This point relates back to site selection/location and security. Where possible, we have aimed to deploy chargers in well-lit, populated areas to deter malicious damage.

We have seen a similar situation in the West, with several sites having their signage vandalised, but just the one site, Tarnbrook, being vandalised to the point of being unusable.

Impact Protection Bollards

The importance of bollard protection for charge points cannot be underestimated. To date, we have discovered very minor collisions on two sites across the East where the bollard has protected any damage to the charge point itself.

Storms - Arwen etc causing outages

The north has been particularly hard hit by storms this season. As they are designed to do so, intense weather can cause the electrical systems to trip out. Resetting is a relatively easy task, but if there is nobody local to do this, the remote nature of many of our sites means there is a time/cost implication of sending someone to reset - similarly in terms of comms which are also susceptible to extreme weather.

6. Lessons Learned

What are the strengths and weaknesses of EV charging infrastructure initiatives lead by public sector / private sector / 3rd sector at scale. (WP4)

Strengths	Weaknesses
Public sector initiatives	
Access to a large estate of property assets including car parks, highways and a large property portfolio.	Complex internal procedures to install chargepoints at assets - several stakeholders involved with their own agendas (commercial, legal, procurement)
Ability to offer large number of sites to CPOs and obtain economies of scale in procurements	Officer time is limited and contingent on political will to push chargepoint installation up the agenda
Private Sector Initiatives	
Ability to mobilise installation teams to install and support infrastructure, then operate and maintain	A lack of suitable sites which meet the criteria of high numbers of EV owners / traffic
Ability to bring investment	Need to see commercial returns quickly which can exclude some sites with a social inclusion element
Community Sector Initiatives	
Ability to mobilise communities to find sites and accommodate chargepoints on local buildings	Lack of expertise at operating charging points
Installing in areas where there is demand from local people, not just because car parks are there.	Access to long term finance

How can the top down approach of a unitary authority effectively integrate with the bottom up approach of a community-led solution? (WP4)

The approach in Durham has been to work with Local Area Action Partnerships to suggest sites to the EV officer. Sites have then been appraised and funded through the County Council's programmes like SOSCI or OZEV grants. In some cases, groups have been referred to CMS as they are ineligible for OZEV funding and sit outside the scope of the other projects. The outcome of the project has been that processes and systems have been developed to ensure that enquiries for EV chargepoints have been managed by the team at DCC.

What are the social, financial, technical barriers to chargepoint installation in rural and urban areas with different socio-economic profiles. (WP2, WP3, WP4, WP6)

The barriers have been covered elsewhere in the report but the key differences between rural and urban areas are the usage profiles:

In Cumbrian villages where there are relatively few homes without off street parking, visitors use the chargepoints generating revenue. There are challenges in the cost of electricity connections and its ongoing reliability. Communications for the equipment and customers is a greater challenge than in urban areas, with mobile signals more likely to cut out.

In urban areas, the challenges around obtaining sites are greater in affluent areas where there is most demand for charging from early adopters. Parking management is a big issue for site hosts and EV chargepoints introduce an added level of complexity for them. In low-income areas, sites are easier to find but the chargepoints get less use and some local people are hostile to them. They take up spaces from petrol cars and are significantly more expensive.

Does the development of not-normally-public-parking (n2p2) spaces allow for faster deployment of chargepoints than other approaches? (WP2, WP4)

In the original bid it was postulated that one area for site identification and development was the use of parking areas which are only used for a limited time during the day or week e.g. village halls, scout huts, community centres etc. These areas were classed as 'Not Normally Public Parking' or n2p2.

It was felt that the owners of these sites (which may be the LA or a community group) would like to see an increased use of their land, had a high level of community spirit, and if this created a small annual revenue – it would be appreciated.

A particular sub-set of this type of sites was Freemason Halls – these were identified as an output in SOSCI Phase 1, and the interest carried forward into Phase 2. Contact was established with a national officer, and it was felt that this provided a significant opportunity for many sites across the UK.

COVID-19

The pandemic effectively cancelled discussions with most of these groups. There was no lack of interested from most site owners, especially the community sites and the Freemasons, but they were closed for many months and when they did reopen EVCPs were not high on their priority list.

Moving forward it is expected that there will be a renewed/increase in interest from such groups – in the short term there is little scope for funding support from OZEV since the ORCS scheme does not permit the use of land not owned by the LA. However, the new LEVI scheme will permit the use of non-LA sites, especially where the landowner is not a private individual/company.

7. Accessible Access for Drivers

We have considered access to the charger points. Concrete bases were originally normally stepped up from ground level but are now as close to ground level as possible, depending on the gradient of the ground. This gives slightly better access to more drivers with limited or restricted mobility. We have also considered sites for accessibility compliance, marking out for wheelchair access where available. This is achievable only in certain areas. Where space is limited, such compliance would prevent an installation from being carried out, so a fine balance is considered prior to site approval.

Accessibility Research

When we commissioned one of the sites in Carlisle, we received feedback from their Equalities Officer that the site was not accessible for drivers with limited mobility. These raised an issue which, although we were aware of such concerns, we had not identified a specific activity in the project research and development.

A dedicated sub-project was established under the management of Durham CC. This resulted in the appointment of a specialist consultant and the additional outputs of a series of reports addressing various aspects of EVCPs and disabled drivers. The five reports can be seen here:

- EVCP User Trial Report
- EVCP Stage 2 Report
- EVCP Stage 3 Report
- EVCP Stage 4 Report
- EVCP Stage 5 Report

8. Conclusions

Installations have been challenging - due partly to the pandemic, which has slowed down the process of obtaining permissions from landowners, getting hold of equipment and getting sites connected by DNOs. However, there were several success factors in the installation process:

1. Focusing significant resource to support the LAs, to make their lives as easy as possible. This involved having Tracy as the lead in Durham and Sue as the main contact point for the Cumbrian Local Authorities. Their skills and experience allowed them to progress when people less knowledgeable about the culture in Local Authorities would have given up.
2. The partners found innovative ways to get around procedural problems which may have stopped other projects in their tracks.
3. The consortium partners are very outcome focused - so they really drove each other hard to get the charging points in, despite COVID.
4. SOSCI delivered across a portfolio of sites across multiple sectors – community, LAs, Housing Associations and private businesses.
5. Agile project management – scheduling works at other sites when faced with delays from DNOs or LAs.

In hindsight, Mer would probably not achieve the internal approval to carry out another ‘SOSCI’ project due to the poor economic viability of the project. A year’s data on the Batch 1 charge points shows they have averaged a consumption of under 2kWh/socket/day, which is much lower than expected and nowhere near the levels of usage that Mer need to make a project viable.

This shows the importance of grant funded support for deploying infrastructure in underserved areas to attract the private sector to invest and take on the risk of achieving a return on investment.

Some sites in later batches have shown to be more commercially viable - although it has only been in operation for 3 months, a dual fast charger in Queen Street in Barnard Castle is consuming nearly 14kWh/socket/day. With this knowledge and data to hand, partners are now exploring in greater depth the reasons why some sites are more successful than others.

The accessibility work has shown the importance of designing sites which are suitable and safe for users. The main lesson is that each site requires a series of trade-offs between the site hosts, the chargepoint operator and drivers who will use the chargepoint. These are partly driven by commercial considerations, but also complex social and environmental issues.

The project has given all parties fantastic data and case studies for different sites, which can lead to replicable installation models, reduced risks and more installations.

Appendix 1

Union Lane, Brampton Incident December 26th 2021

Ady Powell, 21st Jan 2021

"The most serious near-miss I have ever seen."

Steven Briggs, Bay Camera and Communications, chief installer for Charge My Street – SOSCI West of Pennines

It may seem over-dramatic to open the report with these words, but Steve has been a qualified electrical engineer for 30 years, has worked throughout varied areas of the industry and seen his fair share of near-misses.

The facts – as far as we know them

We have a few extra bits of information from our local contacts, but much of what we know is from this newspaper article which we were first made aware of on New Year's Day, six days after the incident.

https://www.newsandstar.co.uk/news/19813365.bramptons-car-charging-points-destroyed-drunken-car-crash/

We are not sure of the order of events, but the Audi collided with the feeder pillar, the chargepoints, and the Peugeot that was plugged in to one of the sockets. The lady who owns the Peugeot is local and one of our subscribers and informed me that the collision ripped the socket on her vehicle off, rendering it unusable as she now has no way of charging. The Audi driver is known to our subscriber. The extent of the damage is clear from the photo in the news story, and the ones that Daniel subsequently took, 3 above, the rest linked here: (https://photos.google.com/share/AF1QipNuPexmzCKZzHMtp_0hJ-XH4K_ce62EkveN-RrO5Z72x24oz5clj_B8QqN0DUUnYg?key=eGtHTFEtQ1J6VlJYbEJQODd4SjRUQlFYaEV4X0Zn)

At 21.53 the police were called and attended soon afterwards, an official report was not lodged, as confirmed by the documentation sent to us https://docs.google.com/document/d/19IP0LB1pdzru311o43Z6hrzdXosVcO29/edit. Whether the feeder pillar was ripped off its plinth, or whether it was subsequently removed by the police, we don't know. What we do know is that it ended up propped against the wall, thereby exposing live 400V mains cables and leaving them very close to the pavement. Anecdotally some barriers were laid on top of them, but these were not in evidence when Daniel arrived on site on 1st Jan.

What precisely happened next is unclear. At 22.20 there is the first of four calls to our support number from 'Anonymous', which is how a police number would show up.

Throughout the Christmas period our support number was redirected straight to EO where instructions would have told the caller to select Option 2 followed by Option 2 and this would have taken them through to the 24-hour AA-run support line. There is no evidence that the caller completed this, indeed the fact there were four such calls made supports this, and EO / the AA have no records of speaking to the police that evening.

Electricity North West have confirmed to us that they were not contacted by the police informing them of the accident so they could make the site safe – in a comparable situation the gas supplier would automatically be contacted in the event of a gas leak. This has now been escalated within ENWL and they will be doing a full report regarding accidents to EV chargepoint equipment and the procedure that needs to be put in place by the police to treat it the same way they would a damaged streetlight. They have said they will send us a copy of this report once done.

As far as we can tell, no attempt was made to contact Carlisle City Council as the owners of the site.

The first we knew about this was when Jenny spotted the article on 1st Jan and immediately notified Daniel, who diverted with his family on the way back from a visit to Newcastle. Arriving on site he took the photos linked above and called ENWL, as well as Steve who, on seeing live video of the site, made him aware of the seriousness of the situation. Daniel waited as long as possible for ENWL (given that he was with his young family), and in the meantime took some barriers from our nearby site and placed them over the protruding cables. ENWL didn't turn up in the 2 hour window required for an incident of this severity, but the site was made safe later that evening.

Conclusion

The bottom line is nobody was hurt, but this doesn't detract from the fact that this had the potential to be a lethally dangerous situation. For six days live cables lay very close to a pavement and in an area that was fully accessible to the public – this car park is regularly used by parents with children at the nearby primary school, so it was lucky that this occurred in the school holidays. As with the majority of major incidents, it's not one single cause that leads to its severity, rather a combination of lesser ones. If contact had been made with EO then, a course of action would have been put in place, or if either ENWL or Carlisle City Council had been made aware then this could have been averted.

The fact of the matter is that this could have been an end-of-business event for Charge My Street. No matter that, technically, the responsibility of the live cables was ENWL's, or that it was up to the police / emergency services to notify the relevant people and make the site safe, it was our name on the signage, and indeed EO's on some of the equipment. If there had been serious injury, or worse, as a result of this, the damage to our reputation would not have been survivable. This would have also impacted on EO's reputation, but I believe they are of a sufficient size that they would have survived.

In a wider context, I have no doubt that the sceptic press would have picked up on this story and made the most of it, thereby damaging the already low confidence the general public have in the public EV charging infrastructure.

Actions

Each stakeholder has procedures in place to deal with precisely this sort of incident, but these procedures can only be enacted if we / they are aware of it. Therefore:

We await ENWL's report and once they have a formalised process in place regarding how the emergency services should notify them of damage to EV charging infrastructure, we will encourage them to share this with all DNOs and relevant emergency services nationwide.

We have spoken with EO, and they will now have an explicit entry on their support handlers' information sheet instructing them to contact the relevant DNO's emergency line in the event of any damage to either the charging sockets themselves or to the feeder pillar.

Charge My Street will activate a new, emergency-only number through Sipgate. This number will be displayed on a sticker, one on the outside of the feeder pillar, one on the inside, stating that this should be called if there is any visible damage to the equipment (similar to the signage seen on railway bridges). This line will be permanently directed to one of Charge My Street's directors. One director will be responsible for this each week, 24/7, providing both a mobile number as option 1, and a landline as option 2 to cover off 'do not disturb' settings that may be on their mobile. We do not foresee this will be onerous for the board, indeed in 2021 this will have resulted in just two calls, one for the above incident, the other for the vandalism at Tarnbrook Road, Heysham.

Charge My Street will extend its network of Chargepoint Champions, that is local people who can keep an eye on our sites. We plan to improve the training we give these champions, not only for emergencies, but for general care of each site.

Appendix 2

Carlisle City Council Case Study

Scaling on Street Charging Infrastructure

Carlisle City Council Case Study

Acronym:	**SOSCI**
Full Title:	Scaling on Street Charging Infrastructure
Coordinator:	Cybermoor
Project Duration:	11/2019 - 02/2022
Website:	www.sosci.co.uk
Partner:	Carlisle City Council
Contact:	Phil Gray
Email address:	phil.gray@carlisle.gov.uk
Website:	www.carlisle.gov.uk
Work Package:	WP4
Deliverable:	
Lead:	Carlisle City Council
Authors:	Phil Gray
Contributors:	Keith Poole, Carlisle City Council Sue Gilbertson, Cybermoor
Internal review:	Daniel Heery

Appendix 3

Installation Costs

Site Name	InstallationType	Infrastructure Cost	Infrastructure Cost	Groundworks costs	Installation Cost (labour + materials) estimated	MaintenanceCost	MaxVehicles	Other Cost - value of EO kit	Other Cost - Lighting Installation	Other Cost - Line marking/logo's)		Total kWh	Months operational	Average kWh/month
Alston, Tyne Willows Pavillion	2 x 7kw chargers	0	0	0	4300	300	2	2075	N/A		SOS CI Phase 1	1513.58	28	54.06
Boot & Shoe	2 x 22kw chargers	4200	3000	1200	5010	300	2	2790	N/A		SOS CI Phase 1	1844	33	55.88
Lancaster Boys and Girls Club	2 x 22kw chargers	1500	0	1500	3330	300	2	2000	N/A		SOS CI Phase 1	8590	36	238.61
Broughton in Furness Victory Hall	2 x 22kw chargers	1600	0	1600	6140	300	2	2750	N/A		SOS CI Phase 1	1583	33	47.97

West Point House	2 x 22kw chargers	1000	0	1000	4880	300	2	3000	N/A			614	16	38.38
Langdale Leisure	2 x 22kw chargers	0	0	0	9970	300	2	3100	N/A			4316	18	239.78
Kendal College	2 x 22kw chargers	2580	0	2580	7380	300	2	3050	N/A			1867	17	109.82
Dalston Kingsway car park	2 x 22kw chargers	5396	2855	2541	4000	300	2	2850	760			742	14	53
Aspatria Masonic Hall	2 x 7kw chargers	0	0	0	4800	300	2	2600	N/A			108	14	7.71
Nadder Close Car Park, Tisbury	2 x 22kW	654	654	0	6335	300	2	2600	N/A			299	12	24.92
Mellor Village Hall	2 x 22kW	3366	0	3366	5050	300	2	2739	N/A			1315	13	101.15
Linton Tweeds, Carlisle	2 x 22kW	2090	0	2090	4800	300	2	3100	N/A			484	12	40.33
Dent Car Park	2 x 22kW	4431	2148	2283	7110	300	2	3100	1475			1462	7	208.86
Salt Ayre	2 x 22kw chargers	1650	0	1650	6000	300	2	3100	N/A	Inc	Paid from tender	4067	10	406.7
Festival Market	2 x 22kw chargers	2800	0	2800	6200	300	2	3100	N/A	Inc	Paid from	3672	11	333.82

											tender			
Williamson Park	2 x 22kw chargers	7535	5500	2035	7800	300	2	3000	N/A	Inc	Paid from tender	5736	9	637.33
Dallas Rd	2 x 22kw chargers	4203	2536	1667	6200	300	2	3000	N/A	Inc	Paid from tender	2485	9	276.11
Christie Avenue, Morecambe	2 x 22kW	7508	2578	4930	5765	300	2	3100	N/A	Inc	LLC covered DNO costs	348	6	58
Cedar Road, Lancaster	2 x 22kW	8204	5599	2605	5765	300	2	3100	N/A	Inc	LLC covered DNO costs	98	6	16.33
Tarnbrook Road, Heysham	2 x 22kW	9424	4868	4556	5765	300	2	3100	N/A	Inc	LLC covered DNO costs	0	0	0
Blain House, Penrith	2 x 22kW	3650	0	3650	5475	300	2	3100	N/A	Inc		3333	10	333.3
Sands Centre, Carlisle	2 x 22kW	7154	2359	4795	4414	300	2	3100	N/A	Inc		2772	7	396

Stanwix Car Park, Carlisle	2 x 22kW	7200	2555	4645	4414	300	2	3100	N/A	Inc		2517	8	314.63
Paddy's Market, Carlisle	2 x 22kW	9004	2809	6195	4414	300	2	3100	N/A	Inc		585	8	73.13
Milbourne St, Carlisle	2 x 22kW	9107	4362	4745	4414	300	2	3100	N/A	Inc		193	7	27.57
Union Lane, Brampton	2 x 22kW	8172	3427	4745	4414	300	2	3100	N/A	Inc		556	8	69.5
Shady Grove, Carlisle	2 x 22kW	7415	2595	4820	4414	300	2	3100	N/A	Inc		699	4	174.75
Wigton Road, Carlisle	2 x 22kW	7789	2544	5245	4414	300	2	3100	N/A	Inc		2182	8	272.75
Westmorland St, Carlisle	2 x 22kW	7200	2455	4745	4414	300	2	3100	N/A	Inc		480	4	120
Clifford St car park r/o Corporation Road	2 x 22kW	11356	6676	4680	4414	300	2	3100	N/A	Inc		188	4	47
Showfield car park, Brampton	2 x 2kW	9986	5241	4745	4414	300	2	3100	N/A	Inc		0	0	0

Thwaites Village Hall, Millom	2 x 22kW	2445	0	2445	5385	300	2	3100	N/A			875	9	97.22
Morland & Newby Village Hall	2 x 22kW	2082	0	2082	4790	300	2	3100	N/A	Inc		1658	8	207.25
Walney School	2 x 22kW	2522	0	2522	5450	300	2	3100	N/A	Inc		82	6	13.67
Shap Car Park	2 x 22kW	6472	2617	3855	4730	300	2	3100		250		309	3	103
		0												
		0												
		0						Estimated						
The Dog Inn	2 x 22kW	9064	3800	5264	4290	300	2	3100		Inc		307	2	153.5
Netherhall School	2 x 22kW	1480	0	1480	4765	300	2	3100		N/A		180	3	60
Haydon Bridge Community Centre	2 x 22kW	4175	0	4175	5120	300	2	3100		N/A		164	2	82
Belah Centre	2 x 7kW	5184	0	5184	3986	300	2	2776				0	2	0
Botcherby Commu	2 x 22kW	8435	2771	5664	3986	300	2	3100				0	1	0

nity Centre														
Union Lane Brampton (new)	2 x 22kW	400	0	400	4061	300	2	3082		N/A		556	8	69.5
William Loveless Hall, Wivenhoe, Essex	2 x 22kW	0	0		5027	250	2	3100		N/A		0	0	0
Father's House, Lancaster	2 x 22kW	2945	0	2945	4875	300	2	3100		N/A				
Staveley Mill	4 x 22kW	1810	0	1810	9550	500	4	4845						
Keswick Ministries	4 x 22kW	4931	0	4931	10010	500	4	5377						
Gambleby	2 x 7kW	3250	0	3250	3600	300	2	2739		N/A				
Great Eccleston	2 x 22kW	6613	2700	3913	4400	300	2	3100		N/A				
Hambleton	2 x 7kW	0	0	0	4495	300	2	2739						
Farmborough Village Hall	2 x 22kW	0	0	0	6264	250	2	3100						

Rydal Hall	2 x 22kW	2775	0	2775	7300	300	2	3100						
Anglers Rest Community Pub, Bamford	2 x 22kW	13378	6403	6975	6370	300	2	3100						
Currock Community Centre	2 x 22kW	7670	2456	5214	3986	300	2	3100		Inc				
Harraby Sports Centre	2 x 22kW	15072	2806	12266	3986	300	2	3100		Inc				
Petterill Bank Community Centre	2 x 22kW	11987	6193	5794	4429	300	2	3100		Inc				
Morton Manor Community Centre	2 x 22kW	12833	5829	7004	4429	300	2	3100		Inc				
Beetham Road Car Park, Milnthorpe	2 x 22kW	6777	2087	4690	4225	300	2	3100		Inc				
Daltongate Car	2 x 22kW	9130	4669	4461	4225	300	2	3100		Inc				

Park, Ulverston														
Kents Bank Road car park, Grange over Sands	2 x 22kW	9217	2568	6649	4225	300	2	3100		Inc				
King Street car park, Amblesi de	2 x 22kW	10435	5226	5209	4225	300	2	3100		Inc				
Rayrigg Road car park, Bowness	2 x 22kW	18166	6275	11891	4225	300	2	3100		Inc				
Red Bank Road car park, Grasmer e	2 x 22kW	8059	4669	3390	4225	300	2	3100		Inc				
South Lakeland House car park, Kendal	4 x 22kW	13641	6097	7544	4225	500	4	4800		Inc				
Stricklan dgate	4 x 22kW	16137	6186	9951	4225	500	4	5377		Inc				

House, Kendal														
Broad Streeet, Windermere	2 x 22kW	9105	4225	4880	4225	300	2	3100		Inc				
Peppercorn Lane car park, Kendal	4 x 22kW	11991	3727	8264	4225	500	4	5377		Inc				
Ulverston Buxton Place	2 x 22kW	8880	4669	4211	4225	300	2	3100		Inc				
East Installations														
Albert Road Car Park, Consett, DH8 5QU	2 x 22kW	5,427.26	4,427.26		5650	506	4							
Belmont Park & Ride, DH1 1SR	2 x 22kW	5700	5000		6650	506	4							
Bowlees Visitor Centre	1 x 7.4kW	958.19	958.19		1066.62	253	1							
Howlands Park &	4 x 7.4kW	5,536.85	4,761.85		6775	759	4							

Ride, DH1 3TQ														
North Burns Car Park, Chester-le-Street, DH3 3TF	4 x 7.4kW	2,973.88	2,323.88		1754	506	4							
North Terrace Car Park, Seaham, SR7 7EZ	2 x 7.4kW	2913.63	2213.63		4000	253	2							
Old Elvet, Durham, DH1 3HP (Old Shire Hall)	2 x 7.4kW	3,163.88	2,323.88		2850	506	2							
Riverside Car Park, Chester-le-Street, DH3 3SJ	4 x 7.4kW	6,538.72	5,888.72		5,689.40	506	4							
Scott Street Car Park, Stanley, DH9 8AD	4 x 22kW	5,077.26	4,427.26		6,589.64	506	4							

Sniperly Park & Ride, DH1 5AA	4 x 7.4kW	4,996.85	4,647.80		10,755	759	4							
St. John's Car Park, Seaham, SR7 7JD	4 x 7.4kW	4,657.54	4,007.54		6,566.65	506	4							
Annand House	2 x 7.4kW	2125.95	1975.95		1047.61	253	2							
DCC Comeleon House, Tanfield, DH9 9NX	2 x 7.4kW	1975.95	1975.95		1056.25	253	2							
DCC Greencroft Centre, Annfield Plain, DH9 7BF	4 x 7.4kW	1,975.95	1,975.95		1056.25	759	4							
DCC Greenlane Offices, Spennymoor, DL16 6JQ	2 x 7.4kW	2,323.88	2,323.88		1700	506	2							
Sidegate Car Park	4 x 22kW	13584.72	6000		5,840.82	506	4							

Consett Leisure Centre	4 x 22kW	19037.73	6000		5,906.40	506	4							
Derwent Street Car Park	2 x 7.4kW	15159.51	4000		4902.4	253	2							
Pelton Community Centre	2 x 22kW	13966.67	4000		4498.67	253	2							
Queen Street Car Park	2 x 22kW	9395.48	4000		4119.78	253	2							
Royal Road Carpark	2 x 22kW	12162.26	4000		5109.09	253	2							
Blake Street Car Park	2 x 22kW	9015.01	4000		4934.59	253	2							
Newton Aycliffe Youth and Community Centre	2 x 22kW	9534.73	4000		4465.2	253	2							
Lanchester Valley Railway Line	2 x 22kW	10186.45	4000		4500.34	253	2							
Abbey Leisure Centre	2 x 22kW	3000	3000		4714.83	253	2							

Sunnydale Leisure Centre	2 x 22kW	3000	3000		4589.96	253	2							
S Stanley Football Pavillion	2 x 22kW	3746	3000		6240.19	253	2							
Tanfield Lea Business Centre	2 x 22kW	3000	3000		5333.35	253	2							
Fulforth Centre	2 x 22kW	3746	3000		3578.2	253	2							
Nevilles Cross, Cross view terrace	2 x 22kW	3400	3000		3000	253	2							
16 Cambridge St, Spennymoor Leisure Centre	4 x 22kW	15554.79	6000		7,000.00	506	4							
Park Street Car Park	2 x 7.4kW	8708.85	4000		4860.76	253	2							
Peterlee Leisure Centre	2 x 22kW	8700	4000		4956.15	253	2							

Green Street Car Park	2 x 22kW	13053.03	4000		5431.08	253	2							
Teesdale Leisure Centre	2 x 22kW	10468.03	4000		5026.81	253	2							
Denesid e Lodge Park	4 x 22kW	5000	5000		8000	253	4							
Car Park 2 South Terrace B.A.	2 x 22kW	8823.39	4000		3570.2	253	2							
Car Park 1 Kingswa y B/A	2 x 22kW	9607.69	4000		3570.2	253	2							
Car Park adj Wilfred Street	2 x 22kW	14248.15	4000		4668.13	253	2							
Car Park Low Chare East (St Marys) 1	2 x 22kW	14610.73	4000		3570.2	253	2							
Car Park Osbourn e Road	2 x 22kW	14610.73	4000		3570.2	253	2							
Car Park Foundry Lane & WC -	2 x 22kW	10624.31	4000		3570.2	253	2							

Chester le Street														
Car Park Low Chare East (St Marys) 2	2 x 22kW	18609.98	4000		3570.2	253	2							
Car Park No.2 Gibson Street Consett	2 x 22kW	11682.29	4000		3570.2	253	2							
Eamont Road, Ferryhill	2 x 22kW	21970.81	4000		3677.36	253	2							
Cheapside Car Park	2 x 22kW	11814.4	4000		3570.2	253	2							
Bondgate Car Park	4 x 22kW	5700	4500		4,647.50	506	4							
Hardwick Visitors Centre	2 x 22kW	4350	4000		7500	253	2							
Wharton Park	2 x 22kW	5752	3752		3927.4	253	2							
Festival Walk	2 x 22kW	2188.06	2188.06		4868.7	253	2							
Cutlers Hall Road,	2 x 22kW	10603.564	4000		4590.2	253	2							

Shotley Bridge														
Blackhall Mill Community Centre	2 x 7.4kW	2188.06	2188.06		4904.12	253	2							
Car Park opp Mikes Fish Bar Greenwell Road N	2 x 7.4kW	2638.06	2188.06		2651.64	253	2							
Belmont Park & Ride	2 x 50kW	38200	18500		12000	650	2							
Galgate Car Park	2 x 50kW	36756.59	18500		13756.94	650	2							
Tenters Street Car Park	2 x 50kW	22500	18500		10000	650	2							
Nevilles Cross, Cross view terrace	2 x 50kW	32600	18500		39000	650	2							
Car Park opp Mikes Fish Bar Greenw	2 x 50kW	33391.26	18500		13756.94	650	2							

ell Road N														
Hardwick Visitors Centre	1 x 25kW	6350	6000		20000	253	1							
Beamish Museum of the North	3 x 22kW	16000	16000		22,400	506	3							
Rowlands Gill Community Centre	2 x 7.4kW	4888.06	2188.06		5987.95	253	2							