



Department
for Environment
Food & Rural Affairs



Birmingham
City Council

AI CCTV & Duty of Care Education

Birmingham City Council – Fly-tipping Intervention Grant

Birmingham City Council trialled **AI enabled CCTV** in 3 hotspot locations to identify fly-tipping offenders and take enforcement action where necessary. The council also engaged with the public via door-knocking and informative leaflets to **educate residents on their waste duty of care**. The project started in July 2023 and despite having issues with the AI element of the CCTV, officer feedback and results 3 months post-intervention show an **overall reduction in fly-tips**. The CCTV has also identified **improvements to the council's waste management policy**.



(fly-tipped rubbish on street)



(hotspot after CCTV installation)

The Fly-tipping Issue

The council targeted 3 hotspot locations:

Hotspot 1: A road that has had ongoing fly-tipping problems over the past 10 years including regular issues of waste on the street and outside a primary school and nursery. The road consists of terraced properties that are not suitable for wheeled bins and remain on black sack collections. Previous council work on enforcement and waste prevention has had limited effect. The most common type of waste fly-tipped at this location is

residential bulky items such as sofa's, mattresses, and fridges as well as household waste in black bin bags. Intelligence from the Neighbourhood Enforcement Team found that the waste was being fly-tipped by a small number of properties on the road and on some occasion's household waste was being fly-tipped by people outside of the hotspot driving to the location.

Hotspot 2: A road similar to hotspot 1, with lack of space for wheeled bins, but with a dead-end road attached where waste is often found fly-tipped against the brick wall. The council have reported large scale commercial waste fly-tipped at this location; and looking at the nature and volume of the waste to this location it indicates the presence of vehicle style offending.

Hotspot 3: This road has a mix of residential and commercial properties with residential flats situated above ground-level businesses. There has been a long-standing issue of black sacks amongst other items of waste being fly-tipped on the pavement; sometimes in front of a Madrasa where children come to worship/study. Like the other 2 hotspots the location has limited space for wheeled bins and residents are on black sack collections. The council have continuously tried regular enforcement and educational visits to combat fly-tipping. The most common type of waste fly-tipped at this location is residential bulky items such as sofas, mattresses, and fridges as well as household waste in black bin bags. There has also been concerns that waste is being fly-tipped by the local businesses/shops.

The Intervention

Education: The council engaged with the residents of each hotspot location to raise awareness of their duty of care both as a householder and as a business. Education methods have previously proved to be effective in similar projects and are an important factor of this intervention to ensure residents understand their waste duty of care obligations and it limits the use of enforcement to individuals who breach environmental laws in a negligent, reckless, or intentional fashion.

Education officers went from door-to-door to engage with residents and provide leaflets detailing the proper arrangements for disposal of waste. Where necessary, bilingual officers were also utilised to overcome language barriers. Whilst officers were going from door-to-door, residents had the opportunity to flag localised waste issues such as broken/missing bins or provide directed community intelligence about which properties fly-tipping issues stem from. Residents were also encouraged to report fly tipping incidents via the council website to ensure that the council is aware of any fly-tipping activity.

Enforcement: The council introduced AI enabled CCTV to monitor each site and capture images of any offenders. The initial proposal was for the AI to detect a fly-tip, alert the system, record evidence and warn the perpetrator with a recorded message. Enforcement officers would then rapidly be dispatched to the hot-spots in the immediate aftermath of a

fly-tipping incident to collect evidence, identify the offender, and take enforcement action where necessary.

Once the cameras were installed it quickly became apparent that the AI function was not fit for purpose; unfortunately, the CCTV detected false positives each day (to the thousands) that were general day to day activities of the public. The technology provider's support team tweaked the software to reduce the number to the hundreds, but this resulted in the sensitivity of the camera's being unable to detect fly-tipping incidents. The false positives were overwhelming for officers, so they resorted to using the cameras in a traditional sense (looking through the previous day's footage each morning).

The cameras also included a pre-recorded alert that the council were planning on utilising by having a recorded voice stating 'CCTV in operation, do not leave waste here' when triggered by a potential fly-tip. This however was ruled out early due to the suspected false activation error and potential noise nuisance this would have caused to local residents.

Signage: Separate from grant funding, signs were installed at the hotspot locations warning residents that the area is under surveillance for the purpose of detecting environmental crime.

Communications: The council got in touch with the local radio and television broadcasting media who attended one of the hotspots with the councillor cabinet member for environment to put a spotlight on fly-tipping and promote awareness of the council's use of AI-enabled CCTV cameras. This news was then cited by the Telegraph and the Metro. The council also used their own social media and website to promote the project.

The Result

The pre-intervention monitoring data represented below is limited in the fact that it only measures the number of fly-tips reported to the council by residents and it is commonly found that the residents experience 'reporting fatigue' in these hotspot areas. Considering this, it is likely that the data is an undervalue of the true number of fly-tips compared to the evidence we now have from installing the CCTV cameras.

Street crews have remarked that they have seen a noticeable difference in the amount of rubbish they are clearing from the streets in the hot-spot areas, which mirrors the feedback that has been received from a Neighbourhood Enforcement Officer, who patrols one of the hotspots that the camera was deployed into.

Hotspot 1: The results show that the number of fly-tips reported on this road increased by 600% during the post-intervention monitoring period. The increase may be owed to the engagement work carried out by officers before CCTV was installed who encouraged residents to report any fly-tipping on their street. There has been a noticeable difference of the amount of waste that is being fly-tipped at this hotspot and feedback from waste management crews report that they are not removing as much waste from this hot-spot since the introduction of CCTV.

Hotspot 2: The data shows a huge reduction of fly-tipping reports at this hotspot since introducing the CCTV. There have also been reports of the cleanliness of the street in general.

Hotspot 3: The CCTV identified that the substantive numbers of black bags being placed at the hotspot by residents were actually part of their weekly collection and this was not being collected by waste management crew. The council enforcement team reported the missed collections to the depot, who then indicated that they thought it was commercial waste from shops and therefore the job of the street cleansing crew. Once the refuse collection crew started picking up the black bags in their weekly collection, the CCTV evidence shows that fly-tipping at this hotspot is mostly resolved.

| Location | Intervention | Pre-Intervention Monitoring | Post-Intervention Monitoring | Results |
|------------------|------------------------------|------------------------------------|--|----------------------|
| Hotspot 1 | Educational awareness & CCTV | 1 1st May 2023 - 31st July 2023 | 7 1st August 2023 – 27th October 2023 | 600% Increase |
| Hotspot 2 | Educational awareness & CCTV | 6 1st May 2023 – 31st July 2023 | 1 1st August 2023 – 27th October 2023 | 83% Decrease |
| Hotspot 3 | Educational awareness & CCTV | 1 1st May 2023 – 31st July 2023 | 1 1st August 2023 – 27th October 2023 | No Change |

Data Source: M3 Publication Protection Database

Other Relevant Data

Enforcement: Whilst CCTV did have an impact on the reduction of fly-tipping it has failed to provide an uplift in the number of enforcement measures actioned as the identification of offenders has been a barrier in being able to instigate enforcement action. The identification of an offender is still primarily reliant on officers being provided the offenders name during a doorstep encounter. If an offender is not forthcoming or cooperative the enforcement action may be hindered.

The CCTV did capture fly-tipping incidents and traced the perpetrators property at hotspot 1, however this did not enable officers to identify the perpetrator. One perpetrator was identified in this hotspot however the person was a teenager under the age of 18 so no enforcement action materialised. In hotspot 2 another perpetrator was captured fly-tipping but again the officers could not identify them.

Other relevant data: Local residents have been supportive of the use of CCTV to capture fly-tippers, as they enjoy the deterrence value the cameras bring. Typically, areas that necessitate the use of CCTV to capture fly-tipping are areas of increased deprivation, often associated with high levels of non-environmental related crime (e.g. theft / ASB / assault). As such residents have also remarked that they feel safer with CCTV on their street.

Feedback

What went well?

The education exercises and introduction of the CCTV has appeared to have an overall impact on the reduction of fly-tipping in the key hot-spot locations. The education exercises have appeared to awaken resident's interest in tackling fly-tipping in their local area and resulted in more fly-tipping being reported. Whilst the CCTV monitoring identified issues with collections from "flats above shops" in hotspot 3 and was subsequently addressed to bring about operational change within the council's waste management team. The Councillor Cabinet Member for Environment has called for a review of the policy around which properties are allocated wheeled bins or kept on sack collections.

The use of AI-enabled CCTV cameras stirred a news interest and put the broader issue of fly-tipping into the spotlight and local Councillors are very supportive of the deployment of cameras, as one of the primary sources of complaints they receive from residents feature waste related issues (in hotspots most afflicted by fly-tipping, where these cameras have been deployed into).

What would you do differently?

Most importantly, the council's experience has shown that the AI-enabled CCTV has not yet reached sufficient development to be relied upon for detecting fly-tipping events. The AI functionality aspect of the intervention has failed to free up officer hours and speed up officer response time due to the technology's inability to detect fly-tipping incidents and create alerts in real time. Consequently, officers had to revert to the existing process of manually trawling CCTV imagery to identify fly-tipping incidents.

In the future the council would avoid the use of AI until further technological advancements in the software are made. Instead, an intervention could use an officer to monitor hot-spot in real-time through the cameras and once they recognise a fly-tipping event is in action, the officer could talk to the offender through a microphone/speaker and ask them to pick the item back up.

The council are looking into alternative AI enabled CCTV systems that may be more effective and mature than the current.

What key information would you pass on so others can deliver this project?

In some of the council's residential areas where the CCTV cameras were deployed a small number of complaints were received from residents who felt that CCTV outside their property intrudes their privacy. As such, it is important to have due consideration to Article 8 of the Equality Human Rights Commission whenever CCTV is proposed, and the use of cameras must be necessary/proportionate at tackling CCTV in targeted areas, rather than being adopted as a sweeping brush tool to tackle fly-tipping across the entire City.

Equipment Inventory

| Item | Supplier | Unit Cost | Quantity | Total Value |
|---|-------------------|-----------|----------|-------------|
| CCTV Package (Camera installation set, HD IR Speed Dome, GSM unit, detection alarm and installation fee) | Chroma Vision Ltd | n/a | 3 | £44,444.43 |

Contact Details

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Defra's Fly-Tipping Intervention Grant: The Fly-tipping Intervention Grant supported projects trialling approaches and interventions to tackle fly-tipping. Administered by Rural Payments Agency (RPA) on behalf of Defra, this grant provided capital funding for projects at known fly-tipping hot-spots that showed the potential for improving infrastructure, raising awareness, and supporting enforcement activity.