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Making the Most of Birmingham City Council's Aerial Thermographic Study

Report to Central Midlands LASP

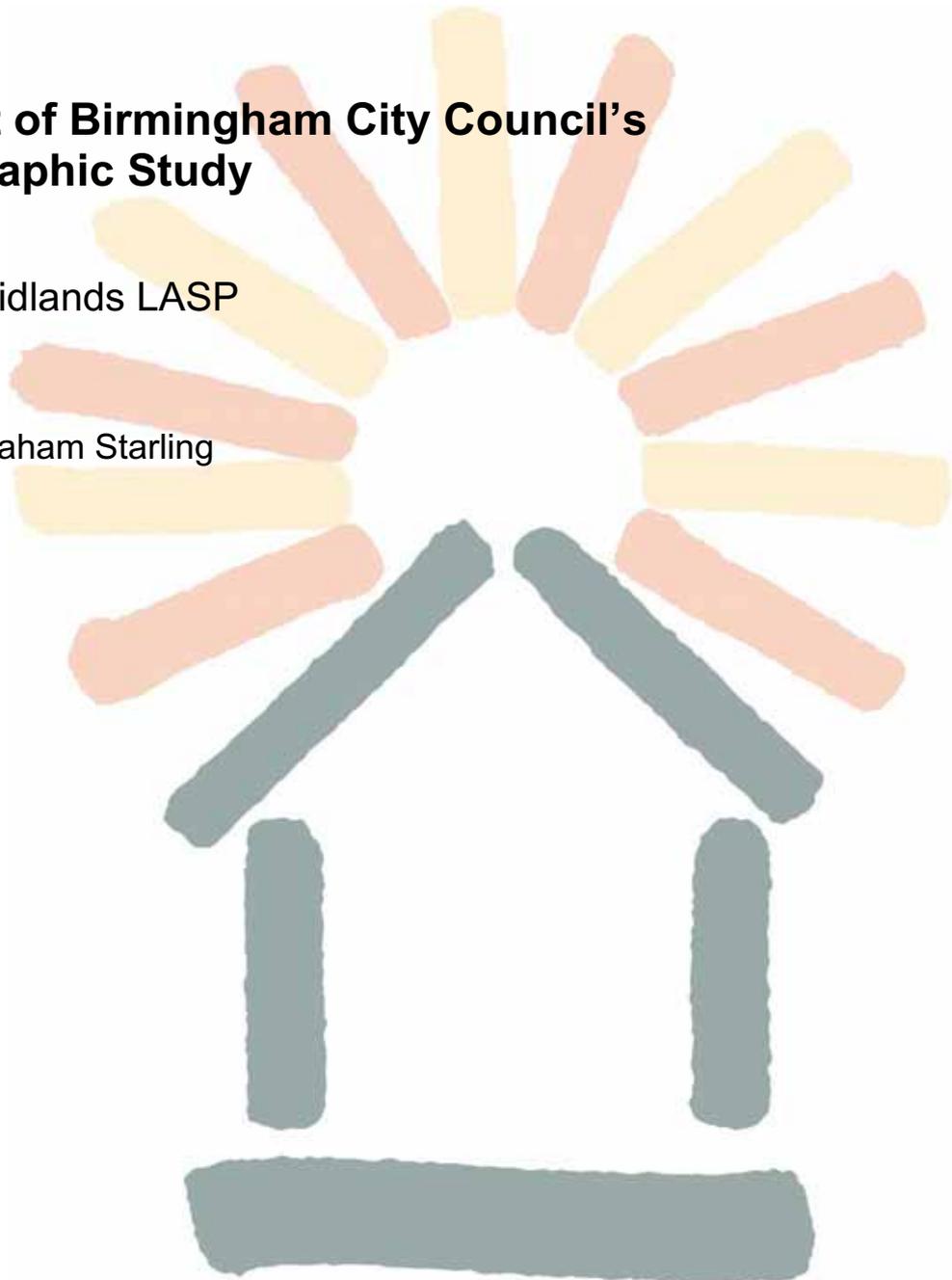
by

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Report to Central Midlands Local Authority Support Programme

by Simon Roberts and Graham Starling, Centre for Sustainable Energy

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Background

In March 2002, Birmingham City Council commissioned an aerial thermographic study of their council area at a cost of £37,000. The study, which covered 39 wards and included 18,000 postcode units and approximately 400,000 residential properties, was designed to assist with the identification of buildings with poor insulation levels.

The heat loss data derived from the aerial survey has been linked to the City Council's Geographical Information System (GIS) to enable further analysis in combination with other datasets belonging to the Council. These include information on thermal improvements to the Council's own stock and postcode-based data on incidence of Council Tax Benefit claims to review potential targeting of grant take-up initiatives.

However, the use of the thermographic data has been relatively limited to date. Within the Council, access to the data is currently constrained by the way the GIS operation is set up; this restricts the opportunities for reviewing and 'playing with' the data and for engaging officers and members with the information it contains. In addition, the data has not as yet been used to engage either the public or key decision-makers (eg councillors and major residential building owners such as the universities).

The Central Midlands Local Authority Support Programme (LASP), in partnership with Birmingham City Council, was interested in exploring the potential for making more use of the thermographic study. They therefore commissioned the Centre for Sustainable Energy (CSE) to undertake a short study reviewing experience elsewhere in the UK and identifying opportunities to use the study to raise the profile of building energy efficiency more widely within the City.

Aims and objectives of this study

The Central Midlands LASP defined the aim of the study:

"To research the use of aerial thermographic studies in other areas of the country and produce a report detailing their applicability in helping to develop responses to sustainable energy use in buildings."

Three objectives were identified to achieve this aim:

- Carry out desk research into, and review the use of aerial thermographic imaging in other parts of the country covering both residential and commercial sectors.
- Identify ways of adding further value to the study through its application to energy efficiency issues, affordable warmth etc.

- Propose ways of raising the study's profile under LASP objectives and application to the Birmingham City Council area.

UK experience of the use of thermographic imaging

CSE identified very few recent examples of aerial thermographic surveys which had been commissioned and used by councils in any systematic way. A number of authorities had undertaken such surveys in the 1990s (eg Hampshire County Council, London Borough of Havering) but these have not been repeated.

Three current or recent initiatives were examined in more depth to see if lessons applicable to Birmingham could be extracted: Aberdeen, Chester and Nottingham.

- **Aberdeen City Council**

Aberdeen City Council undertook an aerial thermographic survey in 2001 and have used the resulting image extensively to inform its fuel poverty strategy, direct home energy efficiency assistance and to engage householders directly with the thermal inefficiency of their homes.

The image is linked to Ordnance Survey mapping data and searchable by both postcode and street name on the City Council's website.

(see http://www.aberdeencity.gov.uk/acc_data/service/hous_hecanews.asp)



Figure 1: Original thermographic image for Aberdeen, as used in Sept 2003 'Green News'

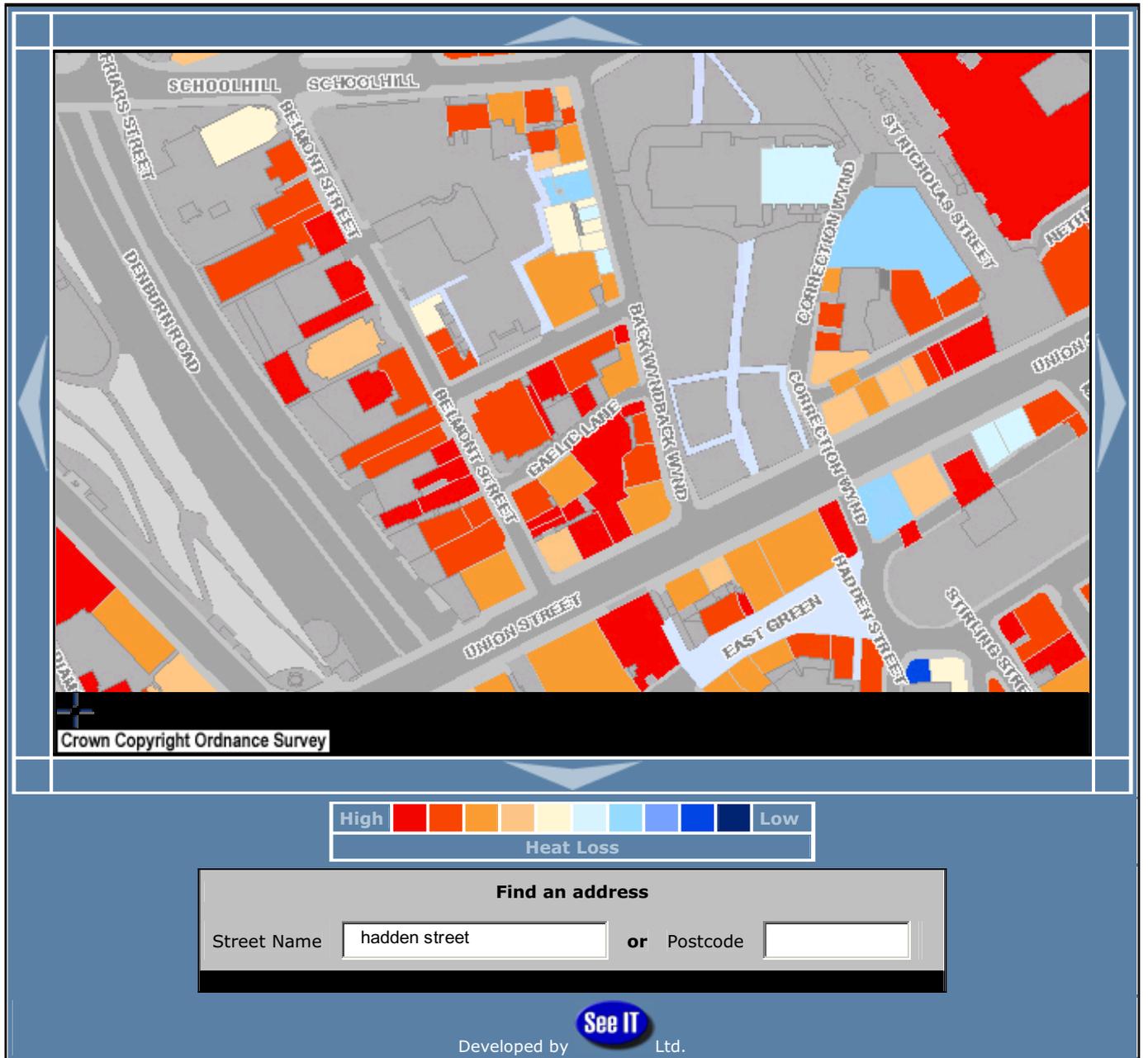


Figure 2: Example of Aberdeen website thermographic image from search by streetname

Combined with promotional activity, this has triggered 'many' householders (both owner occupiers and tenants) to contact the council seeking advice having seen their home showing 'red' in the image.¹

The Council used the thermographic image in combination with deprivation information (eg Index of Multiple Deprivation) to help draw up its fuel poverty strategy to target resources on those areas exhibiting the least thermally efficient homes.

They also proactively used the thermographic images in literature distributed to areas with high levels of heat loss, pinpointing former council homes where the 'right to buy' had been exercised prior to council insulation schemes.

At a very direct and engaging level, energy advisors used the image on laptop computers in community advice sessions (eg pensioner groups etc) to engage householders in considering heat loss in their own homes, the value of insulation and their eligibility for assistance.

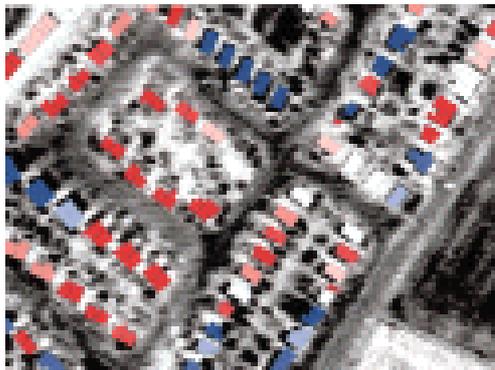
Aberdeen City Council are planning a re-run of the survey in 2006 with the aim of assessing the level of improvement since the 2001 survey and thereby the effectiveness of their grants and assistance targeting and promotions.

Contact: wroseburgh@housing.aberdeen.net.uk

- **Chester City Council**

Chester City Council undertook an aerial thermographic survey which has [according to its website, but not the Energy Efficiency Officer] been linked to its GIS. Samples of the image are available on the Council's website and householders and businesses can request (in writing) a copy of the thermal image of their own home. The website gives some brief guidance on how to interpret the image.

See: <http://www.chestercc.gov.uk/community-services/housing/EnergyEfficiency/Thermal1.html>



1 Note that Aberdeen City Council was not systematically collecting data to quantify 'many' so this is a subjective judgement by the relevant officer.

An initial study of the data was carried out by geography students at Nottingham University. This, staff of the Partnership explain, simply confirmed what they already knew about the characteristics and locations of buildings which have high heat loss. Moreover, staff report that 'no one has found any practical use for the data'. They consider that the survey proved no substitute for sound local surveyor knowledge of building type, backed up by standard 'street by street' insulation programmes.

While such a view might seem cynical, it reflects the important recognition that, as a tool for targeting insulation programmes, aerial thermographic surveys have their limitations. In particular, such surveys cannot identify households which might be described as the 'cold fuel poor' – those who live in poorly insulated homes without attempting to keep them warm or who restrict their heating to one downstairs room. Their homes would appear cool (and interpretable as 'well insulated') on the survey, a 'false negative'. Insulation programmes driven solely by data from a thermographic survey risk missing those perhaps most in need – the cold fuel poor.

Lessons for Birmingham City Council from these experiences

These varying experiences provide lessons for Birmingham City Council and others considering the use of aerial thermographic surveys.

• Positive lessons

- a. Thermographic images of their homes showing high heat loss are motivating to householders to take action to improve insulation levels.
- b. The provision of searchable web-based access to the survey images is a potentially powerful tool for gaining householder attention, both through community group-based demonstration and direct householder interrogation of the database.
- c. A thermographic survey can be used to help identify areas of housing and specific homes which demonstrate relatively high heat loss for targeting for grant assistance, particularly where combined with existing data and knowledge within the Council.

• Salutory lessons

- d. It is important to the successful use of the thermographic survey to have established a clear purpose for the data at the outset, both in terms of analytical uses and any associated marketing activity (preferably with clearly defined targets for take-up of measures).
- e. Follow-up targeting must be wary of the 'false negative'. Homes appearing 'well insulated' on the survey may actually be the most needy in terms of assistance – those unable to heat their poorly insulated homes. This limits the value of the thermographic data for finding the 'cold fuel poor'.
- f. There may be considerable additional costs (in officer time and materials preparation and distribution) of building targeted marketing programmes using the thermographic images. These should be weighed up against the costs and benefits of more simple marketing approaches.

Adding value to the Birmingham City Council study

a. Recognising the limitations

A thermographic study is only ever a snapshot of heat loss from buildings. As mentioned above, while high heat loss can be revealed, there is also risk of the 'false negative' where a home was unoccupied or simply cold on the nights of the survey. These limitations must be recognised both in the direct use of the thermographic image to inform further action and in the use of the thermographic dataset within GIS-based analysis. It cannot be assumed that the thermographic survey has provided a complete, comprehensive dataset of heat loss from buildings in the city.

Unless these limitations are fully recognised in use of the data and analysis based upon it, there is a danger that false or inaccurate conclusions are drawn. This is particularly important because those perhaps most in need of insulation improvements and most deserving of financial assistance – the cold fuel poor – are most likely to be absent from such analysis.

b. Improving access to data and analysis for the Council

These limitations do rather constrain the use which can be made of the data for analytical purposes. A comprehensive dataset of thermal performance of buildings (eg SAP ratings) would be useful in GIS to link to benefits data, health data and fuel poverty data. This could enable analysis both for research purposes (eg relationships between incidences of different health problems and thermal performance of buildings) and for targeting purposes (eg identifying those wards or enumeration districts which have worst SAP/cold-related illness and most take-up of passport benefits). [See www.imint.info for an example of how different datasets can be combined to provide new insights].

However, it is questionable whether an aerial thermographic survey provides a dataset robust enough to produce reliable outputs from such analysis. That said, the dataset does provide details of homes which show high heat loss (even if it does not detail all such homes). These homes are certainly worthy of further attention and, beyond what they have already done and the marketing ideas outlined below, there are a number of options for the Council:

- Cross-checking their own council housing records (address, heating installation and insulation records) against thermographic data to identify the worst remaining homes and any homes 'missed' by previous programmes.
- Identifying the number and location of homes which definitely need insulation improvements (remembering this can only be a minimum number) to plan the development and delivery of insulation programmes within both Council-stock and private housing (potentially in partnership with energy suppliers under EEC).
- Analysing the dataset against the Index of Multiple Deprivation by ward to identify the **less** deprived wards with higher proportions of homes showing high heat loss. These identified wards could be presented to insulation contractors or scheme managers as 'ripe' for marketing activity (see below).

c. Maximising the marketing value to stimulate insulation improvements

There is clearly value in making the data available to the public so that they can assess the performance of their own homes. Evidence from both Aberdeen and Chester indicates the strongly motivational nature of such images for householders. With links to energy advice and grants/discounted insulation schemes, such images can provide a clear stimulus to householders for taking action to improve insulation and reduce heat loss.

There are a number of ways in which this data could be used for marketing purposes but a starting point is to create a common access point for it.

Aberdeen's web-based image linked to Ordinance Survey data and searchable by street name or postcode represents a model of how this could be done. This enables both the public and council officials access to the thermographic image and to relate it directly to a specific property. This is powerful, attention-grabbing and motivating.

The website should carry a 'health warning' that highlights the limitations of the survey. Aberdeen City Council provide the following warning on their website:

"It should be stressed, however, that the image provides only an indication of heat loss. There could be other reasons for, say a property apparently losing no heat, eg it could be there was no heating on at the time the image was taken. What the image provides is a snapshot of possible heat loss at the specific time of the flight. It should be used as the basis for future enquiry."

In addition, it is vital to recognise that simply creating web access to the data does not guarantee its use. Without knowledge of the presence of the thermographic images on the Aberdeen or Chester websites, a member of the public would be hard-pressed to find them. In the case of Chester, the requirement to request a home-specific image in writing must have limited take-up compared with Aberdeen.

PR and marketing activity must therefore be planned and delivered to draw people to the site. Such activity should define the target audiences. Bearing in mind the comments made above about the cold fuel poor, the best target may be fuel rich households (as defined, simplistically, by where in the city they live).

A web-based access point can be the focus for a range of activities designed to encourage householders to review the performance of their own home in the survey:

- Community-based energy advice sessions (eg pensioner groups, church groups, or shopping centre displays etc), using the website (or laptop-based CD) to engage householders
- Schools based energy education activities which, as part of a curriculum-linked programme, could use the thermographic image website to:
 - understand the physics of heat loss and the measures available to reduce it
 - look at the reasons for heat loss levels within particular building types in their area

- identify their own homes and develop action plans for reducing heat loss to discuss with parents
- draw up energy saving plans for their areas
- Targeted marketing to individual ‘probably fuel rich’ addresses which showed high levels of heat loss, encouraging them to look at the website to ‘find out how much they are wasting’ (thus avoiding the need to produce costly address-specific outputs from the thermographic image since the householder can access this themselves at the website). This should, of course, be linked to a ‘call to action’ to seek energy advice and details of available insulation schemes.
- Providing the image to approved insulation contractors to enable their canvassers to use it in door-to-door/street-by-street marketing activities.

d. Costs vs benefits vs alternative routes to the same benefits

Because of the limitations of the dataset (in particular the ‘false negative’ described above), the principal benefit of an aerial thermographic image is in the targeting and revealing of heat loss to householders, particularly fuel rich householders.

The motivational potential of a thermographic image for a householder is clearly high, with a strong probability of remedial action to reduce heat loss resulting from it. But this potential will only be realised if the householder gets to see the image, which is not an inevitable consequence of undertaking a survey.

Bearing in mind the costs of acquiring the image and data, it is vital that a strategy for disseminating the information to householders is drawn up and costed in advance. Clear take-up targets for insulation measures should be set and monitored.

In addition, alternative ways of achieving such take-up should also be considered and costed. Most planning control and building surveyor departments in councils will have detailed knowledge of the age, build-type and condition of housing across their district. This alone may be enough information to target insulation schemes, with little cost.

For example, the success of ‘street-by-street’ insulation schemes has not relied on such ‘high tech’ or costly means for targeting. In such schemes, contractors canvas areas targeted on this more informal basis or through the use of existing datasets such as the Fuel Poverty Indicator (see www.cse.org.uk/fuelpovertyindicator). By combining offers of government grants (Warmfront), council assistance and energy supplier discounts, the contractors can ensure that every household with insulation requirements has some route to action (eg the Warm & Well schemes in Gloucestershire and Somerset).

If the ultimate objective is the take-up of insulation measures, then there may well be less expensive approaches to achieve this objective than thermographic imaging.

However, in Birmingham’s case, where the data is already available (and the costs effectively ‘sunk’), there should be relatively low additional cost in of making that data publicly accessible and developing marketing and PR and education programmes to maximise its use.

Conclusions

As a dataset, a thermographic image must be treated carefully if being used to inform targeting of fuel poor households since the image will not capture the homes of the 'cold fuel poor' who fail to heat their poorly insulated homes adequately. This limits its value as an analytical tool.

However, it does have some potential as the basis for promoting to householders the need to act to reduce heat loss. Having undertaken an aerial thermographic survey and subsequently linked it to GIS, Birmingham City Council has the potential to follow Aberdeen's example in this respect and provide a publicly accessible, searchable web-based thermographic image.

For this to be worthwhile and cost-effective, it must be combined with carefully planned and executed marketing, PR, advice and education programmes to ensure that householders seek out the website and view the heat loss from their own homes. Fuel rich households are likely to represent the most effective target for such activity.