

Brownfield & Regeneration Network

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EVENT REPORT

Brownfield Scotland 2023 — looking to a brave new world

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The Brownfield & Regeneration Network Conference, Brownfield Land Scotland 2023 – sponsored by Groundsure, Landmark, i2 Analytical, Butek Landline, GGS Scotland, The Coal Authority and Suez – covered a lot of bases. Significant time was devoted to the hugely ambitious [National Planning Policy Framework 4 \(NPF4\)](#).

Also discussed in detail were developments in site investigation, emerging contaminants, and the drive to the circular economy.

During the interactive discussion sessions it became clear that Covid has impacted communication, particularly face-to-face communication, which is affecting some of the more technical brownfield sectors more than others. There is a need for more case studies, pointing to more examples of what the brownfield community can do, which will help the current personnel and skills gap. Some delegates also wanted more guidance and enforcement, as well as more leadership to drive through the brave and bold new world envisioned by NPF4.

Some commentators say that NPF4 will lead to a revolution in the way things will work. Besides tackling climate change and biodiversity, NPF4 is also seeking to 'rebalance' where development takes place in Scotland, shifting the emphasis away from greenfield to brownfield, to tackle vacant and derelict land.

The brownfield policy in NPF4 is supported by positive aspects, such as effective land use, nature recovery and increase in wellbeing, but what did delegates make of it?

"Brownfield should be advocated over greenfield", said John Hamilton, CEO of Winchburgh Developments, as he summarised his roundtable discussion.

"NPF4 will link the Scottish planning policies better. Although planning isn't the most exciting of subjects, NPF4 could increase public interest. There could be a better understanding of achieving climate change goals in the context of house building - something the Scottish government could do more to help with."

In the discussion, there was acknowledgement that the Scottish government had been bold with long term aspirations with NPF4, but in effect they had to be. The policies have to be robust and deliverable, and here again the government has been bold in engaging the public. The participants agreed that masterplan sites are critical and there needs to be good collaboration between the public and private sector.

"It just doesn't work for local authorities to ask for everything to be built at the start of a development; there has to be a structure to how we approach it. We think the NPF4 can bring about collaboration, but it won't be quick, because it's just been adopted recently. That will take probably a period of years."

Hamilton added that there could be opportunities for smaller developers in Glasgow, and the other major cities, to move into the space where some of the major national builders don't want to go and get more involved in master planning. "We thought that master planning could become more common, fitting in with the placemaking approach to developing with greater control and planned targets."

He added that there needs to be leadership to realise the policy ambitions in NPF4, but there were worries over where this would come from. There were also concerns from developers about government uncertainty over the infrastructure levy, which will fund enabling works around sites.

In a separate presentation, John Hamilton and Duncan Pickering, technical manager land quality at Sweco, described how engineering had turned an old landfill into a community asset — an 85 acre green space, next to a housing development — and key to the Winchburgh masterplan was showing the importance of green space. Design solutions included clean cover, landfill gas management system, surface water management and stringent acceptance criteria of community growing areas. The site is adjacent to education facilities which have been named 'Schools in the park'.

Brownfield and climate change

Another roundtable discussion explored how the brownfield redevelopment assessment process should account for climate change.

In summing up their discussion, Isla Smail, principal hydrogeologist, water resources unit at the Scottish Environment Protection Agency (SEPA), and Helen McMillan, associate director and QRA technical lead at RSK Geosciences, said delegates found that the application of climate change adaptation is quite patchy. "It's not always required by clients and so there is a need for guidance and regulation, and enforcement of that regulation to make sure that adaptation is taken into account and consultants are willing to do it.

"Budgets and market pressures rule and there needs to be an increased awareness all round, with education and training within the industry and for the public and particularly developers."

In terms of adaptation, the group thought there was a role for insurance and organisations like NHBC, in terms of future proofing of developments — but also supporting infrastructure including roads, drainage and transport planning, which are particularly important for brownfield sites.

They concluded there was more optimism than they were expecting on whether or not we'll achieve the climate change mitigation that is planned, but the fact remains that more regulation is needed.

In regards to exploring alternative uses for brownfield sites, Dr Donald Payne, land & air quality officer at Fife Council, noted that for any different site there will be multiple solutions, and there's no need to jump in and choose one to focus on.

"The right answer probably is to have multiple uses on any one site. There are many small schemes going ahead at the same time and some will be more successful than others, but they will sort themselves out. Something that hadn't occurred to me before is there's also an opportunity to provide short term space for use by events, alongside a longer-term use by the community.

"One thing that can aid our discussion is that all community groups are different. People have different approaches to things with different levels of skill and ability, to help re-use the sites is to provide specialist help to community groups that may not have it."

Designing appropriate gas protection measures

A highly topical, but often contentious topic, is how to improve standards in the installation and verification of gas protection measures, which was discussed by a panel including Kevin Mitchell, UK technical manager at Butek Landline, part of the Butyl Products Group; a membrane supplier and a local authority CLO.

Frustrations were voiced on both sides, but everyone agreed that wider publication of best practice examples was a good idea, and trying to reach those making decisions at the highest level.

The overriding conclusion by all involved in the discussions, and voiced by Mitchell in his comments, was that there needs to be greater collaboration “so that we understand each other..and we get a better idea about our different situations and what we're all trying to achieve”.

“Let's find a real quick way to collaborate”, Mitchell concluded. “COVID hasn't helped, but hopefully, now we can do more face to face, we'll try and collaborate more.”

The importance of good site investigation

The conference found that prioritising the reuse of vacant and derelict land will come to the fore in local development plans and spatial strategies, which will identify opportunities, allocate sites and give priority to sites close to areas of deprivation. Conference co-chair Christine Switzer, lecturer, civil & environmental engineering at the University of Strathclyde, commented: “We have opportunities and benefits that come from cleaning up and re-using vacant and derelict land, but we also have really big challenges.

“The key thing that keeps emerging in site investigation is understanding the site history, doing not just adequate characterisation, but knowing site characteristics, being aware and informed by the uncertainties, because there's always going to be limits within site investigation.

“If you understand your uncertainties, you can handle it a little bit better in terms of your development plan. Good site investigation feeds into good risk assessment. A good risk assessment is key to doing things correctly, like we talked about in the gas membrane discussion. If you have a good site characterisation, and you've done a good risk assessment based on what's there, then you can do a good design to support the needs of the redevelopment.”

Technical excellence to release more land

A theme of the conference was technical excellence in releasing land for community use, which was amply illustrated by RSK's Helen McMillan, who highlighted the benefits and challenges using an example of a complex conceptualisation of creosote, and the migration of this dense non-aqueous phase liquid (DNAPL) into an artesian aquifer. The project's brief was to bring brownfield land back into productive use for the local community, and RSK was asked to undertake a contaminated land assessment prior to the land being brought back into productive use.

The site investigation was funded by Fife Council and the Scottish Government Vacant and Derelict Land fund. The desk study identified pollutant linkages in 2020, with surface and groundwater monitoring following in 2021.

McMillan's case study showed the importance again of good site characterisation, and how to identify limits and uncertainties using the Conceptual Site Model (CSM). Pollutant linkages were shown using

multiple lines of evidence, including detailed logging of soil; composition analysis and review of creosote indicators; plume plots; review of vertical and lateral distribution of key contaminants; and NAPL assessment using TPH fingerprinting and application of solubility limits.

The project won the 2022 Environment Analyst Brownfield Award for Best Project Preparatory Work, with the judges noting it was a good example of using and refining a CSM as an analysis tool, and using multiple lines of evidence.

Contaminant watch

Dr. Switzer observed that what we are now talking about in terms of contaminants is different to what we were talking about five years ago, and in a few more years the profile will likely change again based on what's emerging now becoming more mainstream. So when we're thinking about contamination, we need to be more forward thinking about the kinds of problems that are there.

Dr Ken Scally, technical and quality director at SUEZ, expanded upon this and relayed the contaminants to watch out for. The first was 6PPD Quinone – the secret killer of Coho salmon in Puget Sound. Washington state observed that Coho salmon appeared to present abnormal behaviours after rainfall followed by mass pre-spawn death during the spawning season.

Scientists in the University of Washington using LC-QToF-MS were able to identify that tyre additives, and their degradants 6PPD quinone, were responsible. Urban Runoff Mortality Syndrome (URMS) was suspected as a contaminant transport pathway.

States across the USA have implemented studies to test the prevalence and concentrations of 6-PPD and 6-PPD-q in their stormwater and road runoff systems, as well as impacted water bodies (streams, lakes, estuaries, embankments). Mitigation efforts have centred on adjusting best management practices (BMP) for stormwater and finding safer chemical alternatives for 6-PPD.

Next up was 1,4-Dioxane, not to be confused with dioxin. 1,4-Dioxane is most commonly known for its use as a stabiliser in some chlorinated solvents in particular 1,1,1-trichloroethane (TCA). It is a trace contaminant of some chemicals used in cosmetics, detergents and shampoos, and considered a probable human carcinogen by the US EPA. 1,4-Dioxane is hydrophilic, and is highly mobile in groundwater, migrates rapidly through soil and is resistant to biodegradation in sub-surface. Health concerns include cancer, liver and kidney damage, plus lung, skin and eye irritation.

At a federal level some states have a groundwater clean-up level, some have screening level guidance, while others have drinking water guidance levels. The European Chemicals Agency has it listed as a substance of very high concern under Article 57f of the REACH.

In terms of remediation, advanced oxidation (ex situ), hydrogen peroxide with UV light or ozone, adsorption using granular activated carbon (GAC) (ex situ) and bioremediation are being used.

Also on the watch-list are polybrominated diphenyl ethers (PBDEs) and brominated flame retardants (BFRs), which are a mixture of man-made chemicals that are added to a wide variety of products, including for industrial use, to make them less flammable. They are used commonly in plastics, textiles and electrical/electronic equipment.

PBDEs are relatively persistent lipophilic chemicals, with a tendency to bioaccumulate. In production, some BFRs are additives mixed into polymers and are not chemically bound to the plastic or textiles

and therefore may separate or leach (PBBs, PBDEs and HBCD). Others, such as TBBPA, are reactive and are bound to the material chemically.

Health effects are on the following human systems: endocrine, neurological, reproductive, immune and cardiovascular. Remediation includes chemical reagent catalytic degradation, electrocatalytic degradation, photocatalytic and oxidation reduction and plasma catalytic degradation.

The European Environmental Bureau (EEB) and the European Commission have a revised draft restrictions roadmap (Nov 2022) submitted to the Competent Authorities for REACH and CLP for 2023.

And last but not least, pharmaceuticals and personal care products (PPCPs), which contain a diverse range of different chemical groups, such as hormones, antibiotics, antimicrobial agents etc. Significant concerns have been raised due to their persistence in the environment. Examples of PPCPs include all human and veterinary drugs, dietary supplements, topical agents such as cosmetics and sunscreens, laundry and cleaning products.

These chemical contaminants entering the aquatic environment via point and diffuse sources of pollution is increasingly evident, as is the potential human health risk associated with impacted drinking water sources. Scully listed 35 analytes from Richardson et al., 2021, including cocaine, ketamine, lidocaine, and nicotine, with notable differences between winter and summer months.

Towards a circular economy

Waste is another important topic when discussing brownfield development. Laura Tainsh, partner at Davidson Chalmers Stewart LLP, in outlining the circular economy agenda in Scotland, recognised that it covers a wide range of issues and there was a lot of regulation. She pointed out there are practical challenges using the current guidance and understanding new regulation and policy, of which there is a lot.

Tainsh said drivers included Scotland's Climate Change Plan and Zero Waste Plan, which has been developed since 2010, and the Scottish Government Route Map to 2025 and beyond. But all eyes are on the Circular Economy Bill 2024. She said current and impending legislation concentrating the mind includes the Scottish Landfill Tax, subject to change; the pending landfill ban, secondary materials which will be affected by other regulations and a new, pending aggregates tax.

Tainsh said NPF4 contains a specific policy relating to soils and states that, going forward, development proposals will only be supported if they are designed and constructed in a manner which minimises disturbance to soils on undeveloped land and protects soil from damage, other than in a number of excepted circumstances where infrastructure is essential.

A position taken by some local authorities is that they already consider that there is a need for good soil management to be set out and in place prior to the commencement of specific developments (such as those on large greenfield sites or sites where a potential flooding risk has been identified).

Tainsh concluded by saying that there is some doubt (which is a view she shares), as to whether the changes proposed go far enough in allowing materials to be reused.

In the roundtable discussion on the circular economy, Darren Beriro, geoscientist at the British Geological Survey, said people need to share ideas and information, as knowledge exchange is a

really key element. He also added “the business case is really important, as things are driven by profit margins and decisions are influenced by the economic case.

“Timescales are an important and early-stage consideration of the circular economy. Everyone agreed that coming up with ideas later in the process causes issues and means perhaps that they won't necessarily get traction, whereas visioning early on is absolutely crucial.”

He concluded by stating that there needs to be a regulatory or business lead which the circular economy can hang its hat on, and which can be embedded into net zero, waste management and sustainability policy.