

The Building Sustainably Podcast

Episode 2: Why Green Roofs are key to biodiversity success

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Intro - 00:00:05: Welcome to the Building Sustainably podcast by RPS. Sustainable, resilient development demands a new approach to how we plan, design, and build. We invite you to join us as we explore real-life case studies and offer practical guidance. Here's your host, James Bowman.

James - 00:00:42: Well, thanks for joining us today, Mike, and for joining us to share your experience. Mike, I believe you're the operational director for RPS' ecology team here in England. Welcome. Great to have you involved. To kick us off, can you give us some more background of how you've come to be involved with ecology?

Mike - 00:00:57: Excellent. Thanks, James, and pleasure to be here. So, yeah, I'm Mike Baker. I'm the operational director of ecology in RPS. So I look after the team in England, Scotland and Wales, and there's about 80 or 90 of us all told. And one of the topics that we cover is biodiversity net gain. And we do quite a lot of that. And I personally do quite a lot of that. It's a really interesting, evolving field and moving quite quickly now.

James - 00:01:27: Definitely, definitely very important. So, for the listeners, can you help explain or just introduce what is biodiversity net gain?

Mike - 00:01:33: Okay, so biodiversity net gain or BNG, as it's often referred to, is a system of classifying and quantifying biodiversity on a site as a baseline. And then looking post-development if it's changed. And if it's changed, has it gone up or down? And there is legislation now to require that there's at least a minimum of a 10% uplift on each and every application that comes forward through the planning system.

James - 00:02:05: That's across England, Ireland, Wales, Scotland, everywhere?

Mike - 00:02:09: Actually, at the moment, it's just in England. There is a separate system in Wales, which is not as quantitative. So they don't have the 10% target. And in Scotland, it's coming forwards, but the legislation is still being developed and discussed. And the Northern Ireland Assembly are a way off, it's fair to say.

James - 00:02:31: Okay, so 10% on every site.

Mike - 00:02:33: So yes, it's about measuring the baseline and the uplift. And each application needs to have a minimum uplift of 10%.

James - 00:02:40: Okay. And in big cities like London, we know London can be a unique case in terms of development in this country. And it has its own rules and regulations. Is it 10% in London as well? Or is it any different?

Mike - 00:02:51: It is 10% in London at the moment. But there are some places where they're looking to have an increase, which is more like 20% or even 30% in one or two very special places. Yeah, okay. I think those places will be a real challenge. 10% is doable, usually on most sites. 20%, if you think about it early in the development phase, usually is quite okay to do if you've got a lot of space. But certainly in London, any more than 10% will be a challenge because of the urban nature of the environment

James - 00:03:26: And I appreciate you say that there's the baselining at the start and it's 10% from baseline. So site to site, I gather. If you're starting with a green space already, your baseline is going to be fairly high for biodiversity. Is that right? Whereas if you're starting with a, say, an old disused industrial plot, then your biodiversity is predictably probably low, which means your gain is easier to achieve. If I summarised that right?

Mike - 00:03:51: It could work that way. So in urban areas, if you've got a hard stand, you know, a sealed surface, basically it scores zero. And so your baseline is zero. And then you don't need to provide biodiversity net gain, because 10% of zero is still zero. So there's no requirement for an uplift on those sorts of sites. But actually what we're finding, even in urban areas, most development sites will have a little bit of greenery, some sort of biodiversity and habitat on them. So there will quite often, there will be a requirement to provide some sort of uplift to get to the 10%. And in greenfield areas, so more rural or urban edge. Quite often the baseline can vary depending on what the land use type is. So even an arable field, which is basically ploughed or cropped with cereal or other agricultural plants, those sorts of habitats still score. So there is a baseline there. So there is a requirement to provide 10% on top. In most areas for most applications, there is a BNG element built in there. That seems to be pretty much where we are now.

James - 00:05:03: Yeah. Okay. So thinking about London specifically, and one of the topics we want to cover today is green roofs. How can green roofs be a helpful solution to the biodiversity net gain challenge in a compressed or condensed setting like London?

Mike - 00:05:17: So in urban spaces, so in big cities like London, Birmingham, etc., often development sites are very constrained. They're very tight in terms of what the design requirements are. Usually they'll have a building on quite often. So they may score quite low as a baseline. But if there is any greenery, if there is any habitat present that scores, then there will be a requirement. And quite often in those urban areas, finding an extra 10% can be quite a challenge at ground level because space is a real premium. And so trying to find more space is a real design dilemma for developers and their project teams and it's working really carefully with the landscape architects and designers and architects to work out what the best options are and quite often that option will be actually to not just use ground space but to use roof space so looking at a brown or greenfield green roof solution some of which can be quite biodiverse and score quite highly or you can go for a very basic sedum sort of roof which will score less but is easier to maintain yeah interesting

James - 00:06:36: okay so looking specifically at green roofs now can you run through some of the environmental benefits I guess that's the obvious place to start with green roofs and then we might touch on some of the other non-environmental categories there absolutely

Mike - 00:06:47: So quite a fan of green roofs actually, so I work in Cambridge which although it's not a big city it is an urban area and space is quite confined in terms of what's available and so we are looking at green roof solutions in around central Cambridge as well as in London and other places. The advantage of green roof design is that they provide biodiversity, provide habitat which is why you get the Big Bang credits for them. But, they can be designed so you can have a thing called a blue roof which holds a lot of surface water so they are effective in terms of managing water run off, so they slow the flow.

James - 00:07:29: Like a flood mitigation.

Mike - 00:07:30: Yeah in terms of mitigation so it's flood attenuation to a degree so they have that benefit as well but they also provide urban cooling so because it's a natural habitat they transpire so there's evaporation. So there's some cooling there and also they absorb the heat and then reflect it back

James - 00:07:50: yeah okay so the actual occupants of the building get some benefits as well.

Mike - 00:07:54: Yeah exactly exactly

James - 00:07:56: Not entirely outward looking for the environment.

Mike - 00:07:58: Yeah. The benefits of green roofs is you're starting to see it in urban areas where there are more than one of them. So where you're starting to get accumulations or groups of clusters of green roofs, you start to see that the habitat at that high level interacts with each other and you get synergy. So the more green roof space that you have in an urban area, the more valuable it becomes as an entity.

James - 00:08:25: Yeah, for the ecology. Yeah, fascinating. Interesting question that has struck me with green roofs, that it's great for the ecology. But the other thing we're trying to do is put solar panels in roofs. Can you have both? Can you put solar panels on green roofs or is it one or the other?

Mike - 00:08:40: Absolutely. And we've got some built out examples of that. And again, in Cambridge and elsewhere, where we're specifying a biodiverse green roof, usually quite species rich mixture, and also with solar PV as well. And actually, although you think, oh, solar is shading the plants, actually green roofs are quite an extreme stressful environment. Even though they have some substrate to hold water, actually, they're usually quite water stressed, the plants there. So having some cooling, some shade is actually a benefit. And also, it works the other direction as well, because the plants are transpiring and making the atmosphere cooler. They also cool their solar panels.

James - 00:09:27: Of course.

Mike - 00:09:27: Which makes them more efficient. So they get more electricity from them as well. So there's a real synergy there between green roofs and solar PV. And they work really well together, actually.

James - 00:09:38: So really, you should have both together.

Mike - 00:09:39: Yeah, no, absolutely. Where we're putting green roofs in, we do talk to clients about thinking about solar PV as well.

James - 00:09:46: Yeah, fascinating. I never would have thought about that. As you explained it, it makes a lot of sense. But yeah. I just assumed you'd have one or the other and not both.

Mike - 00:09:53: And also the thing is, when you're designing a roof space, if you're going to put a lot of structure on the roof, then you need more structural integrity within the building, more steel. So there's a cost there. So if you're putting solar PV on, which is a load, you might as well put a green roof on as well. And they balance out. But if you're putting one on, you might as well have both, frankly.

James - 00:10:18: Yeah, okay. That brings us nicely to some of my questions around some of the challenges of green roofs. Obviously, they sound like a bit of a silver bullet in terms of where you can put solid PV on and get better solar performance, you get better ecology, reduced heat island effects or air temperatures. But what are some of the challenges? What do people need to think about if they're going down the path of implementing a green roof?

Mike - 00:10:39: I think specifying the right green roof for the right place is really important, making sure that it's going to function and establish. So it's really important to make sure that you're not trying to do something overambitious. So you could, for example, try and recreate a chalk grassland on a roof. And actually, you probably could do that. But unless you actually really, really needed the biodiversity net gain points, it's going to be much easier to put a more simple, straightforward green roof in. So I think you need to mix and match the solution to the requirements that you need, rather than go too ambitious straight away. But certainly, it is possible to put in really quite species-rich, biodiverse green roofs. And in places where that's possible, that's certainly an ambition to have and to look at.

James - 00:11:37: Okay. And in locations like London, are there, you know, we're talking about ambitious plans. What is too ambitious for London?

Mike - 00:11:44: So I think historically in London, quite a lot of the green roofs that have been built have been quite simple. So seed and roofs. I think there's an opportunity to be more ambitious in London, actually, and still maintain green roof, which isn't too onerous in terms of the maintenance of the habitat there. Because maintenance of these green spaces in rooftops actually can be quite complicated, depending on access arrangements.

James - 00:12:14: That's one of my questions.

Mike - 00:12:15: You do need to be mindful of neighbours and also safety aspects on the ground. Because if you're high up, you just need to make sure things don't blow off. You can't have that. It's really dangerous. So those sorts of considerations, really, in terms of what you specify and what you don't. Yeah, okay.

James - 00:12:34: So thinking in terms of maintenance, you've touched on already. What are some of the considerations that a project site needs to think about when it comes to maintenance, as far as, I'm guessing, access? Access is a pretty obvious one. But there's probably also a hand-in-hand relationship

between the specification of the roof and how diverse it is or how ambitious it is, how much maintenance it might need. Is that fair?

Mike - 00:12:53: To a degree, yes, absolutely. And look, there are some simple solutions, and there are also some off-the-peg solutions that you can buy off the shelf, pretty much, with suppliers providing different types of green roof that you can buy and they will deliver with a specification in terms of maintenance. Quite often, I think the more complicated the habitat is, the more requirements it has, the more maintenance it will need. What you don't want to do is end up with a habitat that needs mowing or any sort of management like that. It's really a question of making sure that the specification is sensible, really, rather than going for something too onerous, really, in terms of ongoing maintenance. What you really don't want, I guess, is anything that is going to drop into larger plants like shrubs and trees. And you can have those self-seeding into these sorts of environments, so you do need to have regular maintenance visits just to make sure that what you've planted is what you've got and nothing has blown in.

James - 00:14:00: Yeah, okay, yeah, you can't really control what the birds bring in otherwise. As far as the more engineering side of a green roof, what are some of the considerations that projects need to consider in specifying the roof and then the underlying structure that holds that roof up?

Mike - 00:14:13: Even with suppliers that provide green roof systems, the key things really are the substrate and also the water retention facilities. And that's what most of the weight is on green roofs. It's really the water that the green roofs will hold can be quite heavy. So in specifying those, it's really just having an eye to what the load will be and whether it's a very deep substrate and water retention or whether you go for something slightly lighter. But the issue with the lighter roofs is that if they're not retaining water under the substrate for the plants to utilise, then actually the environment's going to be quite water-stressed. So that will have an impact on what you can plant and what will survive in the green roof. Okay. But actually, just picking up on the water stress, actually, that isn't always a bad thing. Because although the individual plants are stressed and may not perform necessarily as well as they would at ground level, where they can have very long, deep roots, it does mean that there's open areas within the roof space for other plants to come through. So you can, by making it a stressful environment, it can become more diverse. So actually, that's counterintuitive. So the more you stress the environment, actually, the more rich it becomes, potentially.

James - 00:15:35: Yeah, okay. Again, something I would never have thought of. Fascinating. Thank you. You spoke about the longevity of these roofs and trying to get it right. What kind of a green roof, what does it typically last for? How long does it typically last?

Mike - 00:15:47: So if you buy one off the shelf, it will come with a specification. I would expect that most green roofs will have a lifespan of a good 10 or 15 years. But beyond that, you may need to look at some replanting. It depends on the maintenance. If you can maintain it.

James - 00:16:03: I was going to say, it should go hand in hand, shouldn't it?

Mike - 00:16:05: Then basically, it should last the age of the building, frankly. It becomes a natural self-regenerating process. The plants that survive will set seed and will regenerate in that environment. And so it will change and evolve through time in terms of the species mix, but it will still classify as a green roof. And I think. One of the things to think about is that for the biodiversity net gain requirements, the habitat needs to be there for a minimum of 30 years. So that's the benchmark. So you need to be designing something that will last time because otherwise there'll be a requirement to go in and replace it or repurpose it so yeah

James - 00:16:48: that's what I was thinking with the maintenance regimes you'll have a structural maintenance regime which is part of the building regardless but then yeah the maintenance regime of the roof itself and how it interacts with the structure and I'm wondering yeah is there a point where you have to do a full overhaul

Mike - 00:17:01: exactly the physical structure of the green roof in terms of the water retention the substrate should be long-lived it really then becomes a question of what are the plants in the green roof doing and which species are surviving and which ones are not and that will change over time but i think actually that allows an element of natural process to creep in if you've got green roofs in proximity to each other then they're planted with different species the early colonisers that have aerial windblowers seeds will colonize other green roofs and actually the ones that you planted to start with won't always be the ones that are there in 30 years' time that will change.

James - 00:17:44: Yeah okay like nature tends to do but that's

Mike - 00:17:47: not always a problem the issue then is making sure that it still meets the requirements of the BNG that was set out at beginning 30 years before and so some monitoring is required to just make sure that everything is in place you might need to go back and look at some supplements to see if you've had a phase of a number of dry summers where quite a lot of plant species have died out and you've just got very drug tolerant species who may want to go in and replant some other species just to keep the numbers up really.

James - 00:18:23: Now am i right to assume that there are companies out there now that that specialise in this the maintenance and the review of the monitoring and then the corrections or is that still an evolving sector

Mike - 00:18:34: The suppliers who provide fully designed and fitted green roofs will also do the monitoring and maintenance to a degree but also ecological consultancies people with the right technical expertise will be able to do that and provide advice in terms of what's required for maintenance of the green roof if you need to tweak anything or do anything different

James - 00:18:59: Yes. Is that something your team does?

Mike - 00:19:01: Absolutely. We're working across England in various urban areas, looking at green roofs and the maintenance of them on projects where we've provided the pre-application assessment and design and inputs.

James - 00:19:14: Yeah. Okay. Excellent. So touching on pre-application and thinking about the life cycle of projects, can you share your views on what are some of the best practices or strategies if you're taking a project from its conception through, what are some things that people leading projects should be thinking about from those very early days throughout? What does good look like?

Mike - 00:19:34: Our advice since biodiversity net gain became a thing is that it's really important to start early. You really need to think about the ecological baseline and measurement very early on to get an idea of

what the requirements will be. And I think it's also really important that the ecologists and the landscape architects and the hydrologists looking at surface water. And the surface water management all work together. Those sorts of integrated designs, much more functional, much more pleasing to the eye and deliver all of the sort of integrated outputs in a much more synergistic way. So you can make the space on developments work a lot harder for you. So you get all bang for your buck as it were. And I think it's really important to really design with a view to what's in the biodiversity net gain metric. So my advice to clients is for that design process to always have the metric in your back pocket, metaphorically, so that you know what the baseline is, you know what you've got to hit in terms of the 10% uplift. And if you start with that on the front foot, then you're much more likely to get there in the end. It's really hard to retrofit BNG into a design where it's not being considered.

James - 00:20:58: It's halfway run?

Mike - 00:20:59: Yeah.

James - 00:20:59: And as far as engaging with the people side of a project and the stakeholder engagement, how important are conversations early with planning department of the local authority, with neighbours, with potential residents or occupants of a structure? Where do they come in?

Mike - 00:21:16: Well, I think it's really important for a project in any case, but I think certainly my experience on sites where there is some existing ecological interest or concerns, it's really important to take the local authority with you on the design process so that they can see how the design is evolving to consider the constraints and opportunities for the site and really in the consultation with other stakeholders, the public, the community, it's really important that you can demonstrate that process has taken place and that the design reflects the site. It's not just being plonked on as a standard design. And there are references to the local context in terms of ecology and other aspects.

James - 00:22:04: Yeah, okay. That makes a lot of sense. Thinking about getting these things off the ground, no pun intended, are there any incentives or grants in the industry right now that will support including that? Or is it really left to the project to find the funding and meet the Big Bang requirement?

Mike - 00:22:19: It really is built into the projects now. It's a requirement. And so developers need to find a way to be able to finance both the surveys and the assessment and valuation, but also the design and the delivery. And some of that can be quite expensive. It depends on the project type and the local context. Green roofs are not necessarily cheap, especially if you buy them off the shelf and you want, especially if you want particularly biodiverse one or you want something that's a little bit specialist, then you can actually find that the costs for those are really quite large. And they're a real consideration in terms of the overall build. So again, it's really important to have an understanding of that early on so it can be built in. But there are some opportunities as well. And certainly being engaged a number of times now in London in particular, where the assessment and the need for biodiversity net gain is pretty much nil because it's a complete hard standing and existing building. So there's no need for uplift, but there is space for green roof. And so there's a real opportunity there to generate extra biodiversity net gain units for a site which are in excess of the requirement for that particular development. So clients who have a portfolio of projects coming forwards, they can bank those to use for their other projects. And that saves them time and money and heartache and risk in terms of other projects where you might struggle to find off-site opportunities. If you can't deliver them on-site, you may need to buy biodiversity units. And that market is a free market at the moment, and it's very much led by demand. And so the prices can vary quite a lot. So being able to generate your own biodiversity units as a client is really a real positive, actually.

James - 00:24:29: Yeah, so are you seeing, thinking about that off-site option, are you seeing clients who are improving their biodiversity net gain position beyond requirements and funding it from a third party who needs to find an off-site solution? Is that a possibility?

Mike - 00:24:44: We're talking to a number of clients who have regional portfolios of projects coming forward, be that house builders or retailers, supermarkets. Or big logistics firms. And they all are looking for opportunities to develop a regional solution so that where in a particular county, for example, or a natural character area, they can build a solution that will generate biodiversity units that they can then bank and then use for their other regional projects. And that is happening at the moment. Although, as yet, I haven't actually seen anyone deliver their biodiversity site in the round and claim the units and then use them. So it's early days, but in theory that will work. We definitely have seen people looking to generate these units and then use them for the next phase of development. So if you've got a multi-phase site.

James - 00:25:45: So front load your BNG.

Mike - 00:25:47: Front load the BNG, deliver it all, and then for phase two, three, and four, you can draw down on the surplus that you've already created.

James - 00:25:57: Yeah, smart. Okay.

Mike - 00:25:58: In terms of London and a range of sites, there has been a push. **There's fallen a little bit into a balance around The Wild West End** where a lot of the portfolio holders and property owners in that vicinity of London, we're looking at greening the environment a little and looking at street trees and looking at roof space and providing habitats of all those levels. And actually what biodiversity net gain and urban greening in London is doing is pushing a revival of that sort of initiative so some of these old so

James - 00:26:37: the initiative was called the The Wild West?

Mike - 00:26:39: The Wild West End.

James - 00:26:42: Yeah, The Wild West End. Okay great.

Mike - 00:26:43: And what it means in some of these buildings, they put in quite simple sedum roofs. And actually, there's an opportunity now to go back, retrofit in a much more biodiverse green roof, which will provide better habitats, better support for invertebrates and pollinators and other things, because you've got a wider range of species that flower at different times of the year. And actually, in doing that, those property owners are able to generate extra biodiversity units because of the uplift between the difference between the baseline of a seeded roof and a more biodiverse roof. It's quite a big jump. So actually, it's well worth doing and well worth the cost. And I think it's quite interesting to see how that evolves, because I think there will potentially be a marketplace in urban areas for biodiversity, biodiversity net gain units that are generated from green roofs. And I think there will be a marketplace in those units. So I think developers and property owners that can build in green roofs are going to be in a really strong place to either support their own portfolios or provide biodiversity units for others who are also developing in that arena.

James - 00:27:59: And building on your point about the Wild West End movement and saying now there's this opportunity to come back, and improve, go from a seeded roof to a more diverse roof. Are you seeing

the critical mass or the momentum of green roofs where they have been built in bigger number in an area like the West End? Are they starting to support each other now? Is there any evidence that says one helps the other?

Mike - 00:28:21: It's still early days, actually, James. The thing is that biodiversity net gain has only been a legal requirement since February this year. So actually, we're still seeing it come through in terms of new requirements. I think... In the fullness of time, I think we will get there. But it's not really happening yet. I can see those discussions happening. And certainly, there are aspirations to go back and retrofit more biodiverse habitats onto various roof spaces. And I think that will happen. And I think there will be a marketplace in urban roof space habitats just because there's such limited space at ground level for these sorts of requirements that is just inevitable that some of the habitats will end up on the roof.

James - 00:29:09: Yeah, absolutely. So we're now starting to get into the territory of what the future might hold. If I can start on the topic of law, and you mentioned that it's become a legal requirement just this year, do you think the future will still be 10% net gain? Do you think that's going to go up, go down? Are we going to get to a point where it's very, very difficult to lift the bar if we do this so well on every site?

Mike - 00:29:29: I think in the fullness of time, there probably will be a change in terms of the 10%. But where we are right now, there are local authorities, so Greater Sudbury are looking at 20% as an aspiration. So 10% is mandatory, 20% is the aspiration. So they're encouraging everyone to do 20%. I think that's fine for now. I think it will become a challenge to continually deliver 20% every time there's a redevelopment of a site. And there will be certain limits to this in terms of space and opportunity. But I think we're a long way off reaching any of those theoretical limits.

James - 00:30:15: And definitely early in the journey.

Mike - 00:30:17: We're starting from quite a low base in terms of England's remaining habitats. So there's a long way to go before we fill the whole countryside with habitat instead of agricultural land. And those two aren't mutually exclusive in any case. So you can have agricultural land that also provides biodiversity net gain units. So there will come a time, I'm sure, when we're trying to retrofit and retrofit and include units. But I think we're a long, long way off that yet. So I think it will stay at 10% for the foreseeable future. But it is in the Secretary of State's gift to change that limit, to put it up or down. And I think politically, it would be expedient just to keep it where it is. And I think whoever holds that role will find it difficult to move it up or down. Because there will always be arguments on both sides of the case in terms of the impacts of changing the target.

James - 00:31:20: Yeah, we know there are challenges with housing and getting enough housing and adding more requirements to comply will hamper that to an extent, but all for good reason too. So like you say, both sides of that argument.

Mike - 00:31:31: So I think that there might be pressure to have different targets for different development types. And it's fair to say that nationally significant infrastructure projects are not included at the moment in Big Bang. That's coming. And will they have a 10% target as well as everyone else? That's still a point up for discussion actually so we'll see but it could be politically because of the push on housing that maybe housing developments only need to generate five percent but I think that's invidious really and if some developers need to provide 10 why would you only allow house builders to do five percent I think a level playing field across everything and keeping it the same is what we need for now just to let everything settle and bed in.

James - 00:32:22: There's an interesting question you mentioned earlier on sites that have zero biodiversity the uplift is then zero you'd think that would be an obvious place to start if you're going to change anything it's to say well zero needs to go to something.

Mike - 00:32:33: Yeah I think then locations will follow London's lead as often happens actually because as well as having the national legislation around biodiversity net gain London also has a policy of urban greening and there is a requirement to provide an uplift in terms of green space for every development from what may and no matter if your baseline is zero you still need to provide an urban greening factor and an inclusion there and I think in urban areas that probably it's a policy that really makes a difference and particularly is driving a reintroduction of urban trees and street trees which is a really good thing for lots and lots of different reasons and I think it could well be that it wouldn't be legislation but I think as a policy initiative it may well be adopted in various urban authorities where they'll pick it up and use it as well.

James - 00:33:30: Yeah okay. Switching gears quickly to the future still, but away from law and hopefully keeping people awake. Are there any technologies, materials, monitoring devices, anything in the space, green roof related, that we're seeing emerge, being adopted maybe?

Mike - 00:33:45: I think one of the really interesting things in terms of monitoring is looking at what else is your habitat providing. And biodiversity net gain is very much around just habitats. And it just measures the plant diversity. But biodiversity is so much more. And what BNG Assumes is if you provide the habitat, everything else will come. If you build it, they will come and I think where I see monitoring going is very much around the bioacoustics and being able to record using static devices. Things like not just bats, but birdsong and invertebrates. So some invertebrates also make distinctive noises that you can identify. And in more rural areas, they're also looking at soil organisms and monitoring soil noise. Which is that's interesting.

James - 00:34:42: Soil noise.

Mike - 00:34:43: Yeah. So you've got invertebrates, microorganisms work beavering away in the soil. It's detectable using the right sort of equipment. Whether you apply that to sort of substrates in green roofs, probably not. But it would be interesting and applicable, actually. But I think bioacoustics for monitoring is definitely the way the industry is going.

James - 00:35:07: Yeah, I'm interested to see if there's any technology out there. So most large buildings have a building management system that monitors all the goings-on in the building. Are there tools that you can plug in your green roof into your BMS and monitor? Whatever degree it might be, how it's traveling, whether it needs maintenance.

Mike - 00:35:24: I think in terms of monitoring and maintenance, having using fixed cameras, so you just put a camera on a pole, so you've got a view down on the green roof, so you can just inspect to see what it looks like. You can remotely check on the condition of the green roof. That's a really easy thing to do. It's completely possible to do now. I don't know many people who are actually doing that, but I think that would be a useful addition. You have your green roof cam for spring water and see how that goes.

James - 00:35:56: I'm sure there's all sorts of people who'd love to log in and see what's happening, get some nesting birds or whatever's happening up there.

Mike - 00:36:03: I think it might be quite a calming sort of ASMR thing where, you know,

James - 00:36:08: Sure

Mike - 00:36:08: You have the green roof and you listen to the soil, the substrate noise monitoring, like white noise.

James - 00:36:16: Yeah. You could even pipe that in if it's an office. You could pipe it into people's headphones and things.

Mike - 00:36:21: Yeah, they'll fall asleep well, good for going to sleep. I'm not sure it's good for the working environment.

James - 00:36:26: True, true. So the last thing I want to touch on was your predictions for the future. You've already made a few predictions around where you think legislation might go, probably a long way in the future. What do you see being trends in the next sort of one to five years now that this is part of law and part of projects? What do you see happening?

Mike - 00:36:43: I think the biggest change will be biodiversity net gain has been designed around a compliance mechanism. So it's very much around you're having a planning process, you have an impact, you provide some mitigation, you provide some uplift and compensation beyond that. And that's fine. And that's great. But there's a real untapped market around voluntary contributions and around nature positive. And I think a lot of businesses and corporations and organisations are starting to now measure what their ecological footprint is in terms of their whole supply chain and operation. And where they're seeing that they're having an ecological footprint that isn't being dealt with elsewhere, then they will absolutely look to buy voluntary sort of biodiversity credits. And those credits and that market could be very valuable.

James - 00:37:43: Yeah. Okay. So this is like carbon offset through carbon trading, but for BNG.

Mike - 00:37:47: Yes. Exactly like those carbon credits, sort of that marketplace and that tying into sustainability and ESG is exactly where the market is likely to go. That'll be the case in urban environments in places like London and other rural areas as well.

James - 00:38:05: Yeah. Interesting. So potentially there's a future where property value as far as investment goes, is assessed not on land size per se or its zoning, but also on its potential for biodiversity.

Mike - 00:38:19: Definitely. There will be a component in there. I think in terms of urban areas, you're limited by how big it is and the size. So it's quite condensed, hence using the roof space. But I think if you've got a portfolio of land and you own some mix of rural and urban sites, then absolutely, though the weather space, there's opportunity. For some of those locations, if they're traditionally non-developable sites, so places where you wouldn't necessarily be able to build any more, then there may well be new values in terms of biodiversity, net gain and sustainability, which mean that those forgotten parts of the portfolio suddenly become more valuable. And I think that's yeah. I think that already people are starting to look at land in a

different way. People are definitely looking at brownfield sites with that new lens now, where there's a real opportunity to generate value through biodiversity, net gain, actually.

James - 00:39:22: Yeah. Excellent. Mike, that's been a great conversation. Thank you for sharing all your knowledge and experience with us. And I think we'll wrap it up there.

Mike - 00:39:30: Yeah, no, an absolute pleasure, James. And thank you very much. Been a joy.

James - 00:39:34: Excellent. Thanks for joining us, Mike.

Mike - 00:39:36: Okay, cheers. Bye.

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