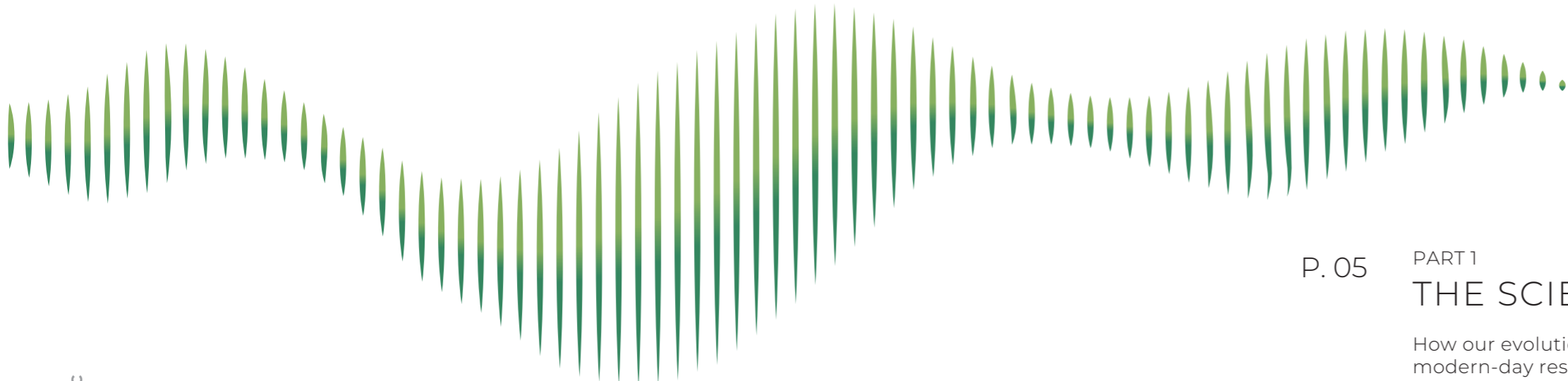


# Soundscaping for positive spaces

A GUIDE TO SOUND, HOW IT AFFECTS US AND BEST PRACTICES FOR CREATING HEALTHY AND PRODUCTIVE ENVIRONMENTS





Sound changes the way we think, feel and behave. It changes our bodily rhythms, our hormones and our physical health. It has a huge impact on our day-to-day lives.

Humans evolved for survival in nature. It's where we feel our best. Because of this, nature-based soundscaping can counter some of the most pressing challenges faced in today's buildings: focus, physical health, mental health, focus and connection with the outside world.

In this design guide we'd like to change the way you think about sound and inspire you about the possibilities of soundscaping. By learning from nature we can turn the sound of our buildings from a painful afterthought into a positive, exciting design opportunity.

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## PART 1

# THE SCIENCE OF SOUND



Sound plays a huge part in the way we experience the world. To understand why, we need to take a trip back in time.

Humans evolved in nature for hundreds of thousands of years. During this time, our ears were arguably our most important survival tool.

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Sound helps us make sense of physical spaces. Our ears can tell us about events happening many miles away or pick up on tiny sonic clues in our immediate surroundings. Unlike our eyes, our ears give us 360 degrees of information about our environment.

As we evolved, sound became our primary warning system. Hearing is by far our fastest sense. The time it takes us to process visual information is sluggishly slow in comparison! Our ears are always on, even when we sleep.

Natural soundscapes are rich with information. They alert us to threats, like a twig snapping behind us, but also to positive characteristics. Natural sounds can tell us when a habitat is:

**SAFE** – Gentle birdsong signals safety and a lack of predators. (We know that other animals listen to birdsong for safety clues too!)

**REFRESHING** – Humans have an age-old connection to water sounds that's deeply rooted in our evolution. We're drawn to these blue spaces and feel good when we hear these sounds of water.

**NOURISHING** – Think fresh water and the gentle rustling of leaves in the wind (or *psithurism*, to give it its official name).

Over hundreds of thousands of years, we've learned to feel good when we're in the presence of these healthy natural sounds. When we hear them, our brains and bodies automatically relax.

PART 2

# NOISE IN THE BUILT ENVIRONMENT



We spend around 90% of our lives indoors, so clearly it's important to make sure these environments enhance wellbeing.

Think about the sounds you typically encounter indoors. If you're lucky, you might be able to hear the birds singing from outside. But for many people, the soundtrack to their lives is a blend of urban noise like construction and air conditioning, punctuated by other people's conversations and endless notifications that make us stressed, distracted and fatigued. It's a far cry from the natural soundscapes our ancestors spent their time in.

Much of the noise we hear in buildings is unwanted and unhealthy. In our homes, we can manage that sound to a certain extent. But in shared buildings like hospitals, offices and schools, people have very little control over the noise they're subjected to.

**Noise is the number one complaint in most workplaces and healthcare environments.**



## MICRO THREATS

We're still hard-wired to react to sudden noises. Slamming doors, construction noise, electronic notifications... Even if we consciously know that these sounds aren't immediate threats, it doesn't stop our subconscious readying us for fight or flight. Just like a twig snapping behind us in the forest, these sounds don't have to be loud to have a big effect on us.

“SOON THERE WILL BE TENS OF MILLIONS OF DEVICES CONNECTED ONLINE. THAT MEANS WE’RE GOING TO BE SWIMMING IN MORE NOTIFICATIONS, MORE ALERTS, MORE ANNOYING AUDIO, MORE RANDOM SOUNDS.

“WE REALLY NEED TO STOP AND THINK ABOUT WHAT KIND OF SOUND WORLD WE WANT TO DESIGN.”

**MATTHEW BENNETT**  
SOUND AND SENSORY ARTIST



## WHY ARE OVERHEARD CONVERSATIONS SO DISTRACTING?

Other people's conversations are one of the biggest gripes in shared spaces.

Humans are social creatures and our speech is full of intricate meaning. The babble of unintelligible background chatter doesn't tend to be too distracting – it can even be pleasant – but when we can understand *every single word* it becomes almost impossible to focus.

It's estimated that we have bandwidth for 1.6 human conversations, so when we're distracted by someone else's we have very little brain power left to process our own thoughts.

## IS SILENCE GOLDEN?

It might seem like all this noise is the enemy, so surely it's best to get rid of as much of it as possible? That's certainly been the approach historically. But this can cause more problems than it solves.

Loudness is an important consideration. We've all experienced that feeling of "not being able to hear ourselves think", and ongoing exposure to loud noise can cause some very serious health problems. But loudness isn't the only factor that determines how healthy or productive an environment is. How often do you hear beach-goers complain that the waves are *too loud*?

**Buildings can also be too quiet.** It's become a particular problem post-Covid, with lower occupancy levels. In really quiet spaces, noises like speech become even more distracting and people feel uncomfortable sharing ideas.

And even without any distractions, silence isn't actually the gold standard for wellbeing or productivity. It might sound counter-intuitive, but if we think back to our ancestors' experiences it makes sense: Silence would've signaled danger.

We actually function and feel our best when we're listening to sounds from the natural world.



PART 3

# BRINGING NATURAL SOUNDSCAPING INDOORS

## THE THEORY OF BIOPHILIC DESIGN

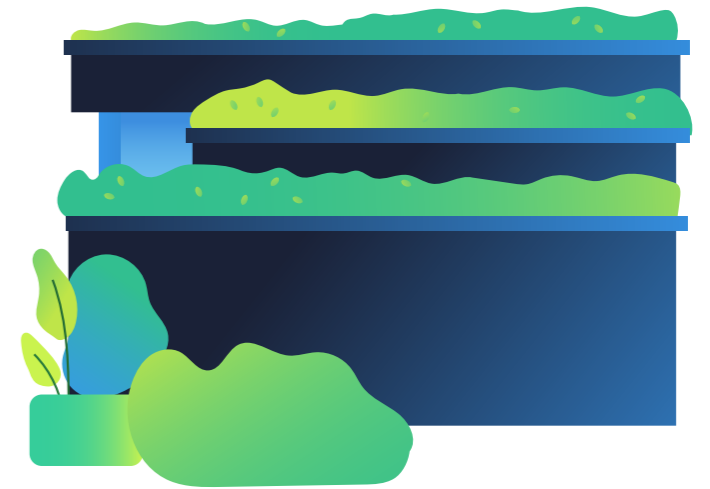
Biophilia literally translates to *a love of living things*.

Humans have an innate affinity with the natural world, although the majority of us live in urban environments. The practice of biophilic design involves bringing nature and natural elements into the built environments, in all the senses, for better human health.

Many people are nature-deficient. Biophilic design can inject some of the sensory richness and therapeutic benefits that the great outdoors brings, indoors.

OLIVER HEATH  
INTERIOR DESIGNER

“CONTACT WITH NATURE  
RELIEVES STRESS. IT SLOWS  
THE HEARTBEAT AND INDUCES  
THE PRODUCTION OF  
COMPENSATORY HORMONES  
THAT SUPPORT A FEELING OF  
INTERCONNECTEDNESS AND  
COLLABORATION.”



# NATURAL SOUNDSCAPING FOR WELLBEING

Despite the fact that we spend most of our time indoors, we still respond very positively to natural sounds. These biophilic soundscapes can make us better physically and mentally, even when we're indoors.

- 🧠 **Reduced psychological stress and greater feelings of comfort, happiness, motivation and restoration**
- 🧠 **Better connectedness to the outside world – natural soundscapes can cue our circadian rhythms (our 24-hour body clock) to help us feel more awake in the daytime**
- 🧠 **Improved physical comfort and relaxation – including lower muscle tension and heart-rate. Healthcare patients even require less pain medication when they're listening to biophilic soundscapes!**
- 🧠 **Improved sleep quality with fewer disruptions**

Researchers used an MRI scanner to compare what was happening in people's brains when they heard natural and artificial sounds. When people heard artificial sounds, they found that the brain had an "inward-directed" focus of attention, similar to brain states found in people with anxiety and depression.

Natural sounds produced the opposite effect. People's brains showed an "outward-directed" attention of focus that's associated with restoration and relaxation. It's a feeling you might have experienced during a long peaceful walk in nature – except this was just from listening to a few minutes of nature sound.



# NATURAL SOUNDSCAPING FOR PRODUCTIVITY

Productivity can mean many things. Natural soundscaping has been shown to improve people's abilities across an array of different tasks. Researchers think that there's a strong link between wellbeing and productivity: The calmer we feel, the easier it is for us to think and solve problems.

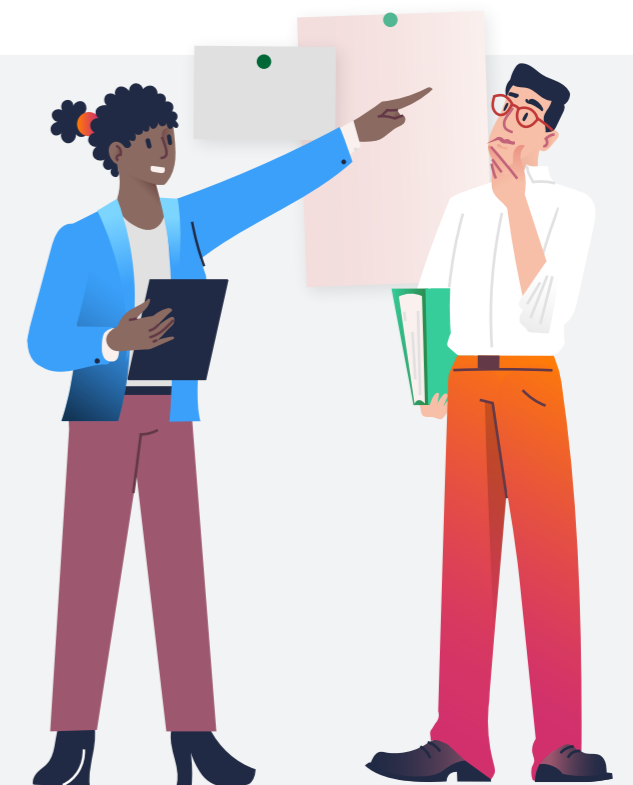
- 🧠 **Improved cognitive functioning – both difficult and easy focus tasks**
- 🧠 **Improved creativity and problem solving**
- 🧠 **Improved collaboration**

## DON'T LOOP!

PEOPLE CAN EASILY SPOT LOOPS, EVEN WHEN THEY'RE A WEEK LONG. MAKE SURE YOUR SOUNDSCAPING SYSTEM USES GENERATIVE TECHNOLOGY THAT DOESN'T SUBJECT PEOPLE TO ANNOYING REPETITION.

Researchers found that people given cognitively-demanding tasks in the presence of babbling brook soundscaping saw their productivity scores remain higher over time.

Even compared to silence, the water sounds had a buoying effect, lifting up people's cognitive abilities.



# CREATING DIVERSE AND ACCESSIBLE SPACES

Within ASD alone, responses to sound vary massively, from hypersensitivity through to hyposensitivity.

And it's not just people with ASD who are adversely affected by sound. Research shows that people with other conditions like Attention Deficit Disorder (ADD) and Tourette's syndrome can also respond differently.

**“IF YOU’VE MET ONE PERSON WITH AUTISM, YOU’VE MET ONE PERSON WITH AUTISM.”**

**DR STEVEN SHORE**  
PROFESSOR AND AUTHOR

#### Hyposensitivity

On the flip side, people who are hyposensitive to noise will thrive in completely different environments. For some people, highly complex, loud or stimulating environments might actually be enjoyable and help them perform at their best.

It's important to remember too that people's reactions to sound aren't based on volume alone. There will be differences based on other characteristics, like the texture, pitch or meaning of that sound.

There's no one size fits all when it comes to sound. People respond differently depending on things like their personality, working style and neurodiversities.

Inclusive design sometimes involves practical physical interventions—wheelchair ramps are one example. But many of the barriers experienced by neurodivergent people are less straightforward. They may not even be visible. Instead, many people face sensory obstacles in the built environment.

#### Hypersensitivity

Atypical responses to sound are most commonly associated with Autism Spectrum Disorder (ASD). The typical scenario that comes to mind might be a child covering their ears when they hear a loud noise like a vacuum cleaner or a hand dryer. Hypersensitivity to sound is quite common in people with ASD. But it's not the only way that someone with autism might respond to loud sounds.

## 5 BEST PRACTICES FOR INCLUSIVE SOUNDSCAPING

**Sensory zoning** – Create different sensory zones for people to choose between. In some spaces the soundscaping can be stimulating and surprising, while in others it's quieter, calmer and more consistent.

**User journeys and way-finding** – Where these sensory zones are positioned in relation to one another is also important. Think about how sounds from one area might bleed into another.

And imagine typical employee journeys: For example, is there a calming route that a hypersensitive person could take through the building without having to pass through the livelier social areas?

**User control** – Where appropriate, give people direct control of their soundscape so they can choose one to support their immediate needs – such as in smaller spaces like meeting rooms.

**Communication** – It's important to communicate with people about the soundscaping available to them throughout a building. This can help people understand their sensory environment and choose areas that will best support them and their sensory needs.

**Responsive soundscaping** – Indoor spaces are difficult to predict. Soundscaping technology can track and respond to changes in the environment to make sure it's always optimized and appropriate. For instance, when a collaboration session begins, the soundscaping can react in real-time to minimize disruption for other people.





PART 5

# THE BUSINESS CASE FOR SOUNDSCAPING



## REDUCED DISTRACTION

Biophilic soundscaping can reduce employees' *zones of distraction* in open spaces by 84%-89%.

Speech distraction reduces productivity by approximately 10%\*, so biophilic soundscaping can equate to an approximate increase in productivity of 9.3%-9.9% due to reduced distraction.



## IMPROVED TASK PERFORMANCE

Cognitive performance +20-30%

Creativity and collaboration +10-20%



## IMPROVED EMPLOYEE WELLBEING

Improved perceptions of place

Improved mood

Physiological relaxation +10%

These improvements could also lead to long-term outcomes like improved engagement and absenteeism.

\* This is a conservative estimate based on a review of 33 published papers, where it's demonstrated that speech distraction results in 7-41% decreases in productivity. Hongisto, V. (2005). *A model predicting the effect of speech of varying intelligibility on work performance*. Indoor Air.

