DESIGNING HUMAN / NON-HUMAN PUBLIC SPACES
FOR NEIGHBORHOOD RESILIENCE

Design Exploration #3: Activating underused spaces for a resilient Diemen

From Prevention to Resilience
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Amsterdam University of Applied Sciences

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Preface

This case study report describes one of three case studies conducted as part of the ZonMw project 'From Prevention to Resilience'. Each design case is described in a separate report, each of which can be found in the Publications section at: http://resilientpublicspaces.nl/resources. In each of the design cases a concept version of our design perspective Human/Non-human public spaces was implemented. At the time of the design cases, we still referred to this design perspective as the 'Design Framework for Neighbourhood Resilience'. Before reading one or more of the reports, it is useful to first get familiar with this initial concept version of our design perspective (available here). The three reports are an intermediate step towards a publication in a scientific journal, in which we analyze and discuss the three design cases together. For this reason, the reports should be considered detailed accounts of the design cases and findings, while not yet coming to general insights and conclusions.

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1. Introduction

Around the world, the Covid-19 crisis brought out renewed debates about the design of urban public spaces. Initially the focus lay on the design of interventions in public space that sought to prevent the further spreading of the virus. However, it didn't take long before cities also started to realize that well kept, green public public spaces - especially at the neighborhood level - were also instrumental in coping with the crisis, as sites for - socially distanced - recreation, social encounter and (covid-related) care. So while public spaces may indeed be a hazard for contamination, they also contributed to the resilience of urban society in coping with the covid-crisis.

The research project From Prevention to Resilience aims to contribute to this debate and provide designers with a design perspective that can aid in designing public spaces such that they contribute to resilience at the neighborhood level. This perspective, initially called a framework, also aims to broaden the scope for public space design. We believe that public spaces can contribute to more resilient cities by strengthening not only human communities, but also non-human communities. And whereas urban designers, social policy makers, urban ecologists, and other professionals often work in different silo's of urban governance, we see opportunities for a more integrated approach in which designers start seeing both humans and non-humans as their 'clients' or 'users'.

Our position builds on the growing awareness that humans are interconnected and therefore, interdependent with the natural world around them, and proposes a nature-inclusive approach to building more resilient neighborhoods. Such an expanded scope is of importance in order to mitigate and respond to the impacts of climate change, biodiversity loss, and future pandemics, but also recognizes and takes care of the non-human life that is present in urban ecosystems.

To test whether this is a viable approach, in the winter of 2021 and spring of 2022 we ran three design cases in which designers worked with our design perspective while tackling challenges in particular neighborhoods of the Amsterdam metropolitan area. The design perspective was at that point referred to as a framework, and a concept version was used with the title '*Design Framework for Neighbourhood Resilience*' (available here). The design cases were conducted in close collaboration with architecture center of Amsterdam Arcam, social design agency The Beach and the experience design department of architectural firm UNStudio, called UNSx, as well as with social housing organizations Eigenhaard and Rochdale. The goal of these design cases was to explore and evaluate

the framework in practice, seek insights to improve it, but also to gain a more general understanding of designing for neighborhood resilience and how to integrate human and other-than-human perspectives in such a process. Guiding questions were:

How do designers use and value the framework? How do they integrate it in their practice? Which aspects are fruitful, and which aren't?

How do designers appropriate the framework? Are they making adaptations to the framework, and if so, for what reasons?

How do design outcomes instantiate the (adapted) framework? What design strategies or other forms of intermediate-level knowledge can we derive from their concept designs and the descriptions of it?

How do designers combine human and non-human perspectives? What are challenges and opportunities when integrating the two perspectives?

2. Design Framework for Neighborhood Resilience

The Design Framework For Neighborhood Resilience was printed as a leporello leaflet (see Figure 1), which contained two sides. One side introduced the framework and the rationale behind it. In short, a focus on both human and non-human communities is argued to be relevant in the light of building more resilient neighborhoods and cities. These two communities are graphically separated as two sides of the framework. Subsequently, five concepts are introduced as important conditions for resilience to emerge in both human and non-human communities: agency, connection, diversity, rhythm, and abilities. Finally, a distinction is made between spatial and civic design, which can contribute to these conditions in distinct ways.

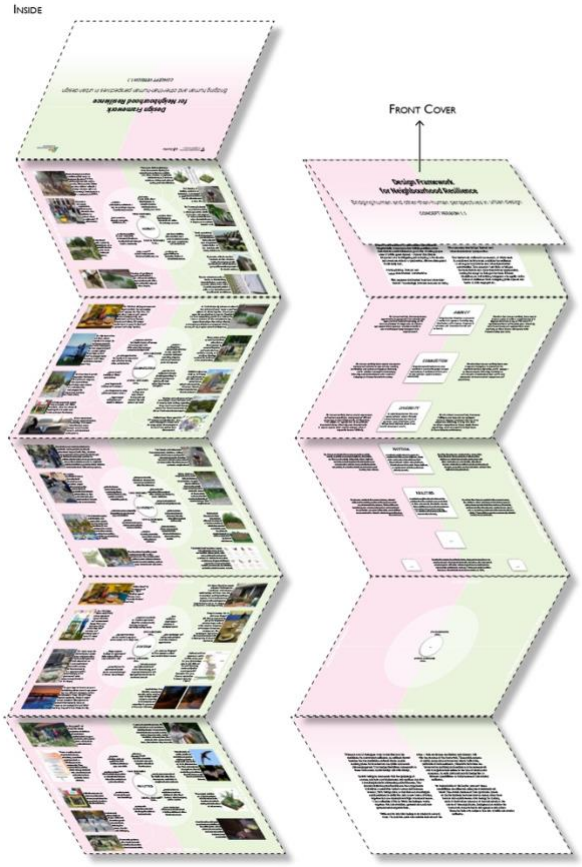

Figure 1: The Design Framework For Neighborhood Resilience was printed as a leporello leaflet

On the other side of the leporello leaflet, concrete design examples and strategies are used to give designers actionable insights in order to design for the five concepts, considering both human and non-human communities. Around each concept ideas are organized in four quadrants, based upon a human / non-human axis and a civic design / spatial design axis. For getting a better grasp of the *Design Framework for Neighbourhood Resilience* we encourage the reader to scan through the digital version that is available on our website (available here).

3. UNSx and the Rodekruis Laan in Diemen

3.1 About UNSx

UNSx is UNStudio's experience design team, which creates physical and digital experiences through a people/planet-centred approach. The team is composed of architects, computational designers, product designers, creative strategists, VR/AR specialists and sustainability consultants. With this heterogeneity of professions, the team aims to design solutions for the built environment that create a connection between people and the planet, as well as the physical and digital realms. UNSx is committed to delivering inclusive solutions through a co-creative design thinking methodology, which involves stakeholders and users in the process and informing the decision-making.

The Amsterdam-based team works on different scales and combines various disciplines, from product design, to strategic and service design, and the built environment. They aim to enhance the user and the stakeholder experience, and to address systemic challenges while accounting for both human and planetary needs (UNStudio, 2022). Recent projects include adaptive and responsive work environments (Soliscape, 2020), biometric pods that help workers lower their stress levels (Reset, 2017), and deep research on the properties of new materials (Coolest White, 2019). They also collaborate with other UN Studio departments on area development projects in the Middle East.

3.2 The brief

UNSx was invited to develop a design solution to answer the housing association Rochdale's need for a more resilient neighborhood (i.e. 'sterkte buurten' vision) in Diemen. Diemen is a municipality adjacent and well-connected to Amsterdam and serves as a commuter town to the capital. Part of the assignment was to apply and test the first version of the Design Framework for Neighbourhood Resilience in their design process.

The assignment revolved around a social housing complex adjacent to Diemen train station and owned by Rochdale. The Rode Kruislaan complex is a typical 1960' development on the outskirts of the city surrounded by abundant but unprogrammed green space. It struggles with social challenges characteristic of similar developments across the country, such as a lack of public space identity and social proximity. The ten buildings of Rode Kruislaan are interlinked into a mega-structure with a strong division of front and backside: on the front side, semi-courtyards accommodate playgrounds

and a recently completed neighborhood pavilion, while the parking lots are on the backside, lacking 'eyes on the street' (Jacobs, 1961) and thus social control. The development suffers from a high rate of criminality, partially facilitated by the interlinked buildings where connecting paths, and multiple entries and exits provide easy escape routes, and disturb residents. Involvement in criminal activities begins in the area as young as 12-year-old. These activities lead to a feeling of insecurity among residents. Proximity to the train station, and Amsterdam center, as well as the availability of green space might provide opportunities for positive change. Rochdale was inspired by the motto 'from Prevention to Resilience' and asked for social and/or spatial solutions that are actionable, but that could also serve as conversation pieces to mobilize discussions within Rochdale and with the municipality.

4. Approach and methods

4.1 Conveying the framework

To help the designers at UNSx to understand and appropriate the framework, the HvA team presented the tool and organized a sense making workshop with the team. During the online workshop, we presented and reflected on the different qualities of the framework, using a whiteboard on Miro. On the whiteboard, we created several frames that depicted the human- and non-human side of the framework, each with one of the concepts positioned in the middle. Several triggering questions were provided in the frame to get the participants starting to think about the concept and what it means and requires for both human and non-human communities. After the session, the framework was handed over to the design team first in a digital version (PDF format), and several weeks later, a printed version was provided.

4.2 Data collection

In order to document and reflect on the design process and the use of the framework, data was collected through note taking, interviews, a final presentation and final report.

For the note taking, one of the researchers from the HvA team closely followed the design process of UNSx in the field. For several months, the researcher was present one day a week and also joined important events as well as the frequent update meetings. The researcher did observations, asked

questions, and took notes during the day and turned these into a short digital report at the end of the day.

Two interviews were held in which the design team was asked to update the research team about the progress. Questions were aimed at getting a clear understanding of the design process and the developing design concepts, the connections of these with the framework, their use and valuation of the framework, as well as next steps. During these interviews two researchers were present. In a final presentation, UNSx presented their design proposals to the research team and Rochdale. Questions similar to those during the interviews were asked. The interviews were audio-recorded and the final presentation audio- and video-recorded.

The final report … , and shared explicit reflections on how the program connects to the framework.

4.3 Data analysis

The interviews and presentation were transcribed, using automated transcription software. In general, the quality of the transcripts was sufficient for analysis, while in some cases minor corrections were made. The transcripts and final reports were analyzed, while digitized note-taking forms were used occasionally for recalling certain details. We used a digital whiteboard (Miro) to visually organize our data. For each document, we lined out our key questions horizontally on the whiteboard. While going through the document, relevant quotations were identified with the key questions in mind, copy-pasted on digital post-its with a time stamp, and placed underneath one or more of the key questions. On the post-its, the researchers also added their interpretation of the quotations. On several occasions, the researchers gathered and shared their quotations and interpretations with one another, reaching consensus about the interpretation and making minor modifications. For each of the key questions, we summarized our findings based on the collected quotations. These summaries are written down in the Findings section below.

5. Design process and outcomes

UNSx addressed Rochdale's brief through the iterative and co-creative approach they are familiar with, while also working with the framework. The design team began with site visits where they

observed the context and conducted user interviews at different times of the day and the week. They identified a number of challenges, such as underused public spaces, a lack of public space identity, and spatial and social disconnectedness. The presence of abundant green space, a multigenerational community and a recently established community hub were opportunities the team aimed to build on.

Following the site visits, UNSx defined three 'impact goals' during a co-creative workshop with Rochdale and the AUAS researchers. Strengthening local identity, celebrating nature and weaving local communities became the goals guiding the subsequent design process. A second co-creation workshop was organised with UN Studio colleagues, AUAS researchers and Rochdale. The workshop aimed to iterate design solutions that create a new synergy between the estate, its residents and the surrounding area to reduce antisocial behaviour. UNSx also invited UN Studio colleagues beyond their team to bring in their expertise. The workshop's three strongest ideas, 'social platter', 'bridging landscapes' and 'makerspace', had a common vision. They aimed to activate underused spaces to benefit from existing assets. Following the workshop, UNSx also organised a meeting with an urban ecologist who they saw as an other-than-human expert. The three concepts were combined, iterated, and elaborated, resulting in the final design.

UNSx's final design proposal, the 'Rode KruisLab', is a scalable solution that combines a placemaking concept and a programming concept (see below). The design team sees the Rode KruisLab as Diemen's Neighborhood-lab that creates the conditions for local residents to connect. It is based on the idea of resident participation to foster a stronger sense of identity, celebrate nature and stimulate connections with other communities.

The placemaking concept is called 'Confetti Parklets' and it aims to nudge residents to take up new behaviours. The design proposes flexible urban furniture modules as soft interventions that connect human and potentially non-human residents. The intervention aims to promote multi-generational interaction, activate the landscape and deliver a distinct visual character. The parklets suggest a broad range of activities through a variety of modules, such as hang-out modules or ones with edible plants, that engage residents and foster a sense of belonging and appropriation of the green spaces.

The programming concept is called 'Garage work/shops' and aims to create opportunities for residents as well as local entrepreneurs. The proposal aims to activate the existing ground floor garages and storage spaces that face the parking area by converting them into flexible, multifunctional spaces in order to attract new users to the neighborhood, such as startups. The intervention introduces an active plinth to the backside of the Rode Kruislaan complex and thereby activates the area at different times of day. This also creates new work opportunities for the residents, strengthens public space identity and raises the feeling of safety.

Finally, UNSx's proposal suggests two complementary interventions. They propose introducing transparent elements in the building's facades to provide visual connection and further opportunities for social control between outside and inside. A bridge over a small canal is also suggested to connect the parking lot to the adjacent linear park. The two design proposals, Confetti parklets and garage workshop, are intended as the initial phase of a longer process to scale the solution and define broader spatial and social interventions.

6. Findings

6.1 How was the design framework used?

The use of the framework varied between the different design phases. During the site visit and research phase, UNSx found it challenging to use the framework. It did seem to have triggered some consideration for other-than-humans: "While we were doing the site visits, [...] I had a special eye for the non-human that maybe without having the framework in the background, I might not have had." – reflected one of the UNSx team members. We observed UNSx team members carrying out user interviews at the site and observing user behaviour to better understand the lived experiences of residents, but the social research methods used for this context research were inspired by their existing knowledge rather than the framework.

Later in the process, the framework started to play a bigger role. After their observations during the site visit, the design team held a collaborative workshop with the client Rochdale to define a set of impact goals. They saw the impact goals as "overarching principles that connect, on a macro level to the framework" and "frame the general challenge" of the assignment. At this stage, the layout of the

framework, in particular its human and other-than-human side, was used to evaluate whether the impact goals addressed both human and other-than-human residents.

During ideation the framework served as “a tool that would help [UNSx] think of a step forward in the design” by maximising the other-than-human friendliness of their ideas. The team explains how “the framework was used as a form of assessment” and directed them to be more inclusive to other-than-human residents in their proposal. UNSx looked at the framework as a model that their proposal needed to respond to and expected that “the framework becomes an assessment form to iterate those ideas and test them if they're inclusive”. At some point in their design process, a meeting was organised with the ecologist of the Diemen municipality, in order to receive advice on the topic of other-than-humans. UNSx also said that during the ideation process, they asked questions about how the design could include one of the five qualities (i.e. agency, connection, diversity, rhythm and abilities) to support either human or other-than-human residents. They experienced it as a back-and-forth process. On the one hand, there were questions the team thought of because of the framework and tried to find design examples to address that question. On the other hand, the framework helped them map the strengths of already collected design examples in supporting human and other-than-human communities. During the various meetings in this phase, the framework and its concepts were not discussed.

In the final stage, the framework helped expand the design concepts, thinking about how they contribute to each quality. “When thinking about the final concepts, we surely tried to stretch the ideas and think of an additional step on how it could contribute to these five concepts [of the framework] that we should consider as valuable.” – says one team member. The framework was used for finding opportunities for design and later checking if the design fulfils the framework. It encouraged designers to revisit their design solutions that primarily addressed human residents and ask how they could be “conceived as something that could also sustain the other-than-human”. Moreover, they used the framework “to make sure that the non-human actors are served or taken to account and are equally treated.”

When UNSx organized a workshop with the client Rochdale to evaluate the three scenarios and possibly eliminate, expand or merge them, they did not use the framework but introduced the concepts of people – planet – profit. In the final interview towards the end of the project, the design

team expressed that addressing other-than-humans requires a more detailed understanding of the other-than-humans in the neighborhood: “once we will truly identify the [other-than-human] users (…), we can add some specific features” when referring to features of the confetti parklets for other-than-human residents.

6.2 How was the framework valued?

UNSx referred to the framework in many different ways, such as a tool, a guidance, a model, a scoring matrix, or an assessment form, indicating the various roles that the framework could play in their view. They valued the completeness of the framework and thought that one of “the purpose[s] of the framework was to stimulate [their]thinking in a […] more open way”. At the same time, they found it challenging to design with all five qualities in mind and to consider them for both human and other-than-human residents. This may have to do with the assumption that they had to consider each of these qualities equally. We observed that, from time to time, the design team perceived the framework as a requirement and that the qualities were seen as steps to follow. “It feels that if you skip one or miss one, then you're doing something wrong or skipping an important aspect” – they explained.

When asked about their expectations from the framework, UNSx thought, “it really invites a strong balance between human and non-human actors”. UNSx also valued how it encouraged them to pay more attention to other-than-humans or try to adapt their usual working methods. For example, one of the team members pondered during the research phase what might cultural mapping for other-than-humans look like. At the start of the process, the designers felt they had “the space and also the support of the model to really enforce this sort of 50-50 balance”. However, in the final stages of their project, the team explains that they identified “a sort of urgency on a social level, also human level”. This was also visible in the design outcomes.

The framework was also valued for inviting interdisciplinary discussion and collaboration. “I think the framework is a really nice invitation to also have more conversations across sectors. (…) a really great tool to have more interaction with each other and to also be challenged to solve something together.” – said one of the team members. UNSx reaching out to the ecologist at Diemen municipality might be seen as a first sign of such bridging of disciplines. The designers also found

that the framework might stimulate them to create “a more hybrid team if [they] would integrate this into other assignments also”.

We also observed how the team shared in-depth reflections on ecological matters, although this was dependent on one team member who raised relevant questions for this. For example, at one of the design meetings, this team member reflected on the value of the framework’s two sides, what they mean for design decisions and whether these decisions are making things better or worse.
UNSx also valued the framework as a simplification of the design process that supports a systemic thinking approach in design, just like other design frameworks or models they create themselves. UNSx valued the two-sided structure of the framework as one possible thinking model to approach the design where the human and other-than-human sides are two of many variables that designers need to consider. They also pointed out that there are many other variables, for example, the commercial aspects of design that the framework does not consider. The fact that UNSx used a people-planet-profit scoring sheet to evaluate scenarios and work towards a final proposal might underline that they lacked an economic perspective in the framework, and therefore decided for a more holistic or general framework to work with for that particular part of the project.

Finally, “the framework helped to identify a perspective towards design that is not centred towards human behaviour, as a sort of key aspect”. So UNSx valued the framework as the harbinger of a new focus on other-than-human behaviour and design. Such a new perspective also requires new expertise to be built; UNSx proposed the framework “highlighted a lot the lack of knowledge in the design field of ecology or ecosystems design”. One of the team members elaborates: “I think we are well trained in the field of urban design, building design, product design and talking about people [...] So it's designed for humans. But we are [...]less trained in designing for non-humans. That requires a new academic degree”.

6.3 How were the two sides of the framework combined?

As UNSx is expert in experience design, the human side of the framework was more familiar and approachable than the other side. For addressing ecological matters, UNSx trusts their experts from other departments. “Usually with our projects, we have an expert from landscape on the team (...) it's also their responsibility”, – UNSx explained. In the team’s “UX approach, the non-human plays a very small part”, with the occasional consideration of one or two animal actors. “To give the same

weight to the two elements", i.e. human and other-than-human, would require a different approach, the team reflected. They also believe that in most of their assignments, a human approach is needed for solving pressing architectural matters for their clients.

In addition to the human-centred approach, the design team also saw an "urgency on a social level" in Rochdale's assignment, which asked for a more socially resilient neighborhood. They found that this made it more challenging to balance human and other-than-human residents in the process. "...doing the new natural park of Amsterdam or something, maybe it would have been different" – the researchers reflected when asked about balancing the two sides. Also the impact goals that were articulated by UNSx connected particularly to the human side of the framework, as was the case for the final design outcomes, which "had a stronger importance for the human aspect of it and a bit less for the non-human''. In addition to prioritising human issues as more urgent, we observed that other-than-human residents were often referred to as nature, and nature, in turn, was perceived to serve human needs; an example that was often given was how trees offer climate comfort for humans. The designers also talked about considering other-than-humans as potentially conflicting with human needs: "Other living actor issues might interfere with finding social solutions."

The designers found it "challenging to have in mind both typologies of actors always throughout the process." Furthermore, they had mixed ideas about whether the framework helped them to combine human and other-than-human perspectives. On the one hand, they saw the framework as depicting humans and other-than-humans as "part of one system in which they are linked". They also talked about two of the concepts in ways that suggested such an integral perspective: "if you have a certain rhythm in a landscape, it doesn't only help the diversity of species (...) but it also helps human actors to navigate through a space. So that aids each other." Connection was also interpreted by the designers as a quality that may not only connect humans to humans, or other-than-humans to other-than-humans but also the two types of communities to each other. On the other hand, they expressed the framework asserts a separation of humans and other-than-humans, and thereby discourages integral or synergistic solutions. This view was expressed more dominantly, and also in the process we observed little instances in which synergies were attempted to be found.

6.4 What are challenges of implementing the framework?

One of the challenges of implementing the framework emerged from the nature of the assignment. As discussed in the previous section, the social urgency emphasised by Rochdale made using the other-than-human side of the framework challenging for UNSx. The brief and the data provided by Rochdale focused on human residents and common socio-economic indicators. UNSx explained that they needed to find planet-centric challenges in the brief and data because, without an ecological challenge, they saw no need to use both sides of the framework. As a result, UNSx conducted a site visit focusing on human social issues, which was complemented by the socio-graphics they received and gathered. According to them, an ecological site visit and corresponding "nature-graphics" were missing. So the lack of location-specific and objective data on other-than-humans, ecology and biodiversity, such as a database of local species, was experienced as an inhibitor to using the framework throughout the process. They also indicated that simply addressing other-than-humans was a too general goal, offering little focus in comparison to the human-centred goals.

The design team also found that designing for resilience and including other-than-humans is a long-term process that has to be tackled in phases. They encountered a conflict between giving an immediate design response to pressing social challenges or taking a long-term perspective: "If we have to give a response and tackle the project directly, the social issues will come firstly, I would say, but on a long term process, the other-than-human will also have a strong importance". Again, the choice of prioritising urgent human issues might have been influenced by the Rochdale assignment. In addition to UNSx's usual way of working, their field of expertise was experienced as a limiting factor in implementing the framework. The designers felt the framework asks for specific skill sets that were not present in their team; their background, knowledge and skills were insufficient to design responsibly for other-than-human residents. Knowledge gaps were experienced sharply regarding what agency and abilities might mean for other-than-human residents. They also felt their background lends itself to a macro-level understanding of other-than-human rather than "digging under into the agency of plants and species". "There is a need for a truly multidisciplinary team. You need help from really an expert of the nonhuman world" – they explained.

During the process, we also observed how the professional orientation of people at the table enables or hinders engagement with different aspects of the framework. Architects, creative strategists from human geography or service and experience design, a community manager or a

physical asset manager at a housing association all have their own take on the project with spatial, social, economic, service design, or climate-comfort-focused ideas. The UNSx team did not have an ecologist or landscape architect on the team for this project with a potentially deeper understanding of flora and fauna. They questioned whether, given these shortcomings, designers could use the framework without slipping into oversimplifying matters or greenwashing.

Recognizing and reflecting on the lack of expertise propelled UNSx to propose that other-than-human design is a new field. "..we are well trained in the field of urban design, building design, product design and talking about people because we design objects that are (...) designed for humans. But we are less trained in designing for non-humans. That requires a new academic degree." – they reflected. UNSx found that even being a landscape or climate designer would fall short because all design disciplines serve humans' needs. In addition, knowledge is scarce on the topic and experts are scattered: "I see that there is a lack of knowledge, missing, that is greater than what the framework should supply and where do you go get it? (...)The closer one you get is the bird expert, but for sure he doesn't talk about integrations, or interfacing. So we saw a missing piece of the puzzle."

The lack of expertise UNSx encountered brought the challenge of taking responsibility to the table as well. "If you're not an expert in working with ecosystems or the species you deal with, then you might actually make their situation worse." In other words, the design team felt uncomfortable taking responsibility for other-than-human-design decisions, which might have propelled them to leave the other-than-human side of their concept just as open as their other design concepts were left open for a potential participatory process with human residents.

Another challenge the framework brought into the process is the potential conflict with other methodologies. "What was challenging for us was that sometimes you have to start handling two different approaches at the same time because we have our way of running a project, going from research to ideation, having methods for it, and then you have to collide them." – the designers explained. As indicated earlier, UNSx also found the five qualities as too specific and too many, creating a conflict with other frameworks in use: "having these specific steps to follow can sometimes be maybe an obstacle". During the ideation phase, UNSx perceived the framework as an additional restriction that might hinder the free ideation process.

6.5 Suggestions for improving the framework

The challenges UNSx encountered in implementing the framework helped them reflect on its usability and to make suggestions for improvement. The design team missed the commercial aspect in the framework and said, “what would make the framework maybe stronger is to also have examples of how that leads into a strong business proposition”. Case studies and references could help designers convince investors why the framework is useful in the design process. In addition, UNSx would also like to see case studies that show how “nature gives them (i.e. investors) a business benefit because that's the other language that we have to bridge towards”, – they said.

In addition to showcasing the economic benefits of implementing the framework, UNSx would also welcome case studies on the co-benefit(s) “that comes out of establishing strong green zones or biodiversity“. For example, “If you add more female species trees instead of only male species, then less people have allergies and there's less cost for health care.” The design team also adds that the importance of a commercial aspect depends on who uses the framework: “maybe having it as a guiding tool for designers, it's something that maybe we don't look at directly, you know, the return of investment”, but to argue the usefulness of the framework to clients the monetary aspect is key. These comments are in line with our observation of the people-profit-planet scoring sheets UNSx that were introduced at the concept development workshop, in which the human and other-than-human sides of the framework seem to be represented by people and planet, while it also adds profit as a third pillar.

Apart from adding case studies on monetary and co-benefits, UNSx also found that the five qualities in the framework may be too specific or too many, creating a conflict with other frameworks or asking for knowledge beyond designers’ expertise. They suggested that they could be condensed. UNSx felt that agency and abilities, based on our observations, especially for other-than-human residents, were “stretching the concept too much”. UNSx thought that fulfilling the other three qualities was already an outstanding achievement. The design team also found that the visual layout of the qualities makes designers feel that all qualities are all obligatory to address. After we had told them this was not the intention they said: “Even if we're aware that it's not meant to be like ‘your design has to exactly address these five’, visually having it laid out like this, it feels that if you skip one or miss one, then you're doing something wrong or skipping an important aspect”.

Finally, given that UN Studio is an architectural design firm and their UNSx team has great architectural expertise, they wished the framework could be better applied to indoor environments. "…once you move to a sort of semi interior design, then the nature component disappears as you are in the world of interior", – they explained UNSx through that information on the environmental impact of materials or their restorative qualities could help in this respect.

6.6 Use and understanding of the five key concepts

As discussed in the previous sections, the five qualities of the framework were not used at the beginning of the process and gained more importance as design ideas were concretised. The qualities were perceived in various ways, for example, as guiding principles that helped to expand concept ideas, but also as obligatory steps that occasionally felt restrictive to the design team. As also discussed earlier, UNSx dealt with human and other-than-human residents as two separate parts of the project. This separation also pertained to understanding each quality distinctly for humans and other-than-humans.

Given UNSx's field of expertise and usual way of working, they felt more comfortable and trained to integrate the five qualities for human residents. They found that diversity, connection and rhythm were also easy to understand for other-than-human residents because they are "characteristics that are more belonging to the non-human''. Based on our observations, it might be that these qualities were easier to grasp because they lend themselves to a macro level of looking at other-than-humans, looking at larger ecosystems or green infrastructures rather than individual other-than-humans.. UNSx found that agency and abilities were challenging to design for when it came to other-than-human residents.

6.6.1 Agency

UNSx spoke about other-than-human agency first and foremost as providing care for other-than-humans. They felt that agency for other-than-humans is one of the most challenging aspects of the framework, both to understand and to design for. The designers found that it requires human intervention, so "it's a human fostered kind of thing", because it is "the humans that give…like the care and maintenance to the green". When addressing this quality, they spoke about "how some

sort of parklets could be thought…as like sanctuaries for specific species, so providing a specific form of care for a certain species". They also thought about designing "objects of different amount of shelter, shadow and viewpoints. Spread through the landscape this can offer hiding spots for birds when there are dogs or cats around." Objects of shelter also point to the understanding of other-than-human agency as a place for species to settle and space for biodiversity.

In addition to specific forms of care, they also saw a connection to 'green tech': "From an agency perspective, to implement the other-than-human aspect, we were thinking that we could maybe involve and focus on the enterprises that [...] can work in green tech, that could use the area and the estate as a testing ground of their innovation" – they explained. Here it remains unclarified how a green tech business could actually support the agency of other-than-humans in the neighborhood. Agency for humans was a concept that came closer to the expertise of UNSx, which is also reflected in the multiple ways they tried designing for this quality. They said that human agency "links a lot with the (impact) goal that we identified [as] identity and feeling recognized in the area where you live, which is very strong for our project." They sought to build identity through designing an open-ended concept that would be further developed through resident participation and co-creation (…) that reflects local values and cultural heritage, creating a sense of shared ownership of the Estate and surrounding".

According to UNSx, gaining a deeper understanding of residents' preferences and interests can also allow agency to emerge by "steering towards user-centric adaptability". For example, "the parklets have been designed as a library of elements. This way neighborhood managers and residents can plug and play with elements they need in different locations, and adapt the configuration in response to changing needs". So creating flexible layouts and functions allows residents to adapt their physical environment to their requirements. Similarly, residents can adapt their situation when facing unpleasant circumstances, such as nuisance from other residents. Another way UNSx aimed to help human residents exercise their agency was by enabling them to organise events in the neighborhood living room or to affect their environment through businesses or initiatives.

6.6.2 Connection

UNSx aimed to connect other-than-human residents to each other by establishing ecological stepping stones. They explained that "in terms of biodiversity, [...] connectedness was mostly

fostered by connecting natural landscape to the estate and [bringing] in new greenery and pollinators to strengthen the ecosystem; so providing new pockets of green." They saw these pockets of green as "a possibility to create new small ecosystem(s), providing additional connections for species and nature to expand". These stepping stones were mostly considered for insects and other small animals.

In terms of fostering connection between human residents, UNSx introduced both spatial elements as well as activities. At the start of the project, the design team remarked that they "want to learn about [...] the relation between human relation building and the programmatic elements of a neighborhood". They regarded shared experience and help as two of the important ways humans can establish connections, and their concepts included "working together and servicing each other". Another way they sought to connect the different human communities was by "providing an opportunity for new spaces for interaction". "Designing elements that facilitate different uses, finding shadow, using a seat, and playing for individuals and groups, we believe the parklets can contribute to multi-generational meeting spots that allow people to have activities and encounter one another'' – they explained.

The quality of connection also took on a third meaning during the process. UNSx aimed to establish a stronger connection between human and other-than-human residents by "trying to connect (...) the natural elements to the urban aspect". They explained that "the planters are included to contribute to human and plant connection" and they wrote in the final report about educational events on nature that would be "building connection between human and other-than-human actors".

Finally, UNSx saw a clear link between connection and diversity for both human and other-than-human residents. "Connectedness, I think, goes hand-in-hand with the diversity" – they said. No further explanation was given.

6.6.3 Diversity

As UNSx saw a strong link between the qualities of diversity and connection, they also perceived ecological stepping stones as contributors to other-than-human diversity. For example, they aimed to achieve one of their three impact goals, "Celebrating nature to allow biodiversity to flourish",

partly by establishing pockets of green. They address other-than-human diversity as the diversity of plant and animal species, the diversity of animal residences, such as bird houses, and ecological richness or natural biodiversity of wild landscapes.

Diversity for human residents took on many meanings, such as neighborhood diversity, the diversity of user groups, activities, programming and functions. UNSx aimed to welcome cultural diversity and the diversity of ideas through a “consultation process on how residents could share their cultural knowledge and ideas”. The designers also anticipate “significant differences in the experience and valuing of the neighborhood” of different residents. The design team also thought that the quality of diversity for human residents might be an activity that “promotes appreciation of diversity through sharing cuisines / meals” or “learning about diversity in the common design of the wayfinding system”.

6.6.4 Rhythm

Rhythm for other-than-human residents was linked to the rhythm of nature, for example, the natural migration of species or the rhythm of changing seasons. “It's kind of linked to the seasonality of use of public spaces as well [as thinking] towards some kind of intervention that could [...] make nature a bit more welcoming during the wintertime...” – UNSx proposed. The rhythm of movement, the rhythm of light and dark changing through the day and the rhythm of the sun and its changing intensity were all topics connected to natural rhythms and discussed during the process, although not clearly addressed in the final design proposals. UNSx also proposed that rhythm for other-than-human residents may be about “providing additional safe spots where rhythms are not disturbed but encouraged”.

UNSx saw many different types of rhythms for human residents as well. Some were also associated with the rhythm of nature, such as the change in air and light conditions throughout the day or how knowledge transfer workshops could respond to the changing availability of plants throughout the seasons. They also identified human rhythm as the routine of everyday life: “You did this sort set of tasks during the day and the night, and in the afternoon this happens, or it can be as you write down weekly, monthly..., and it's affected by season, but it's kind of the routine of everyday life” – UNSx reflected on the meaning of rhythm. The design team also found that rhythm was strongly associated with mobility and flow patterns, and ways of using a certain area: “especially with the

bridge, we would bring new rhythms and flow of people in the area" they said. "...it would allow people to create new routes and paths that will shift the normal use of this space".

UNSx also found that the daily rhythms of different human communities might be out of sync, and they proposed to first disrupt existing rhythms as they nudge towards new ones: "we're trying to kind of nudge the behaviour of teens in different ways or how they appropriate the areas. I feel that we're kind of aiming to disrupt this rhythm." – they explained. Their interventions aimed to nudge human residents to establish new habits, activities and behaviours. Establishing a rhythm in the opening times of spaces was also proposed as a way to create inclusive spaces for young and old, regardless of being able to consult opening times on an app or website.

Finally, as discussed earlier, UNSx saw how natural rhythms may serve both human and other-than-human communities and, in some way, even connect them. For example, they proposed creating a rhythm of changing landscapes to help human wayfinding and foster other-than-human diversity. Their idea of synching knowledge exchange or DIY workshops to the rhythm of seasons and seasonal produce might also point to a way of connecting the two communities.

6.6.5 Abilities

UNSx found other-than-human abilities the most challenging quality to work with. Abilities seemed a contradictory theme: if design focuses on the best possible habitat for species to settle it "maybe limits their abilities to become more resilient to changes", and maybe they will also be less able to thrive in other environments, they reflected. They likened "creating the perfect habitat for other species" and understood abilities in this context; they aimed at "answering needs and providing necessary amenities to meet their abilities". Furthermore, they spoke of other-than-humans' ability to navigate, move through, hide or reside in an environment and saw ecological steppingstones as interventions that also contribute to these aspects. Finally, they considered how the "abilities of bees contribute to the garden". In other words, they looked at the other- than- humans' abilities to contribute to a flourishing natural environment.

The abilities of human residents proved more straightforward to address. It was framed as learning or gaining knowledge, building skills, knowledge transfer or sharing knowledge. "Bringing in workshops and providing a place for business invites residents to grow knowledge, or share and

grow their knowledge on-site, instead of performing professional tasks elsewhere in the city." – said UNSx. They also spoke about learning to respect other cultures, which might provide a link to diversity, although the designers did not mention this. UNSx also saw their garage workshop concept as "a tool to unveil hidden local talents within residents to show their interests" and which could provide "new opportunities to bring people together in [...] workshops or exchange skills". UNSx also linked human abilities to the idea of resources, particularly from a monetary perspective. They spoke about how the financial means of residents influence their abilities to get around their neighborhood and explore places. At the same time, they also saw residents' abilities as skills they could use to make a living.

7. Discussion

7.1 Combining human and non-human perspectives

Responding to Rochdale's brief, UNSx perceived human residents and related social issues as more urgent than those of other-than-humans. They consciously decided to prioritize humans which meant that they did not thrive for design solutions that took human and non-human inhabitants equally into consideration. Based on our observations, this may have had three key reasons. First, the social housing association Rochdale formulated a human-centered brief which did not include a design challenge and information concerning non-humans. The non-human challenge was only implicitly introduced through the request to use the framework. Second, the UNSx team is expert in designing human experiences and services. They indicated that they lacked the necessary expertise and data to address non-human residents. Third, UN Studio is accustomed to work on large and complex architectural assignments where many design considerations are at play. For them, the non-human perspective was just one of these many considerations.

While we can observe that the garage workshops and confetti parklets primarily addressed human residents, the UNSx team appreciated the framework as an invitation to think about non-human residents. It is interesting to highlight how designers expected the brief to explicitly mention non-human issues as opposed to the framework indirectly implying their relevance. We assumed the non-human side of the framework would be seen as an opportunity to take a novel perspective and

potentially anticipate some of the future challenges relating to climate change and biodiversity loss. We expected the framework to support designing win-win solutions benefitting both resident communities. The prioritisation of human challenges may highlight the need to establish a clearer rationale for including non-human residents in neighborhood design, all the while addressing urgent human issues.

Moving from the why to the how, the lack of expertise and objective knowledge that could support other-than-human design became an obstacle to using the framework. We observed the final proposal, the confetti parklets placemaking concept and the programming of the garage workshops, defined better how people would interact and benefit from them. How exactly these interventions would support other-than-human residents was defined in general terms but not tuned to the specificities of the context. Leaving the proposal open to interpretation and external input might have been the designers' way to acknowledge limits to their expertise and supporting data and show that they cannot take responsibility for decisions concerning non-human residents.

UNSx recognised these limits and highlighted the framework calls for a truly multidisciplinary team. They proposed non-human design as a new field of expertise. These reflections from UNSx explain that knowledge on non-humans is scarce and fragmented, and the framework might disrupt established ways of working. It also opens up knowledge gaps or limits on how designers can intervene in complex systems, such as an ecosystem. Acknowledging these limits more explicitly in the framework might open up space to designers' creative thinking and experimentation. If the framework fosters appreciation and application of hybrid (design) teams, multidisciplinary expertise may contribute to not only designing for non-humans, but addressing social resilience at large and dealing with urban challenges, such as sustainable mobility or densification, that were beyond the scope of this research.

The lack of expertise and information on other-than-human residents coupled with a perceived social urgency also influenced the role the two sides of the framework played in the project. We assumed dividing human and other-than-human residents would encourage generative thinking and finding synergies between the two communities. The two-fold structure was on the one hand welcomed by UNSx as a model for balancing the two communities, but on the other hand was perceived as a divide that asserts separation rather than unites. We observed that the framework foremost served as an assessment form to evaluate if human-centred ideas could apply to other-

than-human residents. In this sense, the framework was successful in challenging designers to think for both human and other-than-human, but it did not inspire them to find synergies nor did it guide them on how to do so.

Moving forward, the precedents on the backside of the framework might provide the opportunity to better illustrate connecting the two sides. The qualities of connection and rhythm were perceived as concepts inherently linking the two communities. They could play a more central role and encourage synergies between human and other-than-human residents. Complementing these two qualities, the concept of circularity also emerged as a way to sync natural and human rhythms and co-create with nature. A key challenge for the next iteration of the framework is to encourage designers to address the two sides in parallel, without singling non-humans out and thereby unintentionally reinstating the outdated divide between 'nature' and 'culture'.

7.2 How non-humans were conceptualized

Another important lesson for improving the framework is how designers conceptualise non-humans. We observed UNSx challenged by questions such as who the non-humans are and whether they deserve attention as individuals, as species, as taxonomic ranks, or as webs of interdependencies. UNSx often abstracted the concept to a macro-level and spoke of ecology, biodiversity, landscape, environment, climate or nature. Framing non-humans in these overarching planetary concepts make designing on a neighborhood scale and addressing the framework's five qualities challenging. At the same time, UNSx also talked about non-humans as specific types of species, such as dogs, birds or bees. These seemed a common representation of the species humans are aware of. We might ask how the framework could encourage an understanding of non-human that goes beyond common cultural representations of nature and species that matter. How can designers, with the help of the framework, critically question who are we sharing urban space with and how consider them in the design process?

Our stance when creating the framework was that other-than-humans not only matter because we rely on them for ecosystem services or because we are interconnected, but also because they are worthy of consideration and care in their own right. We observed that a common way of taking other-than-human residents into account was thinking about how they can serve humans needs.

UNSx missed a financial aspect from the framework and suggested adding precedents on the monetary benefits of including other-than-humans in the design process. They saw profit as a pillar that would enable the wider application of the framework in commercial circles. A challenging question for taking the framework further is whether considering other-than-humans for inclusive reasons engenders a different mindset and leads to different design solutions than considering them from a pragmatic stance.

The concept of scale and design detail is also inherent in how designers conceptualize other-than-humans. While speaking of other-than-humans as webs of interdependencies challenges designers to look beyond the neighborhood scale, identifying particular species in a neighborhood allows designers to zoom in. During the research phase and impact goal definition, the framework's division between human and other-than-human residents played a central role and encouraged designers to take a bird-eye view on these communities. During the ideation and concept development phases the design gained more definition and encouraged UNSx to pay a closer attention to the framework's qualities.

7.3 Lessons learned about the resilience qualities

We observed that working with the qualities is easier on a smaller scale when the user perspective is present. At the same time, the qualities of connection, diversity and rhythm allow designers to move across scales, from region, to city and neighborhood, down to the details of a design object. Agency and abilities are challenging to address on a larger scale and become meaningful when zooming in and considering particular species. So, the various aspects of the framework seem to relate to different design phases and spatial scales. Introducing a scalar definition might help in operationalizing the framework but might reinforce the framework being seen as a method. We observed that designers perceived the framework as a method composed of compulsory steps to follow, while we intended it as an open thinking model. This may point to designers' need for guidance when designing for non-human resilience.

During the process, we observed UNSx's expertise and affinity with addressing complex socio-spatial challenges. Their usual working methods, such as cultural mapping or working with user journeys, were a valuable resource they relied on to envision a resilient neighborhood for human residents. They indicated their familiarity with the human side of the framework and found it easier to relate to

the five concepts when addressing the social issues in Rochdale's brief. We also recognized this familiarity through the diverse ways UNSx related the framework's five qualities to their design proposal. For example, UNSx aimed to give agency to human residents by proposing two open-ended concepts that would allow for resident's formal participation in the decision-making process, co-creation and informal appropriation. They also envisioned that by giving agency to human residents, their design would foster a sense of ownership and ultimately lead to a connected community involved in shaping and caring for their physical environment.

The UNSx team also related to the concepts of connection, diversity, and rhythm through their programmatic and placemaking proposals. Human relation building, creating shared experiences, social help, spaces for interaction, multi-generation meeting spots, facilitating diverse activities, thinking about resident's everyday routines, addressing the rhythm of opening times, considering natural rhythms were all different ways their proposal aimed to contribute to a more resilient human community. The notion of a neighborhood lab related strongly to the concept of abilities: building skills, learning through making and knowledge transfer were key qualities the garage workshops and open-ended parklet modules contributed. The clear connection between how UNSx related to the human side of the five framework qualities and their final design proposal might point to the framework as valuable in guiding designers to achieve (human) neighborhood resilience. Rochdale was pleased to hear at the final presentation how UNSx addressed the complex social challenges the brief outlined. They welcomed the final design concepts as actionable solutions that will foster their collaboration with the Municipality of Diemen and help in achieving their resilient neighborhoods vision (i.e. 'sterkte buurten').

7.4 Improving the framework: Towards version 2.0

Based on our findings and discussion, we propose to take along the following considerations for a version 2.0 of the framework:

- The framework should be more explicit in what it means by other-than-humans, in particular regarding whether we propose to focus on individuals, or rather on communities or eco-systems. Given the fact that our framework focuses on resilience, a system-level property, and on the scale of the neighborhood, it makes sense to frame other-than-humans more explicitly, as well as humas, as communities, networks or systems.

- Expertise concerning other-than-humans was lacking, and similarly, we could imagine an applied ecologist lacking expertise concerning social resilience. The framework can only offer so much, but it would make sense to have some sort of collection of resources (including tools, expert organizations, literature) that can give access to expertise that might be lacking.
- The framework should clearly communicate that not all of its qualities are proposed to be requisites for a successful design; rather, a design may place its main focus on one of the qualities and still make a valuable contribution to neighborhood resilience.
- WIthout an ecological challenge, UNSx saw no clear reason to design for non-humans. The framework should thus make clear that many issues on the neighborhood level can benefit from including non-humans.It could also provide practical suggestions for reframing an initially human-centered brief.
- UNSx has a multi-disciplinary team but is oriented as a whole towards user experience (UX) design. When talking about expertise regarding non-humans, designers indicated they would require expertise from an ecologist or landscape architect. But could we not think of UX design for non-humans? What would that look like? Would that still be relevant for neighborhood resilience, or would the focus come to lie elsewhere? Could we tailor the framework in that specific direction to be more fruitful for a design agency like UNSx?
- Rhythm was not described and used in a way that clearly related to resilience, raising the question of whether this quality is fruitful to use as one of the key resilience qualities.
- The concept of abilities was considered confusing when speaking of other-than-humans, raising the question of whether this quality is fruitful to use as one of the key resilience qualities.
- UNSx missed a business perspective on including non-humans; would it be valuable to include this? Eco-system services are a well-established concept that might be relevant in this regard.