

DESIGN WRITING PROJECT

NO MORE DEMOLISHING

reusing, repurposing, and working with existing structures

“Never demolish, never remove or replace, always add, transform, and reuse!”

- Lacaton and Vassal

Thousands of buildings are being demolished every year and replaced by new ones, while there are plenty of unused buildings that could be worked with instead. By demolishing a building and putting a new one in its place, the built industry causes around 40% of CO2 emissions and around 60% of waste in the United Kingdom alone.

By building a new building, "around 400 million tonnes of new materials are used in the United Kingdom every year, and around 45 million tonnes of waste are created,"¹ without the further realisation that we don't have that many resources to be able to create that much waste. Furthermore, the created waste ends up without further use, even though it could be used as a new building material. All of this contributes to a climate crisis.

“As members of our industry, architects are accomplices to the deterioration of our planet's liveability, which has led to the global environmental crisis”² and it is time for the built industry to change.

“If we do not change our behaviour radically, we will reach a point of irreversible damage to our planet within the next 12 years.”³

WHY NOW?

Careless tearing of buildings in order to create something brand new and contemporary while being hungry for virgin materials has been happening for way too long. A large carbon footprint and millions of tonnes of unused materials that end up as waste have piled up, and now there is an environmental crisis with a risk of irreversible consequences such as "the high risk of droughts, floods, extreme heat and poverty for millions of people"⁴. It has gotten to a point where architects and designers can no longer ignore the impact they have on this situation and have to become more responsible.



Fig.1 - demolition of a building showing the dust polluting the air and created waste

¹Hopkinson P, Chen HM, Zhou K, Wang Y and Lam D (2019) Recovery and reuse of structural products from end-of-life buildings. Proceedings of the Institution of Civil Engineers – Engineering Sustainability 172(3): 119–128, <https://doi.org/10.1680/jensu.18.00007>

² Design Studio Vol. 1: Everything Needs to Change : Architecture and the Climate Emergency, edited by Sofie Pelsmakers, and Nick Newman, RIBA Publications, 2021. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=6530222>.

³ Design Studio Vol. 1: Everything Needs to Change : Architecture and the Climate Emergency, edited by Sofie Pelsmakers, and Nick Newman, RIBA Publications, 2021. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=6530222>.

⁴ Design Studio Vol. 1: Everything Needs to Change : Architecture and the Climate Emergency, edited by Sofie Pelsmakers, and Nick Newman, RIBA Publications, 2021. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=6530222>.

WHAT NEEDS TO CHANGE?

"Sybren van den Busken from the City of Amsterdam proposed the following universal strategy, which aligns with the construction hierarchy of the C40 upcoming Clean Construction Declaration:

Reuse before demolishing

Use existing materials. Buildings of today are resources for the future (urban mining)

If new, build flexible

Use sustainable materials

Administer used materials, for the future"¹

The most important solution to this problem is to start reusing buildings and work with existing structures. Reusing buildings can not only cut embodied carbon production by up to 70% compared to demolition, but it can also offer unique architectural features that a new building never could.

The problem is that many architects, designers, and even their clients think that reusing is more of a compromise than an instant option. Building a new, modern building is a lot more preferable than working with an old one that needs a lot of repairs, research, and attention. Yet there are many successful and beautiful examples of what can arise through reuse, and through those examples, we architects and designers should learn, educate ourselves as well as our clients, and influence them to opt for reuse before building. We can and must do things differently. We have to look for architectural potentials and aesthetic features that existing structures have to offer rather than how to get rid of them, build around them or change them completely. Let's keep challenging ourselves and the field of architecture. Let's experiment!

THE BENEFITS OF REUSE

Along with the main benefit that is, of course, environmental, the other benefits of reusing are lower construction costs, reducing land take, shorter time of completion, preserving heritage values, and connecting the present with the past. Existing structures also offer unique features and elements and provide an interesting basis for their new purposes.

"Old buildings are intrinsically sustainable due to the natural materials and methods used to build them. These materials tend to be more recyclable and come with a lower energy cost than many modern materials and, in the case of timber, act as a carbon store."²

Completing an exciting project through reuse can influence, creatively motivate, and inspire others to choose to reuse rather than demolish. It can make others think about the issue of demolition and global crisis.

Of course, reusing is not always the answer, and it can sometimes not even be possible at all. Reusing can be very demanding and the process differs from a regular project in many ways, but it is important to at least consider the option and think about the possibility. In the end, it is a challenging but exciting process with unique results.

¹C40reinventingcities.org. 2021. Do not demolish, repurpose! How to develop adaptive reuse and flexible building design | News & Events | Reinventing Cities. [online] Available at: <<https://www.c40reinventingcities.org/en/events/do-not-demolish-repurpose-how-to-develop-adaptive-reuse-and-flexible-building-design-1432.html>> [Accessed 2 November 2021].

²Hunt, Roger, and Iain Boyd. New Design for Old Buildings, RIBA Publications, 2018. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=5840019>.

ADAPTIVE REUSE

“Adaptation means the process(es) of modifying a place for a compatible use while retaining its cultural heritage value. Adaptation processes include alteration and addition”¹

Adaptive reuse is a repurposing of an unused or ineffective existing structure and giving it new life in the form of an upgrade, extension, reconstruction, or modification of the interior or exterior. Reuse is a way of “creating new futures for existing buildings”²

Zeitz Museum of Contemporary Art

Cape Town, Africa
Thomas Heatherwick

This project is a rebirth of an old abandoned grain silo built in the 1920s as a museum of contemporary art. The giant silo once stored maize from all over the South Africa. It was an important part of Cape Town’s harbour as well as the tallest building in the city.

“With the advent of containerised shipping, the huge piece of concrete infrastructure was decommissioned and in need of a new purpose.”²

The building had been unused since 1990 until Victoria & Alfred Waterfront approached the architects from the London studio Heatherwick to give the building a new purpose.



Fig. 2 - the majestic entrance hall revealing the cut through the vertical tubes

¹Wong, Liliane. Adaptive Reuse : Extending the Lives of Buildings, Walter de Gruyter GmbH, 2016. ProQuest Ebook Central, <<http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=4793914>> [Accessed 18 November 2021]

²2020. Transform & Reuse: Low Carbon Futures for Existing Buildings. [ebook] Arup. Available at: <<https://www.arup.com/perspectives/publications/promotional-materials/section/transform-and-reuse-low-carbon-futures-for-existing-buildings>> [Accessed 14 November 2021].

² Heatherwick Studio | Design & Architecture. n.d. Heatherwick Studio | Design & Architecture | Zeitz MOCAA. [online] Available at: <<http://www.heatherwick.com/project/zeitz-mocaa/>> [Accessed 14 November 2022].

The museum was carved out of the majestic original concrete structure of the silo and its forty-two vertical tubes that form the building. It now hosts eighty galleries, six research centres, a top-floor hotel, a restaurant, bar, a bookshop, and a rooftop terrace with a sculpture garden and is a monument to the industrial harbour.



Fig.3 - the silo in the past



Fig.4 - the building after the reconstruction

THE APPROACH OF THE ARCHITECT

Thomas Heatherwick made this project a great example of how giving abandoned buildings a new purpose and re-opening them back to the public attracts more attention than a new building with the same purpose. Putting a gallery, a cinema, or a shop into an old building that has been unused for a while evokes curiosity. The building had been closed for some time, and people might have been passing by it on a daily basis, wondering what it might look like inside. Furthermore, the interior of these buildings is then completely different from the rest and creates a completely unique and unforgettable environment.

“We could have so easily knocked it down and built a big shiny spaceship of a museum instead, but the danger would have been that people would just come to take a selfie and not go inside. In a place that doesn’t have a strong museum-going culture, our challenge was to make compelling innards, to lure people in to see the art.”

- Thomas Heatherwick

As exciting as this project was from the beginning, it was also challenging and difficult. The main challenge was how to carve the gallery spaces without destroying the qualities and industrial character of the space and how to let natural light in.

The project team took on the challenge and retained those qualities by carving an atrium at the heart of the nine-storey building by cutting parts of the dense concrete tubes. They formed a monumental entrance hall with glass panes in the ceiling that allow the natural light to flood the elliptical space from the top of the tubes.

The concrete skeleton of the tubes became a basis of the breathtaking entrance hall and its insertions and gives hints of the building's previous use.

The intention of the architects for the atrium was to create a main social space that reveals the original tangle of construction lines.

The space offers a truly spectacular and fascinating view and makes the visitor soak up the monumentality and beauty of the concrete structure.



**Fig.5 -
the heart
of the
museum**

USER EXPERIENCE

The reimagined interior captures the users immediately as they approach the building thanks to its extraordinary ambience. It appeals to all senses and creates an unforgettable experience that continues to unfold during the journey through the space and leaves a strong impression long after the users have left. It has acquired a unique character, that could have only been gained by reusing the original structure.

There are things that simply cannot be achieved by building a new structure, and Thomas Heatherwick has proven this to the world by completing this spectacular project. He not only gave the old abandoned silo a new purpose and extended its longevity through the hints of its past, but also created an important cultural place that has a strong impact on its visitors and to which people will come from all over the world.

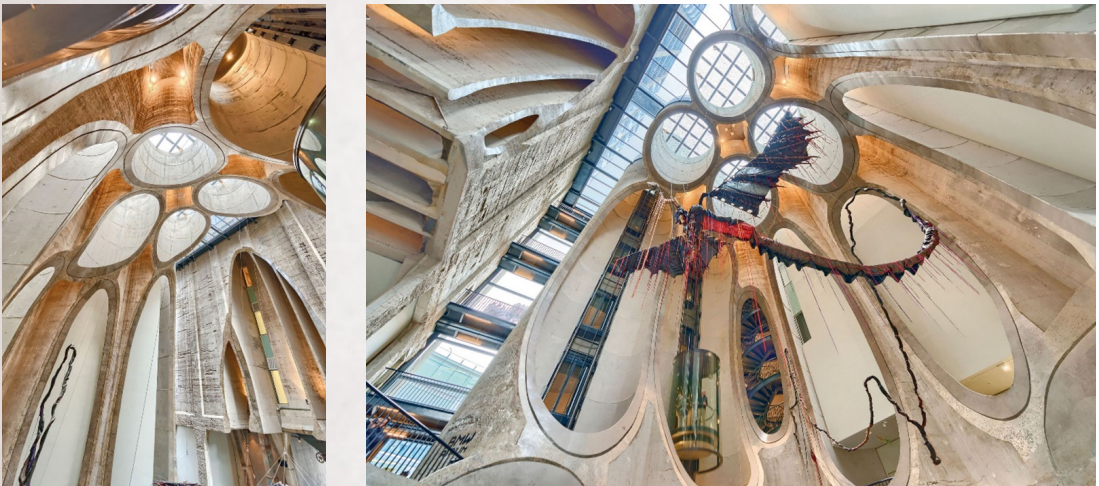


Fig.6 & 7 showing the monumentality of the silo, its glass ceiling and carved tubes

A successful adaptive reuse project respects and retains the original building's significance while adding contemporary layers that provide new value for the future, and I can surely say that the architect paid attention to all of these details and the museum might even become the new Tate Modern.

EXPANSIVE REUSE

Expansive reuse means an upgrade of a structure in the form of adding new spaces such as basements or storeys and maximising a value of a structure.

Cité du Grand Parc' Bordeaux, France

Christophe Hutin, Frédéric Druot, and Lacaton & Vassal



Fig.8 - Before and after the transformation of Grand Parc, Bourdeaux by Philippe Ruault

This case study analysis a transformation of ordinary blocks of flats into modern apartments with spacious balconies. Three fully occupied social housing buildings, built in the 1960s, desperately needed a renovation and their demolition was being strongly considered. Tearing the buildings down did eventually not happen and a creative reconstruction took place instead. The housing estate of Grand Parc was refurbished and 530 homes gained whole new qualities such as more space, more light, panoramic views and a new external layer was add to the buildings.

“The 16-storey slab blocks are curiously dematerialised into a shimmering, fine-grained bas-relief of polycarbonate, glass, corrugated metal and silver solar curtains, more characteristic of light industrial or greenhouse construction than housing.”¹

THE APPROACH OF THE ARCHITECTS

“Instead of demolishing, which involves the use of an important amount of energy, in this case the client understood and supported the advantages of transforming the existing three buildings. This has changed people’s lives for the better without underestimating their previous lives, filling the new volume with poetry because it works with the basis that people understand space and in consequence, they use it in very different ways.”²

– Jury of the Mies van der Rohe Award citation

¹Slessor, C., 2019. Grand Parc, Bordeaux review – a rush of light, air and views. [online] the Guardian. Available at: <<https://www.theguardian.com/artanddesign/2019/may/12/grand-parc-bordeaux-lacaton-vassal-mies-van-der-rohe-award>> [Accessed 18 November 2021].

²ArchDaily. 2021. Grand Parc Bordeaux Wins 2019 EU Prize for Contemporary Architecture - Mies van der Rohe Award. [online] Available at: <<https://www.archdaily.com/914806/grand-parc-bordeaux-wins-2019-eu-prize-for-contemporary-architecture-mies-van-der-rohe-award>> [Accessed 18 November 2021].

The architects did not only respect the original structure and its qualities that have been preserved, but they respected its occupants and their lives as well. One of their goals was for the residents to stay in their homes during the reconstruction without having to move out, which was achieved. As a bonus, the rent did not increase after the modernization was completed. Through this project, they also wanted to spread awareness about the aspects of sustainability and influence others.



Fig.9 - picture showing how the space is enlightened by natural light

The aim was to provide more space and light to the people living in the building, as the original dwellings were small and quite dark. They provided the occupants with twice as much space as they had before, great insulation, and plenty of natural light, improving the quality of their living.

The entire renovation was really simple and, along with the new layer, only small changes were made, such as moving the ventilation, some small design changes, and adding a new lift.



Fig.10&11 - small window opening before the renovation newly added balcony door after



Fig. 12,13 & 14 - different usage of the winter gardens

USER EXPERIENCE

The new qualities of the dwellings, as well as the user experience have vastly improved. The dwellings are now bigger and brighter, which has a positive impact on the occupants, that are claiming to be happier and enjoying the new qualities. They can easily move from one room to another through the winter gardens, as they are connected to each room and enjoy a fresh air.

Each dwelling received additional space suitable for any use in the form of almost three meters of winter garden and one meter of a balcony. Despite the depth of the extension, the interiors are not darker, but, on the contrary, are filled with natural light. The originally small window openings (see fig. 10) were significantly enlarged and replaced by big glazed balcony doors (see fig. 11) that open up to the winter gardens.

The winter gardens then open onto the facade with glazing and are connected to a small balcony space. They are equipped with a sliding window, so they can easily be used as full balconies or be fully closed. This extension not only gives the user an opportunity to have some fresh air and enjoy the views, but also creates a favourable bioclimatic environment in the apartments and increases the energy efficiency of the buildings, acting as an insulating layer.

The Bordeaux project shows that achieving good quality housing with a positive impact on its occupants can be achieved quickly (the whole transformation, thanks to a proper planning and layout of the construction site, took just 12-16 days per apartment), efficiently and in an economical and sustainable way.

No wonder Lacaton & Vassal won the Mies van der Rohe award for contemporary architecture.

RENOVATION

“Upgrading and repairing an old building to an acceptable condition, which may include works of conversion.”¹

“Renovation refers to the process of improving or modernising an old, damaged or defective building.”²

KB Building office

Arnhem, Netherlands

Hofman Dujardin and Schipper Bosch

Newly built office buildings often have poor acoustics and no character at all. Reusing an existing structure as offices not only gives the office an untraditional look and a character, but the design of the workspace becomes exciting and might even bring the employees joy to work in it.

This case study is a transformation of an old former nylon factory into an effective workspace with unusual character that breaks away from a traditional office space. The KB building is part of cleantech campus Industriepark Kleefse Waard.

THE APPROACH OF THE ARCHITECTS

The architects worked with the existing qualities and “intrinsic beauty”³ of the factory. They celebrated them and treated them as preeminences and highlights. All new additions were inserted in a careful, non-disturbing way in order to retain the buildings’ qualities. The architects were also thinking about the buildings’ future and made sure that the transformation would be able to be adapted or even reverted, and ensured a flexibility for future needs.



Fig.15 exterior of the building

¹Wong, Liliane. Adaptive Reuse : Extending the Lives of Buildings, Walter de Gruyter GmbH, 2016. ProQuest Ebook Central, <<http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=4793914>> [Accessed 18 November 2021]

² <https://www.designingbuildings.co.uk/wiki/Renovation>

³Michiel Hofman, architect and founder of HofmanDujardin



Fig.16 & 17 - levels inside the building and the roof panes

“The plan is based on a progression in privacy levels: pantries and lounges are closest to the central staircase, whereas workstations are concentrated at the ends of the platforms.”¹



¹Pintos, P., 2021. KB Building / HofmanDujardin + Schipper Bosch. [online] ArchDaily. Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 19 November 2021].

The factory's former production hall was very spacious and housed huge industrial boilers, the aim of the architects was to add more storeys to the hall while preserving its "great cathedral-like qualities"¹ and maximising the natural light.



Fig.17 - retained original skeleton of the building and its aged texture

The architects then added a new framework of steel platforms and created three levels of diverse workspaces. The industrial design of the building was left intact in order to reveal hints of the building's previous life and to enhance the overall ambience of the space. The industrial concrete structure is grounded by a variety of plants that the employees can work between, timber staircases, wooden flooring, and thoroughly chosen furnishings and equipment. The insertions and equipment are purposely not disturbing or extravagant, so that the original concrete structure is not overshadowed and becomes the centre of focus instead.

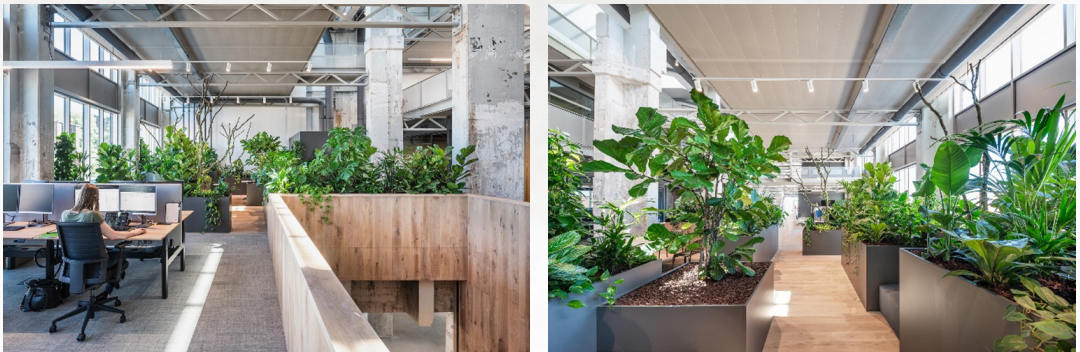


Fig.18 & 19 - plants between workspaces

¹ Michiel Hofman, architect and founder of HofmanDujardin

The space now feels very light and airy because of the tall columns, high windows, and glass roof panes that fill the space with natural light. The materiality is a simple, yet contrasting mix of contemporary materials such as wood, concrete, glass, steel, and resin in neutral and warm tones.



Figure 20 - levels and steel construction

A similar approach was seen, for example, in the Astley Castle renovation by Witherford Watson Mann when the architects did not want to overwhelm the building and its original structure and wanted "to restore the sense of the entire building, while still retaining the consciousness of the history"¹.

The factory had plenty of unique features to offer, and by restoring it, an untraditionally dynamic office space with character and history was created.

The environment has a strong, distinctive character and feels creative and personal, which are ideal conditions for working. This has a positive impact on the users and their decision-making, creativity, productivity, and the quality of their work.

CONCLUSION

The case studies in this essay serve as successful examples of a reuse of existing structures from which we can draw inspiration. They perfectly show how they affect the users of the spaces, the impressions they leave with them and the feelings they evoke. All of the case studies pay thorough attention to the past and future of the buildings, their environmental quality, the users of the space and their feelings, and hold honourable respect for the original structure. They answer a question to why tearing buildings down when we can transform them and make them celebrated, as well as to show respect for their previous use and their original architect.

Through this research, I have learned many new things and have broadened my knowledge about the global crisis that we are facing and what an important role reuse plays in it. I can surely say that I will definitely come back to my research and use my newly gained knowledge in my future projects.

Of course, that building will always be needed as humanity still expands, but we, and the future architects and designers, can do it differently. Due to the environmental crisis we are facing, sustainability needs to be an integral and essential part of the architectural design process. So, let's make sustainable design and reusing existing structures the new normal. And if there is no other choice than to build from scratch, it has to be rethought and reconsidered very carefully in terms of its sustainability and longevity, and whether it can be repurposed or recomposed in the future for new and exciting purposes, such as the above case studies.

"Good new design requires a deep understanding of what has gone before, as well as a vision of how the new and old parts will perform together long into the future."¹

Improvement can be achieved if we work on it together and share our knowledge. Hopefully, those projects, along with many more, will become inspiration for future projects and prevent demolitions.

No New Buildings!

Critical Context

BIBLIOGRAPHY

1. ArchDaily, 2019. Lacaton & Vassal's Grand Parc Bordeaux, winner of 2019 EU Mies Award. [video] Available at: <https://www.youtube.com/watch?v=mJiBScFcjUI&ab_channel=ArchDaily> [Accessed 24 November 2021].
2. Arup.com. n.d. Building retrofit. [online] Available at: <<https://www.arup.com/expertise/services/buildings/building-retrofit>> [Accessed 7 October 2021].
3. Baker-Brown, D., 2020. AJ 100 Awards Keynote Speech. [video] Available at: <<https://bakerbrown.studio/news/test>> [Accessed 13 November 2021].
4. Baker-Brown, D. (2017) *The re-use atlas: a designer's guide towards a circular economy*. London: RIBA Publishing.
5. Baukultur Nordrhein-Westfalen, 2020. Mies van der Rohe Award 2019: Hauptpreis Lacaton & Vassal, Cite Grand du Parc Bordeaux. [image] Available at: <https://www.youtube.com/watch?v=IzA7CaKoKao&ab_channel=BaukulturNordrhein-Westfalen> [Accessed 24 November 2021].
6. Brooker, G. and Stone, S., 2019. *Re-readings: 2 Interior Architecture and the Principles of Remodelling Existing Buildings*.
7. Crook, L., 2020. Old nylon factory converted into "cathedral-like" office space. [online] Dezeen. Available at: <<https://www.dezeen.com/2020/09/28/kb-building-factory-hofmandujardin-offices-netherlands/>> [Accessed 19 October 2021].
8. de Monchaux, T., 2019. A New Idea in Architecture? No New Buildings - Metropolis. [online] Metropolis. Available at: <<https://metropolismag.com/viewpoints/new-idea-architecture-no-new-buildings/>> [Accessed 14 October 2021].
9. *Design Studio Vol. 1: Everything Needs to Change: Architecture and the Climate Emergency*, edited by Sofie Pelsmakers, and Nick Newman, RIBA Publications, 2021. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/mdx/detail.action?docID=6530222>.
10. Frearson, A., 2017. Heatherwick reveals Zeitz MOCAA art galleries in Cape Town grain silo. [online] Dezeen. Available at: <<https://www.dezeen.com/2017/09/15/thomas-heatherwick-zeitz-mocaa-cape-town-art-museum-south-africa/>> [Accessed 7 November 2021].
11. HofmanDujardin. 2021. HofmanDujardin | KB Building IPKW. [online] Available at: <<https://www.hofmandujardin.nl/kb-building-ipkw/>> [Accessed 19 November 2021].
12. Hunt, R. and Boyd, I. (2017) *New design for old buildings*. Newcastle upon Tyne: RIBA Publishing.
13. Pintos, P., 2021. KB Building / HofmanDujardin + Schipper Bosch. [online] ArchDaily. Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 19 November 2021].
14. Schönwetter,, C., n.d. Zeitz MOCAA (Museum of Contemporary Art Africa) | Heatherwick Studio, iGuzzini, KEIM | Archello. [online] Archello. Available at: <<https://archello.com/project/zeitz-mocaa-museum-of-contemporary-art-africa>> [Accessed 24 November 2021].
15. Slessor, C., 2019. Grand Parc, Bordeaux review – a rush of light, air and views. [online] the Guardian. Available at: <<https://www.theguardian.com/artanddesign/2019/may/12/grand-parc-bordeaux-lacaton-vassal-mies-van-der-rohe-award>> [Accessed 18 November 2021].
16. The Institution of Structural Engineers, 2020. The principles of reusing existing buildings. [video] Available at: <https://www.youtube.com/watch?v=rzV6ITBm6SM&t=337s&ab_channel=TheInstitutionofStructuralEngineers> [Accessed 14 October 2021].
17. UKGBC - UK Green Building Council. 2021. The choice between demolition or reuse: developer insights - UKGBC - UK Green Building Council. [online] Available at: <<https://www.ukgbc.org/news/the-choice-between-demolition-or-refurbishment-developer-insights/>> [Accessed 14 October 2021].
18. Wainwright, O., 2017. Mocaa, Cape Town: grain silo reborn as Africa's answer to Tate Modern. [online] the Guardian. Available at: <<https://www.theguardian.com/world/2017/sep/16/mocaa-cape-town-grain-silo-reborn-as-africas-answer-to-tate-modern>> [Accessed 16 December 2021].
19. Watts, J., 2018. We have 12 years to limit climate change catastrophe, warns UN. [online] the Guardian. Available at: <<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>> [Accessed 2 December 2021].
20. Waterson, M. and Morrison, I. (2019) *Rescue and reuse : communities, heritage and architecture*. London: RIBA Publishing.

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fig.1 2020. Usage of the tracked vehicle-based hydraulic hammer in mechanized building demolition. [image] Available at: <https://www.researchgate.net/figure/Usage-of-the-tracked-vehicle-based-hydraulic-hammer-in-mechanized-building-demolition_fig2_340613524> [Accessed 12 December 2021].

fig.2 Baan, I., n.d. Zeitz MOCAA. [image] Available at: <<https://archello.com/story/48998/attachments/photos-videos>> [Accessed 12 December 2021].

fig.3 n.d. <http://www.heatherwick.com/project/zeitz-mocaa/>. [image].

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fig.7 Torres, R., n.d. Zeitz MOCAA. [image] Available at: <<https://archello.com/story/90526/attachments/photos-videos/1?tags=0>> [Accessed 12 December 2021].

fig.8 Ruault, P., n.d. Before and after. Apartments. [image] Available at: <<https://e-zeppelin.ro/en/mies-van-der-rohe-award-2019-transformation-of-530-social-dwellings-bordeaux-interview-with-anne-lacaton/>> [Accessed 13 December 2021].

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fig.11 Lacaton and Vassal, n.d. [image] Available at: <<https://www.lacatonvassal.com/index.php?idp=80>> [Accessed 12 December 2021].

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fig.13 Ruault, P., n.d. Before and after. Apartments. [image] Available at: <<https://e-zeppelin.ro/en/mies-van-der-rohe-award-2019-transformation-of-530-social-dwellings-bordeaux-interview-with-anne-lacaton/>> [Accessed 13 December 2021].

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fig.15 Van Roon, M., 2022. KB BUILDING HOFMANDUJARDIN. [image] Available at: <<https://frameweb.com/project/kb-building-hofmandujardin>> [Accessed 13 December 2021].

fig.16 van Roon, M., n.d. [image] Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 12 December 2021].

fig.17 van Roon, M., n.d. [image] Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 12 December 2021].

fig.18 van Roon, M., n.d. [image] Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 12 December 2021].

fig.19 van Roon, M., n.d. [image] Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 12 December 2021].

fig.20 van Roon, M., n.d. [image] Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 12 December 2021].

fig.21 van Roon, M., n.d. [image] Available at: <<https://www.archdaily.com/958549/kb-building-hofmandujardin-plus-schipper-bosch>> [Accessed 12 December 2021].