

# REFLECTION P5

## GRADUATION STUDIO aE

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### INTRODUCTION

My graduation project, *"Reimagine: Sustainable Alpine Architecture & Tourism through Circular Strategies,"* aims to create a circular building that aligns with the traditions of the Alps while addressing contemporary environmental challenges. This project seeks to act as an example of a new form of sustainable tourism contributing to closing Austria's Circularity Gap. It emphasises the importance of allowing people to enjoy and learn about the unique qualities of the Alps without causing harm, instead giving back to nature through circular and zero-waste strategies.

### **Relation between graduation project topic, master track (A) and master programme (MSc AUBS) (from Graduation Plan)**

The graduation project, "Sustainable Alpine Architecture & Tourism: Reimagining through Circular Strategies," aligns with the studio topic of Architectural Engineering, which focuses on leveraging technology to address critical design questions. The studio's emphasis on integrating advanced technological solutions into architectural practices to solve pressing issues is directly reflected in the project's aim to utilise circular building methods and innovative design strategies. By reimagining architecture in the context of the Austrian Alps through circular strategies, the project explores how technological advancements within the Circular Economy can be harnessed to imagine another form of sustainable tourism and close the material loops, addressing both environmental and economic challenges.

The master track of Architecture centres on the development of innovative, sustainable, and contextually responsive architectural solutions. In this case these principles are visual in proposing a design approach that not only responds to the unique environmental and cultural context of the Alps, but also addresses broader sustainability goals, like the Circularity Gap (in Austria). The project emphasises the importance of designing structures that coexist harmoniously with their natural surroundings while utilising circular strategies to minimise environmental impact. This aligns with the commitment of the master programme to create resilient, forward-thinking designs that contribute positively to their contexts.

The MSc programme in Architecture, Urbanism, and Building Sciences promotes a multidisciplinary approach to solving complex built environment challenges. The project integrates principles from architecture, technology, regional flows, planning, and circular economy, reflecting a holistic perspective. By addressing the intersection of climate change, sustainable tourism and circular building practices, the research contributes to the broader objectives of the master programme.

### **1. Research Phase: Influence Research on Design and vice versa**

The research served as a deep dive into the concepts of circularity, the circular economy, and the Circularity Gap. Prior to beginning the research, I was familiar with these terms, but their specific meanings often remained unclear. Throughout the research phase, I developed a clearer understanding and recognised that these terms are sometimes used too broadly or without sufficient context. The research provided valuable insights into the various flows that

impact a country's circular economy—specifically in Austria—and the potential solutions for contributing to the closure of the Circularity Gap. This is a complex issue, often intersecting with the implementation process and requiring collaboration with stakeholders. I realised that exploring implementation strategies within the scope of a thematic paper, grounded in literature review and case study analysis, presents challenges, particularly when it comes to applying these findings practically.

The primary objective of the research was to inform the subsequent Research & Design phase with a material strategy and design guidelines. The outcomes of the research contributed to a more general list of rules than I initially envisioned, though this was largely due to the nature of the sources I examined, which focused on Austria and the Alpine region and the theoretic nature of research. The thematic research underscored the importance of regionality, highlighting that specific, context-based solutions for contributing to a circular world can only be achieved through thorough exploration of local conditions and activities. Identifying potential waste flows that can be reused and contribute to closing the Circularity Gap requires this level of detailed investigation in the area of design.

Entering the design phase with the research findings and a clearly defined design objective, I formulated my design ambitions, which helped guide my decision-making. The material strategy played a central role in ensuring the feasibility of my ideas. I was working with materials I had already identified, which limited the scope in a productive way, pushing me to think within the constraints of existing resources. This approach was aligned with the principles of reuse that I had explored during the research phase. Starting the design process with using what was already available was a concept I had not previously applied, but one that I found to be both engaging and effective.

As the design process unfolded, I delved deeper into the context, the construction techniques of the existing building, and the examination of the program and circular flows within it. The design phase became an implementation of the results from the thematic paper, aiming to capture as many potentials of the circular solutions identified during my research as possible. This phase encouraged me to further explore how a building, as both a system and a program, could function circularly.

An extension of the thematic research outcomes, directly derived from the design phase, would focus more explicitly on these material and circular flows. My design proposal is an attempt to offer a practical example that addresses the research sub-questions and demonstrates how circular principles can be applied in a credible architectural context.

## **2. Goals and Design Ambitions**

The project's core ambitions have guided my process from P2 onwards. At its heart, it envisions a circular building project deeply rooted in Alpine traditions while showcasing circular innovation. This includes implementing material strategies derived from my thematic research and enriching them with circular solutions observed in case studies. The programmatic goal is to promote sustainable tourism, creating spaces where people can enjoy and learn about the Alps' ecological, cultural and circular qualities.

A significant focus has been on maximising the potential of existing materials to extend their lifespan. The design not only respects but also enhances its surroundings, aiming to give back to nature by increasing biodiversity and making thoughtful use of natural advantages such as sunlight, views, and the natural topography. Additionally, the project contributes ideas for addressing future wastelands in the Alps, with strategies emphasising minimal effort, reduced transportation, and on-site material reuse.

One guiding principle throughout the process has been the German term of *Wohlfühlen*\*—creating spaces that promote well-being, comfort, and harmony with nature. This ambition has shaped material choices, architectural experiences, and programmatic decisions.

## **2.1 Progress and Methods to Achieve Goals and Ambitions**

Since P2, the design has evolved significantly, with the initial ambitions and my design objective serving as a compass. At times during the design process, I found myself losing sight of the overarching ambition or the core objectives of the project. The iterative and sometimes chaotic nature of design—especially when attempting to incorporate numerous ideas and details simultaneously—can make it challenging to maintain a clear focus. To ensure the project remained grounded in its goals, it helped to ask myself how my work could act as an example of circularity and educate visitors.

The practical implementation of the material strategy from my thematic research has been a strong foundation of the process. By conducting a detailed inventory of materials available at the site—including steel lift masts—I created a "3D material shop" in Rhino, allowing me to work directly with the exact dimensions and amounts of these reclaimed elements. This was my first time designing with building materials that were already defined in shape and size, and it became both a limitation and a source of creativity. Experimentation with these materials informed much of the project's structural and aesthetic direction. To focus on creating a strong idea for one truss in a cross-section, I knew how to repeat this element. In my design, I emphasised the strength of its elongated shape. However, the initial concept was to create a versatile cross-section that could adapt to any form emerging later in the design process. This adaptable cross-section was intended to serve as a foundation, capable of being extruded or swept over various shapes as needed to accommodate evolving ideas.

Programmatically, the design process involved imagining the ideal Alpine stay in line with the goals of the Alpine Convention and a sustainable future. This was supported by writing stories that visualised user experiences, helping me refine the spaces, experiences and activities within the building. While these narratives clarified many aspects of the program, there is still potential to add depth, such as developing a story about the staff working at the site, to further ground the design in real-world scenarios. Now, reading these stories, I wrote at the beginning of the design phase, I can still imagine them taking place in the design as it is now. There are even a few more features added to the design, which could make the stories of the experience even more interesting.

## **2.2 Scheme of Ambitions, Methods and Progress**

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*\*Wohlfühlen: It literally means 'feeling at ease' or 'feeling comfortable' and refers to an overall feeling of well-being, calm and contentment, often associated with a harmonious balance between body and mind. In the Alpine region, the concept of Wohlfühlen revolves around a close connection with nature, with the fresh mountain air, clean environments and natural beauty promoting a sense of well-being.*

AMBITION	DESCRIPTION	METHODS APPLIED	PROGRESS AND REFLECTIONS
<b>CIRCULAR BUILDING PROJECT FITTING THE TRADITIONS OF THE ALPS</b>	Create a circular building rooted in Alpine traditions, acting as an example of sustainable architecture.	<p>Writing a Thematic Paper</p> <ul style="list-style-type: none"> <li>- Literature</li> <li>- Case Study Analysis</li> </ul> <p>Research &amp; Design</p> <ul style="list-style-type: none"> <li>- Location Visit (Conversations with inhabitants, Tourismusverband)</li> <li>- Inventory, Analysis</li> <li>- Sketching, Form Studies</li> <li>- Storywriting</li> <li>- 3D Modelling, existing and new</li> </ul>	This ambition helped me stick to the core of my project. I experimented with a lot of different methods, sketching being the one I did most. After the location visit I had found a lot of new energy and inspiration to put into the project. Also better understanding myself what I was trying to do, because I had to explain to multiple people there what I wanted to achieve/ know from them.
<b>PRACTICAL IMPLEMENTATION OF MATERIAL STRATEGY, CIRCULAR SOLUTIONS</b>	Implement the material strategy developed in the research phase and enrich it with case study insights.	<p>Literature and case study analysis, integration of regional material flows, experimentation with reclaimed materials, including testing ideas for steel and biobased applications.</p> <p>Material inventory and reuse strategy, “3D material shop” in Rhino, (Data- driven, Material Passport)</p>	Effectively integrated research outcomes into the design process, resulting in a material-first approach. The steel lift masts formed a tangible starting point, demonstrating the feasibility of reusing existing materials in architectural projects while balancing with programmatic demands.
<b>PROGRAMMATIC INNOVATION</b>	Design a program that promotes sustainable tourism and educates visitors about Alpine qualities and circularity.	Storywriting, developing narratives of visitor experiences, aligning program with natural advantages (e.g., sunpath, views).	Created user-focused narratives that informed programmatic decisions. The educational potential of the design is highlighted in features like the greenhouse, stargazing tower. Additional narrative development (e.g., staff experiences) is planned for refinement in P5.
<b>ENHANCING EXISTING STOCK</b>	Extend the lifespan of existing structures by maximising their potential and adding value to the location.	Site visit and analysis (measurements, photo's, 3D scans), inventory of existing building, creating Rhino models of existing materials and structure.	Thoroughly analysed the existing lift station and surrounding site. The reuse of the concrete base as a foundation for the new structure reflects this ambition. Identified opportunities to restore the site's value, emphasising its unique location and potential for ecological and architectural impact.

<b>DESIGN WITH SURROUNDINGS/NATURE</b>	Utilise natural advantages like biodiversity, sunlight, and views while giving back to nature.	Site analysis (sunpath, topography), program alignment with natural surroundings, finding a way of designing that doesn't damage the ground/ mountaintop	Successfully integrated the natural surroundings into the design, using topography and sunlight to inform spatial arrangements. The "second pedestal" was already there and I took advantage of that. The ambition to create a bathhouse in which you can literally retreat into the mountain, I solved by "adding" to the mountain instead of building in the mountain.
<b>REFRESHING IDEAS / BE AN INSPIRATION FOR (FUTURE) WASTELANDS</b>	Develop a strategy for treating future wastelands with minimal effort and on-site reuse of materials.	Material inventory, minimising transportation through local material reuse, experimenting with reclaimed steel for new structural elements. Keeping in mind building process, constructability and planning.	Created a replicable framework/practical example for material reuse, demonstrating how future Alpine wastelands can be transformed into architectural assets. The approach emphasises feasibility and sustainability, offering a potential solution for decommissioned lift stations.
<b>WOHLFÜHLEN</b>	Create spaces that evoke well-being, comfort, and harmony with the Alpine environment.	Material selection to reflect Alpine traditions, attention to architectural experiences (e.g., viewpoints, light quality), program aligned with cultural and ecological values.	The concept of <i>Wohlfühlen</i> has guided decisions throughout the design process, influencing materiality, program, and spatial arrangements. The aim for traditional aesthetics and the focus on comfort and well-being create a harmonious experience for visitors, aligning with regional traditions and ecological goals.
<b>EDUCATIONAL INTEGRATION</b>	Showcase circular flows visibly and educate visitors about sustainability.	Design of visible systems (e.g., greenhouse, eco-cycle water system, biogas from kitchen waste), storytelling to articulate educational aspects, thematic research integration into design features. Designing and showing the materials	Educational elements like the greenhouse and stargazing tower provide tangible examples of circularity. Visitor narratives ensure that these elements are programmatically integrated, though further refinement of the educational storyline is planned to enhance its impact, by further developing the workshops and folder for the ideal holiday.

### **3. Transferability of Project Results**

In light of the design ambition for this project to serve as an example, its transferability holds significant value. I consider my interventions successful, as the thought of "act as an example" was a constant guiding factor throughout the project.

I hope that the approach I adopted—leveraging nature's advantages, designing with respect for the environment, and developing a new form of tourism, specifically slow tourism, that showcases circular flows—can serve as a model for future projects, particularly in the context of Alpine tourism. One of the key ambitions was also to offer a solution for addressing (future) wastelands in Alpine regions. Given the impact of climate change, ski lifts in lower-lying areas are expected to become obsolete in the near future. Currently, there is also no suitable solution for old ski lifts in need of replacement. The way in which the steel waste streams in this project are reused, ideally on a one-to-one basis, should serve as both a precedent and an inspiration for other projects. However, the practical approach of reusing and incorporating steel into the design is highly specific to this project. In this case, I made the most of the available materials after I made the inventory and first design ideas, but this design cannot be directly transferred to other projects without significant adaptation (The design of the cross-section with the structural elements could be applied to follow-up projects, but should be adapted to the structural elements available). This also brings us back to the nature of reusing materials in a process. It is the architect's process that needs to be adapted compared to the traditional process. It is therefore my design process, approach and insights into implications that reuse brings about that are of greater importance in the transferability of the project.

This challenge is reflective of the broader issue of integrating material reuse into the construction process, a practice that is not yet widespread. To effectively implement such strategies, a meticulous inventory of available materials is necessary, along with a detailed assessment of how they can be reused. This stresses the importance of context-specific research and analysis for achieving successful material reuse in architectural design.

### **4. Feedback and Reflection**

The feedback from my mentors during presentations and informal sessions corresponded to the topics that had been discussed at those moments. I always tried to incorporate that feedback as much as possible, or at least reflect and consider if it did enrich my design. Often the feedback points were good incentives to think more deeply about my choices and interventions. I made use of every possible feedback moment, even when there was not much progress to be seen. Consequently, this was sometimes a bit of a struggle. When I was still busy with ideas in my head, but could not yet bring these worked out (to scale) on paper to guidance moments, then it was harder to discuss my ideas or get the right guidance. Perhaps once every two weeks would have worked better at times. Now it quite broke up my design process at times, because I did want to prepare the guidance. Through this process, I learned to see feedback as a tool for deeper reflection and iteration. While presenting incomplete ideas during feedback sessions is a challenge, these moments often sparked new directions and helped clarify uncertainties, but sometimes they didn't. However, I have learned to embrace this aspect of the process, shifting my focus to other elements when progress stalls and returning to unresolved issues later, even though it is difficult to implement this in practice.

### **5. Personal Growth and Insights**

I learned a lot from my project. Setting up a graduation project in itself is a lot to learn from. How to make it as specific as possible and make your research match your design objective and vice versa. Working on this project has taught me to trust my instincts and embrace the uncertainties inherent in the design process. By consistently returning to the core ambitions and design objectives, I was able to navigate challenges and refine my work.

In general, I discovered once again that, you can't fix everything at once and sometimes be a little more patient or give myself the time to focus on a smaller scale first. My process also confirmed that my way of working still favours a lot of sketching and I had a lot of fun doing this. The step of making things concrete in computer drawings became increasingly difficult. Once I took this step, I discovered that I also like to work out the finer details, connections and buildability. This was extra interesting this time because the materials were already there, but how do you process them and what implications does it have for your design and form. Do you see the material, can you give the reuse a dual function, what do you want to express? Designing within the constraints of reclaimed elements not only aligned with the project's circular goals but also fostered a deeper understanding of how materiality shapes design. This experience has reinforced my interest in exploring material reuse in future projects. Another valuable lesson has been the importance of storytelling in architecture. Writing user narratives allowed me to ground the design in real-world experiences, helping me visualise how spaces would function and resonate with users.

A project as extensive as this one is likely something I will rarely encounter again outside of graduation. Starting from a personal fascination, developing a research plan and graduation plan, and ultimately translating that research into a design is a vast and intriguing process. In this case, it involved both literal and figurative peaks and valleys (pieken en dalen), but it has provided me with many valuable new insights.

## **6. Academic and Societal Value**

This project contributes academically by addressing the challenges of the Alpine region and providing a solution for (future) wastelands in Alpine regions and exploring how circular principles can inform sustainable architecture. By demonstrating the practical application of a material-first approach and integrating ecological and educational elements (with the ambition that this will become a more common practice), the project aligns with Austria's ambitions for a circular economy and the Alpine Convention's sustainability goals.

Societally, the design serves as a model for how tourism can coexist with fragile ecosystems. It emphasises slowing down, reconnecting with nature, and considering the environmental impact of our actions—a mindset increasingly critical in the face of climate change and something that should be part of every hospitality project. The project stresses that if people still want to enjoy the qualities of the Alps in the future, there is an urgent need to do this in another way.

Ethically, the project underscores the responsibility of architects, designers, and tourism stakeholders/developers to safeguard the environment while meeting societal needs. It highlights the ethical obligation to design with respect for nature and to ensure that tourism development does not harm local ecosystems or degrade the cultural heritage of the Alpine region. The ethical approach to the circular economy in this project encourages a thoughtful and responsible engagement with resources, promoting environmental responsibility as a key principle of design and tourism.