

# Review and Compliance

The UMLAUF HPEU Plan’s design guidelines aim to establish a framework that connects the site’s historical and natural elements with the wider community, expanding the existing offerings. The subsequent sections present guiding principles to prioritize future development for successful interventions. These principles do not offer fixed solutions but encourage flexibility and creativity, aligning with diverse project needs, functions, and budget constraints.

As each design challenge lacks a one-size-fits-all solution, these guidelines necessitate careful consideration during the design phase. They require expertise in design disciplines and a deep understanding of the unique context of the UMLAUF. It’s advisable for the Board to engage professionals in architecture or landscape architecture, either by involving them in the committee or seeking their advisory role during the design phases. Their input will be vital for reviewing compliance with these guidelines and ensuring thoughtful design implementation.

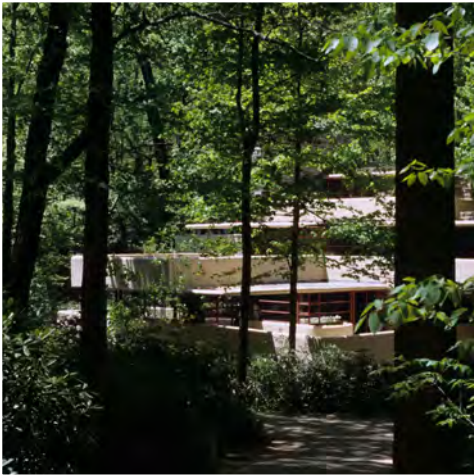
# Architectural Character

This UMLAUF HPEU Plan aims to create architecture that coincides with the goals of the UMLAUF, while reaching their desires for growth, and complimenting the existing structures and site. The architectural character of new buildings should harmonize with the original aesthetics of the house and studio, creating a seamless integration that pays homage to their design legacy. It's essential that these new structures complement the surrounding landscape, respecting its natural features while adhering to the established design guidelines. By echoing the design language and principles of the original architecture, the new buildings will not only honor the historical significance but also contribute to the overall visual coherence of the site. This approach ensures a unified aesthetic that respects the heritage of the space while embracing contemporary design sensibilities.

# Design Guidelines

Design guidelines are a set of principles or standards that offer direction and recommendations for creating and developing spaces or structures. They encompass various aspects of design, including architectural aesthetics, functionality, sustainability, and context within the environment. These guidelines serve as a framework to ensure consistency, quality, and coherence in design outcomes.

The following are used as a reference and framework during the planning and design phase of the HPEU Plan. They aid in maintaining a cohesive vision, ensuring that design decisions align with project goals, community feedback, and the intended user experience.



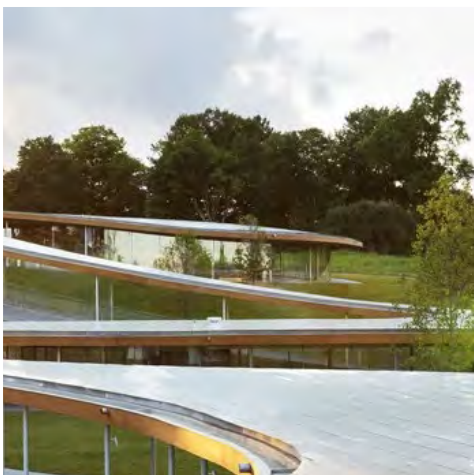
**Harmonize**  
Attunement of form to natural and historic resources. Careful placement of elements to blend in



**Synergize**  
Leverage environmental opportunities for high performance design and landscape



**Materiality**  
Use of natural materials



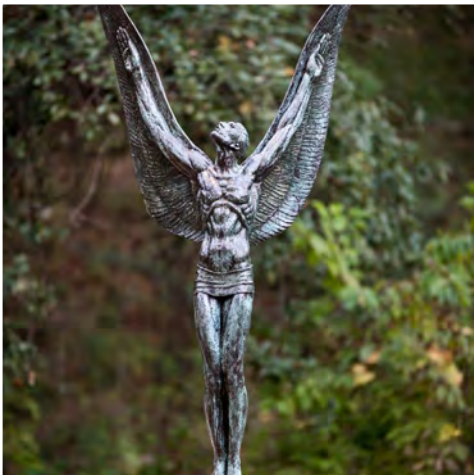
**Topography**  
Working with contour to enhance access, views, and discovery



**Views**  
Locate important program spaces to optimize view sheds



**Transparency**  
Glazed volumes provide views out and also dissolve the building into the trees and sky.\*



**Interpretive**  
Architectural opportunity to frame educational experience



**Biophilia**  
Holistic, healthful building, environmentally beneficial to occupants and ecosystems

\* Please view the Sustainability + Resiliency chapter for energy efficiency and bird-friendly requirements.



# Harmonize

Harmony is a quality of architecture that seeks to blend into and support the effects already present in a place, and often in a delicate balance. Harmony doesn't only imply the superficial imitation of appearances. That is camouflage. Harmony is adding something new into a place that augments and preserves it simultaneously and creates a whole greater than the sum of its parts. Harmony is the chord that must be struck for an intervention into the UMLAUF Sculpture Garden + Museum.

This historic place contains a rich history of sights, sounds, and experiences set in motion by the Umlauf family in which the new treehouse and gateway buildings must formally posture itself as the supporting character. On the wooded hillside the treehouse employs a dark, oxidized metal cladding to recreate the shadows and texture of ground covered by leaf litter. The matte texture avoids reflective distraction in favor of dappled light below foliage, providing minimal intrusion to the visual field of visitors enjoying the artworks and gardens. This attunement of every surface and material selection and form was similarly considered in detail and informs all of the architectural guiding principles, which is the function of harmony.



Fallingwater by Frank Lloyd Wright



# Synergize

The intervention should establish synergies with the environment, existing land use, architectural character, and local community. A primary opportunity of this site is to enhance the filtration of water bound for Barton Springs and Town Lake. The swales and contouring of new elements will serve to intercept water and direct it to biofiltration water features, and riparian areas. This holistic approach integrates the entire site into the hydrological system of its surroundings, enhancing its environmental synergy.

In addition to water management, careful consideration is given to the placement of key features such as the treehouse and gateway. These elements are strategically positioned at points of transition, direction change, and reorientation within the site. For instance, the treehouse location is meticulously aligned with the topography to seamlessly accommodate an elevator between the garden and hilltop levels. This approach not only enhances accessibility but also creates opportunities for implementing geo-thermal systems, thereby improving energy efficiency.

Furthermore, the treatment of the garden's edge along Azie Morton involves the creation of selective apertures, involving visitors in a new entry sequence. The revitalized welcome zone, incorporating amenities like a visitors' library and potential space for a food truck or other revenue-generating ventures, aims to integrate the UMLAUF with the surrounding neighborhood and the broader city. This area serves as a platform for collaboration with local businesses and extends the experience to those walking/wheeling around the site.





# Materiality

The choice of materials for new buildings should seamlessly integrate with the relaxed, natural ambiance that defines the UMLAUF's unique character. Reflecting the historical significance of the site's homestead, the materiality at UMLAUF draws inspiration from mid-century vernacular architecture, rooted in American Arts and Crafts traditions like the bungalow. This design ethos is evident in the existing museum and gallery structures, which are crafted from wood and employ traditional techniques tailored to local environmental and cultural conditions.

The proposed new construction must uphold the architectural legacy established by the house, studio, and pavilion, prioritizing openness to prevailing breezes and providing ample shelter from sunlight and occasional rain. Cross-laminated timber (CLT) emerges as a central element of the design strategy, allowing for innovative interpretations of stick-built shelters. By utilizing CLT as the primary structural material, rather than a veneer treatment, the design evokes the image of a treehouse while offering both aesthetic and sustainable benefits. The warm, inviting nature of wood can be expressed in various design elements, including column spacing, beam spans, and the exploration of expansive canopy cantilevers. Moreover, CLT's renewable and carbon-capturing properties align with the project's commitment to sustainability, as detailed in the sustainability chapter.

To complement the timber elements and harmonize with the site's natural surroundings, weathering steel (corten) and transparent, bird-safe glazing are recommended as additional primary materials for new constructions. The transparent glazing will facilitate the expansion of functional, environmentally controlled spaces, accommodating a range of flexible programs while maintaining visual connectivity with the site's landscape.





# Topography

Topography is a defining characteristic of Austin. Situated at the edge of the prairie and start of the Hill Country, Austin inherited the special rewards and challenges of occupying a limestone escarpment. The dramatic topography introduces protected pockets of nature into the urban grid, cherished by locals. Situated at the southwest edge of Zilker Park, the UMLAUF site occupies a pivotal boundary that offers an opportunity to forge stronger connections between the neighborhood, park, and broader city communities.

A primary objective of the plan is to honor and embrace the site's topography while simultaneously creating an accessible route that seamlessly integrates the entire site, enriching its natural and cultural offerings. Careful consideration of the grade change is essential, with a strategic approach that embraces the land's inherent character to inform architectural interventions. This approach not only prioritizes sustainability by minimizing disruption to the natural environment, but also endeavors to craft spaces that harmonize with the site's distinct identity, fostering a deeper sense of connection between the built environment and its surroundings. Implementation of landscape strategies on the steepest slopes will bolster stormwater management efforts and enhance hill stability.





# Views

The unique and striking elevations and topography of the UMLAUF site offer an exceptional opportunity to craft immersive experiences that showcase the beauty of nature and its surroundings. Intentional integration of architectural elements into the landscape will serve to accentuate and celebrate these breathtaking views, harmonizing the built environment with the site's remarkable natural contours.

Careful consideration of the building's orientation, placement of windows, and architectural features will play a pivotal role in framing the beauty of the UMLAUF's surroundings. Prioritizing the health and well-being of occupants, the design should maximize natural light exposure and provide views of the outdoor landscape, with the goal of reducing feelings of confinement, enhancing overall wellness, and mitigating stress levels. By strategically incorporating moments of openness and scenic vistas, the design can cultivate special experiences that foster a deep connection between users and the natural environment, as well as the art within it.





# Transparency

Transparency in architectural design embodies a concept that aims to dissolve physical barriers, enabling occupants to seamlessly transition between spaces, thus fostering a feeling of openness and interconnectedness. By welcoming natural light and providing unobstructed views, transparency creates an expansive, unified atmosphere that blurs the distinction between indoor and outdoor environments.

The plan recommends the strategic utilization of transparency to convey a sense of lightness and to maximize programmatic opportunities while preserving the site's natural ambiance. This could be achieved through the strategic incorporation of glass, open layouts, and design elements that establish visual connections between the interior and exterior surroundings. It is imperative to employ transparency responsibly, taking into account considerations such as visual and thermal comfort, energy efficiency, and the implementation of bird-safe glass and indoor lighting controls to safeguard the local ecosystem.



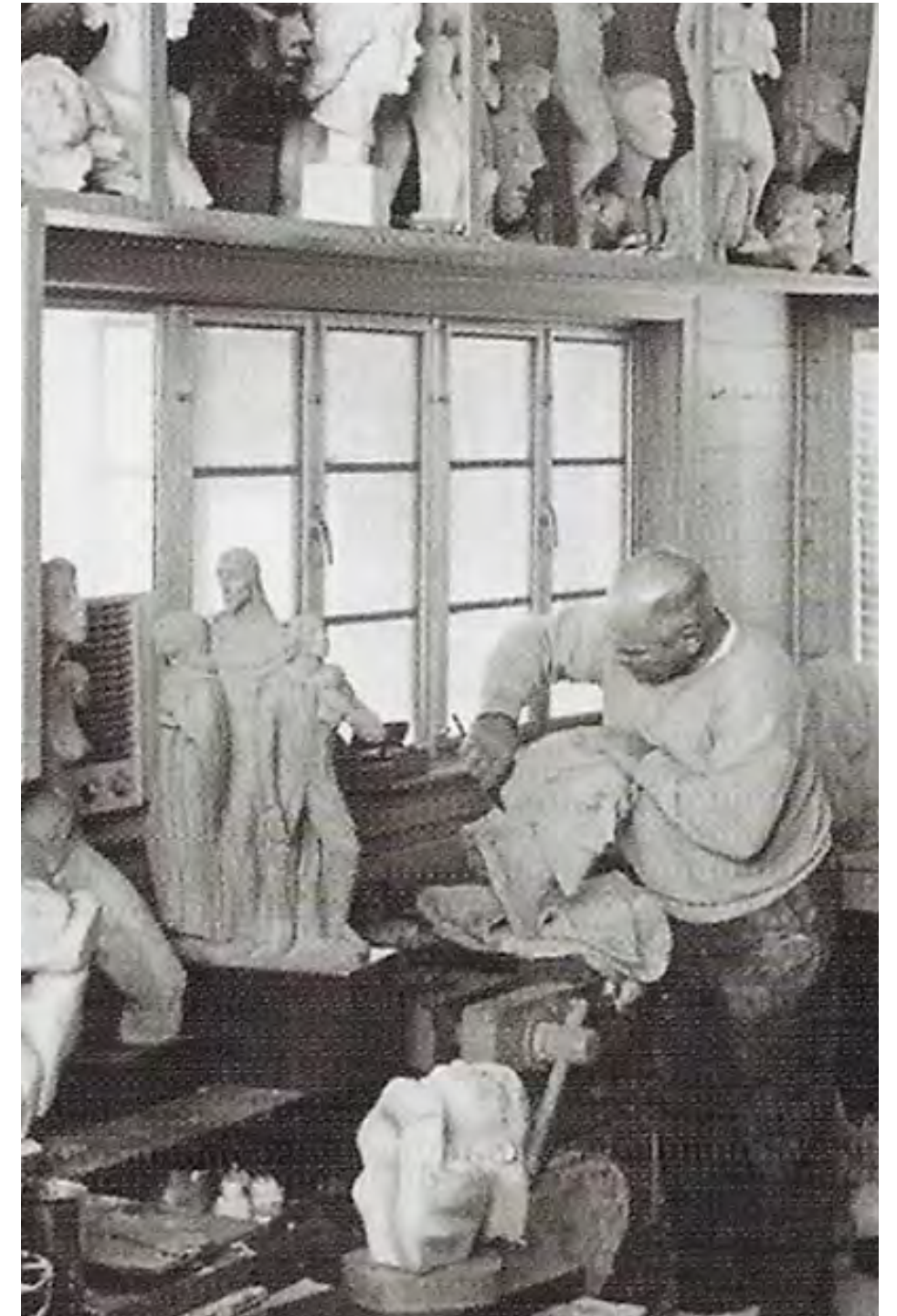


# Interpretive

The location and design of new elements in the plan present an opportunity to craft an immersive educational narrative that aligns with the programs it supports, weaving together Charles Umlauf's life with the world of art and its processes. This design concept envisions spaces capable of hosting elements inspired by Umlauf's artistic journey, spotlighting pivotal moments in his life and the evolution of his creations. These moments are seamlessly integrated into the explorative journey of the site, inviting visitors to embark on a discoverable path through the garden.

The architectural narrative must extend beyond biography. It should include spaces dedicated to understanding art processes, techniques, and inspirations. Through strategically positioned exhibits, interactive displays, and educational zones adjacent to the existing museum gallery, visitors can engage in a curated exploration of artistry. The design strategy should not only provide insights into Umlauf's legacy but also act as a gateway to appreciate diverse art forms, fostering a deeper understanding and connection to the creative world and its creators.

Additionally, the plan advocates for the incorporation of interpretation and education into outdoor and natural spaces. By integrating the water management strategy, promoting native species, and enhancing accessibility of natural trails, these elements become integral to the overall interpretive story. As the most recent addition to the UMLAUF's timeline, the improvements made to the site that enhance accessibility and awareness are embraced as part of its evolving history.





# Biophilia

Biophilia is the innate human tendency to seek connections with nature and other forms of life. By incorporating biophilic elements, such as plants, natural light, water, and materials derived from nature, architectural spaces can evoke a sense of harmony with the natural world. This concept holds particular importance in the implementation of the plan at the UMLAUF due to the site's inherent natural character. Examples of biophilic design elements include green spaces, living walls, abundant natural light, and opportunities for views of nature.

The plan recommends the adoption of biophilic strategies to enhance visitors' well-being, productivity, and overall satisfaction, thereby enriching the art viewing experience and highlighting the unique essence of the UMLAUF. Moreover, these elements can contribute to energy efficiency and sustainability by maximizing the use of natural light and ventilation, thus reducing dependence on artificial lighting and heating systems. Strategic building orientation and window placement are crucial for balancing a strong connection with the site while achieving energy efficiency.

Leveraging existing site elements and integrating additional biophilic design features will create spaces that seamlessly blend with the natural environment and promote a deeper connection with nature for all who visit the UMLAUF.






07

# Sustainability + Resilience

Health  
Energy  
Carbon  
Ecology  
Water  
Resilience  
Sustainability Strategies





*Sustainability goals are woven into the very fabric of UMLAUF's guiding principles and priorities.*



# Sustainability Commitment

## Quality Assurance

While the City mandates a certain baseline of sustainability, the UMLAUF aims to surpass these requirements by adopting a holistic approach to site improvement. This commitment encompasses every stage of the process, from planning and financing to designing, constructing, managing, renovating, operating, maintaining, and decommissioning buildings.

At the forefront of the site's objectives is the enhancement of landscape and stormwater management to bolster resilience during both droughts and floods. Following this, the priority is restoring the existing historic site, which involves weatherization, replacing components of the mechanical, electrical, and plumbing (MEP) systems, and eliminating hazardous materials that pose potential health risks. Lastly, the site seeks to incorporate spaces that serve the local community, fostering gatherings and promoting healthy lifestyles.

Dedicated to impact-forward design, the plan suggests to integrate additional non-traditional sustainability-related scopes into the project. These may include roles such as building performance consultants, enclosure consultants, commissioning officers, certification leads, rainwater subcontractors, solar subcontractors, geo-exchange systems installers, and more.





# Certifications

The Austin Green Building Policy mandates that all City-owned public-private partnerships must meet a minimum **3-star AEGB or LEED Silver rating**, ensuring adherence to sustainable practices in building construction. Furthermore, projects exceeding \$2 million in construction costs are obligated to acquire **SITES certified rating**, which prioritizes both human and environmental well-being through its principles. Whereas certifications like AEGB and LEED focus on the building, SITES focuses on everything on your site except the building (with a few exceptions). These three certifications have certain alignments and synergies which are to be considered when making a final rating decision.

In demonstrating their dedication as conscientious stewards of the environment, the UMLAUF plans to start the design process with a goal-setting exercise to explore options of achieving an exceptional 4-star AEGB rating and/or LEED Gold certification, as well as SITES Gold. In the pre-schematic design discussion, the UMLAUF will explore other certifications such as WELL building standard compliance and PHIUS certification.





# Impact Categories

The plan encompasses six primary impact categories to ensure that sustainability and resilience strategies are approached comprehensively, addressing key aspects crucial for cities and buildings to have a responsible and positive impact on their communities and the environment.

## Health



**Safeguard occupant health and well-being** by incorporating design elements that prioritize thermal and visual comfort, employing biophilic concepts, considering acoustic comfort, and implementing measures to enhance indoor air quality.

## Energy



**Reach net zero annual energy** by incorporating energy reduction strategies, solar panels, and a geoexchange heating + cooling system. Electrify site energy uses. Reduce site energy usage by 50% from ASHRAE 2019 and IECC 2021 baseline.

## Carbon



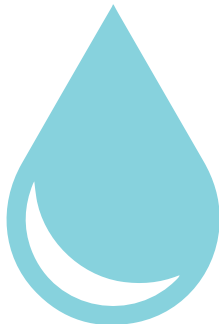
**Reduce embodied carbon by 50%** from baseline through carbon conscious material selection, and planting carbon sequestering ecology. Consider other forms of reducing greenhouse gas emissions such as accommodating for other forms of transit infrastructure (ex. bicycles & electric vehicles) and reducing refrigerant leakage by 25%.

## Ecology



**Enhance ecology and biodiversity** by introducing a diverse middle layer of shrubs and forbes, enriching the environment and providing additional vegetation for animals.

## Water



**Minimize water feature and irrigation water consumption** and use stormwater and rainwater exclusively for outdoor irrigation.

## Resilience



**Establish an effective water management strategy** for both routine rain events and extreme 500-year flood events using bioswales, increases in pond capacity, rain gardens stone path edges, and other relevant measures.



# 07.1

## Health



# Health

## Introduction

At the heart of the UMLAUF's design ethos lies a commitment to people and place. Human-centric design necessitates an understanding of the community's demographics and their specific needs, as detailed in previous sections of this report. This section shifts focus to human health and well-being within the space, particularly examining the impact of light, heat, and air quality on overall health and well-being.

Recognizing the profound influence of physical and social environments on well-being, parks like the UMLAUF play an essential role in nurturing health-conscious communities. These communal spaces serve as vital hubs for social interaction, addressing prevalent health concerns such as depression and loneliness by fostering connections among community members.

These verdant sanctuaries seamlessly blend nature with urban landscapes, offering solace, reducing stress, and augmenting mental and physical health through exposure to natural sunlight. Sunlight exposure intricately regulates the body's circadian rhythm, energy levels, and hormone releases, while the ecological setting provides both direct medicinal benefits and soothes nervous system responses.

By meticulously considering air quality, thermal comfort, and visual well-being, both the UMLAUF's indoor and outdoor spaces will harmoniously integrate sustainability with the well-being of its visitors, cultivating an environment where individuals thrive both physically and mentally.





# People

## Demographics

Part of the UMLAUF’s vision is to honor the Umlauf family’s contribution to the Austin community by offering experiences that integrate art with nature, health and wellness programs, and a peaceful breathing space within the heart of the urban capital city. The site’s special location not only offers a space to connect with nature, it also provides access to an outdoor oasis infused with art, which can contribute to both mental and physical well-being. To support equitable access to these experiences for all members of the community, particularly underserved and historically marginalized communities, the plan recommends the implementation of supporting operational and programming strategies to enhance accessibility to the site and programs.

Historically, health risks have correlated with factors such as the physical environment, education, race, ethnicity, and income. However, data from the Environmental Protection Agency’s (EPA) Building Environmental Justice (EJ) Tool, indicates that the UMLAUF’s immediate vicinity is primarily populated by affluent white individuals with better health indicators than the city’s average (please refer to the comparison on the right for further details). This underscores the importance of ensuring the plan’s real impact on community health.

The table on the right compares demographic data from some of Austin’s wealthiest, poorest (excluding university blocks), and median neighborhoods. Implementing accessibility strategies targeting underserved and historically marginalized communities could allow the UMLAUF to have a more positive impact. By doing so, more people could benefit from the physical and mental health benefits that spending time at a site like the UMLAUF’s can provide.

Demographics			
Scenic Dr. near Colorado River in Tarrytown (zip code 78703)	Local 1/4 mile radius of the UMLAUF and majority visitor population (zip code 78704)	City of Austin Demographics from US Census Bureau	Block at corner of 12th St & Airport Blvd. (zip code 78702)
Population Density <b>1,957</b> people/sq mile	Population Density <b>5,689</b> people/sq mile	Population Density <b>3,271</b> people/sq mile	Population Density <b>7,145</b> people/sq mile
People of Color <b>3%</b>	People of Color <b>11%</b>	People of Color <b>36.8%</b>	People of Color <b>91%</b>
Per Capita Income <b>\$189,050</b>	Per Capita Income <b>\$101,672</b>	Per Capita Income <b>\$86,556</b>	Per Capita Income <b>\$17,755</b>
Lack of Health Insurance <b>1%</b>	Lack of Health Insurance <b>1%</b>	Lack of Health Insurance (Under 65) <b>13.9%</b>	Lack of Health Insurance <b>14%</b>
Persons with Disability <b>5%</b>	Persons with Disability <b>2.5%</b>	Disability Under Age 65 <b>7.2%</b>	Persons with Disability <b>8.5%</b>
Life Expectancy <b>84 yrs</b>	Life Expectancy <b>81 yrs</b>	Life Expectancy <b>82 yrs</b>	Life Expectancy <b>72 yrs</b>



# People

## Demographics

To promote greater equity in access to the UMLAUF, strategies are recommended that are aimed at making the site accessible to areas of the city with higher health risk factors and limited access to quality green spaces and cultural institutions. This initiative aims to extend the reach of the site’s tranquil environment and health and wellness programs offered by the UMLAUF.

The plan recommends incorporating inclusivity into the built environment by designing for different ages, genders, abilities, language barriers, and more. The UMLAUF has already implemented programs to enhance accessibility and inclusion, including Touch Tours that allow visitors to interact with sculptures, Family Day programs catering to all ages, and UMLAUF After Dark events offering museum visits after regular hours. Building upon these efforts, further community engagement needs to take place for the UMLAUF to become a resource for all Austinites, including historically underserved communities in the Eastern Crescent (neighborhoods and connecting areas in central East Austin, Colony Park, Del Valle, Dove Springs, Montopolis and Rundberg areas). The UMLAUF will take deliberate action to continue to reach these populations and identify what they need from the organization.

Below are a series of recommended strategies aimed at expanding the audience of who can benefit from visiting the UMLAUF. It is suggested to collaborate with existing community organizations to support and implement this vision. A comprehensive operations plan becomes essential in the later stages of planning to guarantee that both existing and new spaces are use in an equitable manner.

### Accessibility

- 1. Fully ADA accessible museum and garden experience
- 2. Site edge treatments for maximum visibility and a more welcoming arrival

### Inclusion

- 3. Universal Design principles
- 4. Increase awareness of the current free Touch Tours
- 5. Multilingual educational signage
- 6. Children-friendly programs
- 7. Recognition of historical and site context as well representation of diverse cultures and artistic practices
- 8. Water filling stations & outdoor outlets
- 9. Outdoor resting stations (benches in shaded areas)

### Equity

- 10. Free admission opportunities
- 11. After-hours access opportunities
- 12. Busing/shuttle initiatives
- 13. After-school engagement programs
- 14. Historically underserved communities art education program
- 15. School art field trips

*“I found peace at UMLAUF when I visited. Going there helped me through a tough spot.”*



The UMLAUF currently houses the largest collection of touchable bronze sculptures in Texas. The Touch Tours offer unique opportunities for the visually impaired and other kinesthetic learners to formally engage with the subject matter and materials employed by Charles Umlauf.



# Place

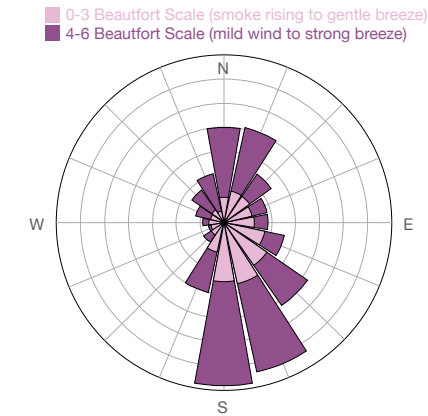
## City of Austin

Various resources such as Klimaat, Climate Check, Colombia’s Natural Hazard’s Index, and the Environmental Protection Agency’s (EPA) Building Environmental Justice (EJ) Tool, provide valuable insights into our local climate and inform strategies for designing for visual and thermal comfort. On the right, you’ll find some basic climate metrics, and at the bottom, the site is situated within the local climate for further analysis.

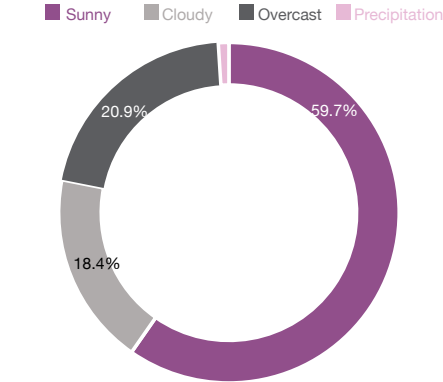
Austin experiences mild variations of typical heat and air quality challenges, yet it still grapples with issues such as extreme heat, drought, and flooding, particularly exacerbated by the urban heat island effect. Within this urban landscape, the UMLAUF functions as a green sanctuary, tempering city temperatures through a micro-climate fostered by biodiversity and water features, providing much-needed relief. Designing comfortable environments not only eases strain on the body’s thermal regulation but also enhances visual comfort.

Throughout the following pages, strategies will be presented to uphold occupant thermal and visual comfort and ensure good indoor and outdoor air quality. The Austin population grapples with air quality challenges, including those posed by COVID, allergies, and other harmful particles affecting human health. Air quality tends to spike during peak traffic times and settles down at night, presenting dynamic challenges that must be addressed.

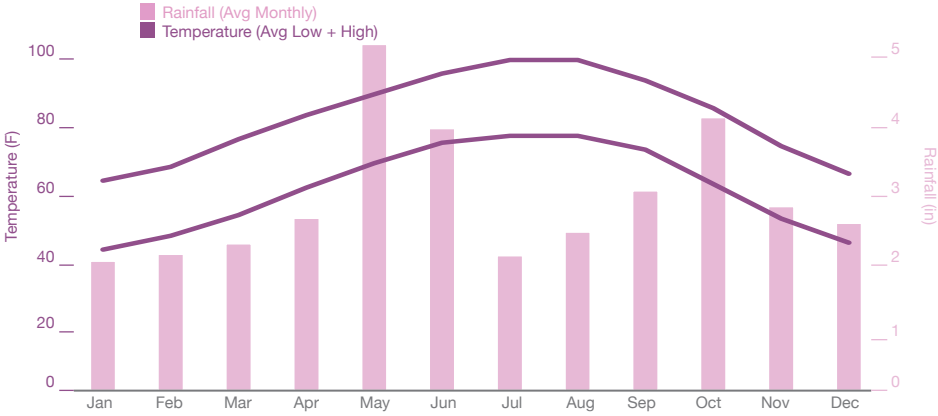
Wind Rose



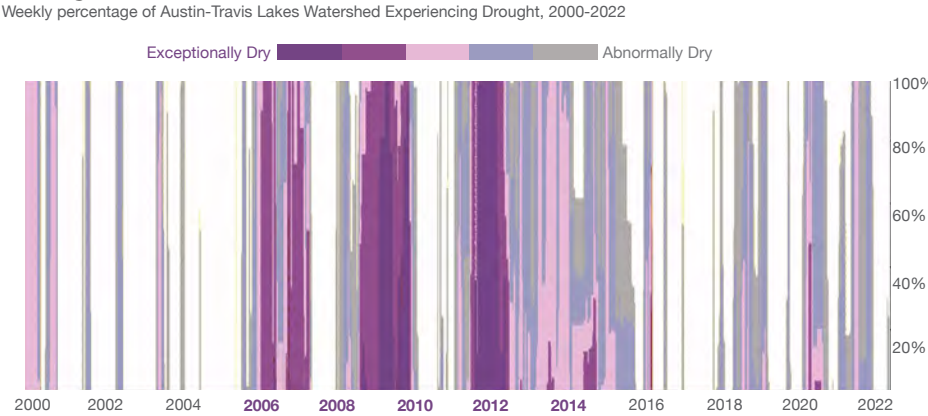
Weather Characteristics



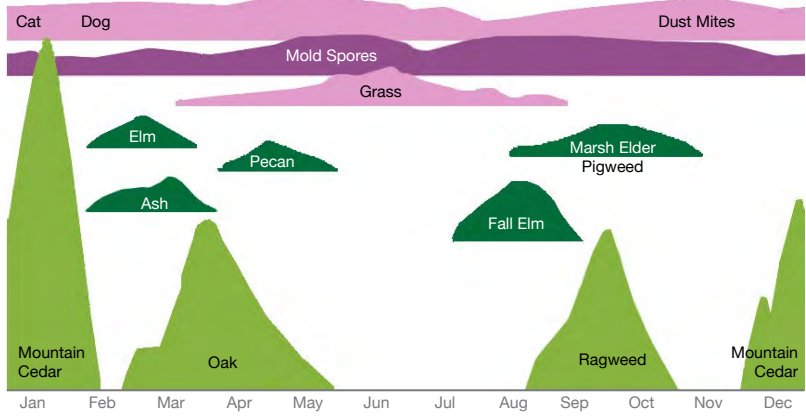
Rainfall + Temperature



Drought Risk



Austin Allergies



Asthma

8%  
Percent of population

Haphazardous Waste Proximity

.74 facility count/km  
compared to US avg of 1.9

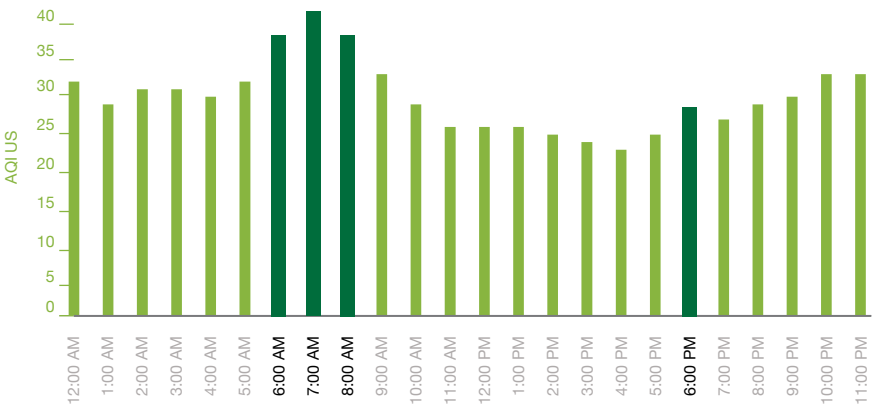
Particulate Matter

9.66  $\mu\text{g}/\text{m}^3$   
compared to US avg of 8.08

Ozone

62.7 ppb  
compared to 61.6 US average

Austin Air Quality Index





# People-centric Design

All Gender, All Age, All Occupants  
Health, Accessibility, Inclusion

The aim of the plan is to establish a space that is welcoming and physically accessible to people of all ages and transportation modes, inclusive of all genders, and promotes healthy practices for every visitor. This involves incorporating principles of Universal Design Guidelines and strategies from the WELL certification. Specific measures, such as installing additional water and bottle filling stations, cooling spray areas, bike racks, and electric vehicle (EV) parking spots, as well as including a lactation room, changing station, multi-lingual signage, and all-gender restrooms with showers, are essential for fostering a more inclusive and healthy environment on the site. Please see some of these recommendations on the map to the right.





# Visual and Thermal Comfort + Biophilia

## Architectural Design Strategies

Designing and maintaining spaces that prioritize thermal and visual comfort is fundamental for enhancing the quality of life for their users. The plan suggests that additional studies on daylighting, energy efficiency, and related subjects is imperative to achieve a balanced integration of daylighting, glare control, thermal comfort, and biophilic design elements. Design strategies such as thoughtful orientation, window-to-wall ratios, window specifications, shading techniques, meticulous enclosure detailing, air barrier continuity + testing, natural ventilation systems, and iterative thermal and visual modeling can all contribute to optimizing design outcomes. Please find below some recommendations and explanations of these critical health metrics.

### Biophilic design

Biophilic design principles can significantly contribute to stress reduction, enhance creativity and mental clarity, improve overall well-being, and facilitate healing processes. Incorporating elements that establish connections with nature, such as visual and auditory stimuli, dynamic and diffuse lighting, specific structural materials, and creating spaces of refuge and mystery, can all contribute to this effect.

The plan suggests biophilic strategies such as optimizing natural views and incorporating materials reminiscent of the outdoors. Dappled lighting, natural auditory cues like the babbling brook, and the sensation of seclusion within a forested area creates thoughtful experiential moments.

### Visual comfort

Visual Comfort plays a pivotal role in occupant satisfaction and performance. Natural light has been associated with improved mood, energy levels, physical health, productivity, and learning.

### UMLAUF HPEU PLAN

Moreover, proper lighting conditions influence circadian rhythms, impacting sleep patterns and hormone releases.

The primary recommendation is to iterate with the massing and orientation of the suggested structures and spaces, and analyze various dynamics of the space to achieve healthy conditions, which are attained when occupants are not subjected to glare or underlit conditions during hours of operation in key areas. Additionally, the art selection could require custom lighting considerations which will be evaluated in later stages of design.

### Thermal comfort

Maintaining optimal thermal conditions is equally critical for occupant well-being. By ensuring a comfortable temperature range, discomfort, fatigue, and stress can be minimized while promoting physical and mental health. Additionally, creating sustainable and energy-efficient thermal environments is essential for overall building efficiency.

The plan recommends to conduct mean radiant temperature, CFD (Computational Fluid Dynamics), and operational temperature studies to assess thermal comfort at the UMLAUF to achieve the recommended envelope-to-floor ratio of 1.53. Mechanical controls and passive design strategies can significantly impact thermal comfort.

### Acoustic Comfort

Considerations will be put into dampening street noise from the site occupants.



The plan suggests the use of natural materials such as mass timber and wood finishes, as well as implementing experiential nature, such as maximizing the dappled light of trees, outdoor smells, and nature sounds through design.



# Indoor Air Quality

## Mechanical Systems and Material Strategies

Ensuring optimal indoor air quality is crucial for occupant well-being. Poor air quality, including high CO2 levels, toxins, biological growth, and airborne diseases, can lead to Sick Building Syndrome. Emissions associated with PM 2.5, ozone, and toxins contain various compounds posing health risks, such as reduced lung function, cancer, and neurological damage. A proactive, multi-faceted approach is essential, as outlined in the provided strategies.

The plan recommends the following strategies for enhancing indoor air quality:

1. Providing adequate ventilation, bathroom and kitchen exhaust systems, and code-compliant filtration for existing buildings.
2. Conducting blower door tests and improving to 3 air changes per hour (ACH) for existing buildings and 0.06 ACH for new buildings.
3. Implementing MERV 16 air filtration for new buildings on outdoor and recirculating indoor air, capable of trapping 99.97% of air particles sized 0.3 microns. And selecting materials with low volatile organic compounds (VOCs), using Red List free materials, and opting for materials with Health Product Declarations (HPDs) to promote healthier indoor environments.
4. Using walk-off mats and vestibules, adopting green cleaning practices, and implementing Integrated Pest Management strategies, among other measures.
5. Monitoring indoor air quality in both new and existing buildings to engage the public and ensure indoor health standards are met.



**Filtration**  
A MERV 16 or HEPA equivalent filter at fresh air intake



**Low Duct Leakage**  
Perform Duct Leakage testing periodically during construction to ensure air tight ducts



**Red List Materials**  
Red List chemicals and elements are known to pose serious human health risks



**Walk-off Mats + Vestibule**  
Walk-off mats and vestibules prevent outdoor air and particles from contaminating indoor air quality



**Fresh Air**  
Fresh air ensures that high levels of CO2 do not build up in the space and toxins get flushed out



**Building Air Tightness**  
Perform Blow Door Testing periodically through construction to ensure the enclosure is air tight



**Low VOC Materials**  
Volatile organic compounds (VOCs) mix with air pollutants and UV light to make ozone, a human health toxin



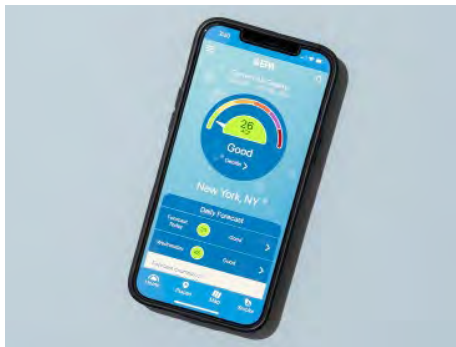
**Green Cleaning Products**  
Use non-toxic cleaning products. Use EPA Safer Choice label



**Dehumidification**  
In a climate like Austin, dehumidification is paramount to comfort and moisture control



**Building Flush Out**  
Do several days of a whole building ventilation before occupancy



**Air Quality Monitoring**  
Post occupancy metrics show real-time data on air quality



**Integrated Pest Management**  
Certain plants act as pest repellents



# 07.2

## Energy



# Energy

## Introduction

The UMLAUF's primary energy objective is to achieve **Net Zero Annual Energy**, meaning the site generates as much renewable energy as it consumes over a year. The strategy involves initially reducing annual energy usage and then offsetting the remaining consumption by leveraging geo-exchange for heating and cooling while maximizing on-site energy production with solar panels.

The careful selection of energy sources is critical, considering that non-renewable options such as coal, natural gas, and propane significantly contribute to air pollution and global warming. Each unit of energy used on-site translates to three units of energy used at the source at coal or propane plants due to losses during conversion and transmission. The UMLAUF has committed to a fully electrified site, eliminating gas, diesel, or propane appliances and systems and providing EV transportation with chargers on-site and places for bikes and human-powered transportation. Despite remaining connected to the grid with a diverse energy portfolio, the UMLAUF is actively reducing its energy consumption and deploying on-site renewables to minimize its environmental footprint. As an option, UMLAUF is to consider enrolling in Austin Energy's GreenChoice program which is 100% renewable grid energy. This multifaceted approach underscores the UMLAUF's conscientious efforts to balance operational needs with environmental stewardship.





# Energy Balance

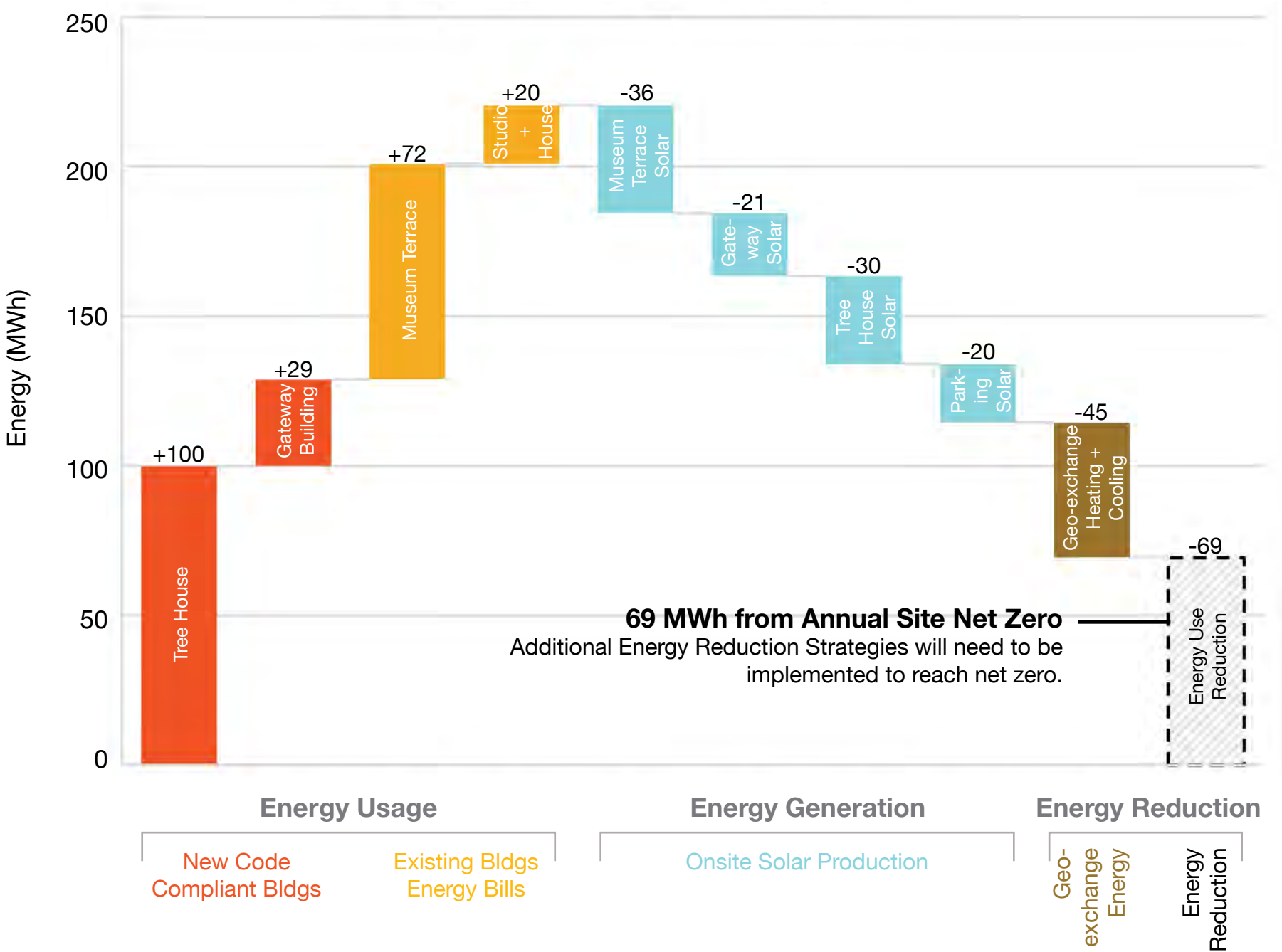
## Annual Energy Balance

The existing and new buildings are predicted to consume 221 MWh per year, which is more energy than 18 homes in Texas. Renewable energy generation from photovoltaic (PV) systems can offset 50% of the total annual energy use of the site. Using geo-exchange wells and ground source heat pumps, reduces an additional 10-20% of site energy consumption. To bridge the remaining gap to net zero annual site energy, existing meter data should be collected with energy audits to evaluate the most effective energy conservation strategies. A comprehensive building performance analysis is recommended to asses aspects such as building orientation, the window-to-wall ratio, the implementation of high performance enclosure, heat pump systems, decoupled ventilation with sensible HVAC systems, and the use of energy-efficient appliances. Integrating these solutions will reduce energy consumption and allow for the PV and geo-exchange systems to offset a larger percentage of the annual energy consumption. Other innovative energy recovery options are to be considered.

Solutions should first be applied to the new buildings to make them as energy efficient as possible. Followed by the Museum Gallery + Terrace, which is currently the highest energy consumer of the existing buildings. Lastly, the historic home and studio should be addressed carefully to retain historic context, while modernizing systems for the future. The improvements will be balanced with the budget of the project to find the most cost-effective solutions. Solutions such as proper orientation, window to wall ration, and passive design strategies will be considered first as cost effective solutions.

# Annual Net Energy Usage

Implementing energy production strategies — such as solar, geothermal, and additional reduction tactics — compensates for the energy consumption of new and existing buildings to reach net annual zero





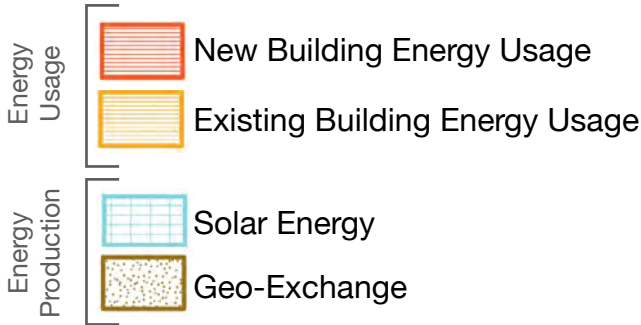
# Energy Use/Generation/Thermal

## Energy Use, Solar Energy Production, Geo-exchange

The location and quantity of solar panels are impacted by site limitations, including existing and historic trees, shaded roofs, and utility provisions. Although historic building funding requirements restrict solar placement, all other buildings are recommended to be fit for solar panels and others are recommended to be solar ready. Implementing solar canopy over parking will make further strides towards reaching net zero annual energy.

Additionally, incorporating a geothermal heat pump system - which replaces traditional HVAC systems by harnessing the earth's relatively stable temperature to regulate buildings' heating and cooling - can further improve energy efficiency. A geo-exchange loop under the southern parking area can potentially cover the entire heating and cooling needs of the gateway and museum gallery. An additional geoexchange system near the northern parking lot in well or loop form could possibly provide heating and cooling to the treehouse. If the capacity of the goethermal system does not completely meet the needs of the historic buildings, the plan recommends using air source heat pumps.

Thinking ahead, as energy has an operational carbon impact, the plan recommends exploring hydronic systems to reduce the carbon footprint of the refrigerant. And think through radiant heating as a more efficient form of heating the space.



UMLAUF HPEU PLAN





# Energy Reduction Strategies

The UMLAUF’s building operations currently demand more energy than what can be generated on-site. The recommended energy conservation strategies outlined below aim to further reduce operational energy usage to achieve the target of net-zero emissions.

For existing buildings such as the Museum Gallery + Terrace and Historic Homestead, implementing circuit-level monitoring or conducting a building energy audit will provide valuable insights into current energy usage patterns. By implementing appropriate strategies based on these findings, the goal is to reduce energy consumption.

To diminish energy usage in new constructions by 50%, consideration towards factors like building orientation, shading, and enclosure will effectively curtail HVAC system energy consumption, reducing upfront equipment costs and long-term energy bills.

The plan also recommends additional energy-saving measures, such as enrolling the UMLAUF in a demand management program, which can contribute towards achieving an AEGB 3-star rating and LEED goals.

The provided recommendations are derived from the Passive House Institute US (PHIUS), representing the gold standard for energy reduction strategies.



**Design Strategies**  
Orientation, compact footprint, window-to-wall ratio, overhangs, tree shading, blinds, cross ventilation, tree buffers from wind, stack effect, and more are some of the biggest impact categories for energy usage. Early phase energy modeling could provide data-driven feedback and benchmarking



**Thermal Performance**  
Solar heat gain, low-e coating, thermally broken windows, no thermal bridging, high insulation, light roof membrane



**Air Tight Enclosure**  
Building air tightness, airtight ductwork



**Electrify Building Equipment**  
Heat, stoves, cars, and other typically gas appliances will be electric only



**Heat Pump Systems**  
Air Source Heat Pump systems are typically 3x more efficient than electric or gas systems



**Energy Efficient Appliances**  
Picking energy efficient appliances with Energy Star certification reduces energy usage



**Measuring Usage**  
Real-time circuit-level energy monitoring creates owner opportunities for energy conservation



**Join Demand Management Program**  
During peak power draws, opt into reducing thermostat settings



# 07.3

## Carbon



# Carbon

## Introduction

As a significant cultural landmark in Austin, the UMLAUF has a critical role to play in raising awareness of environmental issues. Leading by example, the following recommendations aim to reduce embodied carbon emissions by 50%. Various factors contribute to the overall carbon footprint, as defined below. The term CO<sub>2</sub>e, used in the following section, represents the global warming potential of greenhouse gases standardized in units of CO<sub>2</sub>e. For perspective, offsetting a single ton of CO<sub>2</sub>e requires planting 31-46 trees that photosynthesize for a year.

Key Terms:

**Embodied Carbon:** Total greenhouse gas emissions associated with the entire life cycle of a building or product, including extraction, manufacturing, transportation, and construction phases. This calculation includes CO<sub>2</sub> equivalents of greenhouse gas emissions released from refrigerant leakage.

**Operational Carbon:** Ongoing carbon emissions resulting from building operational energy consumption.

**Sequestered Carbon:** Carbon dioxide captured and stored, often through sustainable practices such as afforestation or the use of carbon-absorbing materials.

**Onsite Carbon Offset:** Carbon emissions offset by replacing grid energy with on-site renewables or by reducing energy usage with energy reduction strategies.





# Carbon Synthesis

## Carbon Balance over 30 Years

Goal: Achieve site carbon neutrality by 2055, balancing annual operational emissions and embodied carbon emissions with onsite carbon offsets and sequestration.

The plan suggests small footprints, minimizing energy usage, integrating on-site renewable energy sources, careful material selection, and reforestation areas of the site, to decrease the site’s carbon emissions. To the right is a projection of the carbon released into the atmosphere over 30 years, given that the City of Austin reaches their goal of decarbonizing their grid by 2040.

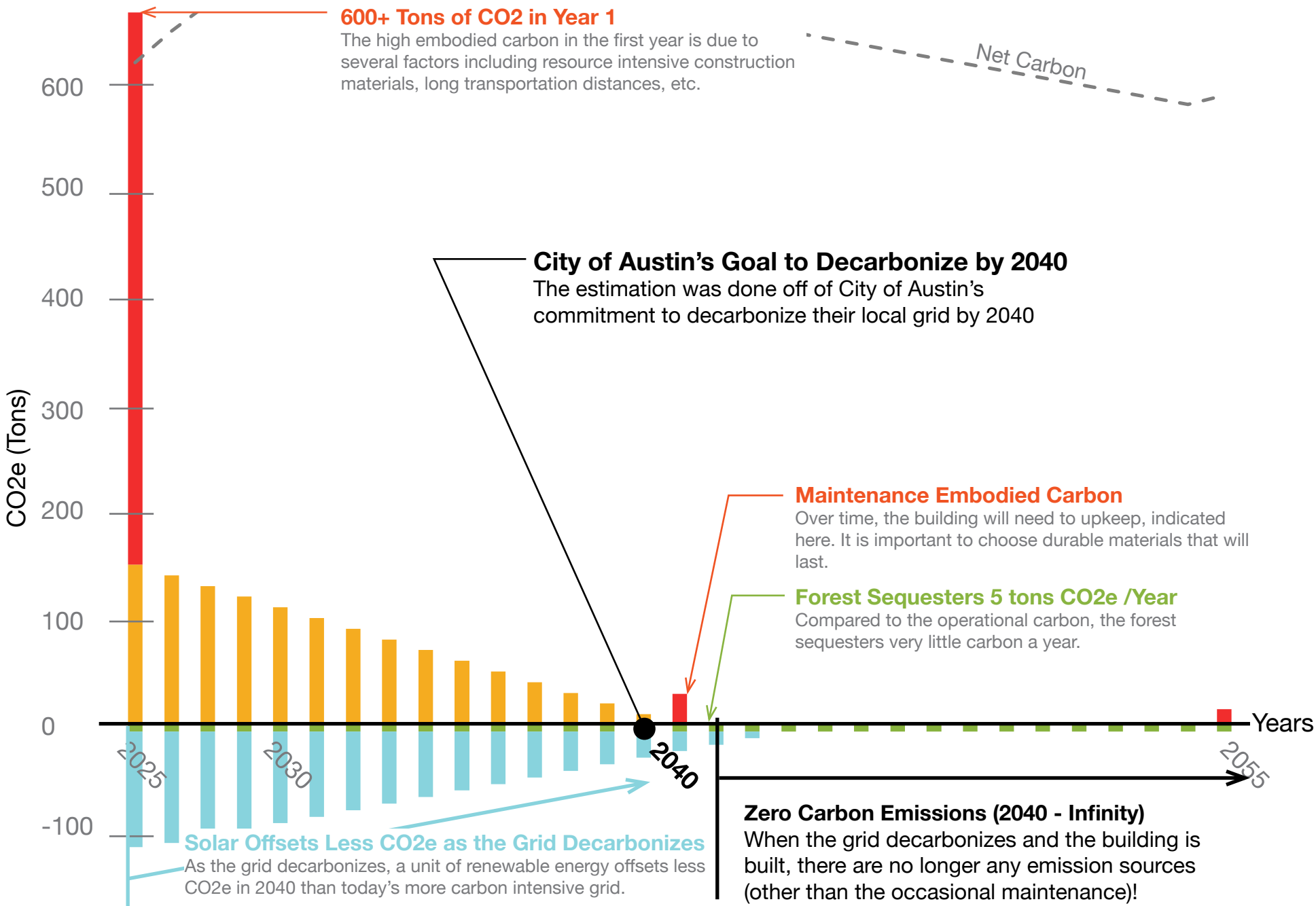
This analysis combines the impacts of:

- Embodied Carbon: Materials
- Operational Carbon: Energy Usage
- Carbon Sequestration: Landscape
- Onsite Offset Carbon: Renewable Energy

An early estimate was compiled using a combination of CBECs data, CARE Tool, City of Austin’s Carbon/kWh estimate, Cambium, and Helioscope. Transportation to and from the site was not considered, but refrigerants were factored into the estimate.

# UMLAUF Carbon Balance over 30 Years

Embodied carbon far surpasses other carbon emitters on day 1. The site’s trees sequester a minute portion compared to the emitted carbon. Producing energy onsite decreases the total carbon emissions tremendously.





# Carbon Emissions Breakdown

## Whole Site over 30 Years

Since embodied carbon accounts for a significant portion of emissions over a 30-year period, it is essential to dissect the information, using OneClick Tally Carbon Designer.

**95% Reduction in Carbon from Reuse** Using existing structures results in a remarkable 95% reduction in embodied carbon compared to building new, determined through analysis conducted with the CARE Tool.

**Enclosure** Incorporating strategies such as bio-based insulation, wood studs, CLT interiors, and others can potentially decrease the embodied carbon impact of the new building enclosure by over 50%.

**Refrigerants** Refrigerant leakage was factored into the analysis, constituting 25% of the total project’s embodied carbon for new construction and 50% for existing structures, based on estimates provided by LMN Architects. UMLAUF aims to align with the city’s Climate Equity Plan to reduce refrigerant leakage by 25% and consider natural refrigerants.

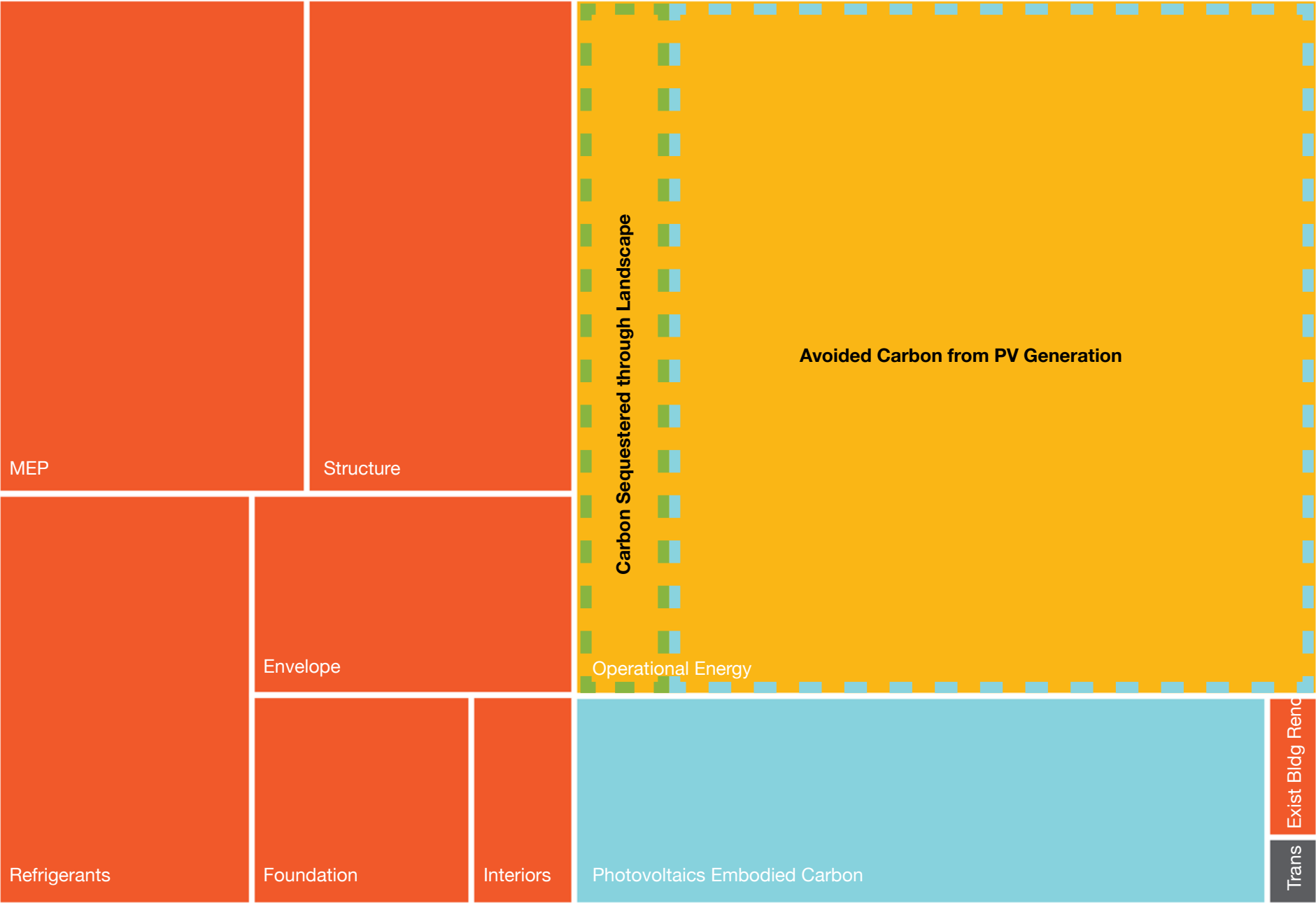
**Transportation:** The emissions from transportation were considered, accounting for 100 people visiting the site daily, driving a total of 6 miles, at an emission rate of 400 grams CO2e/ mile.

**Site vs Source Energy:** While not explicitly outlined here, energy generated by onsite solar panels reduces transmission losses and additional losses associated with petroleum and coal. The US Energy Information Administration states that about “60% of energy used for electricity generation is lost in conversion.”

This initial analysis serves as a foundation but needs to be supplemented with a detailed whole-building life cycle analysis that can be refined as the project progresses.

# Site Embodied Carbon Breakdown over 30 Years

The biggest carbon emitters on site are operational energy, structure, interiors, then MEP systems, envelope, and refrigerants. The landscape barely offsets carbon.





# Carbon Emissions and Drawdown

## Overall Site Plan

In pursuit of sustainable and eco-conscious design, the plan recommends measures aimed at minimizing carbon emissions. Central to those efforts are reducing impervious cover as sitework and concrete structure are some of the largest contributors towards embodied carbon emissions. As the project iterates, the plan recommends building with wood structure above ground and creating a small footprint.

Although the majority of the embodied carbon impact will occur on the reduction side, sequestration from vegetation restoration can draw down carbon out of the atmosphere every year.

The synergistic interplay between material choices and site vegetation underscores the plan’s commitment to sustainability and low-carbon initiatives.





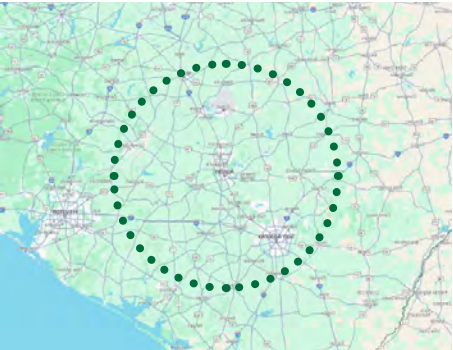
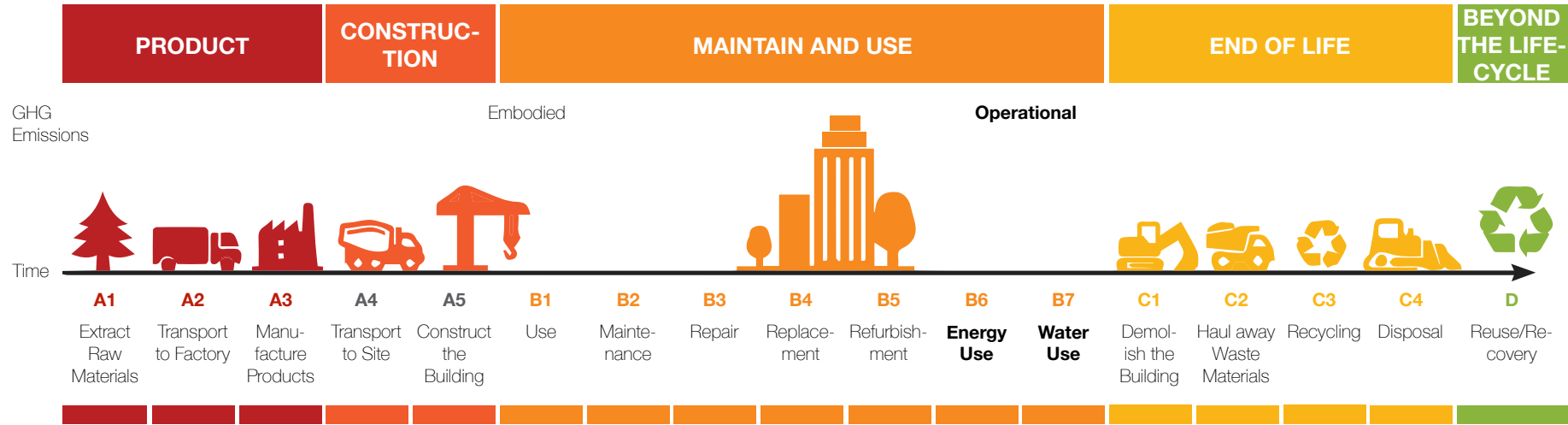
# Carbon Emissions Reduction

## Materials Strategy

Embodied carbon calculations use a set time span to measure the GHG emissions released into the atmosphere in equivalent CO2 from manufacturing, construction, transportation, maintenance, and end of life disposal, as shown in the graphic to the right.

As much as possible, preservation and mindful deconstruction reduces the need for additional materials and further greenhouse gas admissions. Concrete and steel are some of the largest contributors to the new building’s embodied carbon. Asking manufacturers for Type III Environmental Protection Declarations (EPDs) pushes the industry forward by encouraging transparency. Transportation is one of the contributors to a material’s embodied carbon and reinvests in the local economy. And wherever available, the plan recommends choosing materials with high recycled content (either by up-cycling or down-cycling) products at their end of life.

Starting with the higher impact categories, such as structure, enclosure, and interiors choosing materials with low carbon emissions during manufacturing and end of life plans reduces emissions. Where available the UMLAUF is committed to using resources like Mindful Materials and Forest Stewardship Council (FSC) to provide resources for low-carbon, labor justice, and healthier materials.



**Local Materials**  
Choose materials within a 100 mile radius



**CLT (structure)**  
Wood has a lower embodied carbon than other structural materials



**Wood Fiber, Cellulose, HEMP, Cork, Hay Bail Wall (Insulation)**  
Low embodied carbon insulations



**Concrete (Foundation)**  
Use low carbon concrete solutions such as: High Fly Ash Concrete



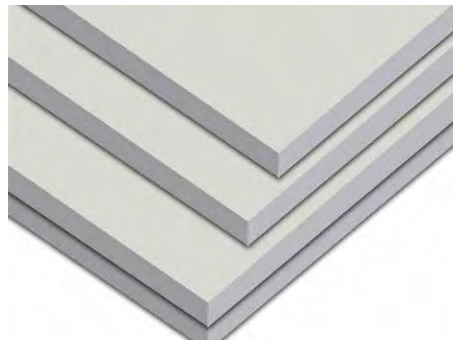
**Wood Framed (Windows)**  
Wood frames are less carbon intensive than aluminum frames



**Metals (Flashing, Strapping)**  
Using metal over peel-and-stick flashings will last longer



**Hardwood Flooring**  
Wood floorings are less carbon intensive and less toxic than vinyl



**Recycled/Reclaimed Materials**  
Seek salvaged materials and look for materials with recycled content



# Quality Assurance

## Resources + Commissioning

Material selection can be complex. It is recommended to put together an Owner Project Requirements (OPR) document to guide material selection which considers aesthetics as well as other qualities such as: durability, low VOC, and avoiding certain work toxins. The industry has developed a range of labels and certifications that offer assurance regarding the sustainability and equity of materials which can be worked into the OPR. Relying on these external sustainability product labels, vetting organizations, and other reputable resources will enhance the quality and confidence in the products selected for this project. This proactive approach ensures accountability and alignment with sustainability objectives throughout the project life cycle.

To ensure quality the plan recommends engaging a commissioning agent to verify that project goals have been successfully achieved during the construction phase.





# 07.4

## Ecology



# Ecology

## Introduction

The UMLAUF serves as a sanctuary for both Austin residents and the diverse plant and animal life that call it home. Dedicated to the flourishing of local flora and fauna, the site supports a dynamic ecosystem that extends beyond its borders. Situated within Austin’s Barton Springs watershed, and Edwards Aquifer Transition Zone, the UMLAUF plays a vital role in the city’s green corridor, underscoring the importance of responsible land stewardship for wildlife conservation.

Regarding ecology, the plan complies with Austin’s regulations, recommending that any invasive species are diligently removed from the site, while measures are taken to safeguard historic trees. Further restoration of the landscape includes the strategic planting of native, diverse mid-level shrubs, and forbs. It is recommended to consider participation in the Local Native Plant Rescue Project.

The ecological benefits of such practices extend far beyond environmental preservation. By incorporating permaculture, drought-resistant native plants, the site remains resilient throughout the seasons without placing undue strain on natural resources. These plants actively sequester CO<sub>2</sub>, mitigating the impacts of global warming, and contribute to air purification. Furthermore, the roots of trees and plants play a crucial role in filtering stormwater runoff and preventing soil erosion. Each plant species fulfills a unique role within the ecosystem, from nitrogen-fixing to repelling pests and providing medicinal benefits. Moreover, the introduction of diverse plant species attracts pollinators and other threatened wildlife, enriching the site’s biodiversity.

For further insights and details on landscaping strategies, please refer to the dedicated landscape section in the report.





# 07.5

## Water



# Water

## Introduction

Austin relies on the lower Colorado River for its primary drinking water, while San Antonio draws from the Edwards Aquifer. Water absorbed into the UMLAUF site replenishes both sources. By actively engaging water conservation efforts, the UMLAUF can contribute to the preservation of these invaluable resources. Strategies such as implementing bioswales, rain gardens, and minimizing impervious cover are employed to slow the flow of water, facilitating absorption into these bodies of water. Shallow rock beds and plant ecology further enhance the site's ability to filter runoff, removing toxins or pesticides that may be washed onto the property.

Currently, the pond and irrigation use city potable water. The plan recommends **targeting 100% of irrigation and the water feature to be supplied by non-potable sources**. This involves a combination of strategies to decrease water consumption and exploring other water sources like rainwater and greywater. By reducing reliance on potable water, the UMLAUF cuts its environmental impact and water utility costs.

### Key Terms:

**Potable:** Water that has been treated to meet safety standards for human consumption, as defined by the EPA and local regulations.

**Non-Potable:** Water not suitable for human consumption, which includes greywater and reclaimed water.

**Greywater:** Wastewater generated from activities like bathing and washing that is relatively clean and can be reused for non-potable purposes.

**Purple Pipe:** The City of Austin's reclaimed water pipe system, which supplies non-potable water for various uses.

**Blackwater:** Wastewater with pollutants like nutrients, metals, toxins, and pathogens that requires extensive treatment for reuse.





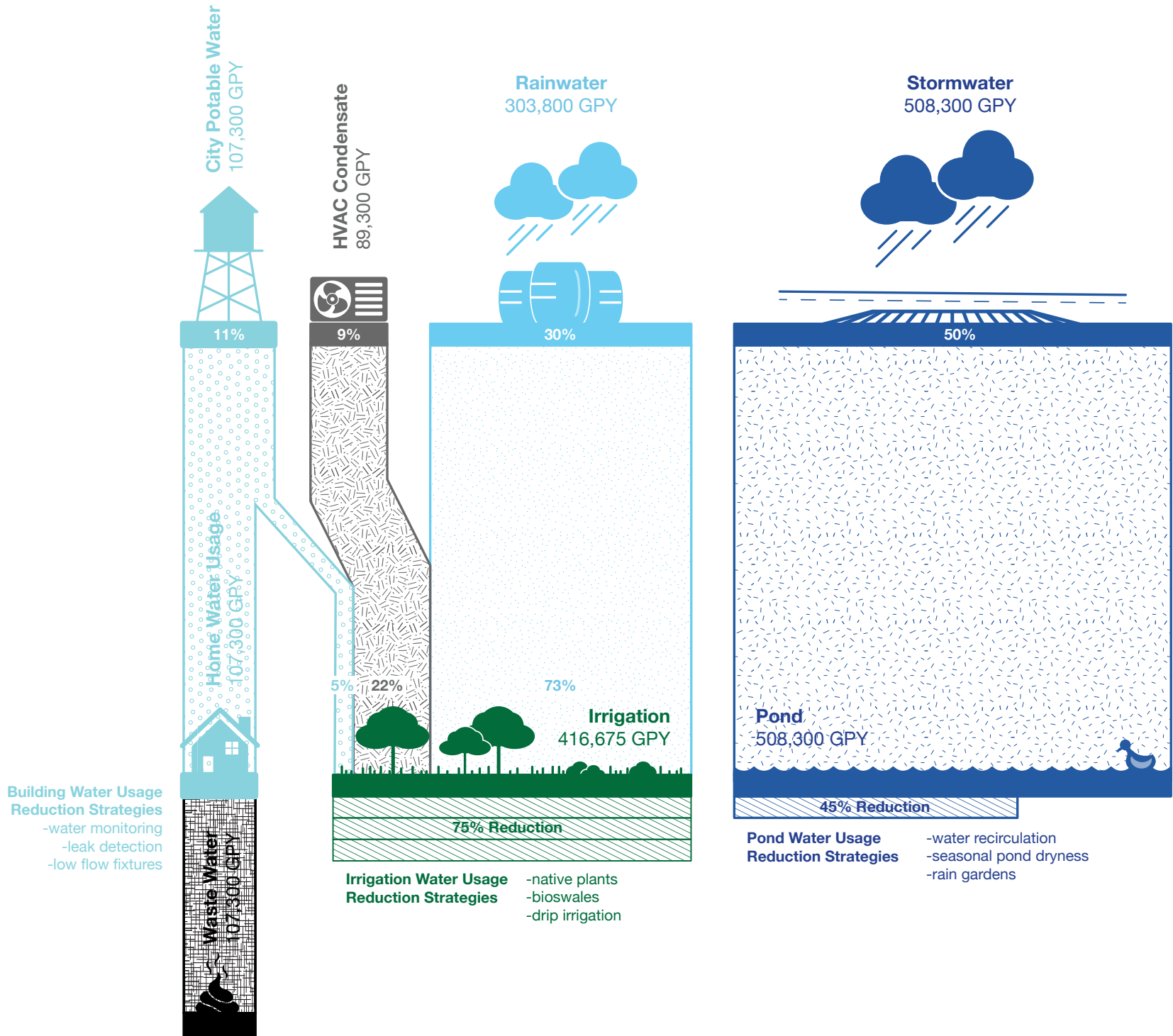
# Water Synthesis

## Water Catchment, Use, and Reuse

With a 45% reduction in pond consumption and a 75% decrease in landscape usage, the outdoor water demands at the site would significantly decline. Instead of relying on potable water, the plan recommends prioritizing sustainability by using stormwater, capturing rainwater, and using greywater (HVAC condensate) for irrigation. Despite these efforts, there remains a shortfall of 5,365 gallons annually. While the plan recommends targeting 100% of outdoor water supplied by non-potable sources, at least 5% or more may still need to come from city potable water.

Given that the project is confirmed to be in the Edwards Aquifer Transition Zone for TCEQ, but not in the Edwards Aquifer Transition Zone for the City of Austin (as these two entities use different maps to define the boundaries of the Aquifer), the project must abide by TCEQ guidelines but is exempt from City of Austin guidelines regulating construction on top of the Edwards Aquifer. TCEQ concerns itself with ensuring no toxic chemical tanks or petroleum tanks are located onsite which does not apply to this project. TCEQ allows greywater and condensate irrigation of sites above the Edwards Aquifer Transition Zone. To use greywater for toilets or irrigation, the water needs to be filtered and test at certain regulations. Although not considered in the current calculations or plan, it is recommended to explore on-site greywater use for toilets and irrigation. **Depending on the next version of AEGB, new construction may be required to dual-plumb fixtures.** Verify regulations with future Austin Water Forward and AEGB standards.

Further discussions and feasibility studies are required to connect to the existing purple pipe system located 1.11 miles from the site if desired. This could be a huge opportunity for keeping the water feature running year-round without potable water use.





# Water Use/Collection/Reuse

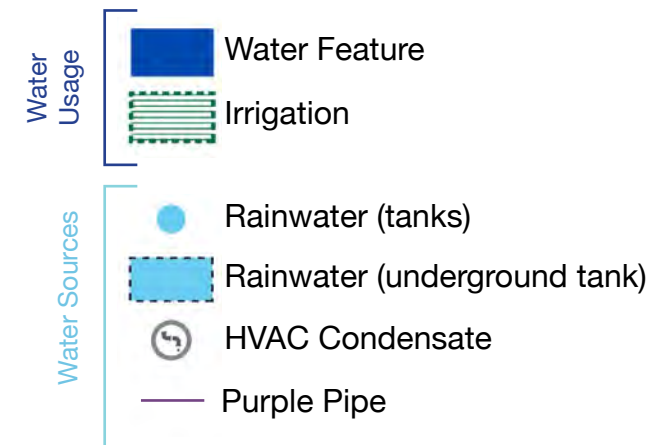
## Water Use, Rainwater Collection, and Greywater

The plan selected required irrigated areas which were picked out because of necessary upkeep required to allow the site to thrive for community events.

Placeholders have been indicated for one to two 15,000 gallon tanks at each new structure. Explore rainwater filtration for potable water, water feature refill, and irrigation uses. Certain considerations related to use will impact sizing, cost, filtration and other equipment, maintenance, and more.

The lower, upper, and water feature are to remain in the existing locations with adjustments to decrease potable water use for the water feature and irrigation.

The greywater from the condensate are implied in the structures indicated. The plan recommends to explore dual-plumbing and purple pipe connection. And the purple pipe system ends off the extents of the map, 1.11 miles away.





# Water Use Reduction

## Strategies

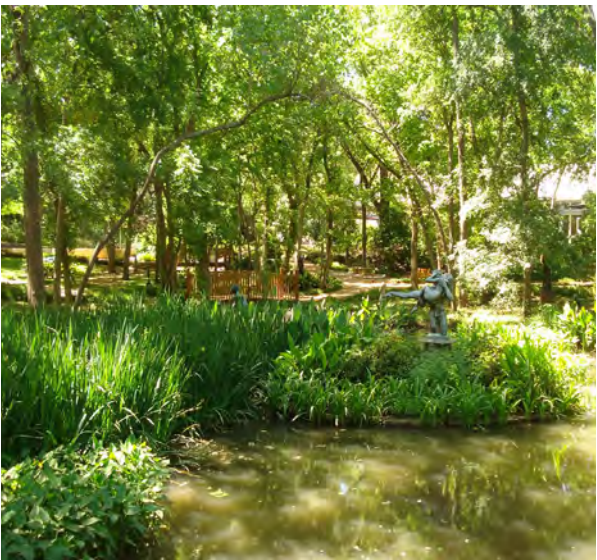
The majority of total on-site water use is allocated to irrigation, keeping the creek running, and the pond full for visitors. A substantial reduction in water consumption can be achieved by targeting these two sources. Implementing measure like removing invasive species, replacing the invasives with natives, introducing drip irrigation, and converting the water feature to a seasonal operation is projected to reduce pond usage by 45% and irrigation usage by 75%.

Efforts to curtail water usage play a crucial role in resource preservation. Given that irrigation and the water feature account for the majority of water consumption on site, key conservation strategies involve the implementation of landscape practices. These include recirculating water in the feature, incorporating bioswales, cultivating native plants, installing drip irrigation, leak detection (measuring and monitoring water use), smart watering systems that account for weather (rain), and soil moisture monitoring.



### Rain Gardens and Bioswales

Bioswales and rain gardens reduce run-off by 25%. They also retain water to seep into plant roots and groundwater and slow water down to reduce erosion. Filter beds also filter out contaminants.



### Seasonal Water Feature

Rather than replenishing the water feature year-round, using rainfall events to provide the water will reduce the water usage.



### Native Plants

Native plants require 75-80% less water than non-native plants. Native, drought-resistant plants significantly reduce irrigation water usage and decrease annual replanting.



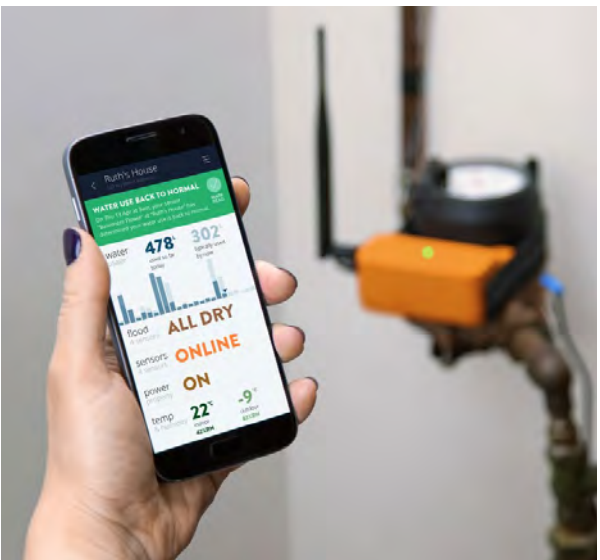
### Drip Irrigation

Drip irrigation is 90% efficient, while sprinklers are only 65-75% efficient in watering plant life. Drip irrigation reduces evapotranspiration and ensures the water goes directly to the plants.



### Low-flow Fixtures

Use the WaterSense and Energy Star label created by the Environmental Protection Agency to choose low-flow fixtures.



### Water Metering

Leak detection, circuit-level water metering, and remote shut-off will reduce usage.



# 07.6

## **Resilience**



# Resilience

## Introduction

Resilience encompasses varied aspects across different scenarios, including durability over time, energy and water availability during extreme events, and more. Specifically for the UMLAUF site, we are focusing on resilience through the lens of stormwater management.

Erosion control is a pressing concern, and implementing diverse landscaping strategies can play a pivotal role in mitigating the effects of water erosion. Planting a variety of shrubs and plants serve as a natural defense mechanism, as their root systems stabilize the soil and prevent it from being washed away by rainfall or runoff. Designing stepped terracing, especially on sloped areas, not only breaks the flow of water but also increases the capacity of water retention in a storm or flood event.

Amplified by unpredictable weather patterns, Austin also grapples with more frequent droughts and floods. Compounded with the UMLAUF's location in the 500-year flood zone — meaning once every 500 years the site is expected to experience a flooding event — resilience measures are becoming all the more pressing. However, with climate change, these floods happen more frequently than predicted. In preparation for the City of Austin denoted 500 year flood-line, UMLAUF is planning for floating floodgates and additional volume of water capacity in the existing pond. Conversely, droughts are longer and hotter. Planting native, drought-resistant species will play a big role in improving site resilience in extreme weathers.





# Stormwater Management

## Typical Year

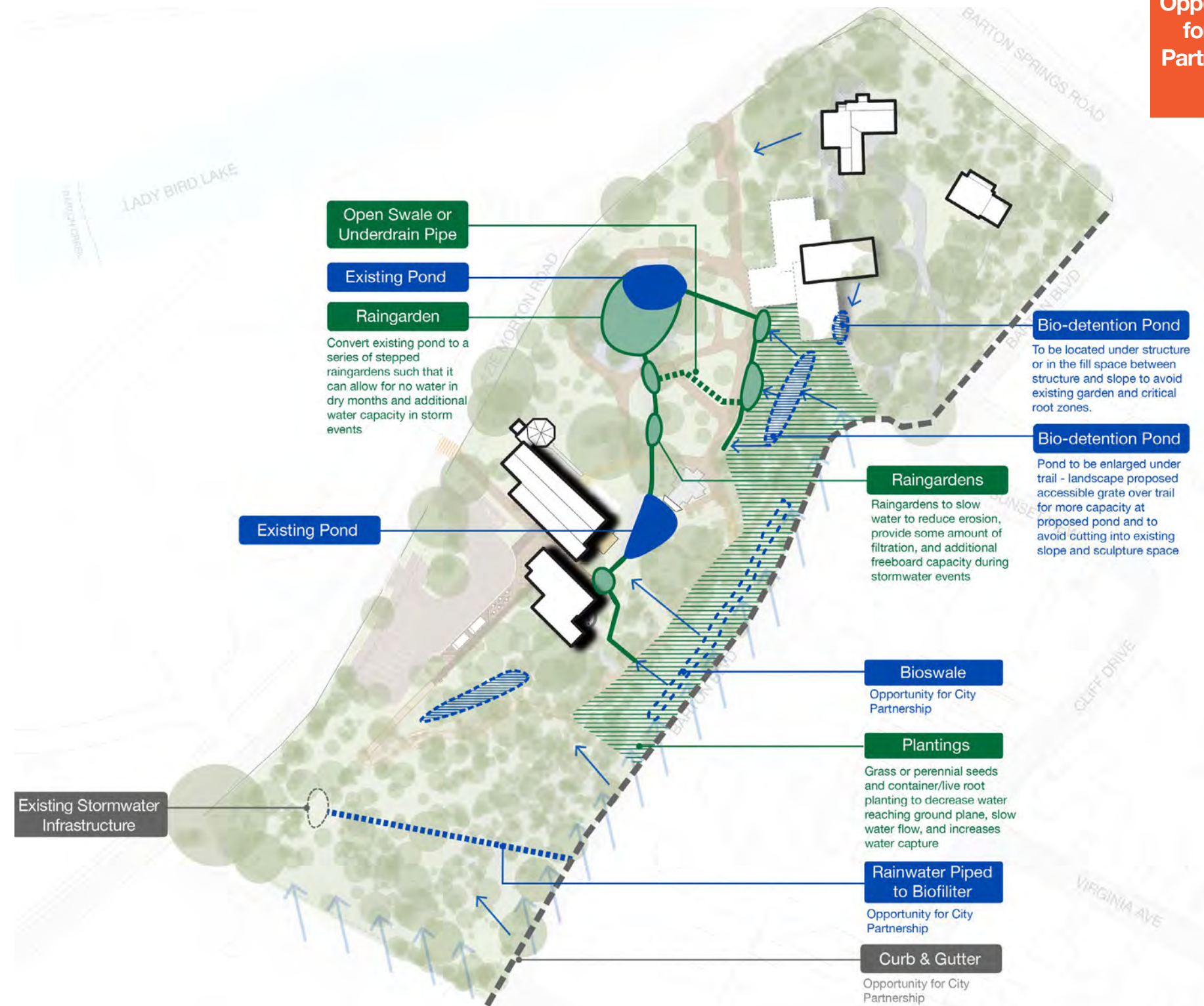
As water from the surrounding acres of land washes down through the UMLAUF site every rain event, the site experiences extreme stormwater issues include erosion and potential flooding.

Drainage from adjacent properties and neighborhoods are adding a significant amount of stormwater flow that impacts the overall site stormwater. 62.8 cfs of stormwater flows across the site without any type of stormwater controls. There is another 250.2 cfs from the adjacent neighborhood that is channeled through an earthen swale, without erosion control, along the banks. This flows into the concrete pond that slows the water and releases it at a controlled rate through a bar grate before flowing down-hill into the sunken gardens in Zilker Park. The predominant stormwater mitigation strategy (to be coordinated with the City) will include a bioswale or bio-detention pond and curb and gutter at the eastern edge of the site to mitigate stormwater coming from the neighborhood and Barton Blvd. This feature captures upstream drainage and release it downstream to the site/waterfall which would help mitigate erosion issues.

The second most significant stormwater management strategy is a series of bio-detention ponds and raingardens which are to hold extra water capacity during storm events. Landscape recommends all proposed ponds to be bio-detention as retention ponds require make-up water which can be from cistern or potable water sources. During droughts retention would require potable source. The bio-detention ponds, capture basins, and rain gardens are located to avoid existing garden features, critical root zones (CRZs), and sculptures.

Options for enlarging raingardens or ponds under trails, grates, decking, and more has been explored to avoid increasing impervious cover to manage stormwater and cutting into existing slope, expand stormwater capacity, slow water to reduce erosion, and clean water to reduce toxic runoff.

## UMLAUF HPEU PLAN



Opportunity  
for City  
Partnership



# Flood Management

## 500 Year FEMA Flood

The UMLAUF sits within the FEMA 500 year flood zone, meaning there is a 0.2% annual chance that a flood event could have a depth of less than 1 foot. The site could be flooded up to approximately the 468 ft contour (indicated with the light blue line). However, the City of Austin recognizes that each year the weather patterns have been more erratic, and sites need to provision for these events.

Given that the footprints overlap with the 500 year flood zone, all new construction is to be 1' above the 500 year storm line or the 468th foot contour, so the buildings have been raised where necessary. For existing buildings below that 500 yr + 1' contour, the flooding will be mitigated by constructing flood walls (retaining walls to direct water) along the perimeter to the elevation. The project plans to construct passive flood protection at all doors (i.e. floating flood gates).

The pond will play a key role in mitigating flooding waters. It is to be enlarged with added walls to increase retention capacity. The UMLAUF will need to coordinate with the city to determine downstream off-site improvements for flow downhill to the western street. Additional bio-detention ponds, raingardens, and more are to be sized for storage or freeboard during a 500 year flood event.

Opportunity  
for City  
Partnership





# 07.7

## **Sitewide Strategies**



# Summary of Sustainability Goals

## Health



### Improve occupant health and well-being

- Provide a minimum of MERV 16 air filter with exhaust, dehumidification, and ventilation
- Design for 80% Useful Daylight Illuminance (UDI) without glare and less than 5 degrees Operational Temperature stratification
- Select healthy materials by choosing those with low volatile organic compounds (VOCs), Red List free materials, and Health Product Declarations (HPDs)
- Provide acoustic noise/vibration control from street traffic and design for amplified sound/music

## Energy



### Achieve annual net zero energy

- All electric site (no on-site combustion)
- Place renewables on each available structure and provisions for a solar ready roof on all other structures
- Heat/cool new buildings with ground source heat pumps. Retrofit existing buildings with ground source heat pumps or air source heat pumps
- Reduce existing building energy usage by 25% and bring new building energy use 40% below code minimum
- Target 30% window to wall ratio

## Carbon



### Reduce embodied carbon emissions by 50%

- Track embodied carbon, aiming to reduce by 50%
- Achieve site carbon neutrality by 2055
- Select products with Environmental Product Declarations (EPDs)
- Separate construction waste into streams and divert 50% of waste by weight
- Source majority of materials from a 500 mile radius
- Place EV chargers and provide ease of walkability and public transportation access to site

## Ecology



### Replenish middle layer of ecology with regenerative species to create plant diversity.

- Remove invasive species
- Replant native species
- Preserve existing ecology & historically significant trees
- Create layers and diversity of plants to create ecological resilience
- Use high performance landscape strategies to reduce erosion and mitigate stormwater
- Support local fauna and protect endangered species

## Water



### Target 100% of irrigation and water feature to be supplied by non-potable sources

- Reduce site water usage by 80%
- Reduce new building water usage by 25% from an equivalent baseline code compliant building
- Collect all possible rainwater off roofs
- Collect all possible greywater for irrigation
- Use green stormwater infrastructure to create high performance landscapes which manage stormwater

## Resilience



### Preserve site through a 500 year flood and regular rain events

- Plan stormwater management for typical rain event without major erosion to the site
- Plan stormwater management for 500 year flood event without major damage to the existing structures



# Sitewide Strategies





# Maintenance

While initial decisions greatly influence the durability of both the buildings and the site, it is imperative to prioritize ongoing operations and maintenance to ensure the facilities remain functional and accessible to the public in the future. The UMLAUF is steadfast in its commitment to maintaining non-traditional sustainability systems such as solar, rainwater harvesting, greywater recycling, and more.

The plan recommends convening fully integrated meetings with all stakeholders, including operations and maintenance personnel, at the project's inception. Throughout the process, operations or maintenance teams will be kept informed and engaged to ensure their endorsement and familiarity with the integrated systems with a commitment to training and upskilling personnel. Upon project completion, it is recommended to compile a comprehensive maintenance manual for both the buildings and the site, ensuring the continuity of sustainability initiatives for years to come.

In alignment with Austin's Zero Waste citywide initiative, further exploration is encouraged to develop an operations, maintenance, and events plan aimed at achieving zero waste objectives.

*Aside: Conversations in this process have spurred evaluating sustainability in the perspective of not just the built environment, but also in relation to operations and the organization. The UMLAUF team is re-thinking event-related environmental impacts and community engagement programs in hopes that the operations and organization can leave a positive impact on the environment and community.*

**UMLAUF HPEU PLAN**





# Sustainability Glossary

## CERTIFICATIONS

Austin Energy Green Building (AEGB) – cultivates innovation in building for the enrichment of the community’s environmental, economic, and human well-being. Known as the first rating system in the U.S. for evaluating the sustainability of buildings, AEGB created a model for many other cities as well as direction for the U.S. Green Building Council’s LEED certification system. (Definition was paraphrased directly from Austin Energy’s website.)

Leadership in Energy and Environmental Design (LEED) – worldwide green building rating system which provides a framework for healthy efficient, and cost-saving green buildings. (Definition was paraphrased directly from USGBC website.)

SITES - provides a comprehensive framework for designing, developing, and managing sustainable and resilient landscapes and other outdoor spaces. (Definition was pulled directly from SITES website.)

WELL Building Standard (WELL) – a performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and well-being, through air, water, nourishment, light, fitness, comfort and mind. (Definition was pulled directly from International WELL Building Institute’s (IWGBI) website.)

Living Building Challenge (LBC) - produces regenerative buildings that connect occupants to light, air, food, nature, and community; buildings that are self-sufficient and remain within the resource limits of their site; and buildings that create positive impact on the humans and natural systems that interact with them. (Definition from International Living Building Institute (ILFI) website.)

Passive House Institute U.S. (PHIUS) – leading passive building certification program in North America for any type of project, large or small to create comfortable, healthy, resilient structures. (Definition was pulled directly from PHIUS website.)

JUST. – a nutrition label for socially just and equitable organizations

## HEALTH

Health Product Declarations (HPDs) – manufacturer disclosure of potential chemicals and product ingredients.

Mean Radiant Temperature – the measure of radiation on a surface.

Operational Temperature – a measure of ambient temperature, taking into consideration other comfort factors such as radiation, wind, and heat (the “feels-like” temperature on weather reports).

Quality Views – LEED defines as multiple lines of site at least 90 degrees apart to flora, fauna, or sky at least 25’ from exterior of glazing.

Useful Daylight Illuminance – the amount of daylight shone on a surface 4’ above the ground, which is in a light density range that is comfortable to the eyes.

Glare – fierce, uncomfortable light.

Temperature Stratification – where a single space has hot and cold spots with little air mixing.

Circadian Rhythm – the physical, mental, and behavioral changes

an organism experience over a 24 hour cycle.

Environmental Justice (EJ) – social movement that addresses the reality that poor or marginalized communities are harmed by hazardous waste, air pollution, and land uses from which they do not benefit.

## ENERGY

Indoor Air Quality – air quality within buildings that relates to the health and comfort of building occupants.

2.5 Particles Per Million (ppm2.5) – fine inhalant materials with diameters that are 2.5 micrometers and smaller. Particles larger than 2.5 ppm cause the largest health risk. The Clean Air Act set by the EPA sets national requirements for air quality monitors based on this metric.

Site Net Zero Annual Energy – The site produces as much energy on-site as it consumes on an annual basis.

Renewable Energy – a form of energy that is not depleted when used such as wind, solar, geothermal, etc.

Site Energy – the amount of energy used on site (the number reflected in energy bills).

Source Energy – the total amount of raw fuel required to operate the building.

## CARBON

Greenhouse Gases (GHG) – gases in the atmosphere that raise



# Sustainability Glossary

the surface temperature of the planet.

Carbon Dioxide Equivalent (CO2e) – the number of metric tons of CO2 emissions with the same global warming potential as one metric ton of another greenhouse gas.

Global Warming Potential – measure of how much infrared thermal radiation a greenhouse gas would absorb over a given time frame after it has been added to the atmosphere.

Embodied Carbon - the total greenhouse gas emissions associated with the entire life cycle of a building or product, including the extraction, manufacturing, transportation, and construction phase. Included in these calculations are CO2 equivalents of greenhouse gas emissions released from refrigerant leakage.

Operational Carbon - the ongoing carbon emissions resulting from building operational energy consumption.

Sequestered Carbon - the carbon dioxide that is captured and stored, often through sustainable practices like afforestation or the use of carbon-absorbing materials.

On-site Carbon Off-Set - Carbon emissions offset by replacing grid energy with on-site renewables or reducing energy usage with energy reduction strategies.

Type III Environmental Product Declarations (EPDs) – a 3rd party certified report which shows the environmental impact of a material from harvesting, production, use, to decommission. The procedure of reporting is regulated by ISO 14205.

Whole Building/Site Life cycle Analysis – a method of assessing

environmental impacts of a building or site over the span of its lifetime, considering the impacts of all the materials and energy that goes into making and operating the building over its lifetime through end of life.

Geo-exchange System – transfers heat in and out of the soil where the soil is used as a heat sink.

Deep Energy Retrofit – the process of installing and/or replacing parts and pieces of an existing building to improve energy efficiency.

## ECOLOGY

Shrubs and Forbes – mid-level planting that look like bushes.

Permaculture – an approach to land management and settlement that uses principles of permanent planting. It focuses on diverse plant and animal species and multi-layered planting which creates an interdependent resilient ecology.

Pollinators – an animal that moves pollen from flower to flower such that fertilization can occur for propagation of plants.

## WATER

Potable – water that is filtered, treated, and free from contaminants (aka drinking water). City of Austin drinking water quality standards are dictated by the EPA and supplementary local requirements.

Non-Potable – any type of water not suitable for human consumption (greywater or blackwater).

Greywater – clean wastewater without pathogen contamination or grease (typically collected from baths, sinks, HVAC condensate, etc.).

Purple Pipe – City of Austin’s reclaimed water (greywater) pipe system.

Black-Water – contaminated wastewater.

Rainwater Harvesting – the collection and storage of rainwater from building roofs.

Stormwater – runoff water that does not infiltrate into the soil but flows over land and collects on surfaces.

## RESILIENCY

FEMA 500 year Flood Plane – There is a 0.2% annual chance that a flood event could have a depth of less than 1 foot based on computer models and statistical estimates.

Run-Off – That portion of the precipitation on a drainage area that is discharged from the area in stream channels. Types include surface runoff, ground water runoff or seepage.

Swale – A natural or man-made drainage way that is below the adjacent ground level that collects and moves surface run-off.

Bio-Swale – A vegetated natural or man-made drainage way that is below the adjacent ground level that collects and moves surface runoff. Bioswales are channels designed to concentrate and convey stormwater runoff while removing debris and pollution. Bioswales can also be beneficial in recharging groundwater.



# Sustainability Glossary

**Curb and Gutter** – Curb is a vertical or sloping structure located along the edge of a roadway, normally constructed integrally with the gutter, which strengthens and protects the pavement edge and clearly defines the pavement edge to vehicle operators, gutter is a shallow concrete waterway adjacent to a curb for conveying street flow.

**Raingarden** – A vegetated, depressed landscape area designed to capture and infiltrate and/or filter stormwater runoff. The growing medium for the rain garden consists of native soil or biofiltration media. If the infiltration capacity of the subgrade soils is limited, the rain garden can be underlain by an underdrain system. Rain gardens provide removal of pollutants in stormwater runoff similar to other treatment systems. However, because they are restricted to smaller drainage areas and shallower ponding depths, which necessitate a larger surface area, infiltration, evapotranspiration, and biological uptake mechanism may be more significant for rain gardens than other treatment Best Management Practices (BMP).

**Filter Strip** – A strip of permanent vegetation above ponds, diversions and other structures to retard flow of runoff water, causing deposition of transported material, thereby reducing sediment flow.

**Impervious Cover** – The total area of any surface that prevents the infiltration of water into the ground, such as roads, parking areas, concrete, and buildings.

**Pervious Cover** – The area of land within a lot occupied by trees, lawn, mulch, or other materials that permit rainwater to permeate into the subsurface.

**Underdrain Pipe** – A buried pipe or other conduit (subsurface drain).

**Floodgates** – A gate for shutting out, admitting, or releasing a body of water. There are two types: active flood mitigation (requires human interaction to deploy) and passive flood mitigation (has an established elevation that requires no human interaction).

**Bioretention Pond** – A bioretention pond can be large or small and uses a combination of plantings and special drainage systems to filter surface water runoff before it makes its way into the watershed. Plantings around the pond help to slow the velocity of the water and pick up small particles of sediment.

**Detention** – The storage of storm runoff for a controlled release during or immediately following the design storm. Release rates draw down within 24 - 48 hours to make room for additional or subsequent rainfall.

**On-site Detention** – A detention pond which is located within the specific site or subdivision it serves.

**On-stream Detention** – The temporary storage of storm runoff behind embankments or dams located in a channel.

**Drainage Area:** The area contributing storm runoff to a stream or drainage system at a particular point.



08

# Plan Implementation

Phasing  
Case Studies



# Phasing

The plan outlines three main phases for implementation, emphasizing that sustainability and resilience strategies should be integrated throughout all phases. To ensure equitable access to the UMLAUF site, programming and operational strategies focused on diversity, equity, and inclusion must be implemented along and after the completion of the three phases.

Before Phase One, it is recommended to perform an Archaeological Survey of the site.

## Phase One: Existing Facility Projects

The plan proposes initiating existing facility projects as the initial step to promptly address site accessibility and mitigate current water runoff issues. These strategies can be complemented by edge improvements to enhance site safety, strengthen connections to the city, and raise public awareness.

**Accessibility Site Approach Improvements:** Site-wide accessibility enhancements, full access to the museum gallery, and the expansion of public restrooms as a priority. Include water filling stations, benches, and other landscape accessibility and inclusion elements.

**Parking and Accessible Parking:** Include in accessibility approach. Expand parking with code compliant accessible parking spots and relocation of the crosswalk. This could also be the time to install the ground source heat pump loops to be used for new and existing buildings

**Garden Improvements:** Bringing garden pathways into TABS compliance (follow landscape recommendations), reworking the pond edge, concrete walls for extra stormwater storage,

and circulation system, replacing landscape irrigation. Install rain gardens and swales to manage and slow stormwater drainage across the site. Add mid-level native vegetation and replace pond vegetation. Repair and improve stormwater drainage from the UMLAUF site under Azie Morton and Barton Springs Roads.

**Other Museum Renovations:** Includes sustainability and resilience strategies, as well as strategies to bring the museum up to standards for art installations. These include placing an ERV, dehumidifier, MERV 16 filters, bathroom booster fans, and seal ductwork, among others. Evaluate roof age and place solar on roof. Place rainwater system (collection tank, gutters, and filtration). Collect greywater off condensate to be re-used for toilets.

**Edge Improvements:** Follow landscape recommendations. Replace fencing along Barton Springs Road and Azie Morton with new edge strategies for visibility and neighborhood enhancement. Consider the curb and gutter strategies on Barton Blvd.

During Phase One it is recommended to further engage with the community to get programming feedback and start implementing equity, diversity, and inclusion programs. Track programs and document their impact.

## Phase Two: Historic Preservation

Phase Two could commence either concurrently with phase one or afterward, focusing on historic preservation strategies aimed at preventing the deterioration of the historic homestead. Operational strategies should be enacted to ensure access to the enhanced historic homestead while phase three progresses.

**Historic Preservation at Home:** Includes exterior and interior



# Phasing

approaches. Follow the recommendations in the Historic Preservation chapter. Consider energy retrofit, further existing energy data evaluation is recommended. Includes updating MEP systems to heat pumps, include ventilation, filtration, electrification, solar-ready roof, and greywater collection off the condensate. Further feasibility studies are recommended to collect water off historic buildings, install proper catchment and guttering.

**Historic Preservation at Studio:** Includes exterior and interior approaches. Follow the recommendations in the Historic Preservation chapter.

**Improvements and Access to Upper Garden:** Renovating the driveway and accessibility to the Historic Homestead from Barton Blvd. It is recommended to install ground source heat pump loops (for old and new buildings in area) at the same time as driveway renovation.

## Phase Three: Expansion and Unification Projects

Phase Three encompasses the incorporation of two primary connectors and the expansion of space to facilitate the implementation of new programs, encompassing both public and private events, exhibitions, arts education, library services, and expanded operational capabilities.

**Gateway and welcome zone:** The plan recommends the addition of a building of approximately 3,500 SF for educational, operational, and ticketing programs. Follow material and system recommendations from Design Guidelines and Sustainability and Resilience chapters. Along with the building addition, enhancements suggested for the welcome zone must be implemented to support a

more inclusive arrival experience, such as a public area, and a welcoming/decision making plaza.

**Treehouse:** The plan recommends the addition of a connector building of approximately 10,300 SF to support program such as private events, exhibitions, and education. An elevator must be considered for accessibility to the historic homestead. Follow material and system recommendations from Design Guidelines and Sustainability and Resilience chapters (for example: rainwater, greywater for dual plumbing, solar, energy efficiency measures)

**Historic Garden Enhancements:** Additional enhances to the upper garden—such as outdoor event spaces and overlooks—should be implemented when the area is fully accessible. Follow the recommendations on the Landscape chapter.

**Natural Area:** Considers landscape strategies to improve biodiversity on the southern area of the site, and an interpretive trail or boardwalk to unify the site, and provide a space to connect to nature. Accessibility strategies must be implemented to make this area fully or partially accessible.



## Case Studies

Three pertinent case studies have been included as references for this plan, each offering valuable insights into the preservation of artist houses and studios, now serving as museums. These case studies analyze similarities, differences, and key takeaways from each project, all of which represent significant examples of successful preservation efforts. While the UMLAUF distinguishes itself through its urban setting, unlike most of the referenced cases situated outside bustling urban centers, all examples share the common goal of preserving the artistic legacies while serving as educational and cultural hubs within their respective contexts. By integrating preservation models with new exhibitions and events, these museums have evolved into national destinations, enriching their communities and honoring the artists' contributions.



Library at The Block in Marfa, Texas / Judd Foundation. Photo by Luis Garvan



# The Donald Judd Foundation

The Donald Judd foundation in Marfa, Texas, is a thriving art studio, museum, exhibit, and home. The museum experience is divided into two parts, The Block and The Studio. The Block, also known as La Mansana de Chinati, is situated in a separate location within the city. Meanwhile, The Studio comprises three separate downtown spaces: the Architecture Studio, Art Studio, and the Cobb and Whyte Houses.

## Similarities:

- The foundation preserves and interprets the artist's home and spaces of art production.
- A permanent exhibition of the artist's works span many periods and modes in which Judd worked.
- Direct access to the studio spaces where the artist worked.
- Sculptures are experienced in their original context, as located by the artist.
- The period of historical significance in which the artists lived and worked are similar.
- Exterior and interior space are essential to the art.

## Differences:

- The viewings of all facilities are scheduled, guided tours.
- The foundation is spread throughout multiple properties, distributed among a small urban context.
- The scale of the art is often at an architectural scale which is a bigger and different scale of work.

## Take-aways:

- Preserving the artist's living and working space sparks interest across diverse communities, from arts and education to tourism.
- The house/studio preservation model integrates easily with exhibits of new work, dozens of events, and foundation staff offices. These programs are shared with the UMLAUF.
- The unification of an urban district into a cohesive web, consisting of multiple points of interest offers valuable insights for UMLAUF's vision of a larger arts district.





# The Georgia O'Keeffe Museum

The Georgia O'Keeffe Museum includes two houses owned and used by the artist in Northern New Mexico. The house on the Ghost Ranch property was used by O'Keeffe in the summer months, but only her larger, year round home in the village of Abiquiu is accessible for tours.

## Similarities:

- The artists lived and worked in a similar period.
- The artists both carefully studied and adapted their environments to reflect their sensibilities.
- The art has regional character as a center of interest in a larger region.
- Both artists' homes include gardens where art and space interact.

## Differences:

- The UMLAUF is centrally located in a city and can be easily visited. Whereas the O'Keeffe museums require a dedicated effort to reach.
- The museum is substantially focused on the life and works of the artist. At the UMLAUF, the role of rotating exhibits, arts education, and events play a more significant role.
- Private wedding venue functions are not part of the business model at the O'Keeffe Museum.

## Take-aways:

- The artist's home as a destination can motivate people to make the journey.
- The museum can feature the impact of landscape and environmental regional character on the artist's work—one of the main features of the UMLAUF garden.
- Gardening and landscape characteristics create an important draw to those curious about art and nature.





# Sul Ross

The new Sul Ross expansion at The Museum of the Big Bend may seem like a distant relation to the UMLAUF, but, in fact, it effectively combines similar program elements to accomplish similar goals. It is instructive in this regard.

## Similarities:

- The MotBB is known to be a destination that is easily accessible to visitors of the national park. While its scale may differ, its context bears resemblance to the UMLAUF's location adjacent to Zilker Park. The proposed new building has the potential to establish an art center that garners attention and recognition on a broader scale.
- Dramatic landscape provided context for viewing and understanding art.
- Each project incorporates a new building that doubles the size of the existing museum.

## Differences:

- The Sul Ross is a traditional museum gallery and a single building footprint.
- The cost of construction is less due to the simple, flat site.
- The integration to the Sul Ross State University campus affords the museum a much different advantage for visitors, and a diversity of users.

## Take-aways:

- The relation of architecture to the landscape can drive the form and performance of the project.
- A visionary building can positively transform the perception an institution.
- Flexible large assembly spaces used for weddings can maximize use and return on investment and are supportive of arts program building types.

