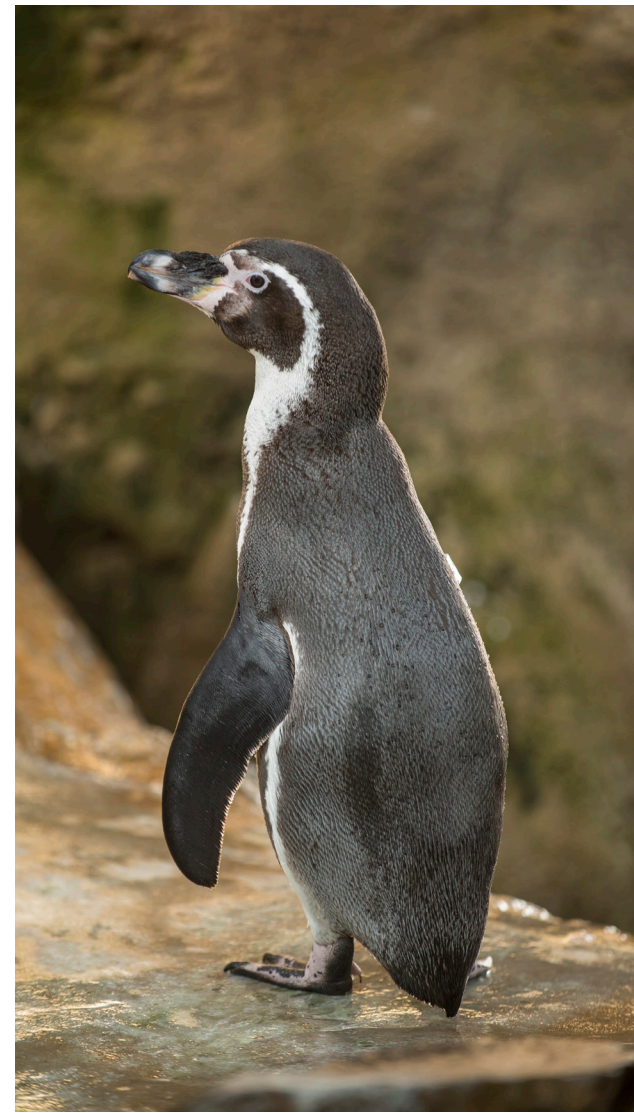


Oregon Zoo Campus Plan 2024



CAMPUS PLAN 2024

PLANNING PARTICIPANTS

PREPARED FOR:



4001 SW Canyon Rd,
Portland, OR 97221

PREPARED BY:



D E S I G N

833 Chestnut Street, Suite 909
Philadelphia, PA 19107

ADMINISTRATION

Heidi Rahn – Zoo Director
Utpal Passi – Deputy Director
Krista Swan – Director of Marketing
Hova Najarian – Director of Communications
Melanie Sorensen – Director of Education & Conservation
Lori Ford – Culture & Inclusion Manager
Charetta Long – Equity & Engagement Manager
Shervin Hess – Conservation Manager

OPERATIONS

Ivan Ratcliff – Director of Business Operations
Tim McCormack – Director of Facilities
Jennifer Burns – Safety & Health Program Manager
Mickey Webb – Director of Events
Michael Harris – Maintenance Manager
Seth Menser – Horticulture Manager
Jesse Lene – Building Controls Manager
Joel Lavespere – Public Safety Manager
Ron Herrington – Custodial Supervisor

ANIMAL CARE

Steve Lefave – Curator of Elephants
Kate Gilmore – Curator of Primates & Ambassador Animals
Kelly Gomez – Curator of Africa & Marine Life
Travis Koons – Curator of Birds, Reptiles & Native Conservation
Asaba Mukobi – Area Supervisor, Primates
Eliza Lee – Area Supervisor, Ambassador Animals
Amy Hash – Area Supervisor, Africa & Marine Life
Marcus Jason – Area Supervisor, Birds, Reptiles & Small Mammals
Jen Osburn-Eliot – Area Supervisor, North America

ANIMAL HEALTH, WELFARE, & NUTRITION

Carlos Sanchez – Director of Animal Health
Nadja Wielebnowski – Animal Welfare & Research Manager

OREGON METRO

Kristin Solomon – Senior Capital Project Manager
Staci Pfau – Senior Capital Project Manager
Joel Morton – Senior Attorney
Tom Rogers – Finance Manager
John Lindenthal – Program Director, Construction Project Management Office
Jenna Garmon – Sustainability manager
Dana Visse – Climate Analyst
Sarah Allison – Sustainability Planner

OREGON ZOO FOUNDATION

Julie Fitzgerald – Executive Director

CLR DESIGN

Gregg Leicester – Principal in Charge
Dan Miller – Project Manager, Architect
Nick Iott – Landscape Architect
Kelsey Weber – Architect
Scott Dietrich – Graphic Designer

WALKER MACY

Chelsea McCann – Principal
Emily De Lautour – Landscape Architect
Betty Lou Poston – Urban Designer
Sierra Gardiner – Landscape Designer

KPFF CONSULTING ENGINEERS

Daan Dommels – Principal
Paul Schmidtke – Civil Engineer

PAE ENGINEERS

Allan Montpellier – Principal
Tim Elley – Project Manager, Mechanical
Karina Hershberg – Regenerative Design
Robert Smith – Electrical
Steve Kelly – Technology

TJP ENGINEERING

Terri Johnson – Principal, LSS Engineer

EQUILIBRIUM ENGINEERING

Ed Quesenberry – Principal, Structural Engineer
Leif Erickson – Principal, Structural Engineer

GRI

Jason Bock – Principal
Nick Hatch – Geotechnical Engineer

DCW COST MANAGEMENT

Andrew Jonsson – Technical Lead
Bryan Baldwin – Project Manager, Cost Estimator

JP MITCHELL, LLC

Jim Mitchell – Advisor

COMMUNITY ENGAGEMENT

Terry O'Connor – Terry O'Connor Consulting
Nette Pletcher – Beez Kneez Creative

THE BOOKIN GROUP

Chris Hagerman – Principal, Senior Planner
Debbie Cleek – Principal, Senior Planner

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EXECUTIVE SUMMARY

INTRODUCTION

Together for Wildlife

For nearly 135 years, the Oregon Zoo has offered local residents and visitors from around the world a chance to connect with wildlife. Along the way, it has evolved into a hub for the science of animal well-being and is an internationally recognized conservation leader. The zoo is helping to save all kinds of endangered species, from California condors to northwestern pond turtles and has generated a tremendous amount of community pride and support.

In 2008, people across the region acted on behalf of animals and sustainability with an overwhelming vote to invest in the zoo. The 2008 zoo bond measure was transformative. It provided for a dramatic overhaul to some of our most popular animal habitats, plus a state-of-the-art veterinary medical center, an education center, and much more. All told, the bond reshaped nearly 40% of the zoo campus — an impact enjoyed by millions of visitors.

Even with all that has been achieved, there are habitats in sections of the zoo that date to the late 1950s and are not able to keep pace with changing standards. There also are accessibility challenges and aging infrastructure. The zoo has a lot to be proud of, but at the same time there is more work to do — for our animals, for our guests and for our environment.

Collaborating with a professional planning team from CLR Design, the zoo set priorities through a nearly yearlong engagement process involving zoo guests, staff members, community groups, experts in animal care and conservation, and other stakeholders. The Metro Council provided additional input and guidance.

All of that work is reflected in this 2024 campus plan, which will help shape the next era of animal care, guest accessibility and resource conservation at the zoo. Focusing on areas not improved through the 2008 bond, the plan proposes updating some of the zoo's oldest animal areas, improving accessibility and amenities for guests of all ages and abilities, and ensuring the zoo does its part to both mitigate and respond to a changing climate.

The Oregon Zoo's mission is connecting our community to the wonder of wildlife to create a better future for all. This plan envisions the physical manifestation of that mission: a space for the zoo to create connections, spark interests and foster relationships that will benefit not just this region but the world — a campus that will bring us together for wildlife.



CONTEXT

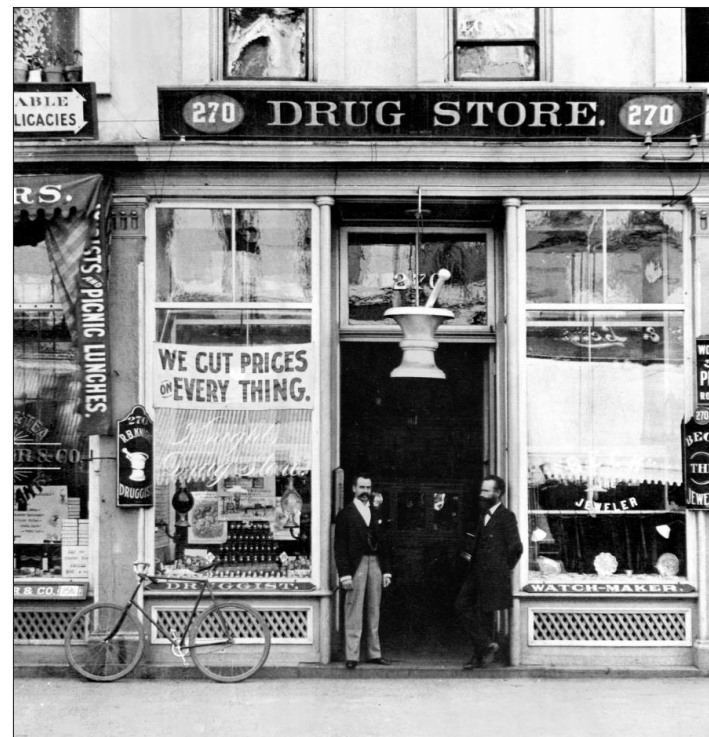
The Oregon Zoo has been at its current 64-acre location in Portland's West Hills since moving to Washington Park in 1959. The zoo is a key community resource and regional attraction, currently welcoming around 1.3 million visitors annually.

Many updates and groundbreaking animal-care advancements have been made over the years, facilitated most recently through a 2008 bond measure and subsequent capital projects. Improvements to the zoo over the past decade were guided by a previous Campus Plan completed in late 2011.

History

The zoo's history dates back to 1888 when a pharmacist named Richard Knight donated a grizzly bear and a small number of exotic animals he had acquired to the City of Portland. This led to the establishment of the Portland Zoo at a site in lower Washington Park. Over the next 70 years, the diversity and number of species housed at the zoo grew dramatically. In 1954, A successful bond measure financed the construction of the Portland Zoological Gardens, which opened at the current zoo site in 1959.

The Metropolitan Service District assumed management responsibility of the zoo in 1976 and oversaw significant renovations over the next 20 years. The zoo became the Oregon Zoo in 1998, the same year that the regional MAX light rail system was connected through the Washington Park station.



Richard Knight's Pharmacy

Ten years later, local voters approved a bond measure which, along with support from Oregon Zoo Foundation donors, funded eight major projects defined by the 2011 Campus Plan. These transformative projects reimagined roughly 40% of the zoo's usable area and include the Veterinary Medical Center, Education Center, Condors of the Columbia, Elephant Lands, Polar Passage, and Primate Forest among others.



Aerial photograph, Oregon Zoo 1967

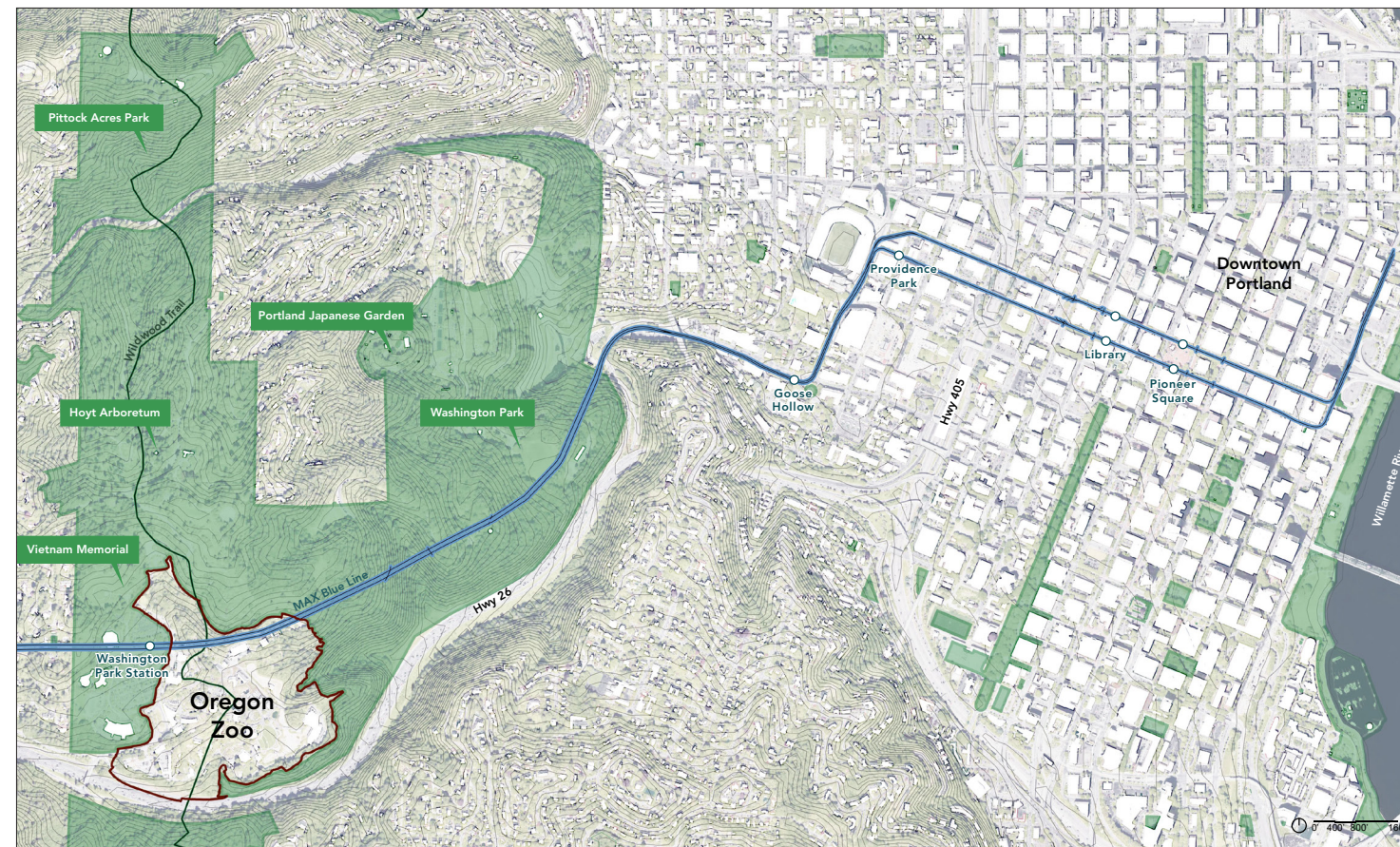
From its humble beginnings 135 years ago—through strong support from the local community, strategic planning, and responsible development—the zoo has transformed into a world-class center for wildlife education, species recovery and conservation science.

Site Characteristics

Located about two miles southwest of downtown Portland, the zoo landscape is characterized by around 80 vertical feet of north-to-south slope and surrounded by mature Pacific Northwest conifer forest. The site is easily reached via MAX light rail lines as well as by car from Highway 26 and SW Kingston Drive.

Various bike and foot trails also provide access and recreation around the zoo. The slope, forested landscape and park surroundings offer excellent views and adjacencies throughout the campus but limit the zoo's usable footprint to roughly 43 acres.

The hills surrounding the zoo, known as the Tualatin Mountains, are defined by a series of active and inactive faults leading to a generally seismically active condition. The land the zoo sits on is part of an active mapped prehistoric landslide encompassing roughly 125 acres, ranging from 20 to 100 feet deep. The zoo's ongoing monitoring program has recorded slow but steady movement near the edges of the slide and at the toe of the main slope.

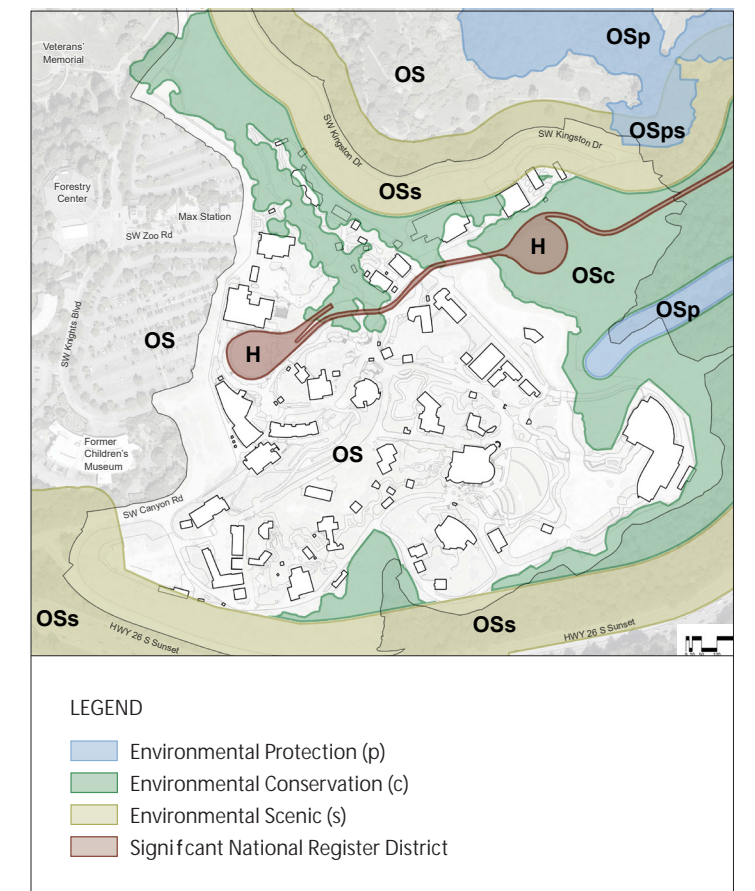


Zoo context map

Future zoo development should maintain current net loading with balanced cut-and-fills, avoid steep sloped areas, and limit water infiltration as much as possible. Foundation design and excavation will also be critical components of all future designs. Structures are likely to require a combination of mat foundations, conventional spread foundations tied together with grade beams and—for those near the toe and head of the landslide scarp—deep foundations such as micropiles or drilled shafts.

Washington Park is zoned by the City of Portland as Open Space. The Open Space zone is intended to preserve and enhance public and private open, natural, or improved park and recreational areas. Additional overlay designations fall within the Open Space zone encompassing the zoo, including environmental protection, environmental conservation and scenic resources.

Protections provided by the environmental overlay zones, which preserve the amazing natural environment surrounding the zoo also impact the improvable area within the zoo's boundaries. Development adjacent to these areas must be strategic, limited within undisturbed areas, and compliant with additional environmental regulations as defined by Title 33 of the Portland City Code.



Zoo open space zoning overlay map



Veterinary Medical Center

Planning and Strategic Framework

This Campus Plan is built on the framework of the recent Oregon Zoo Strategic Plan, drawing on knowledge gained from the 2011 Campus Plan and subsequent capital projects. Context provided by these elements helps to define the goals and drivers behind current planning efforts, which will inform progress over the next 10 to 15 years. Many of the Strategic Plan's focus areas tie directly to physical campus planning and provide important context for proposed elements in this Campus Plan.

2020–2023 Oregon Zoo Strategic Plan Focus Areas:

- Lead the way in animal care & welfare.
- Advance wildlife conservation.
- Deliver an inspiring guest experience (every time).
- Create diverse, equitable & inclusive environments.
- Connect with our communities.
- Provide meaningful and fulfilling staff experiences.
- Achieve financial sustainability.

The capital projects associated with the 2011 Campus Plan were transformative, advancing animal care and well-being, environmental sustainability and the zoo's ability to provide high-quality conservation education. Condors of the Columbia highlights a conservation program that has boosted the wild population of critically endangered California condors in significant ways. The Veterinary Medical Center allows zoo staff to provide industry-leading medical care to the resident animals. The Education Center provides a new home for the programs that help fulfill the zoo's commitment to conservation education and outreach.

Most recently, Elephant Lands, Polar Passage, Primate Forest, and Rhino Ridge significantly expanded and improved both the indoor and outdoor housing spaces while supporting activity and choice to enhance the well-being of these complex animals.



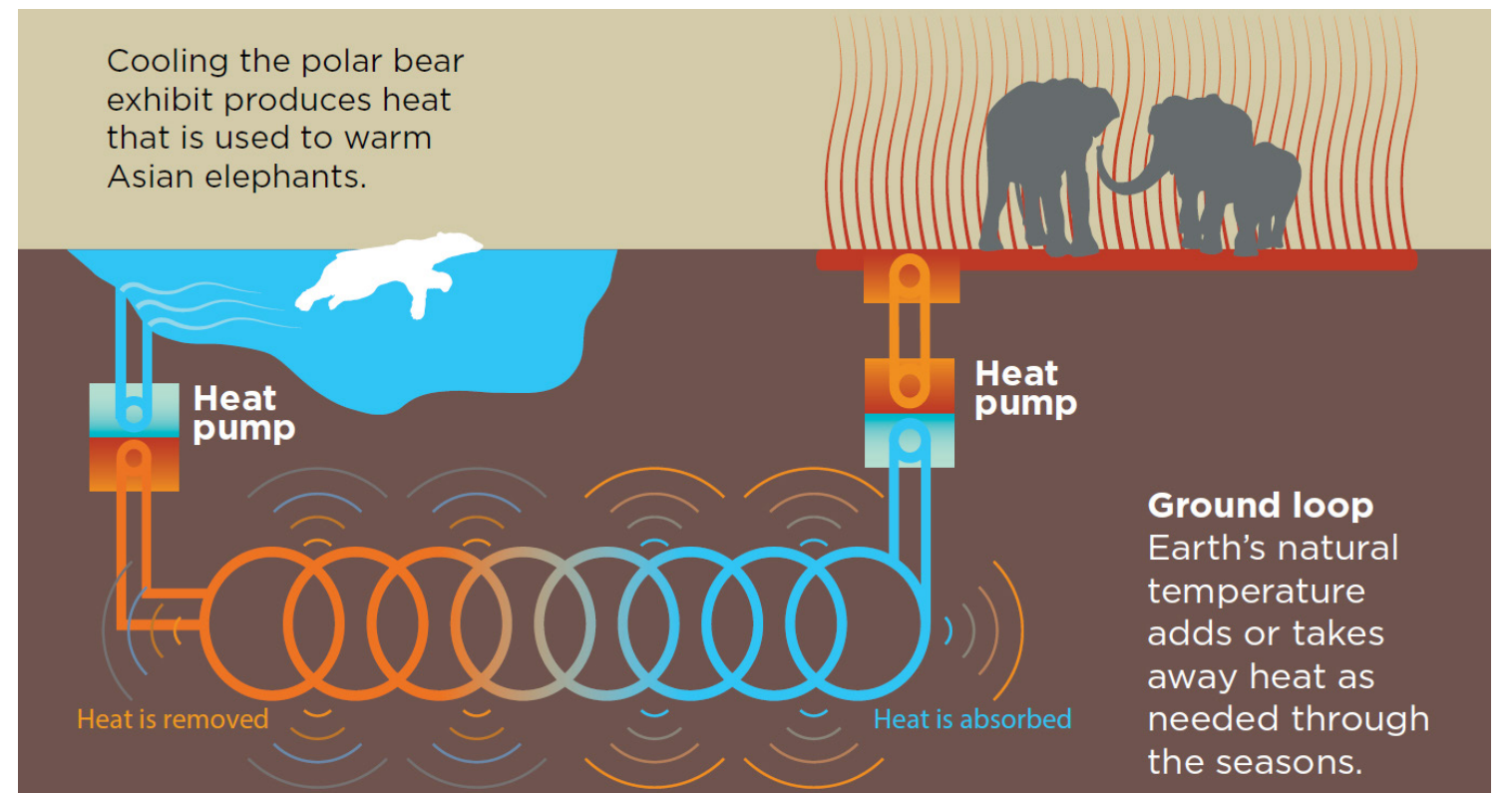
Education Center

All of the above projects represent critical progress for the Oregon Zoo, and provide important information for planning future directions. Some key reflections informing this campus plan include:

- Enhancing animal well-being often requires a larger care footprint compared to older/existing facilities. On a constrained site, this can lead to fewer animals and less species diversity. One goal of this Campus Plan is to increase the diversity of life represented at the zoo.
- Sustainability and climate resiliency measures included in recent projects have been largely successful case studies for continued development. Rainwater and solar harvesting systems at the Education Center, Elephant Lands and VMC, as well as the geothermal heat exchanger between polar bears and elephants, are all worth studying to determine whether aspects may be incorporated into new work.
- Efforts to publicly showcase animal care have been very successful for engaging zoo guests, but special attention should also be paid to providing top-quality and naturalistic viewing opportunities.
- It can be a challenge to maintain quality guest experience during ongoing construction, especially when large areas of the zoo are closed for redevelopment. Phasing and implementation plans must be carefully developed to optimize the guest experience during such times.
- As climate change, invasive species, disease and other threats to biodiversity intensify, the broader conservation community is turning to the Oregon Zoo to advance species recovery efforts both on-grounds and in the field. The zoo supports industry-leading animal care and conservation work, but studies have shown many guests are not aware of these programs.



Primate Forest



Successful heat exchange system between polar bear (2021) and elephant (2015)

THE PLANNING PROCESS

This final report represents a consensus reached through the input of hundreds of people, numerous planning workshops, community engagement sessions, and detailed engineering analysis over the course of 2023. The process was divided into five distinct tasks.

I. WORK PLANNING

Develop a detailed schedule and strategy to deliver the Campus Plan as envisioned by the zoo.

II. PRELIMINARY PROGRAMMING

Define the goals of the Campus Plan and consider what programmatic elements are required to achieve them.

III. INVENTORY & ANALYSIS

Review and analyze the existing zoo landform, facilities, infrastructure, utilities, circulation, opportunities and constraints.

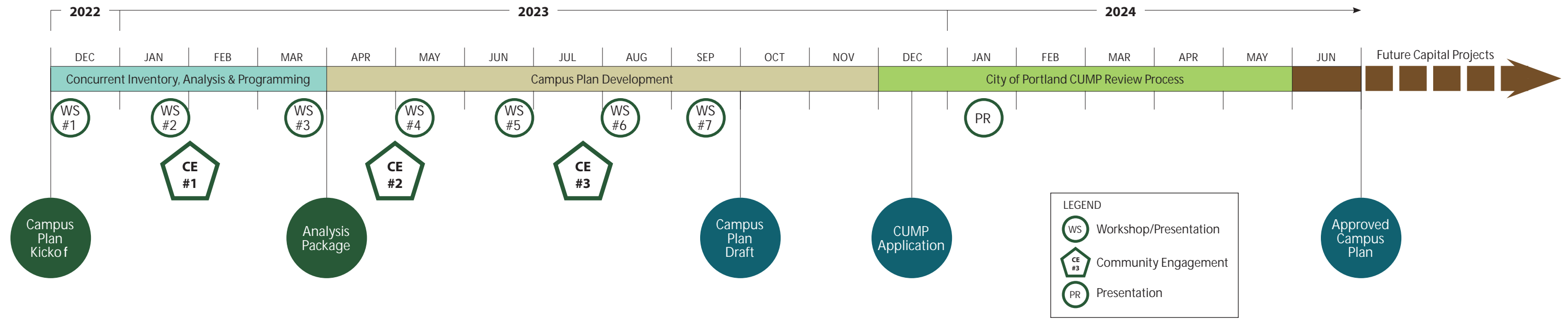
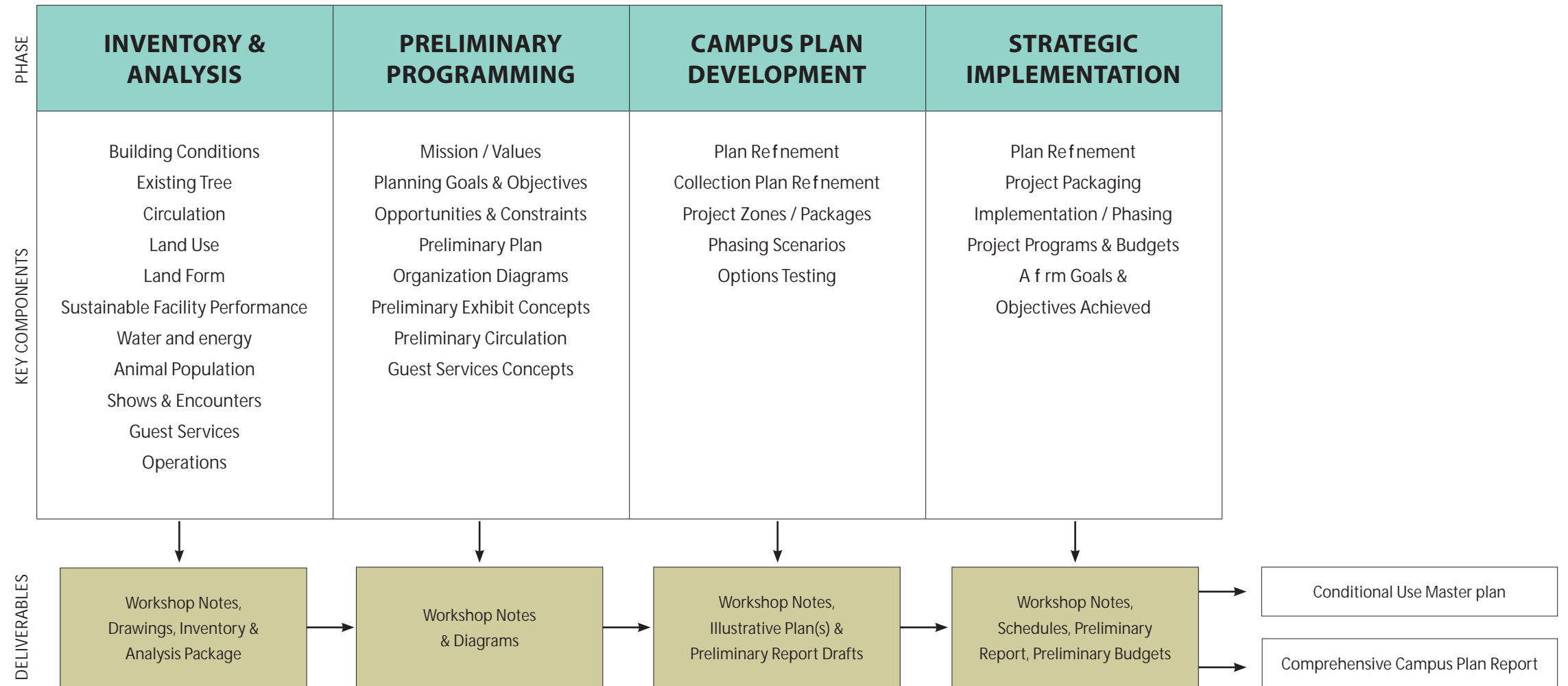
IV. CAMPUS PLAN DEVELOPMENT

Using information gathered in the programming and analysis phases, establish priority project zones and define the direction of future improvement and development.

V. CONDITIONAL USE MASTER PLAN

Obtain preliminary approval from the City of Portland for the concepts developed in the planning phase.

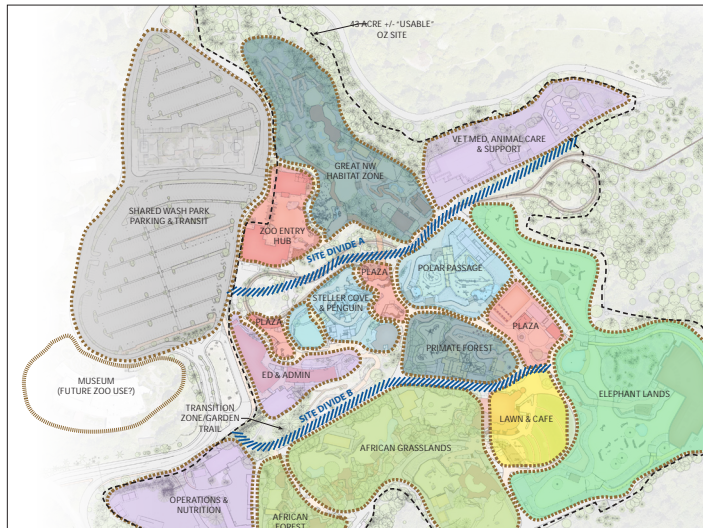
Planning Phases, Components & Deliverables



Workshop Approach

Throughout the planning process, participants gathered for collaborative in-depth workshops covering key topics and including many perspectives from zoo staff as well as the team of planners and engineers. Each workshop formed the common baseline to inform next steps and build consensus on the planning direction.

Through this highly interactive approach to planning and decision-making, team members gained an understanding of what makes the zoo and its community special. Exploring and respecting the points of view, observations, recommendations, and expectations of this specific zoo community results in a tailored Campus Plan for the future that is thorough, creative, achievable and mindful of the zoo's history, culture and mission.



Example of workshop diagram – Land Use Area

Community Engagement

Many diverse stakeholder groups are affected by long-range planning efforts. In recognition of this, the internal planning team included dedicated representatives from Metro, the Oregon Zoo Foundation and all zoo departments, including administration, operations, guest services, facilities, maintenance, veterinary care, animal care, education, volunteers, communications and marketing.

Engaging with the broader community to inform planning efforts was also a high priority. Terry O'Connor Consulting, in partnership with Nette Pletcher (Beez Kneez Creative), led an extensive effort to identify stakeholder groups, learn about current zoo experiences and needs, and test design concepts at key points in the plan development process.

Stakeholder groups engaged through surveys, focus groups and open houses included:

- Broader zoo staff
- Zoo volunteers
- Zoo Apprenticeship Program participants
- Oregon Zoo Foundation board members
- Community Advocacy Council
- Zoo members
- Frequent visitors
- Multiple community groups

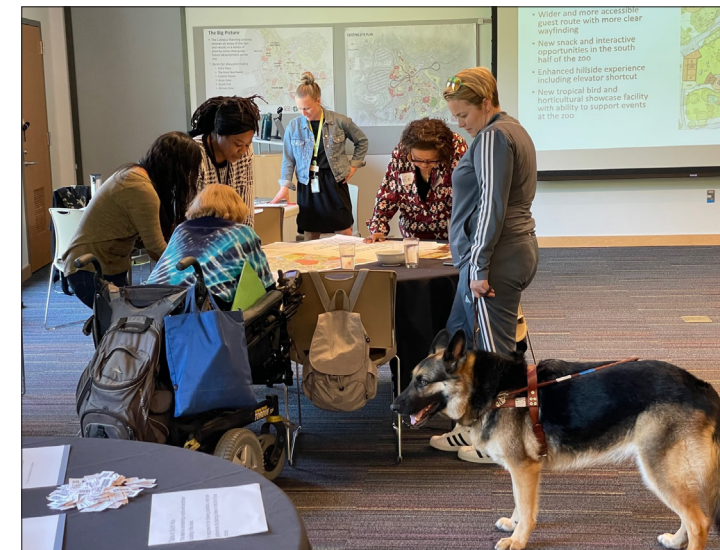
Front-end evaluation was designed to inform the plan's initial development. Methods included three comprehensive, online surveys asking quantitative and qualitative questions of members and frequent visitors, zoo staff, and volunteers, as well as two virtual focus groups with the Oregon Zoo Foundation board. Results provided data on these stakeholders' ease of navigating the zoo, their favorite and least favorite habitats, zoo experiences they enjoy, which areas need improvement, needs for guest amenities, and other priorities for future investment.

During the plan development phase, a second and third round of engagement activities occurred over two weeks in May and August. The purpose of these formative activities was to gain feedback from a variety of stakeholder groups on the most recent Campus Plan designs.

Questions in the first series of engagement sessions were focused specifically on the topics of flow, pathways, amenity choices and features that promote access and inclusiveness. The formative evaluation methods included two open houses with table-top activities, three focus groups and an interactive session with youth from the Zoo Apprenticeship Program who used photography to illustrate their opinions.

The third round of engagement activities were designed to include many of the same groups that participated in the second round as well as an expanded group of members and frequent visitors. These activities and discussions focused on areas in which the planning team responded to previous feedback as well as a number of specific areas of study.

Overall, through all three phases of engagement, over 2,000 opinions were collected and considered.



Community engagement sessions



CAMPUS PLAN DRIVERS

The primary purpose of the early planning effort was to carefully evaluate the context of the existing zoo site, infrastructure, previously established strategic goals and new priorities. This critical period of review and reflection led to the establishment of the Campus Plan drivers that directed and informed design efforts for the remainder of the planning process.

Animal Wellbeing

The well-being of the animals residing at the Oregon Zoo is a critical driver for all elements of the Campus Plan. In addition to AZA standards and other industry guidance for habitat design, opportunities to enhance well-being through activity and choice were explored.

Some animals thrive best in habitats customized directly for their species' needs, while others may take advantage of sharing several more-flexible habitats with other species. All animals benefit from being provided choices within their environment – sun vs. shade, heating vs. cooling, variable eating and sleeping locations, visibility vs. privacy, and many other considerations.



Elephant Lands activity tree in Forest Hall

Choice goes hand-in-hand with flexibility, which is an important element for all public-facing habitats as well as behind-the-scenes areas. Flexible habitats allow for optimal animal care, zoo population management, and consistent guest experiences.

Staff Wellbeing

Providing a meaningful staff experience is one of the focus areas identified in the Strategic Plan. A first step toward achieving this goal is addressing the need for more quality working spaces for staff members. Cramped and aging facilities around the zoo are a primary contributor to this issue. Proposed new projects include more generous and comfortable staff areas.

In addition, the primary central working spaces for the animal care team and facilities and maintenance team are in buildings that are approaching the end of their useful lives. This Campus Plan includes strategic development dedicated to replacing these facilities with expanded and improved modern structures. High quality working spaces for staff will support better communication, more flexibility to staffing and operations, a higher level of comfort, and most importantly a better representation of the value these individuals bring to the zoo community.



Existing zoo circulation diagram

Circulation and Flow

Studies of existing guest and staff circulation revealed several areas in need of improvement. The primary challenges are in the Great Northwest, Pacific Shores and Africa zones, and the focus is on providing an equitable and fully accessible experience for all guests.

To achieve this goal, pathways must be widened to accommodate more guests, graded to achieve maximum slopes, and designed to support intuitive wayfinding. These guidelines will support flow throughout the campus that is navigable by all users.

Another element of circulation and flow is to provide guests with more options for how they experience the zoo. Current paths, combined with steeply sloping topography, require guests to take long and strenuous routes to experience many of the zoo's popular attractions and animals.

This Campus Plan strives to provide additional options of varying lengths, and to reduce the physical demand by shortening overall walking distances and reducing the vertical elevation climb needed to exit from any point within the zoo. Increasing the accessibility, flexibility and choices available to guests will provide a more equitable experience for individuals of all abilities, whether they're visiting for a couple hours, a full day, or just want to visit the elephants each week!

Conservation Action & Education

Over the past 25 years, the Oregon Zoo has achieved some monumental wins for wildlife: helping prevent the extinction of the Oregon silverspot butterfly, tripling the range of the northwestern pond turtle in Washington, becoming the first institution to breed pygmy rabbits, starting a polar bear science revolution, launching a continent-wide effort to eliminate lead from the ecosystem, and helping the Yurok Tribe bring condors back to their ancestral homeland.

All of these efforts are part of bigger partnerships, but none of them would have been possible without the Oregon Zoo. As the biodiversity crisis intensifies, the zoo will leverage its facilities, expertise and partnerships to restore wildlife populations and promote human-wildlife coexistence. The zoo's diverse community is critical to the success of its conservation mission. The campus plan will draw the zoo community further into the collective conservation journey, sharing stories, offering hope and inspiring action for wildlife and the natural world.



California Condor

Guest Experience

Delivering an inspiring guest experience is another key focus area of the zoo's Strategic Plan. The improvements to circulation and flow discussed above will help in this effort, but a variety of other elements are informed by this key driver. Inspiring guests begins with amazing opportunities to view and experience thriving animals at all times of year. To this end, zoo care staff included animal visibility and climate suitability in their holistic evaluations. The collection of habitats proposed here supports a robust year-round experience with diverse animal experiences, great views, and many new ways to interact with animals and animal-care staff.

What happens in between animal-related experiences is also a critical element of this plan. The proposed layout includes many opportunities for guests to learn, rest, eat, play and decompress — all within the forest park environment of the Oregon Zoo. One important aspect of this effort is to make true hubs out of the major decision points by improving amenities and guest infrastructure at these locations. The location of these hubs was also assessed and reorganized to provide a better balance of amenities throughout the guest experience.



Elephant Lands provides unique and inspiring experiences

Operational Efficiency

Improving efficiency is critical for ensuring the campus plan supports continued sustainable operation for years to come. From day one of the planning effort, it became clear that future sustainability depends on prioritizing updates to the zoo's critical infrastructure.

Replacing facilities that have reached the end of their expected life reduces the effort and cost of increased maintenance down the road. In addition to physical structures, the organization of guest and staff flow across the campus is improved by including more generous clearances, direct service access to buildings and habitats, and clear routes of circulation.

The financial sustainability of the zoo requires a high degree of operational efficiency. In addition to the updates proposed around flow and access, improvements to guest amenity hubs are critical to enhancing this efficiency. The proposed hubs included in the campus plan are spaced evenly along the main circulation routes to provide consistent comfort for guests and revenue opportunities for the zoo. The hubs themselves include a focused collection of services including wayfinding, restrooms, dining options and retail, allowing for more centralized staffing and services.



Pollinator Garden conveys important conservation message

Campus Ecology

Campus Ecology is a term CLR uses to refer to the sustainable development and operation of a campus. Fundamentally, it is the long-term vision for showcasing the conservation, education and sustainability that guide the zoo's daily operations, policies and future projects. The zoo must holistically evaluate green design principles and ideas in terms of its unique climate, cultures, plants and animals to arrive at a unique collection of design directions.

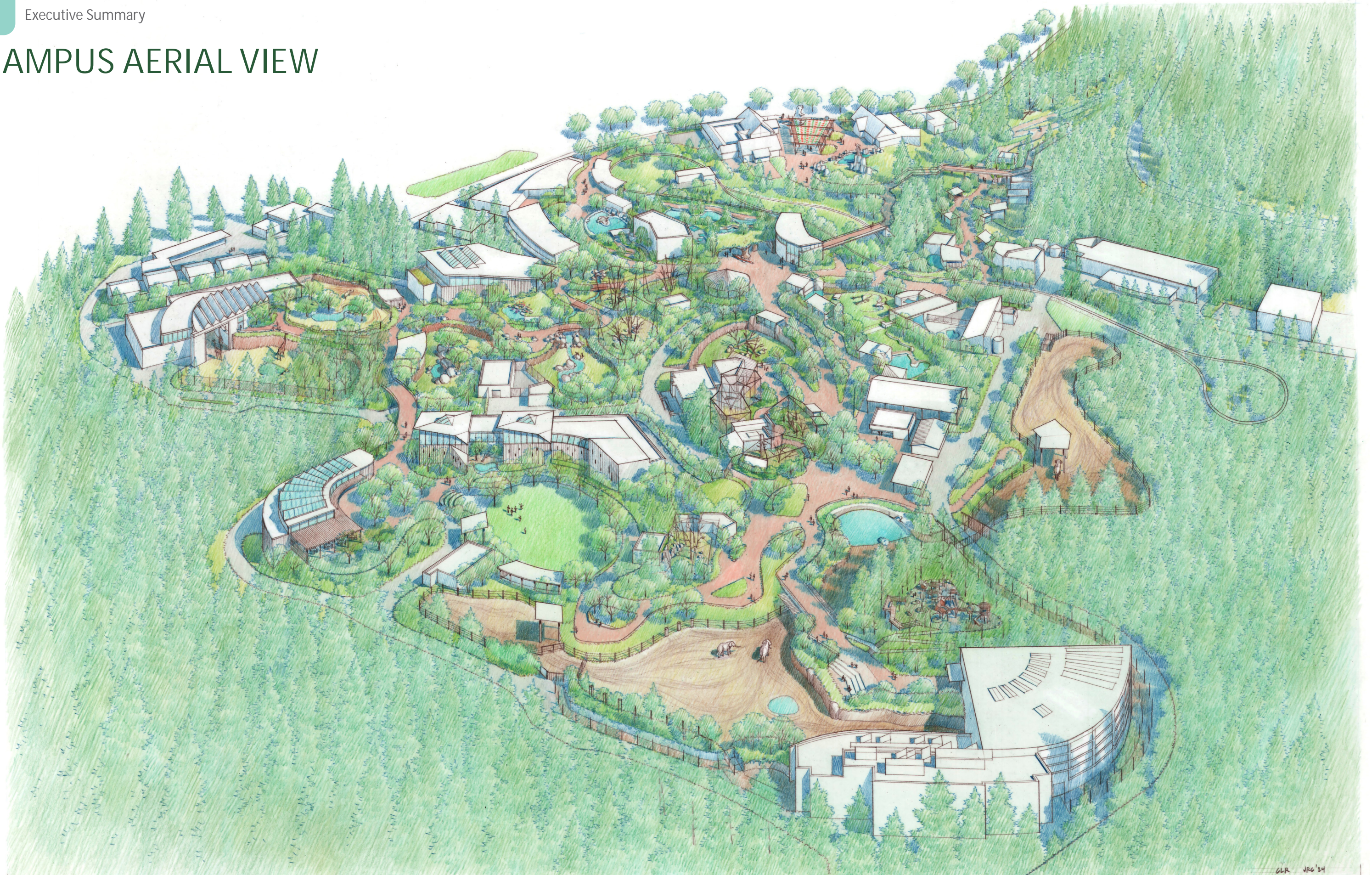
The bar for future development at the Oregon Zoo is already set high by Metro's Sustainable Buildings and Sites policy, which provides standards for design, construction, operations and maintenance of all Metro properties, supporting the goals of reducing greenhouse gas emissions, eliminating priority toxic and hazardous substance use, reducing overall waste generation, reducing potable water use, and ensuring properties positively contribute to healthy urban ecosystems and watersheds.

Beyond the established policy, the Metro team participated in campus planning workshops to help establish a set of ambitious goals supported by the engineering team and the proposed development. The primary purpose of these goals is to ensure that the Oregon Zoo campus positively contributes to human and environmental well-being, conserves natural

resources, and inspires sustainability practices by guests, community organizations and businesses. This will be achieved in part by pursuing the following specific goals:

- Eliminate campus operational carbon emissions by 2040.
- Reduce water use 35% by 2040.
- Promote ecological integrity and function in design of landscaping, stormwater systems and animal habitats.
- Go beyond the Sustainable Buildings and Sites policy and contribute to climate environmental justice outcomes in the region.
- Design zoo facilities and systems to be resilient in the face of climate change and other challenges.

CAMPUS AERIAL VIEW



CAMPUS VISION

Existing Campus

The zoo is organized into three large zones including North America, Elephant Lands, and Africa. The non-public facing areas of the zoo are focused around the Facilities Hub in the southwest corner and the Animal Care Hub in the northeast.

ENTRY PLAZA

1. Gift Shop
2. Cascade Crest
3. Ticket Redemption
4. Train Round House

GREAT NORTHWEST

5. Mountain Goat Habitat
6. Mt. Goat & Black Bear Care Building
7. Pedestrian Bridge
8. Suspension Bridge
9. Black Bear Habitat
10. Snowy Owl Habitat
11. Covered Bridge
12. Eagle Habitat
13. Cascade Building
14. River Otter Habitat
15. Beaver Habitat
16. Waterfowl Aviary
17. Public Restrooms
18. Cougar Habitat & Building
19. Condor Habitat & Building
20. Family Farm Barn
21. Family Farm House

GATE J

22. Veterinary Medical Center
23. VMC Generator
24. Care, Connection & Conservation (C3) Building
25. Wildlife Live Building
26. Avian Reproduction Center Building

PACIFIC SHORES

27. Polar Bear Filtration Building
28. Polar Bear Care Building
29. Polar Bear Habitats
30. Boardwalk Path
31. Steller Cove Exhibit
32. Steller Cove Filtration Building
33. Penguinarium

PRIMATE FOREST

34. Chimpanzee Habitat
35. Chimpanzee Care Building
36. Chimpanzee Mesh Habitat
37. Orangutan & Gibbon Care Building & Habitat

EAST HUB

38. Growlers Cafe
39. Storage Building
40. Public Restroom

ELEPHANT LANDS

41. Forest Hall
42. Elephant Habitats
43. Elephant Filtration Building
44. Lawn
45. Stage

AFRICA

46. Aviary Cafe
47. Vullum Aviary
48. Predators of the Serengeti Building
49. Cheetah Habitat
50. Cheetah Care Building
51. Painted Dog Habitat
52. Painted Dog Care Building
53. Lion Habitat
54. Lion Care Building
55. Black Rhino Habitat
56. Black Rhino Care Building
57. Tortoise & Pygmy Goat
58. Savanna Habitat
59. Hoofstock Barn
60. Giraffe Feeding Station
61. Giraffe Care Building
62. Tree Tops Building & Boardwalk
63. Butterfly Lab
64. Sankuru Trader
65. Rainforest Building
66. Africa Rainforest Aviary
67. Kongo Ranger Station
68. ASC Otter Care Building
69. ASC Otter Habitat
70. Bat Cave

GATE A

71. Facilities & Maintenance Offices
72. Horticulture, Welding, & Autoshop
73. Animal Nutrition Center
74. Greenhouse
75. Compost & Waste Disposal
76. Custodial Building
77. Hay Barn

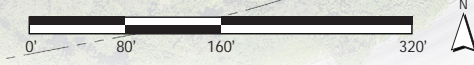
DISCOVERY ZONE

78. Administrative Center
79. Education Center
80. Classrooms
81. Overnight Camping Deck
82. Train Station
83. Red Panda Habitat & Building
84. Tiger Habitat & Building
85. Carousel



SITE PLAN LEGEND	
[Red Box]	Visitor Amenity
[Brown Box]	Exhibit Building
[Purple Box]	Admin / Support
[Yellow Box]	Habitat Space
[Orange Box]	Animal Care Building
[Light Yellow Box]	Off-Exhibit Yard
[Blue Box]	Ponds / pools
[Light Blue Box]	Visitor Path
[Grey Box]	Service Path
[Dark Brown Box]	Train
[Green Box]	Event Lawn

1 ACRE
43,560 SF



Proposed Campus

The proposed campus plan maintains the overall organization of the zoo and focuses on strategic improvements informed by the key drivers identified by the planning team.

ENTRY PLAZA

1. Gift Shop
2. Guest Services
3. Ticket Redemption
4. Train Round House

GREAT NORTHWEST

5. Mountain Goat Habitat & Care Building
6. Pedestrian Bridge
7. Owl Habitats
8. Owl Care Building
9. Animal Habitat
10. Animal Overlook
11. Eagle Habitat
12. Covered Bridge
13. Animal Habitat
14. Black Bear Care Building
15. Black Bear Habitat
16. Public Restroom
17. Cougar Habitat & Building
18. Condor Habitat & Building
19. River Otter Habitat
20. Otter & Beaver Care Building
21. Beaver Habitat
22. Freshwater Exhibit Building
23. Filtration Building

ANIMAL CARE HUB

24. Veterinary Medical Clinic
25. Animal Care Offices
26. Flexible Holding & Support
27. Avian Holding & Support

COASTAL SHORES

28. Filtration Building
29. Polar Bear Care Building
30. Polar Bear Habitats
31. Seal Habitat
32. Sea Otter Habitat
33. Aquatic Support, Care, & Filtration Building
34. Penguin Care Building & Habitat

CENTRAL HUB

35. Guest Services
36. Carousel

PRIMATE FOREST

37. Chimpanzee Habitat
38. Chimpanzee Care Building
39. Chimpanzee Mesh Habitat
40. Orangutan And Gibbon Care Building & Habitat

EAST HUB

41. Event Shelter
42. Growlers Cafe
43. Storage Building
44. Dining Shelter
45. Public Restroom
46. Adventure Play

ELEPHANT LANDS

47. Forest Hall
48. Elephant Habitats
49. Filtration Building

SOUTH HUB

50. Primate Expansion Care Building & Habitat
51. Red Panda Care Building & Habitat
52. Lawn
53. Ambassador And Herpetarium
54. Restaurant
55. Play Area
56. Bridge
57. Public Restrooms
58. Event Shelter
59. Stage
60. Play Area

AFRICA

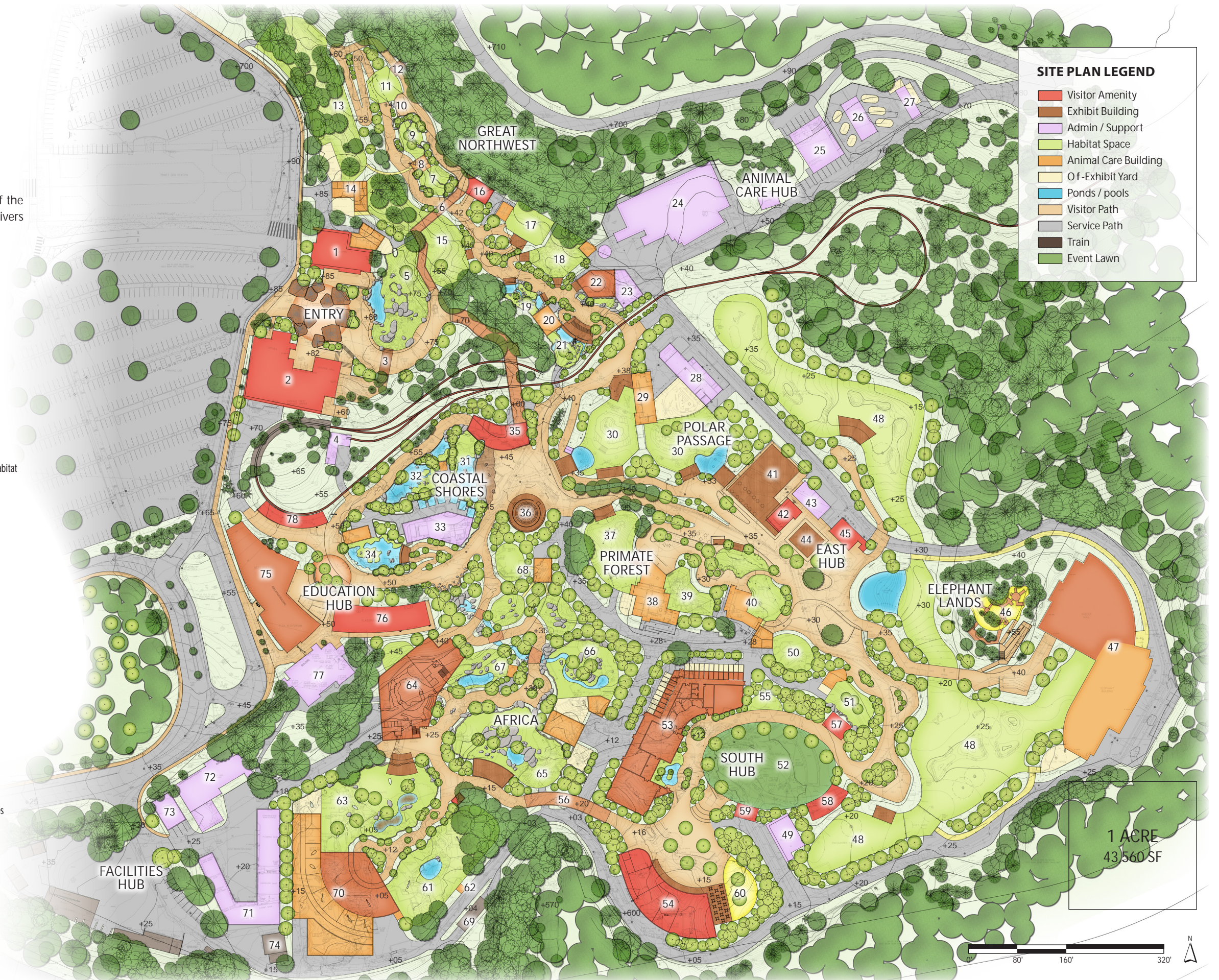
61. Giraffe Habitat
62. Bird Care Building
63. Rhino Habitat
64. Tropical Forest Building
65. Lion Care Building & Habitat
66. Painted Dog Care Building & Habitat
67. Marsh Care Building & Habitat
68. Primate Care Building & Habitats
69. Butterfly Lab
70. Rhino/Giraffe Care & Exhibit Building

FACILITIES HUB

71. Facilities/Maintenance Shops & Offices
72. Animal Nutrition Center
73. Greenhouse
74. Hay Barn

EDUCATION HUB

75. Education Building
76. Classroom Building
77. Administration Building
78. Train Station



PHASING & IMPLEMENTATION

The implementation of a long-range campus plan is a complex and multifaceted endeavor that requires a carefully crafted approach. This campus plan encompasses a wide range of projects, objectives, and stakeholders, each with its unique challenges and dependencies. The implementation plan outlined here serves as a roadmap, summarizing milestones, timelines, and resources needed to realize the vision of the campus plan.

The primary aim of this planning exercise is to provide structure and clear direction, breaking the long-term vision into manageable phases and projects. This approach facilitates continuous progress tracking, simplifying the identification of next steps and ensuring steady progress towards the campus plan goals. Another important aspect of this implementation plan is its support for the efficient allocation and optimization of Metro and Oregon Zoo resources, including financial, human, and material, throughout the lifespan of the plan.

Much like the campus plan itself, the implementation plan is designed as a living document, adaptable to changes and unforeseen challenges. In a long-term project such as this, flexibility is key, as economic, environmental, and social landscapes evolve over time. The ability to adapt and modify the plan while maintaining focus on the goal is critical.

Many considerations are folded into the version of the implementation plan presented here, but some of the key discussions that lead to this plan include:

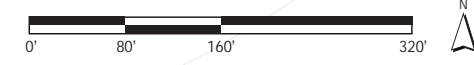
- Evaluation of project budgets and funding streams.
- Ability to maintain a great Oregon Zoo experience while updates take place.
- A focus on addressing critical needs for animals, guests, staff, and physical infrastructure.
- Balancing the overall investment between animal experiences, sustainable infrastructure, and guest services.

2024 Campus Plan Projects	Estimated Budget	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Plaza Enhancements (Entry, East Hub)	\$19M	█													
Coastal Shores	\$79M	█													
Africa Phase 1 (Savanna, Predator)	\$109M				█										
South Hub (Restaurant, Herpetarium, Event Lawn)	\$113M							█							
Africa Phase 2 (Primate)	\$31M											█			
Projects of Opportunity or Beyond 15 years															
Destination Play	\$5M	█													
Asia	\$19M	█													
Gate A	\$22M	█													
Gate J	\$23M	█													
Great Northwest	\$53M	█													
Tropical Forest	\$63M	█													

* Note that estimated budgets presented above for 2024 Campus Plan Projects include escalation to the midpoint of construction, while Projects of Opportunity are presented in 2024 dollars as escalation will depend on sequence and schedule.



1 ACRE
43,560 SF





SUSTAINABLE ZOO

SUSTAINABLE ZOO

Metro and the Oregon Zoo have a unique and powerful role to advance sustainability, climate justice, and resilience in alignment with Metro's values and the commitments the agency has made to the public.

As a regional government committed to promoting sustainable communities, Metro also strives to make its own operations sustainable. With an extensive portfolio of buildings, including the Oregon Zoo and other visitor venues, parks, office buildings and solid waste facilities, and serving millions of visitors and customers each year, Metro has a significant opportunity to reduce its impacts and advance positive progress on the region's quality of life. To that end, in 2003, the Metro Council set an ambitious vision for business operations to be sustainable within one generation, by 2025. The Council adopted goals in five key categories: climate, waste, toxics, water, and habitat, and adopted a Sustainability Plan in 2010 that identifies strategies and actions to achieve these goals.

In 2010, Metro named sustainability as one of Metro's central values:

We are leaders in demonstrating resource use and protection. We are leaders in demonstrating resource use and protection in a manner that enables people to meet current needs without compromising the needs of future generations, and while balancing the needs of the economy, environment, and society.

Metro's Strategic Framework, adopted in 2021 to guide Metro's decisions and priorities, identifies racial justice, climate justice and resilience, and shared prosperity as guiding principles.

Sustainability at the Oregon Zoo

The Oregon Zoo aspires to be a model of sustainability by putting conservation of natural resources at the forefront of its daily operations and planning for future improvements. The Oregon Zoo has been leading by example for many years. Conservation is in the zoo's mission, and the zoo works on a range of issues around the world.

In alignment with these values and goals, the Oregon Zoo Campus will be designed to positively contribute to human, animal, and environmental well-being, to conserve natural resources and to lead and inspire sustainable practices by guests, community organizations, and businesses.

The campus planning process provides an opportunity to reflect on the current state of the campus, as well as to look forward to the opportunities and challenges ahead. This section focuses on sustainable and resilient design and operation including greenhouse gas emissions, water management, habitat and stormwater, and resilience planning for extreme weather events and disruptions beyond the zoo's control. In this section we look at the 2010 Metro and zoo sustainability goals, the current state of progress toward those goals, and set new goals for the coming decades.

Several campus wide strategies are highlighted in the plan including a movement away from fossil fuel use on campus, minimizing urban heat island effect, and reusing water onsite. A more detailed summary of the analyses performed during the campus planning process is included in the appendix.



Green stormwater facility at Polar Passage

METRO GOALS FOR SUSTAINABLE ZOO

Metro Sustainable Buildings & Sites Policy

Metro's Sustainable Buildings and Sites Policy sets inspiring goals for Metro properties, many of which apply to the zoo. A summary of this policy and its implications for the zoo is included in the Appendix. Some of the significant policy elements that will pertain to the zoo include:

- All new buildings over 2,000 SF and \$1M in total project cost will meet the Core and Zero Carbon certifications.
- New projects will use materials with low embodied carbon content.
- All projects will meet bird-friendly design guidelines.
- No new fossil fuel infrastructure and campus will move toward electrification of buildings and fleet.
- New structures will be designed for climate resilience.

Oregon Zoo Sustainability

The Oregon Zoo will seek opportunities to go beyond the Metro Sustainable Buildings and Sites Policy to design buildings and spaces to contribute to climate environmental justice outcomes in the region and provide healthy, accessible, welcoming spaces where staff and visitors thrive.

The Oregon Zoo Campus will be designed to positively contribute to human and environmental wellbeing, to conserve natural resources and to lead and inspire sustainability practices by guests, community organizations and businesses.



CLIMATE

Eliminate greenhouse gas emissions from zoo operations by 2040 and prioritize actions that contribute to reduced regional greenhouse gas emissions.



GUIDING PRINCIPLES

- Reduce energy demand first
- Prioritize strategies that contribute to regional grid decarbonization
- Consider the climate impacts of a building through its entire lifecycle
- Minimize urban heat island effect
- Demonstrate and provide education on key climate solutions



STRATEGIES AND ACTIONS

- Electrify the zoo campus: design new buildings to be all-electric and electrify existing buildings over time as they are retrofitted
- Install electric vehicle charging infrastructure (and electrify fleet)
- Design new exhibits for energy exchange between buildings with opposing loads, when feasible
- Choose low carbon materials and natural carbon solutions in landscape and exhibit design
- Pursue active and passive renewable energy
- Conduct total cost of ownership analysis when choosing mechanical systems
- Implement energy management information systems across the campus (to allow for tracking and informing energy efficiency)
- Pursue strategies to reduce urban heat island effect such as cool roofs, green roofs, cool pavement, and landscape design
- Sub-meter every building/exhibit gas and electricity usage. Collect, store, and trend data electronically in a single location that is accessible to the zoo and Metro.



MEASURABLE TARGETS

- Reduce energy use per visitor to 25% below 2023 baseline by 2030
- Design buildings to achieve at least a 70% reduction in total energy use compared to an Architecture 2030 (or existing zoo) baseline building
- Generate 35% of total electricity use across the zoo campus with onsite renewable energy on an annual basis by 2040
- Maintain 100% renewable electricity
- Achieve a fossil-free, all-electric campus by 2040



WATER

Reduce municipal water use by 35% from 2023 baseline by 2040 by eliminating water waste, increasing water efficiency, and reusing water onsite.



GUIDING PRINCIPLES

- Reduce demand for water first
- Design landscaping to minimize the need for irrigation
- Reclaim and reuse water onsite to minimize the need for municipal water
- Eliminate water waste through leak detection, increased efficiency, and monitoring
- Demonstrate and educate visitors about water conservation, efficiency, and reuse systems



STRATEGIES AND ACTIONS

- Include rainwater harvesting in all new buildings
- Collect and use stormwater to supply water needs for exhibits and pools
- Eliminate dump and fill pools and upgrade exhibits with modern filtration systems
- Establish water tracking and reporting systems to better monitor water use
- Install smart irrigation in all exhibits and landscaping
- Design exhibits to reduce water use for exhibit washdown (e.g., integrate soft substrate into exhibit and holding areas)
- Install WaterSense faucets and fixtures
- Sub-meter every building/exhibit/landscape water use. Collect, store, and trend data electronically in a single location that is accessible to the zoo and Metro.



MEASURABLE TARGETS

- Achieve 2/3 of water needs for exhibits and pools from stormwater runoff collection and reuse by 2040
- Design buildings to achieve at least a 50% reduction in water use compared to a baseline building
- Reduce water use for irrigation by 50% by 2040
- Reduce water leaks by 75% from 2023 baseline by 2040



HABITAT AND STORMWATER

Promote ecological integrity and function in design of landscaping, stormwater systems, and animal habitat while respecting unique geologic constraints.



GUIDING PRINCIPLES

- Model habitat-friendly development practices that contribute to ecological integrity and provide multiple benefits
- Utilize green infrastructure whenever possible to support healthy ecosystems



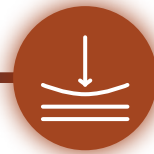
STRATEGIES AND ACTIONS

- Use pervious pavement wherever feasible
- Use native and adaptive species to reduce the need for irrigation, pesticides, and maintenance
- Create local habitat for pollinators, birds, and native species across the campus and provide spaces for visitors/multiple benefits
- Incorporate green roofs where feasible to sequester carbon, filter pollutants, create habitat, absorb heat, and insulate buildings
- Install rain gardens to filter pollutants, and reduce erosion and urban heat island effect
- Conserve and restore native plant communities around undeveloped, natural campus land
- Create educational opportunities to showcase the benefits of habitat-friendly development



MEASURABLE TARGETS

- Reduce effective impervious area by 20% compared to 2023 baseline
- Create a living classroom in each quadrant of the zoo



RESILIENCE

Design zoo facilities to survive and maintain critical functions in the event of extreme weather events exacerbated by climate change, earthquake activity, supply chain disruptions, energy outages, and public health emergencies.



GUIDING PRINCIPLES

- **Anticipate** – Understand and document potential threats and disruptions
- **Absorb** – Design systems and facilities to withstand, deflect, or otherwise accommodate stresses and disruptions with minimal failure or planned, safe failure
- **Adapt** – Identify and modify existing structures and facilities that are vulnerable to anticipated stresses and disruptions
- **Recover** – Develop relationships, plans, and procedures to restore systems and facilities to full functioning after a disruptive event



STRATEGIES AND ACTIONS

The resiliency strategies and actions should be determined by conducting a comprehensive resiliency plan study. The plan should investigate strategies related to the following considerations at a minimum:

- Energy
- Water
- Stormwater
- Heat
- Windstorm
- Fire
- Smoke
- Earthquake
- Landslide
- Internet disruption
- Food



MEASURABLE TARGETS

The specific needs and targets should be determined by conducting a comprehensive resiliency plan study. The plan should investigate targets related to the following considerations at a minimum:

- **Expanded Opportunities and Aspirations:** The zoo can maintain all functions, not just critical functions, and can extend support to the local community during disruptive events.

SUMMARY OF PROGRESS FROM THE LAST 10 YEARS

The 2010 Metro Sustainability Plan laid out specific and ambitious goals for both greenhouse gas (GHG) emissions and water use reduction. These goals informed and were adopted by the 2011 Oregon Zoo Comprehensive Capital Campus Plan (CCCP). The greenhouse gas reduction goals were staged over a 40 year timeline from the 2008 baseline emissions as follows:

- 2013 – Arrest GHG Emissions
- 2020 – 25% Reduction
- 2025 – 40% Reduction
- 2050 – 80% Reduction

The 2011 Oregon Zoo CCCP identified potential strategies to reduce emissions including energy efficiency, utilizing a ground-source heat pump condenser loop, biomass boilers, solar PV, solar thermal, and green power purchase from the utility. Some of these strategies were employed in the subsequent bond projects, when determined to be appropriate and cost effective. In 2022, zoo emissions associated with natural gas and electricity totaled approximately 3600 MT CO₂e – an approximately 25% reduction in GHG emissions compared to the 2009 baseline. Natural gas consumption has been reduced by ~9% from the baseline while electricity consumption increased by ~3% (note that the bond projects have added significant energy consuming program area and LSS systems to the campus). The reduction in total greenhouse gas emissions is due in part to the reduction in campus natural gas consumption but even more so by the reduced emissions associated with electricity generation in 2023 compared to 2009. The reduced emissions associated with electricity generation is a key reason in the recommendation to replace natural gas consuming equipment with electric (“Electrification”) presented in this campus plan as well as the zoo’s decision to purchase 100% renewable electricity. Nevertheless, electric consumption should be reduced with efficient equipment such as heat pumps, managed against peak utility demands, and offset with onsite renewable generation to the extent practical. All of which are presented in this campus plan.

The 2010 Metro Sustainability plan identified water use reduction goals staged over a 15-year timeline from the 2009 water consumption as follows:

- 2013 – 15% Reduction
- 2020 – 30% Reduction
- 2025 – 50% Reduction

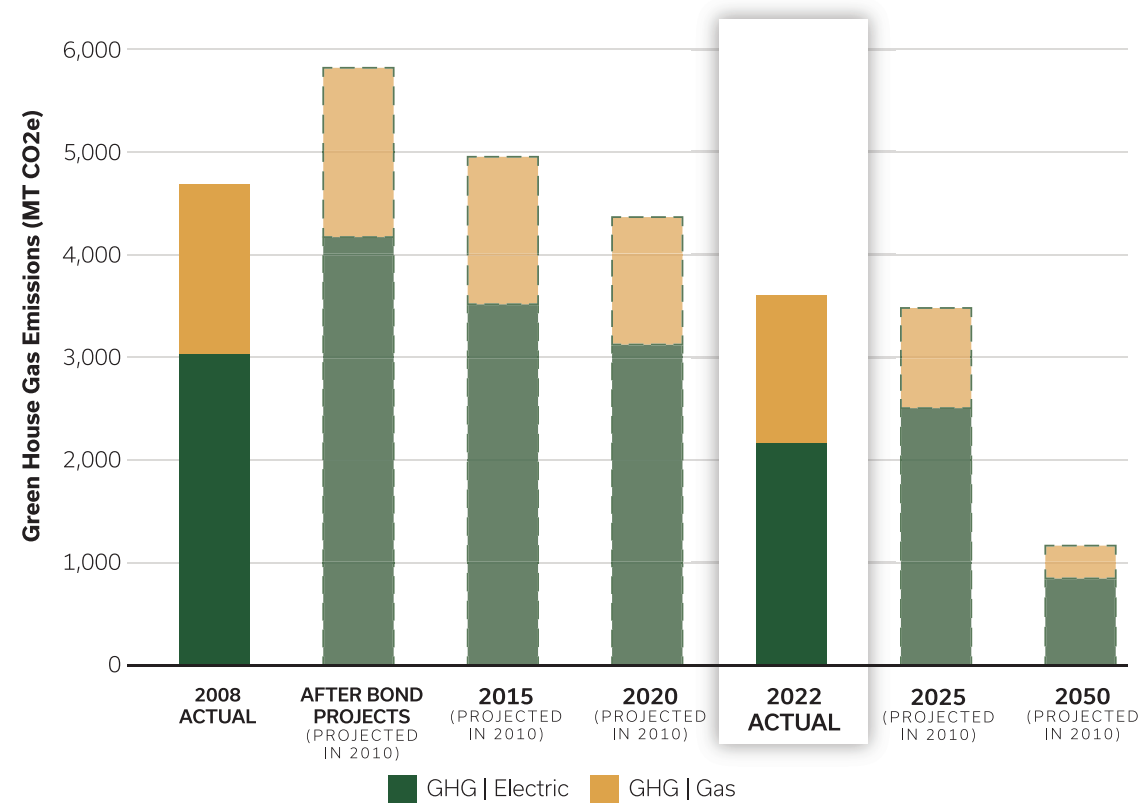
The 2011 CCCP took the water savings goals a step further and targeted a 60% reduction in water reduction by 2025. In 2022 the zoo consumed approximately 37 Million Gallons of water – a 56% reduction from the baseline consumption of 85 Million gallons. The zoo has already achieved Metro’s 2025 goal for water use reduction and is very near to achieving the 60% CCCP goal with 3 more years to go. Water savings is the result of water efficient exhibit systems at elephants and polar bear, replacement of aging and leaking infrastructure, and rainwater capture and reuse systems at elephants and the Education Center. Approximately half of the current water consumption is associated with exhibit usage and reduction strategies will be most effective by targeting exhibit usage, though other non-potable demands such as restrooms and irrigation also offer significant opportunities for water savings.

UTILITY	AVERAGE ANNUAL USE		
	2008	2022	% Change
Electricity	7,393,000	7,634,000	+3%
Natural Gas	306,000 therms	277,000 therms	-9%
Water/Server	84.8 million gallons	38 million gallons	-55%

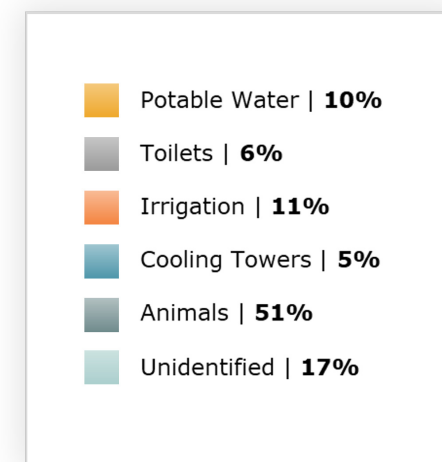
Notes: Since 2008 the zoo has significantly expanded indoor and habitat. Electrification of heating systems has nevertheless led to an overall reduction in gas consumption with only a slight increase in overall electric consumption.

Water consumption has been drastically reduced via water saving pool systems, rainwater reuse, and infrastructure improvements.

EMISSIONS REDUCTION PLAN FROM 2010 CAMPUS PLAN



The 2010 Campus Plan projected future zoo emissions up to the year 2050 beginning with the 2008 emissions baseline. It was expected that emissions would increase as new buildings and habitats were constructed with the bond. Emissions were projected to decrease over time as campus efficiency measures were implemented along with on site renewable sources and cleaner electricity from the utility. The overall 2022 actual emissions are consistent with the 2010 project.



37.5 MILLION GALLONS

56% REDUCTION FROM 2008 EXCEEDS METRO'S GOAL

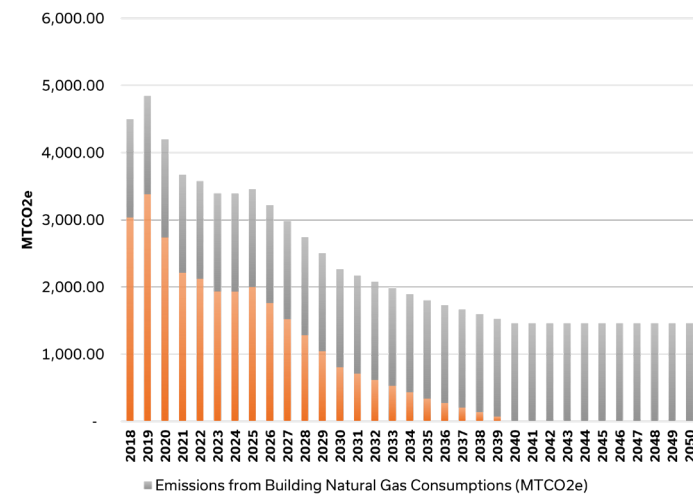
A PATH TOWARDS ELECTRIFICATION

Since one of the most impactful transitions buildings can make to reduce their operating emissions is to shift to high performance, all-electric systems, a path toward electrification is one of the key tenets of the Oregon Zoo sustainability work.

KEY FINDINGS

- Oregon has a state policy requiring the state's electric utilities to achieve zero operating emissions by 2040.
- By shifting to all-electric systems, buildings will benefit from the decarbonization of the grid. Building operating emissions will reduce in connection with grid emission reductions if all systems are electrically based.

BASELINE: YEARLY OPERATING EMISSIONS

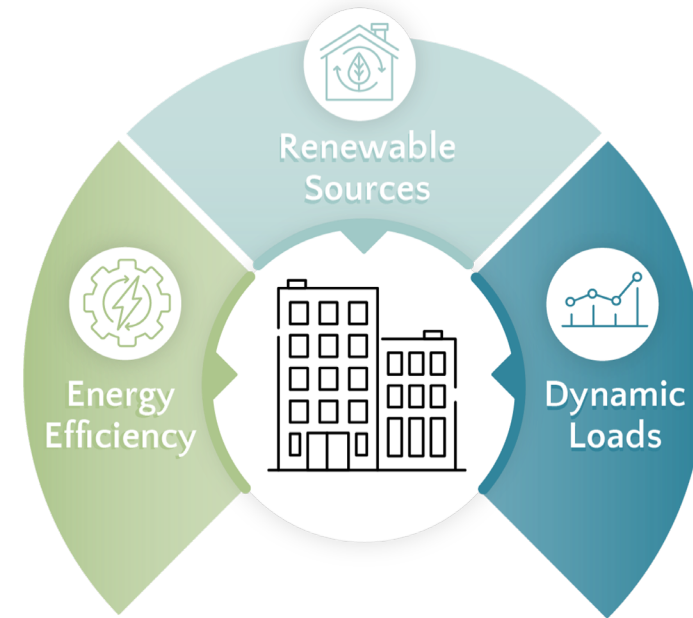


Grid-Interactive Efficient Buildings (GEBs)

Implementing grid-interactive efficient buildings and flexible loads has the potential to be one of the most impactful sustainability measures the Oregon Zoo can implement.

KEY FINDINGS

- Load flexibility and demand reduction can help reduce operating emissions and operating costs.
- There are multiple programs available through PGE to help incentivize and support participation with grid-interactive systems, including demand response schedules and onsite batteries.
- Reducing energy demand during peak times helps support a more sustainable, resilient grid.



INTERACTIONS WITH THE GRID

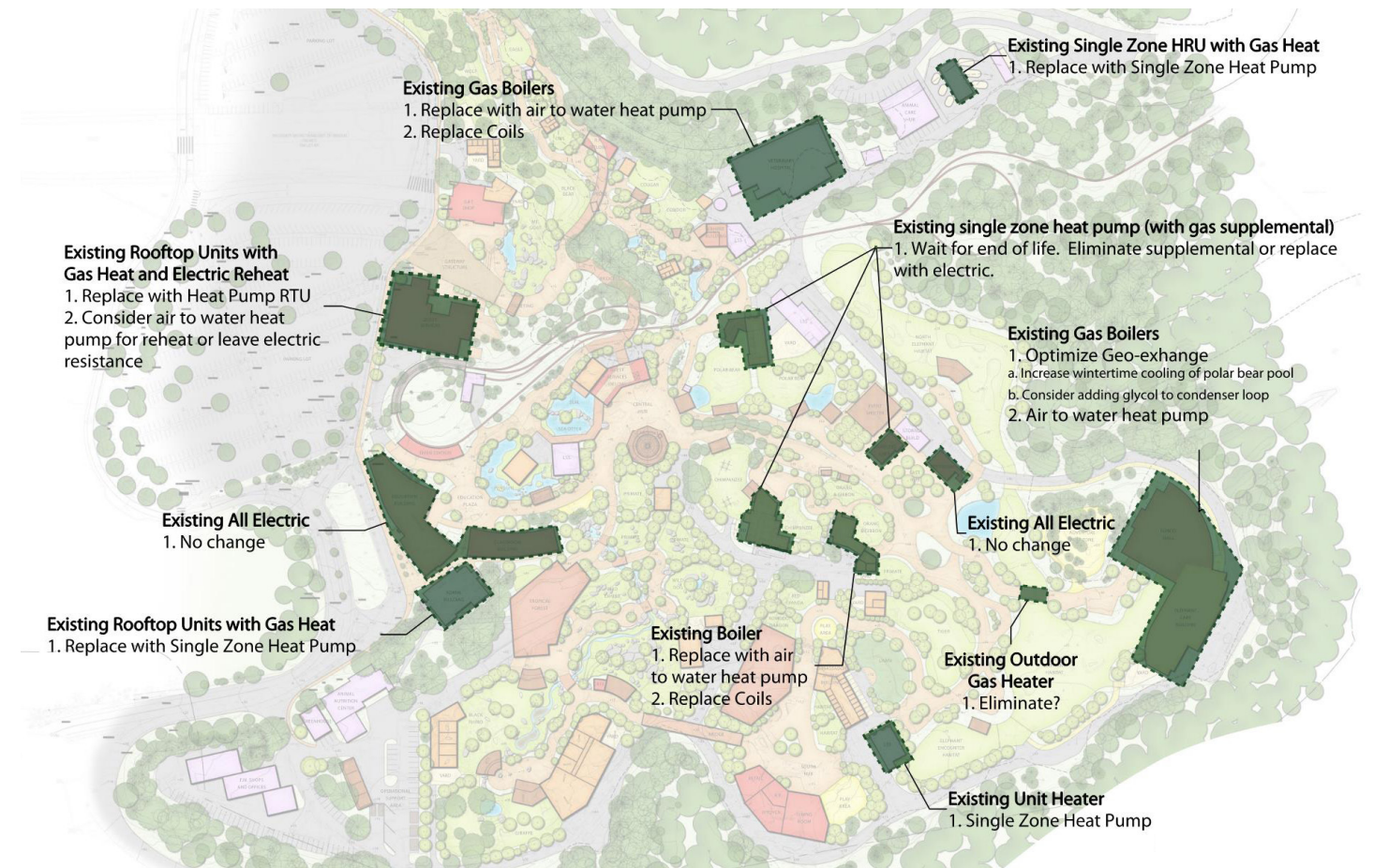


New Construction Electrification

All new buildings will be designed to use high efficiency all-electric system for all end uses.

Existing Building Electrification

Existing buildings which are not demolished as part of the current campus plan (e.g. recent bond projects) will need to be evaluated for natural gas equipment replacement. Existing buildings can present a greater challenge to electrification than new buildings due to limitation in space, structural capacity, and especially electrical capacity. A complete campus inventory of all campus gas equipment, the timeline for equipment (or building) replacement, and the available electrical capacity at the location of the gas equipment will be required to produce a detailed electrification plan for all existing buildings.



KEY FINDINGS

Prioritization of electrification projects should be based on:

- Deferred Maintenance - Replace gas equipment at end of life
- Return on investment - Replace gas equipment that results in highest operational cost to project first cost ratio.
- Carbon Reductions - Replace gas equipment that results in the highest carbon emissions to project first cost ratio.
 - Including a dollar valuation of carbon emissions would allow items 2 and 3 to be combined in a single return on investment metric

KEY FINDINGS

Electric replacements of specific gas equipment include:

- Replace single zone units (unit heaters, gas fired roof top units) with single zone heat pumps (split systems, heat pump roof top units).
- Replace gas boilers with air to water heat pumps (may require equipment coil replacements to accommodate lower supply temperature).
- Replace domestic water heaters with air to water heat pumps.
- Replace gas kitchen equipment with electric equivalent (induction where available).

CAMPUS ENERGY SYSTEMS

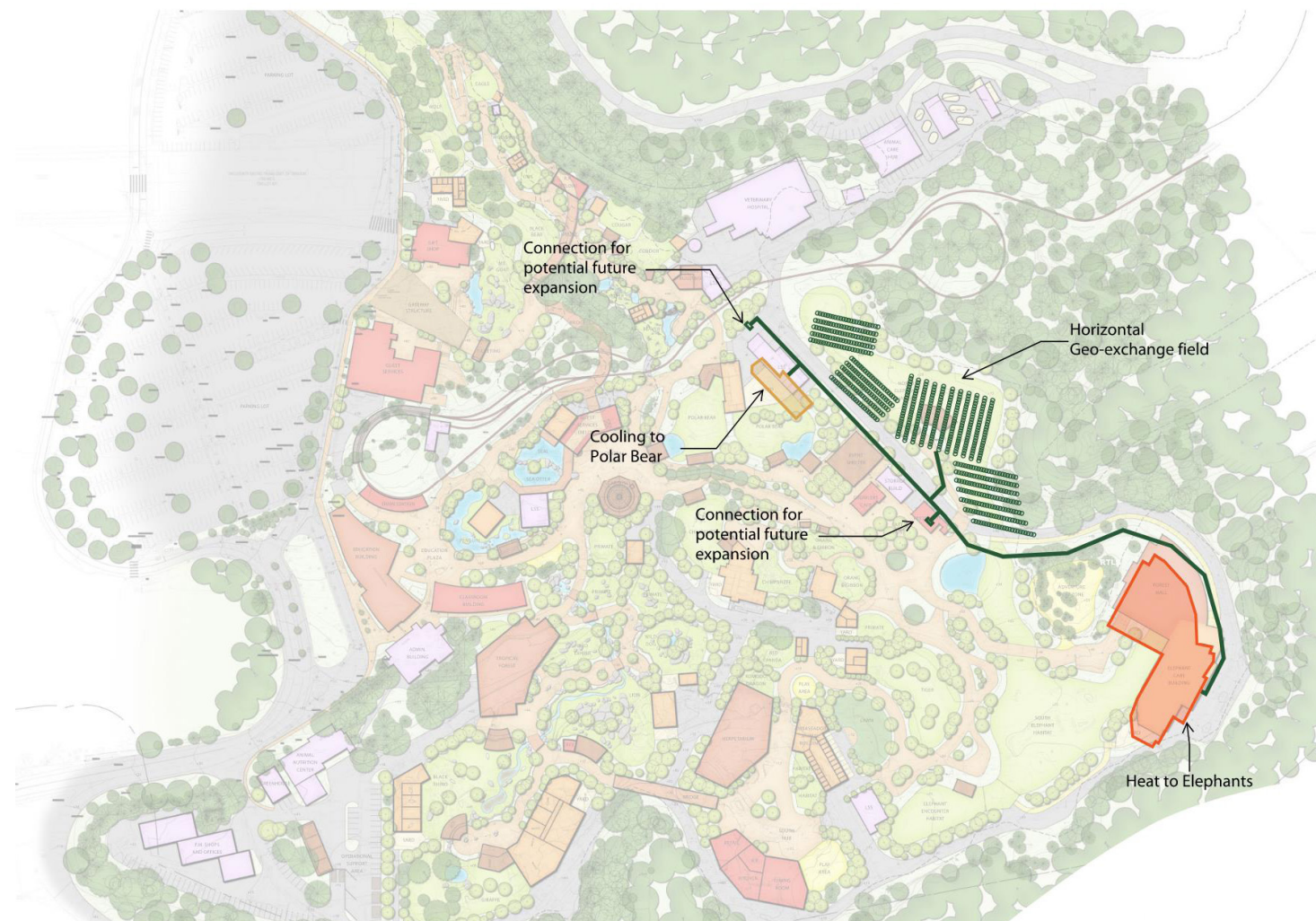
District Thermal Loop

There are unique opportunities that come forward at the campus scale. Options like district systems and shared resources across multiple areas were evaluated as part of this study.

KEY FINDINGS

- Expansion of the ground source well system throughout the entire campus is not recommended, or necessary. Air source heat pumps are anticipated to provide an efficient electric heat source for most needs of the campus.
- There might be opportunities for localized district thermal energy systems within small building clusters that have simultaneous heating and cooling loads. For example, the significant cooling loads of the penguin and sea otter could create an energy sharing opportunity with the heating needs of the Forest Pavilion.

Refer to the Appendix for additional information.



Campus Renewables

KEY FINDINGS

Incorporating renewables on the campus helps achieve three main goals:

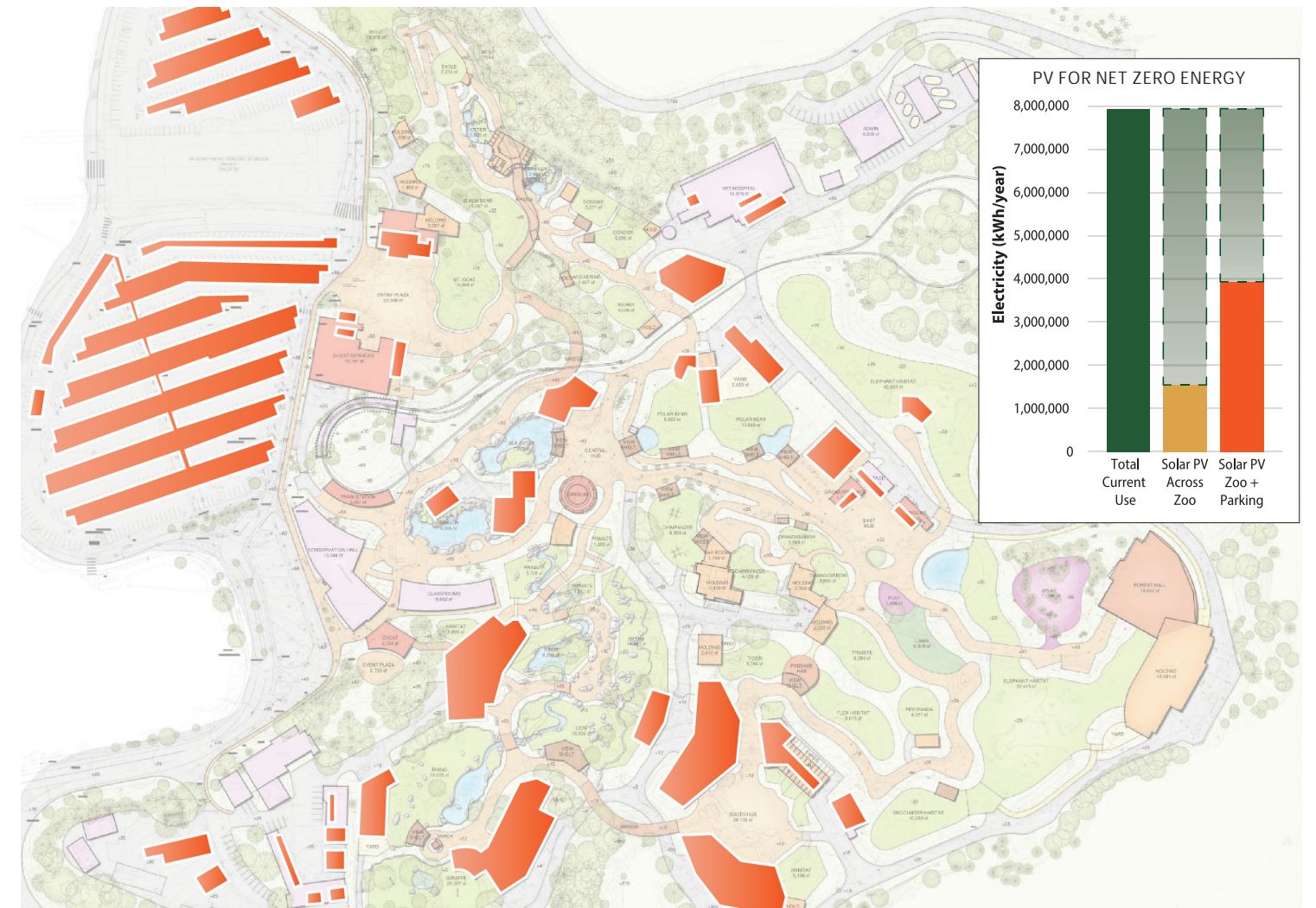
- Reduced operating costs
- Reduced operating emissions
- Visitor education tool

The most cost-effective and best suited onsite renewable energy technology is photovoltaic (PV) panels. New and existing roofs with adequate solar access can benefit from the additional of PV panels.

The opportunity with the most potential is the parking lot. Incorporating PV parking canopies would greatly increase the onsite generation potential, which could provide both sustainability and

energy resilience benefits. This also creates a memorable visitor entry experience with a vast PV array being the first element of their entry experience. Additionally, it provides protection from weather for visitors loading families in and out of vehicles. This solution will require collaboration between the multiple jurisdictions with ownership of these facilities, but the potential benefits make this a worthwhile conversation to continue.

Refer to the Appendix for additional information.



DESIGNING FOR ENERGY RESILIENCE

Discussions of energy resilience have become increasingly important as regions grapple with the increase in extreme weather events. The Oregon Zoo is not spared from this challenge it has experienced snow, rain and heat events in recent years beyond what was previously considered normal. Electricity and natural gas supply and distribution can also be impacted by these events which can affect their ability to deliver consistent, reliable energy.

KEY FINDINGS

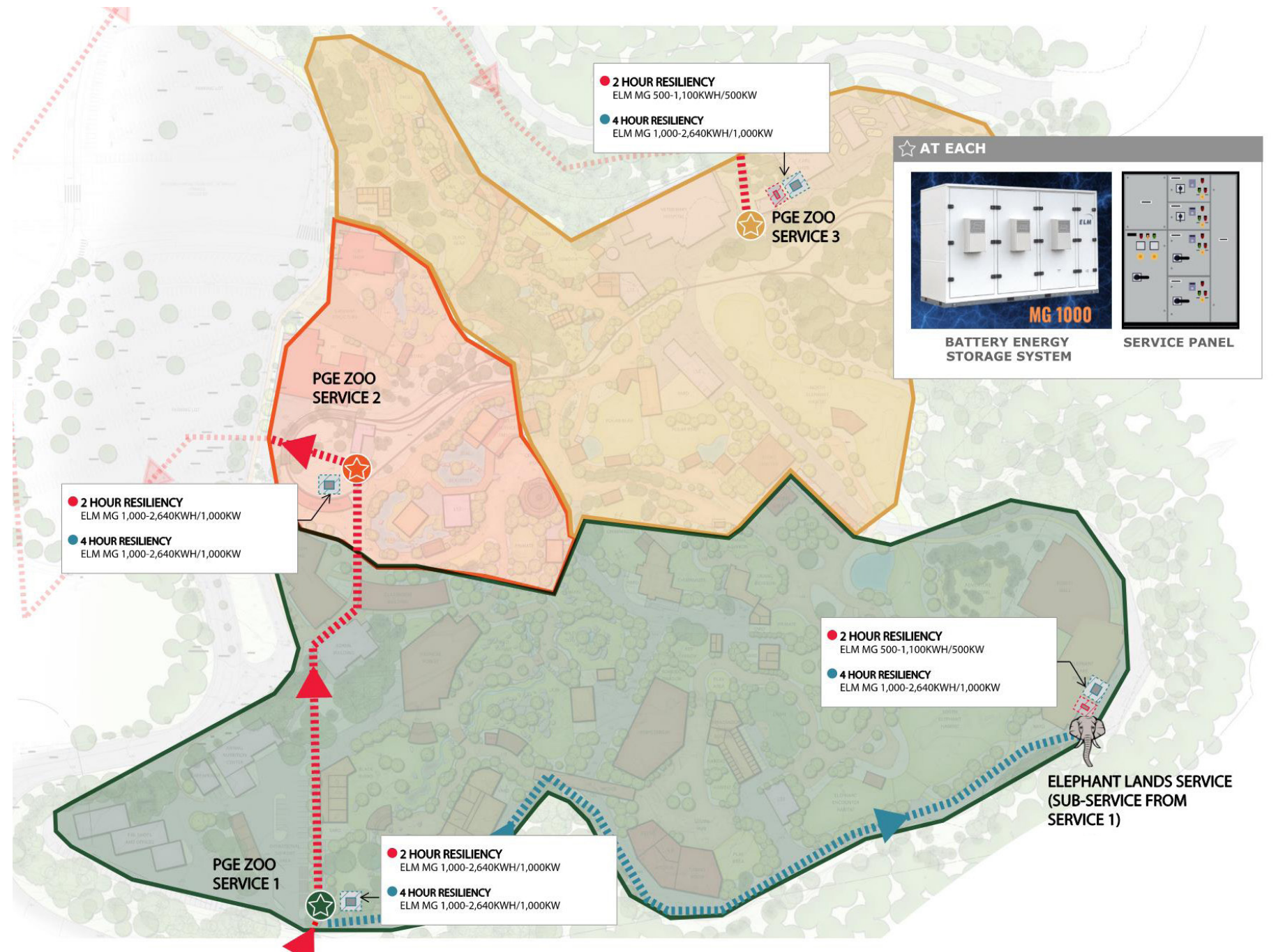
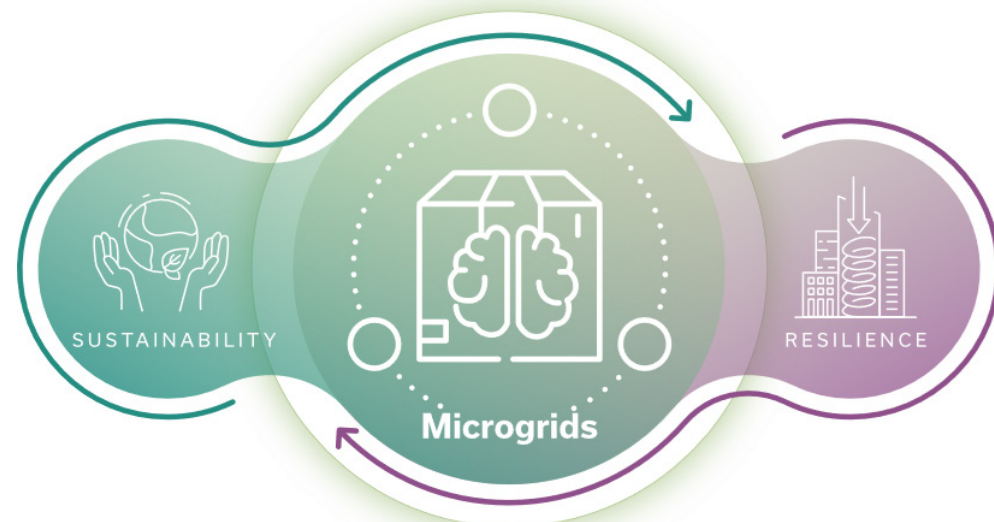
- A benefit of the zoo's long term goal of transitioning to an all-electric campus is that electricity is the primary source of energy that can be locally generated and stored. Electricity can be generated onsite with photovoltaic (PV) panels and stored in battery energy storage systems (BESS) to create a localized energy source that can self generate indefinitely. Fossil fuel reliant systems such as natural gas utility service and diesel generators are dependent on outside inputs to keep these systems running.
- A consideration with a PV and BESS resilience system is that the battery system size needed to support a long term outage during winter (i.e. low solar production) will likely be size and cost prohibitive. Although a long duration outage is possible, a review of the historic outage history at the Oregon Zoo found that the majority of outages are four hours or less.
- Therefore, the best solution is likely a hybrid approach with PV+BESS and diesel generators. The PV and BESS can support the more frequent short

term outages minimizing the emissions and cost associated with operating the diesel generators. The generators can be reserved for only the more catastrophic events, like a major earthquake.

- Initial analysis of the historic loads found that a 1000kW/2500kWh BESS associated with each existing PGE service would be adequate to provide 4-hours of backup to each region.
- For the generators, the zoo's current use of renewable diesel helps reduce emissions and should continue to be utilized.
- In addition to energy resilience, the most important contribution of the BESS is its ability to be a grid-interactive flexible load. In this scenario, the BESS is used during normal grid operations as a grid support resource to improve grid stability and even accelerate grid decarbonization, as discussed in the Electrification section. This is perhaps one of the most important sustainable measures the zoo could implement.

By integrating onsite renewables with storage the Oregon Zoo will be able to implement a campus microgrid. This will provide both sustainable and resilience energy solutions to the site.

Refer to the Appendix for more information on grid-interactive solutions.



THE PATH TOWARDS HOLISTIC SUSTAINABILITY

WATER IS A PRECIOUS RESOURCE

The reduction in water use at the zoo since 2008 is a major success story. With a continued commitment to responsible use, including onsite reuse, the zoo can demonstrate through action that water is a precious resource. Additionally, the zoo has an opportunity with the new campus vision to rethink the role rainwater has within the campus's water story. By capturing, treating and storing the water that falls on the site annually, there is potential to reduce the imported water needs of the campus.

KEY FINDINGS

- Since exhibit usage is the largest component of the total, strategies to reduce this use category, including storm water capture and reuse offer the largest water use reduction opportunity.

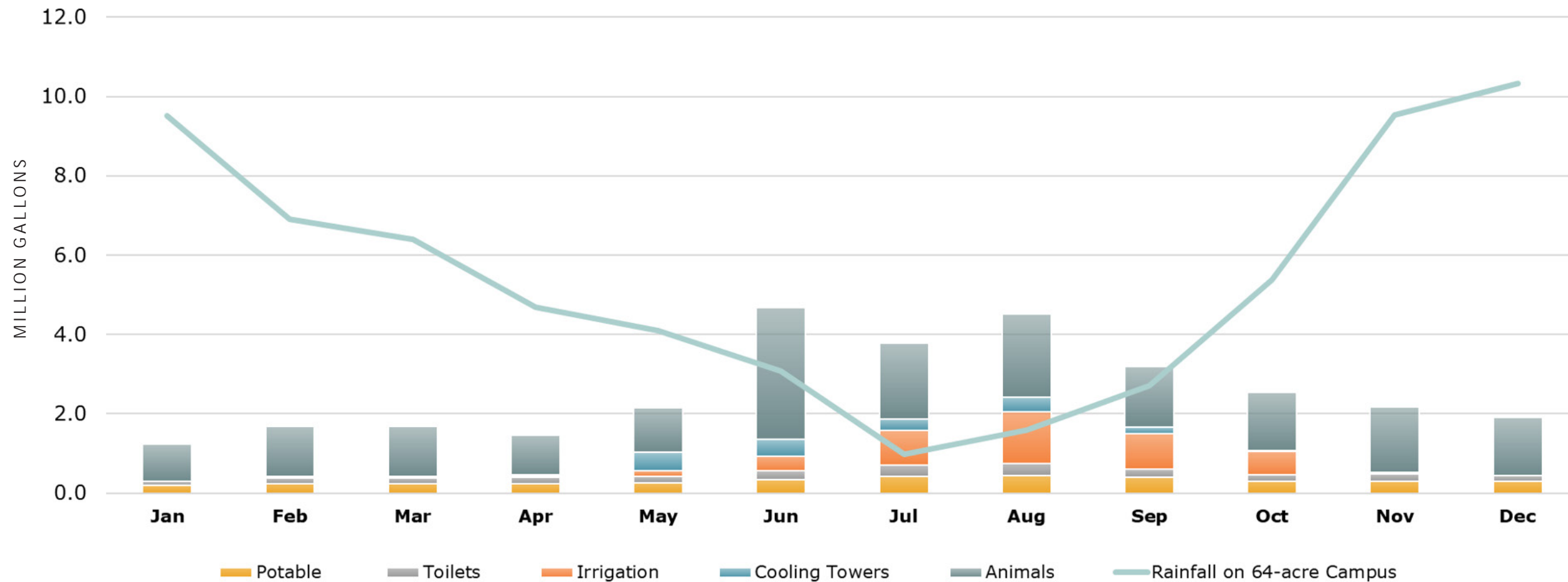
- Reductions in other non-potable demand including irrigation and toilet flushing can have a significant impact.
- Potable demand is a relatively small percentage of total zoo water use (10%); therefore, an on campus treatment system to produce potable water is likely not practical due to maintenance and regulation implications. Yet considerations around water resilience will be further evaluated in the effort to develop the Comprehensive Resilience Plan.
- It is estimated that installing roughly 2.5 million gallons of rainwater storage could save 6 million gallons of water used for landscape, exhibits, and washdown areas.

Refer to the Appendix for additional information.

37.5
MILLION GALLONS

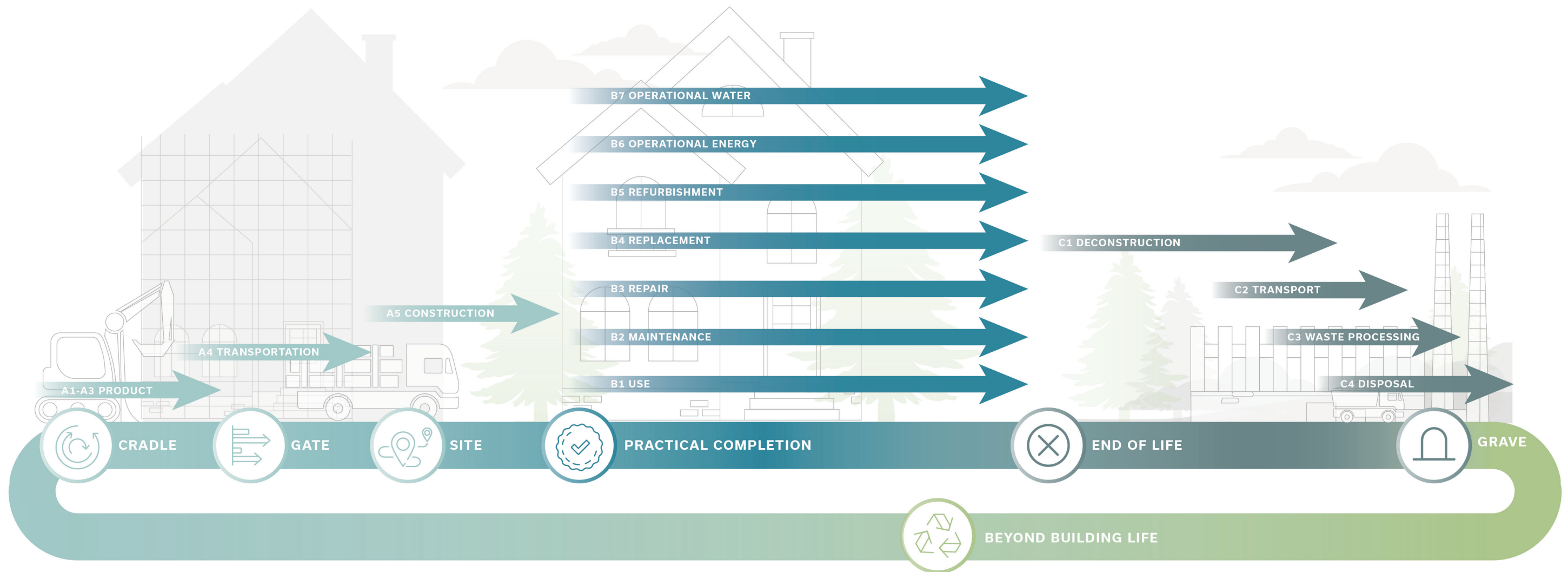
56%
REDUCTION FROM 2008 EXCEEDS
METRO'S GOAL

CAMPUS WATER USE BY MONTH 2022



HOLISTIC EMISSIONS REDUCTION TARGET

Much of the emissions analysis at the zoo to date has focused on operating emissions - the emissions associated with operating the building during its active life. In partnership with understanding the operating emissions, the zoo will expand its view to also consider the embodied emissions of its work- that is to say, the emissions associated with building, maintaining, and deconstructing a building throughout its life. This includes the emissions associated with the materials, transportation, construction, and end-of-life disposal of the building. By taking a more in-depth look at all these factors, projects can better understand the interactions between these different factors and further reduce the overall emissions impacts of the built environment.



DESIGNING FOR CLIMATE RESILIENCE

Metro and the Oregon Zoo are committed to sustainable design to mitigate the zoo's contribution to greenhouse gas emissions and climate change. Nevertheless, climate change will continue to occur and future exhibit designs will need to anticipate the change. The following graph shows the number of hours the outside air temperature in Portland, Oregon exceeds 75°F over the course of a year. The light green bars are based on the historical average (1991-2005). The colored bars indicate several predictions for future outdoor temperature in Portland. Temperature predictions vary significantly depending on whether global GHG emissions are reduced, and between the different models. However, in all cases there are significantly more hours above 90°F, and in two of the models, many more hours over 100°F.

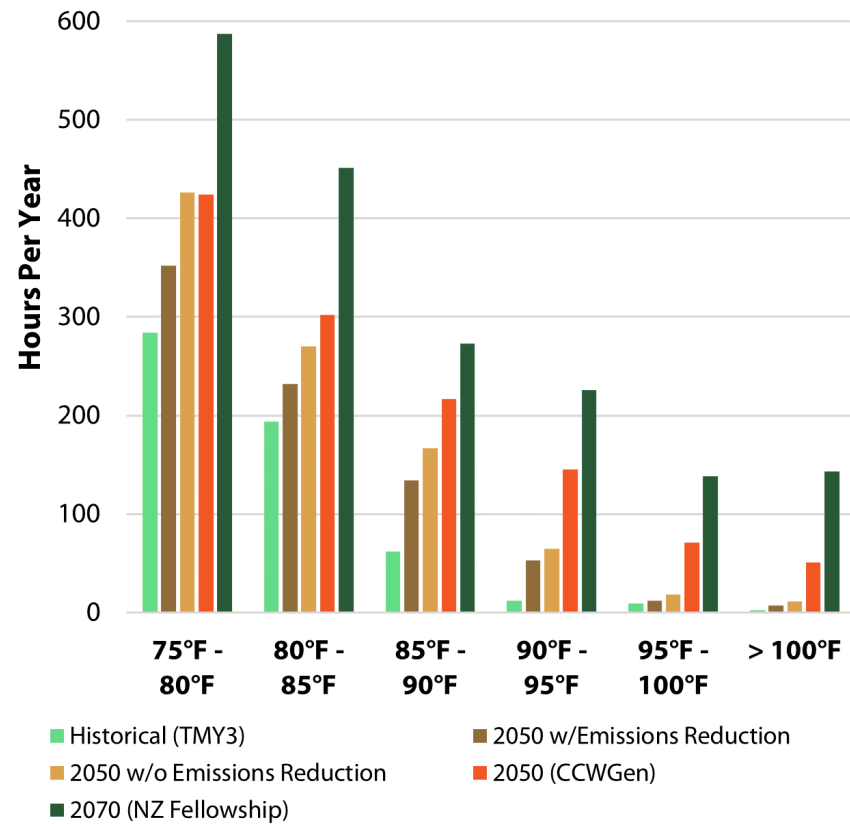
For non-critical applications in the Portland area, cooling systems design typically assumes a peak summer time outdoor temperature of 91°F. Based on the predictions for future climate, a cooling outdoor design temperature of 95°F is recommended. More critical applications, including life support systems, will need to be evaluated on a case by case basis and may warrant outdoor design conditions well over 100°F.

Designing cooling systems to accommodate warmer outdoor temperatures is only one component of the recommended Comprehensive Resiliency Plan to document strategies to mitigate risks associated with climate change, a Cascadia earthquake, and other disruptive events.

METERING & VERIFICATION

Energy and water sub-metering is critical to understanding and managing energy and water use on campus. In addition to installing physical meters, the meter data must be stored and accessible in a useful location for the building owners and operators to easily see and understand. At the zoo, the Education Center is an example of a metering system that is well set up and utilized. Other buildings including polar bear and primates, have the physical meters installed, though the software is not set up so that the data is easily understandable or used. A comprehensive inventory of existing meters should be performed, meter data should be labeled, stored, and trended electronically in a single location that is easily accessible to and understood by the zoo and Metro. All future projects should be set up similarly.

CLIMATE COMPARISON
DRY BULB



Historical (TMY3): <https://energyplus.net/weather>
 2050 w/emissions reduction: <https://www.weathershift.com/>
 2050 w/o emissions reduction: <https://www.weathershift.com>
 2050 CCWGen: [a.https://energy.soton.ac.uk/ccworldweathergen/](https://energy.soton.ac.uk/ccworldweathergen/)
 2020 NZ Fellowship: <https://www.energytrust.org/wp-content/uploads/2020/06/Download-research.zip>

A LOOK FORWARD ON THE CURRENT PATH

A key tenant of the electrification movement is that through technology advances, economic benefits of renewable energy and state mandates the electric grids are in steady trending towards reductions in operating emissions. This “greening of the grid” translates to operating emissions reduction on everything that it serves, including buildings.

As the PGE grid trends towards this zero carbon state, the zoo’s electricity related operating emissions will follow. Over time, this current emissions source will become zero.

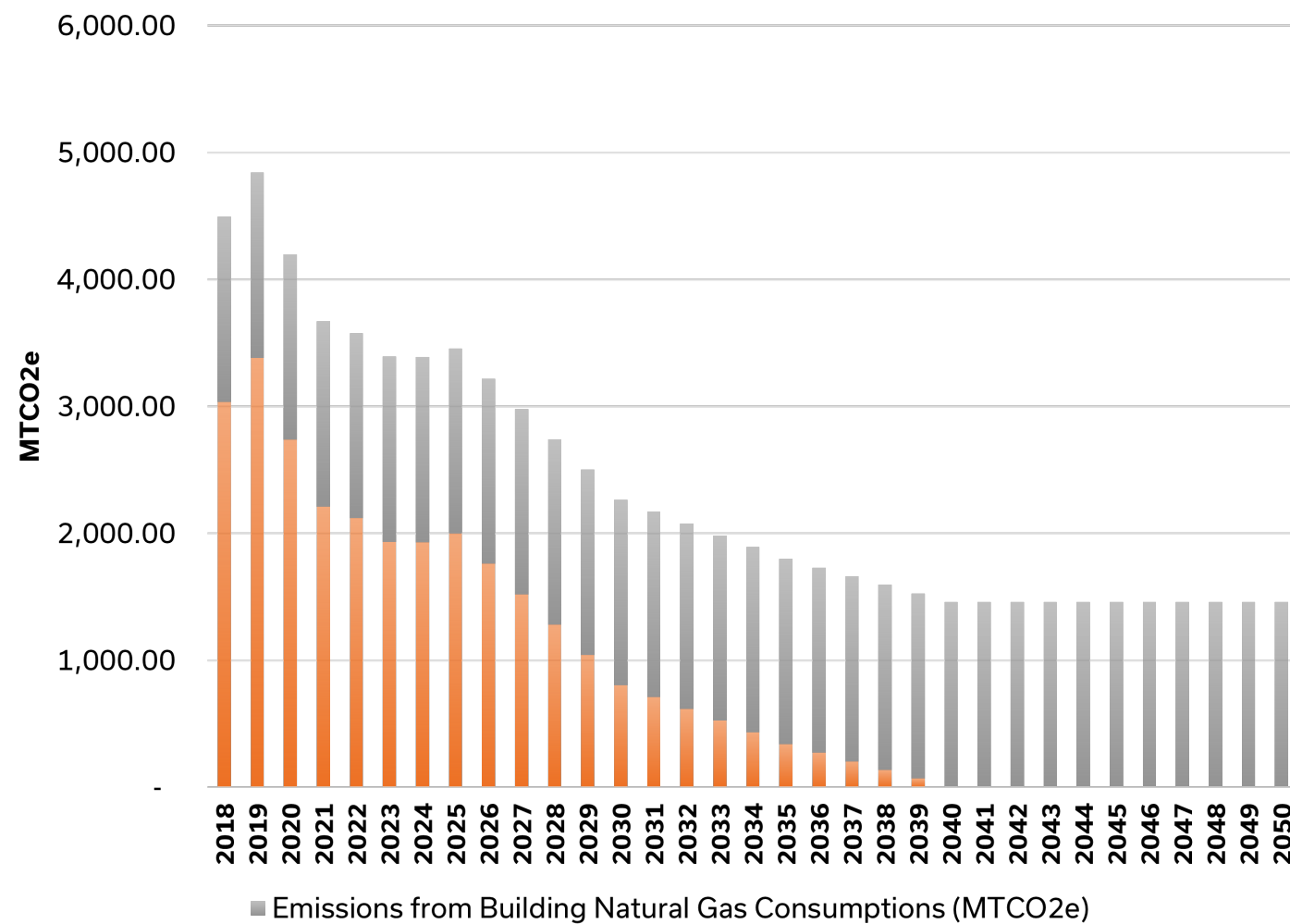
By comparison, natural gas- also known as methane gas or fossil gas- will always have emissions associated with it due to being a fossil fuel. By 2030 the natural gas on the campus will become the main source of operating emissions on campus and by 2040 it will be the only source.

Note: Alternate methane sources, such as an onsite anaerobic digester, were considered as part of this campus plan but were found to not be viable for this site. Refer to the appendix for additional details regarding the study.

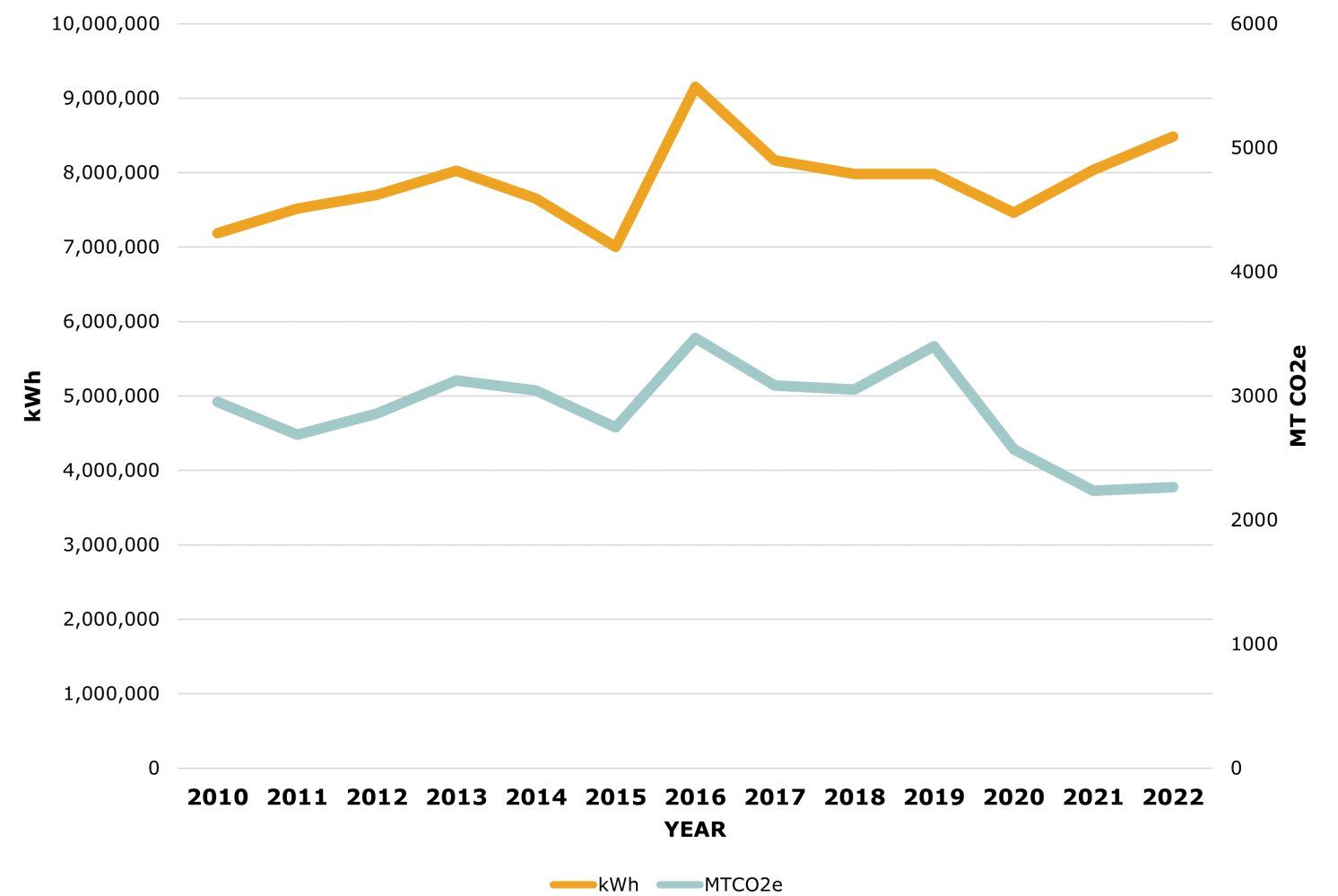
As the electric grids move towards decarbonization the relationship between energy use and operating emissions is decoupling.

This means even if zoo electricity use increases due to building and transportation electrification, overall operating emissions will continue to decrease due to the changes on the PGE grid. The zoo has already begun to witness this phenomenon with an increase in recent years in electrical usage due to new exhibits and a post-pandemic visitor return. Yet during this same period, it experience a decrease in operating emissions. This trend is anticipated to continue as PGE moves toward the state mandated HB2021 zero emissions by 2040 target.

BASELINE: YEARLY OPERATING EMISSIONS



ENERGY V EMISSIONS





PROJECT ZONES

PROJECT ZONE KEY MAP

1 GREAT NORTHWEST

Enhancement of the iconic Great Northwest exhibits and visitor experience with new pathways, elevated walkways, and some new animal species while preserving the native Douglas fir forest. Rotational flexible habitats will allow species like black bears, beavers, and river otters to explore different terrains, diversifying their habitat space and providing a dynamic experience for visitors.

2 COASTAL SHORES

Transform the heart of the zoo with the removal of Steller Cove, the Penguinarium, tiger and red panda exhibits to make way for a re-imagined Central Hub and new exhibits for seals, sea otters, and penguins. A new guest services building will provide direct access to the lower plaza, featuring a cafe, restrooms, and underwater views of seals, while a new carousel and open space inspired by the Pacific Northwest coastal landscape will enhance the guest experience.

3 AFRICA

Redevelopment of the existing Africa Zone with new savanna exhibits for giraffe and black rhinos, new holding buildings and year-round viewing. The Tropical Forest building will house a walk-through aviary and diverse plant collection. A Kopje walking trail will connect the African Forest and Lowland Savanna zones featuring new exhibits for lions, painted dogs, and primates.

4 SOUTH HUB

Situated midway through the guest experience, the South Hub will provide key amenities like restrooms, retail, a play area, first aid services, and a sit-down restaurant. The open plaza will serve as a transition zone between the Asia Forest Trail and African Savanna, with a focus on comfortable seating, canopy trees for shades, and a sprawling event lawn for picnics and events. Anchor attractions surrounding the hub also include the Herpetarium and Ambassador Animals.

5 ENTRY

Redevelopment of the existing zoo entry to improve accessibility, flow, and overall arrival experience. The plaza will be transformed into an inviting and intuitive space inspired by the local forest and mountain views. The design includes shade canopies, seating, and framed views of mountain goats, while also integrating existing architectural elements and native Pacific Northwest plantings.

6 EAST HUB

Recently completed as part of Elephant Lands and Polar Passage, the East Hub shall be enhanced with permanent architectural shelters for flexible use between daily guest picnics and after-hours private events. At the knoll north of the Elephant South Habitat, a new children's adventure playground is envisioned offering climbing opportunities and themed elements related to nearby animal species providing an engaging and unique experience for families.

7 ANIMAL CARE HUB

At the northeast corner of the zoo, Gate J is a hub for animal care functions like the Veterinary Medical Center (VMC) and serves as an entry and exit point for staff from Washington Park. Enhancements include improved vehicle access and additional staff parking. The animal care building will be replaced by a new structure featuring research labs and offices for various staff.

8 FACILITIES HUB

At the southwest corner of the zoo, Gate A serves as a hub for essential operational support functions such as horticulture, and facilities and maintenance offices, custodial staff, and welding and wood shops. The plan includes replacement of the existing older structures with new facilities, renovation of the Animal Nutrition Center (ANC), and a new greenhouse.



THE GREAT NORTHWEST

The Great Northwest is an iconic exhibit at the Oregon Zoo. Surrounded by a native Douglas Fir forest, this trail replicates the local Northwest watershed from forest canopy down to underground passageways formed by lava tubes, from waterfalls down to the bottom of the stream, all while highlighting native species in their natural habitat.

The Campus Plan proposes to preserve this immersive experience with enhanced accessibility and fow for visitors. Redevelopment within this zone will include new pathways and elevated walkways as well as the potential introduction of exciting new animal species to accompany the existing collection. The new development will limit the removal of existing mature trees as this zone falls within the City of Portland's environmental conservation overlay.

PROGRAM

Total Project Site	3.2 AC	139,375 SF
Exhibit & LSS Building		4,150 SF
Condor Care Building (ex)		440 SF
Condor Habitat (ex)		4,870 SF
Beaver & Otter Care Building		1,260 SF
Beaver Habitat		2,750 SF
Beaver View Shelter		1,440 SF
Otter Habitat		2,165 SF
Otter View Shelter 1		40 SF
Otter View Shelter 2		240 SF
Cougar Care Building (ex)		575 SF
Cougar Habitat (ex)		3,390 SF
Restroom Building (ex)		1,630 SF
Owl Care Building		570 SF
Owl Habitat		1,610 SF
Animal Habitat		1,825 SF
Eagle Habitat		2,430 SF
Black Bear Care Building		2,055 SF
Animal Yard		1,360 SF
Black Bear Yard		1,280 SF
Animal Habitat		20,010 SF
Black Bear Habitat		13,110 SF
Black Bear View Shelter		245 SF
Mountain Goat Care Building (renovated)		1,590 SF
Mountain Goat Yard (ex)		500 SF



SITE PLAN LEGEND

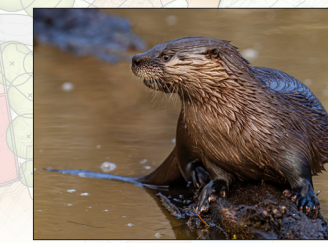
- Visitor Amenity
- Exhibit Building
- Admin / Support
- Habitat Space
- Animal Care Building
- Off-Exhibit Yard
- Ponds / pools
- Visitor Path
- Service Path
- Event Lawn



Beaver



Cougar



River Otter



Black Bear

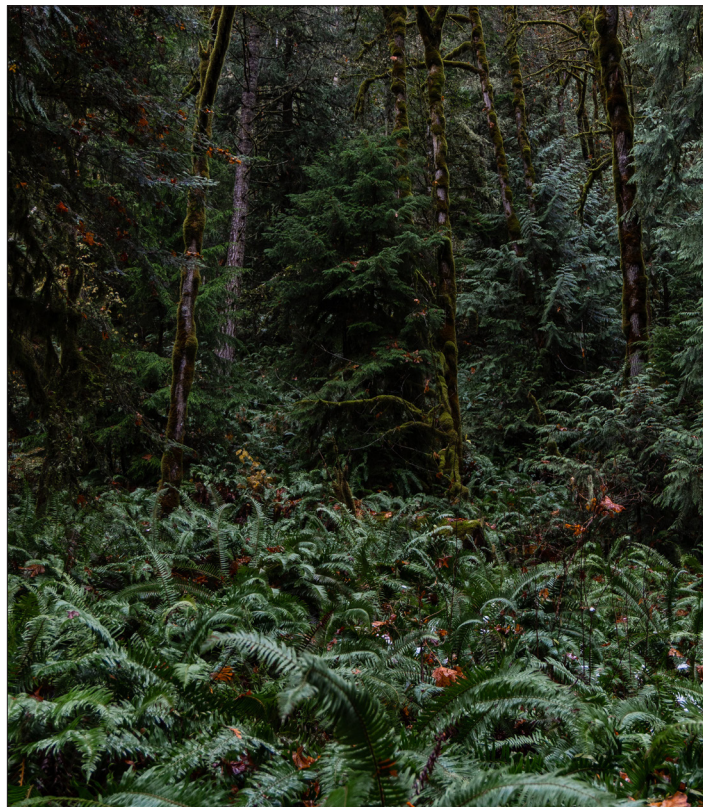
New exhibits will also provide an opportunity to restore the understory of the native Douglas Fir Forest, continue the zoo's ongoing effort to remove non-native and invasive species, and improve the overall health of the native forest. Botanic collections may include ferns, maples, and native vegetation used by indigenous communities within the area.

As visitors round the corner of the rocky mountain goat exhibit, they will remain at the canopy-level as they trek across a new elevated bridge to the opposite side of the ravine. Then visitors will trace the edge of the ravine, eye-level with owls high up in the trees as they continue to the existing bald eagle overlook. Through the existing covered bridge, visitors will arrive at a new exhibit.

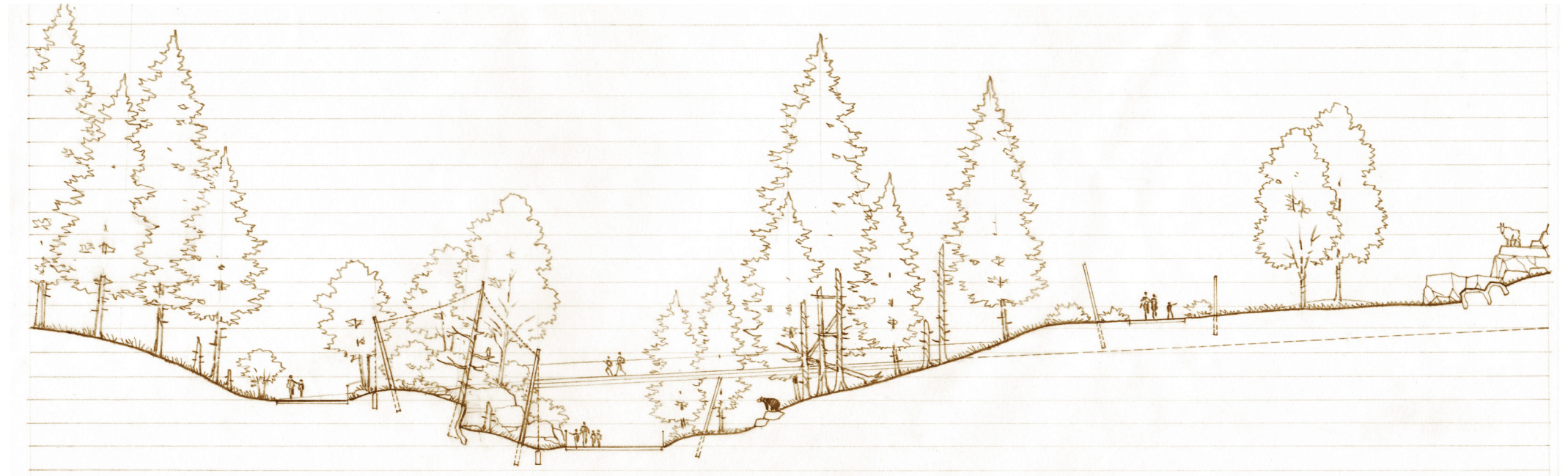
Occupying the west side of the ravine, the new exhibit will limit site disturbance by enveloping the existing natural site with its mature vegetation and complex topography. From there, visitors will make their way down to the forest floor on an at-grade path taking in close views of snowy owls, while possibly catching a glimpse of black bears up high up along the ridge.

At the base of the ravine and opposite to the existing cougar and condor exhibits, new habitats will be provided for river otters and beavers, completing one's journey down the mountain. Incorporated throughout the new pathways will be areas for visitors to pause and absorb the sights, smells and sounds of the forest as they wait in anticipation for the local animal residents to pass through.

An important feature in this zone is the implementation of rotational flexible habitats. By creating physical linkages between exhibits of



Northwest forest landscape



Section through The Great Northwest Canyon



different species, these animals can rotate through all the exhibits at different times, increasing their habitat space and promoting natural exploratory behaviors, as well as providing a dynamic experience for visitors. Seasonally, there may even be opportunities for one species to occupy both habitats while bears hibernate during the winter. All exhibits will be designed for the individual species with the most rigorous standards to allow for ultimate flexibility.

Tying into the zoo's campus-wide focus on water conservation, the Great Northwest will incorporate both renovated pools and new pools with life support systems (LSS). The existing 20,000-gallon pool within the Eagle exhibit is a freshwater aquarium for native PNW species and shall remain but replace the LSS equipment similar to the existing with sand filtration, temperature control, ultraviolet sterilization, and provisions for gas exchange.

The new aquatic exhibits in the Great Northwest requiring LSS are river otter, beaver, and tanks in the new Freshwater Exhibit Building. River otter and beaver have a combined volume of 40,000 to 50,000 gallons and share a life support system. Anticipating underwater viewing and the industrious behaviors of both river otters and beavers, the LSS process consists of strainers or a screen to remove coarse solids, sand filtration, ozonation, ultraviolet sterilization, and provisions for gas exchange.

Freestanding tanks will be supported by off-the-shelf packages similar to a home or commercial aquarium tank. The backwash water from the sand filters associated with all of these exhibits is an excellent candidate for reuse on the zoo's campus. For example, a simple single pass recovery system could adequately treat this water for reuse as makeup water to exhibits like Elephant Lands and Condors of the Columbia.



Great Northwest Canyon Trail

COASTAL SHORES

At the end of the existing boardwalk, visitors arrive at the center of the zoo, met with the rocky sea stacks of Steller Cove and panoramic views of the zoo beyond. Although home to some favorite animal species such as sea otters and seals, the circulation through the existing Steller Cove exhibit can be unclear, causing those unfamiliar with the zoo to miss the Education Center or Penguinarium. Further, most of the structures in this part of the zoo are reaching the end of their service life due to aging infrastructure and frequent need for maintenance and repairs. Therefore, with the demolition of Steller Cove, the Penguinarium, and the dated tiger and red panda grottos, Coastal Shores plans to redevelop the heart of the zoo with a new vision that will integrate the recently completed Polar Passage, Education Center, and Discovery Plaza with new outdoor seal, sea otter, and penguin exhibits.

Key to this redevelopment is the transformation of the Central Hub into a true plaza with guest amenities, way finding, and circulation. From the boardwalk level, a new Guest Services Building will be constructed to provide visitors the choice to immediately get to the lower level of the central hub by way of elevators or stairs. At the lower level, the building will house restrooms and a quick service snack option as well as feature underwater viewing of the seals. Opposite the Guest Services Building will be a new and improved hand-crafted carousel housed within an enclosed shelter. Throughout the Central Hub, there will be plenty of open space for circulation as well as built-in planters and seating.

PROGRAM

Total Project Site	2.0 AC	87,870 SF
Guest Services Building (2 floors @ 3,772)		7,545 SF
Carousel Enclosure		3,110 SF
Sea Cave		2,420 SF
Sea Otter & Seal Of-Exhibit Pools		1,540 SF
Sea Otter Habitat		3,060 SF
Seal Habitat		3,420 SF
Coastal Habitat		205 SF
Coast Habitat Support Building		800 SF
Penguin Care Building		985 SF
Penguin Habitat		3,690 SF
Penguin Underwater View Shelter		500 SF
LSS Building (2 floors @ 4,294)		8,590 SF

Reference imagery



Proposed Species



Sea Otter



Harbor Seal



Humboldt Penguin

From the upper level of the Guest Services Building, visitors will also have the option to begin their venture into Coastal Shores, enjoying multiple views of sea otters from varying vantage points and then panoramic views of penguins at the Discovery Plaza as they swim around their new outdoor pool.

The concept for the walkways, exhibits, and vegetation within this area is inspired by the Pacific northwest coastal landscape of forest and rugged, coastal edges supporting many of these coastal animal species. New planting areas may be broken into different plant communities: Discovery Plaza may support lower-growing and resilient coastal headland-type of plants including reed grass and frosted paintbrush, and the spaces within and immediately adjacent to the exhibits may focus more on Oregon's coastal forests.

Botanic collections bordering the new Coastal Shores exhibits could incorporate hemlock and cedar as well as understory species such as rhododendrons, azaleas, wax myrtle, and ferns. Collections of native plants important to local indigenous communities could also be highlighted in this area.

Behind the scenes, a new central service court provides direct access to all the new exhibits and a centralized location for day-to-day operations. While penguins will require a separate indoor holding building with nest boxes, sea otters and seals are able to be managed outdoors in off-exhibit pools with some open-air shelters as they are currently.

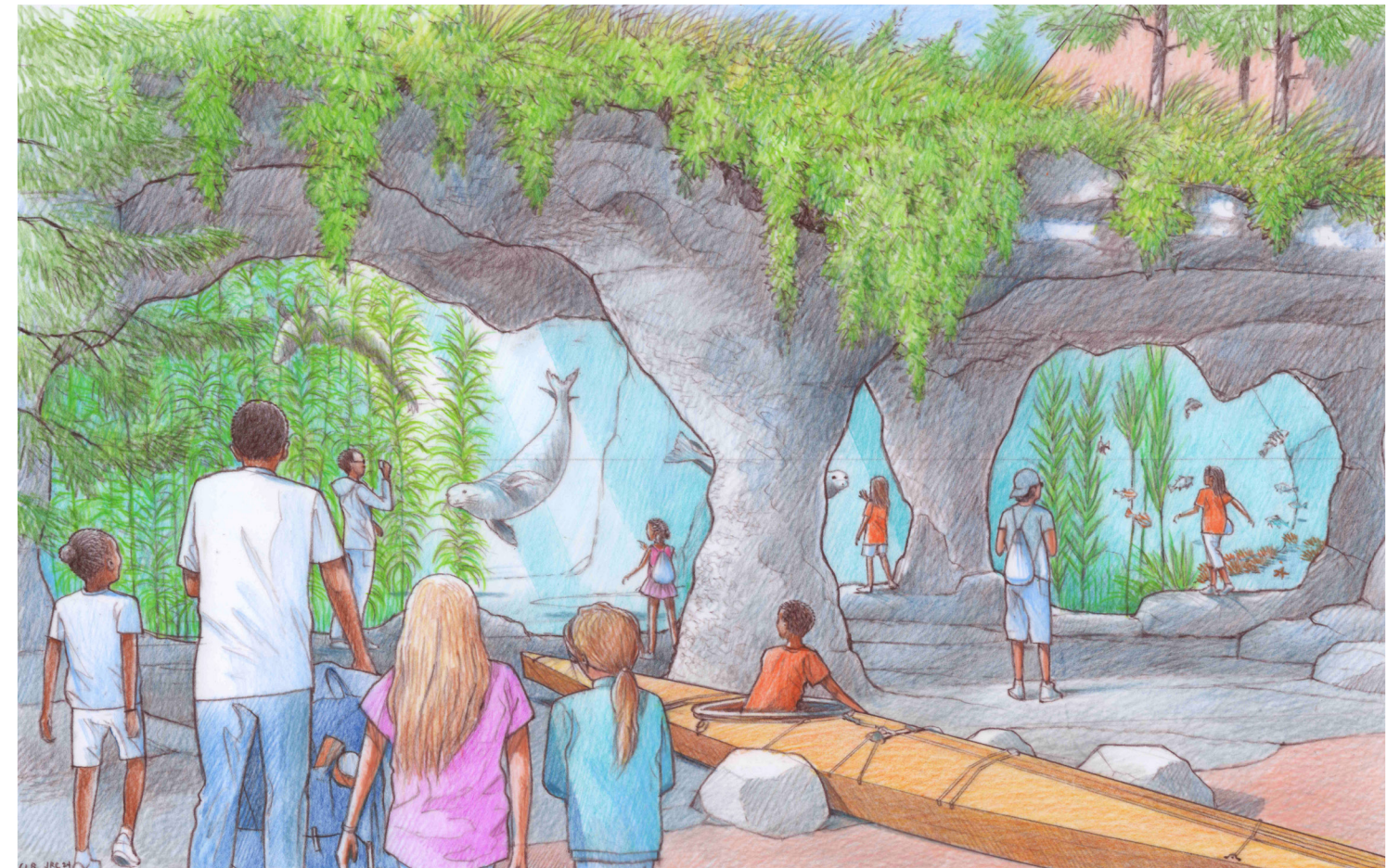
All the pools will be connected with water transfer chutes to allow for flexible rotation or create one large continuous swimming area. This flexibility allows for better integration of the zoo's role in sea otter conservation as a rotational housing facility for retired sea otter surrogate mothers after age 10 as well as young otters around age 3

who cannot be released into the wild, have been through the surrogate program, and will become future surrogate mothers.

To optimize efficiency and space for zoo staff, a new two-story LSS building will be constructed to house diet prep areas, enrichment storage, diver equipment and facilities, and offices for life support staff on the first floor and all life support system (LSS) equipment for the three aquatic exhibits on the basement floor. The seal and sea otter pools will be saltwater, and penguin will be freshwater. The LSS processes for seal and sea otter incorporate sand filtration, fractionators, temperature control, ozone, ultraviolet sterilization, provisions for gas exchange, and backwash recovery.

The penguin LSS process incorporates a combination of traditional LSS with sand filtration, ozonation, and temperature control targeting premium underwater viewing and a hybrid mechanical-natural system supplying the larger portion of the look-down-only pool. The penguin life support system also has an opportunity to use a backwash recovery system utilizing a hybrid mechanical-natural system approach. In this approach, wetland cells could be constructed. Water leaving the pool through skimmers and sumps from the exhibit will be sent to these cells to be treated, recreating the treatment processes that occur in natural wetlands, and then return to the LSS Building for refinement and polishing before reentering the animal exhibits.

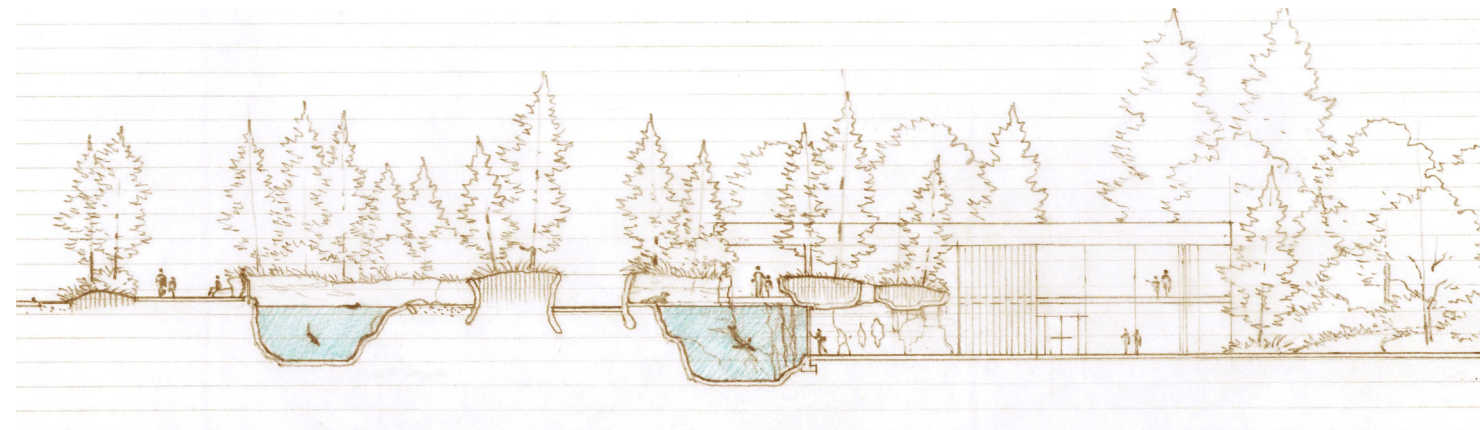
This process reduces the exhibits' potable water demand through biological water treatment and reuse of exhibit pool water. To supplement water use in these exhibits, Coastal Shores will also capture and reuse rainwater.



Coastal Sea Cave underwater viewing



Outdoor Penguin habitat



Section through habitat pools and Central Hub

SOUTH HUB

The South Hub is strategically located at the midpoint of one's journey through the zoo and exemplifies the campus driver of providing a holistic guest experience beyond animal-related experiences. Located where predator exhibits currently reside, visitors will arrive in the South Hub ready to eat, take a break, and recharge for the remainder of their visit. Therefore, guest amenities are a must and include restrooms, retail, first aid, playground, and a sit-down restaurant.

Core to the South Hub is the open plaza space that unifies the surrounding amenities and destinations, while also providing a transition between the Asia Forest and Africa Savanna zones. With the thoughtful integration of pavement patterns, planters, and built-in seat walls, the plaza provides plenty of space for large crowds to flow easily through the South Hub as well as areas for groups to gather and sit.

The planting concept in this area seeks to emphasize seasonal interest as well as include large canopy trees for shade and comfort in the plaza. The species selected may reflect the indoor habitats of the Herpetarium or become a continuation of the Asian landscape with flowering trees and understory in the plaza planting beds.

Adjoining the plaza, a new event lawn will be incorporated in this area to support events and concerts within the zoo, as well as opportunities for picnicking and respite for visitors.

PROGRAM

Total Project Site	5.0 AC	216,555 SF
Pedestrian Bridge		3,560 SF
Restaurant & Patio		15,090 SF
Play Area		3,940 SF
Herpetarium & Ambassador Animal Building		21,020 SF
Ambassador Animal Yards		2,195 SF
Ambassador Animal Habitat		1,450 SF
Lawn		24,300 SF
Stage Enclosure		840 SF
Pavilion		2,000 SF
Restroom Building		1,155 SF
Red Panda Care Building		810 SF
Red Panda Yard		235 SF
Red Panda Habitat		3,620 SF
Primate Care Building		1,025 SF
Primate Habitat		3,360 SF



Anchoring the south edge of the plaza, the proposed restaurant will serve as the zoo's primary food and beverage option and will accommodate many more guests than the existing Aviary Caf  with a grand dining room, mezzanine level, and covered outdoor seating that offer views of the native Douglas fir forest around the zoo. The restaurant will offer multiple cuisine options in a scramble servery concept and an outdoor service window serving a la carte items outside of typical dining hours of the main restaurant.

On the lower floor, the restaurant will house a walk-in freezer and dry storage large enough to service all other food and beverage locations throughout the zoo. Its location with direct access from the main service road is ideal for deliveries and distribution.

Reference Imagery



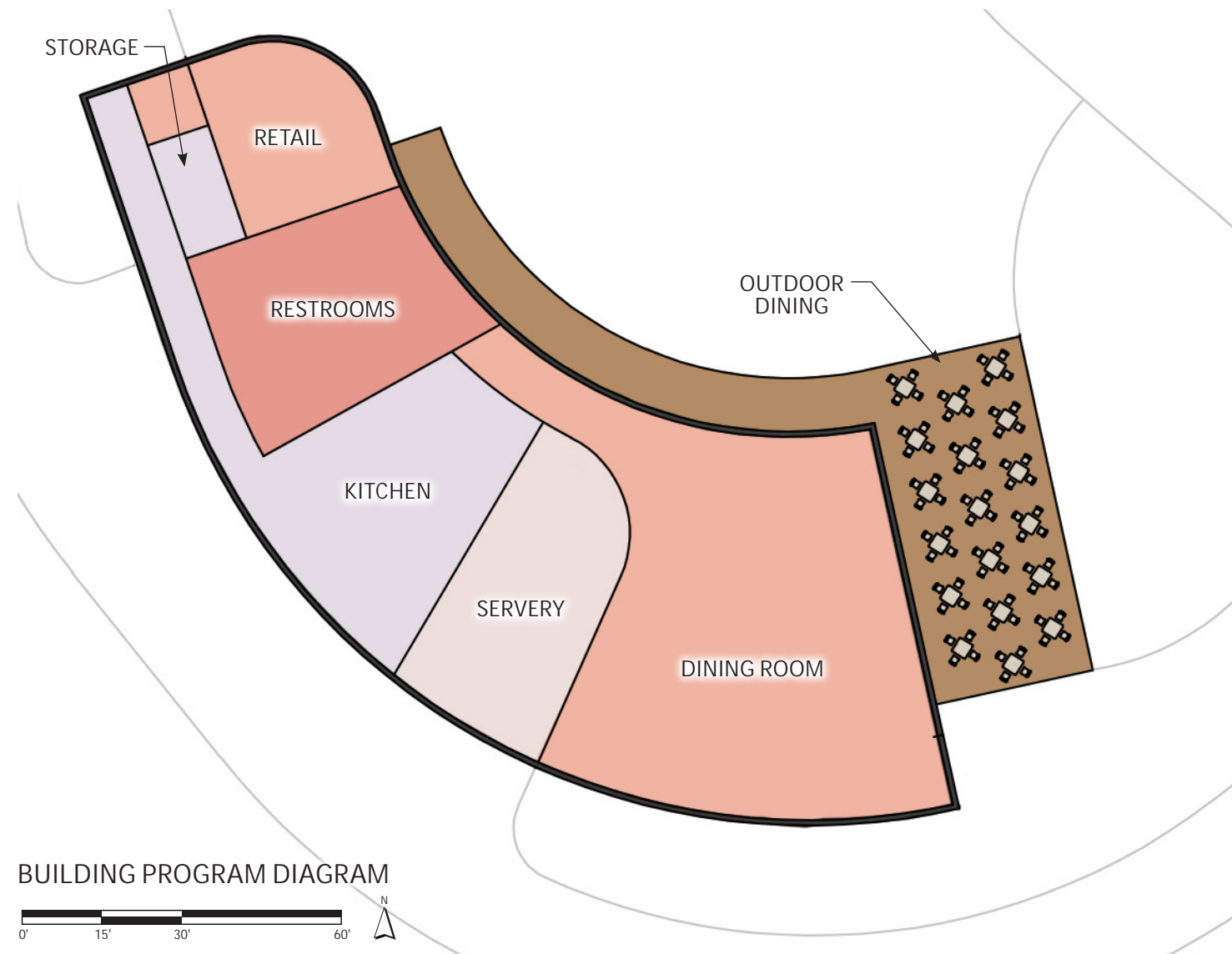
South Hub

RESTAURANT & PLAZA

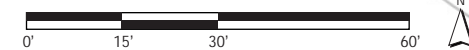
The core of the South Hub focuses on a new open plaza space and primary sit-down dining option. This combination of functions provides critical space rest, decompress, and refuel before embarking on the journey through the second half of the zoo.

The restaurant facility features a sizable indoor dining option as well as covered outdoor seating adjacent to a new children's play space. This building also supports a significant restroom facility, guest services zone, and small retail area.

The natural slope of the site in this area also provides an opportunity for the lower level of the restaurant facility to incorporate much needed support functions such as receiving and storage.



BUILDING PROGRAM DIAGRAM



Reference Imagery



PROGRAM

Lower Level

Offices	1,500 SF
Food & Beverage Storage	3,500 SF
Support	2,000 SF

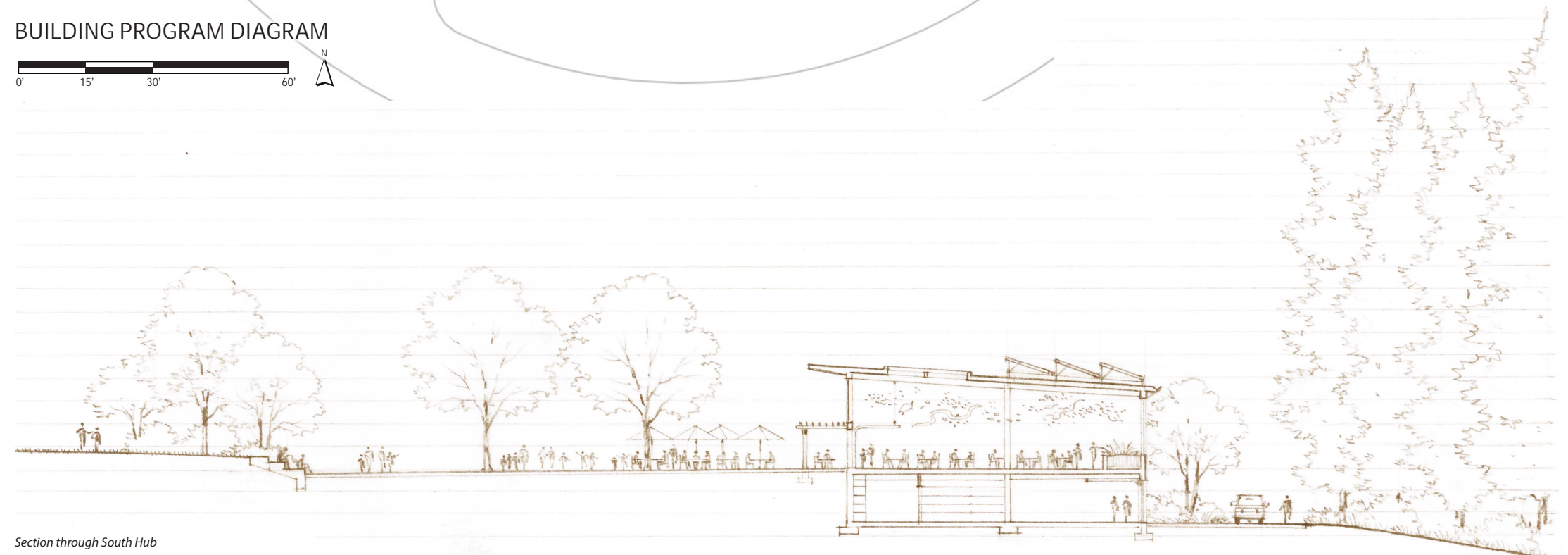
Plaza Level

Dining Room	4,665 SF
Outdoor Dining	3,210 SF
Servery	1,600 SF
Kitchen	1,865 SF
Restrooms	1,715 SF
Retail	995 SF
First Aid	170 SF
Storage	275 SF

Net 21,500 SF

Net to Gross 1,430 SF

Gross 22,930 SF



Section through South Hub

ASIA FOREST TRAIL

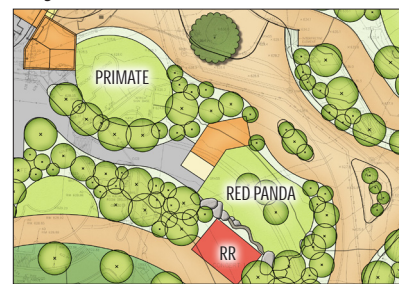
Opposite Elephant Lands is a new immersive walking trail through the Asian Forest with added habitats for Asian primates and red panda. At the east edge of Primate Forest, new expanded holding areas for gibbons will be constructed to increase management flexibility and provide a direct connection between the existing facility to a new outdoor high-volume mesh enclosure.

This new area will be built to reflect the natural history of the primates who reside in this part of the world, offering guests a chance to see these animals as they would in the wild. In the new outdoor exhibit, it is key that all vertical space can be utilized by these arboreal species to replicate their natural brachiating and climbing skills.

Continuing along the trail, visitors will arrive at a new mixed species exhibit for red panda and muntjac deer. Red pandas will trail through the upper canopy branches while muntjac deer forage along the forest floor. A new shared holding building with an off-exhibit yard will be placed strategically out of view from visitors. Care should be taken to incorporate noise-reducing materials within the building envelope and barrier walls surrounding the habitat as red pandas can be sensitive to sound.

In the planting and materials, the Asia Forest Trail builds upon Elephant Lands by introducing other Asian plant species, emphasizing hardy ornamental species such as flowering trees, clumping bamboo, rhododendrons, hydrangeas, and other Asian bio-region species. The dense vegetated buffer shown south of the new animal exhibits will help to create that forest backdrop as well as visual and acoustic separation before visitors arrive in the clearing of the new lawn.

Key Plan



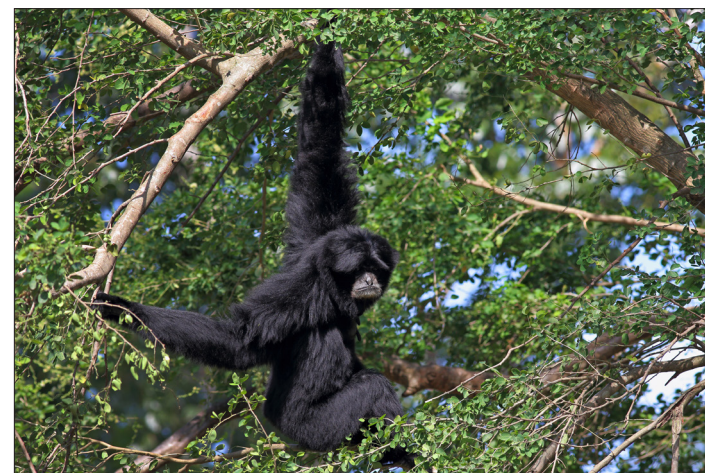
PROGRAM

Red Panda Care Building	805 SF
Red Panda Yard	235 SF
Red Panda Habitat	3,620 SF
Primate Care Building	1,025 SF
Primate Habitat	3,360 SF



Red Panda habitat

Proposed Species



Siamang



Muntjac



Red Panda

HERPETARIUM & AMBASSADOR

Wrapping the northwest edge of the event lawn, the façade of the Herpetarium and Ambassador Animal building receives visitors as they round the corner from the Asia Forest Trail. This hybrid facility takes advantage of complimentary programs which benefit operationally for staff and experientially for visitors by sharing the same complex. Ambassador Animals would occupy the north wing and the Herpetarium would occupy the east wing. Together, both programs highlight species diversity as well as extend the peak visitor seasons with a fully indoor experience.

The Ambassador Animal wing provides a combination of indoor and outdoor housing for animals with a visitor presentation space for approximately 150 people that is indoors but could have the ability to open large windows or walls on fair weather days. Animal species may include birds, mammals, and reptiles from around the world.

In the naturalistic presentation space, daily demonstrations would involve a variety of animals and varying themes. Guests will be immersed in the animal experience, seeing them crawl, climb and fly as they learn about wildlife from our ambassador team and connect with nature. This designated presentation space ensures programs can operate year-round, while promoting higher visibility of animals and increased staff-visitor engagement without routinely transporting animals.

While most ambassador animal housing is behind the scenes, some rainforest mammals such as sloths, prehensile-tailed porcupines, tamanduas, and binturongs are great candidates for being visible to the public and also tie in with the program of the Herpetarium. At the intersection of the buildings, these exhibits would layer into the beginning of the indoor walk-through experience. With a focus on reptiles and amphibians, the Herpetarium would be designed to support multiple climates, including montane, temperate, tropical, and desert environments related to each species' native habitats.

Through a mix of large open-air transects in a greenhouse type setting and smaller curated exhibits, this building would truly showcase diversity of species. Vegetation collections will introduce visitors to a variety of plants associated with each animal's region, support animal enrichment and enhance the zoo's botanic collection. The exhibits may also include aquatic features requiring life support systems (LSS) such as two to three pools in the 5,000-to-10,000-gallon volume range for crocodilian species. These pools could support fish in addition to the reptile species. The LSS would consist of sand filtration, temperature control, ultraviolet sterilization, and provisions for gas exchange.

The backwash water from the sand filters associated with the Herpetarium exhibits is an excellent candidate for reuse on site. For example, a simple single pass recovery system would adequately treat this water for reuse as makeup water to exhibits like Painted Dog, Flamingo, or Giraffe.

PROGRAM

Ambassador Animals	
Theater	2,030 SF
Rainforest Ambassador Exhibits (4 @ 280 SF)	1,120 SF
Visitor Gallery	950 SF
<hr/>	
Animal Suites (20 @ 100 SF)	2,000 SF
Prep & Break Room	655 SF
Restroom	80 SF
Locker Room	85 SF
Shower Room	100 SF
M/E	465 SF
<hr/>	
Herpetarium	
Rainforest Gallery	2,975 SF
Small Exhibit Gallery	780 SF
Desert Gallery	4,040 SF
Care Staff & Exhibit Support	2,220 SF
<hr/>	
Net	17,495 SF
Net to Gross	3,525 SF
Gross	21,020 SF



Prehensile-tailed porcupine ambassador



BUILDING PROGRAM DIAGRAM



Ambassador and Herpetarium interior

ENTRY

The entry plaza plays an important role for visitors as it is the first experience one has upon arriving at the Oregon Zoo. The existing plaza is currently sloped at approximately 5 percent and characterized by expansive asphalt surfacing, with little shelter from sun and rain. Circulation is challenged by the steeper slope, making it a space that is less accessible for gathering and events as well as unclear from a wayfinding perspective.

The plaza is framed on the north and south by the guest services and gift shop buildings, both of which have a distinctly Northwest Forest architectural quality. On the east side of the plaza is the existing Mountain Goat exhibit, which serves as a main attraction and immediate animal encounter for visitors.

The focus of the redesign is to create an intuitive flow in and out of the zoo as well as reduce stress for visitors. It will also direct guests towards the gift shop as they exit to encourage final opportunity for souvenirs, memberships, and donations. The redesigned plaza should generate excitement and anticipation for visitors as they arrive, and it must reinforce a positive experience as visitors depart. It should frame

and accentuate the existing Mountain Goat exhibit and anchor the zoo in its context of the Pacific Northwest and Willamette Valley through plantings, materials, and design elements.

The new entry plaza concept addresses the programmatic needs of the main entry, solves accessibility challenges, and enhances visitor amenities and experiences.

The existing Guest Services and Gift Shop engage with the plaza and provide opportunities for visitors to orient themselves, sit, find grab-and-go snacks or restrooms, and shop. Design and material choices will respond to the existing architectural elements at the entry creating an integrated experience upon arriving at the Oregon Zoo. Planting throughout this area could include notable PNW native plantings such as Douglas fir, big-leaf maple, vine maples, rhododendrons, western sword fern, and other native forest groundcover.

The entry concept also considers the Washington Park Campus Plan vision to create a pedestrian-focused plaza space at the MAX station and connect to the zoo entrance.



Concept rendering for plaza design



Reference Imagery





CLR APC 23

Entry Plaza

AFRICA

From the South Hub, visitors will traverse a new pedestrian bridge spanning above the zoo's service road, allowing public and service routes to operate independently. Visitors remain at a higher elevation while being transported from the native Oregon forest to the diverse landscapes of Africa. This redevelopment of the current Africa Zone takes advantage of the natural 40-foot change in elevation to replicate various topographies while also improving circulation and wayfinding in a clear and trail-like sequence. Guests will traverse their way from the low, widespread savanna through outcroppings of kopje rocks and up to the dense canopy of the rainforest.

Architectural features that protect animals and visitors alike from inclement weather are incorporated throughout by way of covered outdoor viewing areas, indoor day rooms, and a fully indoor experience in the Tropical Forest Building. All these provide a more comfortable viewing experience as well as maximize views of animals throughout the year. For animals, new care facilities will be specially designed to the particular needs of each species and their respective group dynamics, such as bachelor herds of giraffes, prides of lions, and packs of painted dogs. Surrounding the Africa Zone, a perimeter service access road provides direct and efficient access for zoo staff to the buildings and exhibits.

PROGRAM

Total Project Site	6.2 AC	270,230 SF
Primate Care Building		1,160 SF
Primate Habitat 1		2,570 SF
Primate Habitat 2		2,610 SF
Primate Habitat 3		3,240 SF
Chimpanzee Habitat (renovated)		8,810 SF
Chimpanzee Yard		755 SF
Chimpanzee View Shelter		760 SF
Painted Dog Care Building		955 SF
Painted Dog Habitat		9,080 SF
Painted Dog & Lion Yard		1,705 SF
Lion Care Building		2,355 SF
Lion Yard		1,150 SF
Lion Habitat		15,055 SF
Lion View Shelter		1,915 SF
Tropical Forest Building		14,295 SF
Tropical Forest Outdoor Habitat		1,395 SF
Marsh Aviary Care Building		300 SF
Marsh Aviary		4,540 SF
Café		295 SF
Rhino-Giraffe Care & Exhibit Building		25,665 SF
Rhino Yard		1,350 SF
Rhino Habitat		19,350 SF
Rhino View Shelter		1,490 SF
Giraffe Habitat		18,185 SF
Ground Bird Shelters		310 SF

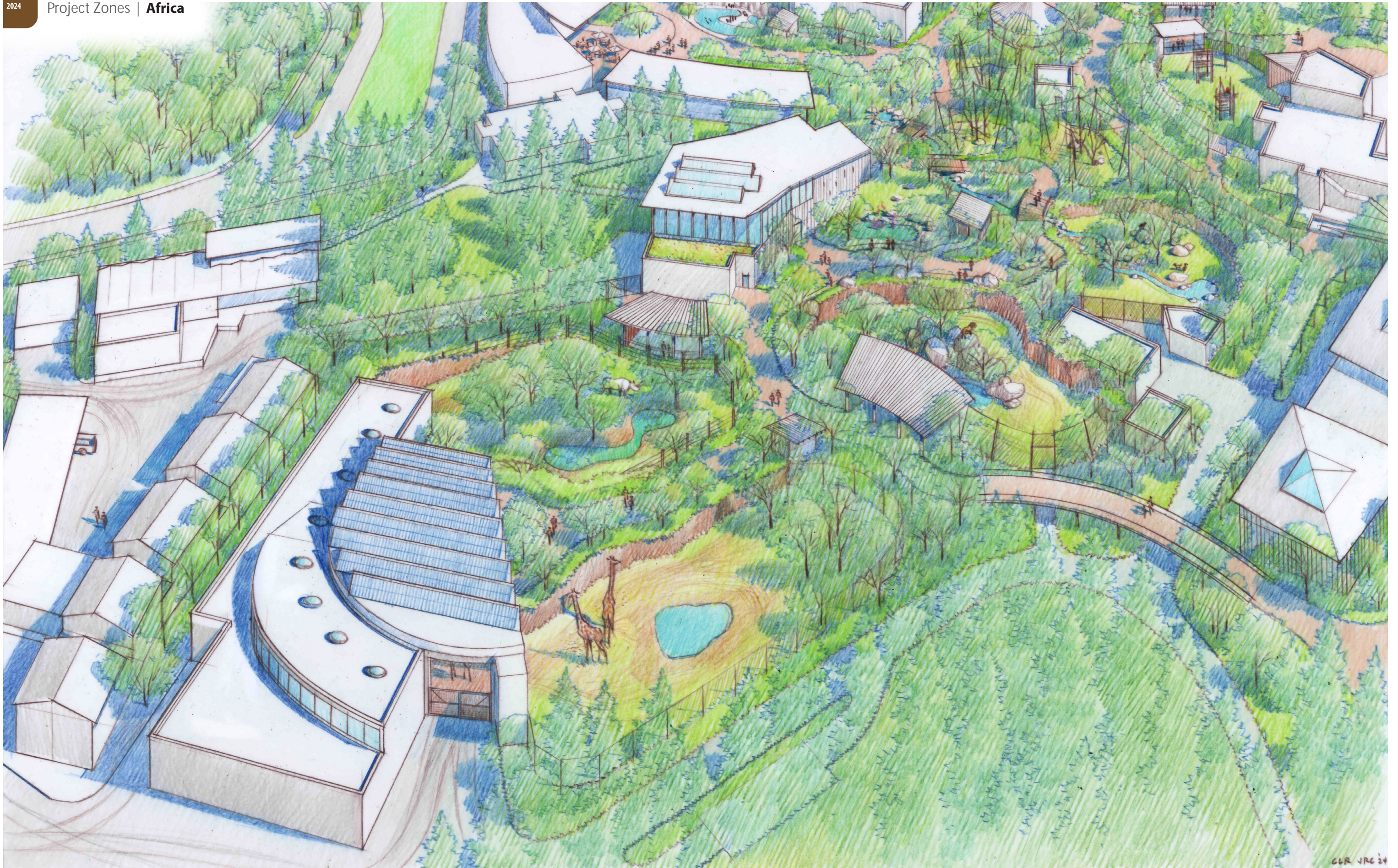


African savanna & kopje



SITE PLAN LEGEND

- Visitor Amenity
- Exhibit Building
- Admin / Support
- Habitat Space
- Animal Care Building
- Off-Exhibit Yard
- Ponds / pools
- Visitor Path
- Service Path
- Event Lawn



Africa experience aerial view

SAVANNA

The first stop in one's journey through Africa is the Savanna. Upon arrival, there is an option for quick refreshments before trailing along the ridge above the plains. Among the sprawling landscape, the redeveloped African Savanna will focus on two popular species currently at the zoo: giraffe and black rhino.

All indoor animal areas will have natural substrate floors promoting health and creating a seamless transition to the outdoor exhibit beyond. At the dayroom as well as the outdoor covered area, visitors will be able to encounter these giants eye-to-eye by participating in staff-facilitated giraffe feedings and rhino encounters.

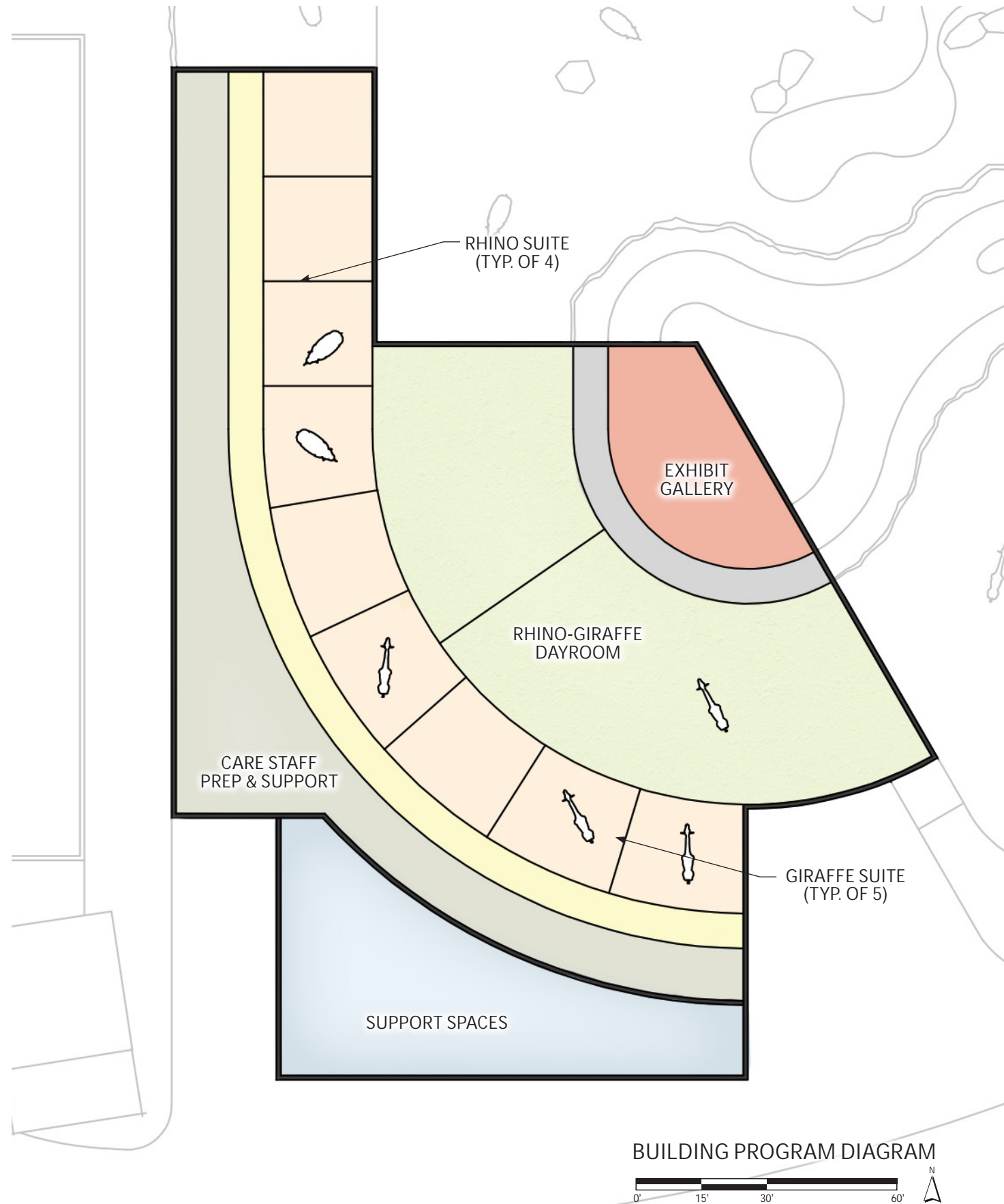
The animal habitats will be characterized by the grassy plains and widely spaced trees of the savanna. Rhinos will have a mud wallow to help cool off and protect their skin from insects and sun during the summer. Meanwhile, girafes will share their habitat and watering hole with African ground birds, such as southern hornbills, vultures, and cranes.

The planting throughout will be inspired by native savanna species, incorporating collections of grasses and other drought tolerant plants, such as reed grass and rushes, which have similar characteristics of African-native cape rush and papyrus. Broad canopy shade trees with low understory plantings will create an immersive experience for visitors and provide respite throughout the Savanna area. It is recommended that the development consider incorporation of existing palm trees and eucalyptus trees as part of the new Savanna exhibits and visitor paths.

Service access is provided along the entire south edge of the site and the existing butterfly lab remains out of site from the visitor area.

PROGRAM

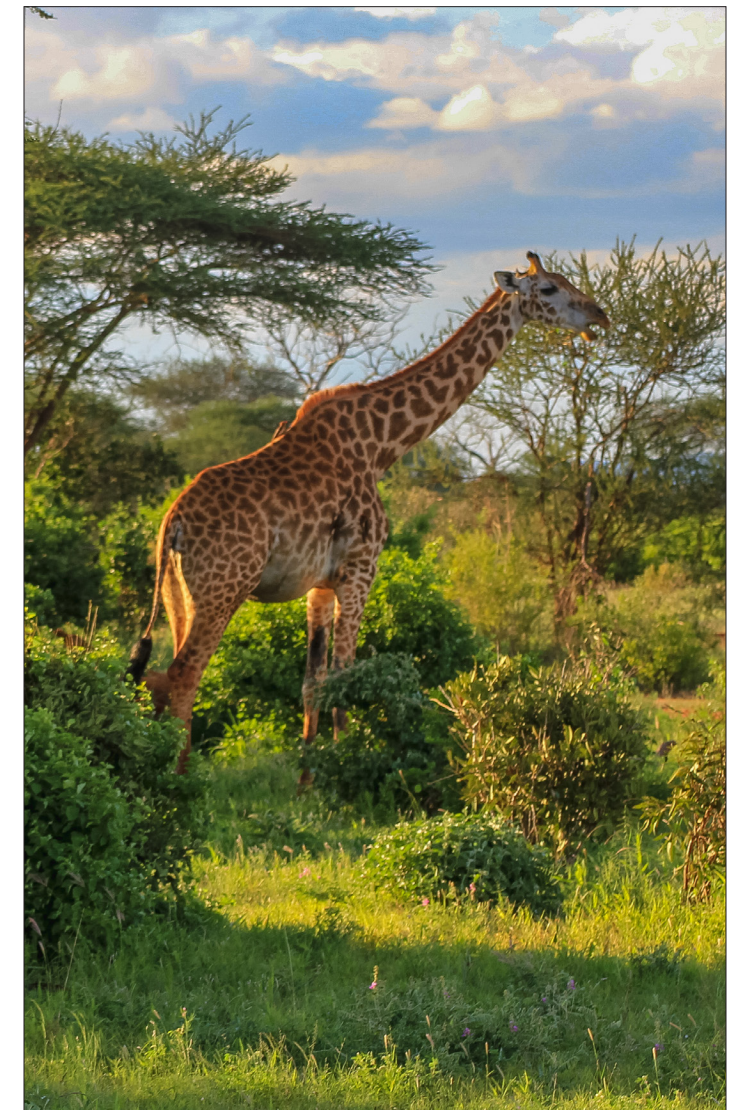
Exhibit Hall	1,695 SF
Rhino-Giraffe Dayroom	6,935 SF
Giraffe Suites (5 @ 740 SF)	3,700 SF
Rhino Suites (4 @ 600 SF)	2,400 SF
Care Staff Prep & Support	4,870 SF
Support Spaces	3,595 SF
Net	23,190 SF
Net to Gross	2,470 SF
Gross	25,665 SF



Proposed Species



Black Rhino



Giraffe



Giraffe and rhino interior habitat

TROPICAL FOREST

In contrast to the fat grasslands and kopje landscape of Africa, the Tropical Forest building highlights the biodiversity of rainforests around the world with a focus on the huge variety of birds that live in our planet's tropical forests. The building is embedded in the surrounding landscape and existing hillside below the Education Building while tying into the Kopje trail at two levels.

The experience begins outdoors at the bottom of the trail with the marsh aviary, home to flamingos, spoonbills, and ibis. Then, entering the building at the ground level, visitors arrive inside the aviary. Visitors are instantly transported as they are surrounded with dense, lush plantings, and colorful birds flying through the high-volume space. A waterfall will add ambient sound accompanying the bird songs and natural daylight will flood through vast glass curtain walls and skylights.

As a multi-story space, the Tropical Forest building allows visitors to experience the aviary from multiple vantage points. By taking the elevator, stairs, or entering through the northeast upper level, visitors will be able to trek around the perimeter of the aviary at the canopy level on bridges and higher-level paths.

In addition to many bird species, the indoor aviary provides an opportunity to showcase diverse non-native plant species that may not otherwise thrive in the zoo's Pacific Northwest climate. The plant

collection in the Tropical Forest pavilion may include orchids, ginger, rhododendrons, bromeliads, and even edible plants such as bananas and chocolate. Large mature trees installed at 20 to 25 ft in height will provide an immediate canopy effect within the space.

Back inside the upper level, the visitor experience transitions from day to night as the building will feature nocturnal exhibits for small mammals. Flying foxes will have the flexibility to also occupy the aviary as well as the outdoor exhibit north of the building.

Between this zone and the aviary, the Tropical Forest building provides a rich indoor experience and in doing so, provides guests with a consistent and comfortable experience during the shoulder seasons. Additionally, the open flow circulation through the upper level will provide the zoo with added event space opportunities after hours.

Supporting all these exhibits is dedicated keeper space as well as bird holding in the southwest zone of the building. Mechanical rooms will house equipment designed to maintain indoor tropical temperatures in addition to life support systems (LSS) for the major water features, including the outdoor marsh. This pool will utilize a hybrid mechanical-natural filtration process. The LSS consists of drum filtration, ultraviolet sterilization, and heating supplemented with constructed wetlands.

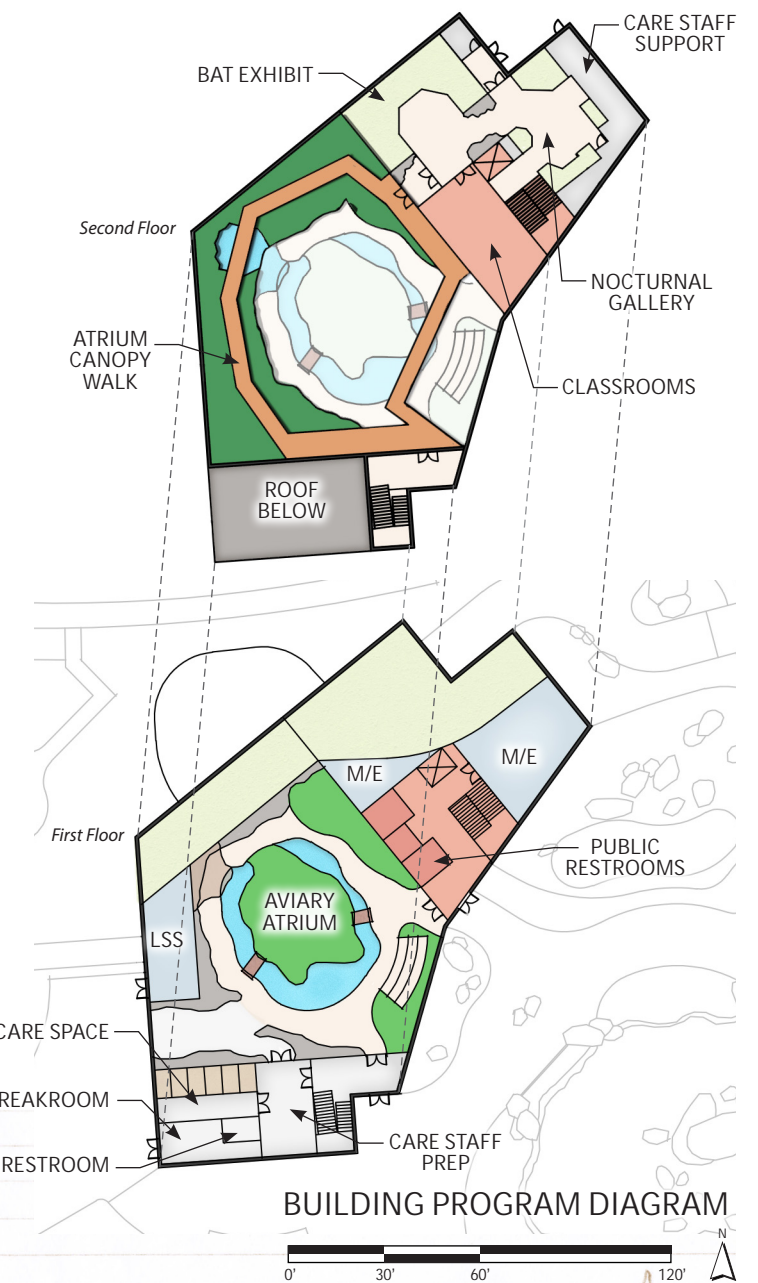
The wetland beds may be adjacent to the exhibit, or they may be integrated into the decorative stream course through the Life on the Kopje trail. Continuing the water conservation efforts, the building will capture roof runoff for flushing toilets in the visitor single-user restrooms on the ground floor.



Banana Tree

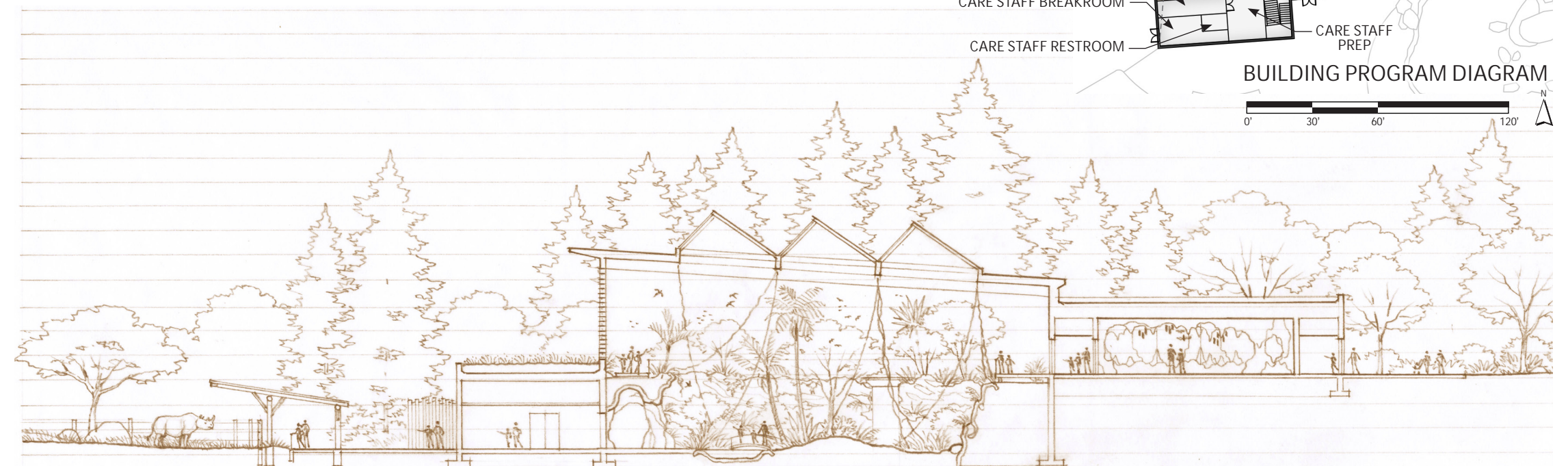


Flamingo



PROGRAM

Lower Level	
Aviary Atrium	5,735 SF
Public Restrooms	360 SF
Animal Care Space	530 SF
Care Staff Prep	470 SF
Care Staff Break Room	260 SF
Care Staff Restroom	100 SF
LSS Room	570 SF
M/E	1,470 SF
Upper Level	
Atrium Canopy Walk	3,000 SF
Nocturnal Gallery	1,050 SF
Classroom	870 SF
Bat Exhibit	605 SF
Small Exhibits (4)	330 SF
Care Staff Support	680 SF
Net	16,030 SF
Net to Gross	3,180 SF
Gross	19,205 SF



Section through Tropical Forest building



Tropical Forest canopy

PREDATOR

Complimentary to the herbivores of the savanna, predator species shall reside north of the new bridge into Africa. From the south end, visitors will have overlapping views of lions and painted dogs basking atop their colossal kopje rocks. These distinct geological formations provide shade as well as high vantage points for predators to scan their surroundings. As visitors wander along the west edge of the exhibits, they will encounter these formidable species at eye-level while they patrol their domain. To further tap into their hunting and investigative instincts, keepers will be able to rotate lions and painted dogs between both exhibits, leaving behind scents and tracks for the other to follow. New holding buildings and shared of-exhibit yards will help to fully implement flexible rotation and maximize animal activity.

At the back of house, service access is provided from the east service road to both buildings and exhibits. In the buildings, roof runoff shall be captured for reuse to washdown inside the animal holding areas. For cooling of in the summer, the painted dog exhibit features a running stream and the lions a small pool at the base of the rocks. The stream will utilize a simple hybrid mechanical-natural life support system (LSS). The lion pool has the option to be dump-and-fill or have a simple hybrid mechanical-natural LSS. Equipment for these life support systems shall be located and accessed within the back of house area.

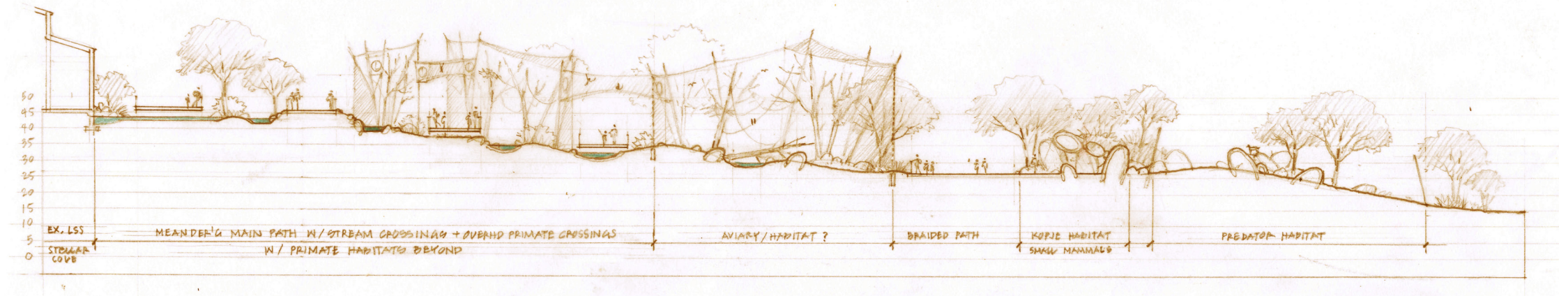


Lion



Painted Dog

Key Plan



Lion kopje

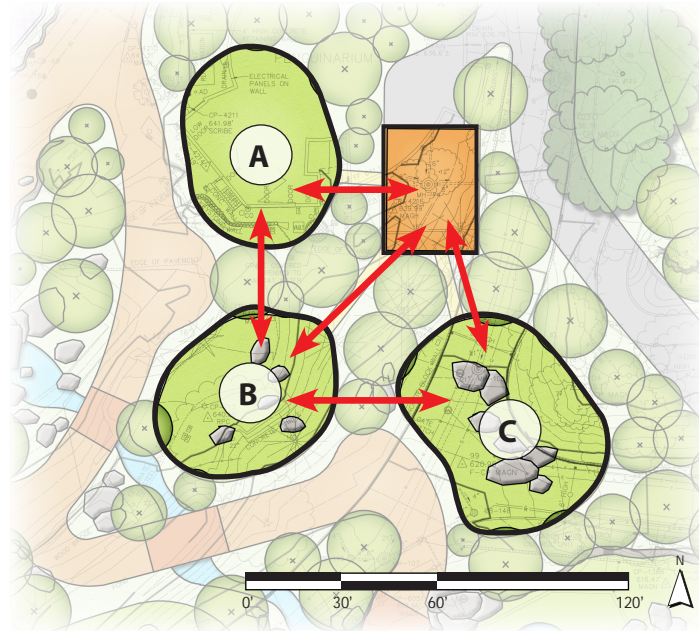
PRIMATE

At the top of the Kopje trail is a habitat sequence bridging the upland African Forest and Lowland Savanna zones. Dynamic layering of must-see Kopje outcroppings and a cascading stream course running from the top of the trail all the way down to the painted dog habitat visually draw visitors up the trail from the main path. Tertiary winding trails, narrow boardwalks and bridges integrate adventure play and exploration for children and families all while making the fifteen-foot climb up from Predator to Coastal Shores.

Nestled in the trail are three habitats for small African primates such as colobus and lemurs. The habitats will have linkages to each other to allow for flexible habitat rotation as well as provide the opportunity to be all open at once for one continuous trail habitat. The interconnected layout will greatly increase management flexibility and add choice to the various social groups of where and with whom they spend their day. Utilizing tree canopy to replicate the forest habitats these primates are from will create a more connected experience for visitors by adding ornamental deciduous trees and understory as well as demonstration gardens highlighting seasonal species such as banana trees.

The new habitats also incorporate a variety of climbing options and comfortable spaces at numerous levels, accommodating the preferences of all species that inhabit the area. Screened by vegetation is a central primate holding building providing direct linkages to each habitat.

Though not visible from the trail, this development would also include the west branch of the middle service road providing direct access for zoo staff to the new primate holding building, the Central Hub, and modified chimpanzee habitat. Modifications in the existing chimpanzee area may also provide an opportunity to include improvements such as more heat and shelter in the outdoor habitats as well as adjustments to better facilitate the housing of multiple groups of chimps.



Habitat Rotation Diagram



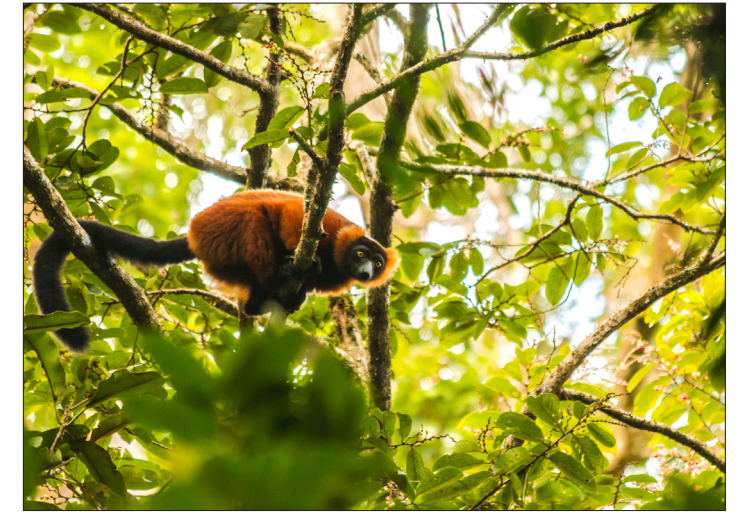
Red-tailed guenon



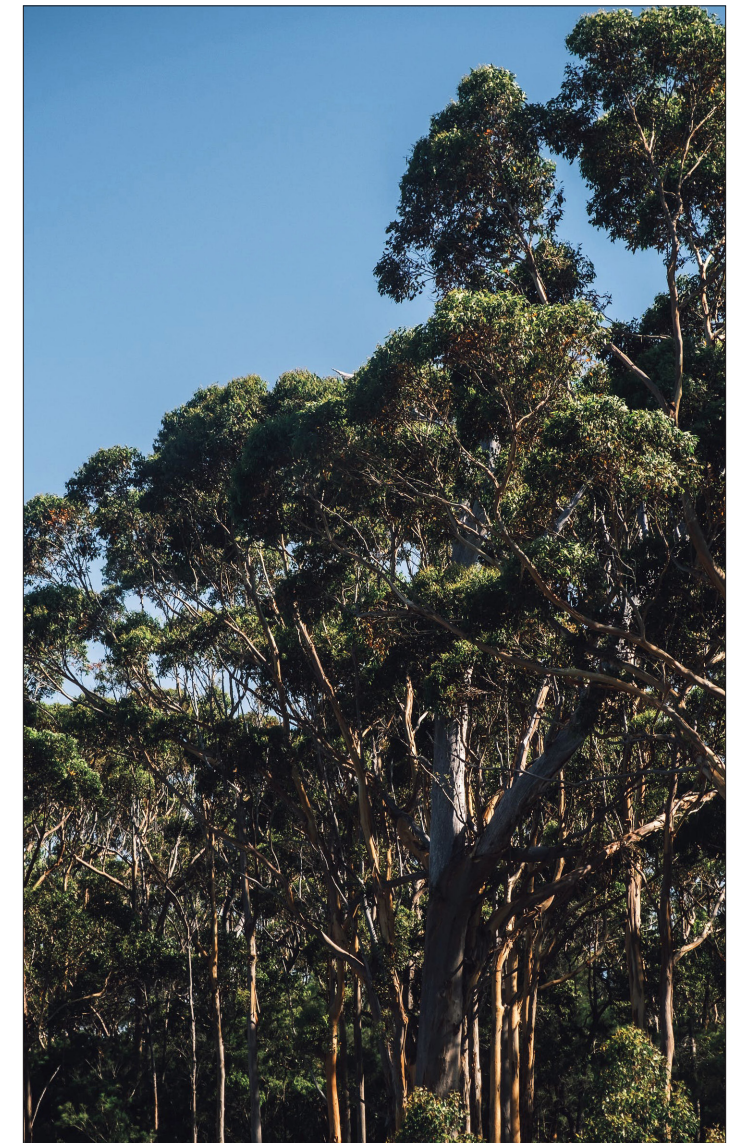
Colobus



Ring-tailed lemur



Red-ruffed lemur



Habitat design references spatial complexity of forest

EAST HUB

Fully surrounded by animal exhibits, the East Hub is a center of visitor amenities with restrooms, snack carts, lunch offerings from Growlers Cafø, and places to sit and gather. Notably, the restroom building is the first building in Oregon to use cross-laminated timber (CLT), a relatively new and sustainable construction material.

From here, visitors have expansive views of elephants browsing in the North Meadow or taking a plunge in the 160,000-gallon pool, all set to the backdrop of the native Douglas fir forest. Ample plaza space is provided for visitors to stop and rest, picnic at the lunch tables, or even observe a keeper talk around the elephant pool. To the west, Polar Plaza offers underwater views of polar bears and to the south, one may see primates from a distance up at the canopy level.

The flexibility of this area to be utilized by daily visitors and after-hours private events is key to the zoo's financial sustainability goal as well as providing a well-rounded visitor experience. The Campus Plan aims to complement and further support these functions with some small but impactful improvements: shade shelters and destination play.



Growler's Cafe

PROGRAM

Adventure Play Zone	5,950 SF
Polar Plaza Shelter	7,630 SF
East Hub Shelter	1,690 SF
Growlers Cafø (ex)	1,560 SF
Restroom Building (ex)	1,660 SF
Storage Building (ex)	1,730 SF



Site for destination play

SHADE SHELTERS

Recently completed in 2021, the Polar Plaza serves primarily as an outdoor gathering area for daily guests picnicking at the zoo and secondarily as a venue for private events. Currently, shade cover and protection from the elements is provided by table umbrellas and temporary tents. The Campus Plan proposes to enhance the existing plaza with a permanent architectural shelter to extend its use throughout the year. In the Pacific Northwest style with heavy timbers, the shelter will unify the existing structures surrounding the plaza into one cohesive space. The shelter will also include movable walls so that when open it maintains framed views of polar bears and elephants, and when closed can ensure privacy for events and even further protection from inclement weather allowing for ultimate flexible use.

Reference Imagery



Similarly, a permanent shade shelter is proposed to be constructed in the East Hub to replace existing temporary tents and provide shaded and sheltered dining space near Growler's Café.

PLAY AREA

Elephant Lands is one of the most popular areas of the zoo and at the east end of the campus is a major destination for all visitors. Just west of Forest Hall is an existing knoll that is characterized by the Douglas fir forest seen throughout Washington Park. Over the years, this space has been used for play and picnicking opportunities, but more recently has not been open to visitors. This area is within the City of Portland's environmental conservation overlay, so development is limited and the design must be environmentally sensitive. The knoll is located at the midpoint of most zoo visits and near food services, and lends itself to creating a unique play experience where families can relax, and children can explore.

A custom children's adventure playground will provide opportunities for climbing and imagination, themed to the forest environment and include sculptural elements that reflect nearby animal species such as Asian elephants. With the playground tucked away seventeen feet above the main visitor path, the approach of switch-backing ramps and stairs traversing the edge of the knoll is part of the journey itself. Upon arrival, visitors will be able to take in panoramic views of Washington Park for an iconic photo opportunity before retreating into the forest. All elements of the play area will be inclusive and accessible, constructed of wood and powder-coated steel with custom animal and plant figurines. While preserving most of the existing native trees and planting, this area will also incorporate Asian and Oregon-native shared planting such as rhododendrons and fern species along the new pathways.



Destination Play

FACILITIES HUB



Located in the southwest corner of the zoo, Gate A does the heavy lifting of housing key operational support functions including facilities and maintenance offices, horticulture and custodial staff, welding and wood shops, animal nutrition, hay storage, staff parking, and composting. Its current location at the southwest entrance into Washington Park off Exit 72 from Highway 26 is ideal for receiving deliveries and then distributing support services throughout the rest of the campus along the main service road that follows the zoo perimeter.

The facilities and maintenance offices are currently housed in some of the oldest structures on campus and will be replaced with a two-story metal building facility in the same location. The existing Animal Nutrition Center (ANC) is a robust concrete building and will be renovated to be fully dedicated to animal nutrition with a walk-in freezer and browse cooler. Any restaurant food and beverage storage will be relocated as a part of the proposed new restaurant project at the South Hub. For the horticulture department, a new greenhouse will be incorporated in this area for growing browse as well as tropical plants.

PROGRAM

Facilities-Maintenance Shops & Offices	11,680 SF
Animal Nutrition Center (renovated)	7,445 SF
Greenhouse	1,870 SF

ANIMAL CARE HUB



SITE PLAN LEGEND

- Visitor Amenity
- Exhibit Building
- Admin / Support
- Habitat Space
- Animal Care Building
- Off-Exhibit Yard
- Ponds / pools
- Visitor Path
- Service Path
- Event Lawn

The Animal Care Hub is located at the northeast corner of the zoo, housing key animal care functions such as the Veterinary Medical Center (VMC) and providing direct service access to enter and exit the zoo from Washington Park. It is critical to maintain the entry and exit flow to and from the VMC, especially for emergency situations. The approach through Gate J will be improved with a widened turning radius, and additional staff parking will be added on both the upper and lower roads.

The existing Care, Connection and Conservation (C3) Building will be replaced with a new three-story mass timber structure within the same footprint, including research lab workspaces, and meeting areas for curators, managers, and animal care support staff. The existing Wildlife Live and Avian Reproduction Center facilities will remain and may incorporate some modest renovations in the future.

PROGRAM

Care, Connection, & Conservation Building (3 floors @ 4,550)	13,650 SF
Wildlife Live (ex)	2,155 SF
Avian Rescue Center (ex)	1,075 SF