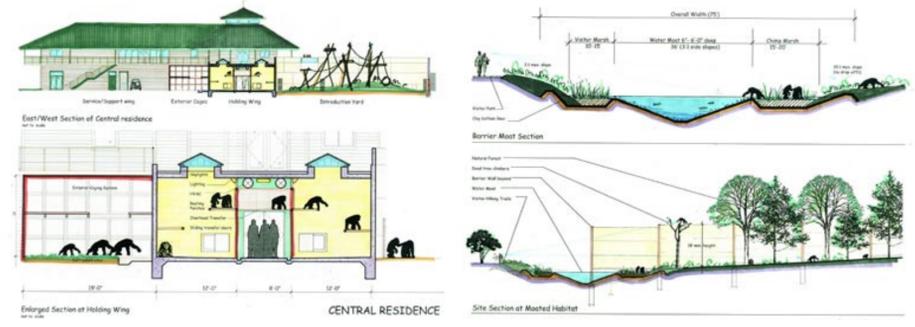


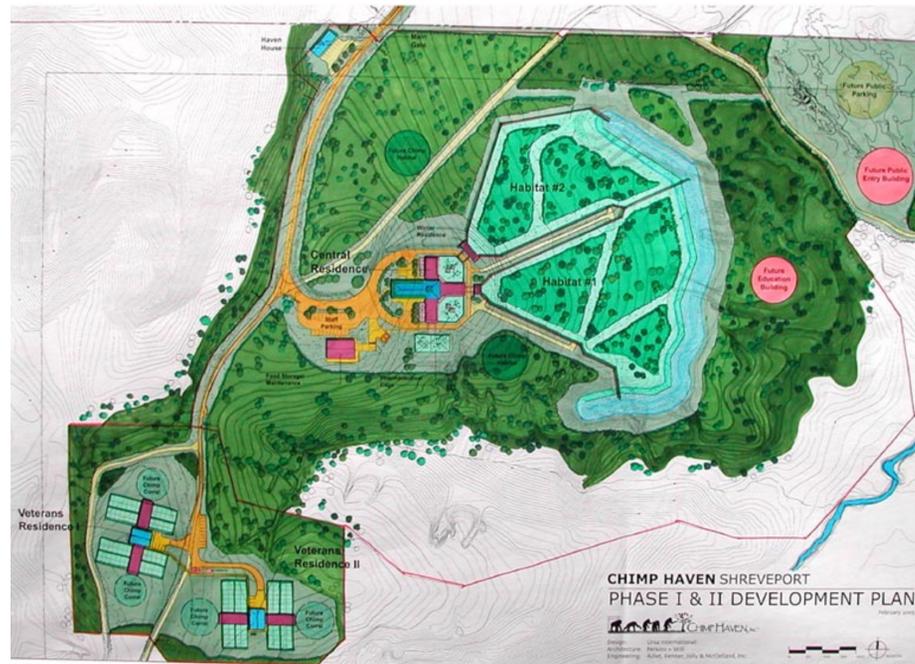


Central Residence First Floor Plan: Functional Diagram



Central Residence Building Section (top), & Detail Holding Section (bottom)

Site Sections in Habitat #1: Detail Section of moat (top), & overall section (below)



Area Site Plan shows current phase I and II construction scope and identifies future phase projects underway

# ENHANCING NATURAL CHIMPANZEE BEHAVIOR: CHIMP HAVEN FACILITY DESIGN FROM CONCEPT TO COMPLETION

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## Introduction

Chimp Haven is a sanctuary for chimpanzees retired from the research setting, as well as former pets and entertainers. Partially funded through the Chimpanzee Health Improvement, Maintenance and Protection Act of 2000, the facility was designed in two phases to accommodate 200 chimpanzees retired from biomedical research facilities. The first phase of the facility can house up to 75 chimpanzees and includes 18 indoor heated bedrooms, four indoor introduction rooms, seven outdoor courtyards, two 1/4 acre open-air play yards, two outdoor jungle gym enclosures, and one 5-acre wooded habitat. Administrative offices are located on the second floor over the service support wing, encompassing the veterinary treatment and minor surgery areas, food preparation and enrichment kitchen, locker rooms and break room.

## Major Design Concepts and Goals

The organization benefits from having a single mission, to care for chimpanzees, without other purposes like exhibition or research having a major impact on facility design or care programs. Thus, the major design concepts were a direct result of the goal of Chimp Haven to provide an environment that encourages the expression of species-typical behavior and social organization. A facility design workshop was held in 1999 and major design ideas were thoroughly evaluated by experts in chimpanzee veterinary care, behavior, enclosure design, and management.

Goal	Design Elements	Design Implementation
<b>Large social groups</b>	<ul style="list-style-type: none"> <li>Group formation areas</li> <li>Large, complex spaces</li> <li>Ability to easily see chimpanzees</li> </ul>	<ul style="list-style-type: none"> <li>Entire facility interconnected by manual doors &amp; chutes</li> <li>Spaces range from indoor bedrooms to 5-acre habitat</li> </ul>
<b>Fission-fusion social organization</b>	<ul style="list-style-type: none"> <li>Many areas for individual, small groups or large groups</li> <li>Large spaces to allow ranging, separation or grouping</li> </ul>	<ul style="list-style-type: none"> <li>Large open-air spaces enclosed by no-climb 17-20 ft. concrete walls or moat</li> <li>Ability to monitor chimpanzees from central core, rooftop, access windows and remote cameras</li> </ul>
<b>Environmental manipulation</b>	<ul style="list-style-type: none"> <li>Complex outdoor areas</li> <li>Natural vegetation, substrate and water features</li> <li>Climbing and resting areas</li> </ul>	<ul style="list-style-type: none"> <li>Visual and spatial separation available by access to different areas, solid walls in bedrooms, large wooded habitats, climbing structures</li> </ul>
<b>Nesting behavior</b>	<ul style="list-style-type: none"> <li>Natural vegetation</li> <li>Facility to accommodate nesting</li> </ul>	<ul style="list-style-type: none"> <li>Play yards, jungle gym and habitat have natural substrate and grass</li> <li>Habitat is densely forested with native vegetation</li> </ul>
<b>Foraging behavior</b>	<ul style="list-style-type: none"> <li>Natural vegetation</li> <li>Easy to clean</li> </ul>	<ul style="list-style-type: none"> <li>Water moat provides long views and enrichment opportunities</li> <li>Composite flooring and unpainted, sealed, poured concrete walls for ease of cleaning</li> </ul>

## Preliminary Post-Occupancy Evaluation

The first of 31 chimpanzee residents arrived in April, 2005. Group formation procedures proceeded rapidly, with chimpanzees arriving singly immediately introduced to others. A number of small-group introductions resulted in three groups of 5-7 individuals, who were integrated into a group of 18 individuals over a period of 2 weeks. Only a few minor injuries resulted from group formation procedures, and only one injury requiring sedation and medical intervention has occurred in the colony to date. The large group was released into the habitat 2 weeks later, and has acclimated very well to the environment.

The success of the group formation procedures and care program are a direct result of the carefully designed facility and exceptional care staff. The original goals of the organization have been met by forming large social groups with the ability to choose environments and social partners (fission-fusion social organization), increased opportunities for nesting, foraging and interacting with the natural environment. The 5-acre forested habitat is a key element and very successful. Most construction problems have been minor in scope, but some have been expensive to fix.

## Design Elements Evaluation

Design Elements	Evaluation
<b>Interconnected spaces</b>	<ul style="list-style-type: none"> <li>Critical to successful quarantine, group formation, and fission-fusion social organization – loved by staff! Chutes are favorite resting spot for chimpanzees.</li> <li>Many doors were problematic to operate and some lacked locking mechanism; gullotine doors required major modifications, slider and overhead doors required minor modifications. Overhead chutes a problem for a chimpanzee with limited mobility.</li> </ul>
<b>Small to large spaces</b>	<ul style="list-style-type: none"> <li>Options for introductions and housing are great, giving chimpanzees many choices. Indoor introduction areas a favorite of chimpanzees – room to separate but still see others, double mesh panel important during introductions.</li> <li>Wild-born chimpanzees make use of spaces and natural elements more quickly than captive-born.</li> <li>Vertical spaces (trees, climbing structures in play yard) not used by all chimpanzees yet. Some chimpanzees are taking time to acclimate to being in open spaces. Need many shaded spaces, especially in outdoor courtyards, play yards and jungle gym.</li> </ul>
<b>No-climb walls and moat</b>	<ul style="list-style-type: none"> <li>Slick concrete walls work well and easy to clean. Moat is 60 ft. wide and 8 ft. deep at center, with shallow water area for chimpanzees to play in and safety line before gradual slope to deep area. No escape attempts to date.</li> <li>Grouting of cracks in concrete walls expensive but important for cleaning and vermin control. Chimpanzees avoid water, although a few drank from the moat.</li> </ul>
<b>Chimpanzee monitoring</b>	<ul style="list-style-type: none"> <li>Vestibules and windows to outdoor enclosures and roof access work very well, especially during introductions. Cameras good to view habitat sides and moat.</li> <li>Impossible to see chimpanzees in center of 5-acre habitat. Implemented training program for chimpanzees to return to main building on cue.</li> </ul>
<b>Visual and spatial separation</b>	<ul style="list-style-type: none"> <li>All areas work well – chimpanzees can be found alone or in small groups, but also sometimes congregated in a bedroom or chute.</li> </ul>
<b>Natural substrate</b>	<ul style="list-style-type: none"> <li>Many options for plants and enrichment, little maintenance required. Most chimpanzees adapted quickly to grass and dirt.</li> <li>Some chimpanzees are taking time to acclimate to walking on natural substrate. Drainage was issue in play yards and additional center drain had to be placed.</li> </ul>
<b>Natural vegetation</b>	<ul style="list-style-type: none"> <li>Habitat provides almost unlimited enrichment potential, has greatly increased natural foraging, manipulation and nest-building. Browse provided to chimpanzees in other areas, used for nesting, tool-use, displays, and foraging. No problems with poison ivy or ingestion of pine needles evident. Potentially toxic plants need to be monitored.</li> </ul>
<b>Flooring, drains and walls</b>	<ul style="list-style-type: none"> <li>Easy to clean surfaces, little maintenance. Nesting materials easy to provide. Sloping floors and drain covers work well.</li> <li>Unpainted concrete aesthetically unappealing. Pigmented block filler patchy.</li> </ul>



Aerial photograph during phase I construction



Wild-born chimpanzee climbing a tree



Foraging behavior is encouraged by hiding fruit in the habitat.



Twin overhead transfer chutes connect holding building to habitat feeding shelter (left) and the "jungle gym" (right).



Manual slider doors made of polypropylene slide easily. View ports are provided for keepers to see both sides of each door.



Spacious introduction rooms are favored by the chimpanzees. They are central and accessible to several bedroom wings.



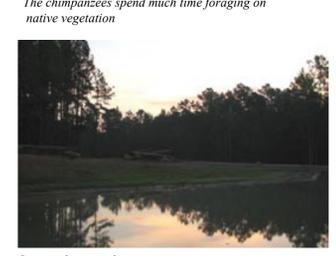
A group of 18 chimpanzees was formed over a two week period.



Nesting material is provided to all chimpanzees



The large habitats allow for multiple groups of a variety of sizes to comfortably co-exist in a natural setting



Sunrise down on the moat.



The chimpanzees have been observed to "patrol" the boundaries of their 5-acre habitat.

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