HSPV 721
Capstone Studio: Materials + Materialities
Crescent building analysis and Visitor Center design proposals Report
Taliesin West, Scottsdale, AZ

Author: Daniel Mangano, Taha Mughal, Diyi Zhang, Miles Wu, Florence Wang
Adviser: Irene Matteini, Frank Matero
Spring 2023
Master of Science in Historic Preservation, University of Pennsylvania
Table of Content

Acknowledgment
Summary

1. Statement of Significance 01
2. Crescent Building: Drawings 08
3. The Application of Point Cloud Data, 3D Model and Drawing Produce 27

Appendix: Condition assessment drawings
Crescent Housing: Statement Of Significance

Taliesin West, the winter “camp” and studio of the architect Frank Lloyd Wright, is a UNESCO World Heritage Site known for being a preeminent example of Wright’s innovation and development of organic architecture. Located in Scottsdale, AZ, the site is designed in forms and materials that provide a sustainable ecosystem in which the boundaries between nature and built-form are dissolved. Beginning in 1938, over 500 apprentices resided and were taught here throughout Wright’s lifetime. Following Wright’s death, a group of Wright’s former apprentices created the Taliesin Associated Architects (TAA), which attempted to further Wright’s organic design principles under the guidance of Olgivanna Lloyd Wright in 1959, and was followed by Wes Peters after Mrs. Wright’s death in 1985. Headquartered at Taliesin West, the TAA was led by over 14 principals who had all worked under Wright. As an active firm, the TAA developed a number of significant projects across the United States and around the world that are now seen as perpetuating Wright’s legacy. Along with the original work, the firm completed several of Wright’s unbuilt designs and undertook other expansion projects, such as the Arizona Biltmore hotel in Phoenix (few more projects). These projects sought to redefine Wright’s ideas to the contemporary audience by employing modern building materials and construction techniques. One historically significant project among these is the Married Student Housing at Taliesin West, also known as the Crescent Building. The building was designed in 1987 by one of the senior apprentices John DeKoven Hill, who also taught at school. The building, designed in response to the growing housing needs on the site, is the last major construction at the site after Wright’s death. Located outside the historic core of the site, the building stands today in its own right as one of the last surviving projects designed and executed by Taliesin Associated Architects before the firm was disbanded in the year 1992.

The Crescent Building is the only existing building designed by Taliesin Associated Architects at the Taliesin West site that utilizes a different material palette while achieving Wright’s principles of organic architecture. It embodies the influence of Frank Lloyd Wright as a teacher on the architect John DeKoven Hill, a principal of the TAA and lead architect of the Crescent, while also reflecting his exploration and practice of different design languages, new materials, and interest in drawing architectural inspiration from nature. The building is based on a semi-circular plan featuring a double roof inspired by the roof angel of the Campus buildings, notably Frank Lloyd Wright’s office and the Taliesin West drafting studio. The buildings material contrast to the rest of the campus is significant for how it the architect’s different understanding and practices on organic architecture in 1987 which embrace more commercially available building materials such as plywood, 2x4 studs, enameled metal and fiber glass reinforced stucco.

By the end of the 1980s Taliesin West had undergone dramatic shifts as did the world of architectural pedagogy and design. Part of the Crescent building’s significance is how these shifts are represented directly and indirectly through the Crescent building’s presence at Taliesin West. By the 1980s, the format of education at the now formally recognized Taliesin School of Architecture had changed dramatically from Frank Lloyd Wright’s idea of learning by doing which motivated him to found the fellowship as an antithesis to the traditional model of education. The need for married student housing on the campus highlights the shift away from the provisional nature of students living full time in desert shelters and instead in more traditional housing arrangements. This shift moves in tandem with the curriculum and school structure which had been implemented bringing with it a new organizational structure that reflected the traditional degree granting university. The Crescent building also reflects a dramatic shift to construction at Taliesin West. With the incorporation of the campus into the City of Scottsdale construction was now monitored by building code. This new regulation marked a shift in architectural production and form on the campus. The materials of the crescent building differ from the typical tectonic of Taliesin West notably the Crescent building lacks desert masonry and is constructed of commercially available architectural materials. For 1987, this is nothing new but this is the first architectural work on the campus of Taliesin West which reflects Frank Lloyd Wright’s forms and design philosophy with commercial construction that represents the modern American built landscape and material vocabulary.

In conclusion, the significance of the Crescent Building lay on three major values: the historical value that the building serves as the witness of the history, evolution and the growth of the Taliesin Apprenticeship; the architectural value that evokes the legacy of Frank Lloyd Wright’s design philosophy and echoes the aesthetic of Taliesin West campus itself; its social value reflects the change in the organizational structure and operational orientation of Taliesin School over time, from its initial stage to the time after Wright’s death and the relocation of the campus.
Point Cloud Data

North Facade

North Facade

North view from Crescent
South Facade

South view from Crescent
Site Circulation

- Mountain
- Desert
- Transmission Tower

1. North View from Crescent

2. South View from Crescent
Site Circulation

11 AM

2 AM

5 PM
Site Circulation

1. View from Main Campus

2. View from Guest Parking Area
Constructional Analysis

[Thermography images and photos showing different perspectives of a building interior, including ceiling sections and wall details.]
Climate Analysis

Crescent Student Housing.

The Crescent student housing was constructed at Taliesin West in 1987 for married students who had come to study at the Taliesin School of Architecture. The building is nestled into a natural slope in the landscape and is hemicycle shaped. The building is a wood frame structure enveloped in a cladding system of plywood, covered with insulation, chicken wire and fiberglass reinforced stucco on the exterior. The roof is an A frame laminated with enamel coated metal. A clerestory runs the length of the build where the two diagonals of the roof curve to a peak. The building is oriented northeast, southwest.

- The goal of this analysis is to understand with a limited range of time and access to data how efficiently the crescent building at Taliesin west performs over an average year of thermal conditions, with regards to daylighting and human thermal comfort.

Software

- Climate Studio Developed by Solemma
- [https://www.solemma.com/climatestudio](https://www.solemma.com/climatestudio)
- Software company based in Cambridge MA. Developed by building performance experts from Harvard and MIT.

Our History

Solemma started as a summer project at Harvard’s Graduate School of Design in 2003 under the guidance of Professor Elliott Crouch. The goal was to integrate advanced environmental simulation engines, including the first pioneering climate research, with the digital tools design students were using in the studio. We created the first sophisticated design interface built for architects.

For over ten years, we developed and shared this suite of tools called Blu, for over 50,000 students, and with these teachers and the top sustainable design and engineering firms in the world. Our tool has been used to design buildings and campuses together modeling cutting-edge green simulations and spectral ray tracing with our Blu software.

In 2010 Solemma released its new flagship software called ClimateStudio after an industry-wide search for the most advanced tool for the design industry. The ClimateStudio platform is built to deliver future innovations, continuing our history of bridging academic research and industry needs.
Climate Analysis

3D Model

Reflects as accurately as possible the true material and tectonic conditions of the building.
Solar Radiance Map
Day Lighting Map

Winter Solstice

March 9th

Summer Solstice
Climate Analysis

HOBO meter: data collected on site

- Data Collected from March 5-9 2023 in an unconditioned interior environment.
Condition Assessment

Water infiltration is found on the end of the beam and its surroundings near the windows.

Water Infiltration
The horizontal ablation on the east wall of the room may be man-made.
There might be pipe leaking problems around the mechanical room, causing water damage, and causes cracks, staining, flaking, missing materials, corrosion, and mold.

Water infiltration occurs at the east-south corner between the ceiling and the walls.
Flaking, staining, and water infiltration occur at the southwest corner beneath the ceiling.
Condition Assessment

Unit 6 Condition Report

Crescent Building Condition Report

12621 N Frank Lloyd Wright Blvd,
Scottsdale, AZ 85259

Group Members:
DANIEL MANGANO
TAHA MUGHAL
FLORENCE (JUN-AI) WANG
MILES (CHENGJUN) WU
DIYI ZHANG

HSPV 721 Capstone Studio: Materials + Materialities
Taliesin West Visitor Center
Daniel Mangano, Taha Mughal, Diyi Zhang, Miles Wu, Florence Wang

HSPV 721 Capstone Studio: Materials + Materialities
Taliesin West Visitor Center
Daniel Mangano, Taha Mughal, Diyi Zhang, Miles Wu, Florence Wang

UNIT 6 CONDITION

DRAWN BY: FLORENCE WANG
DATE: 4/9/2023
SCALE: NOT TO SCALE

Crack
Efflorescence
Staining
Flaking
Water Infiltration
Biological Growth
Corrosion
Most of the condition on the floor happens in outdoor areas, including the stairs, covered patio, and terrace of each unit. The condition is majorly related to water damage, such as efflorescence and water infiltration. In the indoor space, a few cracks can be observed on the floor, and some longer cracks extend throughout the terrace and indoor.
Most conditions on the ceiling happen in outdoor areas, especially eaves on the terraces. The condition may be caused by moisture and lack of maintenance, leading to flaking, staining, and some biological growth. The water damage is most serious in the laundry room, with severe water infiltration on the exposed structure.
his project proposes a visitor center for Taliesin West, Frank Lloyd Wright's winter home and studio in Scottsdale AZ. The plan for the center utilizes an existing building on the campus known as the crescent which was originally built as married student housing for the school of architecture which existed on the site.

This proposal for the visitor center at Taliesin west understands the role of the visitor center on several axes, the physical landscape and the relationship between Frank Lloyd Wright's work as relationships that must be balanced in context. The visitor center should be a didactic installation that introduces guests to the work of Frank Lloyd Wright and the legacy it has had on American architecture and around the world.

The construction of the visitor center is recommended to be completed in five phases. The first phase will introduce an improved ticketing area, followed by additional restrooms and an objects conservation and display annex. Phase 4 will transform the crescent to an exhibition space and lecture theater.
The visitor center will be constructed of rammed earth over a structural system of CLT. The roofs of the building will house basins and remain low in profile to remain minimally visible from the historic campus. The visitor center will mirror the logic of the Taliesin West campus by remaining a group of separate modestly scaled buildings connected by landscaping and dynamic pedestrian paths which privilege the outdoors as a component of the architecture.
The visitor center will make use of the slope as an opportunity to nest the program into the ground which aids in passive cooling in the extreme heat. The pedestrian path will be at ground level closer to the main campus and become a roof walk towards the south allowing for views of the campus and the city of Scottsdale AZ. Each basin will be fitted with a drainage system to empty run off water into a rain garden to resolve the movement of water in high amounts during the rainy season and embrace the natural cycles of the desert.
**DESIGN PHILOSOPHY**

- The crescent building at Taliesin West is one of the last major building additions on-site designed and constructed by Taliesin Associated Architects, whose work continued Wright’s legacy after his death. In respect of its significance, the proposal shall seek to retain and renovate the majority of the existing Crescent building while altering most of the interiors.

- Sustainable design interventions including a green roof and solar paneling shall seek to enhance the building’s performance.

- The New addition adjacent to the Crescent shall serve as a Visitor Center that shall bear similarity in volume, form, and design to that of the Crescent building and shall be laid on the principles of organic architecture, UNESCO’s and NPS guidelines for new additions to historic buildings.

- The design shall prioritize coherence and harmony between the existing and new structure, creating a unified and seamless architectural composition.

- The overall geometry shall seek to maintain a hemicycle shape, the main entrance staircase to the Crescent building shall continue being a focal point while a smaller staircase placed sideways to the phase 2 Visitor center shall aim to enhance user-centric design catering to the visitor needs.

**CONCEPT**

**CASE STUDIES**

*Source: [https://architecturecompetitions.com/flamingovisitorcenter/]*

*The New Visitor Center at Shofuso (2014): Thesis by Parima Sukos*
The proposal involves retaining the main historic access to the site for the vehicular movement.

The orange colored dotted line is the existing road on site. In line with UNESCO’s guidelines on interventions at historic sites, I propose to alter this road to create adequate parking space for over 150 cars, which shall preserve the sanctity of the historic access.

Position 5 serves the starting point where the pedestrian circulation route through points 6, 7, 8, and through the bookstore to position 9 and back eventually. This shall solve the pedestrian-vehicular conflict on site.

The same road can be used by the electric cars for the visitors in small groups, shown here in blue dotted line.
PROPOSED FLOOR PLANS

WELCOME CENTER
(8258 SFT)

VISITOR CENTER
(8202 SFT)

SITE SECTION
COMPARATIVE SECTIONS

SECTION 1-1'
WELCOME CENTRE AA'
SECTION THROUGH GABLE WINDOW
WELCOME CENTRE AA'

ELEVATIONS

Rear Elevation
Front Elevation
Left Elevation

SIMILARITY IN FORM, SHAPE, VOLUME & DESIGN LANGUAGE

• The comparative sections demonstrate the volumetric relationships of the visitor center shown in the left and the welcome center shown on the right. As can be seen, the visitor center maintain a similar height while being influenced by the design of the welcome center.

• The building constructed in Adobe bricks, shall have skylights in the peripheral corridor, and long curved beams supporting the tensile fabric above in its rear side.

• The elevations also demonstrate how the new visitor center aims to establish a unified composition with the Crescent building, making it a sympathetic contemporary design in historic settings.
PROPOSED VIEWS OF ‘THE CRESCENT’- Visitor and Interpretation Center

Top left: Main view of the two buildings showing harmony in form, scale, proportions. Green roof and solar paneling atop Crescent building.
Top right: Aerial view of the two buildings laid in hemicycle layout showing dominance of Crescent building.
Middle right: Borrowing the exteriors to the interiors in new Visitor Center building constructed in Adobe Brick and tensile fabric.
Bottom left: Entrance to the Welcome Center showing new Ticketing counter in the central open foyer.
Bottom right: Peripheral corridor of the Visitor Center showing translucent wood skylights.
DESIGN PHILOSOPHY

Accessibility

Sustainability

Possibility

The visitor center design gives new life to the Crescent building by making a connection between the site and the visitors. The design focuses on improving the accessibility between the visitor center and the main campus as well as the circulation in the building while ensuring its sustainability by retaining major parts of the Crescent and using sustainable materials for additions. Aside from solving the growing demand for infrastructure, the new visitor center emphasizes the flexibility of the space and intends to explore more possibilities that meet the needs and interests of visitors of all ages.
In this design proposal, the majority of parts of the crescent building will be retained. At the same time, some alterations will be made to change this enclosed residential building to a more welcoming and comprehensive visitor center.

Current Crescent Building

Phase 1:
- A shaded pergola is added on the east end as the new entrance, and the pick-up & drop out point
- The Courtyard becomes a plaza for pedestrian
- The north walls are moved inside by 30 inches to yield more space for the hallway
- The walls dividing the units are turned down
- Chimneys are altered into lightwells for ventilation.

Design Phase 1: Alteration

Phase 2:
- Additions are added and connected with the west end of the Crescent, including a restaurant, interpretive area, and program and event area
- The terrace, extended from the original Crescent's hallway, connects the olds and the additions into a round

Design Phase 2: Addition
CIRCULATION

The design intends to improve the accessibility between the visitor center and the main campus by separating the pedestrian route from the vehicle. Visitors drive to the site through Taliesin Dr. and turn left to the parking lot, either the current or the additional parking lot. Afterward, visitors can enter the building through the pergola on the east end through the pickup/drop-off area, a shaded pergola. As the courtyard is completely used for pedestrians, a well-paved pedestrian path starts here, leading the visitors from the building to the main campus, separated from the vehicle. The golf cart serves as the on-campus transit for those in need. The ground surrounding the building is paved for the loading needs of collection from the archive and the catering for the restaurant. The starting point of the future desert shelter trail will be set between the restaurant and the exhibition building, an opening of the covered terrace that is closest to the wash, and the ideal route leading up to more shelters.
Individual Design Proposal - Florence Wang
Taliesin West Visitor Center

PHASES & PROGRAMS

In Phase 1, the existing parts of the Crescent become a welcome center that provides all the essential infrastructure, and the courtyard is altered into a multifunctional plaza. In Phase 2, the new addition covers the interpretive area and the spaces for various kinds of programs and dining. A few highlights of the designs are the restaurant with the wide opening facing the city view and the desert wash, the green roof above the exhibition building, and a wide step seating serving as stairs to the rooftop and auditorium for outdoor events.
MATERIALS

The choice of building materials takes sustainability into prior consideration. The foundation and walls of the additions are built with rammed earth for its high thermal mass that can moderate temperature, and its natural color and texture will better match the surroundings. The rafters and purlin in the pergola and exhibition building’s roof are made of ipe wood for its density and hardness that perform well under extreme weather. The roofs are installed with solar panels to help the self-sufficiency on electricity. Also, the green roofs are widely used in the design. All the glazing are Low-E glass that can effectively minimize the entrance of the UV lights.
Individual Design Proposal - Miles Wu
Visitor Center - Into the desert

CHENGJUN (MILES) WU
MAKEVER
The adaptive reuse of the crescent building at Taliesin West embrace the spirit of Frank Lloyd Wright's organic design philosophy while also accommodating the needs of modern occupants. The phased extension building should also follow this philosophy and be designed to complement the crescent building in a cohesive manner. The goal is to create a harmonious and functional environment that celebrates the unique features of the desert environment and Taliesin West's design language.
Individual Design Proposal - Miles Wu
Visitor Center - Into the desert
Individual Design Proposal - Miles Wu
Visitor Center - Into the desert
Individual Design Proposal

Visitor Center for Taliesin West, Crescent x Wedge
Individual Design Proposal - Diyi Zhang
The R.A.M.P. at Taliesin West

The R.A.M.P. at Taliesin West
Resplendent, Accessible, Multi-dimensional, Progressive
Individual Design Proposal - Diyi Zhang
The R.A.M.P. at Taliesin West
Individual Design Proposal - Diyi Zhang
The R.A.M.P at Taliesin West

TALIESIN WEST VISITOR CENTER
Daniel Mangano, Taha Mughal, Diyi Zhang, Miles Wu, Florence Wang
APPENDIX
Water infiltration is found on the end of the beam and its surroundings near the windows.
The horizontal ablation on the east wall of the room may be man-made.
There might be pipe leaking problems around the mechanical room, causing water damage, and causes cracks, staining, flaking, missing materials, corrosion, and mold.

Water infiltration occurs at the east-south corner between the ceiling and the walls.
Flaking, staining, and water infiltration occur at the southwest corner beneath the ceiling.
Most of the condition on the floor happens in outdoor areas, including the stairs, covered patio, and terrace of each unit. The condition is majorly related to water damage, such as efflorescence and water infiltration. In the indoor space, a few cracks can be observed on the floor, and some longer cracks extend throughout the terrace and indoor.
Most conditions on the ceiling happen in outdoor areas, especially eaves on the terraces. The condition may be caused by moisture and lack of maintenance, leading to flaking, staining, and some biological growth. The water damage is most serious in the laundry room, with severe water infiltration on the exposed structure.