

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF GEOGRAPHY

REVITALIZATION OF A UNIVERSITY BUILDING INTERIOR:
ABSTRACTING LOCAL GEOGRAPHIES THROUGH
CARTOGRAPHIC PUBLIC ART INSTALLATION

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Abstract

Geography and art are two scholarly and applied disciplines that have become increasingly linked through the emergence of geographic topics in artwork. This connection manifests itself in a variety of art forms, including public art, which vary greatly in scale, form, and purpose. Culture, wisdom, innovation, and economy are among the impact categories of diverse productions of public art. When these pieces are designed to align with the purpose of a space, they can aid in reinforcing its function and meaning. Public art and other aesthetic work fit within a broader discourse of university renovation. Renovations are undertaken to attract and retain students, in addition to enhancing the overall appearance and functionality of the campus environment. This thesis details the creation of a cartographically inspired floor design for a renovated space within the Penn State Department of Geography. The design abstracts Native American foot paths and natural features with the intention of acknowledging local Native American culture and history. This process involved modeling irregularly oriented pentagonal tiles within the building's hallways, overlaying them with a map of historical paths at a variety of scales and orientations, and generating colored sequence of tiles to recreate these features. The final result of this work is a charismatic design that will be used as a guide for the floor's installation. In the future, this piece of public art will educate its viewers about Native American history and culture, serve as a source of innovation for experiencing public art, and return value to the department by increasing the space's aesthetic appeal and solidifying its connection to the discipline of geography.

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Chapter 1: Project Context

I became involved with this project through my work in the Geographics Lab under my thesis advisor, Dr. Cynthia Brewer. I spent the summer of 2023 developing and updating cartographic design graphics for the new edition of her book, *Designing Better Maps: A Guide for GIS Users*, and was introduced to the broader renovation of the Walker Building's second and third floors in a lab meeting. Part of the renovation included the design and display of large resin panels showing maps of various themes in geography at a global scale (Figure 1). While these map panels displayed a variety of geographic research topics, there was a desire to also highlight marginalized groups at a more local scale. This emphasis was something that seemed to be missing from what the panels represented. With the physical floor on this level of the building also being replaced, its blank canvas presented a space to add to the themes of geography showcased by the renovation. This was how the creative floor design project was born and the topic of Native American paths was selected to carry out its purpose. I saw this as an exciting opportunity to work with Dr. Brewer on a project with the potential for a long-lasting legacy within the department and took on the role of designing the floor.



Figure 1: Printed Panel Designs during Hallway Renovation

This renovation would not be possible without contributions from many individuals within and external to the Department of Geography. Department head Brian King secured its funding and has facilitated the renovation's progress. Helen Greatrex, Harrison Cole, MacKenzie Goss, and Dr. Brewer constituted the department's renovation committee before I started working on the floor, laying the project's conceptual groundwork. Account executive Michael Albert from Tarkett has coordinated purchasing and consulted on design details. Shana Coder and the Penn State OPP Renovation Services Group will bring the floor's design to life by installing it. Lastly, Cierra Naglowsky in the Department of Geography has coordinated communication between all of these stakeholders, guiding us through the many steps of the renovation process.

This thesis details the development of the Walker Building's future floor design. It begins with a Background and Literature review section that introduces concepts connected to the project. This section is broken into four parts: Geography and Art, Public Art Impacts, Design for Purpose, and University Renovation. Each subsection details these subjects' connection to the floor, introducing qualities, motivation, and impacts involved with this project. The Data and Methods section describes the Native American path records used to create the floor's design and provides a step-by-step account of how this design was developed. This section is supported by figures that show the components of the design and its progress throughout the course of my work. The Results and Discussion section showcases the final design and reflects on its representation of the source data. This section includes both two and three-dimensional models of the floor that provide a visual preview of what it will look like when installed. Finally, the future potential impacts of the floor as a piece of public art are envisioned in the Conclusion section.

Chapter 2: Background and Literature Review

This section introduces key terms, concepts, and disciplines related to the project. It begins by establishing the relationship between geography and art to provide a theoretical foundation for the project's premise. It then moves into a discussion of public art impacts, design for purpose, and university renovation. Each of these concepts are relevant to the motivation, methodology, and intended outcomes of the project.

2.1 Geography and Art

Geography and art exhibit many similarities, leading to an integration of the two in both research and work produced by practitioners of each discipline. Hawkins (2015) identifies a turn in how geography and art are viewed in tandem, beginning in the 1980s, through the examination of landscape paintings. She states that these paintings provided a lens to explore the "relation between the world outside and the pictures in our heads" (p. 5). The ways that different people experience the world around them is influenced by geographic processes, and their expression of this through art provides another type of data to study this relationship. This connection between art and geography served as a starting point for an emergent field of scholarship that has grown tremendously, further linking these two disciplines (p. 9). Hawkins repeatedly views and analyzes art through its materialities, spatialities, and temporalities, all of which connect to concepts within geography. Through the establishment of her analytical framework which aims to understand the geographical work that artwork does, the geographies of artworks themselves, and the nature of art encounters (p. 14), many connections between art and geography emerge.

The use of maps and geographic topics as the subject of artwork shows one way that the disciplines of geography and art are connected. Harmon and Clemans (2009) compile a collection of pieces that leverage maps and spatial relationships to create exhibitions of art. These works vary in their medium, level of abstraction, and purpose. The hundreds of pieces that make up this collection explore topics such as location, environment, and personal experience, exhibiting the inspiration that geography provides to artists. Watson (2009) identifies an increase in contemporary art exhibitions that are created with maps as their main purpose. She examines the rise of the map as a tool for visual communication and places it as a central component of post-modernism. The use of maps as the subject of artwork integrates geography and art, providing a more accessible way for general audiences to experience geographic themes and data.

Cartography is a form of visual expression that closely ties geography and art through its emphasis on aesthetics and effective spatial data communication. Opach (2009) explores the theoretical and practical similarities between cartography and graphic design. The focus on effective color usage, visual hierarchy, and layout in cartography mirrors priorities of graphic design. Just as elements within logos, packaging, and digital platforms are carefully colored and arranged to create a cohesive product, so too are data and supporting elements within a map. Effective cartographers understand the purpose of their work and communicate it through these designs, just as a graphic designer works with a client to develop their desired product.

More abstractly, cartography shares connections with architecture. Architectural design involves planning and visually representing space within a building, mirroring mapmaking. Vartic (2015) documents similarities between cartographic and architectural design processes.

He identifies that similar “visual languages” and processes are used when mapping space at the broader scale of cartography and the building-level scale of architecture.

Beyond their aesthetic and spatial dimensions, both cartography and art are used by their creators to comment about the world and contribute to public discourse (Caquard and Cartwright 2009). These artifacts allow for information to be communicated in a more relatable way than other forms of public advocacy, giving maps and artwork the potential to catalyze change in society. This broader capability, in addition to the practical and theoretical connections between cartography and art disciplines, further emphasizes the interdisciplinary relationship between geography and art.

2.2 Public Art Impacts

According to the Australian Centre for Contemporary Art, public art is defined as “an artwork in any medium, planned and executed outside a gallery context and intended specifically for exhibition within public space” (ACCA 2024). Other definitions of this art form vary in detail, but reinforce the broad nature of what can be considered public art. It can range in size, longevity, and even mobility. This diversity allows for a wide range of creativity in its development and implementation. The abstraction of local geographic features into a map-like floor design thus falls within the broad spectrum of creative works considered to be public art. It is an artistic endeavor developed independently from a gallery context and designed for public interaction. The possibilities of public art’s manifestation are seemingly endless, but its purpose is often linked to the community it is displayed within. These works can link the past, present,

and future of a location and bring awareness to social, environmental, or other issues that relate to their designs. Public art's impact expands beyond purely aesthetic value and can provide tangible benefits to the communities it occupies.

Cheung, Smith, and Craven (2022) identify eight impact categories of public art: placemaking, society, culture, economy, sustainability, wellbeing, wisdom, and innovation. These impacts demonstrate how public art can serve multiple purposes, and intentionality in its design can emphasize the categories most relevant to the art's motivation. Impact categories especially of interest for this renovation are culture, wisdom, economy, and innovation. With respect to culture, public art can invoke an acknowledgment and appreciation for cultural heritage and put communities more in touch with the past. This allows for people to take ownership of the area's history and take action to encourage a sense of belonging in the present.

The category of wisdom takes this impact a step further, as public art installations can be used as educational resources. Installations can also act as supplements to educational programming (Yamamoto 2018). Moving beyond the surface level reaction of acknowledging a site's history, public art can provide a gateway to other resources. These materials serve to inform people and instill knowledge of the topic of interest within them. Additionally, public art can generate economic value for a site through its attraction of tourism. This results in increased interaction with the area as people are drawn in to engage with the art.

Lastly, public art fosters innovation in audience interaction, as installations are increasingly experienced in multiple ways. The art's physical presence provides one way for people to interact with it, but other platforms such as social media, websites, and augmented reality have become prevalent in the public art landscape (Zebracki 2017). The various potential impacts of

public art draw consideration to what should be communicated by it and how this message will reach its audience. Strategic design of the art itself, as well as the platforms that support it, aids in creating an installation with the capacity for profound community impact.

2.3 Design for Purpose

Built environments, ranging from small interiors to entire complexes, are most effective when their designs align with the purpose of the space. These environments can serve a variety of purposes, and considerations of certain aspects of their design vary when viewing the space as a reflection of its purpose. Rosenman and Gero (2006) explore the relationship between the structure, behavior, function, and purpose of designed artifacts and their interaction with technological and socio-cultural environments. They argue that these factors build upon each other to bridge the gap between these two environments and that their alignment is imperative to realize purpose through the eyes of the artifact's audience. They take a mechanistic, component-based approach to the design process, but also acknowledge the salience of non-physical functions and purposes of design such as aesthetic value. Furthermore, they identify that artifacts may have unintended or unrealized purposes despite careful consideration of aligning these four components of design to achieve an intended one.

Poot, Van Acker, and De Vos (2016) explore the emerging topic of the public interior and the "increasing interiority" of everyday life. They define public space through the lens of ownership and accessibility, noting that the ability to enter a space without hesitation or effort is key to making it public. They also note the transition of interior architecture from primarily private

spaces to a wide range of public ones, identifying this type of architecture as a developing field of study and design. Now, within interior architecture, thought must be put into making public spaces inviting and accessible to serve their purpose of gathering community together. These spaces vary in scale and purpose, and the design of each must conform to accessibility needs.

A discussion of design for purpose necessitates the introduction of the servicescape. Bitner (1992) defines this term as the physical design and decor elements of a facility, constituting its physical environment. A servicescape can be broken up into its spatial layout and functionality and artifacts within it that contribute to the space's aesthetic appeal. The design and implementation of servicescapes ranges across a variety of sectors and impacts the experiences of people that interact with these spaces.

Lam, Chan, and Lo (2010) investigate the effects of the casino servicescape on customers' satisfaction, intention to revisit, and desire to stay within the built environment of the casino. Within leisure settings, such as a casino, the business's goal is to encourage customers to stay longer and spend more money. Their study was conducted to assess if the physical components of a casino's servicescape contributed significantly to this goal. Dimensions of the servicespace including ambience, navigation, and interior decor were hypothesized to impact customers through their cognitive and affective (emotional) satisfaction. Two casinos differing in the level of investment in their servicescape were compared, and significant differences in customer satisfaction were found between the two. Ambience and navigation had a significant impact on cognitive customer satisfaction while navigation and interior decor had strongly significant impacts on affective customer satisfaction. In the casino that invested in its servicescape, the goals of getting

customers to stay longer, spend more money, and return to the casino were achieved, resulting from alignment of design and purpose of the space.

Bulakh (2021) analyzes the servicescape of hospitals and connects the purposeful development of public spaces to the goals of rehabilitation and recovery in this setting. Noting that hospitals have historically been viewed as cold, enclosing, and intimidating places, she suggests that the creation of public spaces within them can increase the physical and emotional comfort of hospital patients, visitors, and staff. She identifies two architectural features of modern hospitals that contribute to this goal: the pedestrian street and hospital park. Examples of pedestrian streets within international hospitals provide a public space away from treatment areas that mimic normal life through seating areas, cafes, and even street performers. These open areas contrast with the confines of treatment rooms and provide an escape from that setting for stakeholders within the hospital. The hospital parks discussed are open green spaces on the hospitals' ground that are accessible from or within view of treatment rooms. These spaces bring the natural environment closer to patients and are intentionally created to serve the purpose of increasing the sense of comfort within hospitals. These examples reinforce how design and purpose align in built settings.

While the area within Walker Building is not a setting of service like those mentioned above, it is the hub of the Penn State Department of Geography. The purpose of this space's design is to make that known. Maps are foundational to geography, and their artistic representation within the space will reinforce its purpose of embodying the department. The space's design elements inspired by maps will set it apart from other areas of the building, representing geographic practices and invoking geographic thought. This design will make the space more inviting to

visitors and students, encouraging them to interact with both the physical space and the faculty and staff that bring the department to life.

2.4 University Renovation

Colleges and universities across the United States and the rest of the world are in a seemingly constant state of construction. This construction supports the development of new buildings and facilities, as well as the renovation of existing ones. These projects are associated with massive expenses for the institutions, but are prioritized to enhance the aesthetic and functional value of their campuses (Donadel 2023).

At Penn State University specifically, renovations are occurring in academic buildings, housing areas, and athletic facilities. The motivation for these improvements varies and is associated with the purpose of the facility being renovated, but all share a sense of momentum for positive development within the university's physical space. Academic building renovation is motivated by functional needs such as maximizing space and reducing maintenance needs, but also involves aesthetic components. For example, an objective of the Sackett Building's renovation is to "reinststate the spirit of the original Charles Klauder design as a prominent freestanding building facing Pattee Mall" (Penn State Office of Physical Plant 2022). This aspect of the renovation will improve the building's visual appeal as a component of the broader university landscape. The renovation will also beautify campus for the experience of prospective, current, and former students, faculty, and their families.

Another renovation occurring on Penn State's campus is the phased, complete conversion of East Halls to renovated housing units for first-year students. This renovation also includes

exterior and landscaping work but is primarily focused on enhancing the interiors of the student dormitories to be more modern and comfortable living spaces. Amenities added through the renovations, such as climate control for rooms and enhanced study spaces, make these spaces more desirable for prospective students and more comfortable for current ones. These projects are described as student experiential enhancements by the university's assistant vice president for Housing and Food Services and are claimed to "translate to a greater sense of community, belonging, and overall student satisfaction" (Penn State News 2022).

Beyond intentions of improving the student experience and the visual appearance of a college campus, studies have been conducted which link the quality of campus facilities to the recruitment, satisfaction, and retention of students. Kampf, Haines, and Gambino (2018) identify recreation centers as a specific category of university facilities that impact students throughout their college experience. Renovations of recreation centers at three institutions in the United States were analyzed through the lens of the impact that the facilities had on student recruitment and retention. The importance of high-quality recreation facilities at these institutions was a heavily weighted factor in surveyed students' decisions to attend and continue at that institution.

Hill and Epps (2010) studied the microenvironment of a classroom and the impact that interior renovation had on student satisfaction and evaluation of teaching. Professors involved in the study taught the same accounting course in standard and updated classrooms. These spaces varied in seating type, capacity, computing equipment, and lighting. Despite the professors teaching the same course with the same style and expectations, dissatisfaction with the conditions of the standard classroom were expressed by students. A significant difference was found between the students' levels of enjoyment and sense of satisfaction between the class

sections. Furthermore, there were significant differences in students' perception of the organization and presentation of class materials; the standard classroom was viewed as less organized and coherent than the updated one.

Finally, Reynolds (2006) surveyed institutional characteristics that impact the recruitment and retention of students with a specific focus on facilities. The overall quality of campus facilities was found to be essential or very important to 66.9% of the over 16,000 students that participated in this study. This value ranked behind only the considerations of a strong major in the student's field of interest, excellent/accessible professors, preparation for a career, and a customizable education. Within the category of facilities, those related to a student's major were found to be the most important type of facility considered in the college selection process. Additionally, inadequate or missing facilities related to students' majors were found to be impactful in their decisions to reject other institutions.

The studies of facility impact on student recruitment, experience, and retention as well as the motivation behind ongoing renovation projects at Penn State reinforce the value that the revitalization of the Walker Building's third floor will provide to the university and the Department of Geography. This project not only fits within the university's broader vision of development and modernization but will also be foundational in improving the department's facilities. While the department is already prestigious in its faculty and quality of research, students' priorities and the value they place on facility quality should be considered as a key component of their recruitment and retention. The visual appeal of this renovation, paired with continued enhancement of labs and classrooms within the Walker Building, aims to increase the quality of the department in the eyes of current and prospective students.

Chapter 3: Data and Methods

This section introduces the data used for creating the floor design and details the design process. The design process portion is heavily supplemented by figures to provide visual representation of the design's step-by-step development.

3.1 Data

Native American paths were the aspect of Central Pennsylvania's local geography selected as the focus of the floor's design. The original inhabitants of what is now Pennsylvania included the Lenape, Susquehannock, Shawnee, and Iroquois people. The intention of this design was to acknowledge and honor these groups and their connection to this land by representing their routes of travel across it. The data for the design needed to be something that could be abstracted to the unit of a tile, and the shapes of these linear features can be represented by flooring tiles. Footpaths were the primary mode of transportation for Native American groups living in Pennsylvania, and these routes served key roles in diplomacy, war, trade, and travel (Seeley 2018, p. 5). Different variations of the paths were taken depending on the season and purpose of travel. These paths allowed them to effectively maneuver through Pennsylvania's complex terrain and were chosen to be dry, level, and direct. These priorities resulted in many of the walking paths following sides of ridges above streams, avoiding the thick brush and potential for flooding along their banks. Because of the paths' navigational connection to streams/rivers and ridges, these features were added to the floor design. The paths were thin, and only the most traveled routes were typically wide enough for two people to pass each other without one

moving to the side (Seeley 2018, p. 7). These paths effectively traversed the state's topography, and many became the foundation for modern roads and highways (Bernard 2021).

The data source for this project's design is maps within *Indian Paths of Pennsylvania*, written by Paul A. W. Wallace (1965). This book compiled primary source data from the journals of fur traders, missionaries, surveyors, and other groups that interacted with Native Americans and walked their paths. The author is abundantly clear about the challenges of mapping these routes, as they are based on settlers' documentation rather than the expertise of Native American sources. The groups that lived in this area did not use a written language to document the routes, and the actions of settlers significantly diminished indigenous populations. The combination of these two factors left no Native sources of this data to be found in the course of my research; the Wallace Paths were the best available option to use for this design project.

The paths show only a single line to represent their route, rather than the various permutations documented based on weather conditions and purpose of travel. However, at the mapping scale for this project, encompassing the region of Central Pennsylvania, this level of detail is not required. The paths Wallace documented are also not limited to a single time frame. They show where paths were documented to be located at any point of contact between Native Americans and settlers. Because of this, any paths traveled prior to the seventeenth century were accounted for. The paths were also given English names and spellings by Wallace, in place of their originally given names for consistency and familiarity to the book's audience.

Despite the challenges of compiling this data and its shortcomings with respect to indigenous authenticity, it is believed that the paths mapped by Wallace provide a sufficiently accurate

depiction of the true paths' routes. His maps of individual paths include waterways, topographic features, and settlements from the historic journal records and can be matched to those locations with mapping technology. The drawn paths follow the local topography and are consistent with the routing of paths to be dry, level, and direct, the known practice of Native American groups. Additionally, the routes of nearly all of these paths align with modern roads and highways, which is consistent with research on their locations.

Wallace's work is viewed as one of the most complete portfolios of Native American paths in Pennsylvania and is referenced by other publications on this topic. His routes have been digitized into features in Pennsylvania's Cultural Resources GIS Database and are thus viewed as reputable by the commonwealth and its Historical and Museum Commission.

3.2 Design Process

The floor design began by becoming familiar with the materials to be used to bring it to life. We worked throughout this project with a representative from Tarkett, a flooring company that offers a unique Johnsonite flooring material. Johnsonite is a rubber-based flooring that provides durability for high-traffic areas and boundless creativity in design through its various colors and tile shapes. We decided to use Tarkett's Johnsonite Pentagonals product to give the line segments within the design a wandering look as they connected to each other. The pentagonal tiles are offered in diamond, monument, and shell shapes (Figure 2), and we chose to use the shell-shaped tiles because they could be installed in a seemingly random design (Tarkett 2024). This was best suited for overlaying the Native American path data. It allowed for line segments that mirrored the paths, along with rivers and other natural features, to be created in the most

organic fashion. The other tile shapes and installation patterns were too uniform, and it would have been challenging to capture the shape of the data used for the design with them.

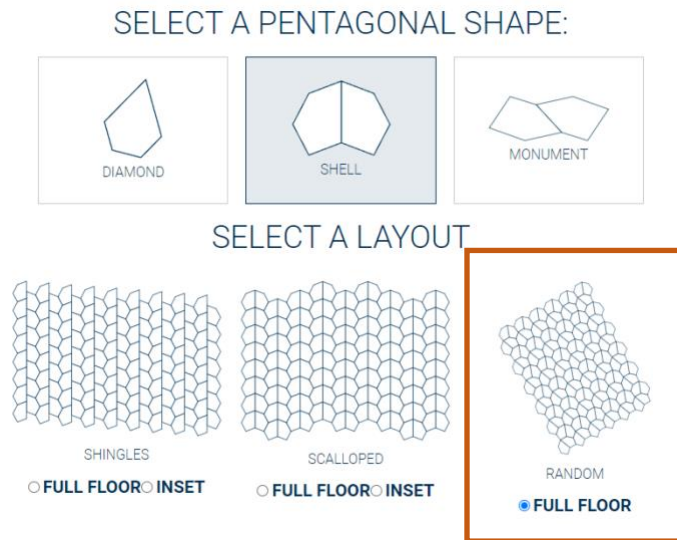


Figure 2: Tarkett Pentagonal Shell Layouts

The irregular pattern of the shell-shaped pentagonals, named Random, presented a challenge for design and installation because it at first did not appear to have any repeating edges or smaller patterns. I needed to identify a repeating grouping of tiles and its orientation so that I could model the floor and overlay tiles that would align with the uniform angles of the Walker Building’s hallways. I rotated the pattern sample provided by Tarkett to find a straight edge and isolated a group of four tiles that repeated along this axis (Figure 3). This was my base unit for populating the hallway footprint with tiles in Adobe Illustrator (Illustrator). With this pattern identified, I took four full-sized tile samples to the third floor of the Walker Building and ensured that they aligned with the straight edge of the hallway (Figure 4). I measured the tiles and repeated the pattern across the width of the hallway to get an estimate of how many sets of the pattern were required to cover this space.

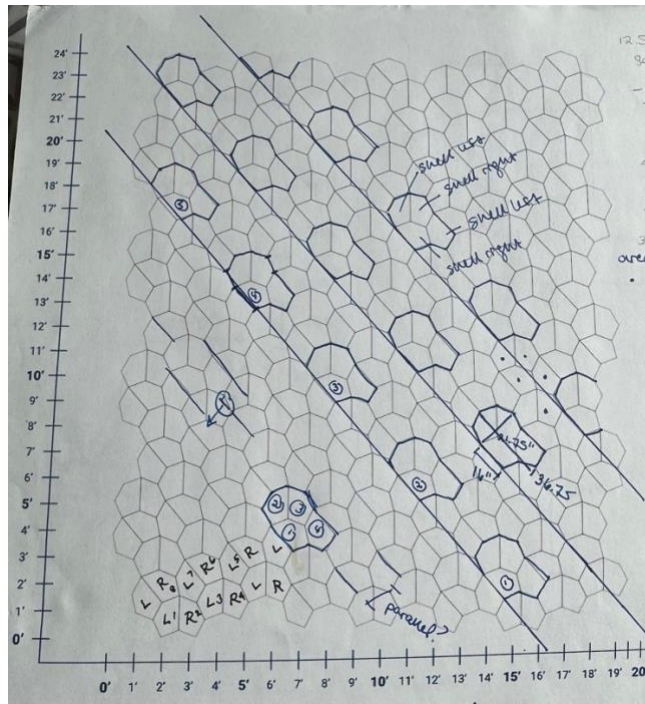


Figure 3: Identification of Repeating Pattern within Random Tile Layout



Figure 4: Verification of Repeating Pattern Alignment with Sample Tiles

I then uploaded a blueprint of the Walker Building third floor from Penn State OPP to Illustrator and made an outline of its hallways using preliminary measurements of their dimensions done by Dr. Brewer (Figure 5). I created full-scale pentagonal tile objects using the Illustrator pen tool and grouped them to make the repeated pattern (Figure 6) and populate the hallway footprint with tiles.

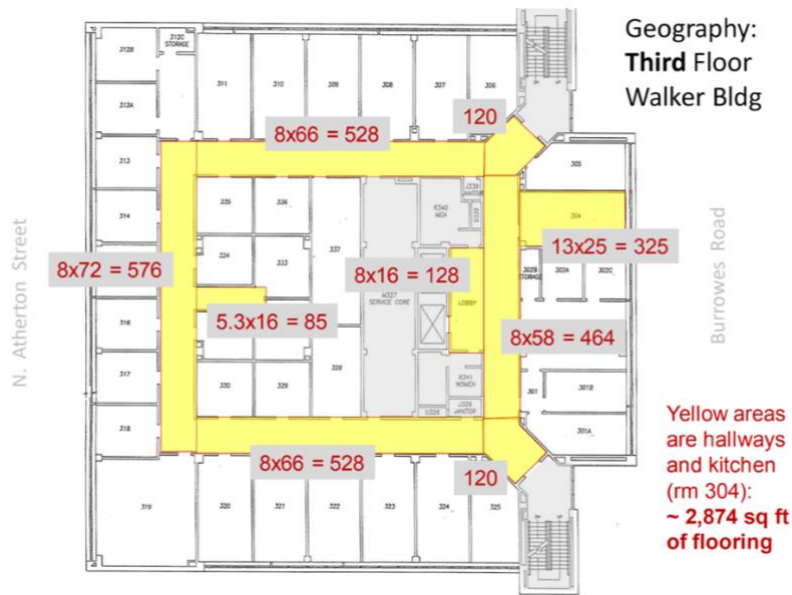


Figure 5: Preliminary Floorplan Dimensions for Design



Figure 6: Repeated Tile Groupings in Adobe Illustrator

With the hallway geometry and tiles created, I began working with the Native American path data. I stitched together four regional path maps (Figure 7) that provided higher resolution than the full-state map that was provided in Wallace's book. I rotated this image and changed its scale in Illustrator, attempting to find an orientation and size that aligned well with the hallway's shape and provided a charismatic design (Figures 8 and 9). It was also key to ensure that the area around State College was centrally located, as faculty wanted Native American culture and history local to Penn State to be highlighted by the design.

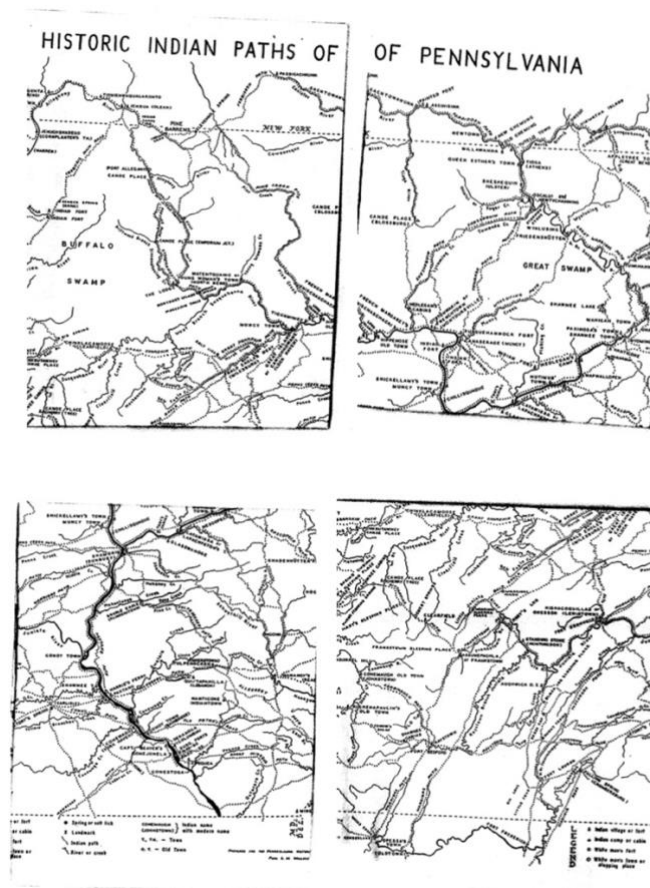


Figure 7: Regional Maps of Native American Paths within Pennsylvania

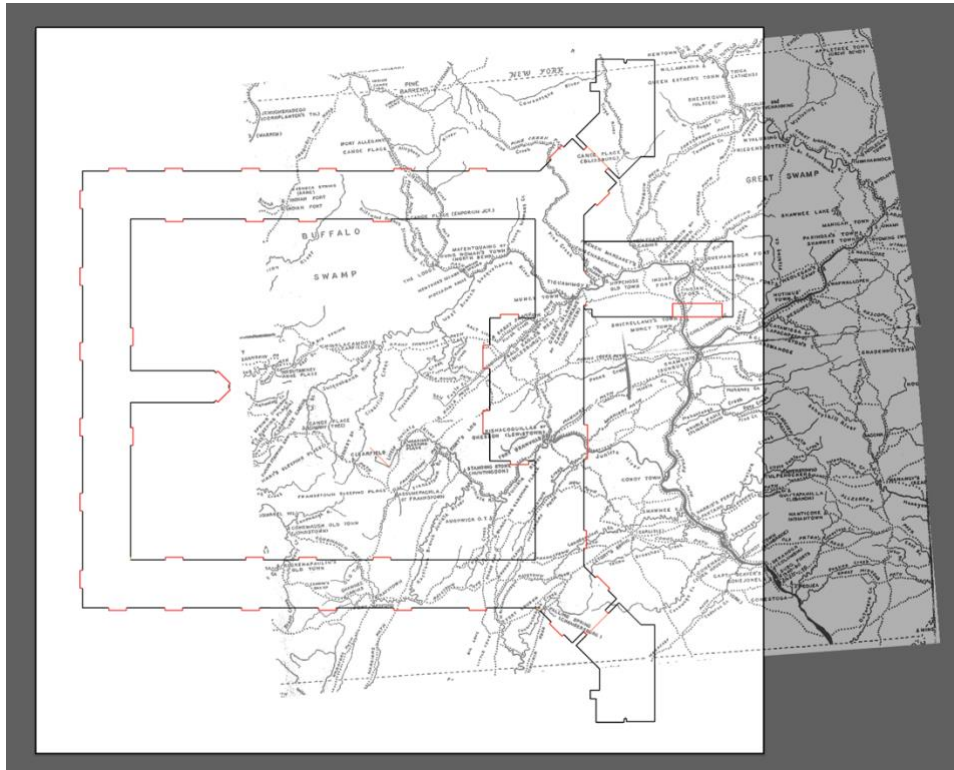


Figure 8: Regional Maps Aggregated, Scaled, and Oriented to Fit Hallway Shape

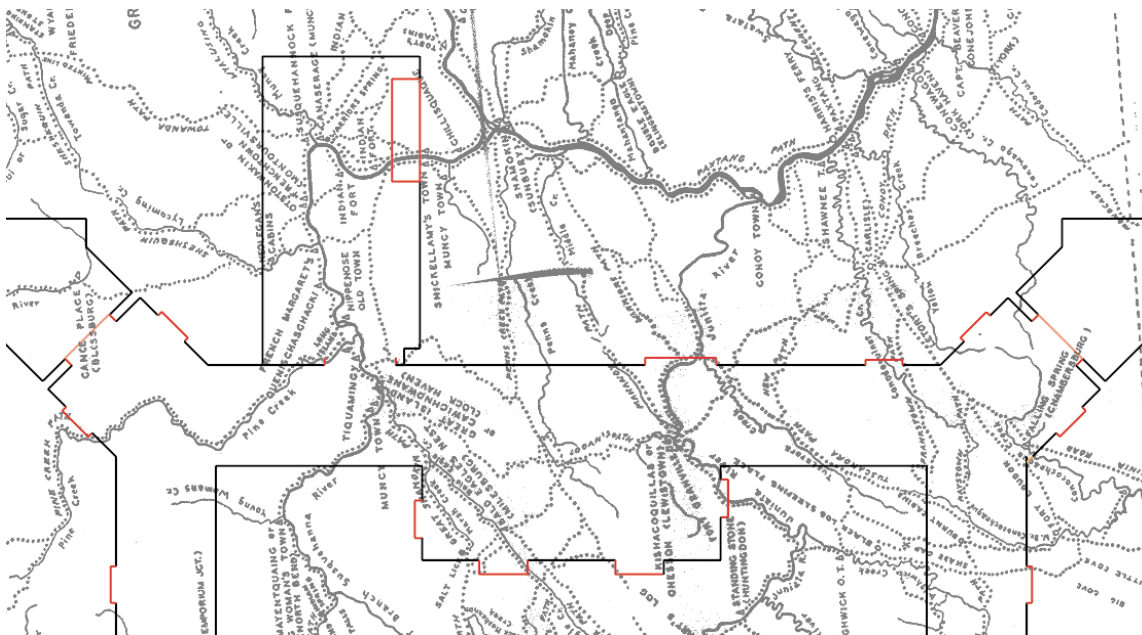


Figure 9: Map Overlay Emphasizing Area of Focus for Design

I found a few scales and orientations that I thought would result in a strong design and began to color code the tiles to create an abstracted map of these features. We selected orange to represent Native American paths, blue to represent rivers and streams, and a custom marbled beige as the base color of the floor. These each had specific color names through Tarkett of Dragon's Breath, Glass Slipper, and Dolomite, respectively (Figure 10). The light Dolomite color was intended to brighten the space compared to its current dark floor, and the orange and blue corresponded with color choices for the other part of the building renovation: the resin wall panels.



Figure 10: Tarkett Tile Colors

We selected the tiles in Tarkett's Mesto finish, which added more depth to colors with marbling and prevented them from being entirely monochromatic. In order to map the Native American paths and waterways onto the floor, I isolated the tiles, the hallway outline, and the map containing the data into separate layers. I then traced the line segments of each feature with the Illustrator pen tool, clipping this area to the main elevator lobby, kitchen, and entrances from the building's stairwells (Figures 11 and 12).

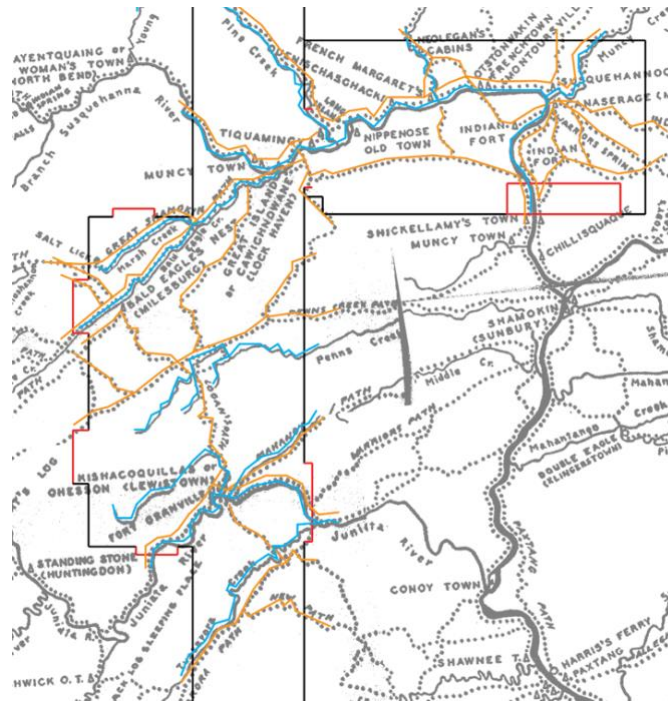


Figure 11: Feature Line Segments Traced from Source Map

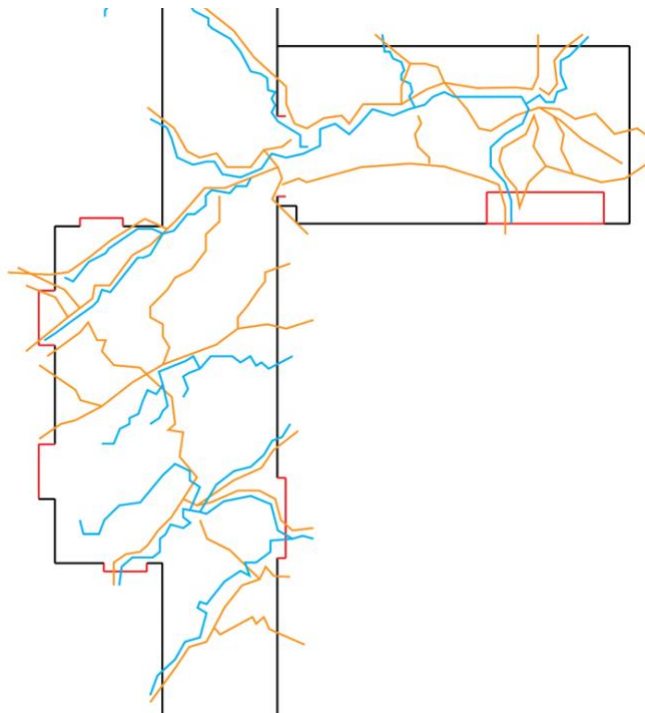


Figure 12: Resulting Segments Overlayed on Floorplan Outline

This clipping was done to emphasize the design in a central part of the building rather than including an overwhelming amount of detail through the entire third floor. After drawing the line segments in a layer above the tiles in Illustrator, I colored individual tiles based on the feature that passed over them (Figure 13). Many paths followed rivers, so I stacked the blue and orange tiles to represent this adjacency. Due to the random nature of the tile pattern, I could not exactly match tiles to the line segments. I selected tiles to color based on my best judgment of what would create a continuous path or river segment. I made an effort to give additional weight to major rivers such as the Susquehanna and Juniata by coloring two rows of tile in blue along the rivers' routes.

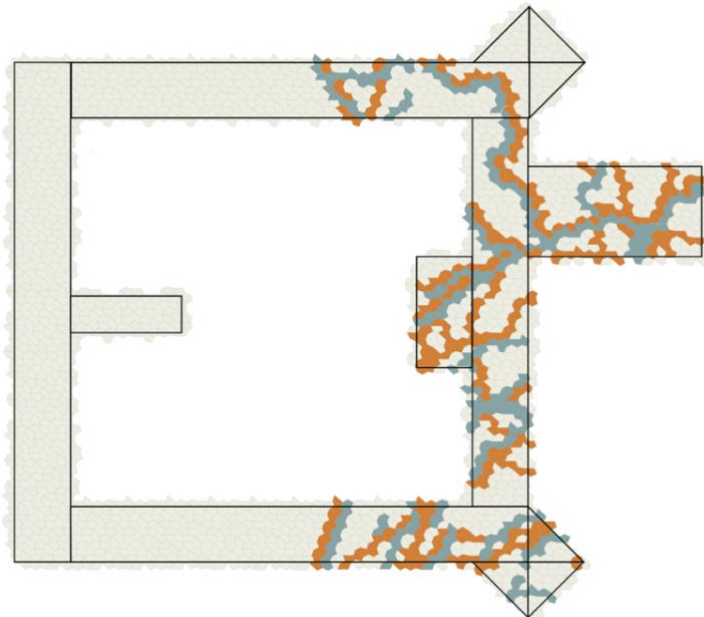


Figure 13: Initial Draft of Floor Design

Once the design drafts were completed, we printed and trimmed them to avoid showing the partial tiles that would be removed upon installation (Figure 14). This process allowed Dr. Brewer and me to get a better perspective of what the floor would look like when standing in the

hallway, rather than looking at it from a birds-eye view in Illustrator (Figure 15). From this process, we identified that the design would be better if it was more focused to the main eastern hallway of the building and if some path and water segments that extended down the other hallways were removed (Figure 16).



Figure 14: Printed Floor Design Draft with Partial Tiles Removed



Figure 15: Perspective View of Printed Floor Design Draft

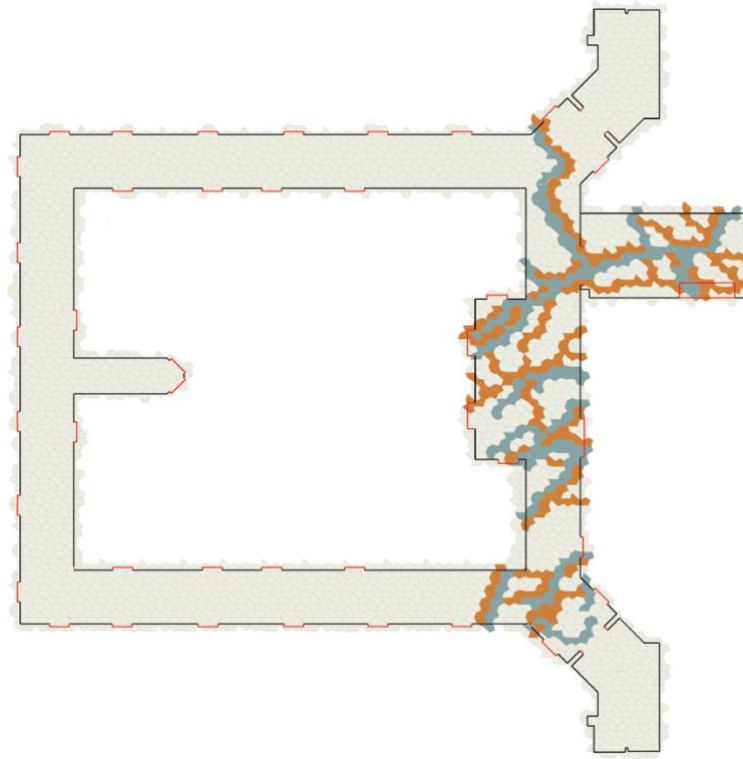


Figure 16: Second Draft of Floor Design with Segments Removed

With orientation and scale established and the design draft reviewed and edited, I then transitioned towards creating an exact model of the Walker Building's third floor. This model would be used to make a final design for flooring estimates to send to the supplier. I measured all of the third floor's wall segments, including doorway insets, elevator openings, and aspects of the department kitchen to create an exact model of the floor's outline in Illustrator.

I then populated this framework with tiles, ensuring that no unnecessary tiles lay outside the floor outline. I did another iteration of the design using the same map scale and orientation, removing the unnecessary segments highlighted in our review, and making adjustments based on how the repeating tile pattern aligned with the exact floor dimensions.

After discussion, we decided to add another physical geography feature to the design in addition waterways. This was done because Native American paths followed ridges and valleys in addition to water. The change provided another way to acknowledge how these communities and their routes of travel interacted with the land close to Penn State. The feature we decided to add was Mt. Nittany, which conveniently filled blank space of the design in the third floor elevator lobby (Figure 17). I used the Pennsylvania Cultural Resources GIS Database to match digitized path geometry to the Wallace map and incorporate the topography of Mt. Nittany's ridgeline in my design (Pennsylvania Historical & Museum Commission 2024). The connection of this feature to Native American groups was evident, as multiple paths followed or crossed over the mountain.

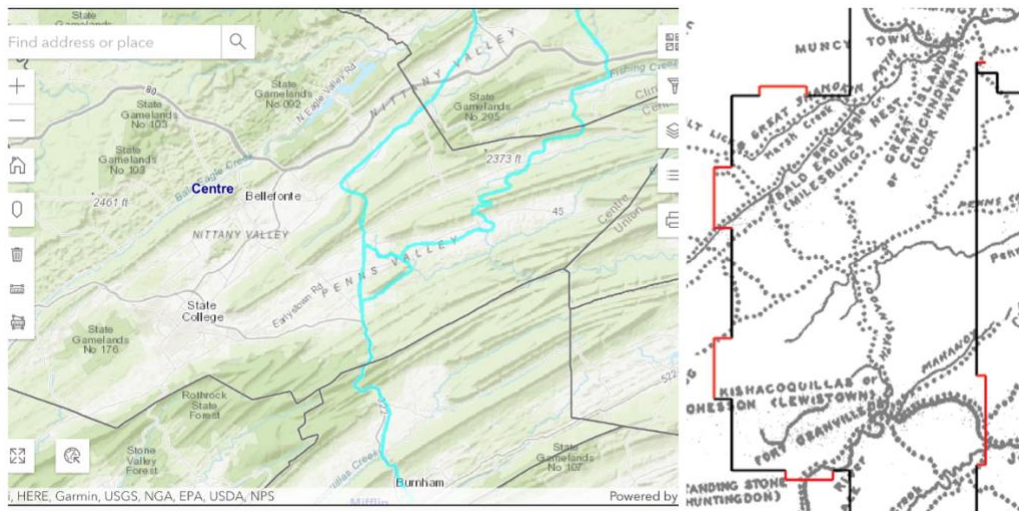


Figure 17: Comparison of Digitized Path and Illustrator File to Locate Mt. Nittany

This feature was represented by green tiles and will correspond to the wall panel of ridge and valley topography in Central Pennsylvania (Figure 18). This panel will serve as the centerpiece for its installation, which the floor is complementary to through the colors they share.

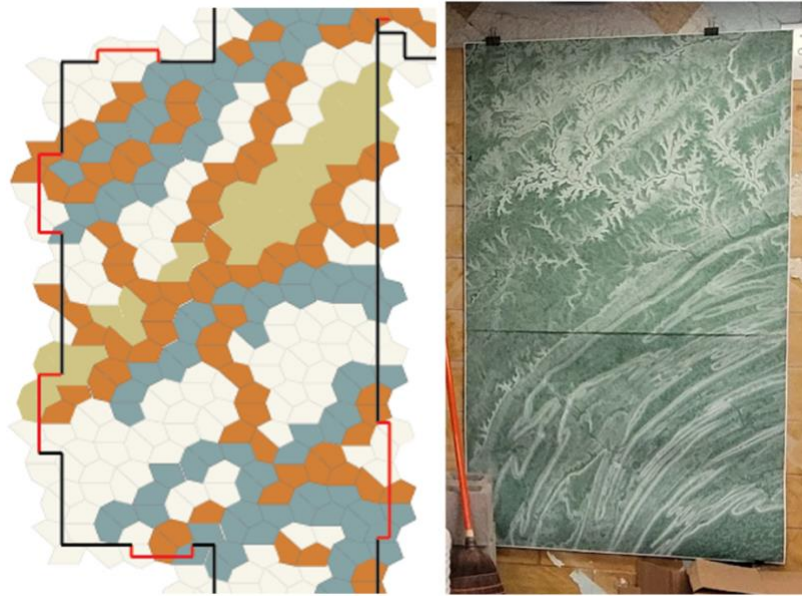


Figure 18: Addition of Green Tiles, Complementing Ridge and Valley Map Panel

With the exact floor design created, we again printed it out to view the design from multiple perspectives. At this step, we decided to go further in generating perspective, and I created a 3D model of the hallway using architectural cardstock. This provided bounds to the space and allowed us to see how different areas of the floor could be viewed separately or in connection to each other. After creating this model and reviewing it, we were satisfied with the design. I then used this final floor plan file to generate counts for each tile color and provided estimates for our supplier to order the materials for installation.

Chapter 4: Results and Discussion

This section showcases the final floor design through a bird's eye view and three-dimensional perspective modeling. It also discusses the potential impacts of the completed floor through the lens of public art impact categories.

4.1 Final Design

The final floor design is shown below (Figures 19 and 20). The line segments extending beyond the main hallway were removed and the green tiles representing Mt. Nittany in the elevator lobby have been added to this version. The design is centered on the elevator lobby, eastern hallway, and kitchen to channel attention and prevent it from being too busy. It offers opportunities for students, faculty, and visitors to follow the line features as they walk from the north stairwell down the hallway, out of the elevators, or into the kitchen. This was a key design consideration, as we wanted the floor to spark interaction for those walking upon it.

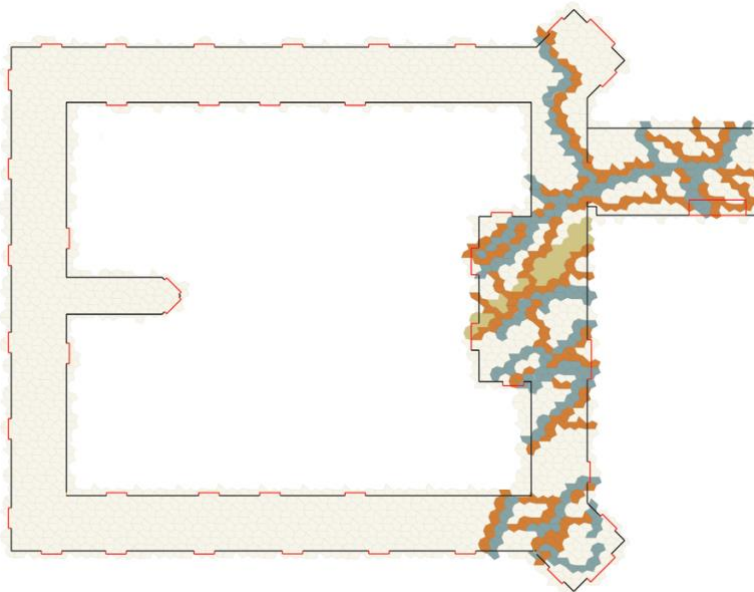


Figure 19: Final Floor Design

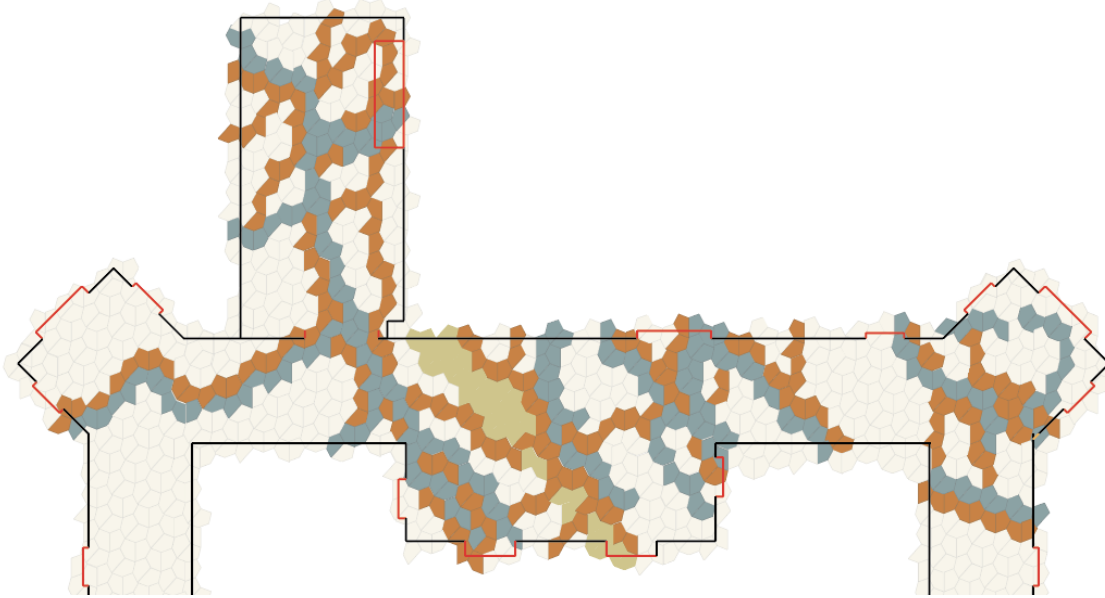


Figure 20: Final Floor Design Focused View

The map overlay shows the extent to which the design follows the paths and natural features of Wallace's maps (Figure 21). The scale of one tile (the length between its two furthest vertices) represents approximately 3 miles. Given the proximity of many paths to waterways, the design strays slightly from the map because of the abstraction to the tiles' size. For features such as Pine Creek (top of Figure 21), I strayed from the exact shape of the line. This prevented a repeated tile pattern which would be inconsistent with the random nature of the rest of the design. Other areas of inconsistency include the Susquehanna and Juniata Rivers, which stray from the map due to their added weight to showcase significance. While following the line segments of the map was a priority in design, these slight changes were made to enhance the appearance of the floor. The rasterized, random medium of tiles for this regional mapping project inherently came with error. However, we felt that making these small adjustments to support the overall design was appropriate.

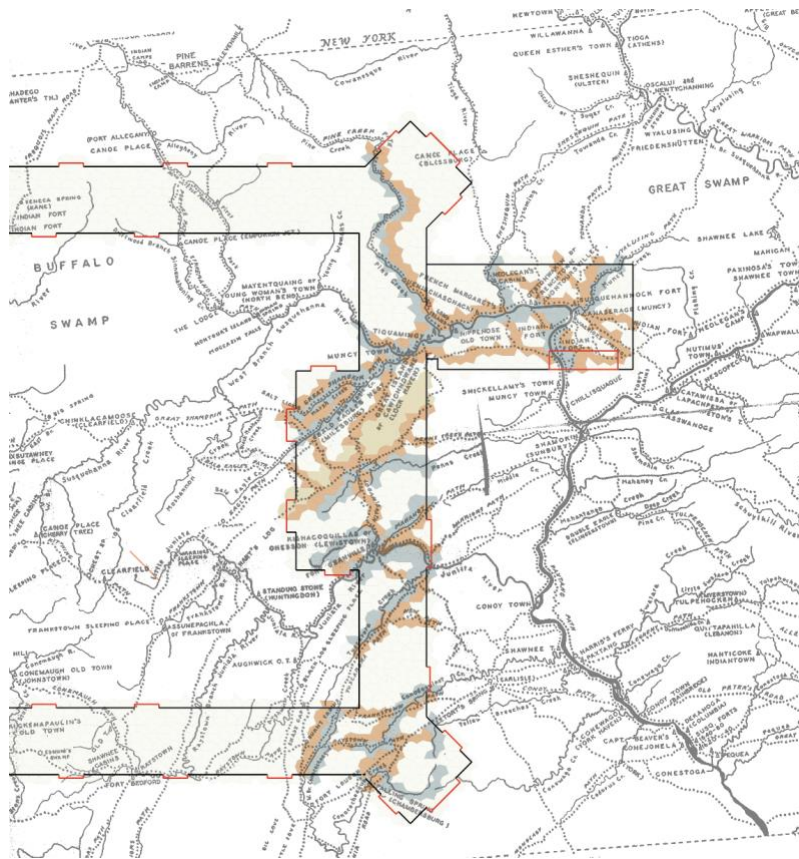


Figure 21: Final Floor Design with Map Overlay

4.2 Perspective Photos

The following three-dimensional perspective models provide the best picture of what the floor will look like before it is physically installed (planned for summer of 2024). Angles from the north stair lobby, elevator lobby, and kitchen show what the design will look like in segments as it is viewed. It is key to note that the design will not be experienced from the bird's eye view perspective shown previously, so viewing it in segments through these models is more realistic. The different parts of the design shown can be experienced uniquely based on a person's location within the building or on a continuum if they are moving across the floor and the space.

Focal points of attention within the design include the elevator lobby, the kitchen, and its intersections with walls. These spaces are where signage guiding viewers to the floor's educational website will be located in the future. A key detail to note is that the floor will not include visible borders between tiles of the same color. These borders were placed on the shell shapes throughout the design process to emphasize the random pattern seen on the floor and distinguish individual tiles for coloring purposes. Additionally, the colors seen below are matched to only a portion of the marbled tiles to be installed. The installed floor will have a broader range of color within it. These models were a useful tool for assuring our satisfaction with the floor design before moving forward with ordering the product. They also allowed others to see the vision of the design come to life.



Figure 22: Perspective Model of Floor Design from North Stair Entrance

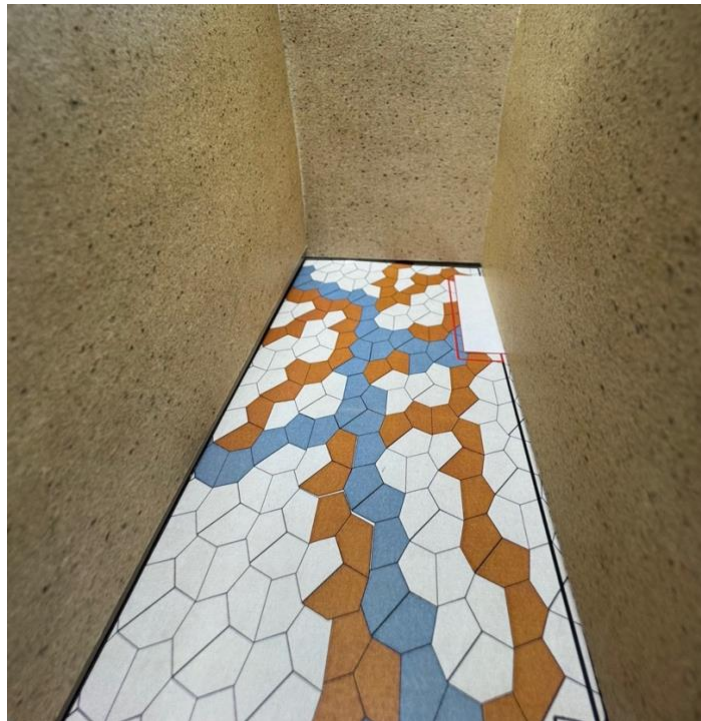


Figure 23: Perspective Models of Floor Design from Elevator Lobby and Kitchen

Chapter 5: Conclusions

This project has a variety of potential future impacts. Drawing on Cheung, Smith, and Craven's (2022) framework, I believe that the floor's design and presence spans the impact categories of culture, wisdom, innovation, and economy.

The purpose of this project was to acknowledge and elevate the presence of Native American groups, past and present, within the Department of Geography, Penn State's University Park campus, and Central Pennsylvania. The floor itself and supporting materials explaining its design will contribute to the impact category of culture, serving as an acknowledgement of Native American history and putting those who walk across it in touch with the past.

Expanding beyond culture, the floor will provide the opportunity to supplement and generate wisdom for students, faculty, and visitors of the department. While the design of the floor can be taken at its aesthetic face value, it has the potential to be a powerful learning tool. The intriguing design can be used in the future to engage people with Native American culture and history. Interest in the floor can spark further desire to learn about these topics in a more formal manner. We encourage faculty and students to develop resources pertaining to the Native American groups connected to the paths displayed on the floor and use it as a storytelling object. The greater depth of knowledge made available through this work allows it to channel the impact category of wisdom associated with public art.

This project is also prime for innovation in the way that it is experienced by the Penn State community. The idea of walking across the paths on the floor and feeling connected to the history it represents is innovative, but there is more to be done in making this work of public art

interactive and accessible in multiple forms. The educational resources discussed above will have an online presence, allowing the design and meaning of the floor to reach a broader audience than those who find themselves on the third floor of the Walker Building. This online platform will further communicate the impacts of culture and wisdom to more people and reinforce the project's purpose of increasing visibility for Native American groups. Additional forms of innovation related to the project may also be developed, such as a georeferencing augmented reality program that will place people on an online map at the location of feature segments as they move across the floor. We enthusiastically encourage further ideas from faculty and students about how to make the floor more interactive in the future.

Lastly, the floor renovation project has the potential for economic impact in the sense of increased department visibility and facility quality. As discussed previously, facility renovation can increase student satisfaction. This aesthetic upgrade to the physical face of the department aims to do that. The floor may also increase foot traffic through the department as people seek to interact with it, providing the opportunity for further engagement with the department. It can even serve as an anecdote during prospective student visits, representing the environmental, cultural, and computational components of geography and appealing to students with these interests. If the floor can be used as an engaging recruitment tool, it can result in direct economic impact through increased enrollment in department courses and degree programs. These foreseen benefits come in addition to the floor's purpose of serving as a platform for acknowledging Native American culture and history. The combination of these impacts fits within Penn State's broader mission of university renovation, doing so in a distinctly meaningful and educational manner.

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