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THRESHOLDS: ENHANCING THE EXPERIENCE AT THE RAYMOND FARM

By

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ABSTRACT OF THE THESIS

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The transition from one space to another is a fundamental element of design that frames the view and the experience. Whether transitions occur inside or outside or between the two, these transitions, or thresholds, are unique to every site.

This thesis is a study of thresholds at the Raymond Farm in Bucks County, Pennsylvania along a site transect that includes spaces both inside (the Raymond Farm Center) and outside. As the Raymond Farm Center has been expertly designed to connect to its surroundings it needs no adjustment. This thesis focuses on the study of spatial thresholds, but also stresses the importance of place to create a design that respects the existing beauty of the landscape. Multiple visits were made to the Farm in order to experience the site overall and locate the thresholds that define the experience. During the visits personal experiences were recorded and empirical data were collected to better identify things such as temperature changes, flora species, and the presence of sun or shade and how it affected space. Within this complex landscape, multiple layers of thresholds were identified at various scales. Some were more obvious, while others were hidden to the casual eye.

The intention of the design is to draw more awareness to the existing thresholds within the landscape, by enhancing their presence through subtle design interventions that cause the visitor to pause and look again at their surroundings. Inspiration for elements within the design came from the work of the Antonin and Noémi Raymond and George Nakashima.

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I. Introduction: Threshold

Growing up in suburban New Jersey and studying architecture as an undergraduate student, I have been struck by the lack of connectivity between the inside¹ and the outside.² This lack of connectivity between architecture and the land inspired me to investigate transitions from one space into another. Moreover, in suburban America there is a lack of awareness, whether conscious or unconscious, of the experiences provoked by a new space or moving between two types of spaces. Lawns now dominate and replace any sense of place that previously existed before the arrival of the construction crews. Just as there needs to be a sense of connectivity between the building and the landscape, this sense of connectivity, transition, and arrival is also necessary when moving between spaces outside.

My thesis, therefore, investigates the threshold, what the *Oxford Dictionary* defines as "a strip of wood or stone forming the bottom of a doorway and crossed in entering a house or room."³ Thresholds mark transitions between "a point of entry or beginning" which exist regardless of whether we humans have designed them.⁴ In order to become more aware of thresholds and to draw more attention to their existence through design, I follow ideas presented by Anita Berrizbeitia and Linda Pollak in the text *Inside Outside: Between Architecture and Landscape* (1999).⁵ These authors discuss the spatial relationships between architecture and landscape, and they make a case for the importance of the "threshold" between disciplines and the physical thresholds in the everyday landscape.

A "threshold" can have multiple meanings, but in architecture the threshold can be easily identified as the doorway or archway that leads the individual into another

space. Nevertheless, it does not need to be as abrupt as stepping through a doorway. A passageway or corridor, although elongated in shape, can also be a threshold. It performs as a transition space, building up anticipation before the end is reached. A threshold is the space in-between that leads to the moment of arrival. It is a space of its own that can be subtle in its presence or prominent and impactful in how it connects space.



Figure 1: Obscure Threshold Compared to a Familiar Threshold

The architectural form is familiar with its clean lines, highlighting the threshold as seen in the image on the left, whereas the wild and opportunistic nature of the plants seen in the image to the right obscures the threshold.

Source: Sonya Shapoval, author

Living within a structured, built environment we are most familiar with thresholds like doors, windows, or a gate through a fence. But the landscape is more complex. A break in a hedge is architectural in form and familiar and easily grasped as a threshold, but a gap within the understory and trees of a woodland, often unnoticeable, is also a threshold.

Thresholds are not limited to the physical characteristics that define a space: they are also temporal moments where two spaces meet. With the crossing of a threshold

there is a change in the spatial environment, and in certain cases a noticeable difference in the feel of a landscape.⁶ For example, a window or a break in the vegetation of a hedge wall extends the view and changes the amount of light, while the sound and feel of a gentle breeze can all pass through such an opening, creating another form of threshold.

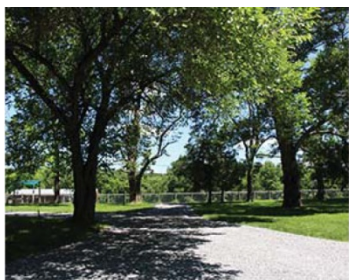
Another kind of threshold is the ecotone — an ecological edge between two ecosystems, as exemplified, for example, by the area where a meadow meets a forest. Here, the meadow will begin to succeed and become an extension of the forest.

Diagrams in Wenche Drumstad, James D. Olson, and Richard T. T. Forman's book *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning* illustrate the various edges where different ecological areas meet and overlap, as well as show where and how paths of movement may occur or become concentrated.⁷

There is still another form of threshold that is non-spatial: the "threshold of consciousness." This psychological threshold, as Berrizbeitia and Pollak note, defines "the point at which a stimulus is of sufficient intensity to begin to produce an effect" on the individual, making them aware of a sensory change.⁸ It has to do with sensation, expanding the conversation of thresholds beyond spatial terms.

Each of these thresholds, no matter how they are associated with space, occur at a specific place. Thus they are locations in space that are not limited by size or breadth, but can be extended over a physical distance to give the individual more time for contemplative passage.⁹ Within the landscape a change in perception and scale can fluctuate from day to day, making the location of thresholds reliant on vegetation incredibly fluid within the landscape.

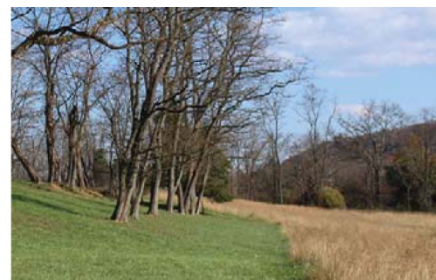
In consideration of these ideas, I define a threshold as a portal, an edge, or in-between place that connects two or more spaces. A threshold can activate all of the senses or just one: sight, touch, sound, and smell. As an experience, it can be a physical sensation, a purely aural experience, or an unconscious (or conscious) awareness. It is a space of its own that can be subtle in its presence or prominent and impactful in how it connects space.



beneath tree a canopy



road / driveway / house



lawn / meadow



tree collumnade



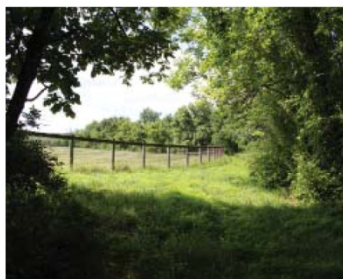
inside / window / outside



inside / glass door / outside



meadow / woodland



tree tunnel / open path



fence / lawn / woodland



woodland / successional
meadow



woodland / gate / open pasture

Figure 2: Thresholds found at the Raymond Farm

Thresholds at the Raymond Farm, both inside and outside, and constructed and natural.

Source: Sonya Shapoval, author

The Site: The Raymond Farm in Bucks County, Pennsylvania



Figure 3: Raymond Farm Wetland Meadow in Autumn, 2018

The colors of the wetland meadow in autumn contrast the wide open blue sky above. It is a sight to behold. The air is crisp and fresh as the seasons turn.

Source: Sonya Shapoval, author

The Raymond Farm (located in Bucks County, Pennsylvania) was the site of the graduate core design studio led by Kathleen John-Alder in the fall semester of 2017. It is a beautiful place located within the rural countryside, ten minutes southwest of New Hope. This site is a classic example of a farm residence within a picturesque landscape of rolling hills and valleys, forests and streams, and long views and open skies. Surrounded by acres of woodland and farmland, the Raymond Farm is distant enough from the bustle of the city to feel secluded and set apart from the rush of everyday life.

The farm is situated west of the Delaware River and 35 miles north of Philadelphia (Appendix A, Figure 49), and it encompasses over 210 acres of land, with 120 acres occupied by horse pasture and woodland and 90 acres encompassing the area of the Raymond Farm Center (Appendix A, Figure 51). Within this great expanse of land the site has over 150 feet in elevation change, which allow for diverse ecological areas to occur (Appendix A, Figure 50). This area is rich in the diversity of flora, unfortunately, the high percentage of non-native and invasive plants is a concern.

1939-41: Antonin and Noémi Raymond and the New Hope Experiment

The current owners of the farm are descendants of Antonin and Noémi Raymond, European architects who spent many years working under Frank Lloyd Wright until they decided to establish their own practice in 1921.¹⁰ It was while working in the office of Frank Lloyd Wright that the two made their first visit to Japan. In 1920 they made a name for themselves with their work on the Tokyo Imperial Hotel.¹¹ Assigned as the lead architects for the project, the Raymonds designed the hotel using concrete, which would withstand the earthquake and fire of 1923. The design and materiality of this iconic building brought a new style of design to Japan.

In 1938, after 18 successful years of practice in Japan, World War II loomed and the Raymonds returned to the United States.¹² One year later, Antonin opened an office in New York City, and Noémi and he began a search for a country summer home where they could both live and work. They sought to escape the confines of life in the city and to regain their direct connection with nature that their Japanese homes provided. Abhorring the suburbs, they looked to the country.¹³ In March of 1939, they purchased a farm with an old stone barn and 1728 Quaker House near the town of New Hope in

Bucks County, Pennsylvania.¹⁴ There was history embedded in the laying of the stones that was also present in the facade of the farmhouse. Even though previous owners modified the house, and the land was overworked and tired from decades of farming, Antonin perceived its potential.¹⁵



Figure 4: Raymond Farm Center, 2017

The back of the farmhouse as it appears today.

Source: Sonya Shapoval, author

The Raymonds renovated and modified the house, keeping the original stone walls that attracted them to the property while adding Japanese design elements. Modifications made to the back of the house included the installation of sliding glass doors and windows to bring in more light and views of the surrounding landscape. Two ponds were also created in the low-lying area behind the house, mimicking the water element in Frank Lloyd Wright's Taliesin West.

The Raymonds designed their home as a place to practice architecture and teach. The students who enrolled in their New Hope Experiment spent half of the day drafting at their tables and half of the day taking care of the land, farming and planting trees. Similar to Frank Lloyd Wright's Taliesin Fellowship, this combined farm and studio became the place where the Raymonds and their students could live, work, and teach. They called it the New Hope Experiment (1939 to 1941).

The Raymond Farm Center c.2017 - 2019

Today the site is the home of the Raymond Farm Center, a non-profit organization that is reviving the ideals and practices of the New Hope Experiment. There is an artist in residence at the farmhouse and various activities that occur on site, including: artist workshops, lectures, tours, yoga, cooking classes, woodworking, gardening, farming (chicken raising and egg collecting), stabling of horses, tea ceremonies, weekend open houses, and much more. Activities are focused in the 1728 farmhouse, but they spill over into the adjacent landscape as well.

The Raymond Farm Center is a beautiful home that mixes the architecture of the West with that of Japan. By hybridizing the characteristics of two cultures, the Pennsylvania Quaker with Japanese, this building makes unique connections between inside and outside. The Raymonds redesigned the old Quaker home to have a greater connection between the building and the landscape. The redesign incorporated many of the Japanese architectural design techniques that Antonin used while working and living in Japan. This connection to Japan, in terms of both the design of the site and the history of those who have lived there, is expressed in the materiality and construction of the

farmhouse's new design and is discussed in more detail in "Threshold E/F - Raymond Farm Center / Under the Black Locust Canopy" (see page 42).



Figure 5: Landscape Architecture Studio Final Review in the Raymond Farm Center, 2017

The farmhouse, now named the Raymond Farm Center, is the site of workshops, lectures, and an artist in residence. In the fall of 2017, the Rutgers Landscape Architecture graduate core design studio presented their work at the site of their design project. Source: Charlotte Raymond. Reprinted by permission.

George Nakashima

A Japanese American from Washington, George Nakashima was an architect, furniture designer, woodworker, and close friend of Antonin and Noémi Raymond. In the 1930's, George Nakashima worked at Antonin Raymond's architectural firm in Tokyo and helped design and supervise the construction of the dormitory at Sri Aurobindo Ashram in Pondicherry, India.¹⁶ The time George Nakashima would spend at the ashram, working on the project greatly influenced his outlook on life. It was not only an architectural challenge, but spiritual. Mira Alfassa (known as Mother Mira), who was responsible for approving the design of the ashram, had a large role in Nakashima's spiritual development, which she considered more important than the time it would take to complete the ashram. "In accord with Sri Aurobindo's philosophy, Nakashima believed that the subtle, complex inner worlds of consciousness more important than the more

superficial physical and intellectual worlds; he believed that a deep understanding of that inner world was essential to conquer the tyranny of the ego."¹⁷ He would later devote his career to the promotion "of a life moved by a higher consciousness, a life of spirit."¹⁸ This linkage of design to spirit existed before his work on the ashram, but his experience at Pondicherry strengthened his beliefs.¹⁹

Shortly, after George Nakashima returned to the United States with his wife and daughter, Mira, Pearl Harbor was attacked (1942). The government relocated anyone of Japanese descent, citizen or not, into internment camps. George and his family lived in one of these internment camps until 1943, when the Raymonds petitioned for their release. Nakashima and his family subsequently moved to the New Hope farm. Nakashima built a woodworking facility in an old chicken coop and began what would become a world-renown woodworking business.²⁰

George Nakashima would live at the Raymond Farm for a year before buying a stone cottage on the ridge up the road. It was there that he would build the Nakashima Woodworker Compound. Life and work would be intertwined — his craft was not simply a job, but a way of life.

Nakashima's respect of nature and his eye for detail are evident in his work.²¹ The Nakashima family's Japanese heritage is clearly evident in the architectural design of the Compound and the plant selection. Today his daughter, Mira Nakashima, continues his legacy at the Nakashima Woodworker Compound creating handcrafted furniture.



Figure 6: Nakashima Conoid Bench

A handcrafted wooden bench made from walnut and hickory wood. The edge of the bench seat is true to the natural form of the tree.

Source: George Nakashima, North American; American, 1905-1990, (Artist). 1977. Conoid Bench. Decorative Arts and Utilitarian Objects. Place: Smithsonian American Art Museum, Washington, DC, USA, Gift of Dr. and Mrs. Warren D. Brill, 1991.121, https://library-artstor-org.proxy.libraries.rutgers.edu/asset/AMICO_SAAM_103812694. Accessed September 24, 2019.

The work of George Nakashima inspired the design that I pose in this thesis. As expressed by Nakashima in *The Soul of a Tree: A Woodworker's Reflections* (1981), "to be intimate with nature in its multifaceted moods is one of the greatest experiences of life."²²

Inventory and Analysis to Design

The Raymond Farm was chosen, not because it is a place that necessarily needs or requested help to define its spaces, but because it is a large site with multiple areas of varying characteristics. These characteristics include rolling hills, woodland, successional meadow, pasture, and wetland with a few streams and creeks flowing through the site, and ponds. The variety of ecological areas found within the property contribute to the site's many outdoor threshold spaces.

This thesis explores the site of the Raymond Farm, locates thresholds within the area of study and analyzes them before leading into a design within the specified thresholds. The design does not seek to remake the existing thresholds or to create new thresholds, but to enhance the experience within them and draw awareness to their existence. By doing this I hope to better emphasize the significant role that thresholds play in the landscape and design.

II. The Farm Past and Present

The Raymond Farm is a place rich in history. When the Raymond's purchased the property in 1939, they revived the land and old stone house which would then be filled with the memories of all those they have touched. Colleagues, farmers, neighbors, and friends would all mingle at the farm and share meals at the farmstead. The complexity of the history of these people is similar to the diversity of the land today.

Then and now, the farm has been a place where many personal threads of history intersect and mingle. The tale that describes the history of the site is not simple.

Originally, Thomas Ross purchased this land from William Penn's sons in 1737 and transformed it into a farm.²³ Later, the farm was purchased by the Raymonds who worked with apprentices, colleagues, and friends; and now, the next generation of the Raymond family has extended the reach of this place to their friends and neighbors, students, artists, those that stable their horses within their pasture, and many more. Of the many histories of this place, my focus has been on the Raymonds, then and now, and George Nakashima, a friend and colleague of the family. To have a more thorough understanding of the Raymond's history, my reading included the following books:

Antonin Raymond: an autobiography (1973), *Architectural Details* (1938), and *Crafting a Modern World : The Architecture and Design of Antonin and Noémi Raymond* (2006).²⁴ In addition to my reading, I attended an open house at the Raymond Farm Center where I learned about the history of Antonin and Noémi Raymond.

To better understand the artistry and life of George Nakashima the following books were read: *The Soul of a Tree: A Woodworker's Reflections* (1981), *George*

Nakashima: Full Circle (1989), *George Nakashima and the modernist moment: James A. Michener Art Museum, Bucks Country Pennsylvania, June 9 - September 16, 2001* (2001), and *Nature, Form, & Spirit: the life and legacy of George Nakashima* (2003).²⁵

III. Methods

Multiple methods were used to complete this thesis. In the graduate core design studio, research and extensive site analyses were created with my colleagues in class, including regional context and location, topography, elevation, slope, water flow, vegetation, sun and shade, setback boundaries, and farming permissions. This gave me a deeper understanding of the place and a base for future work. In my thesis I build upon this work with multiple site visits, threshold studies, vegetation surveys, soil and temperature analysis, and archival research.

Study Area

The study area (about 62 acres), indicated within the highlighted box in Figure 7, includes a woodland stream, successional meadow, woodland edge, pasture, the area surrounding the Raymond Farm Center, a wetland meadow, and ends at a woodland to the south. These seven distinct ecological areas provided the opportunity for diversity in the thresholds that I encountered and documented.

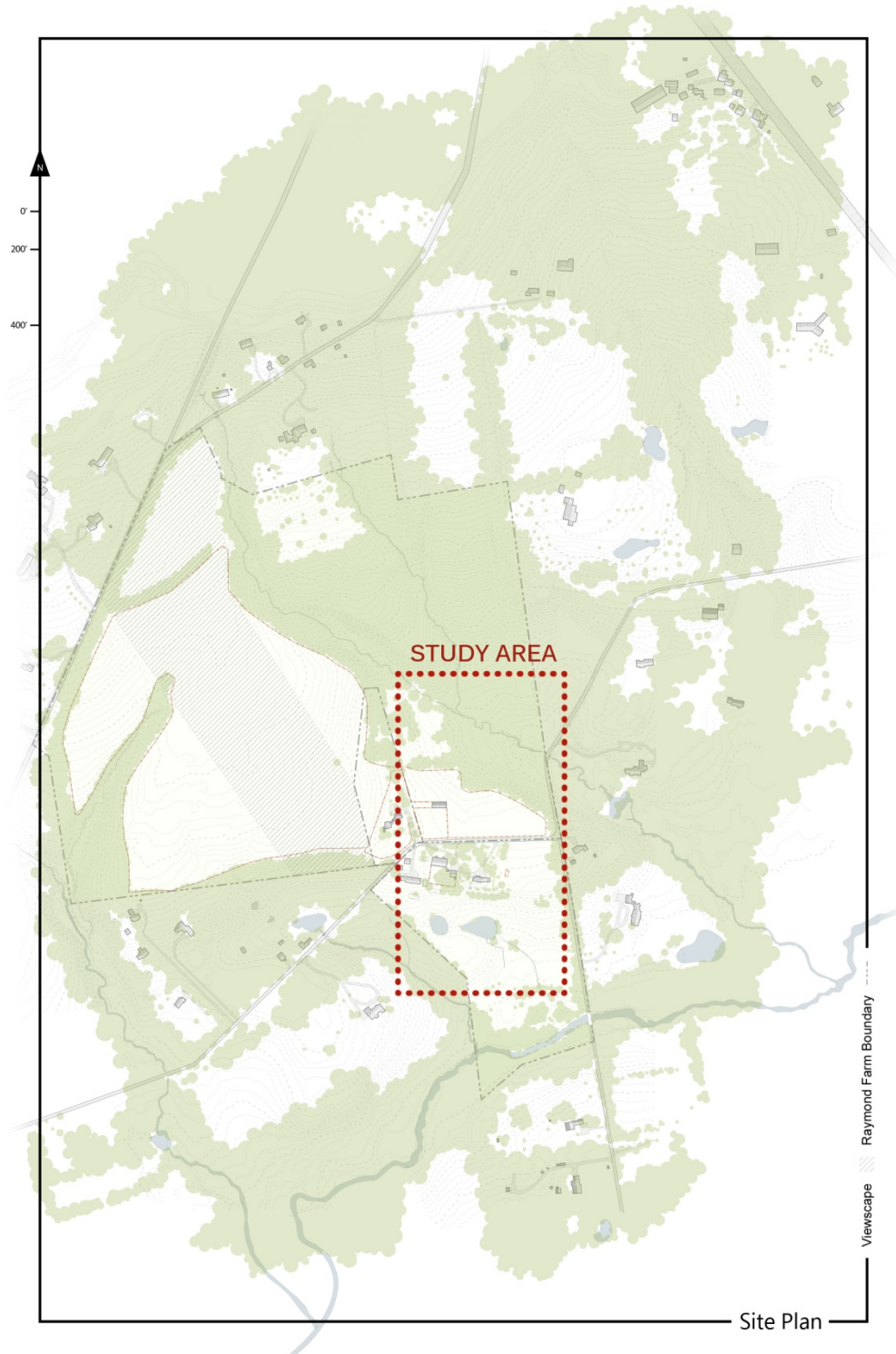


Figure 7: Study Area

Research of the site was concentrated within the area outlined in red. (In original 1" = 200')

Source: Sonya Shapoval, author

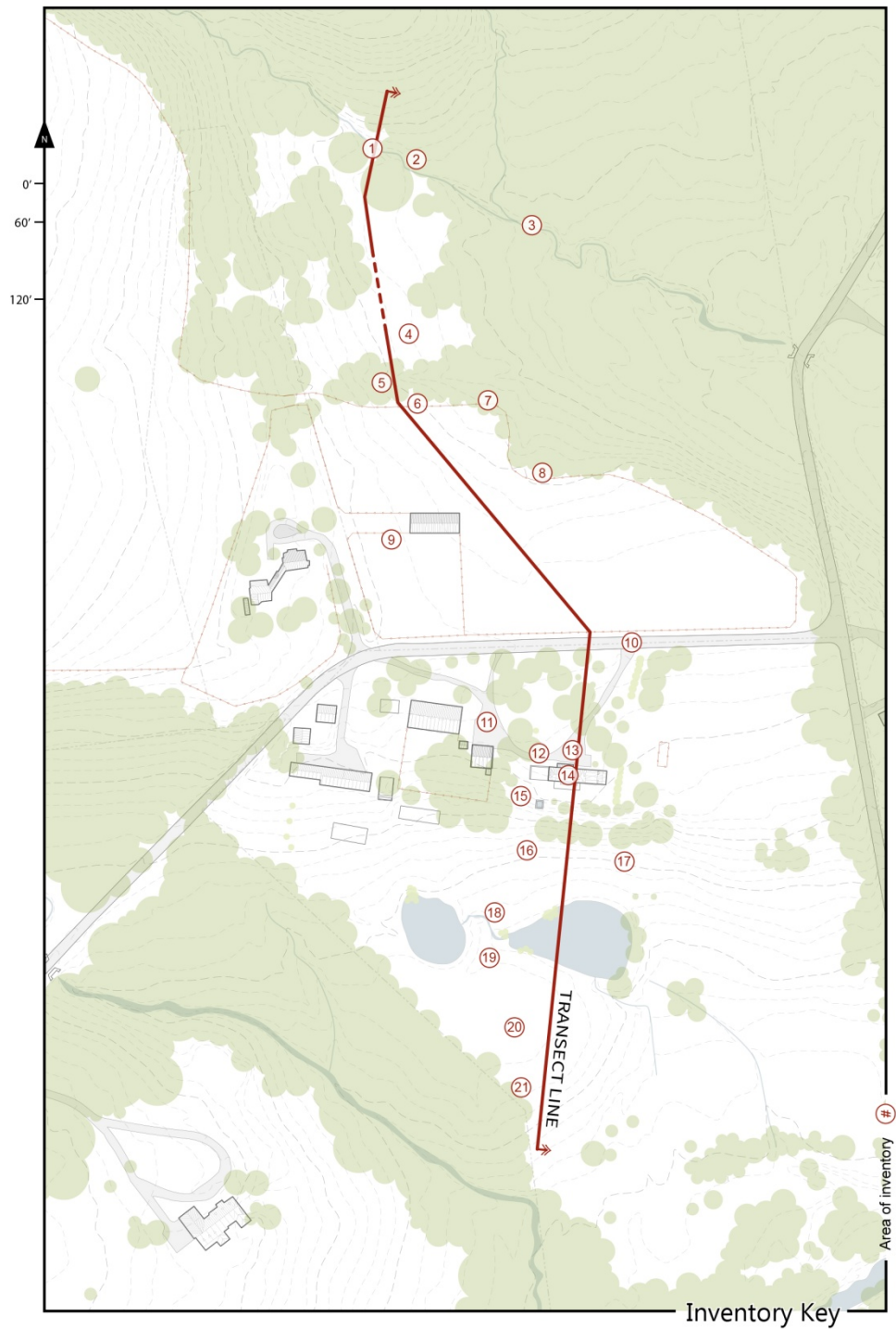


Figure 8: Inventory Key

The study of the thresholds throughout this thesis can be found along the site transect line. Numbers indicate areas of greater interest, data gathering, and photographs. Photos can be seen in Figure 9. (In original 1" = 60')

Source: Sonya Shapoval, author

Inventory & Analysis

In the summer of 2018, exploration of the site focused on the thresholds both within the landscape and the 1728 farmhouse, now the Raymond Farm Center. Primarily, the focus was on the transition zones between spaces along a site transect line, as seen in Figure 8. To better convey this site transect, I created a visual representation using photo collage which I combined with a section line derived from a topographic base map (Figure 9).

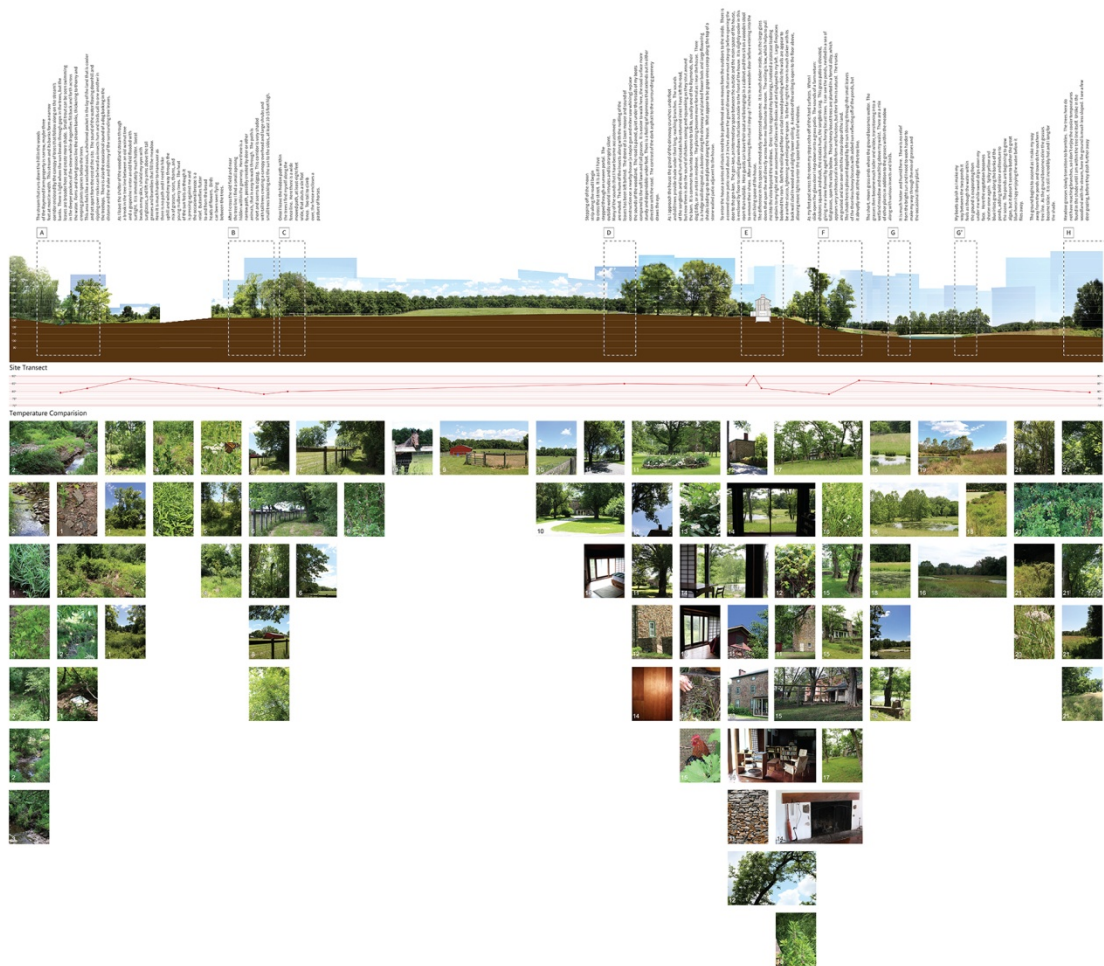


Figure 9: Experience Through the Site Transect

The site transect, with its thresholds marked by dashed boxes, is bordered above by a written experience through the site, immediately below by temperatures within each threshold, and then supported by photographs within and surrounding the thresholds. (Site transect in original 1" = 40')

Source: Sonya Shapoval, author

Site visits were made during the months of June, July, August, and September. Documentation methods were both experiential and empirical.²⁶ The decision to chronicle my personal experiences as I walked through the site was influenced by readings relating to sense of place. In Lucy Lippard's book *The Lure of the Local* she says that her "lived experience is central to [her] writing and to the subject of place."²⁷

The experiential documentation consists of thoughts and feelings written as I walked the site. I made spatial observations that highlighted what was most interesting to me and made note of what I heard, smelled, or felt. The empirical documentation consisted of recording temperatures throughout the site in the sun, the shade, and directly beneath trees. I also catalogued plant species and used a clinometer to measure tree heights. In order to better understand the soil composition and profile, I used the online Web Soil Survey provided by the USDA Natural Resource Conservation Service.²⁸ It gave me an understanding of the soil profile throughout the site and an idea of how much space roots required and how deep they went before reaching bedrock. To document the appearance of my surroundings, I took many photos and made sketches.

With the empirical data gathered, I then used photographs and the written word to convey the experience and physical characteristics of the site. Two representation methods were used to convey the experience and physical characteristics. Shown at 40 scale, a site transect section of the entire study area visually conveys the diversity of the site and the locations of the thresholds (Figure 9). This large image also contains a narrative of my experience from one end of the site to the other, as well as supportive photography.

In addition to the narrative of my personal experience through the site, I also catalogued physical characteristics of the thresholds and the surroundings spaces, through section diagrams. These diagrams were represented at a much larger scale than the site transect, drawn at an eighth scale to show greater detail. The characteristics are listed above the section and include the following: slope, light, wind, temperature, water, canopy trees, shrubs, herbaceous, native plants, non-native plants, and any existing manmade structures. There is also an enlarged plan of existing conditions for context and diagrams that help to explain the threshold.

To better understand the history of the site and the farmhouse, I visited the Architecture Archives of the University of Pennsylvania to examine the architectural drawings, photographs, paintings, drafted plans, sections, and surveys in the Antonin and Noémi Raymond Collection. Using these drawings as reference, I created my own set of drawings that located and visualized my experience of the site and its thresholds.

Design

Once the thresholds were located and diagramed, I selected three areas to create a design intervention. These areas included Threshold A: Woodland Stream Corridor / Successional Meadow, Threshold B/C: Within the Woodland Edge / Woodland Edge Meets Pasture, and Threshold H: Meadow / Woodland Edge. The design for Threshold A has a platform for resting and taking in the scenery as well as a stone path that is sensitive of its surroundings within the woodland stream corridor. The next threshold, Threshold B/C, has a hidden woodland boardwalk connecting the space on either side of the woodland edge. And finally, Threshold H has a boardwalk that overlooks the man-made

ponds near the Raymond Farm Center, terminating with a seating area hidden within the meadow, where bird watching is ideal.

Taking the design beyond concept drawings, I drew construction details of the boardwalks and the streamside platform. Although the design is subtle in appearance and presence, these construction details highlight the complexity and craftsmanship needed in order to make the concept reality. Building materials are specified, as are the Japanese joinery and timber framework techniques that use connections that avoid an excessive amount of metal fasteners. The book *The Complete Japanese Joinery* was referenced extensively when deciding upon the structure and construction for the designs.²⁹

IV. Existing Thresholds

Armed with material from the fall 2017 studio, my analysis began with the overall site. A study of the topography and elevation map (Appendix A, Figure 50) and water flow map (Appendix A, Figure 52) created by my colleagues highlighted the existence of waterways and wetland within the 150 feet of elevation change throughout the site. The vegetation map in Appendix A, Figure 53, as well as site visits, confirmed that these wet areas also supported a wide variety of flora and fauna, making them more complex landscapes.

These areas, which also bracketed the Raymond Farm House and pasture, were ideal for my study of thresholds (A map of the study area can be seen in Figure 7). After additional onsite exploration, a site transect was drawn from the woodland stream to the Raymond Farm House and continued until it reached the southern woodland. With this line to guide my studies, eight thresholds were identified.

The site transect represented in Figure 9, calls out the thresholds of study in labeled dashed boxes. In the undulating text above the site transect, the complexity of the experience within the threshold is visually conveyed. As the reader's eye travels from left to right, so does my path through the landscape. The description of my experience is concentrated above the corresponding threshold box in which it occurred, and in doing so, the complexity of the thresholds is visually conveyed. Similarly structured, the photos below the site transect highlights surrounding elements near and within the threshold. Both the text and images mirror each other, adding visual strength to convey the intensity, size, and importance of the outlined thresholds.

Narrative of My Experience

The stream that runs down the hill in the woods of the Raymond Farm property is narrow, approximately three feet at most in width. This stream and its banks form a narrow corridor enclosed by the canopy of trees that follow along on the stream's banks. There is light where the sun breaks through gaps in the trees, but the leaves are broader here and create more shade. Small trout can be seen swimming in the deeper pockets of the stream while dragonflies flit back and forth across the water. Ferns and short grasses line the stream banks, thickening to thorny and creeping plants species below the trees.

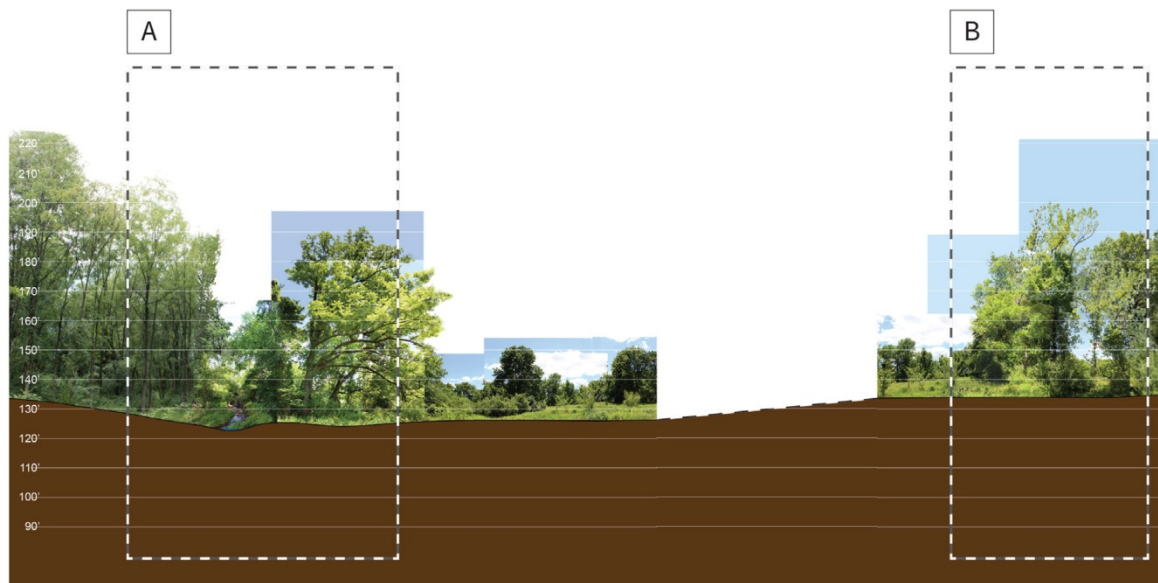


Figure 10: Site Transect Showing Thresholds A to B

The woodland stream corridor meets the successional meadow, which then meets a woodland edge. (This image is an enlargement from Figure 9)

Source: Sonya Shapoval, author

This area feels like a secluded oasis, a sheltered pocket in the lay of the land that is cooler and set apart from the rest of the site. The sound of the water flowing downhill and rippling over rocks can be heard as insects hum and birds call to one another in the

treetops. There is also the occasional sound of a dog barking in the distance and the shake and shimmy of the surrounding tree leaves.

As I leave the shelter of the woodland stream through a break in the tree line between an old walnut tree and a grapevine, I enter an old field flooded with sunlight. It is immediately much hotter. Sweat beads on my skin, I shield my eyes with sunglasses, and lift my arms above the tall grasses and brambles that fill the meadow. It is much harder to maneuver here, as there is no path and I need to hike uphill and wind my way through the mix of grasses, roses, thorns, and young mulberry trees. The heat of the sun feels as though it is pressing against me and the occasional breeze is a relief. Butterflies flutter among the broad heads of flowers. Birds can be seen flying between the trees.

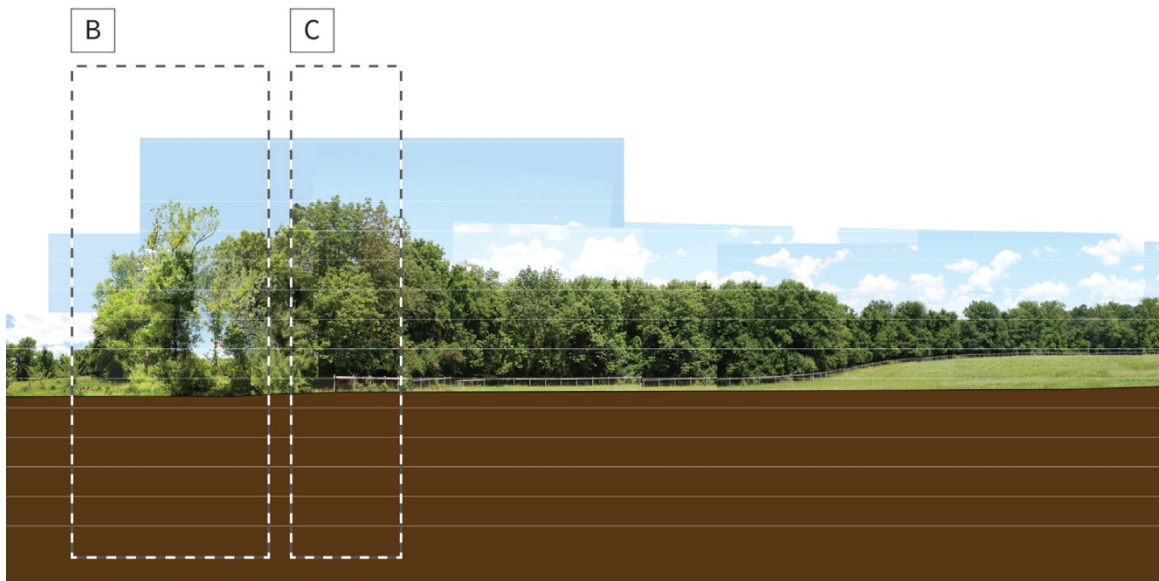


Figure 11: Site Transect Showing Thresholds B to C

The woodland edge meets an 8 foot wide mown path along the fence line that encloses the pasture. (This image is an enlargement from Figure 9)

Source: Sonya Shapoval, author

After I cross the successional meadow near the tree line, I find a small opening hidden within the greenery. Here there is a narrow path, possibly created by deer or other

animals, that is easy to walk through (I would later learn that it is mown in the winter to provide access for hunting). The path is short and seems to zigzag. This corridor is shaded by tall trees creating a canopy overhead and large shrubs and small trees, at least 10-15 feet high, blocking out the sun to the sides.

Once I leave the hidden path within the trees, I find myself along the fence line. Here there is a wide mowed path, at least eight feet wide, that abuts a five foot fence. Too tall to climb over, the fence encloses a pasture of horses.

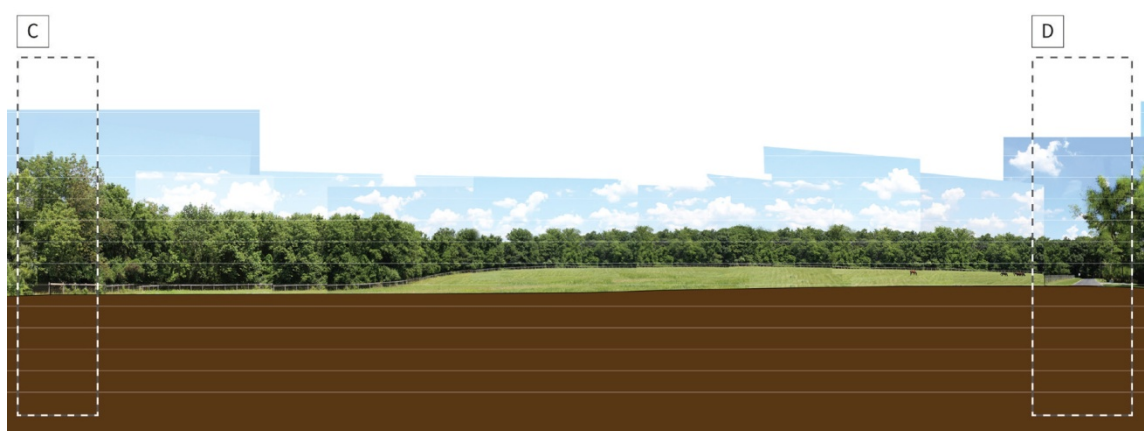


Figure 12: Site Transect Showing Thresholds C to D

The woodland edge meets an 8 foot wide mown path along the fence line that encloses the pasture. On the opposite side of the pasture there is another mown strip between the fence line and Pidcock Creek Road, which divides the Raymond Farm property. (This image is an enlargement from Figure 9)

Source: Sonya Shapoval, author

Stepping off the mown strip along the road, I cross the paved street that divides the property and step through an unseen portal. The outside world intrudes, but it is strangely silent. Many of the sounds that I have become accustomed to are muted. The hum of the insects along with the rustling of the leaves have been left behind. The drone of a lawn mower and sound of construction on a nearby house (a staple gun and miter saw whining) replace the sounds of the woodland. The road is paved, quiet under the

treads of my boots compared to the soft lawn and tall grasses. It is easier to walk here, the road surface more sturdy and dependable underfoot. There is a feeling of openness that extends out in either direction with the road. The contrast of the dark asphalt to the surrounding greenery draws the eye.

As I approach the house, the gravel of the driveway crunches underfoot and old trees provide shade under long, reaching branches. The sounds of the songbirds and loud hum of cicadas returns, and it is joined by the sound of chickens cooing and squawking as they strut around the barn. It is common to run into someone to talk to here, usually someone from the Raymond family, their dog Eddy, or the artist in residence. The plantings become more formal in arrangement as I near the house. There is a hedge wall designed as a border along the driveway, and flower beds, and large flowering shrubs leading up to the house. Grapevines creep along the top of a stone wall adjacent to the house.

To enter the house a series of rituals need to be performed as one moves from the outside to the inside. There is a covered stone patio raised about three inches above the gravel driveway that one must step upon before opening the door to the *genkan*.³⁰ The *genkan*, an intermediary space between the outside and the main space of the house, is enclosed by floor to ceiling glass windows that look out to the front of the house. It is slightly cooler in this room than outside. Here guests can leave their coats and belongings in a cabinet and then sit on a wooden stool to remove their shoes. After performing this ritual, I step up three inches to a wooden door before entering into the main living space of the house.

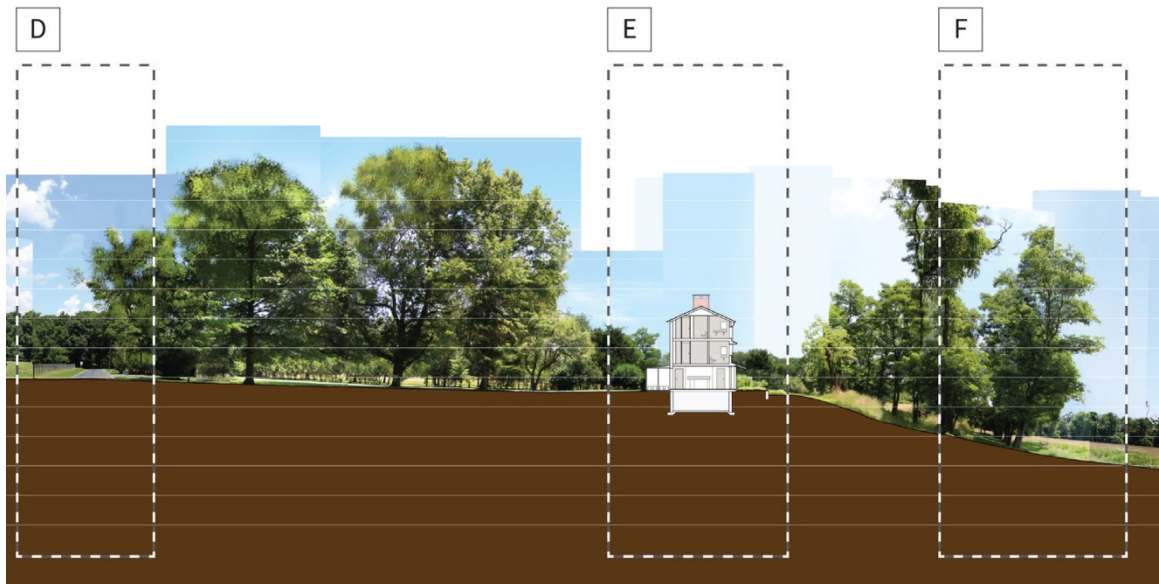


Figure 13: Site Transect Showing Threshold D to F

The road meets the front yard with its many specimen trees and the Raymond farmhouse, which meets the backyard with its allée of black locust trees. The allée of black locust trees standing in the mown grass meet and transition into a wetland meadow. (This image is an enlargement from Figure 9)

Source: Sonya Shapoval, author

I feel the difference in this space immediately. It is much darker inside, but the large glass doors that span the wall directly across from me illuminate the room. The ceiling is low, which helps to pull me into the view beyond the windows. Once I regain my bearings, I notice a staircase leading upstairs to my right and an assortment of tables with books and art displayed to my left. Large fireplaces bookend the room. Both the ceiling and floor are clad in wood paneling. The walls are covered in white stucco, lightening and enlarging the space. To the far right, the room is much darker with its back wall clad in wood and a slightly lower ceiling. A section of the ceiling is open to the floor above, allowing light to enter the space from a line of windows.

As my feet pad across the room my steps echo off the hard surfaces. When I slide open the glass door, I step down onto a grass patio. The sounds of a farm return:

chickens squawk and cluck, the cicadas hum, the songbirds sing. This grass patio is elevated, giving me a view framed by black locust (*Robinia pseudoacacia*) trees. I can see the ponds, nestled in a sea of tall grasses, in the valley below. The locust trees are planted in a double row, which appears very architectural in terms of their spatial arrangement, but the physical form of each plant is natural. The trunks are gnarled and lean over with the steep slope of the land.

The shade here is pleasant, dappled by the sun shining through the small leaves of the black locusts with added sun reflecting off the ponds, but it abruptly ends at the edge of the tree line. The short, mown grass ends where the ground becomes wetter. The grasses become much taller and wilder, transitioning into a wetland meadow and reaching above my waist. There is a mix of herbaceous plants in the grasses within the meadow along with various insects and birds.

It is much hotter and more humid here. There is no relief from the bright sun and I need to work harder to make my way through the mix of grasses and the occasional thorny plant.

My boots squish as I make my way between two ponds; it feels as though the water within the ground is evaporating from under me while sweat drips down my face. Here the vegetation becomes shorter once again. Spiky yellow and blue irises grow along the banks of the ponds, adding bold color and texture to the scene. The ponds are beginning to grow algae, but it doesn't seem to bother the great blue heron I spy enjoying the water before it flies away.

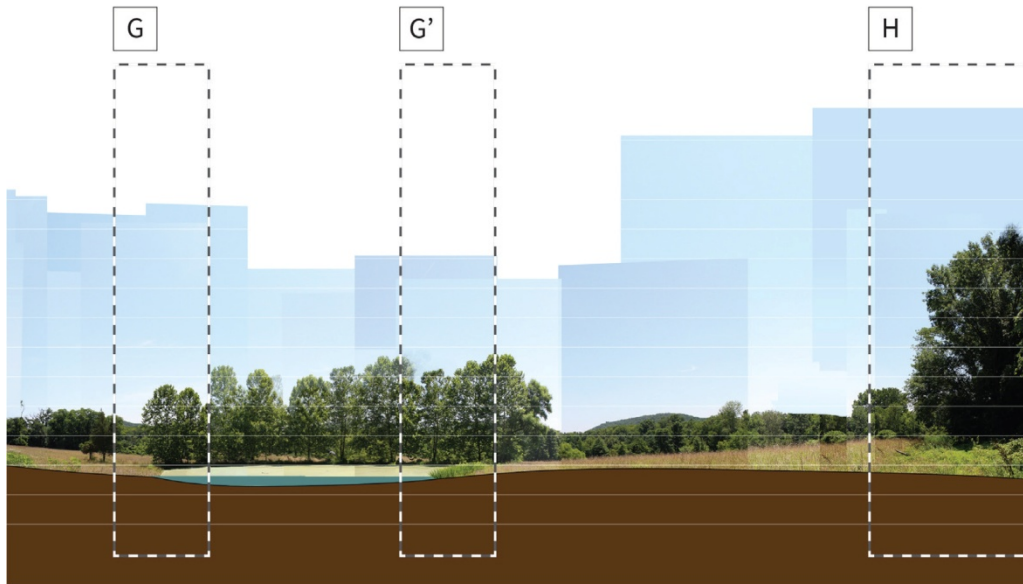


Figure 14: Site Transect Showing Threshold G to H

Within the wetland meadow are two man-made ponds north of a woodland. The land is higher and drier near the woodland. (This image is an enlargement from Figure 9)

Source: Sonya Shapoval, author

The ground begins to ascend as I make my way away from the ponds and towards the southern tree line. As the ground becomes drier, the grasses become taller. It is still incredibly hot and I long for the shade.

Meadow grasses transition to brambles. The trees here do not have wide-spreading branches, so I don't enjoy the cooler temperatures found in the shade until I am within the tree line itself. Unlike in the woodland with the stream, the ground here is much less sloped. I see a few deer grazing, before they dash away.

Moving through the successional meadow and wetland meadow required determination and effort on my part to cross. This was in part due to the absence of a path and the density of the vegetation.

Diagrammatic Analysis of my Experience

Referencing the data and observations taken when exploring the Raymond Farm, I created sections of the thresholds I discovered. These sections illustrate the spatial and ecological characteristics of multiple spaces and the edges where they meet. Notations include: slope, light, wind, temperature, water, canopy trees, shrubs, herbaceous, native and non-native plants, soil, and structures. A plan notating the location of these thresholds can be seen in Figure 15. Tables that easily convey this information are located in Appendix B.

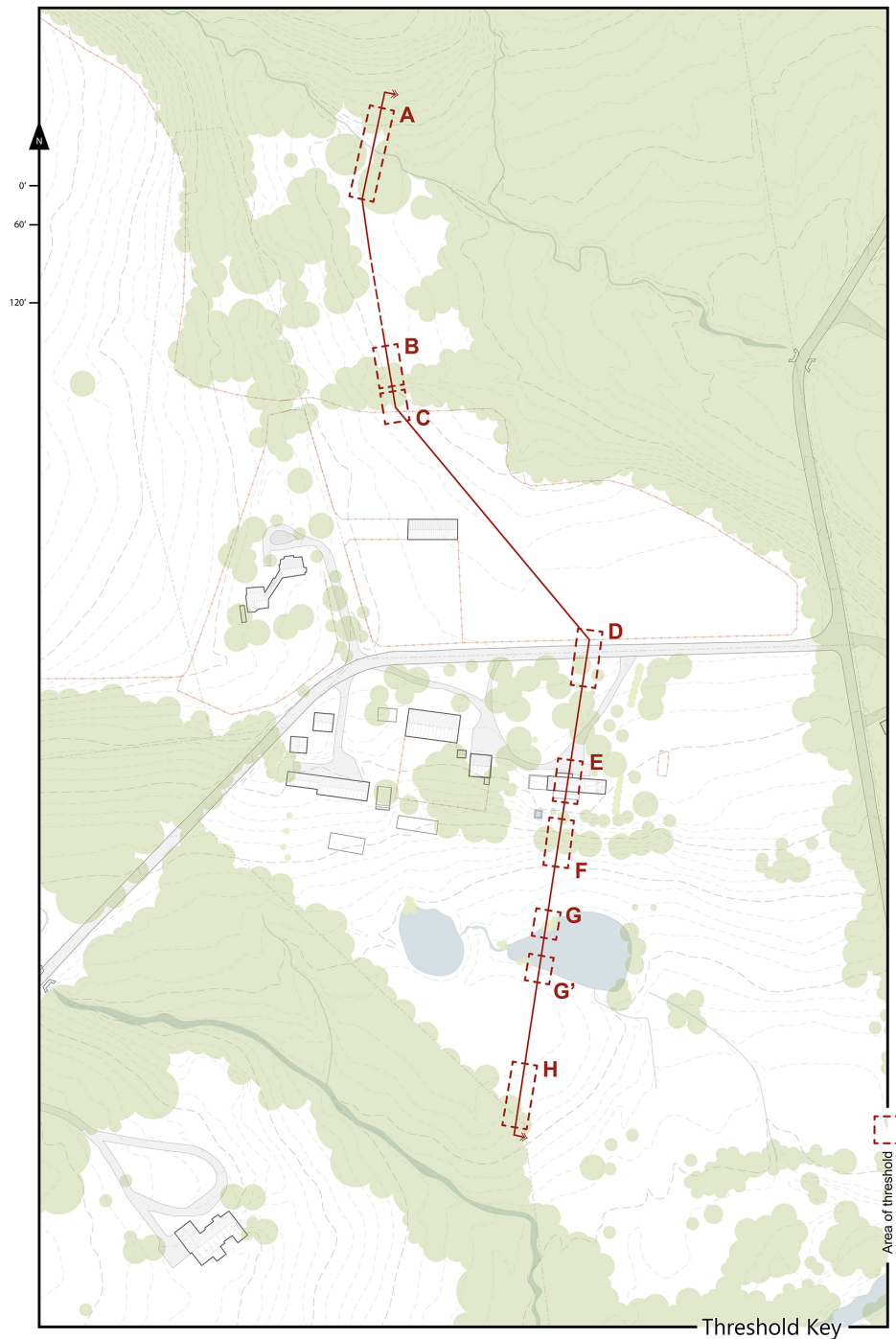


Figure 15: Existing Threshold Key Plan

The location of the existing thresholds are outlined in dashed boxes and labeled: Woodland Stream Corridor/Successional Meadow (A), Within Woodland Edge (B), Woodland Edge Meets Pasture (C), Road Between Pasture and Farm House (D), Raymond Farm Center (E), Under the Black Locust Canopy (F), Wetland Meadow/Pond (G/G'), Meadow/Woodland Edge (H).

Source: Sonya Shapoval, author

Threshold A - Woodland Stream Corridor / Successional Meadow

In the existing conditions plan in Figure 16, the threshold is indicated by the dashed box along the site transect line. You can see two streams running through the woodland before they join on the bottom right of the plan. This threshold touches both the woodland stream corridor and successional meadow.

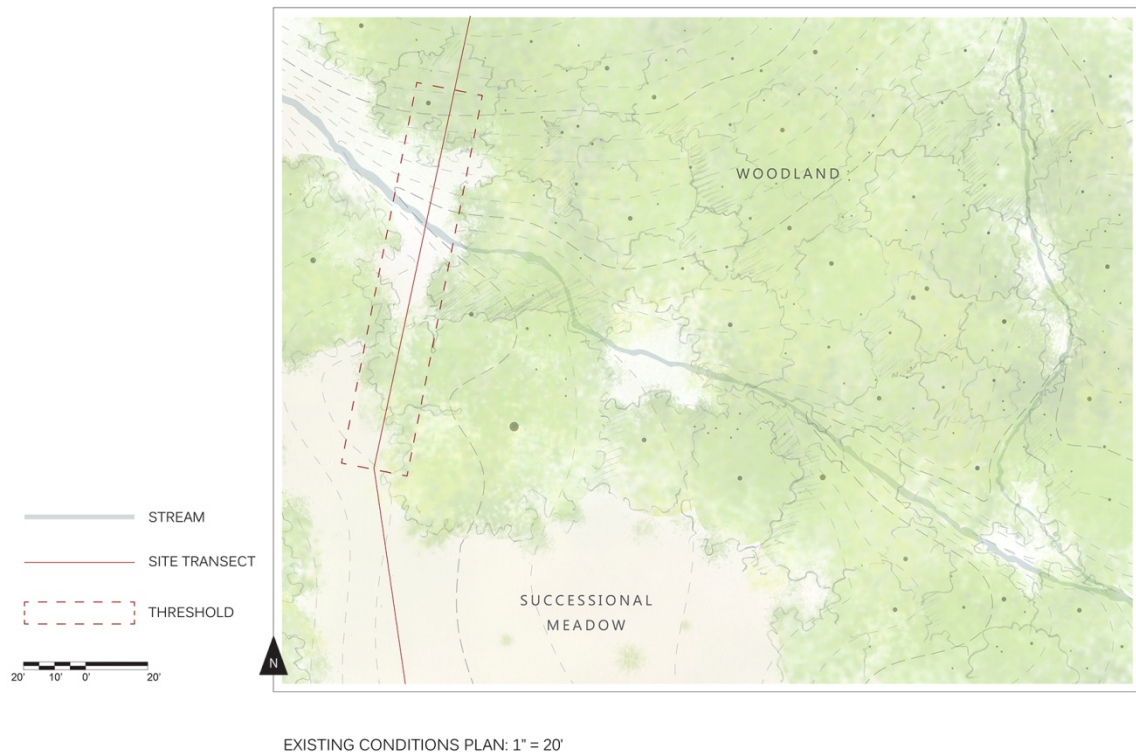


Figure 16: Existing Conditions Plan of Threshold A

Threshold A spans both the woodland stream corridor and successional meadow. Within the woodland, two streams can be seen joining on the right of the plan.

Source: Sonya Shapoval, author

The Idealized Edge Abruptness diagram seen in Figure 17 shows how the ecological edges within this area meet and overlap. The canopy of the woodland overlaps both the stream corridor and meadow while also separating the two. The stream and its banks have their own ecological corridor, creating a break in the woodland that is

visible from the ground. The easiest direction for fauna movement is along the woodland edge or stream corridor, while secondary movement can be seen running perpendicular to the main paths of movement. These secondary paths take advantage of small breaks between trees, shrubs, and brambles of the woodland floor.

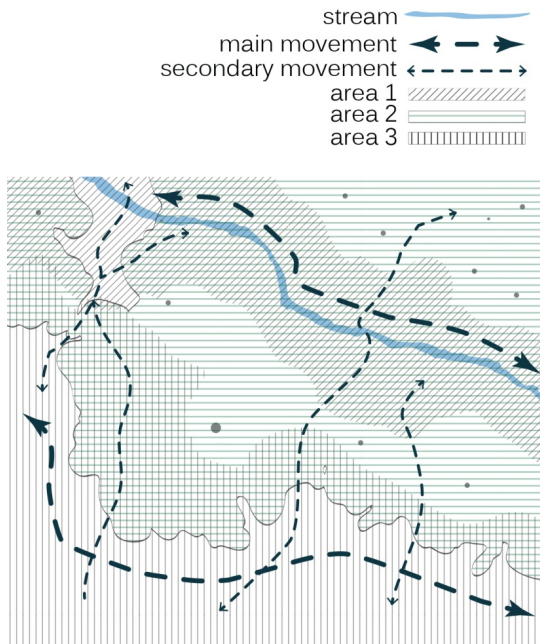


Figure 17: Threshold A Idealized Edge Abruptness Diagram

This diagram shows the edges and movement through the different ecological areas within Threshold A. The canopy of the woodland overlaps the successional meadow and herbaceous plants of the stream corridor. The main path of movement follows the stream and tree line, while secondary paths pass between the trees into and through the woodland.³¹

Source: Sonya Shapoval, author

After compiling the physical data and observations, the contrast between the spaces was more apparent. The density of the forest, with its clinging, invasive vines, is easy to see in Figure 18, while the dense mass growing along the stream and sometimes up the trees is a diverse mix composed of wild blackberry (*Rubus spp.*), Japanese honeysuckle (*Lonicera japonica*), mile-a-minute (*Persicaria perfoliata*), and wineberry

(*Rubus phoenicolasius*). An old black walnut tree (*Juglans nigra*), over 60 feet in height, extends its branches over the successional meadow, taking advantage of the sunlight and open space. Mulberry (*Morus spp.*) saplings grow in the meadow with a mix of other native and non-native flora species. Some of these include mountain mint (*Pycnanthemum muticum*) and milkweed (*Asclepias spp.*) along with many invasive species such as multiflora rose (*Rose multiflora*), autumn olive (*Elaeagnus umbellata*), and wineberry (*Rubus phoenicolasius*). The presence of birds within the woodland is apparent by the sound of their song; birds can be seen flying back and forth from the meadow to the canopy edge. It is important to note that, although most of these plants are non-native, this area is a successful habitat for birds. Non-native plants, however, do not support many species of native insects, which birds rely on as a major part of their diet.

The shade within the stream corridor provides a desirable place to find relief in summer with the temperature four degrees cooler than within the successional meadow. It is also interesting to note the depth of the soil before reaching bedrock is 18 to 28 inches. It is even less within the stream itself.

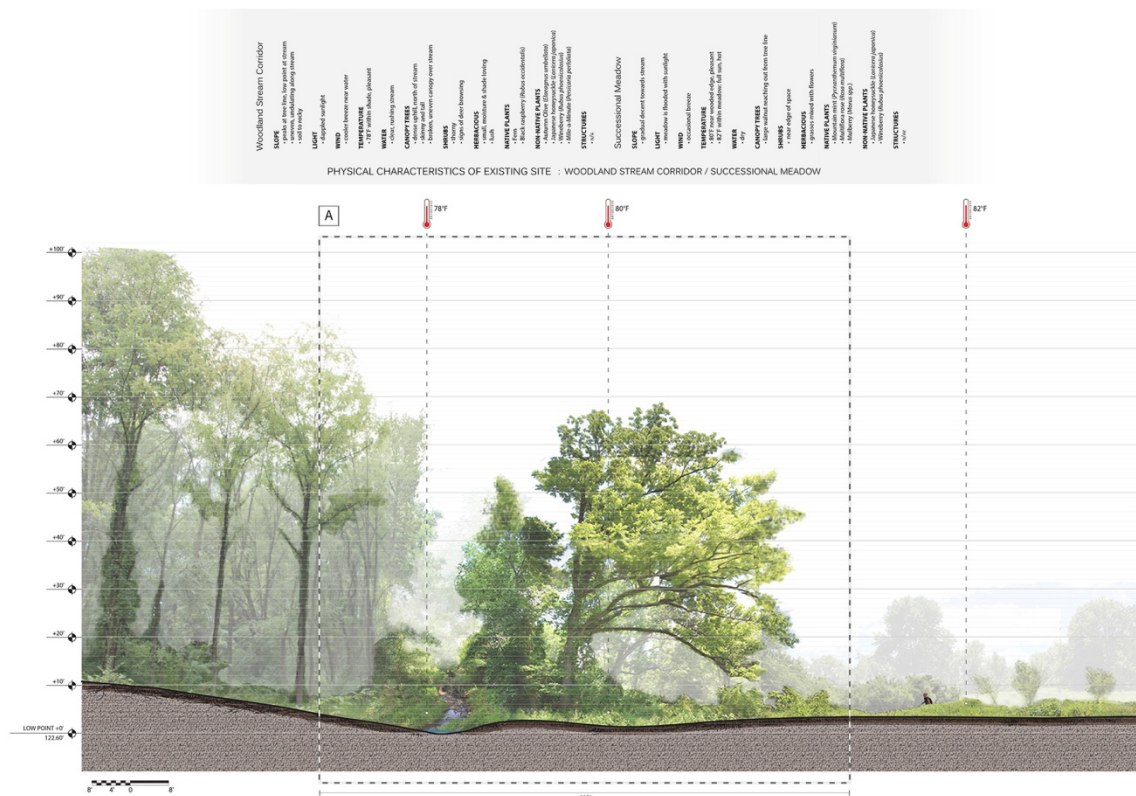


Figure 18: Enlarged Section of Threshold A

Threshold A is located within the dashed box, which is about 110' wide. Invasive species can be seen climbing and choking the woodland trees, while a 65'+ tall walnut tree reaches over the successional meadow. Although one of the most lush areas of the property, the soil is thin and the closest to bedrock.

Source: Sonya Shapoval, author

The slope on either side of the stream is declining towards it, gathering water from the surrounding area. The water of the stream runs clear, providing habitat for small trout and water to drink for the fauna in the area.

Threshold B/C-Within Woodland Edge / Woodland Edge Meets Pasture

Moving south along the transect line, we find ourselves at Thresholds B and C: within the woodland edge and where the woodland edge meets the pasture. Located between the successional meadow and a fenced pasture, there is an eight to ten foot wide mown strip between the woodland edge and fence line.

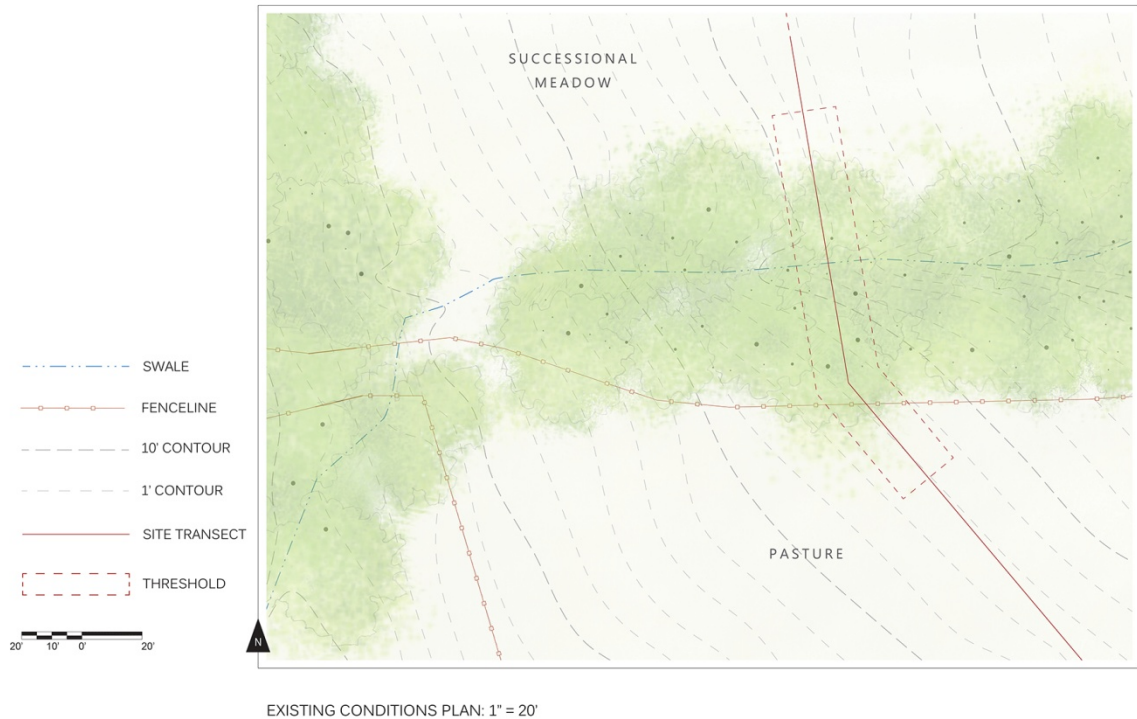


Figure 19: Existing Conditions Plan of Threshold B/C

The woodland edge can be seen bisecting the successional meadow from the fenced pasture. Running through the woodland edge is a swale, which directs water captured around Charlotte Raymond's residence.

Source: Sonya Shapoval, author

As can be seen within the ecotone diagram in Figure 20, the main line of movement is along either side of the fence line. This is where there is the clearest path with the lawn being mown. The space between the fence line and the woodland is emphasized more as a path of movement with the side opposite the fence bordered by vegetation. Secondary paths move through the woodland where gaps in the vegetation occur. One of these gaps through the trees is much wider due to its use as access during the hunting season in the autumn and winter months. During the spring and summer months foliage grows and fills out this space making it hard to identify, but it is still an accessible space inviting entry and movement.

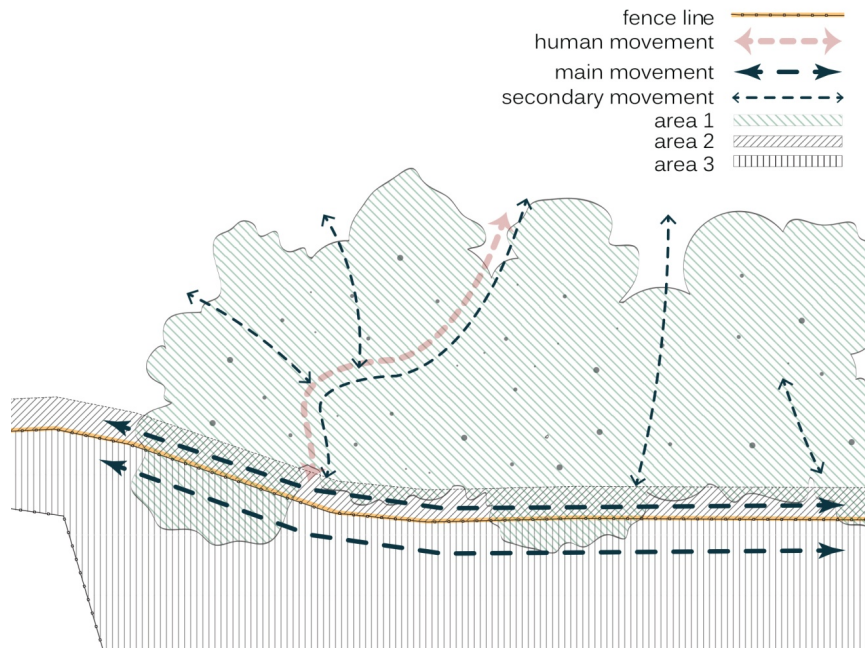


Figure 20: Threshold B/C Idealized Edge Abruptness Diagram

This diagram shows the overlap of the tree canopy over the mown grass path and pasture. The mown path and pasture have distinct vegetative differences due to the fence line. The maintained fence line is also the reason for the main line of movement, while secondary paths pass through the woodland edge.

Source: Sonya Shapoval, author

The temperature difference within the woodland and the space along the fence is not as apparent. Invasive vine species, like Japanese honeysuckle, are also abundant here, adding to the shade within the woodland edge where it is darker than the stream corridor due to the trees growing closer together. The contrasting characteristics of the woodland and pasture is apparent when standing between the two: the woodland is much more wild and dense, while the pasture is heavily managed with a clear sightline towards the farmhouse. If the wind is angled correctly you can smell the scent of horses and farm. Here the soil is Reaville channery silt loam, extending 32 to 42 inches deep before reaching bedrock.

Deer can be seen passing through this threshold where the woodland is thin, but birds are not as plentiful or vocal here. It is likely that the more vocal songbirds, which prefer living within larger woodlands and not at the edge, prefer the stream corridor with its water and larger woodland.

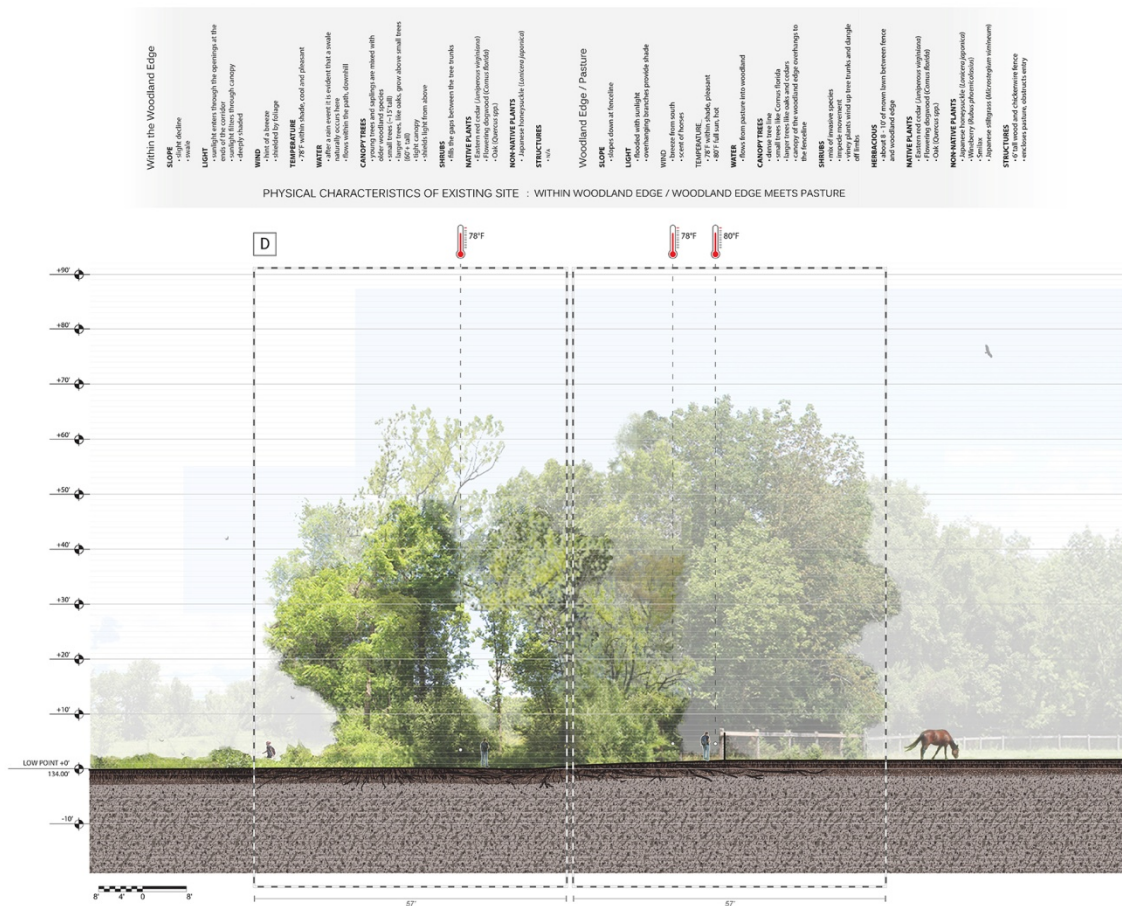


Figure 21: Section of Threshold B/C

Together, these two thresholds are 114' wide. The contrast of the areas on either side of the trees is emphasized by the transition through the thresholds. Lighting, temperature, sounds, smells, and vegetation vary on either side of these woods.

Source: Sonya Shapoval, author

Threshold D - Road Between Pasture and Farm House

The threshold encompassing Pidcock Creek Road and the space adjacent to it is easiest to identify when comparing the ground surface. The mown lawn along the pasture's fence

line receives more sun and is drier than the lawn on the opposite side of the road under the trees. There the lawn is lush. In between is the road with its surface of asphalt: impermeable, hard, and soaking up heat from the sun. The texture of each surface is different as well as their hardness, temperature, and sound created when stepped over.

Similar to the clear path between the fence line and woodland in Threshold C, Threshold D has a clear line of sight and movement along the roadway that is perpendicular to the site transect line. This openness is pronounced alongside the trees that grow up to and over 80 feet tall. The contrast of the vertical openness within the road compared to the space beneath the trees is strengthened by the amount of sun that reaches the road. The shade cast by the tree canopy insulates and shrinks the space adjacent to the road.

Although unseen, the soil horizons beneath the surface drastically shift within this threshold. North of the road the soil is Brownsburg silt loam (BsB) and extends approximately 55 to 66 inches deep before reaching bedrock. This soil type then shifts to Klinesville very channery silt loam (KIE) beneath the road and towards the house. At this point the bedrock horizon shifts to 18 to 28 inches below ground level, much closer to the surface, compared to the Brownsburg soil. With the bedrock being closer to the surface, tree roots have less room to easily spread deep into the ground and instead need to extend their roots further out, closer to the surface.

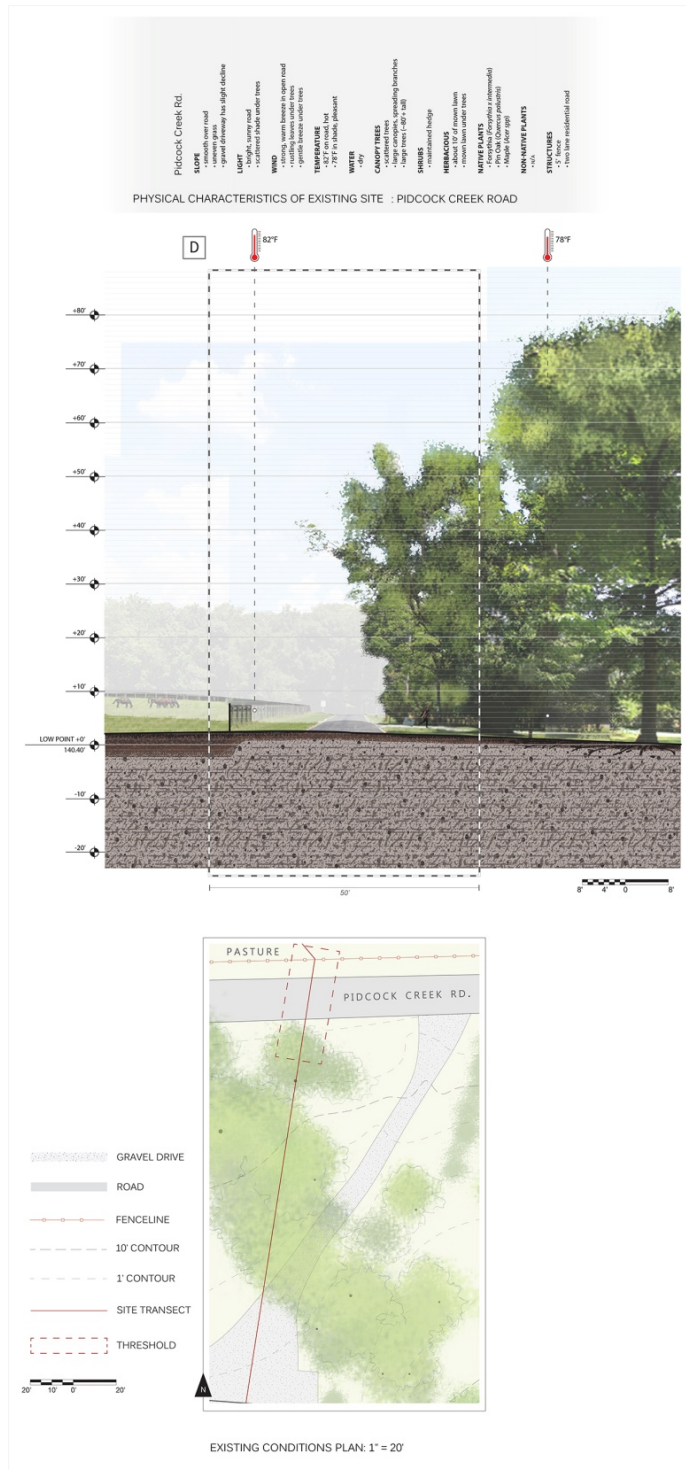


Figure 22: Threshold D - Road Between Pasture and Farm House

The transitions within this threshold are much more abrupt and defined than those in previous thresholds. The change in material and texture of the road contrasts with the vegetative surroundings. The openness and difference in light within this threshold are also noteworthy, as seen in the enlarged section.

Source: Sonya Shapoval, author

Threshold E/F - Raymond Farm Center / Under the Black Locust

Canopy

Unlike the rest of the thresholds within the site transect, Threshold E is the only threshold that includes a building: the Raymond Farm Center, which is the modified 1728 farmhouse and its immediate surroundings (Figure 28). Since the farm house's inception, many additions and modifications had been made with the change in ownership. Most of these additions were stripped away from the house by Antonin Raymond to expose the original character and basic form of the colonial Quaker farmhouse. The original stonework was left exposed on the exterior of the house, while the interior walls were plastered over with stucco and painted white. New living spaces were created by "either [carving] out of, or [adding] to, [the] existing fieldstone shells."³² The main staircase was moved to open up the first floor living space and the entirety of the central portion of the rear facade was removed and redesigned to allow for more light to enter the building and take advantage of the pastoral views. The sliding glass doors and windows added light that helped to elongate what were once dark rooms with low ceilings. *Shoji* screens and *fusuma* panels helped to divide space and diffuse light. These elements of Japanese design "brought lessons from Japan to the New Hope context." "Materials [were] salvaged from existing structures, [which] added richness to the designs while exercising an economy of means."³³

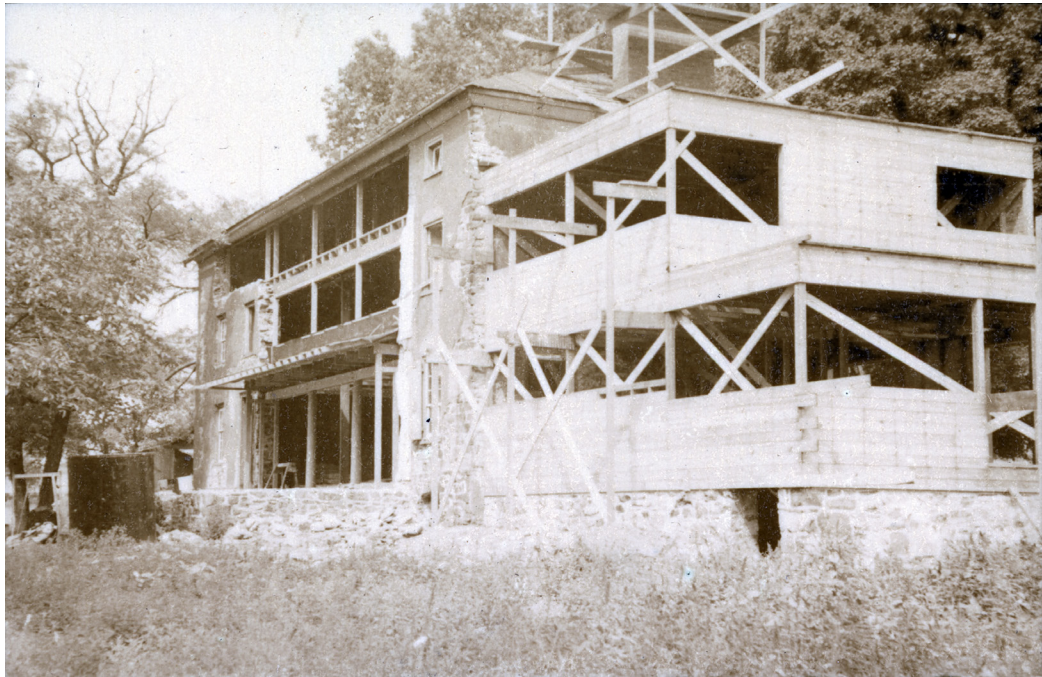


Figure 23: Raymond Farm House Undergoing Modifications, 1939

Seen in the photograph are the framing and supports installed during construction that will hold the new sliding glass doors and windows.

Source: Masanori Sugiyama Collection, The Architectural Archives, University of Pennsylvania.

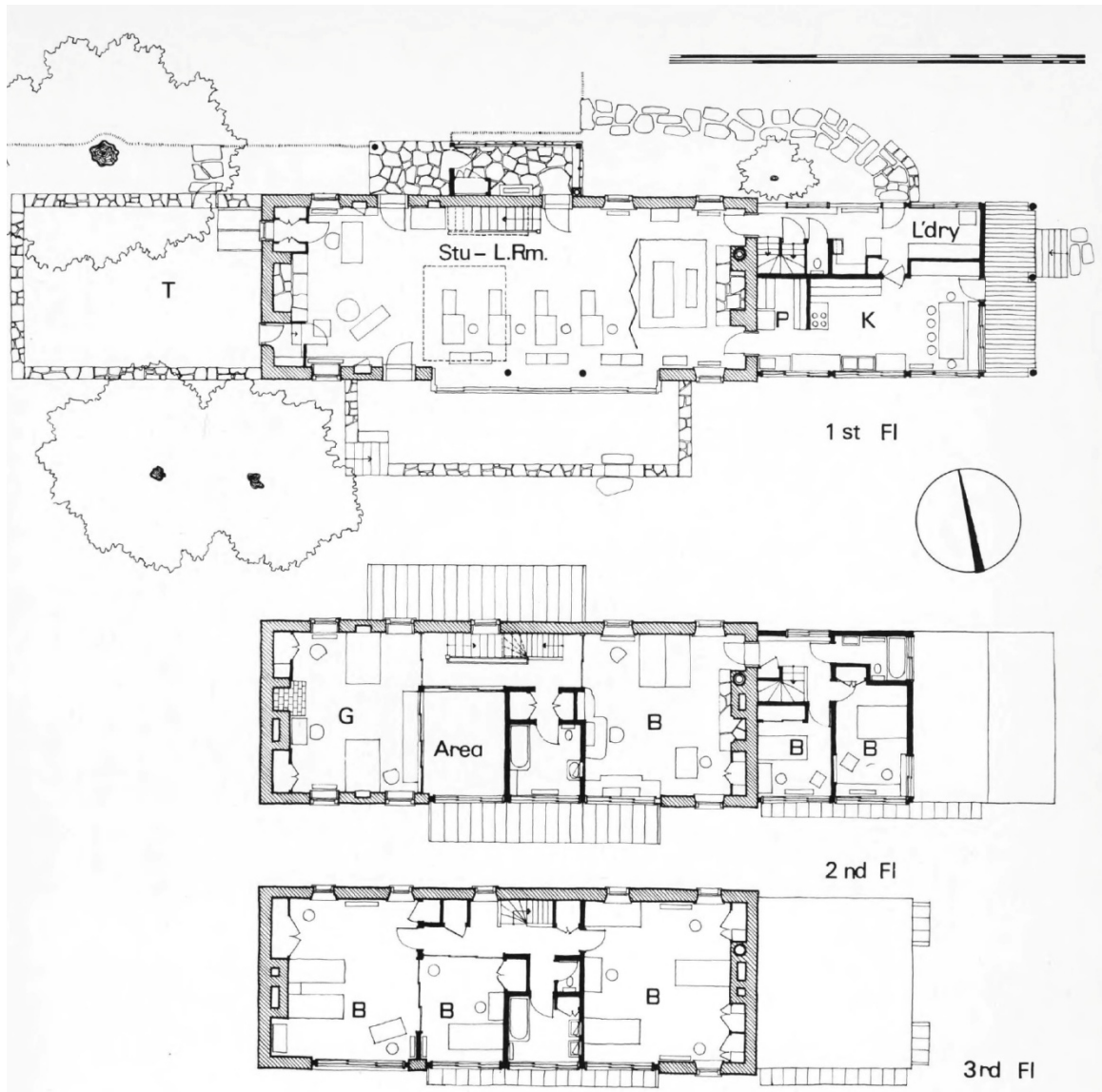


Figure 24: Floor Plans of Raymond Farm House

The plan of the Raymond Farm House as designed by the Raymonds. Bedrooms accommodate both the architects and their apprentices while the main living area on the first floor shows space for drafting tables.

Source: Raymond, Antonin. *Antonin Raymond: An Autobiography*. Rutland, Vt: C. E. Tuttle, 1973, 175. Antonin and Noémi Raymond, The Architectural Archives, University of Pennsylvania.

The placement and design of the furniture in the main room of the house, on the first floor, enhances the view of the wetland meadow that is visible through the floor to ceiling windows. Being the largest living and gathering space, it has the greatest capacity

for light to enter the room. On the second floor the windows begin about three feet above the floor, a height that allows someone washing their hands at the sink or standing in the shower to easily enjoy the view of the landscape. On the third floor of the house the sliding panel windows rest on the floor and reach about four feet high, allowing someone resting in bed or taking a bath to gaze out the window. There are also chairs and a couch that are designed with low seats that allow for those gathered to enjoy the view while seated. All views are focused to the rear of the house as the front windows remain small and have *shoji* screens muting their light.



Figure 25: Furniture in Relation to the Windows of the Raymond Farm Center

Similar to Japanese furniture design, the chairs and couches were designed with the seat low to the ground. This design allows for those seated to be able to look out the window and see the pond and surrounding landscape. Shown in the photographs are a sitting area and bedroom on the third floor.

Source: Sonya Shapoval, author

A portion of the second floor is open to the living room below, creating a light well to shine into an area that would otherwise be very dark as it is far enough away from the sliding glass doors to seem cavernous.



Figure 26: Two-Story Light Well within the Raymond Farm Center

The two-story light well allows additional light to shine into the main living area of the farmhouse.

Source: Sonya Shapoval, author

At the rear of the house, the sliding glass doors open to a raised grass patio that is 18 inches high. It both helps to transition the interior space outside, creating a gathering space, and to soften the verticality of the architecture before stepping down to the adjacent lawn and landscape. In the section (Figure 27) the elevation of the house is apparent with it sitting at the top of the hill, looking out over the wetland. The Raymond Farm Center is a 30 foot tall building with some of the trees surrounding it reaching over 100 feet.

The Raymond Farm Center is an old building standing 30 feet tall, making it appear small beneath the trees that can reach over 80 feet, like the black locust. The house is situated to look out at the landscape with its windows and sliding glass doors providing views through the trees and of the pond beyond.

Unlike the rest of the site, the landscape surrounding the house consists of a mown lawn, gravel driveway, large specimen trees with wide canopies, and formal plantings consisting of flower beds and trimmed hedge rows. A mix of native and non-native flora species planted include: peony (*Paeonia spp.*), Solomon's seal (*Polygonatum odoratum*), astilbi (*Astilbi spp.*), elephant ears (*Colocasia*), pin oak (*Quercus palustris*), white ash (*Fraxinus americana*), and maple (*Acer spp.*). The majority of trees behind the house are black locust (*Robinia pseudoacacia*), the compound leaves filter the strong summer sun creating dappled sun and shade. Over 70 feet tall, these trees keep the house cool, while framing the view between their gnarled, twisting trunks.



Figure 28: Existing Conditions Plan of Threshold E/F

Leading up to the house is a gravel driveway with native and non-native specimen trees planted in the front lawn. Clustered near the Raymond Farm Center are a barn, chicken coop, garage, and small vegetable garden. The house looks over the wetland meadow, which is more obvious in the enlarged section (Figure 28).

Source: Sonya Shapoal, author

Threshold F, located immediately south of Threshold E, contains an allée of black locust trees and spans not far from the rear of the house to include the edge of the wetland meadow. The linear planting of the black locust trees mimic the orthogonal lines of the architecture. In the spring the black locust trees have cascading, fragrant white flowers that adds beauty to the view.

The southern edge of this threshold is most easily defined by the tall meadow grasses growing at the edge of the lawn. In this area the soil shifts from a Klinesville very channery silt loam (KIE) with bedrock beginning 18 to 28 inches below the surface to a Doylestown silt loam (DdB) that has loamy soil extending beyond 65 inches below the surface with no record of how deep the bedrock is. The "line" where this edge occurs

is evident in the topography. This shift in soil type and transition into wetland occurs at the approximate location of elevation 107.

Threshold G/G' - Wetland Meadow / Pond

After frequent rain and before the high heat of the summer sun arrives, the ground of Thresholds G and G' retain water well. While walking into this area, the water can be heard, felt, and seen. This soil's capacity for water retention is due to the soil being Doylestown silt loam (DdB), which has silt loam soil extending beyond 65 inches. This water retention also makes this area very humid on hot days when the sun evaporates the water in the ground and within the pond.



Figure 29: Existing Conditions Plan of Threshold G/G'

Some time before 1956, the Raymonds added two man-made ponds to the site, which are situated within the wetland meadow behind the house. Large American sycamore (*Platanus occidentalis*) are planted at the east end of the large pond. Water fowl are attracted to the ponds throughout the seasons.

Source: Sonya Shapoval, author

Threshold H - Meadow / Woodland Edge

Within this threshold the wetland meadow becomes a dry meadow that then transitions to a woodland. Between the meadow and woodland the existing flora palette shows signs of succession. Woody plants and brambles like wineberry (*Rubus phoenicolasius*) and multiflora rose (*Multiflora rose*) are visibly encroaching into the meadow grasses. Other invasive plants, like mile-a-minute (*Persicaria perfoliata*) are also present.

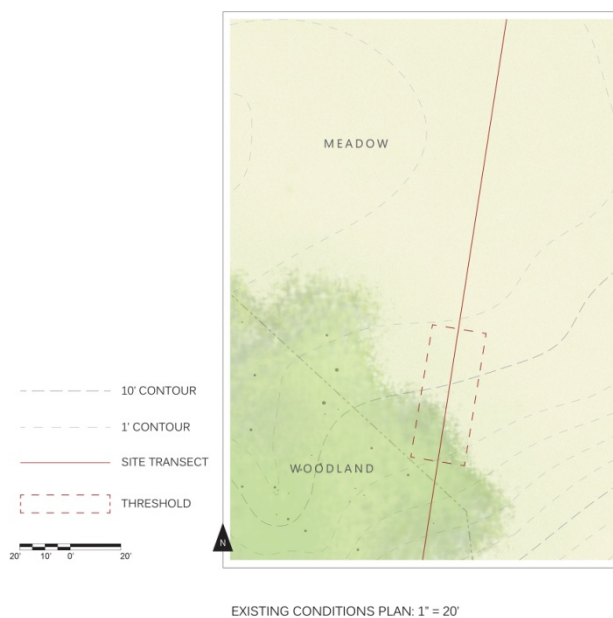


Figure 31: Existing Conditions Plan of Threshold H

At the southern edge of the property is a woodland with an understory of brambles that transition into a meadow. The rise in elevation near this edge, allows vegetation requiring drier feet to flourish.

Source: Sonya Shapoval, author

Unlike the woodland to the north in Threshold B/C, the woodland here has little to no reaching branches over the meadow. This requires someone to stand directly under a tree to find shade along the meadow, compared to finding shade within the woodland where the vegetation is left alone to spread naturally.

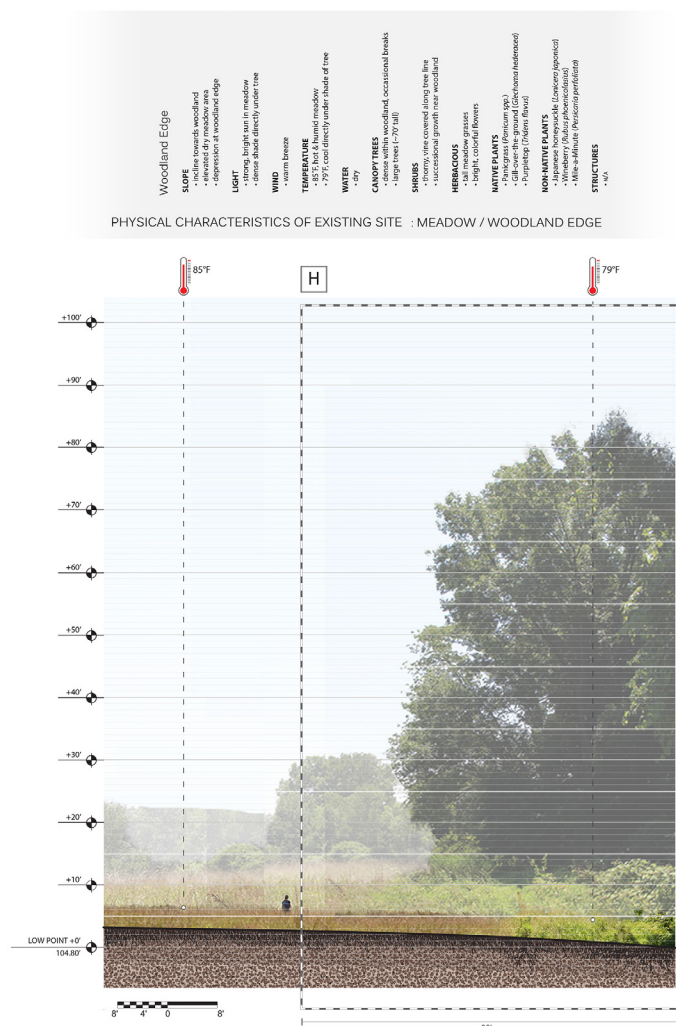


Figure 32: Section of Threshold H

A dry meadow transitions to woody plants such as multiflora rose (*Multiflora rose*) and wineberry (*Rubus phoenicolasius*), before the trees of the woodland begin.

Source: Sonya Shapoval, author

When all of the physical characteristics for each threshold are placed side by side it is much easier to compare them. This information can be found in Appendix B, where there is a table cataloging the physical characteristics for every threshold.

V. Enhancing Experience through Design

Following my study of the landscape at the Raymond Farm as it changed with the seasons, I have come to the conclusion that a design for this site should be subtle in its presence and materiality. I do not feel that this is a place where someone comes to experience a "Kodak moment" - a singular, specific scene that someone travels to see. There is too much to see here within the many nuances of the landscape that is the Raymond Farm. With seasonal change, a shift in the angle of the sun, a spike in temperature, or a rainstorm, the landscape is a different place from day to day. Instead, just as my experience and views were guided by my personal interests, the design seeks to provide every individual with just enough guidance to have their own fulfilling experience where they can then walk away remembering seeing, hearing, and feeling something memorable. The places I defined as thresholds form the basis of my intervention.

My designs for the site are located along the site transect within the thresholds that were analyzed in the chapter "Existing Thresholds." The designs focus on enhancing the experience of the visitor as he or she moves between spaces via the threshold, as well as provide access to areas that are currently hard to reach. By enhancing thresholds that are currently indistinguishable to the casual eye through the implementation of subtle design interventions, the intent is to have people pause and reassess their surroundings. By taking an extra moment the visitor may experience something new and reconnect with the landscape. At a time when social media and electronics monopolize most of our time, these subtle shifts in the landscape encourage visitors to slow down and explore.

Some of the designs can be found in the northern portion of my study area, as seen highlighted by boxes A and B in Figure 33, which is the location of thresholds A, B, and C (the woodland stream corridor, successional meadow, and woodland edge). This area has an ecological complexity very different from the rest of the site as it is mostly free of human intervention. Fauna find refuge here while much of the flora that have populated the area are volunteer species.



Figure 33: Master Plan

The locations of the three landscape designs are shown outlined in red boxes. Both the Stream Corridor Retreat (A) and Hidden Woodland Boardwalk (B) are in the northern portion of my study area. The Meadow Boardwalk & Viewing Platform (C) are closer to the Raymond Farm Center, to the south.

Source: Sonya Shapoval, author

Hidden Woodland Boardwalk

The first design is located at Threshold B/C: Within Woodland Edge / Woodland Edge Meets Pasture. Currently, when someone walks along the mown path that follows the pasture's fence line there is no encouragement for them to deviate from their clear path and enter the woodland. The design for this threshold proposes a hidden wooden boardwalk that meanders through the woods to the other side to the meadow. Once across, the visitor can then make their way through the successional meadow and beyond to the woodland stream corridor.



Figure 34: Finding the Hidden Woodland Boardwalk

A woman steps on a stone inlaid into the lawn and stops to inspect her surroundings. She notices a gap in the woodland edge, where, upon further inspection she will find a hidden boardwalk through the trees.

Source: Sonya Shapoval, author

The visitor's rhythmic walk along the fence line and under the occasional shading branch is interrupted by having stepped on something hard, lacking the familiar, uneven softness of the lawn. Looking down, a Pennsylvania Blue stone slab can be seen embedded into the ground. It is light in color and one foot wide by six feet long. Should they take a second glance at the stone and look to where it extends, it will bring their attention to a gap in the woods. Hidden within the vegetation they will find a wooden boardwalk.



Figure 35: Approach to Hidden Woodland Boardwalk

Obscured from immediate view by native trees, shrubs, and herbaceous plants, the boardwalk provides a path through the woodland.

Source: Sonya Shapoval, author



Figure 36: View From the Hidden Woodland Boardwalk

While walking along the boardwalk, the view to either side is of a healthy native woodland. Creeping phlox (*Phlox stolonifera*) makes a purple carpet while mayapple (*Podophyllum peltatum*) and ferns are scattered throughout. Native azalea, laurel, and viburnum border the boardwalk, providing a buffer to distract the visitor from seeing how high the boardwalk is elevated.

Source: Sonya Shapoval, author

The boardwalk meanders through the woods, urging the visitor to uncover the mystery of where it leads. It is a raised boardwalk, sloping down in elevation while gradually raising the visitor a few feet above the woodland floor. After walking along a second tight curve in the boardwalk the path straightens out and steepens. Light shines through an opening in the woodland; the end of the boardwalk is near. When the visitor leaves the shade of the woodland, a cluster of tall shrubs border the boardwalk before the transitioning into successional meadow grasses and other flora. The surroundings have

gradually decreased in size, becoming less encompassing before the visitor steps off the boardwalk onto a stone slab. It is similar to the stone the visitor crossed at the beginning of the journey through the woodland. A mulch path then cuts through the surrounding successional meadow guiding the visitor to the next destination at Threshold A.



Figure 37: Plan of Hidden Woodland Boardwalk

Two stone slabs, six feet and eight feet, are inlaid into the ground four feet apart. The longer stone slab extends into the shrubbery of the woodland edge. Should someone walk along the slab they will find a larger 4 by 5 foot stone slab extending into a boardwalk hidden in the trees. The boardwalk meanders through the woods, coming out between tall shrubs followed by a successional meadow, and finally ending at a mulch path.

Source: Sonya Shapoval, author

Stream Corridor Retreat

Following the paths through the meadow will lead the visitor to Threshold A: The Woodland Stream / Successional Meadow. Here the design is minimalistic with the intention not to distract from the richness of the space and to protect the ecological sensitivity of the place.



Figure 39: Plan of Stream Design

Due to the sensitive herbaceous vegetation within the woodland stream corridor, the design for this area is minimal in its intrusion. Stepping stones act as the path to guide the visitor along the stream, while a raised platform is made of an old tree slab sourced from within the site.

Source: Sonya Shapoval, author

When approaching the woodland stream area from the mulch path through the successional meadow, a visitor will come across a large stone embedded into the ground before the mulch path dissipates. Not too far from this point a gap in the understory vegetation, vines, and trees exists. There the visitor will find a narrow stone slab bridge,

about two feet in width, spanning the stream. As they near it, they should see a raised platform on the opposite bank of the stream that is positioned on higher ground. Should they cross the stone bridge and approach the platform they will see that it is a functional work of wooden craftsmanship. Like the live edged tables and benches created by George Nakashima, this platform shows the age, character, and life of a tree in its exposed life lines and craggy edges where the bark has been peeled away.

Taking a seat on the platform the visitor is raised above the stream. Protected within the shade cast by the canopy above and cooled by the breeze passing over the water, this is a prime place to relax and soak in the bird song and buzz of the insects on a hot summer day.



Figure 40: Occupied Wood Platform Looking Over Stream

A visitor can sit and relax on a platform created from black locust (*Robinia pseudoacacia*) wood salvaged from the site and immerse themselves in sight, sound, smell, and feel of the thriving landscape.

Source: Sonya Shapoval, author

Should one be more adventurous after they have rested, they can follow a path of stepping stones along the stream and see where it flows. The stepping stone path is intended to be nondestructive. Visitors should not disturb the streamside flora, of various

ferns that enjoy the moist soil. The visitor will find a few places to stop and sit along the path or to walk down to the water and dip his or her fingers and toes.



Figure 41: Stepping Stone Path Along Stream

A visitor walks along a stepping stone path, guided through a variety of sensitive plants while someone else dips their toes into the stream.

Source: Sonya Shapoval, author

Meadow Boardwalk and Viewing Platform

Moving away from the northern area of the site, the next landscape design is located south of the Raymond Farm Center. It is within the meadow near the wetland ponds and the southern woodland edge. The proposed boardwalk is similar to the construction of

the Hidden Woodland Boardwalk located in the northern area of my study. This design is visible when looking out of the rear windows of the house or sitting around the patio.

When walking down the hill from the house, the mown lawn abruptly stops and tall meadow grasses begin. Should he or she walk along this line of tall grasses, a visitor will find a break in the vegetation where a two foot wide by four foot stone slab rests embedded in the ground. This stone spans along the divide from the Klinesville very channery silt loam (KIE) to the loamy soil of the Doylestown silt loam, highlighting the edge of the wetland soil, which is evident from the surface with the change in flora species and the soil's water retention.

On the other side of the stone a mulch path leads the visitor to a wooden boardwalk that will slowly ascend a safe distance above the ground. As the Meadow Boardwalk slowly bends around the smaller of the two ponds, the boardwalk winds into the southern woodland's edge. Here the shade is a welcome relief from the heat of the sun. Sheltered beneath the tree canopy and surrounded by understory shrubs, the visitor is insulated from their surroundings, only able to see the meadow and Raymond Farm Center if they peak over and through the shrubs. Continuing down the slope of the boardwalk, the shade soon ends and the visitor is once again under the sun, but walking close to the small pond's edge. At a sharp curve in the path, the boardwalk is 30 inches high above a swale with a railing along its curve for those passing by to lean and rest while looking out at the large pond with its edge of sycamore trees. Should one look down, the understory plants near the woodland are now sun-loving wetland meadow plants.

As one continues along the Meadow Boardwalk, the path descends and seems to backtrack before curving once again. When the visitor passes through this curve it is noticeable that there is a change, a subtle threshold. The vegetation is replaced by purple-topped meadow grasses that are noticeably higher than the wetland meadow plants. The boardwalk slowly descends into the fluffy, swaying grasses before the path slightly widens into a low platform, only six inches above the ground. Here the visitor will find a bench in the style of the Nakashima Conoid bench with its live edge. Sitting, the visitor's view will lead the eyes over the grasses of the dry meadow towards the large pond. Here the platform is low to the ground, yet at a higher topographic elevation than the pond; hidden among the swaying grasses is the perfect quiet vantage point to watch as a blue heron lands in the shallow water.



Figure 42: Plan of Meadow Boardwalk With Viewing Platform

Accessed from the base of the Raymond Farm Center, a large stone marks the beginning of the mulch path that will lead to the Meadow Boardwalk. At the boardwalk's terminus is a low platform with a Nakashima inspired bench. When seated the bench is a comfortable bird blind within a sea of dry meadow grasses that looks out over the large pond.

Source: Sonya Shapoval, author

Ecological Improvement and Benefits

The threshold enhancing designs (thresholds A - C and F- H) previously mentioned are designed to reveal the native fauna - the birds, foxes, coyotes, deer, groundhogs, squirrels - and native flora. Currently there is a diverse selection of flora found within these areas, but much of it is non-native invasives, like Japanese honeysuckle (*Lonicera japonica*), wineberry (*Rubus phoenicolasius*), and multiflora rose (*Rosa multiflora*). To address this spread of non-native species that are hindering native fauna growth, the design proposes to rehabilitate sections along the stream, within the woodland edge, and along the southern woodland's edge. By removing invasive plant species native flora will be encouraged to return.

Through the use of conservation methods like those mentioned throughout the book *The Once and Future Forest* by Leslie Jones Sauer,³⁴ it will be possible to see progress made at the Farm over the decades with attention given to these designated sections.

A plant list has been compiled for each design area that not only adds diversity and color to the landscape, but provides a variety of wildlife numerous benefits as well.³⁵ Lists can be found in Appendix A.

In addition to rehabilitating the woodland of Threshold B/C, the design proposes to expand the woodland edge near the Hidden Woodland Boardwalk. Trees would be planted within the pasture (and fenced to protect them from nibbling horses) in a pattern that spreads the woodland edge out as seen in Figure 43. By expanding the woodland

edge, movement between this area and those adjacent is enhanced, attracting more native songbirds, like titmouse.

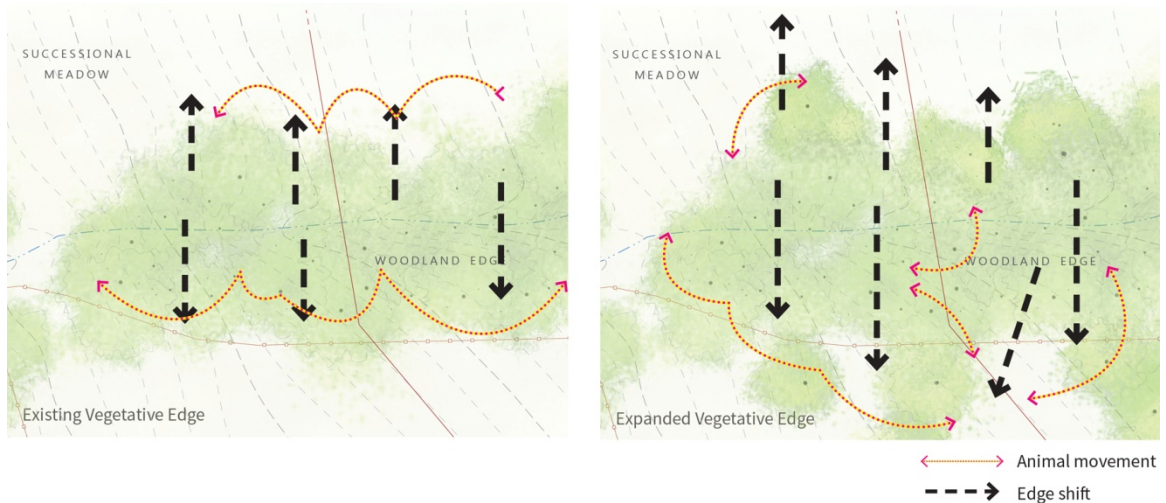


Figure 43: Expanding the Woodland Edge of Threshold B/C

The image on the left shows the existing woodland edge, while the image to the right illustrates the expanded woodland with additional tree and shrub plantings.

Source: Sonya Shapoval, author

A pamphlet can be made available to visitors at the Raymond Farm Center to provide a plan of the trails leading to the designed areas and inform visitors of their various ecological attributes including: bird and mammal species, plant species, and the ecological benefits the plants provide.

Construction Details

The three design interventions all have a set of construction details to some degree with the Hidden Woodland Boardwalk being the most detailed. These details bring the designs into the realm of reality, notating their dimensions, material, and the fastenings or joinery that holds them together. The details of the Meadow Boardwalk are closely related to those of the Hidden Woodland Boardwalk, its change in width, the addition of a railing, and its platform at its terminus the main differences.

The design of the Hidden Woodland Boardwalk was inspired by the clean craftsmanship of both Japanese joinery and timber construction. I chose to use as few fasteners as possible to emphasize the functionality and simple beauty of the construction. This idea came in part from looking at George Nakashima's work, which followed many of the principles of Shakerism.³⁶

Figure 44: L-1 Hidden Woodland Boardwalk Alignment Plan

This alignment plan shows the length or radius of the boardwalk's segments for construction based on the point of beginning being the fence line.

Source: Sonya Shapoval, author

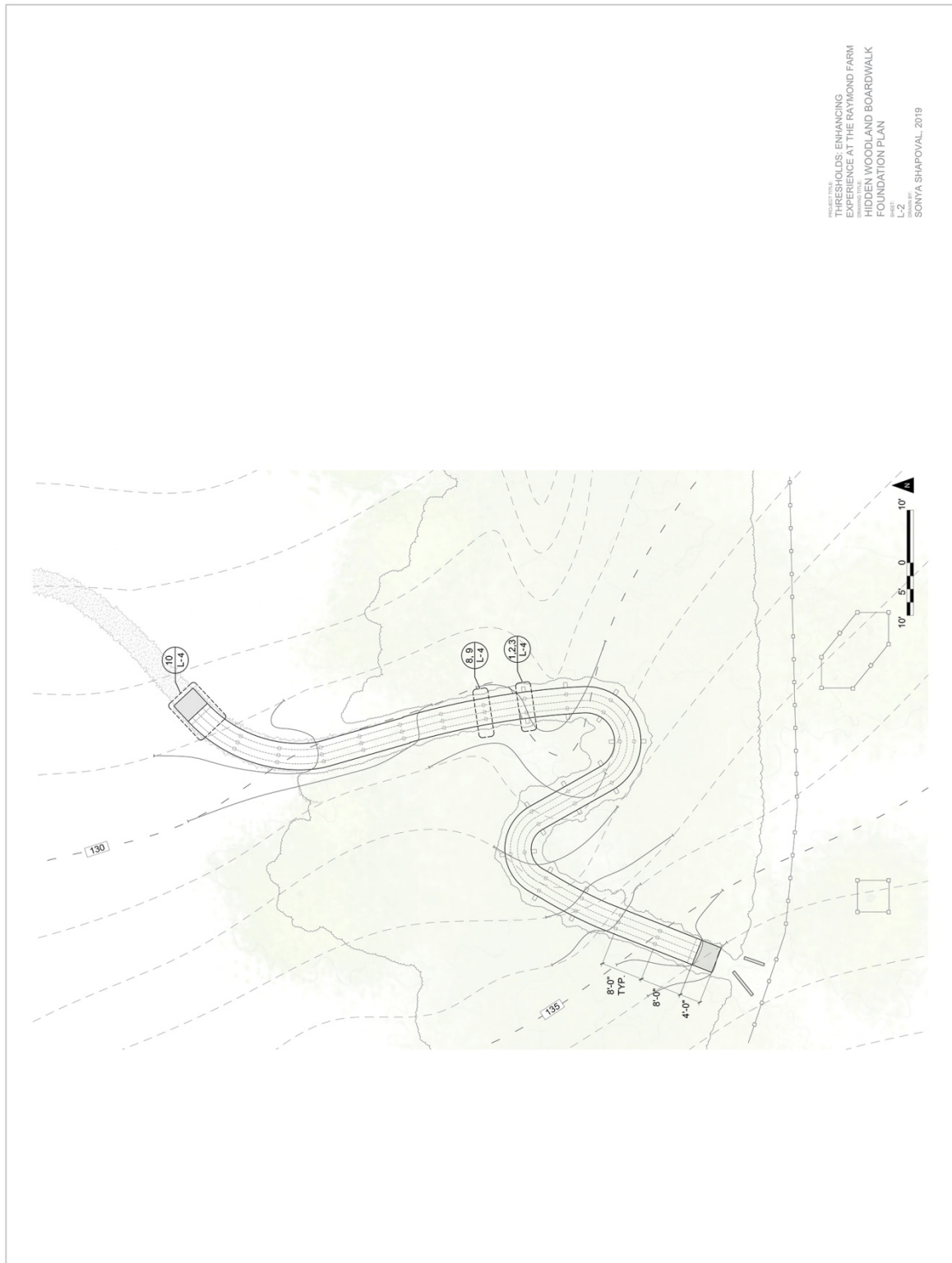


Figure 45: L-2 Hidden Woodland Boardwalk Foundation Plan

This foundation plan shows the location of the footings along the boardwalk and calls out details found on sheet L-4.

Source: Sonya Shapoval, author

This sheet includes a diagrammatic planting plan and plant list for the area immediately surrounding the boardwalk. All plants are native and intended to restore the woodland.
Source: Sonya Shapoval, author

Table 1: L-3 Hidden Woodland Boardwalk Plant List

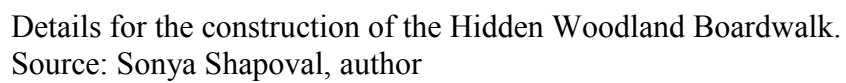
HIDDEN WOODLAND BOARDWALK PLANT LIST (L-3)						
SYMBOL	BOTANICAL NAME	COMMON NAME	HEIGHT	SPREAD	BLOOM	NATIVE
Canopy Trees						
AR	<i>Acer rubrum</i>	red maple	40-70'	30-50'	Mar. - Apr.	x
CF	<i>Cornus florida</i>	flowering dogwood	15-30'	15-30'	Apr. - May	x
NS	<i>Nyssa sylvatica</i>	black gum	30-50'	20-30'	May - Jun.	x
PA	<i>Prunus americana</i>	American plum	15-25'	15-25'	Mar.	x
QA	<i>Quercus alba</i>	white oak	50-80'	50-80'	May	x
RC	<i>Rhus copallinum</i>	winged sumac	7-15'	10-20'	Jul. - Aug.	x
SA	<i>Sassafras albidum</i>	sassafras	30-60'	25-40'	Apr. - May	x
Shrubs						
IG	<i>Ilex glabra</i>	inkberry holly	6-12'	6-12'	May - Jun.	x
KL	<i>Kalmia latifolia</i>	mountain laurel	5-15'	5-15'	Jun. - Jul.	x
LB	<i>Lindera benzoin</i>	spice bush	6-12'	6-12'	Apr.	x
MP	<i>Morella pensylvanica</i>	northern bayberry	5-10'	5-10'	May	x
RM	<i>Rhododendron maximum</i>	great laurel	4-15'	5-12'	Jun.	x
RV	<i>Rhododendron viscosum</i>	swamp azalea	3-5'	3-5'	May - Aug.	x
VA	<i>Viburnum acerifolium</i>	maple-leaved viburnum	3-6'	2-4'	Jun.	x
VN	<i>Viburnum nudum</i>	possumhaw	12-20'	5-12'	Jun. - Jul.	x
Woodland Shrub & Herbaceous Mix - very moist, shaded wood						
CA	<i>Campanulastrum americanum</i>	American bellflower	3-4'	1-2'	Jun. - Aug.	x
DM	<i>Dryopteris marginalis</i>	marginal wood fern	1-3'	1-3'	N/A	x
OS	<i>Onoclea sensibilis</i>	sensitive fern	3-4'	3-4'	N/A	x
PP	<i>Podophyllum peltatum</i>	mayapple	12-18"	12"	Apr. - May	x
RM	<i>Rhododendron maximum</i>	great laurel	4-15'	5-12'	Jun.	x
RV	<i>Rhododendron viscosum</i>	swamp azalea	3-5'	3-5'	May - Aug.	x
Woodland Shrub, & Herbaceous Mix - dry/moist shaded wood edge						
DP	<i>Dennstaedtia punctilobula</i>	hay-scented fern	1-2'	2-3'	N/A	x
KL	<i>Kalmia latifolia</i>	mountain laurel	5-15'	5-15'	Jun. - Jul.	x
PB	<i>Polygonatum biflorum</i>	Solomon's seal	2'	2'	Mar. - Jun.	x
PS	<i>Phlox stolonifera</i>	creeping phlox	6-12"	9-18"	Jul. - Sept.	x
VA	<i>Viburnum acerifolium</i>	maple-leaved viburnum	3-6'	2-4'	Jun.	x
VN	<i>Viburnum nudum</i>	possumhaw	12-20'	5-12'	Jun. - Jul.	x
VS	<i>Viola sororia</i>	common blue violet	6-10"	3-6"	Mar. - May	x

Table 1: L-3 Hidden Woodland Boardwalk Plant List continued

HIDDEN WOODLAND BOARDWALK PLANT LIST (L-3)						
SYMBOL	BOTANICAL NAME	COMMON NAME	HEIGHT	SPREAD	BLOOM	NATIVE
Meadow Herbaceous Mix						
AT	<i>Asclepias tuberosa</i>	butterflyweed	1-2'	1-2'	May - Sept.	x
PD	<i>Penstemon digitalis</i>	Foxglove beardtongue	3'	1-2'	Jun. - Jul.	x
RL	<i>Rudbeckia lacianata</i>	cut leaf coneflower	3-8'	2-4'	Jul. - Oct.	x
SS	<i>Schizachyrium scoparium</i>	little bluestem	2-4'	2'	Aug. - Feb.	x

The plant list for the design of the Hidden Woodland Boardwalk on Sheet L-3 (Figure 46) includes two woodland shrub and herbaceous plant mixes for shady areas and one meadow herbaceous mix with plants that are more sun tolerant.

Source: Sonya Shapoval, author



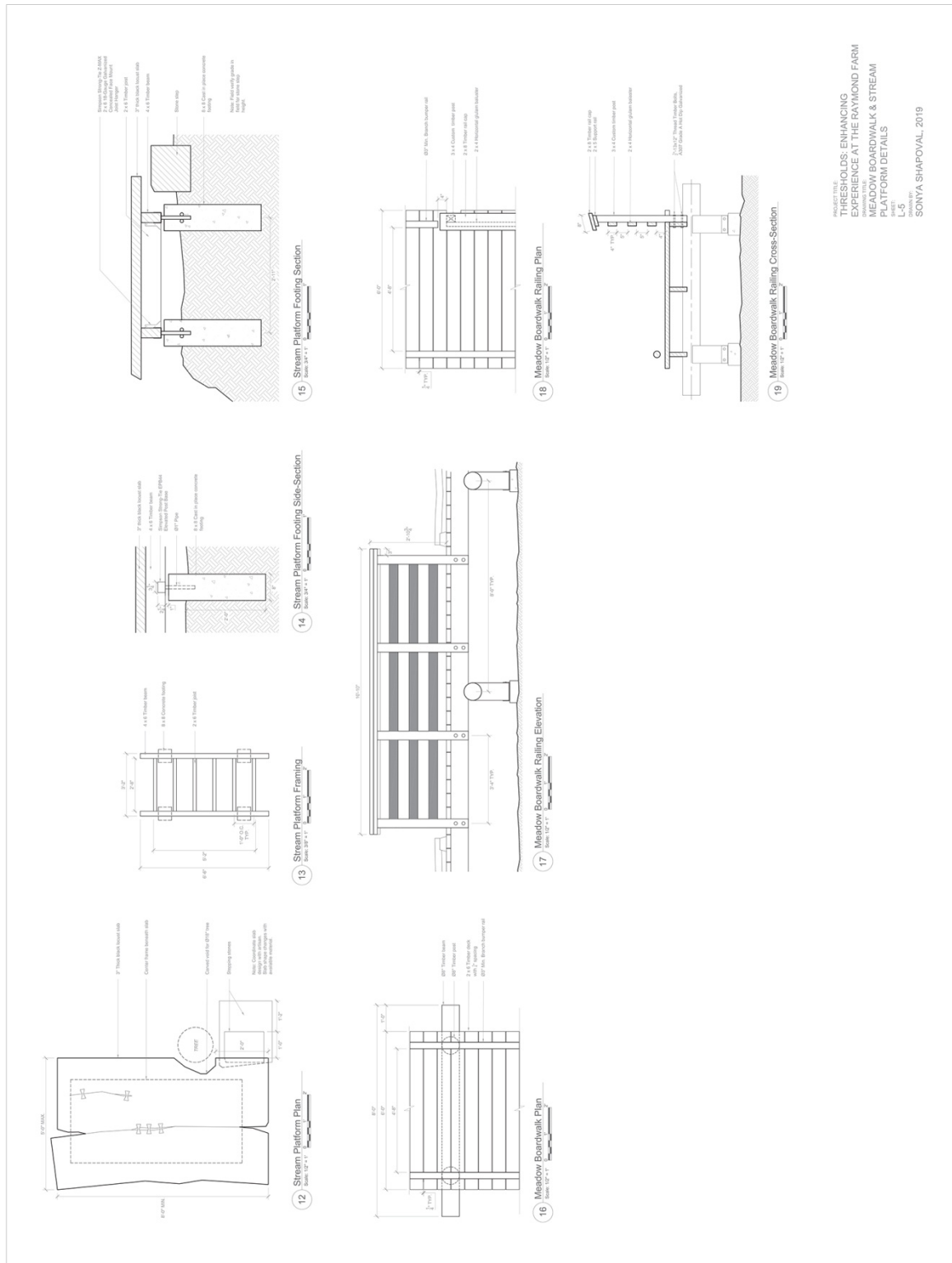


Figure 48: L-5 Meadow Boardwalk & Stream Platform Details

Additional details for the construction of the stream platform at the Stream Corridor Retreat and the railing of the Meadow Boardwalk.

Source: Sonya Shapoval, author

VI. Conclusion

With a thorough understanding of a place from its history to making a personal connection and exploring the land, thoughtful observations and decisions can be made before committing to a landscape design. Without recording my experience and the fleeting changes within the landscape from day to week to month, I would not have remembered the full sensory experience that I had while at the Raymond Farm. From the heat of the meadow to the humming of the insects in the shade of the trees, what would later become fleeting observations, ultimately dictated how I moved through space and my enjoyment of the site. The thresholds within the natural landscape give subliminal messages that one space is transitioning into another. There is something to see, hear, feel, or smell that signals the crossing, entering, or leaving of a threshold. In today's society these subtleties are frequently lost to the unobservant.

As discussed in the chapter "Existing Thresholds," my thorough breakdown of the thresholds along the site transect gave me the insight to realize where to urge a visitor to stop or pause. By designing within the threshold and capturing the visitor's awareness, a more immersive experience can be created. Thresholds are the moment of transition, the edge where there is a change. These are the moments within a landscape where the visitor's attention can be captured and directed.

A stone slab embedded into the ground, the change in its texture from the lawn signals a change to the visitor. Stone transitions to wood, while the path slowly ascends. A path leads through a meadow, then moves into a woodland, before transitioning back to the sunny meadow where the visitor is returned to the familiar, but is elevated to stand

much higher and with a very different view. Thresholds are windows and doorways that can highlight these moments and the wonder of their surroundings. Thresholds are a key component of design and very powerful when artfully manipulated.

Design looks at the larger landscape and connects, adds to, and strengthens the existing thresholds to enhance the visitor's experience of the site.

Endnotes

¹ inside: the space within architecture

² outside: the space within the landscape

³ The *Oxford Dictionary* was used to define the following words relating to threshold. A *transition* is "the process or period of changing from one state or condition to another." A *doorway* is "an entrance to a room or building through a door." A *window* is "an opening in the wall or roof, [usually] of a building or vehicle, fitted with glass in a frame to admit light or air and allow people to see out." A *portal* is "a doorway, gate, or other entrance, especially a large and imposing one." A *passageway* is "a long, narrow way, typically having walls either side, that allows access between buildings or to different rooms within a building." A *corridor* is "a long passage in a building from which doors lead into rooms." See *Oxford Dictionaries*, accessed December 12, 2018, <https://en.OxfordDictionaries.com>.

⁴ Ibid.

⁵ See Anita Berrizbeitia and Linda Pollak, *Inside Outside: Between Architecture and Landscape*.

⁶ Boettger, Till. *Threshold Spaces : Transitions in Architecture*, 49.

⁷ See Dramstad, Wenche, James D. Olson, and Richard T. T. Forman. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*.

⁸ Anita Berrizbeitia and Linda Pollak, *Inside Outside: Between Architecture and Landscape*, 82.

⁹ Ibid., 82-83.

¹⁰ Kurt Gerard Frederick Helfrich and William Whitaker, eds., *Crafting a Modern World*, 316.

¹¹ Ibid., 23.

¹² Antonin Raymond, *Antonin Raymond: An Autobiography*, 168-169.

¹³ Ibid., 171.

¹⁴ Ibid., 172.

¹⁵ Ibid.

¹⁶ Mira Nakashima and George Nakashima, *Nature, Form, & Spirit: The Life and Legacy of George Nakashima*, 20-21.

¹⁷ Ibid., 34.

¹⁸ Ibid., 33-34.

¹⁹ Ibid., 34.

²⁰ Ibid., 43.

²¹ Ibid., 62-63.

²² George Nakashima, *The Soul of a Tree: A Woodworker's Reflections*, 1st ed, 105.

²³ Gdula, Sara. "The New Hope Experiment: An Investigation and Conservation Plan for the Antonin and Noémi Raymond Farm." Theses (Historic Preservation), January 1, 2018. https://repository.upenn.edu/hp_theses/644, 21

²⁴ See Antonin Raymond, *Antonin Raymond: An Autobiography*; Kurt Gerard Frederick Helfrich and William Whitaker, eds., *Crafting a Modern World: The Architecture and Design of Antonin and Noémi Raymond*.

²⁵ See Nakashima, George. *The Soul of a Tree: A Woodworker's Reflections*.; Ostergard, Derek E. *George Nakashima: Full Circle*.; Beyer, Steven, George Nakashima, and James A. Michener Art Museum, eds. *George Nakashima and the Modernist Moment: James A. Michener Art Museum, Bucks County Pennsylvania, June 9 - September 16, 2001*.; Nakashima, Mira, and George Nakashima. *Nature, Form, & Spirit: The Life and Legacy of George Nakashima*.

²⁶ An experiential study makes personal observations and records the feelings of what happened, while empirical methods of documentation include measurements and "data collected through direct observation or experimentation." See *Empirical Evidence: A Definition*, accessed September 23, 2019, <https://www.livescience.com/21456-empirical-evidence-a-definition.html>.

²⁷ Lippard, Lucy R. *The Lure of the Local: Senses of Place in a Multicentered Society*. New York: New Press, 1998.

²⁸ Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: <https://websoilsurvey.sc.egov.usda.gov/>. Accessed February 7, 2019.

²⁹ See Satō, Hideo, and Yasua Nakahara, eds. *The Complete Japanese Joinery*.

³⁰ *genkan* - the Japanese version of an entrance vestibule. See Kurt Helfrich and William Whitaker, eds., *Crafting a Modern World : The Architecture and Design of Antonin and Noemi Raymond* (Princeton Architectural Press, 2006), 51.

³¹ The diagramming approach for the idealized edge abruptness diagrams was based upon those found in Dramstad, Wenche, James D. Olson, and Richard T. T. Forman. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*.

³² Kurt Helfrich and William Whitaker, eds., *Crafting a Modern World*, 174.

³³ *Ibid.*

³⁴ Sauer, Leslie Jones. *The Once and Future Forest: A Guide to Forest Restoration Strategies*.

³⁵ Plant species proposed for the designs were influenced by both discussion and a recommended plant list provided by Amy Gage.

³⁶ Mira Nakashima and George Nakashima, *Nature, Form, & Spirit: The Life and Legacy of George Nakashima*, 66.

Appendix A

This appendix contains additional supportive imagery created for this thesis.

Imagery found here may provide additional site context or understandings of inventory, analysis, and design.



Figure 49: Location of Raymond Farm

North of both Philadelphia and Trenton, the Raymond Farm is west of the Delaware River and a ten minute drive from New Hope.

Source: The Department of Landscape Architecture Graduate Studio, drawn by Jacalyn DeValue

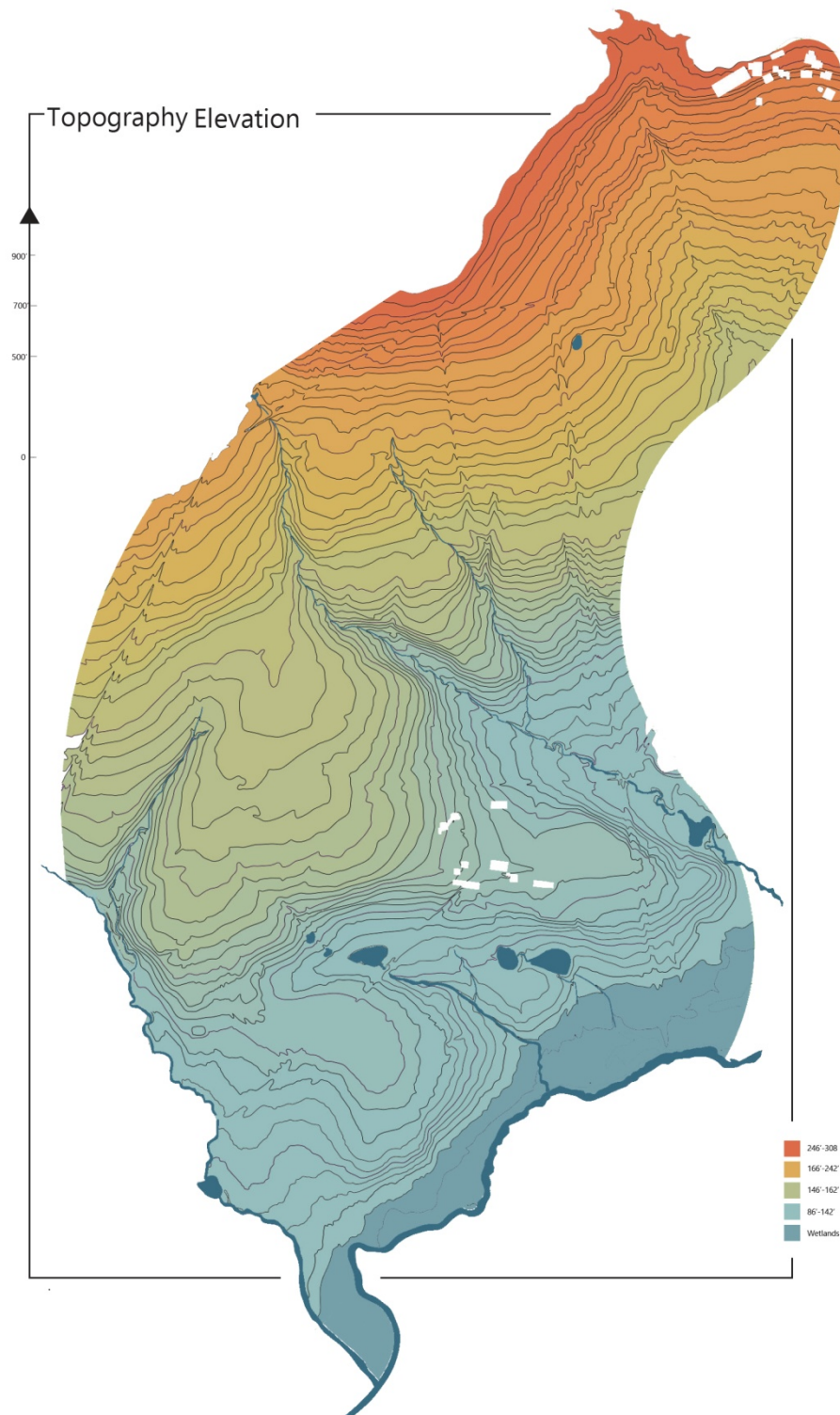


Figure 50: Raymond Farm Topography and Elevation

The Raymond Farm property has over 150 feet of elevation change.

Source: The Department of Landscape Architecture Graduate Studio, drawn by Mai Tai Bui

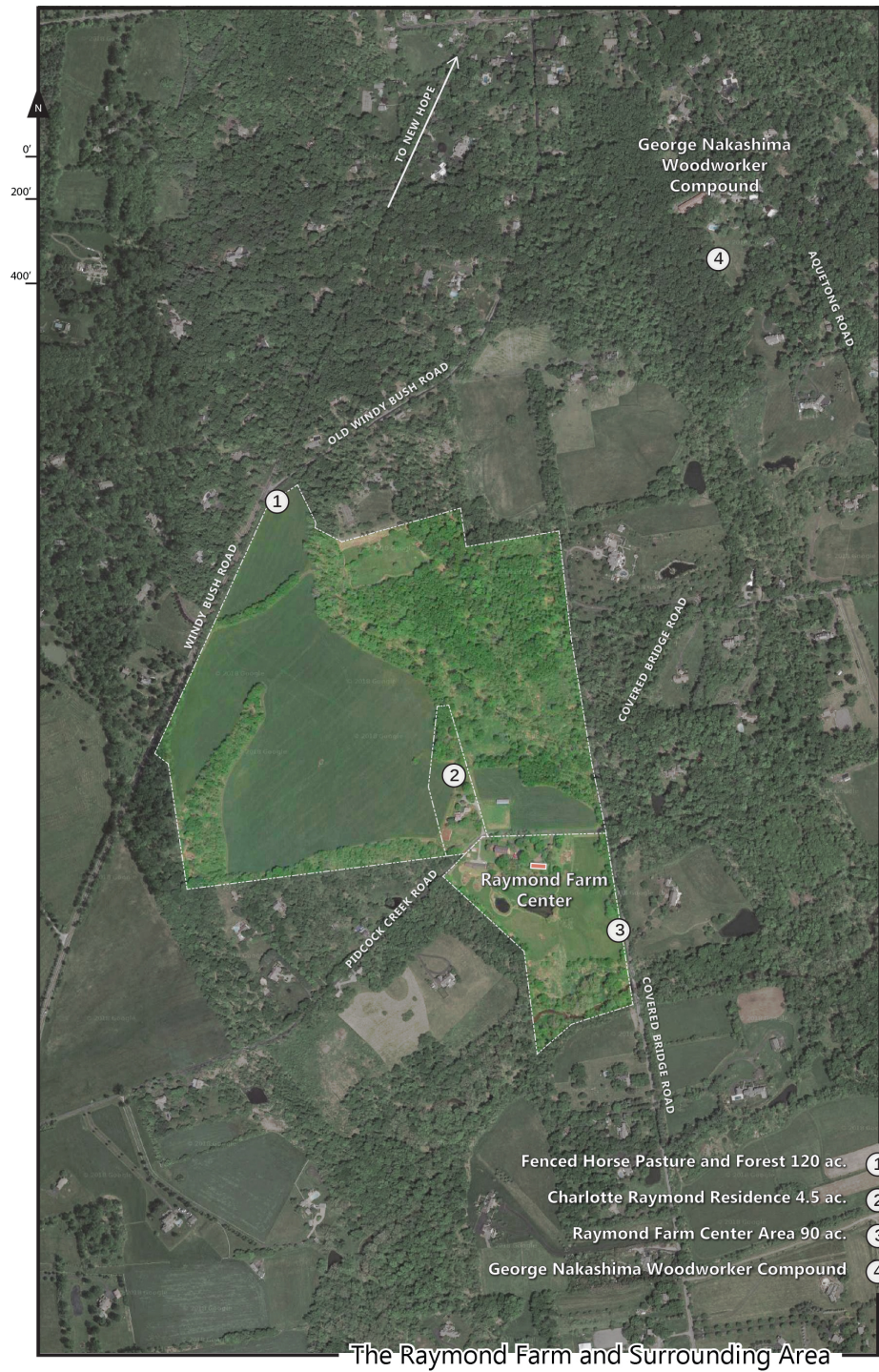


Figure 51: The Raymond Farm and Surrounding Area

Property owned by the Raymond family is highlighted within the center of the map within the 90 acre property. Property divisions and uses are notated with red symbols. (In original 1" = 200')

Source: Sonya Shapoval, author, Satellite imagery from Google.

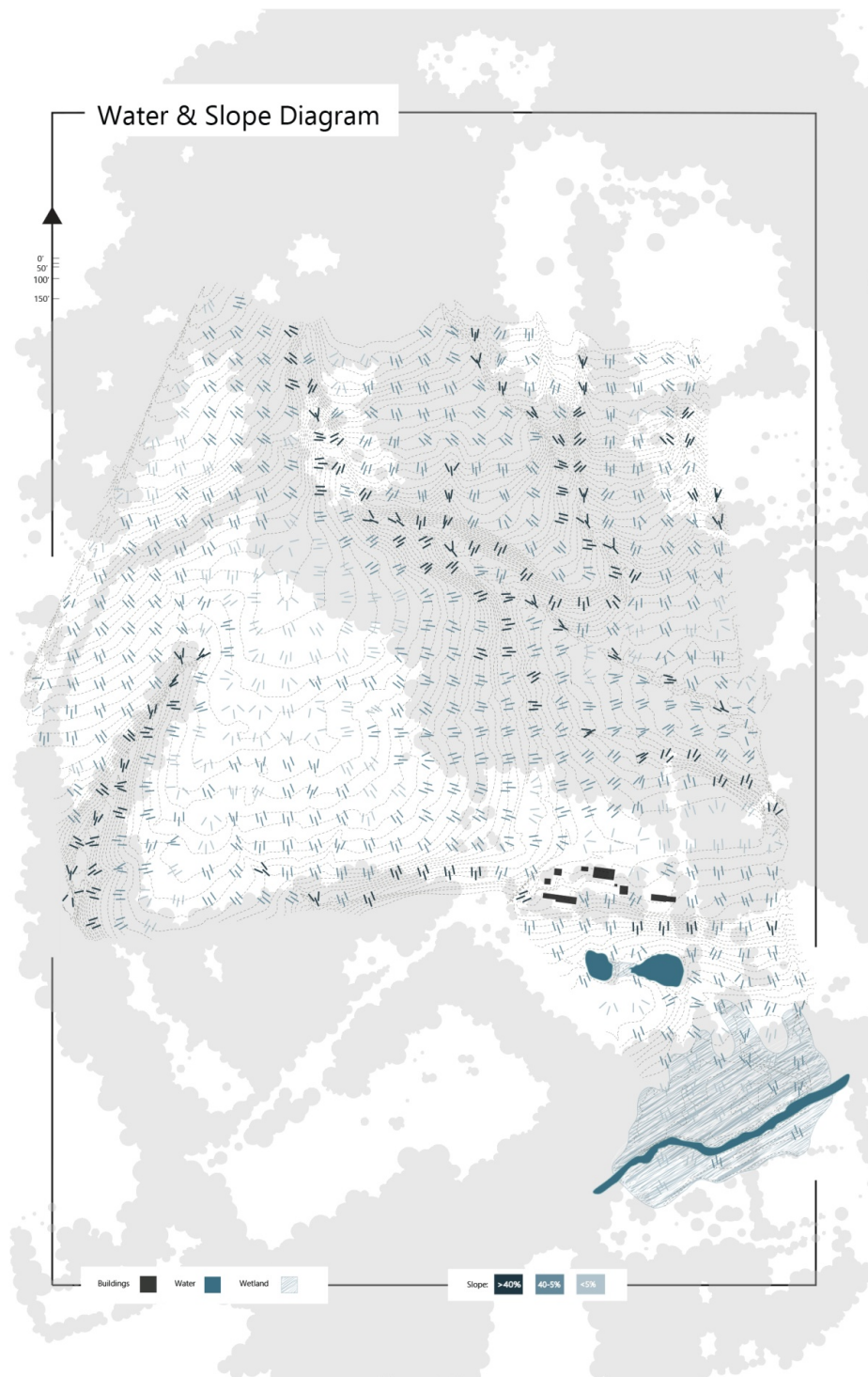


Figure 52: Water & Slope at Raymond Farm

This diagram shows the low lying wet areas, where the slope is steeper, and the dry ridges that have been shaped by the movement of water.

Source: The Department of Landscape Architecture Graduate Studio, drawn by Sanja Martić

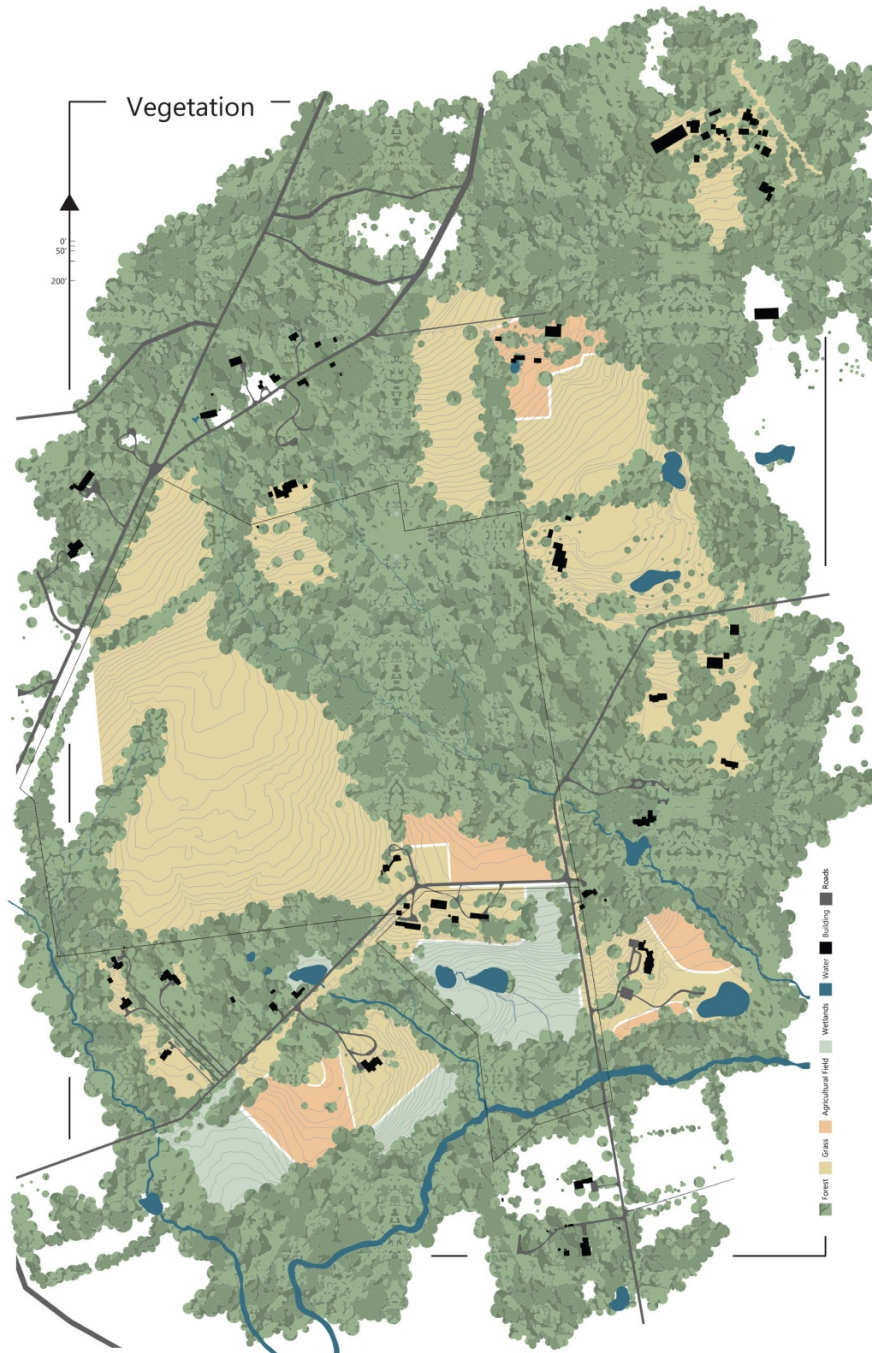


Figure 53: Vegetation at Raymond Farm

This map shows the various vegetated areas (forest, grass, agricultural field). The vegetation of the site is primarily a mixture of woodland, pasture and meadow. Combined with the site's various ecological areas it has a broad plant palette.
 Source: The Department of Landscape Architecture Graduate Studio, drawn by Nicole Cohen

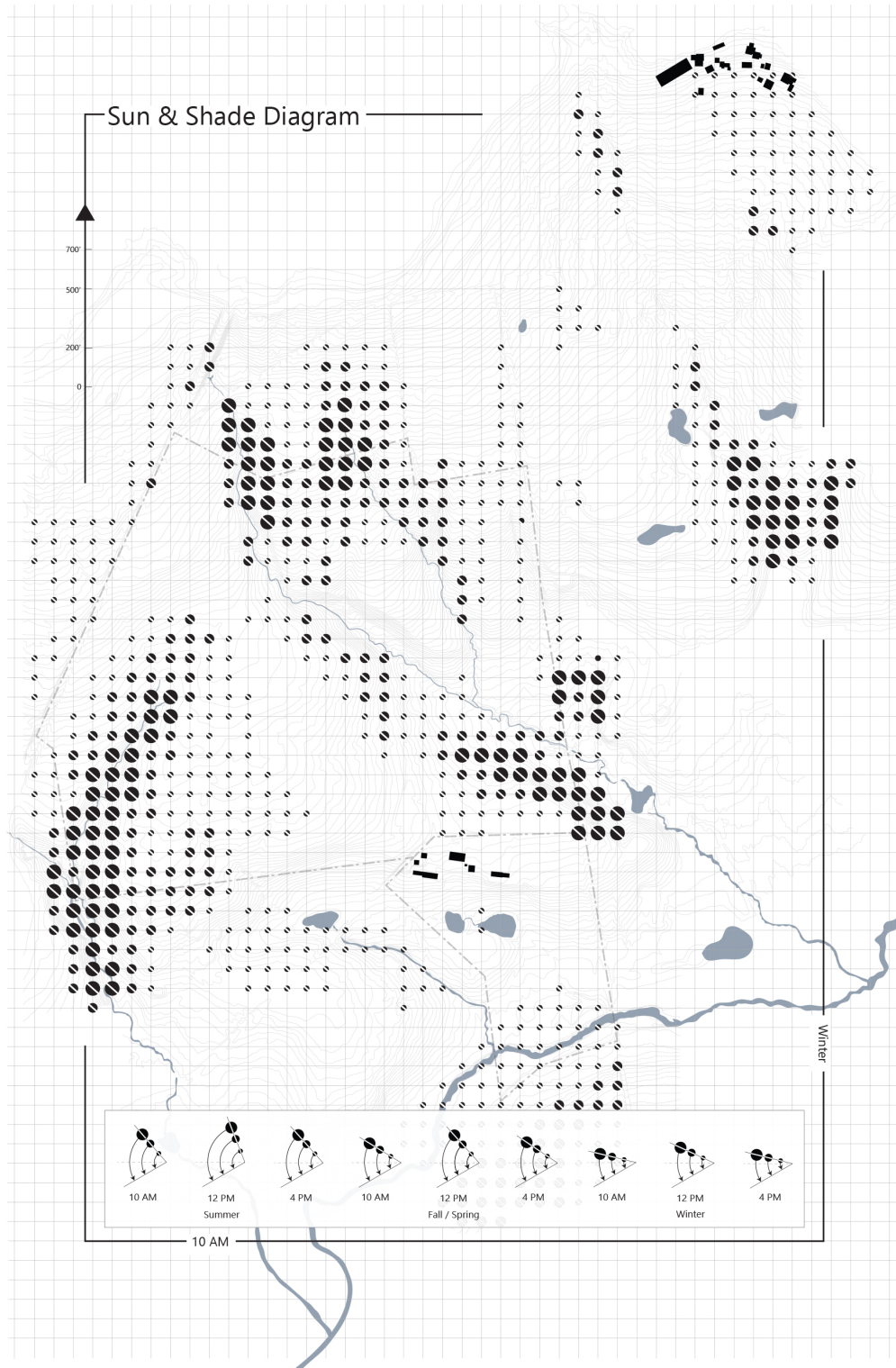


Figure 54: Sun and Shade at Raymond Farm

This diagram shows the intensity of the shade cast by the sun based upon the site's topography. Larger black circles indicate greater shade due to a steeper slope.

Source: The Department of Landscape Architecture Graduate Studio, drawn by Bo Peng, Samantha Moss, and Sonya Shapoval

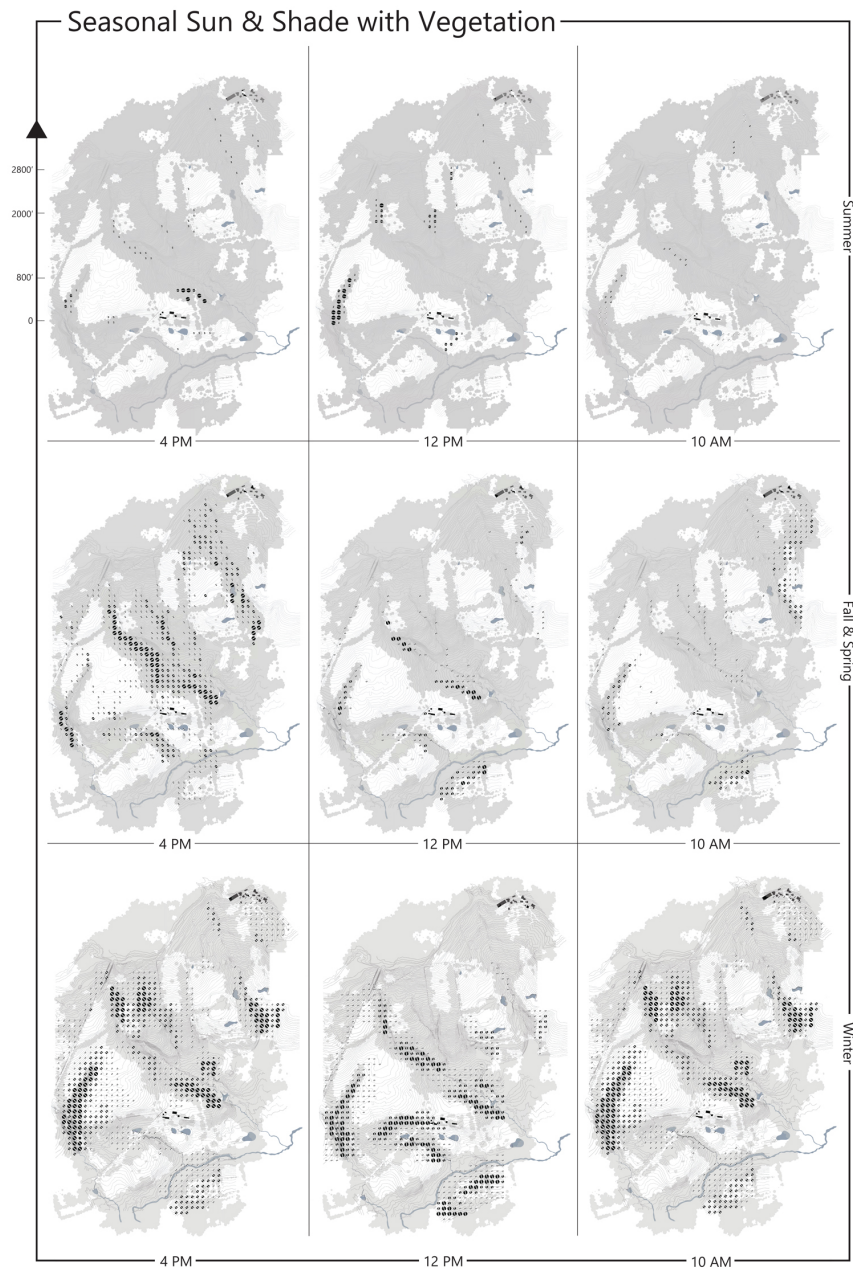


Figure 55: Sun and Shade Seasonally at Raymond Farm

This diagram shows the change in the shade cast by the sun throughout the day at 10AM, 12PM, and 4PM during the summer, fall, winter, and spring.

Source: The Department of Landscape Architecture Graduate Studio, drawn by Bo Peng, Samantha Moss, and Sonya Shapoval



Woodland Stream Corridor Plant Palette



Successional Meadow Plant Palette



Woodland Edge Plant Palette



Raymond Farm Center Plant Palette

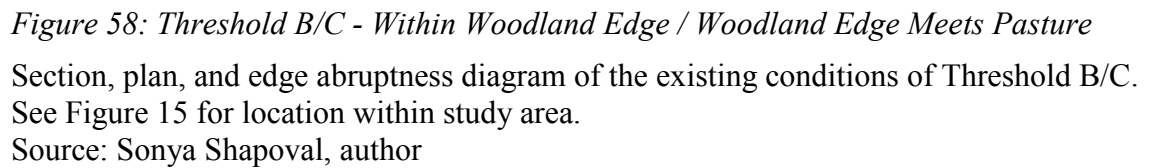


Wetland Meadow Plant Palette

Figure 56: Existing Plant Palettes of the Site

These plant palettes show the diversity in flora species across the site. Photos include both natives and non-native invasive species.

Source: Sonya Shapoval, author



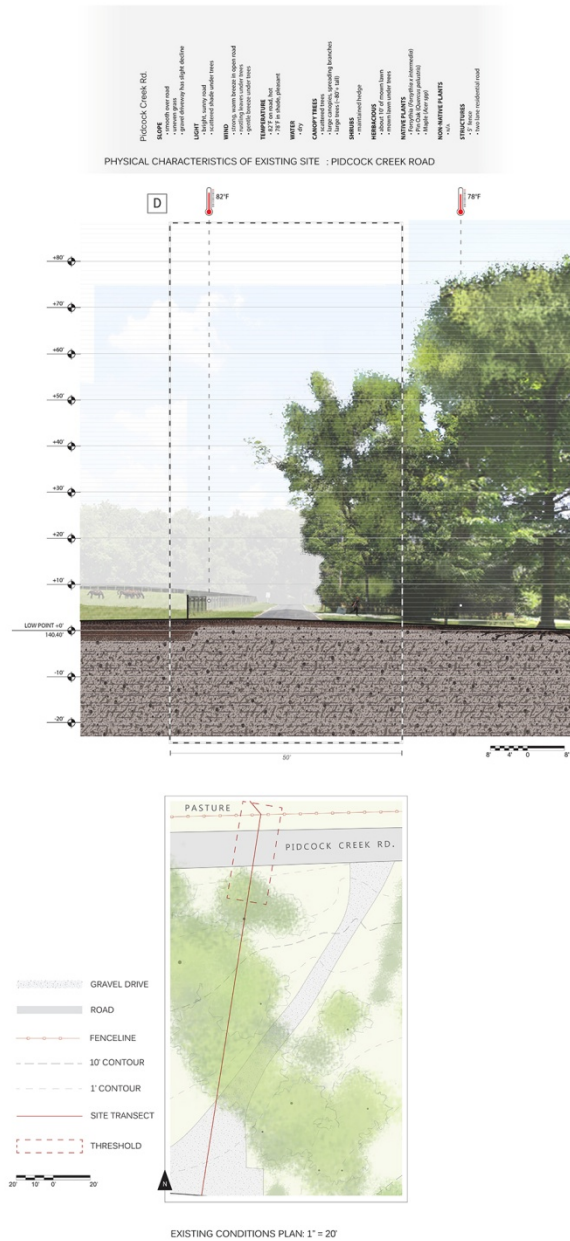


Figure 59: Threshold D - Pidcock Creek Road, Road Between Pasture and Farm House

Section and plan of the existing conditions of Threshold D. See Figure 15 for location within study area.

Source: Sonya Shapoval, author

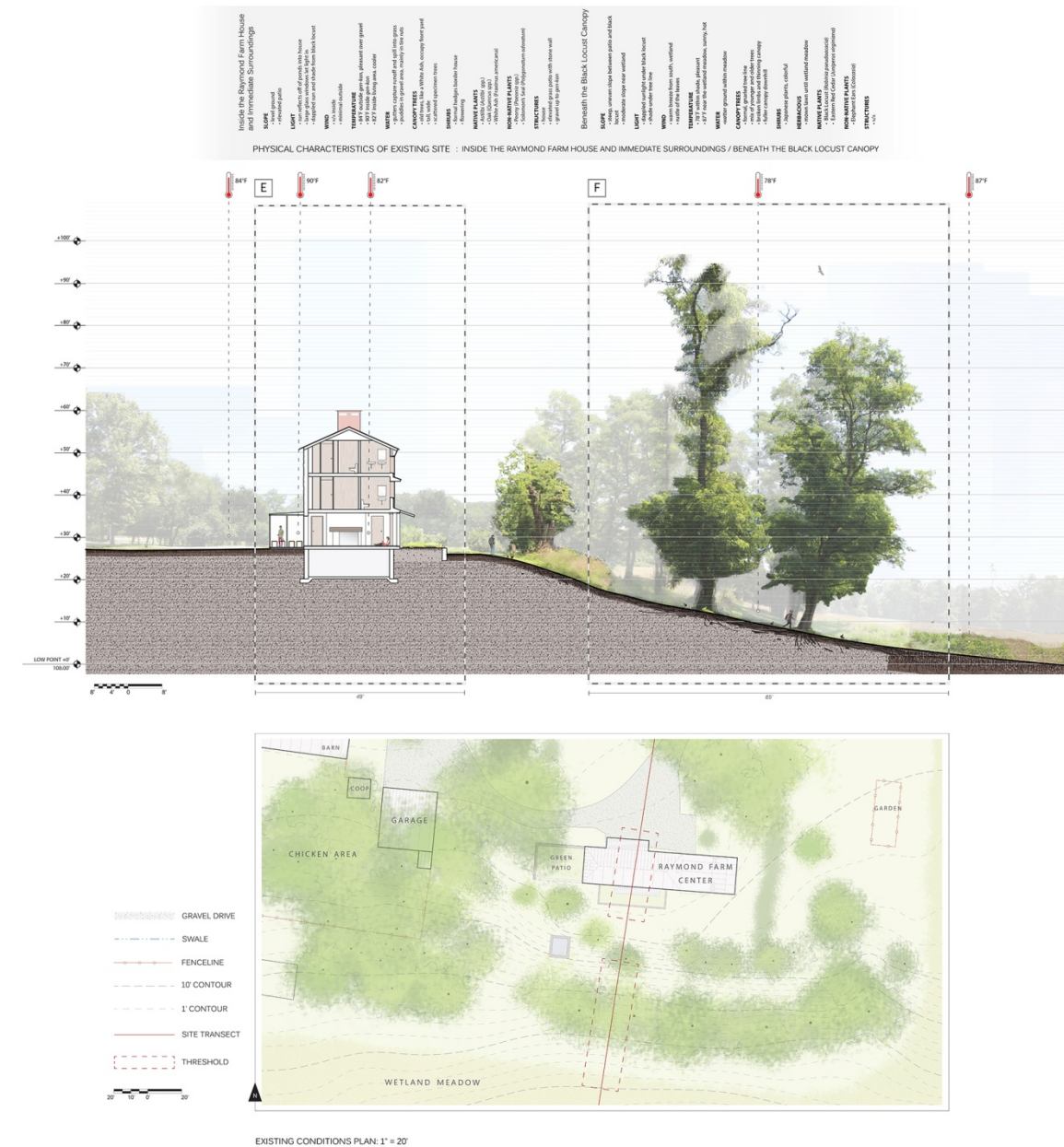


Figure 60: Threshold E/F - Raymond Farm Center / Under the Black Locust Canopy

Section and plan of the existing conditions of Threshold E/F. See Figure 15 for location within study area.

Source: Sonya Shapoval, author

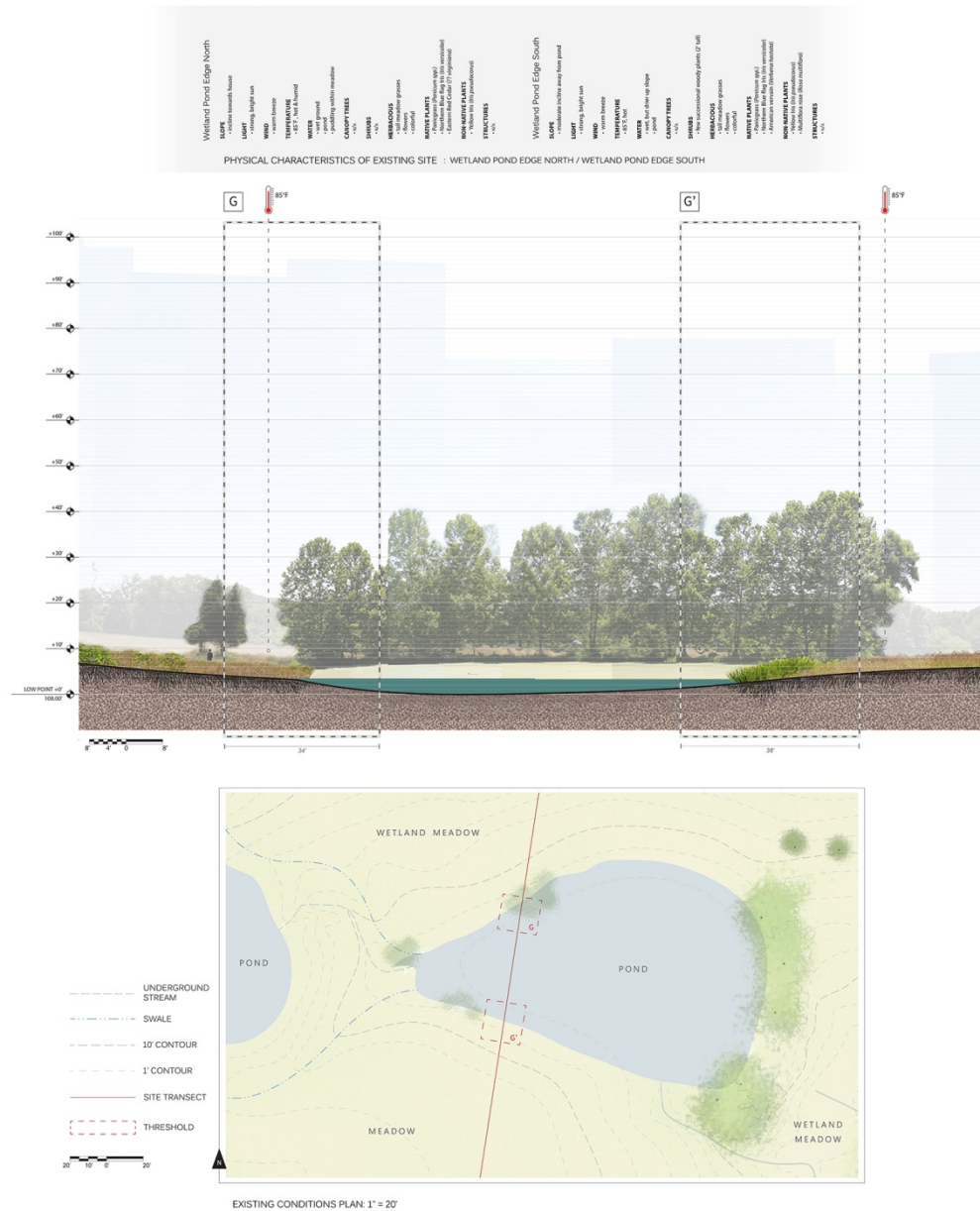


Figure 61: Threshold G/G' - Wetland Meadow / Pond

Section and plan of the existing conditions of Threshold G/G'. See Figure 15 for location within study area.

Source: Sonya Shapoval, author



Figure 62: Threshold H - Meadow / Woodland Edge

Section and plan of the existing conditions of Threshold H. See Figure 15 for location within study area.

Source: Sonya Shapoval, author

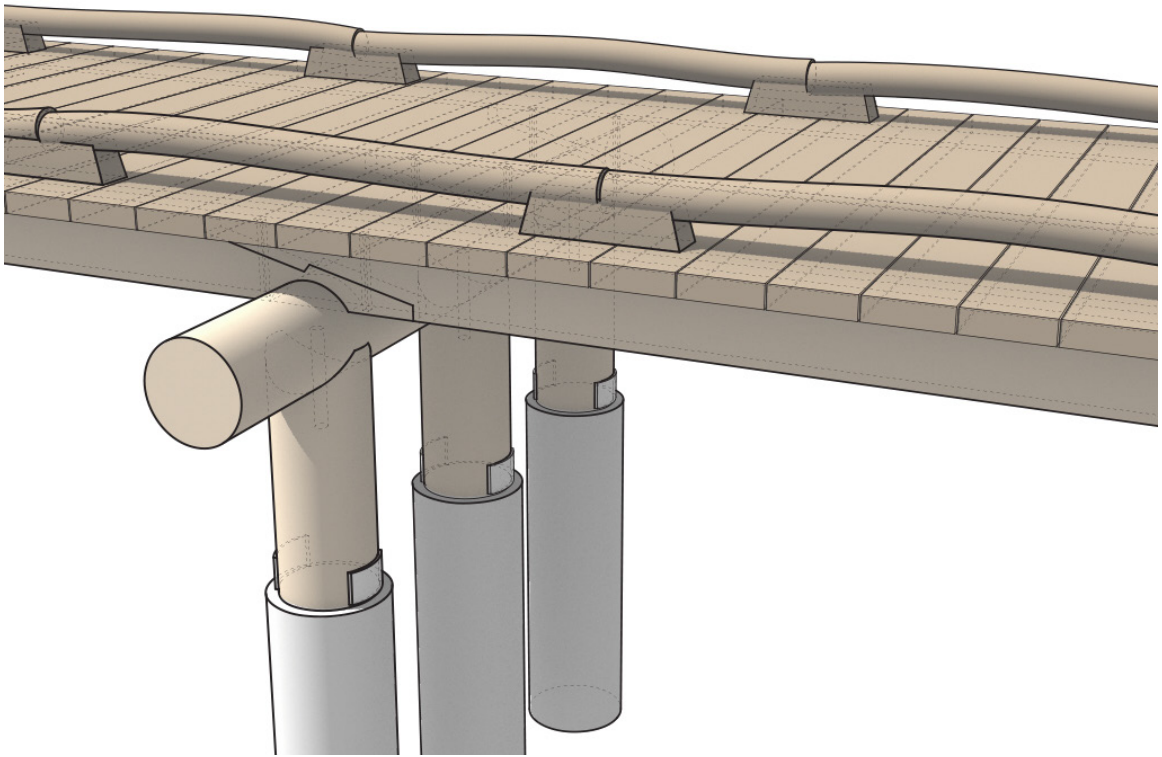


Figure 63: Detail from 3D Model of Hidden Woodland Boardwalk

This rendering shows a close up of the Hidden Woodland Boardwalk near a timber beam. These load bearing points have the most timber and Japanese joinery connections throughout the boardwalk.

Source: Sonya Shapoval, author

Table 2: Hidden Woodland Boardwalk Plant List

HIDDEN WOODLAND BOARDWALK PLANT LIST							
SYMBOL	BOTANICAL NAME	COMMON NAME	BENEFITS (# of lepidoptera species listed at HOST database)	NATIVE	HEIGHT	SPREAD	BLOOM
Trees							
AR	<i>Acer rubrum</i>	red maple	(197) gamebirds eat buds/twigs/seeds, songbirds eat seeds/buds/flowers, large mammals eat seeds/flowers/bark/twigs, and small mammals eat seeds	x	40-70'	30-50'	Mar. - Apr.
CF	<i>Cornus florida</i>	flowering dogwood	(36) attracts butterflies and bees	x	15-30'	15-30'	Apr. - May
NS	<i>Nyssa sylvatica</i>	black gum	(28) birds and mammals eat fruit	x	30-50'	20-30'	May - Jun.
PA	<i>Prunus americana</i>	American plum	(57) birds and mammals eat fruit	x	15-25'	15-25'	Mar.
QA	<i>Quercus alba</i>	white oak	(255) birds and mammals eat acorns	x	50-80'	50-80'	May
RC	<i>Rhus copallinum</i>	winged sumac	(16) birds and mammals eat fruit	x	7-15'	10-20'	Jul. - Aug.
SA	<i>Sassafras albidum</i>	sassafras	(57) birds and mammals eat fruit	x	30-60'	25-40'	Apr. - May
Shrubs							
IG	<i>Ilex glabra</i>	inkberry holly	(6) birds and mammals eat fruit	x	6-12'	6-12'	May - Jun.
KL	<i>Kalmia latifolia</i>	mountain laurel	(7)	x	5-15'	5-15'	Jun. - Jul.
LB	<i>Lindera benzoin</i>	spice bush	(20) birds eat fruit	x	6-12'	6-12'	Apr.
MP	<i>Morella pensylvanica</i> (formerly <i>Myrica pensylvanica</i>)	northern bayberry	(41) birds eat fruit	x	5-10'	5-10'	May
RM	<i>Rhododendron maximum</i>	great laurel	(2) attracts butterflies and bees	x	4-15'	5-12'	Jun.
RV	<i>Rhododendron viscosum</i>	swamp azalea	(5) attracts butterflies and bees	x	3-5'	3-5'	May - Aug.
VA	<i>Viburnum acerifolium</i>	maple-leaved viburnum	(7) attracts butterflies and bees	x	3-6'	2-4'	Jun.
VN	<i>Viburnum nudum</i>	possumhaw	(46) birds and mammals eat fruit	x	12-20'	5-12'	Jun. - Jul.

Table 2: Hidden Woodland Boardwalk Plant List continued

HIDDEN WOODLAND BOARDWALK PLANT LIST							
SYMBOL	BOTANICAL NAME	COMMON NAME	BENEFITS (# of lepidoptera species listed at HOST database)	NATIVE	HEIGHT	SPREAD	BLOOM
Herbaceous Woodland							
CA	<i>Campanulastrum americanum</i>	American bellflower	(0) nectar for bees and hummingbirds	x	3-4'	1-2'	Jun. - Aug.
CL	<i>Claytonia lanceolata</i>	spring beauty	(0)	x	2-10"	2"	Apr. - Jul.
DM	<i>Dryopteris marginalis</i>	marginal wood fern	(1) cover for toads and lizards	x	1-3'	1-3'	N/A
DP	<i>Dennstaedtia punctilobula</i>	hay-scented fern	(3)	x	1-2'	2-3'	N/A
OS	<i>Onoclea sensibilis</i>	sensitive fern	(5) shelters salamanders and frogs	x	3-4'	3-4'	N/A
PB	<i>Polygonatum biflorum</i>	Solomon's seal	(2) nectar for bees and hummingbirds	x	2'	2'	Mar. - Jun.
PP	<i>Podophyllum peltatum</i>	mayapple	(3) raccoon eat fruit	x	12-18"	12"	Apr. - May
PS	<i>Phlox stolonifera</i>	creeping phlox	(0)	x	6-12"	9-18"	Jul. - Sept.
VS	<i>Viola sororia</i>	common blue violet	(14)	x	6-10"	3-6"	Mar. - May
Herbaceous Meadow							
AT	<i>Asclepias tuberosa</i>	butterflyweed	(5) hummingbirds use nectar	x	1-2'	1-2'	May - Sept.
PD	<i>Penstemon digitalis</i>	Foxglove beardtongue	(1) birds and mammals eat seeds, mammals eat seeds/foilage	x	3'	1-2'	Jun. - Jul.
RL	<i>Rudbeckia lacianata</i>	cut leaf coneflower	(11) nectar for bees, seeds for birds	x	3-8'	2-4'	Jul. - Oct.
SS	<i>Schizachyrium scoparium</i>	little bluestem	(20) songbirds eat seeds and small mammals eat seeds/leaves	x	2-4'	2'	Aug. - Feb.

This plant selection includes canopy trees primarily to be planted to expand the woodland edge, while a mixture of shrubs and herbaceous plant material would enrich the understory. All of these plants provide benefits for wildlife.

Source: Sonya Shapoval, author

Table 3: Stream Corridor Retreat Plant List

STREAMSIDE WALK PLANT LIST							
SYMBOL	BOTANICAL NAME	COMMON NAME	BENEFITS (# of lepidoptera species listed at HOST database)	NATIVE	HEIGHT	SPREAD	BLOOM
Trees							
OV	<i>Ostrya virginiana</i>	hophornbeam	(145) gamebirds eat buds and catkins, songbirds eat seeds, mammals eat seeds and buds	x	25-40'	20-30'	Apr.
PV	<i>Prunus virginiana</i>	chokecherry	(331) birds and mammals eat fruit	x	20-30'	15-20'	Apr. - May
QB	<i>Quercus bicolor</i>	swamp white oak	(26) birds and mammals eat acorns	x	50-60'	50-60'	Apr.
QP	<i>Quercus palustris</i>	pin oak	(73) birds and mammals eat acorns	x	50-70'	40-60'	Apr.
Shrubs							
GB	<i>Gaylussacia baccata</i>	black huckleberry	(18) fruit and twigs	x	1-3'	1-3'	May - Jul.
HV	<i>Hamamelis virginiana</i>	witch-hazel	(57) birds eat fruit, deer and beaver may graze	x	10-15'	10-15'	Oct. - Dec.
LB	<i>Lindera benzoin</i>	spice bush	(20) birds eat fruit	x	6-12'	6-12'	Apr.
RM	<i>Rhododendron maximum</i>	great laurel	(2) attracts butterflies and bees	x	4-15'	5-12'	Jun.
RV	<i>Rhododendron viscosum</i>	swamp azalea	(5) attracts butterflies and bees	x	3-5'	3-5'	May - Aug.
VA	<i>Viburnum acerifolium</i>	maple-leaved viburnum	(7) attracts butterflies and bees	x	3-6'	2-4'	Jun.

Table 3: Stream Corridor Retreat Plant List continued

STREAM CORRIDOR RETREAT PLANT LIST							
SYMBOL	BOTANICAL NAME	COMMON NAME	BENEFITS (# of lepidoptera species listed at HOST database)	NATIVE	HEIGHT	SPREAD	BLOOM
Herbaceous							
CA	<i>Campanulastrum americanum</i>	American bellflower	(0) nectar for bees and hummingbirds	x	3-4'	1-2'	Jun. - Aug.
COA	<i>Chelone obliqua 'Alba'</i>	white turtlehead	(7) bees and hummingbirds use nectar	x	3'	3'	Jul. - Sept.
DC	<i>Deschampsia cespitosa</i>	Tufted hairgrass	(44) birds eat seeds	x	2-4'	1-2'	Jul.
DM	<i>Dryopteris marginalis</i>	marginal wood fern	(1) cover for toads and lizards	x	1-3'	1-3'	N/A
FV	<i>Fragaria virginiana</i>	wild strawberry	(12) fruit	x	6"	6"	Apr. - Jun.
IC	<i>Impatiens capensis</i>	jewelweed	(4) nectar for pollinators, seeds for birds	x	3'	1-3'	Jul. - Oct.
MS	<i>Matteuccia struthiopteris</i>	ostrich fern	(4) some mammals may graze fronds	x	3-6'	5-8'	N/A
OR	<i>Osmunda regalis</i>	royal fern	(2) some mammals may graze fronds	x	2-5'	1.5'	N/A
PA	<i>Polystichum achrostichoides</i>	Christmas fern	(0)	x	1-2'	1-2'	N/A
PD	<i>Penstemon digitalis</i>	Foxglove beardtongue	(1) birds and mammals eat seeds, mammals eat seeds/foilage	x	3-5'	1.5-2'	Jun. - Jul.
PP	<i>Podophyllum peltatum</i>	mayapple	(3) raccoon eat fruit	x	12-18"	12"	Apr. - May
SC	<i>Sanguinaria canadensis</i>	bloodroot	(2) bees collect pollen to feed their young	x	6-10"	3-6"	Mar. - Apr.
TC	<i>Tiarella cordifolia</i>	heartleaf foamflower	(0)	x	9-12"	12-24"	May
VS	<i>Viola sororia</i>	common blue violet	(14)	x	6-10"	3-6"	Mar. - May

These plants would enrich the stream bank, help counteract erosion, and benefit wildlife.
Source: Sonya Shapoval, author

Table 4: Meadow Boardwalk & Viewing Platform Plant List

MEADOW BOARDWALK & VIEWING PLATFORM PLANT LIST							
SYMBOL	BOTANICAL NAME	COMMON NAME	BENEFITS (# of lepidoptera species listed at HOST database)	NATIVE	HEIGHT	SPREAD	BLOOM
Trees							
AR	<i>Acer rubrum</i>	red maple	(197) gamebirds eat buds/twigs/seeds, songbirds eat seeds/buds/flowers, large mammals eat seeds/flowers/bark/twigs, and small mammals eat seeds	x	40-70'	30-50'	Mar. - Apr.
NS	<i>Nyssa sylvatica</i>	black gum	(28) birds and mammals eat fruit	x	30-50'	20-30'	May - Jun.
PA	<i>Prunus americana</i>	American plum	(57) birds and mammals eat fruit	x	15-25'	15-25'	Mar.
Shrubs							
CA	<i>Cornus sericea</i>	red osier dogwood	(1) birds and mammals eat fruit	x	6-12'	6-12'	May - Jun.
HVE	<i>Hamamelis vernalis</i>	spring witch-hazel	birds eat fruit and seeds	x	6-10'	8-15'	Jan. - Mar.
KL	<i>Kalmia latifolia</i>	mountain laurel	(7) deer browse young foliage	x	5-15'	5-15'	Jun. - Jul.
MP	<i>Morella pensylvanica</i> (formerly <i>Myrica pensylvanica</i>)	northern bayberry	(41) birds eat fruit	x	5-10'	5-10'	May
Herbaceous							
EF	<i>Eupatorium fistulosum</i>	Joe-Pye weed	(1) nectar for pollinators, seeds for birds	x	3-4'	1-3'	Jul. - Sept.
FV	<i>Fragaria virginiana</i>	wild strawberry	(12) fruit	x	6"	6"	Apr. - Jun.
LC	<i>Lobelia cardinalis</i>	cardinal flower	(5) nectar for bees and hummingbirds	x	2-4'	1-2'	Jul. - Sept.
PD	<i>Penstemon digitalis</i>	Foxglove beardtongue	(1) birds and mammals eat seeds, mammals eat seeds/foliage	x	3-5'	1.5-2'	Jun. - Jul.
RL	<i>Rudbeckia lacianata</i>	cut leaf coneflower	(11) nectar for bees, seeds for birds	x	3-8'	2-4'	Jul. - Oct.
SS	<i>Schizachyrium scoparium</i>	little bluestem	(20) songbirds eat seeds and small mammals eat seeds/leaves	x	2-4'	2'	Aug. - Feb.

This plant selection includes many sun-loving plants for the meadow that benefit birds and pollinating bees and butterflies.

Source: Sonya Shapoval, author

Appendix B

This appendix contains tables for each of the thresholds discussed in "IV. Existing Thresholds." Each table contains the physical characteristics of thresholds A through H.

Table 5: Physical Characteristics of Thresholds: A-H

THRESHOLD	A	
	WOODLAND STREAM CORRIDOR	SUCCESSIONAL MEADOW
SLOPE	<ul style="list-style-type: none"> peaks at tree line, flow point at stream uneven, undulating along stream soil to rocky 	<ul style="list-style-type: none"> gradual decent towards stream
LIGHT	<ul style="list-style-type: none"> dappled sunlight 	<ul style="list-style-type: none"> meadow is flooded with sunlight
WIND	<ul style="list-style-type: none"> cooler breeze near water 	<ul style="list-style-type: none"> occasional breeze
TEMPERATURE	<ul style="list-style-type: none"> 78°F within shade, pleasant 	<ul style="list-style-type: none"> 80°F near wooded edge, pleasant 82°F within meadow: full sun, hot
WATER	<ul style="list-style-type: none"> clear, rushing stream 	<ul style="list-style-type: none"> dry
CANOPY TREES	<ul style="list-style-type: none"> dense uphill, north of stream skinny and tall broken, uneven canopy over stream 	<ul style="list-style-type: none"> large walnut reaching out from tree line
SHRUBS	<ul style="list-style-type: none"> thorny signs of deer browsing 	<ul style="list-style-type: none"> fills the gaps between the tree trunks
HERBACIOUS	<ul style="list-style-type: none"> small, moisture & shade loving lush 	<ul style="list-style-type: none"> near edge of space
NATIVE PLANTS	<ul style="list-style-type: none"> black raspberry (<i>Rubus occidentalis</i>) fern 	<ul style="list-style-type: none"> Mountain mint (<i>Pycnanthemum virginianum</i>) mulberry (<i>Morus spp.</i>)
NON-NATIVE PLANTS	<ul style="list-style-type: none"> Autumn Olive (<i>Elaeagnus umbellata</i>) Japanese honeysuckle (<i>Lonicera japonica</i>) wineberry (<i>Rubus phoenicolasius</i>) mile-a-minute (<i>Persicaria perfoliata</i>) 	<ul style="list-style-type: none"> Japanese honeysuckle (<i>Lonicera japonica</i>) wineberry (<i>Rubus phoenicolasius</i>) multiflora rose (<i>Rosa multiflora</i>)
SOIL	<ul style="list-style-type: none"> KIC—Klinesville very channery silt loam, 8-15% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> Ap: 0 - 8" channery silt loam Bw: 8 - 14" very channery silt loam C: 14 - 18" extremely channery silt loam R: 18 - 28" bedrock 	<ul style="list-style-type: none"> KIC—Klinesville very channery silt loam, 8-15% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> Ap: 0 - 8" channery silt loam Bw: 8 - 14" very channery silt loam C: 14 - 18" extremely channery silt loam R: 18 - 28" bedrock
STRUCTURES	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A

Table 4: Physical Characteristics of Thresholds A-H continued

THRESHOLD	B	C
	WITHIN WOODLAND EDGE	WOODLAND EDGE / PASTURE
SLOPE	<ul style="list-style-type: none"> • slight decline • swale 	<ul style="list-style-type: none"> • slopes down at fence line
LIGHT	<ul style="list-style-type: none"> • sunlight enters through the openings at the ends of the corridor • sunlight filters through canopy • deeply shaded 	<ul style="list-style-type: none"> • flooded with sunlight • overhanging branches provide shade
WIND	<ul style="list-style-type: none"> • hint of a breeze • shielded by foliage 	<ul style="list-style-type: none"> • breeze from south • scent of horses
TEMPERATURE	<ul style="list-style-type: none"> • 78°F within shade, cool and pleasant 	<ul style="list-style-type: none"> • 78°F within shade, pleasant • 80°F full sun, hot
WATER	<ul style="list-style-type: none"> • after a rain event it's evident a swale naturally occurs here • flows within the path, downhill 	<ul style="list-style-type: none"> • flows from pasture into woodland
CANOPY TREES	<ul style="list-style-type: none"> • young trees and saplings are mixed with older woodland species • small trees (~15' tall) • larger trees, like oaks, grow above small trees (60'+ tall) • tight canopy • shields light from above 	<ul style="list-style-type: none"> • small trees like <i>Cornus florida</i> • larger trees like oaks and cedars • canopy of the woodland edge overhangs to the fence line • dense tree line
SHRUBS	<ul style="list-style-type: none"> • fills the gaps between the tree trunks 	<ul style="list-style-type: none"> • mix of invasive species • impede movement • vine plants wind up tree trunks and dangle off limbs
HERBACIOUS	<ul style="list-style-type: none"> • low grass 	<ul style="list-style-type: none"> • about 8 - 10' of mown lawn between fence and woodland edge
NATIVE PLANTS	<ul style="list-style-type: none"> • eastern red cedar (<i>Juniperous virginiana</i>) • flowering dogwood (<i>Cornus florida</i>) • oak (<i>Quercus spp.</i>) 	<ul style="list-style-type: none"> • eastern red cedar (<i>Juniperous virginiana</i>) • flowering dogwood (<i>Cornus florida</i>) • oak (<i>Quercus spp.</i>)
NON-NATIVE PLANTS	<ul style="list-style-type: none"> • Japanese honeysuckle (<i>Lonicera japonica</i>) 	<ul style="list-style-type: none"> • Japanese honeysuckle (<i>Lonicera japonica</i>) • wineberry (<i>Rubus phoenicolasius</i>) • Japanese stiltgrass (<i>Microstegium vimineum</i>) • smilax (<i>Smilax spp.</i>)
SOIL	<ul style="list-style-type: none"> • RIC—Reaville channery silt loam, 8-15% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> • Ap: 0 - 8" channery silt loam • Bt: 8 - 19" channery silty clay loam • C: 19 - 32" very channery silt loam • R: 32 - 42" bedrock 	<ul style="list-style-type: none"> • RIC—Reaville channery silt loam, 8-15% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> • Ap: 0 - 8" channery silt loam • Bt: 8 - 19" channery silty clay loam • C: 19 - 32" very channery silt loam • R: 32 - 42" bedrock
STRUCTURES	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • 5' tall wood and chicken wire fence • encloses pasture, obstructs entry

Table 4: Physical Characteristics of Thresholds A-H continued

THRESHOLD	D	E
	PIDCOCK CREEK RD	INSIDE RAYMOND FARM HOUSE & IMMEDIATE SURROUNDINGS
SLOPE	<ul style="list-style-type: none"> • gravel driveway has slight decline • smooth over road • uneven grass 	<ul style="list-style-type: none"> • level ground • elevated patio
LIGHT	<ul style="list-style-type: none"> • scattered shade under trees • bright, sunny road 	<ul style="list-style-type: none"> • sun reflects off of ponds into house • large glass windows let light in • dappled sun and shade under black locust
WIND	<ul style="list-style-type: none"> • strong, warm breeze in open road • rustling leaves under trees • gentle breeze under trees 	<ul style="list-style-type: none"> • N/A inside • minimal outside
TEMPERATURE	<ul style="list-style-type: none"> • 82°F on road, hot • 78°F in shade, pleasant 	<ul style="list-style-type: none"> • 84°F outside <i>gen-kon</i>, pleasant over gravel • 90°F inside <i>gen-kon</i> • 82°F inside living area, cooler
WATER	<ul style="list-style-type: none"> • dry 	<ul style="list-style-type: none"> • dry
CANOPY TREES	<ul style="list-style-type: none"> • scattered trees • large canopies, spreading branches • large trees (~80' + tall) 	<ul style="list-style-type: none"> • old trees, like a White Ash, occupy front yard • tall, wide • scattered specimen trees
SHRUBS	<ul style="list-style-type: none"> • maintained hedge 	<ul style="list-style-type: none"> • formal hedges border house • flowering
HERBACIOUS	<ul style="list-style-type: none"> • about 10' of mown lawn along fence • mown lawn under trees 	<ul style="list-style-type: none"> • mown lawn • tropical and annual plants
NATIVE PLANTS	<ul style="list-style-type: none"> • forsythia (<i>Forsythia x intermedia</i>) • pin oak (<i>Quercus palustris</i>) • maple (<i>Acer spp.</i>) 	<ul style="list-style-type: none"> • astilbi (<i>Astilbi spp.</i>) • pin oak (<i>Quercus palustris.</i>) • white ash (<i>Fraxinus americana</i>)
NON-NATIVE PLANTS	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • peony (<i>Paeonia spp.</i>) • Solomon's seal (<i>Polygonatum odoratum</i>)
SOIL	<ul style="list-style-type: none"> • BsB—Brownsburg silt loam, 3 - 8% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> • A: 0 - 10" silt loam • B: 10 - 30" silt loam • B: 30 - 44" very channery loam • C: 44 - 56" extremely channery silt loam • R: 56 - 66" bedrock 	<ul style="list-style-type: none"> • KIE—Klinesville very channery silt loam, 25 - 45% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> • Ap: 0 - 8" channery silt loam • Bw: 8 - 14" very channery silt loam • C: 14 - 18" extremely channery silt loam • R: 18 - 28" bedrock
STRUCTURES	<ul style="list-style-type: none"> • 5' tall wood and chicken wire fence • two lane residential road 	<ul style="list-style-type: none"> • house • elevated grass patio with stone wall • gravel up to <i>gen-kon</i>

Table 4: Physical Characteristics of Thresholds A-H continued

THRESHOLD	F	G
	BENEATH THE BLACK LOCUST CANOPY	WETLAND POND EDGE NORTH
SLOPE	<ul style="list-style-type: none"> steep, uneven slope between patio and black locust moderate slope near wetland 	<ul style="list-style-type: none"> incline towards house
LIGHT	<ul style="list-style-type: none"> dappled sunlight under black locust shade under tree line 	<ul style="list-style-type: none"> strong, bright sun
WIND	<ul style="list-style-type: none"> warm breeze from south, wetland rustle of the leaves 	<ul style="list-style-type: none"> warm breeze
TEMPERATURE	<ul style="list-style-type: none"> 78°F within shade, pleasant 87°F near the wetland meadow, sunny, hot 	<ul style="list-style-type: none"> 85°F, hot & humid
WATER	<ul style="list-style-type: none"> wetter ground within meadow 	<ul style="list-style-type: none"> wet ground pond puddling within meadow
CANOPY TREES	<ul style="list-style-type: none"> formal, gnarled tree line mix of younger and older trees broken limbs and thinning canopy fuller canopy downhill 	<ul style="list-style-type: none"> N/A
SHRUBS	<ul style="list-style-type: none"> Japanese plants, colorful 	<ul style="list-style-type: none"> N/A
HERBACIOUS	<ul style="list-style-type: none"> mown lawn until wetland meadow 	<ul style="list-style-type: none"> tall meadow grasses flowers colorful
NATIVE PLANTS	<ul style="list-style-type: none"> black locust (<i>Robinia pseudoacacia</i>) eastern red cedar (<i>Juniperus virginiana</i>) 	<ul style="list-style-type: none"> panicgrass (<i>Panicum spp.</i>) northern blue flag Iris (<i>Iris versicolor</i>) eastern red cedar (<i>Juniperus virginiana</i>)
NON-NATIVE PLANTS	<ul style="list-style-type: none"> elephant ears (<i>Colocasia</i>) 	<ul style="list-style-type: none"> yellow iris (<i>Iris pseudacorus</i>)
SOIL	<ul style="list-style-type: none"> KIE—Klinesville very channery silt loam, 25-45% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> Ap: 0 - 8" channery silt loam Bw: 8 - 14" very channery silt loam C: 14 - 18" extremely channery silt loam R: 18 - 28" bedrock 	<ul style="list-style-type: none"> DdB—Doylestown silt loam, 3-8% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> Ap: 0 - 6" silt loam Btg: 6 - 28" silt loam Btx: 28 - 65" silt loam
STRUCTURES	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A

Table 4: Physical Characteristics of Thresholds A-H continued

THRESHOLD	G'	H
	WETLAND POND EDGE SOUTH	MEADOW / WOODLAND EDGE
SLOPE	<ul style="list-style-type: none"> • moderate incline away from pond 	<ul style="list-style-type: none"> • incline towards woodland • elevated dry meadow area • depression at woodland edge
LIGHT	<ul style="list-style-type: none"> • strong, bright sun 	<ul style="list-style-type: none"> • strong, bright sun in meadow • dense shade directly under tree
WIND	<ul style="list-style-type: none"> • warm breeze 	<ul style="list-style-type: none"> • warm breeze
TEMPERATURE	<ul style="list-style-type: none"> • 85°F, hot 	<ul style="list-style-type: none"> • 85°F, hot & humid meadow • 79°F, cool directly under shade of tree
WATER	<ul style="list-style-type: none"> • wet, but drier up slope • pond 	<ul style="list-style-type: none"> • dry
CANOPY TREES	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • dense within woodland, occasional breaks • large trees (~70' tall)
SHRUBS	<ul style="list-style-type: none"> • few successional woody plants (2' tall) 	<ul style="list-style-type: none"> • thorny, vine covered along tree line • successional growth near woodland
HERBACIOUS	<ul style="list-style-type: none"> • tall meadow grasses • flowers • colorful 	<ul style="list-style-type: none"> • tall meadow grasses • bright, colorful flowers
NATIVE PLANTS	<ul style="list-style-type: none"> • panicgrass (<i>Panicum spp.</i>) • northern blue flag Iris (<i>Iris versicolor</i>) • American vervain (<i>Verbena hastata</i>) 	<ul style="list-style-type: none"> • panicgrass (<i>Panicum spp.</i>) • gill-over-the-ground (<i>Glechoma hederacea</i>) • purpletop (<i>Tridens flavus</i>)
NON-NATIVE PLANTS	<ul style="list-style-type: none"> • yellow iris (<i>Iris pseudacorus</i>) • multiflora rose (<i>Rosa multiflora</i>) 	<ul style="list-style-type: none"> • Japanese honeysuckle (<i>Lonicera japonica</i>) • wineberry (<i>Rubus phoenicolasius</i>) • mile-a-minute (<i>Persicaria perfoliata</i>)
SOIL	<ul style="list-style-type: none"> • DdB—Doylestown silt loam, 3-8% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> • Ap: 0 - 6" silt loam • Btg: 6 - 28" silt loam • Btx: 28 - 65" silt loam 	<ul style="list-style-type: none"> • DdB—Doylestown silt loam, 3-8% slopes <p>Typical profile:</p> <ul style="list-style-type: none"> • Ap: 0 - 6" silt loam • Btg: 6 - 28" silt loam • Btx: 28 - 65" silt loam
STRUCTURES	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A

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