



WPI

Exploring the Night Sky: Scenic Design Process and Standards



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Abstract

This paper describes my experience as the scenic designer for *Silent Sky*, by Lauren Gunderson, produced by the WPI Drama/Theatre program in B-Term of 2021. This report covers a complete scenic design process, including design choices, research, collaboration, feedback, and documentation. This project's goal was to learn a revised scenic design process, create a spectacular scenic design, and become familiar with industry standards for scenic design deliverables. This project reflects professional growth in WPI's theatre program.

Acknowledgments

I would like to thank the Drama/Theatre (DT) program and the entire WPI theatre community for this rewarding experience over the past few months. I thoroughly enjoyed working with you all and cannot wait to see what you continue to accomplish in the upcoming years. In addition, I would like to extend my thanks to Professor Patrick Crowe and Dr. Kathryn Moncrief from WPI Theatre for their guidance in the creative process of this project. Finally, a special thank you to Professors Laura Eckelman and Despoina Giapoudzi, without whom this project would not have been possible.



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1 INTRODUCTION

Designing has long been a passion of mine, whether it be in engineering, art, or theatre. Coming to Worcester Polytechnic Institute (WPI), I had never participated in technical theatre before but was highly interested. I did not know where to start, having no previous knowledge of the craft until my sophomore year when I scenic designed my first show, *Mamma Mia!* Since then, I have grown to love technical theatre and scenic design, so I chose to scenic design for the Drama/Theatre's (DT) B-term show, *Silent Sky*, as my Humanities & Arts Major Qualifying Project (MQP).

The most important lesson I learned from past coursework and theatre experiences is that the designers and technical team must constantly communicate to produce the best quality show overall. The true magic of live performance comes from integrating all the moving parts. The key to a successful show is for all departments in the loop, from the actors to scenery, lighting, props, sound effects, and so on. For example, scenery and scenic art can look okay at first glance, but as soon as a light is shed on something that was supposed to be hidden, such as the non-aesthetic structure in the set, the show becomes less believable for the audience. It's crucial that the designers and technical team are always on the same page to ensure that the designs connect and fully immerse the audience in a different world.

Past productions I have scenic designed varied in style from musicals to straight plays. Although the experience of designing for various styles of shows is valuable, it did not give me a chance to nail down a scenic design process. As a direct result of not always following the same process, my deliverables for each production were always different and it was never very clear to me if there was a standard. Throughout this MQP, my goal was to learn what standard deliverables in scenic design are, and how those materials are presented to other members of the production team. I will hopefully one day apply these standards in the professional theatre industry.

The next two chapters are reflections on my production experience and drafting explorations. The production reflection chapter covers my scenic design process from initial concepts with the creative team to the physical construction and collaboration with the head carpenter (HC). The focus of this chapter is to consider my overall production experience and conclude what my learning outcomes were. The scenic drafting packet chapter outlines my learning about scenic design standards and deliverables. The final drafting packet (attached as an

appendix) includes the major technical drawings necessary for the technical director (TD) and HC to understand the set and how it could be constructed. The packet also includes additional details such as textures, paint colors/palettes, finishes, materials, etc. More details and further explanations can be found in the scenic drafting chapter.

2 PRODUCTION REFLECTION

After receiving the position offer, I immediately knew that I wanted this design to stand out. This meant that I had to nail down a scenic design process. The tight time constraints associated with B-term shows required that this work had to begin as early as September. After reviewing the scenic design processes I had used in the past, I articulated a process to keep myself on track while leaving room for creativity. That process consisted of:

1. Read the Script
2. Research and Collaborate
3. Initial Design
4. Feedback and Additional Research
5. Mid-term Revisions
6. Touch-ups/Finalizing
7. Final Design Touches
8. Adjust as Needed

2.1 Read the Script

The first task in designing a show is always reading the script. I took the approach of going over the text multiple times until I felt confident enough to start marking pages. The pages I marked were ones with scenery notes, stage directions, or scenery mentioned in the dialogue. These indications were very important because scripts often rely on specific named elements. If an element is mentioned during the show and it is not present, it is perceived as poor design execution, unless it is blatantly obvious to the audience that the element mentioned is purposely not there. Minimal script analysis can be performed but it is preferable to conduct additional research and have a discussion with the director and other designers to verify that all visions are aligned before complete analysis of the text.

2.2 Research and Collaborate

As soon as the script was marked, I commenced the research by looking into background information about the origin of the show and why it was specifically chosen by WPI Drama/Theatre. *Silent Sky*, by Lauren Gunderson, is based on the true story of a female astronomer named Henrietta Leavitt, who worked at Harvard in the 1910s. Although it is a work of historical fiction, the message of the story is what really caught the eyes of WPI Theatre. This story portrays the discrimination that Henrietta Leavitt, and other women, endured in the Harvard Observatory purely because of their gender. Henrietta went on to discover a way to map the stars in the universe by finding the correlation between period and luminosity. Using her research, other astronomers were able to translate the sky into a three-dimensional map and determine where we are in the universe. Despite the prejudice that Henrietta experienced, she persevered and accomplished greatness. One goal of this production was to relay the message that with curiosity, wonder, and diligence you will prosper no matter your identity. WPI Theatre thought this was a valuable lesson for our community, in part because of the obvious parallels to the STEM industry.

While developing our approach to this production, the creative team picked out a few keywords that synthesized all the team members' visions of the production. Two words that came up again and again—wonder and curiosity—were represented by the images found in Figure 8, Appendix B. I knew that whatever my design would become, I wanted it to include these two feelings.

2.3 Initial Design Parameters

My research began with determining which stage orientation this show would use. Because the Little Theatre (LT) is an unconventional black box theater with two permanent seating banks, the two obvious options to choose from were thrust and arena stage. The director's original idea was an arena stage, which creates a community between audience members and the performers. Having the audience surrounding the entire stage lets the energy of the performance resonate within the space. Although these qualities were desirable, this stage style also presents major challenges to the director, actors, and creative team because all audience views must be considered. This meant that the scenic design could not include very tall structures because they would obstruct sightlines. The arena layout also did not create much opportunity for video

projections, which were also desired by the director. The director and I ultimately chose a thrust arrangement because of how small the LT already is. This layout, with audience on three sides, could create a feeling of intimacy and allow for projections. The audience would be enveloped by the environment of the show and the actors could give the audience a more personalized experience.

The second necessity for this show was selecting a type of set. Different scenic approaches (box sets, composite sets, etc.) utilize different vocabulary (wagons, flats, etc.), and the thrust orientation limited the types of sets that could be chosen from. Fortunately, the playwright describes in relation to the scenic design that “swift transitions are key,” and suggests that the set should not be a realistic room. The LT does not have large exits and entrances, which limits the ability to move scenery pieces easily on- and off-stage. The play’s fast-paced scene transitions called for a set that could remain stationary throughout the duration of the show. A unit set would satisfy this need because the main architecture never changes, so every scene takes place in the same scenic environment. Only small scenery pieces such as chairs and desks would move. Using this approach, my scenic design would create a general environment that allowed the setting to change from scene to scene without large set pieces moving.

Lastly, I wanted to incorporate a textual theme in the scenic design. The play’s focus on space and astronomy made me fixate on circular geometry. Telescopes, planets, stars, and solar systems all resemble circles and I thought that this would be a clever theme that the audience would understand right away. Some reference images of circular symbols—including the Harvard observatory, where much of the show takes place—can be found in Figures 10-11, Appendix B. In the initial design, you can see how some of those geometries were implemented.

2.4 Initial Design

At the beginning of the sketching and drafting process, there were already many factors to consider: the stage orientation, style of set, and the many themes engaged by the creative team. Each of these parameters were involved in my next steps of sketching the initial design.

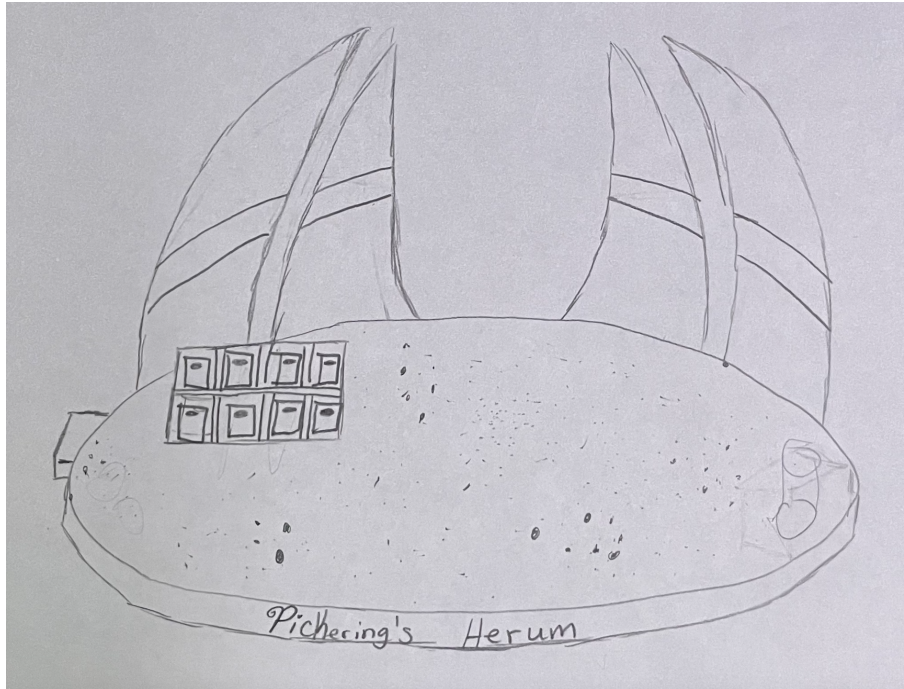


Figure 1: Rough initial design sketch of the scenic design

Figure 1 shows my rough initial scenic sketch representing a large circular star plate as the platform, four concave arches that resemble the dome shape of an observatory, and a long desk for file storage. The large circular platform was the centerpiece where different scenes took place or the actors could “orbit” around. The goal of this choice was to not associate a specific place or setting to this platform but rather have an open area that could represent multiple environments. I wanted to use imagery of a star plate (a map of the stars transcribed onto glass) as the floor texture because it does not define a specific space or setting. Star plates are also an integral part of the show, driving the discoveries that the characters make. Since space is vast and not necessarily a specific place, I decided that it would be the perfect pattern to depict on the large platform. However, a white or “transparent” star plate painted over the entire platform would be too bright under the stage lights and could potentially draw too much attention from the actors. Instead, I chose an inverted color star plate that represents space as black and stars as white. A reference image of a real star plate from the 1900s is shown below in Figure 2 and the inverted color star plate can be seen in Appendix B, Figure 12. The goal of this abstract platform shape and paint treatment idea was to make the stage space feel surreal, similar to a dreamscape that represented multiple scene settings.



Figure 2: Reference image of a star plate from the 1900s

Since the show also involved video projection, specifically of the stars and night sky, I needed to design a surface to be projected upon. Initially, I was inspired by other productions of *Silent Sky* to have arches concaving inward over the large circular platform. These arches would help give the feeling of an observatory dome but would not be too literal since they were only broken up pieces that could be transformed by projections.

The platform and shards would all be non-movable parts of the unit set, which would also include desks and stools. These smaller, mobile scenic elements would give the design some additional layers and would allow for different orientations within the space. For one scene the desks and stools could be aligned to resemble the office at the Harvard Observatory, and for the next they could be swiftly rearranged to resemble an ocean liner, complete with a life preserver hanging in the front. The stools also played with the abstraction versus realism, as they were designed to look like the chimney stacks of a 1900s ocean liner.

The beginning of the show is set in rural Wisconsin, where Henrietta and her sister Margaret are from. The scene takes place at sunrise, and the ominous feeling of silhouettes spoke to the director, the projections team, and myself. Silhouettes communicate the feeling of the unknown because nobody knows what lies behind the shadows. This struck me as a symbol for Henrietta and her future, and inspired me to include silhouettes in the design. Ultimately, this

silhouette idea informed the different projection surfaces I created in coordination with the projections team. A production photo showing this silhouette can be seen in Appendix F.

Since I was drawing so heavily on images of space and the stars, I wanted to include something that could ground the scenery, specifically for the scenes that take place outside of the observatory. This led me to incorporate the exterior siding of the Wisconsin homestead, with a tree branch hanging above. I also hoped that this branch would cast light shadows in some scenes, making the setting a little more mysterious. The tree branch gave a tangible quality to the set because it was natural and grounded in everyday life.

2.5 Mid-Term Revisions

At numerous meetings with the creative team, I received feedback on how the scenery could be improved. One of the biggest comments about the initial design was that it felt very flat. Although the circular platform did add some height, its large diameter made it feel almost as if it was the ground layer. Based on this note, I decided to read the text once more and try to find a clever solution to this lack of levels. Eventually, I incorporated a second circular platform that sat on top of the large circular platform and represented the ocean liner. The small platform had boat wooden decking laid across the top and a 1900s ocean liner railing. The railings were also a safety precaution for anyone who interacted with the raised platform. Adding levels gave the design more versatility and reduced the flatness & simplicity of the set. The added levels also gave the director and actors more options to guide the audiences' eye toward important moments. In retrospect, this ocean liner platform was even more clever than I realized at the time: throughout the show the ocean liner represents change, and in the scenic design it changed the height perspective of the audience and the characters.

The second imperative comment I received from the creative team was a concern about the dome-like arches. Since they were inspired by other productions of *Silent Sky*, it was suggested that my initial design was a partial plagiarism of other scenic designs. This was not my intention and was changed immediately, leaving a question of what they could replace the arches as a projection surface. I went back to the theme of space/time and created curved back walls oriented at different angles. The goal of these walls curvature was to represent a path similar to a sine wave, as shown below in Figure 3.

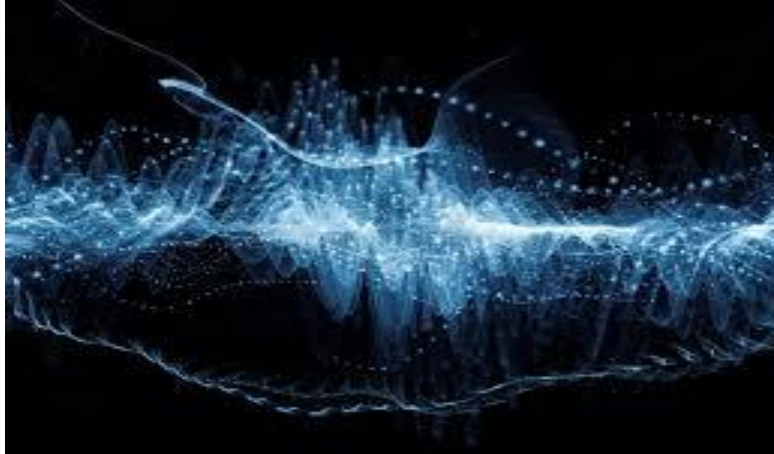


Figure 3: Reference image of an artistic sine wave

In addition to relating to space, time, and light, the sine wave also related to the water that the ocean liner sailed upon. The projections team had an idea to project water on the ground during those scenes, and I added wavy texture to the back walls to give them layers and also to represent the waves of the water. Along with these ocean waves, I added wainscoting (wood paneling) on the bottom of the flats, as both an extension of the ocean liner deck and an architectural reference to period interiors (like the observatory office where the characters worked)..

The third comment that I received, specifically from the director, was that the desks should look “of the period.” Based on this note, I did research about 1900s desks and found many reference images depicting beautiful dark stained wood colors and elegant carpentry. I realized that although I could use a similar stain, the desks given to the female characters should not be in their prime, as they would most likely be old and rickety desks that the men of Harvard Observatory no longer cared for. I designed some simple, two-shelved desks that could be assembled with plywood and wooden dowels, with casters attached to the bottom for mobility.

The fourth major comment I received on my initial design was specific to a scene in which Margaret was doing laundry back in Wisconsin. The director requested an ironing board for the actor to perform the laundry chores on. I foresaw some challenges integrating a bulky ironing board into the design, specifically in terms of sightlines and mobility; but using the space to my advantage, I figured out a way to have the ironing board fold down from the inside of the downstage I-beam, and to fold back up when needed. This solution was optimal because it did

not obstruct any audience members' views, and it enabled quick and easy access to the ironing board without having to carry it onstage. In this design, the ironing board also served as a piano for Margaret to play. To further flesh out the Wisconsin home design, I also added more detail to the wooden house siding, describing to the scenic artist what kind of colors, textures, and weathering I would like to see. The siding was important to delineate their home space where Margaret would read letters from.

During the final stretch of the design process, we found ourselves reexamining the fold-out ironing board/piano, which seemed to be a safety hazard because it was blocking one out of the two emergency exits. This was rectified by giving Margaret a wicker laundry hamper instead, but cutting the ironing board meant that we now needed a piano. I realized that obtaining a period piano within our budget was unfeasible, so instead I chose to modify a modern piano by cutting into it with the same curvature as the back walls. This would help continue the abstract and dreamscape themes of the scenic design. (The original construction drawing for the piano is in Appendix C.)

After I addressed all these comments, I did a few more intermediate sketches, and then created a 3D CAD model of the entire scenic design in SolidWorks, as seen below in Figure 4. I thought this would be beneficial to the production team so they could visualize the scenery and its size/orientation in the LT.

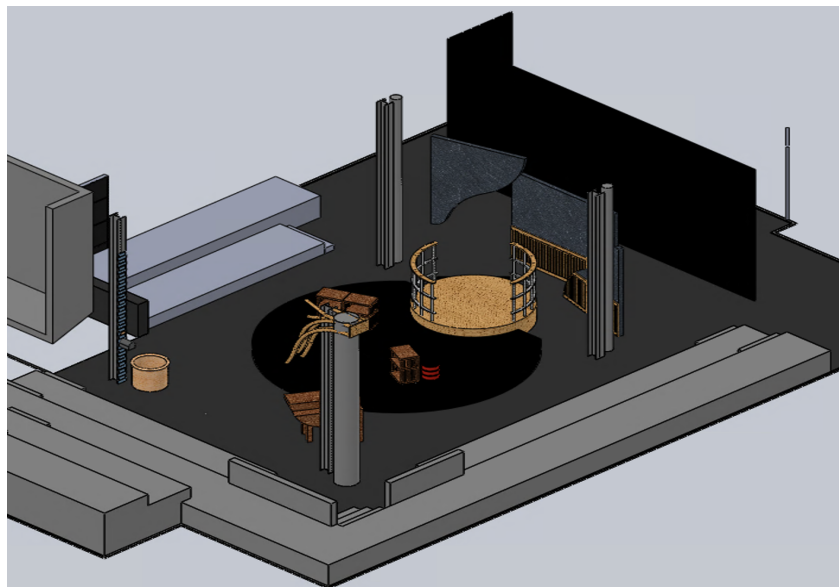


Figure 4: SolidWorks model of the final scenic design

2.6 Final Design Touches

After the major design work was completed, I wanted to incorporate a subtle personal designer “easter egg” into the set. I found an opportunity in Margaret’s address plaque. The number I chose for the show was the same number as my address here in Worcester. I thought this “easter egg” was subtle enough that only friends and family of mine would notice.

After the scenic design was completely 3D modeled and finalized, I went on to make a scenic construction packet. This packet included detailed drawings of every scenic element, from the large circular platform to the wooden house siding. The goal of this drawing packet was to accurately illustrate to the carpenters the dimensions of each piece, and to illustrate how they could be constructed. The packet also helped ensure that every scenic element would be accounted for when the fabrication of the set began.

2.7 Challenges and Key Learning Moments

Even though the final production was fantastic, I still faced challenges along the way. Throughout the building process, there were complications involving the tree branch, piano, projections, and the placement of the back walls. The tree branch interfered with some lighting fixtures and was also not easily affixed to the theatre architecture, so it would sag into a position that was less pleasing to an audience member’s eye. The interference was resolved through some collaboration with the lighting department and the sagging was solved with extra tie line and fasteners. It was a simple fix but still notable.

The piano curvature became an issue when the HC realized that the only way to create the desired shape was to cut through a very thick brass plate within the piano. After many hours and several saw blades, our vision was achieved. The geometry and aesthetic of the piano were slightly modified from the original design, allowing the audience to see the inside of the piano, but this new version fit very well with the abstract aesthetic of the scenic design.

Lastly, after the scenic design was completed, I was notified by the projections team of a geometry challenge with the back walls: If the walls remained where I drew them, then the projections would hit the actors’ faces when they stood on the upper platform. But if they placed the projector further upstage to prevent that issue, then the back walls also needed to be moved upstage (so the projections could fill them). At first this change seemed concerning—like it was

going to change some perspective of the scenery and possibly obstruct sightlines from the audience's view. But after some trial and error, the projection and scenic teams were able to compromise on the position of the back wall, so that the projections would project only above the wainscoting but would not hit the actors' faces.

During the build period, other scenic elements were also adjusted from their original dimensions to suit the actors' needs and comfort. We increased the size of the stools and eliminated the wheels on the bottom of the desks. The desks turned out to be very lightweight and the caster wheels proved unnecessary.

While the scenery was being constructed, the scenic artist and I experimented with different color palettes and wall textures. The most difficult painting technique was for the weathered, wooden house siding. The scenic artist grasped the weathered aesthetic very quickly, but we needed a method to distress the wood after it had been painted. Eventually, we achieved the desired look by scraping the painted house siding with a metal brush. This gave the freshly painted surface some grooved texture and unevenness. The final product achieved the goal of an aged and weathered aesthetic for the house siding.

Possibly the most complicated experimental process that the scenic artist and I encountered was developing the back wall texture. The wall was supposed to have a wave texture, but neither the scenic artist nor myself were experts at manipulating spackle, so we weren't sure how to achieve this effect. After many hours of testing and various mockups, we created two very satisfying options, both of which had unique traits (shown below in Figure 5). We selected the bottom texture because it was simpler to create and gave a more wave-like appearance.



Figure 5: Curved back wall texture mockup iterations 3 & 4

One scenic element that proved invaluable was the small added platform, which was used for many settings beyond just the ocean liner. In one scene, it became a lecture hall for Peter Shaw, who used the railing as a podium. In this scene, the wooden decking of the ocean liner was easily reimagined as the hardwood floor of an academic building. The ocean liner platform was also used as a dreamscape location, where Henrietta daydreamed about her and Peter waltzing (as seen in Figure 6, below). Even though these ideas were not my original intention, the director utilized the scenery to make brilliant choices that tied the show together. This brought me much joy as a designer because these staging choices made sense in the performance and were also picturesque. It felt like individual paintings being stitched together to create a moving picture.



Figure 6: Henrietta and Peter waltzing on the ocean liner platform

Reflecting on the work that I produced for this production, I learned some valuable lessons along the way. For example, the construction packet that I made was very organized and helpful but went into too much detail, particularly in its dimensioning. I learned from the HC that only critical dimensions needed to be given, such as the outline and any crucial details within the design.

Another lesson this design process helped me learn is that it is bad practice to reference other designs of the same show. In addition to bordering on plagiarism, this practice should be avoided so that a designer's creative thinking is not skewed by someone else's design. Overall, I learned a copious amount during the production period, and would continue expanding my technical knowledge of scenic drafting over the next term.

3 SCENIC DRAFTING PACKET

After the show concluded in B-term, I was able to focus on developing my understanding of scenic drafting. This included creating my own drafting packet, which is what scenic designers in the industry use as their primary deliverable to the TD and HC. For the numerous productions that I have scenic designed at WPI, I never had a standard to follow. I did not know which conventions were used or what deliverables were expected of a professional scenic designer. I was always able to express my vision to the production team through sketches and drafting, and I occasionally used SolidWorks to 3D model the scenic design; but during this MQP process, I wanted to learn the common practices used by professional scenic designers in the theater industry, so that I could hopefully one day turn this hobby into a career. In order to achieve this goal, I needed to learn about scenic drafting conventions and Vectorworks.

3.1 B-term Drafting Research

In B-term, while the scenic design was being constructed, I had the opportunity to learn more about proper drafting technique. My journey started with learning about how different line forms can help convey meaning. Creating a standard for line types and weights can help establish a cogent hierarchy and ultimately assist the reader in picking out the most significant information within a drawing. There are many different types of drafting lines, and they each have a unique purpose. Centerlines and plaster lines both split the stage at center, creating a reference point from which all scenic elements can be measured. Cutting plane lines have arrows that indicate where and in which direction a section “cut” is being made, and the annotations around these lines can depict the orientation of different elevation views. Continuous lines are lines with no breaks in them, which are generally used to outline architectural and scenic elements.

Line weights are also very important in drafting because they are used to clarify object relationships and significance. The “weight” refers to the width of a line. In general, if the set-piece is drawn with a “heavy” line weight, then that set-piece is important and is meant to stick out from the ones that have “lighter” line weights. Heavier line weights represent section cut lines and profiles, while lighter line weights represent guidelines, interior contours, and dimensions. These various techniques are essential for generating clear scenic drawings.

3.1.1 Orthographic Projection

The next concept I learned about was orthographic projection, which allows the designer to take a three-dimensional idea and transcribe it onto a two-dimensional sheet of paper, so that the fabricator can construct it accurately. I learned to visualize orthographic projection by imagining a glass box that encases an object, such as a car. Each side of the box represented a flat view of the car that could be plotted parallel onto a piece of paper. An example of a model car in an orthographic projection can be seen in Figures 59 and 60, Appendix E.

One of the most important rules in orthographic projection is that length, width, and height (the three spatial dimensions) must remain constant across every view of the same object. This concept is critical for a scenic designer to understand because it allows them to represent their scenic design in different perspectives, helping the creative team understand how the scenery is oriented onstage. It also allows them to specify details on a scenic element that has complicated geometry or is not symmetrical. This technique of orthographic projection allows the designer to create elevations and sections of their design.

3.1.2 Scale

A full-size drawing of the set would be impractical, which is why scale is important. Scale is the technique of representing a large distance by a smaller increment of measurement, or a small distance by a larger increment of measurement. The purpose of scale is to provide accurate information on a small piece of paper. It may take multiple sheets to convey all the information necessary to the creative and construction teams, but scale drawings allow that information to be precise and clear.

Most often, scenic drawing packets include different views (ground plans, sections, and front elevations) all drawn in the same scale—small enough to fit onto a single piece of paper. Sometimes additional scales are used to show specific details of a scenic element by enlarging a cropped view from a previous drawing that may not have been large enough to convey the information needed. Scale improves the collaboration process between departments because draftings of the design can be shared in a concise manner.

3.1.3 Drawing Views and Orientations

There are many orientations and views that a scenic designer can use to present the final scenic design. The views included in the final scenic design packet depend on the complexity of the design and the crucial details that the designer wants to identify. The three most common orientations included in most drafting packets are the ground plan, centerline section, and front elevation. These three views show all the major dimensions of the set, and can help the production team understand the basic position and sizing of all scenic elements within the performance space.

A ground plan is essentially a horizontal section sliced through the entire set at roughly head height (or slightly above). The goal of the ground plan is to outline the basic geometry of the space, showing where each element goes. The cutting plane height is up to the designer, but is almost never taken from floor level. The ground plan cutting plane should be located to show the objects of most concern (typically furniture, doorways, etc.). Any geometry that the plane cuts through is represented by hatched profiles or dashed lines.

On a ground plan, heights are sometimes indicated using numbers inside bubbles. For instance, a 0" symbol inside a bubble is placed on a surface that represents the ground level. Scenic elements such as platforms, stairs, railings, etc. that have heights above the 0" level are marked with a plus followed by the dimension in inches (+9", +18", +27", etc.). Scenic elements below the 0" level, such as orchestra pits, are marked similarly, using a minus sign instead of a plus.

Sections are drawings oriented perpendicularly to the floor plane, as if the set has been cut-through vertically. An example of a simple front elevation and section view of a door can be seen in Figure 61, in Appendix E. The section line (or cutting line) is cut wherever the designer deems most appropriate or helpful—typically along the theater's centerline. Since a section view is cut through, it shows only half of the space. The scenic designer may decide which side of the set to draw based on the number or complexity of scenic elements on each side. Multiple section views may be needed if the scenic design is extremely detailed or has multiple layers.

Front elevations are similar to section views in that they are side views. The main difference is that in a front elevation, the entirety of the set can be seen and none of the scenic elements are cut through. The view is generally taken from downstage of the apron to allow the

reader to see the “front” view of the design from where the audience sits. Front elevations also allow the reader to observe the differential heights in proportion to one another. Front elevations are particularly helpful for showing more details of the scenic elements. Unlike ground plans, which use simple shapes from a view that nobody will see, front elevations include articulated textures and edges that depict scenic elements as the audience will actually see them.

3.1.4 Dimensioning

Dimensions are measurements that quantify distance and geometry. When dimensioning a drawing, there are a couple of rules to keep in mind. The first rule is that the scenery dimensions should define the scenery at its full length, not its “scaled” size. For example, if a flat designed to be 8 feet tall is shown on a drawing in $\frac{1}{2}''=1'0''$ scale, the flat should be dimensioned as 8 feet tall (**not** 4 inches) because that is the full-scale size of the flat.

Secondly, scenic designers should not crowd their major composite drawings (ground plan, section, and elevation) with unnecessary dimensions. Instead, scenic designers can provide key dimensions that show how important scenic elements relate to the space and to each other. If additional dimensioning is needed, detail views (plans, elevations, and sections) may be drafted onto additional sheets. Deciding which elements need dimensioning requires only a quick conversation between the scenic designer and the head carpenter.

3.1.5 Notes and Title Block

Title blocks are used to clarify the contents and features of a drafting plate. The most common information included in title blocks is: the title of the show, the location of the production, production dates, the view the drawing is depicting, the scale, revision history, and plate number. Title blocks can help organize the drawings and summarize what information is on each sheet, so that the viewer doesn't need to analyze the entire drawing just to see what it is.

The scenic designer also annotates their drawings with notes, for added clarity. For example, instead of spending extra time drafting surface textures or detailing paint patterns, the scenic designer can instead leave a note or even an image to describe the desired texture or pattern. Notes are utilized by designers for organization, clarity, and efficiency of drafting.

3.1.6 B-term Conclusion

By the conclusion of B-term, I had learned many different standards and thought processes that a scenic designer follows during the drafting phase. One of the most important takeaways I incorporated into my design philosophy was how to make decisions about what kinds of drawings to include in the drafting packet. Although I had not yet started drafting, I began to realize which drawings were essential and how I might assemble the *Silent Sky* final drafting packet. In making these decisions, I considered how to clearly show the creative team what the scenery would look like onstage, to share critical dimensions and positions of each piece, and to illustrate my overarching aesthetic and spatial concerns. With these goals in mind, I chose to depict the scenic design with a ground plan, centerline section, and front elevation. These detailed views were chosen because they conveyed most of the information necessary for the creative team to understand the design, and for the HC to construct it. Some other views could have been created to clarify details of specific scenic elements such as the back walls; but if the HC or production team had further questions, they were directed to contact the scenic designer directly for clarifications.

3.2 C-term Drafting

In C-term, my introduction to Vectorworks commenced. My goal was to use the knowledge I had gained in B-term and implement it in Vectorworks to create final drafting plates of my scenic design. The learning curve in Vectorworks was steep, but my familiarity with SolidWorks made the process smoother than if I'd had no drawing experience at all.

I started with the basics of palettes and workspaces. Next, I learned what tools created different geometries and how to organize the document with different classes and layers. Once these basic tutorials were completed, I began drafting my set onto a pre-existing drawing of the LT.

My three plates (ground plan, centerline section, and front elevation) needed to be presented in the same scale, so that the plates would clearly relate to each other. Working with the drawing provided, I chose to draft these three views in $\frac{1}{4}'' = 1'0''$. This is one of the most common scales used in scenic drafting when plating a ground plan or full-stage elevation.

3.2.1 Ground Plan Drafting

The center and plaster lines are the most prominent lines on the ground plan, as expected. They have a convenient intersection point at the center of the stage, which is no coincidence. The plaster line was purposefully placed at this position to create the central point where the large circular platform's arc ends and the center of the ocean liner platform are both located. This shows symmetry as well as giving a true position from which other scenic elements' positions can be referenced along the x-axis.

Ground plans are most often oriented with the downstage side of the drawings placed at the bottom of the sheet, to allow the reader to perceive the layout from the audience's perspective. In this case the ground plan needed to be horizontal to fit on the page, so this layout was an exception to the standard.

In the ground plan, the theater structure (specifically the walls, I-beams, and vertical cylindrical ducts) are drawn with a very thick line weight because they are cut-through. These building structures are important to the drawing because they are immovable and will therefore affect the orientation of everything in the space. The seating banks, stairs, and other architectural features have a lighter line weight on all three drafting plates because they are known and will not heavily affect the overall design.

Dashed or hidden lines are used in the ground plan to show items that are either above the cut line or behind/beneath another object. As you can see in the notes of the final scenic drafting packet (in Appendix H), the ground plan is cut at 72 inches from the ground, which intersects the hanging back walls. (72 inches is a standard cut height because it intersects major elements like doors and windows, while looking down on most furniture items.) Because of the +72" cut line, the back wall flats are shown as cut-through, with dashed lines representing the rest of the flats above the cutting plane.

Continuous lines are used for almost every other scenic element across all three drawing plates. These represent the physical scenic elements onstage, such as the circular platforms, desk, stools, piano, etc.

The ground plan includes dimensions for the platform diameters, as well as the length of the cut-off side of the large platform. These dimensions were crucial, and if interpreted wrong, could lead the platform to be over- or undersized in relation to the space. Another critical

dimension included on the ground plan was the width of the flats. Flats generally have a standard height of eight feet tall (which I utilized) and a width of four feet. To ensure that they would be constructed accurately, it was important to note that the two curved flats were six feet wide and that the large center flat was eight feet wide. The relative angle to which the flats would be placed was also noted as a reference. The bubble method was used to label the heights of the major horizontal scenic elements (platforms, e.g.).

Since the ground plan uses basic geometric shapes to depict many scenic elements, labeling them was critical, as seen in Figure 7 (below). Additional clarifying notes were also added, such as Ground Plan Note 2, which explains that the pattern on the ocean liner platform represents the boat decking. Another note showed a reference image for the inverted star plate design that would be painted on the large platform. Notes like these help provide clarity, save time, and encourage collaboration.

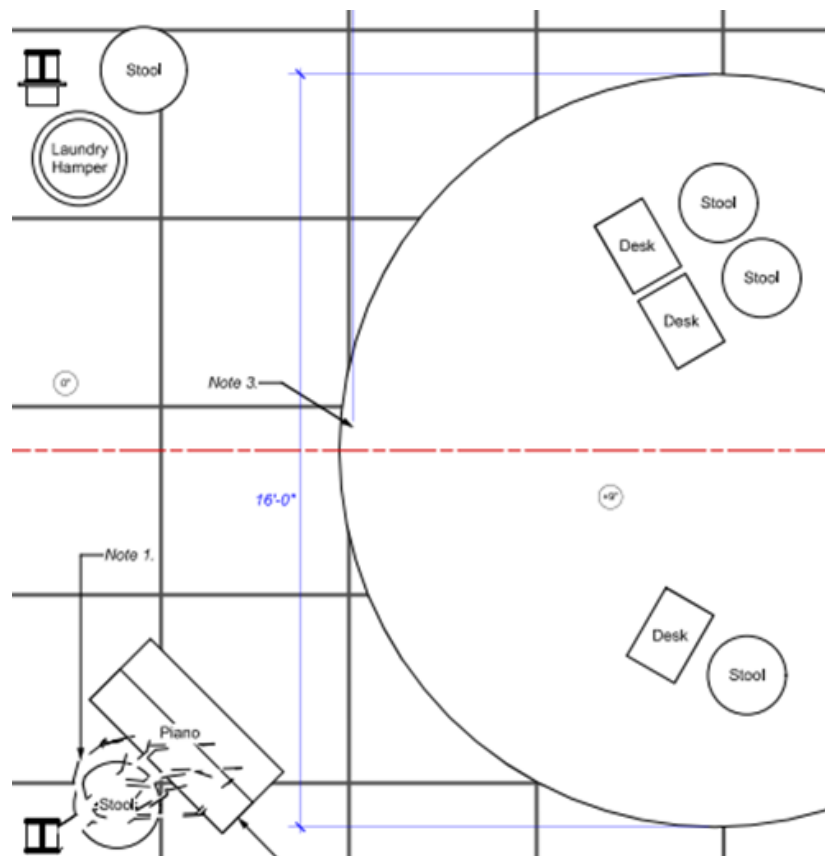


Figure 7: Cropped view of the ground plan displaying the labeled scenic elements

3.2.2 Centerline Section View Drafting

The centerline section view was selected because the set is symmetrical about the centerline, and so the other half of the set can be mostly inferred by looking at the ground plan. I chose to view the stage right side of the set because it included more movable stage elements, such as the desks, stools, and hamper. This perspective also allowed me to dimension the hanging height for the curved back wall flats.

While adding critical dimensions, I noticed that it was helpful to indicate the heights of several narrow items that would have been difficult to dimension on the ground plan—such as the railings, mailbox, and house siding. Other dimensions in this view were less critical and could simply be interpreted by the HC.

Many scenic elements drawn in this view are clearer than on the ground plan, but some still require labels for organization purposes. Few other notes were added to this plate, but if the production team had questions or concerns, they could contact the scenic designer.

One unusual decision made on the section was to draw the mailbox with a heavier line weight than the house siding. Although not technically correct as per the best practices of drafting, this decision made the drawing clearer by defining that the mailbox was not part of the house siding.

3.2.3 Front Elevation Drafting

The front elevation was taken from the “Front Elevation Cutline” shown in the ground plan, because this view would give a realistic impression of the entire set, as seen from the “south bank” audience seats. (The LT does not have an apron, so the area right in front of the downstage first row of seats was used as the cutting line.) Similar to the centerline section view, the front elevation shows what the scenic elements look like from the side, as most people see them. It also includes more detail, particularly of pieces like the piano and desks. No dimensions were included in this orientation because all that information was available on the ground plan and/or front elevation, and because those dimensions would likely crowd the drawing.

3.2.4 Drafting Reflection

This scenic drafting packet is an example of how I would present my final scenic designs to the TD, HC, and creative team. But even in the professional theatre industry, there are always further questions and constant collaboration after the packet is handed over. From this scenic drafting packet, the TD or HC would create their own construction drawings, which would be geared toward communicating construction (not aesthetics), and would therefore include more detailed dimensions of every element in every scenic piece.

Looking forward from this project, my next scenic drafting learning goal would be to create detailed drawings of specific scenic elements. If I design another show in the future, three views of the set may not be enough. In this case, I would create additional plates, each with multiple views (plan, section, and elevation) of individual scenery pieces. Another skill I would like to learn is building physical scenic models. These objects can be used earlier on in the design process, so that the production team can visualize how the set is oriented in three-dimensional space. With so much left to learn, my scenic design journey has still only just begun and I am excited for it.

4 CONCLUSION

My scenic design process for *Silent Sky* was very robust and included many processes and details not described in this paper. Nevertheless, there is always room for improvement in every design. For this production, I believe that the quick transitions and minimal set props were effective; but I also toyed with the idea of fully integrating the furniture into the scenery. For example, if the desks or stools appeared out of a platform or back wall, the transitions would have been smoother. This idea would also be visually appealing to the audience, would demonstrate the potential for creative ingenuity in scenic design, and would have suited the production's dreamscape setting. However, this concept also would require more complicated construction and design, as well as possibly automation.

My scenic drafting packet was fairly simple, since the scenic design's important geometry was either very obvious or easily dimensioned/noted. If I had time to go deeper, I might also have created drawings from different views. These views would have allowed for further clarity on specific scenic elements that might have been vague in other orientations. Drafting details such as bubble coding could also have been included on these additional plates, though they were not necessary for my three basic views.

Throughout this scenic design process, I have learned a lot about the scenic design process and drafting techniques. I have previously scenic designed for other productions at WPI, but this show in particular has helped me grow. I have improved my scenic design process from previous years, experimented with scenic art techniques, collaborated with other designers to synthesize visions, learned scenic drafting techniques, and discovered the standard deliverables of a scenic design. I predict that in years to come, many of the skills I have learned in this project will be expanded and improved upon. In conclusion, this capstone project was a very valuable experience, which I know will be a jumping-off point for many successful scenic designs to come.

APPENDICES

Appendix A: Production Role Description

As scenic designer for *Silent Sky*, I was responsible for creating an alternate world that immersed the audience and actors through the illusion of scenic elements. When creating the set, it was my responsibility to mold an environment that could be used by the director and actors to tell the play's story.

To do this work, I collaborated with the lighting designer, sound designer, and director, so that all the production's creative aspects would complement one another seamlessly. I also collaborated with the technical staff—particularly the technical director/head carpenter, scenic artist, and props coordinator—to ensure that all elements were fabricated and treated according to my specifications.

For this scenic design, I conducted dramaturgical research about the 1900s, specifically the furniture and astronomical laboratory spaces. I also explored the thematic idea of space, to give the feeling of desolation and loneliness and to tie in with the show's theme of shedding light. In meeting these contrasting needs, my design merged abstract with dreamlike expressionism.

Appendix B: Reference Images



Figure 8: Sense of wonder and curiosity



Figure 9: Reference image of a galaxy



Figure 10: Reference image of a Harvard observatory telescope in the 1900s



Figure 11: Reference image of a Harvard observatory exterior in the 1900s



Figure 12: Reference image of an inverted color star plate used for the large, circular, “star plate” platform



Figure 13: Color palette used for the large, circular, “star plate” platform

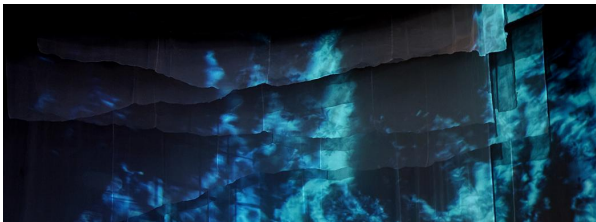


Figure 14: Reference image of the wave texture of the curved back walls



Figure 15: Color palette used for the wave texture of the curved back walls



Figure 16: Reference image of the ocean liner railing style



Figure 17: Color palette used for the ocean liner railing

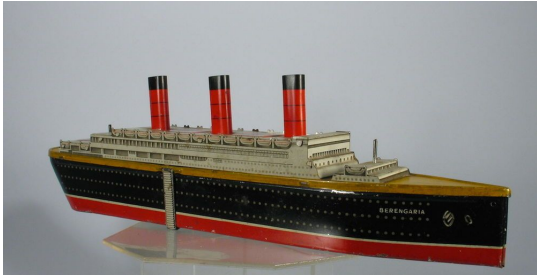


Figure 18: Reference image of the ocean liner chimney stacks used for the stools



Figure 19: Color palette used for the ocean liner chimney stacks used for the stools



Figure 20: Reference image of the wooden house siding in rural Wisconsin

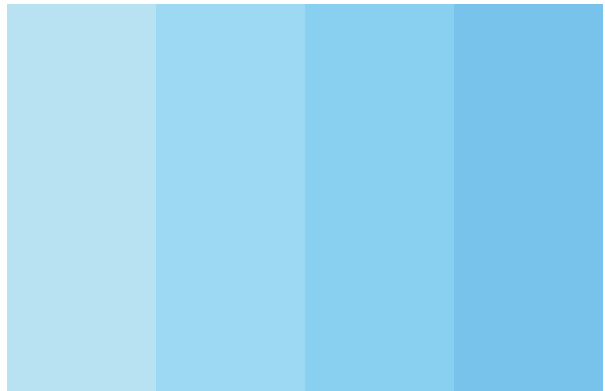


Figure 21: Color palette used for the ocean liner railing



Figure 22: Reference image of the period desks



Figure 23: Wood texture and color (mahogany) used for the period desks



Figure 24: Reference image of the wainscoting used on the curved back walls

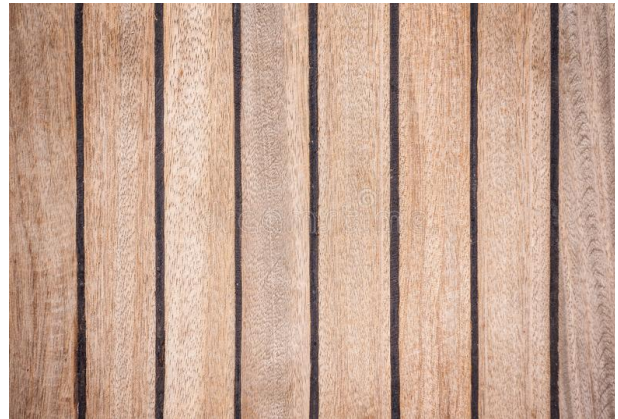


Figure 25: Reference image of the ocean liner decking used on the small, circular, platform



Figure 26: Reference image of the mailbox used for Henrietta's home in rural Wisconsin



Figure 27: Reference image of the Margaret's piano



Figure 28: Reference image of the address plaque of Henrietta's home in rural Wisconsin

Appendix C: Design and Process Sketches

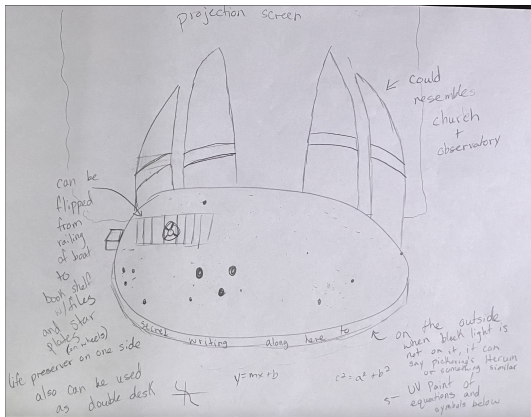


Figure 29: Rough initial design sketch after desks are flipped to reveal ocean liner

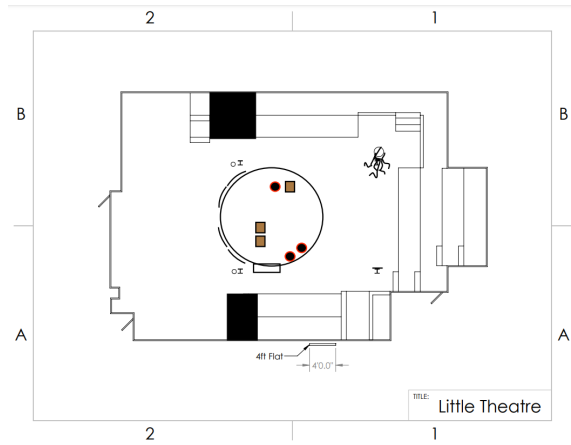


Figure 30: Ground plan of initial scenic design

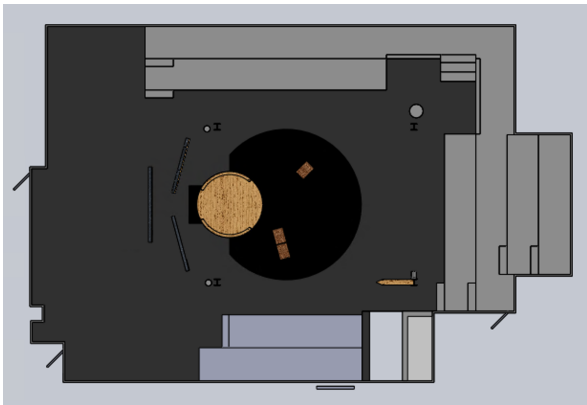


Figure 31: Top view of the mid-term SolidWorks model

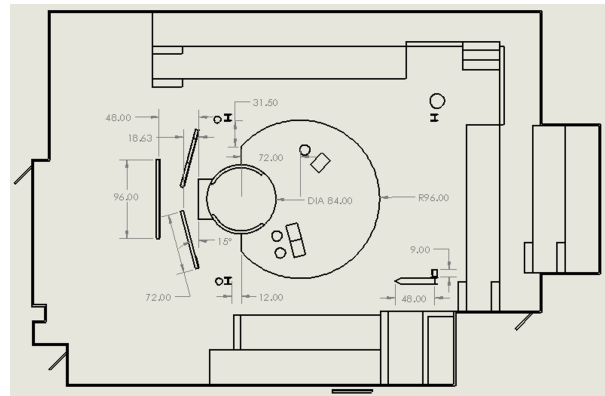


Figure 32: Mid-term ground plan dimensioned drawing

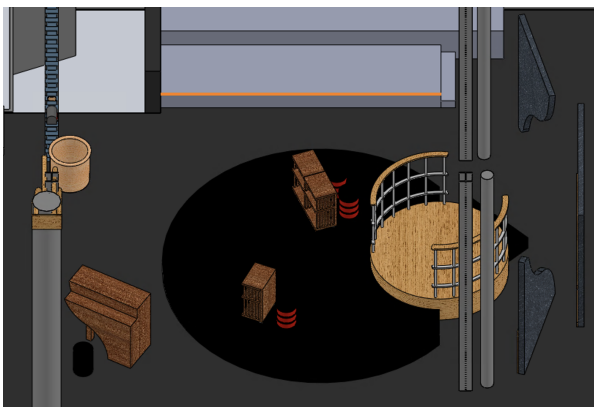


Figure 33: Elevated view of the final SolidWorks model



Figure 34: Top view of the final SolidWorks model

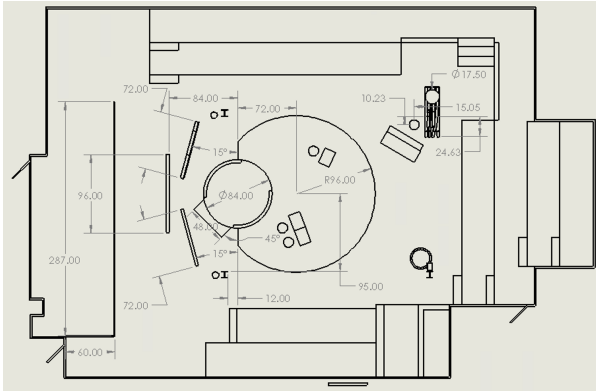


Figure 35: Final ground plan dimensioned drawing

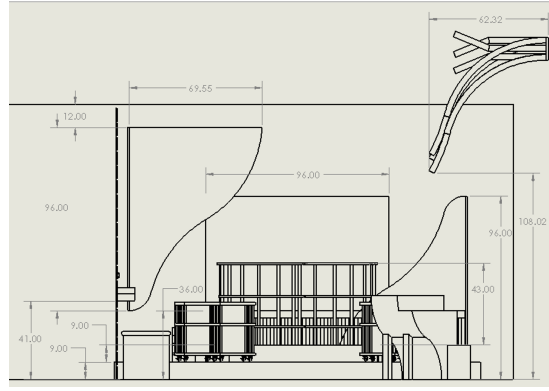


Figure 36: Final front elevation dimensioned drawing

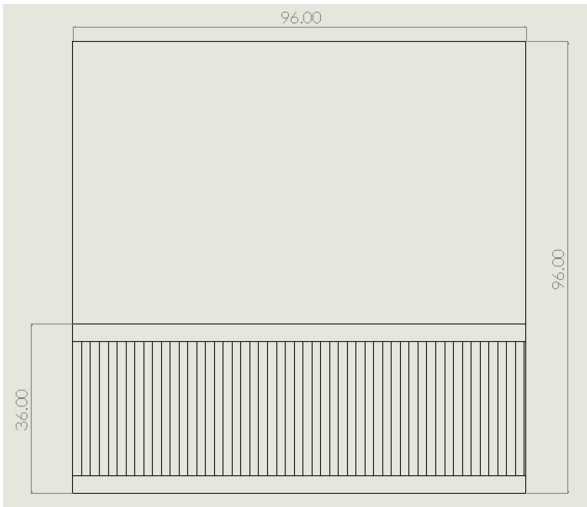


Figure 37: Initial Construction Scenic Packet - back wall

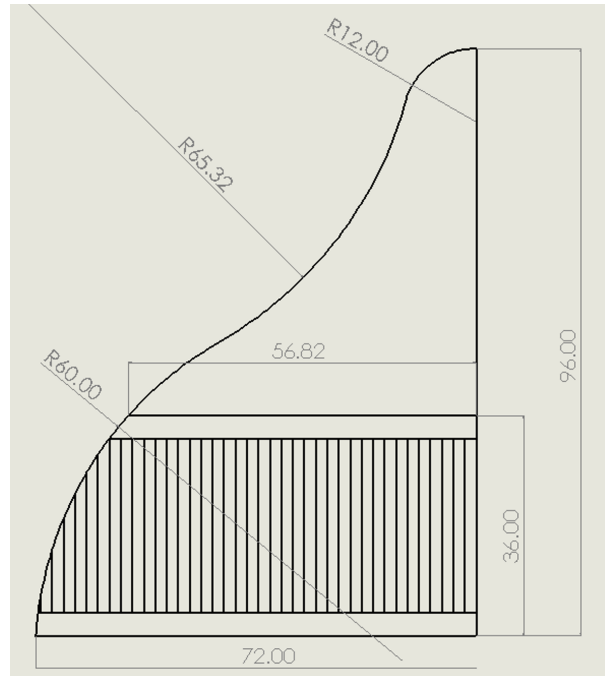


Figure 38: Initial Construction Scenic Packet - curved back wall

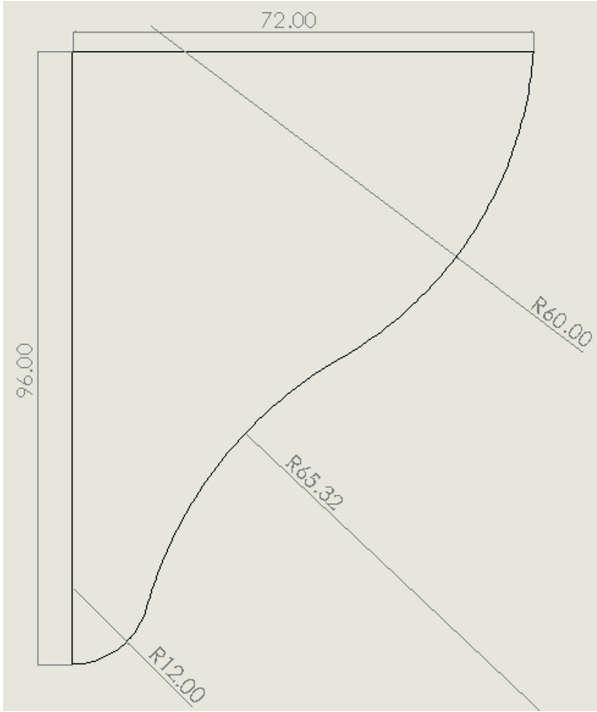


Figure 39: Initial Construction Scenic Packet - suspended curved back wall

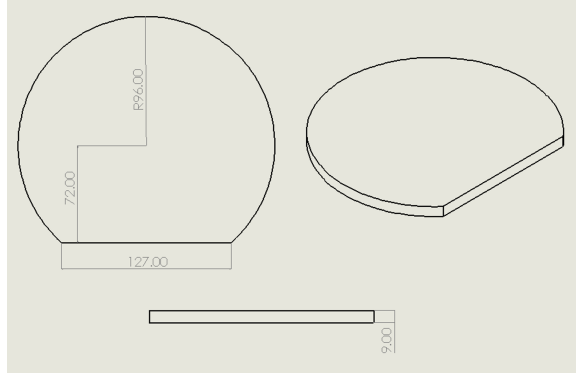


Figure 40: Initial Construction Scenic Packet - large circular platform

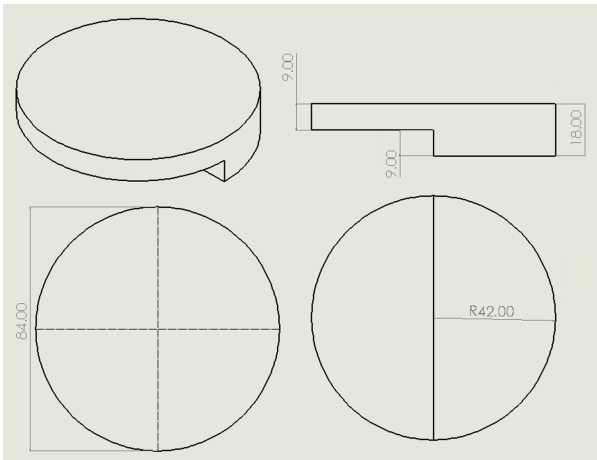


Figure 41: Initial Construction Scenic Packet - small circular platform

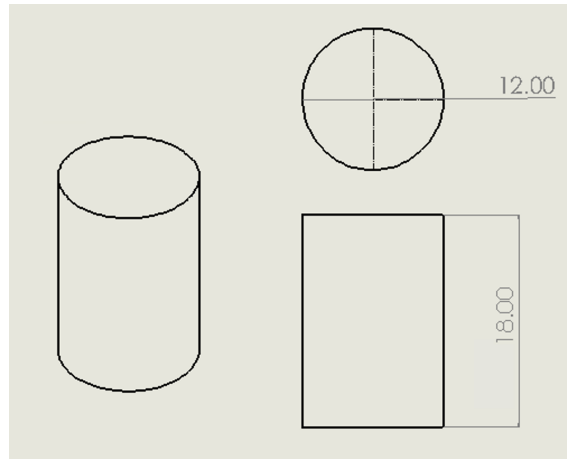


Figure 42: Initial Construction Scenic Packet - stools

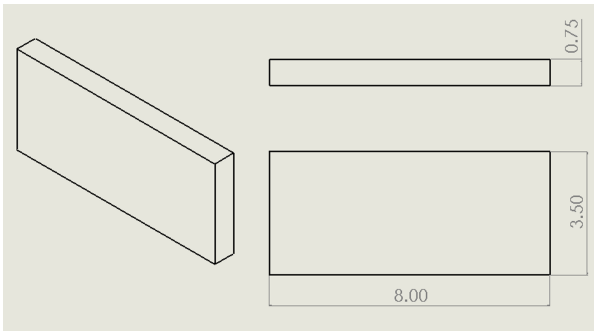


Figure 43: Initial Construction Scenic Packet - wooden house siding

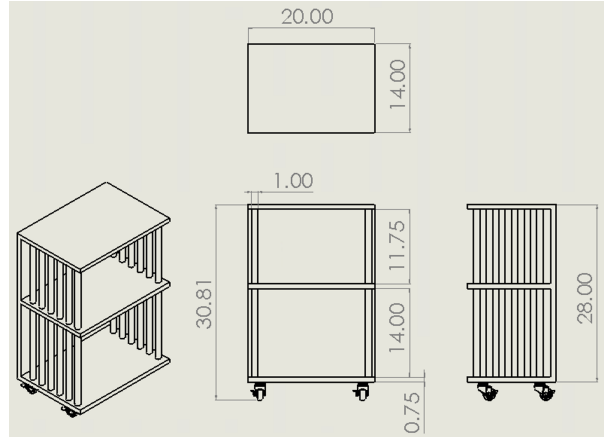


Figure 44: Initial Construction Scenic Packet - period desks

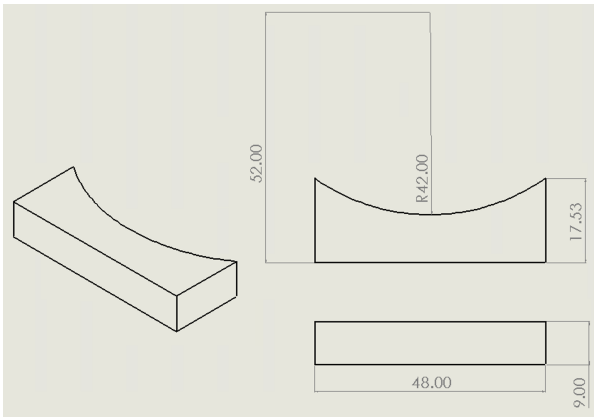


Figure 45: Initial Construction Scenic Packet - back step

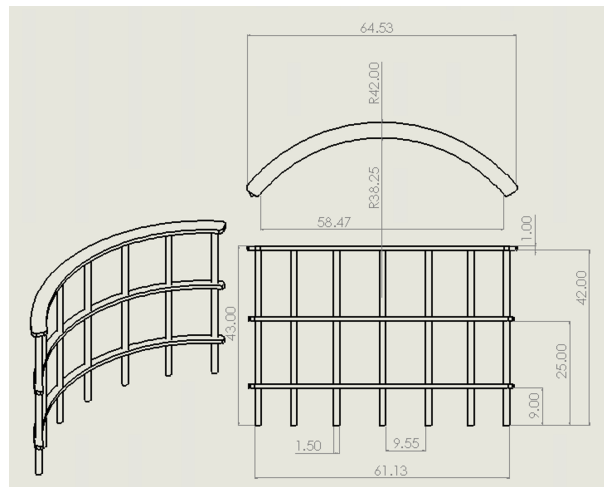


Figure 46: Initial Construction Scenic Packet - ocean liner railing

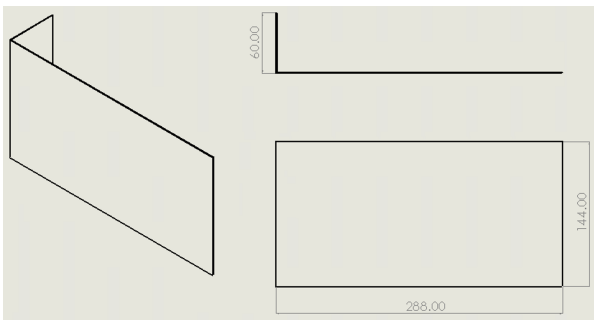


Figure 47: Initial Construction Scenic Packet - masking/curtain dimensions

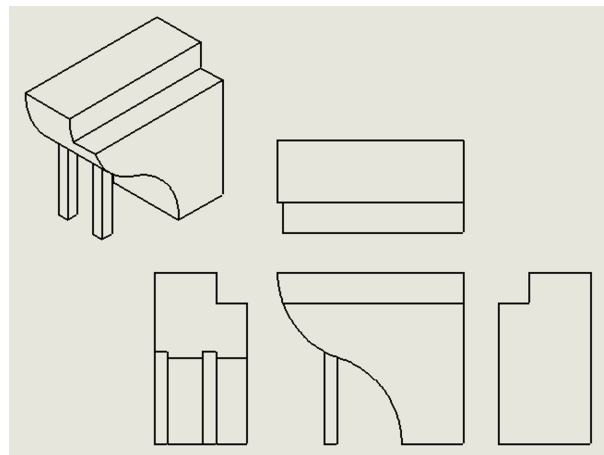


Figure 48: Initial Construction Scenic Packet - piano outline curvature

Appendix D: Scenic Art and Texture Testing



Figure 49: Wooden house siding scenic art design mockup

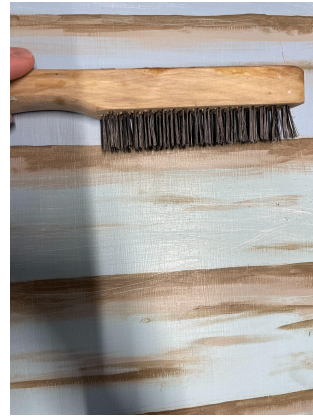


Figure 50: Wooden house siding scenic art design mockup - weathering process



Figure 51: Large platform star plate mockup iteration 1



Figure 52: Large platform star plate mockup iteration 2

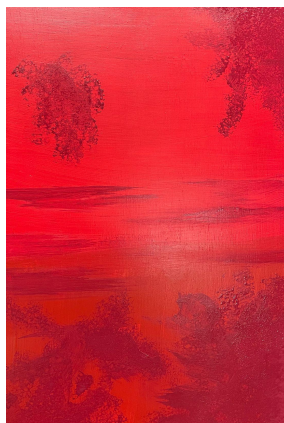


Figure 53: Ocean liner chimney stack scenic art design for the stools



Figure 54: Curved back wall texture mockup iteration 3 & 4

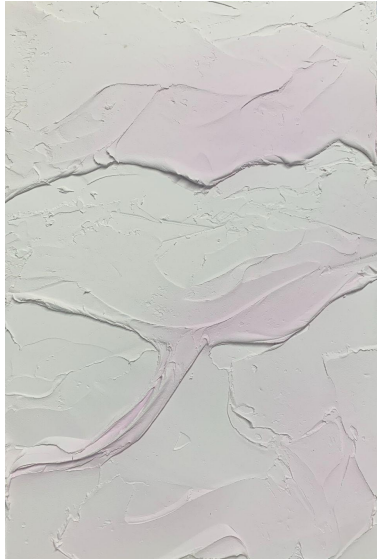


Figure 55: Curved back wall texture mockup iteration 2



Figure 56: Painted curved back wall texture mockup iteration 2

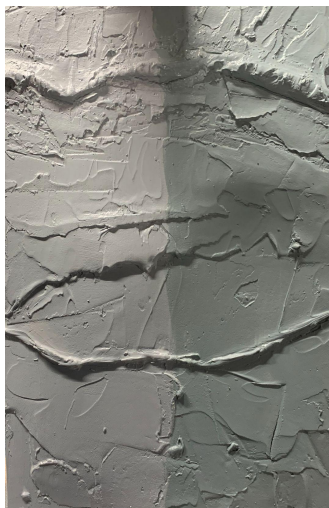


Figure 57: Painted curved back wall texture mockup iteration 1



Figure 58: Piano used for the show

Appendix E: Scenic Drafting Examples

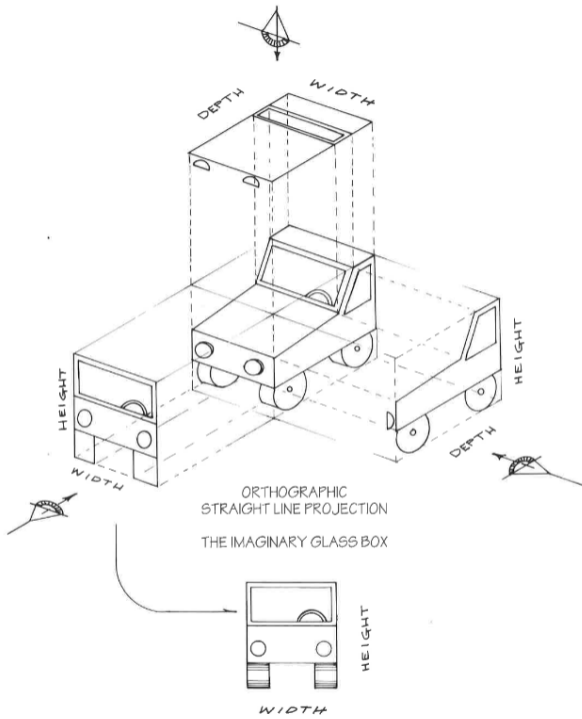


Figure 59: An example of an orthographic projection of a model car (Woodbridge 56)

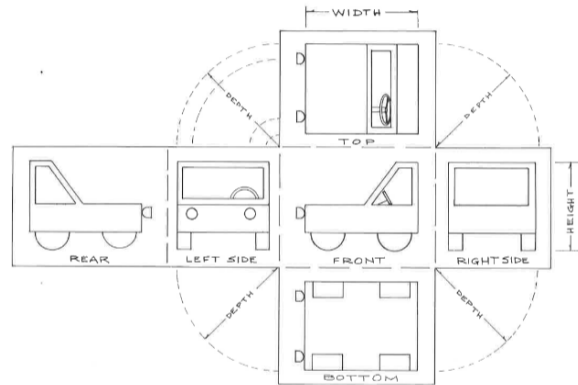


Figure 60: Different views of the orthographic projection of the model car (Woodbridge 57)

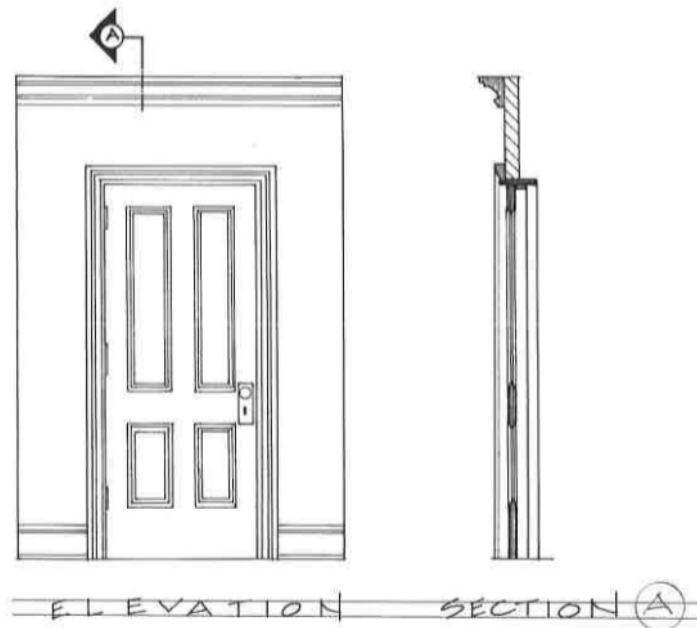


Figure 61: Example elevation section of a door cut at the section line "A" (Woodbridge 75)

Appendix F: Production Photos

(All photos by Matthew Burgos)













Appendix G: Bibliography

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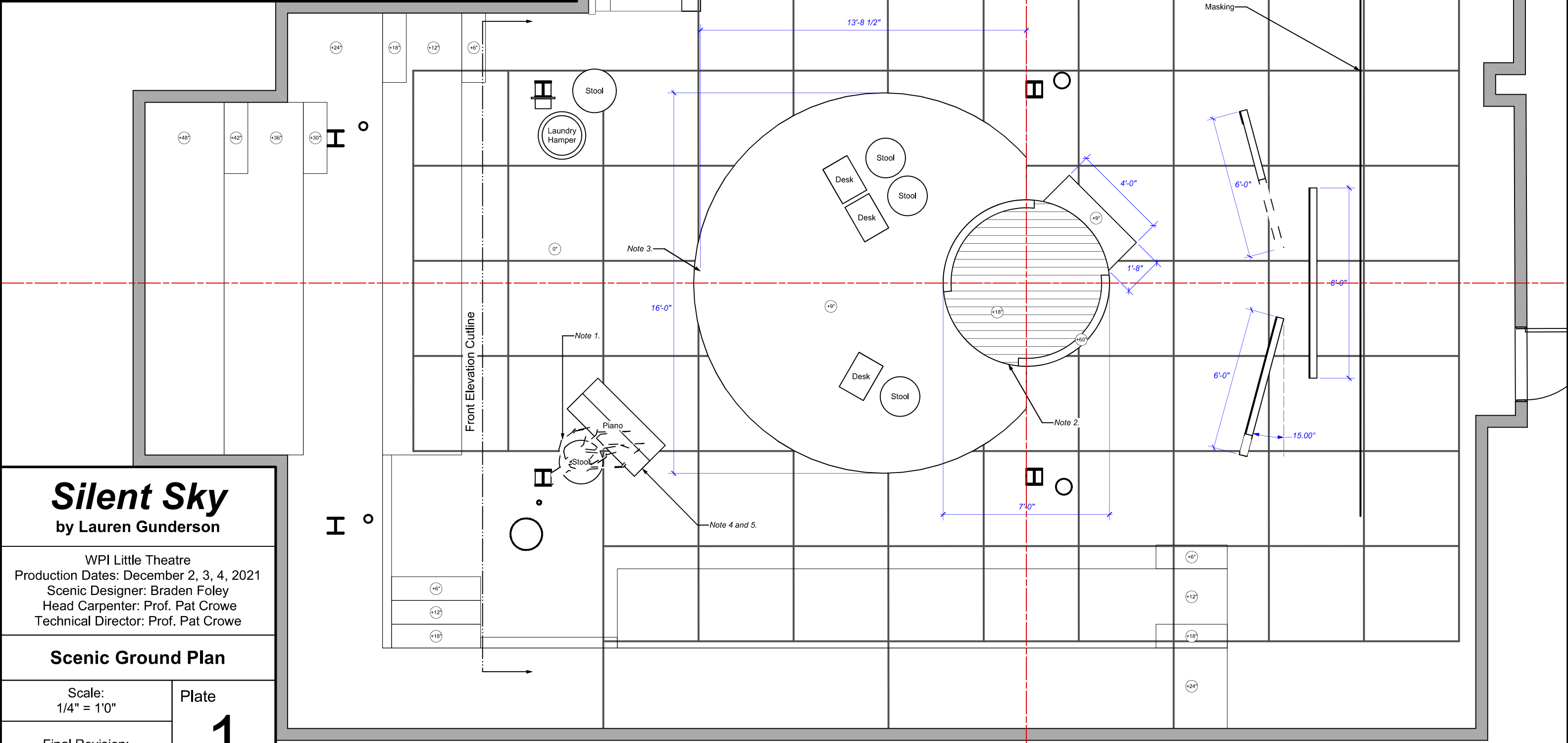
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Appendix H: Final Drafting Packet

See next page for final drafting packet

Notes

- Note 1. Tree branch; discuss with designer onsite
- Note 2. Line pattern represents boat decking
- Note 3. Inverted star plate scenic art around entire large platform
- Note 4. Piano should be cut to mirror symmetry in the curved flats
- Note 5. Piano max. height of 36"
- Note. Ground plan is cut at +72"



Silent Sky
by Lauren Gunderson

WPI Little Theatre
 Production Dates: December 2, 3, 4, 2021
 Scenic Designer: Braden Foley
 Head Carpenter: Prof. Pat Crowe
 Technical Director: Prof. Pat Crowe

Scenic Ground Plan

Scale:
1/4" = 1'0"

Plate

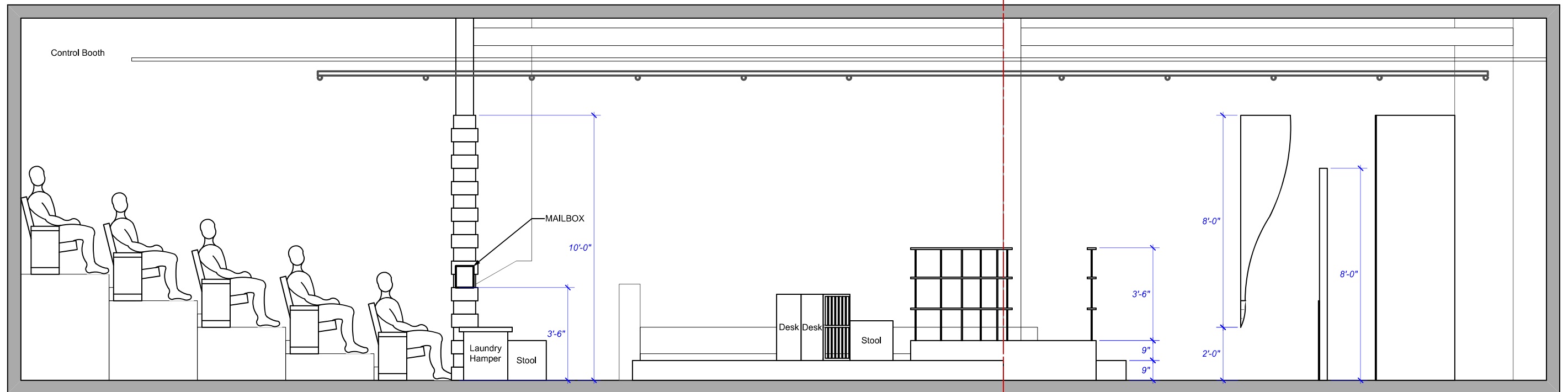
1

Final Revision:
2/9/2022 - BF

of 3

Notes

Note. CL viewing SR; items on SL are not visible



Silent Sky
by Lauren Gunderson

WPI Little Theatre
Production Dates: December 2, 3, 4, 2021
Scenic Designer: Braden Foley
Head Carpenter: Prof. Pat Crowe
Technical Director: Prof. Pat Crowe

Scenic Centerline Section

Scale:
1/4" = 1'0"

Plate

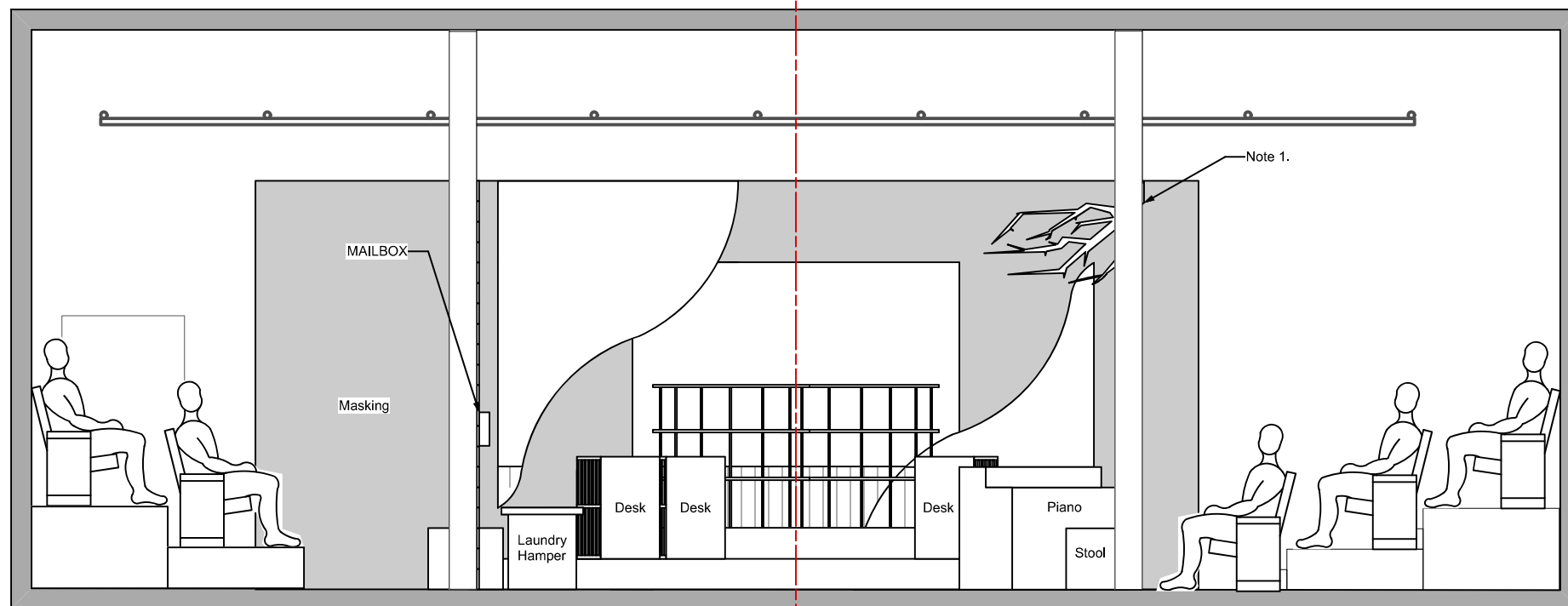
2

of 3

Final Revision:
2/9/2022 - BF

Notes

Note 1. Tree branch; discuss with designer onsite
Note. See ground plan for front elevation cutline



Silent Sky
by Lauren Gunderson

WPI Little Theatre
Production Dates: December 2, 3, 4, 2021
Scenic Designer: Braden Foley
Head Carpenter: Prof. Pat Crowe
Technical Director: Prof. Pat Crowe

Scenic Front Elevation

Scale:
1/4" = 1'0"

Plate

3

of 3

Final Revision:
2/9/2022 - BF