

Team 5
WPI Clay Oven Project
Project Management
(MIS 576)

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Team Members

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Sponsor

Vance "Smoky" Wilson

Table of Contents

I. Executive Summary.....	3
1.1 Introductions.....	3
1.2 Agile Framework.....	3
1.3 Site Research.....	3
1.4 Innovative Oven Technology.....	4
II. Design Documents.....	5
2.1 Pre-Design Thoughts.....	5
2.2 Site Assessment.....	5
2.3 Blueprint Designs.....	7
2.4 Multi-Purpose Pizza Paddle & Turkey Scooper.....	9
III. Project Cost Management.....	10
3.1 Recommended Oven Dimensions.....	10
3.2 Materials and Construction Costs.....	10
3.3 Estimated Total Cost.....	11
3.4 How We Innovated.....	11
IV. Project Quality Management.....	11
4.1 Plan Quality Management.....	11
4.2 Control Quality.....	12
4.3 How We Innovated.....	13
V. Project Risk Management.....	14
5.1 Outdoor Construction Site/Weather.....	14
5.2 Worcester Fire Marshal.....	15
5.3 Injury Risk.....	15
5.4 Noise Complaints.....	16
5.5 Risk Monitoring.....	17
VI. Project Communications Management.....	17
6.1 Stakeholders Interaction.....	17
6.2 Distribution of Informational Brochure.....	19
VII. Plan Procurements.....	20
7.1 Identifying needs.....	20
7.2 Identify suppliers.....	20
7.3 Determine Budget of materials.....	23
7.4 Managing delivery and payment.....	24
VIII. Project Integration Management.....	24
8.1 Integrated change control.....	24
8.2 Closing the Project.....	25

I. Executive Summary

Throughout our implementation of the clay oven design, our team put thoughtfulness first. We were thoughtful not only about our project planning and resulting design, but especially about how we managed our planning process. Our team set up weekly meetings to discuss and distribute tasks for the week, as well as proper file sharing and communication methods to collaborate effectively. Throughout each phase of the planning process, our greatest strengths were our positive communication and support for teammates when they needed help.

With this positive foundation, our team was motivated to extend past the defined requirements and enhance our clay oven project with thoughtful site research, innovative oven technology, and plans for a grand opening ceremony. While not all of these things made the final plans, our efforts in planning them are representative of our team's creative and organizational abilities.

1.1 Introductions

Our team became acquainted with each other entirely remotely due to the online nature of the class. Our team lead began the group project by contacting everyone via email. It was through this introductory email that the foundations were set for team communications and file sharing. Our team used iMessage for updates, meeting reminders, and questions, and we used Google Drive to share and collaborate on team deliverables.

1.2 Agile Framework

To understand and distribute weekly deliverables, our team established consistent weekly meetings. We used when2meet¹ to find a time during the week when everyone was consistently available. As it turned out, the best time was 7:00 to 8:00 on Sunday night.

To help expedite these planning meetings, our team lead established a job board which displayed the week's tasks, deadlines, and assignees. After assigning each task to a team member with a deadline, the team would stick around to answer any questions before scheduling a follow-up meeting. The follow-up meeting would be very brief as well, with the main purpose being to finalize deliverables before turning them in.

The agile framework proved to be helpful since our project had a clear goal in mind, but not a clear solution—at least unclear in terms of how we would *innovate* the solution.

1.3 Site Research

As you will see in the following section for our proposed design, we conducted ample on-campus research to find an ideal location for the clay oven. Our site-scoping resulted in finding a location with adequate foot-traffic and suitable surroundings which sets our project apart in terms of its marketability to WPI.

¹ [when2meet](#) is a great tool for aligning schedules. It displays where free time overlaps in an interpretable chart.

1.4 Innovative Oven Technology

For one of our minor deliverables, each team member was tasked with innovating one unique design element to add to our project. The two that stood out were the multi-purpose scooper and internal thermal reflective layer.

The multi-purpose scooper—which one of our teammates prototyped in real life—was uniquely designed to be both a pizza paddle and a turkey scooper all-in-one. These capabilities were motivated by the project requirements of cooking either a 10” pizza or a 25 lb turkey. See designs for this in Section 2.4.

The internal thermal reflective layer design was beautifully simple and easy to use. By adding a reflective ceramic layer to the inside of the clay oven, we can boost efficiency.

II. Design Documents

2.1 Pre-Design Thoughts

Before jumping into the design process, we made sure to do a little research into Smoky's feedback for other designs, as well as lay out our strategy:

- Professor notes on other blueprints
 - Be sure to display the planned thickness of the oven
 - Illustrate the site/location
- Strategy: View from all angles
 - 1) From front of the clay oven
 - 2) Cross-section of the oven to see layers
 - 3) Birds eye view of site
- Perform site assessment of proposed location: Higgins Upper Lawn

2.2 Site Assessment

Location: Higgins Upper Lawn (HUL)

Description: Higgins Upper Lawn (HUL) is located just outside the lower floor of the WPI Campus Center and beyond the Campus Center outdoor patio space. It is an open area with plenty of visibility and moderate pedestrian-traffic. In the warmer months, students often use the outdoor patio space beside the lawn to enjoy their meals. There is an outdoor grill by the edge of the outdoor patio space which gets used on rare occasions throughout the year.

Things to consider:

- Fire safety: Keep clay oven far from trees and buildings
- Convenience: It could be helpful to place the oven next to existing grills
- Aesthetics: If possible, we don't want to impede on the open lawn space, since that is a great space for students to play lawn games and relax

Pictures:



View from behind outdoor grills looking at HUL. WPI Campus Center and outdoor patio space on the right of the frame.

View from the middle of HUL looking towards the outdoor grills. In the background is the Innovation Studio (left) and Harrington Auditorium (right). Pathway leads to the outdoor patio space and Campus Center, which are out-of-frame to the left.



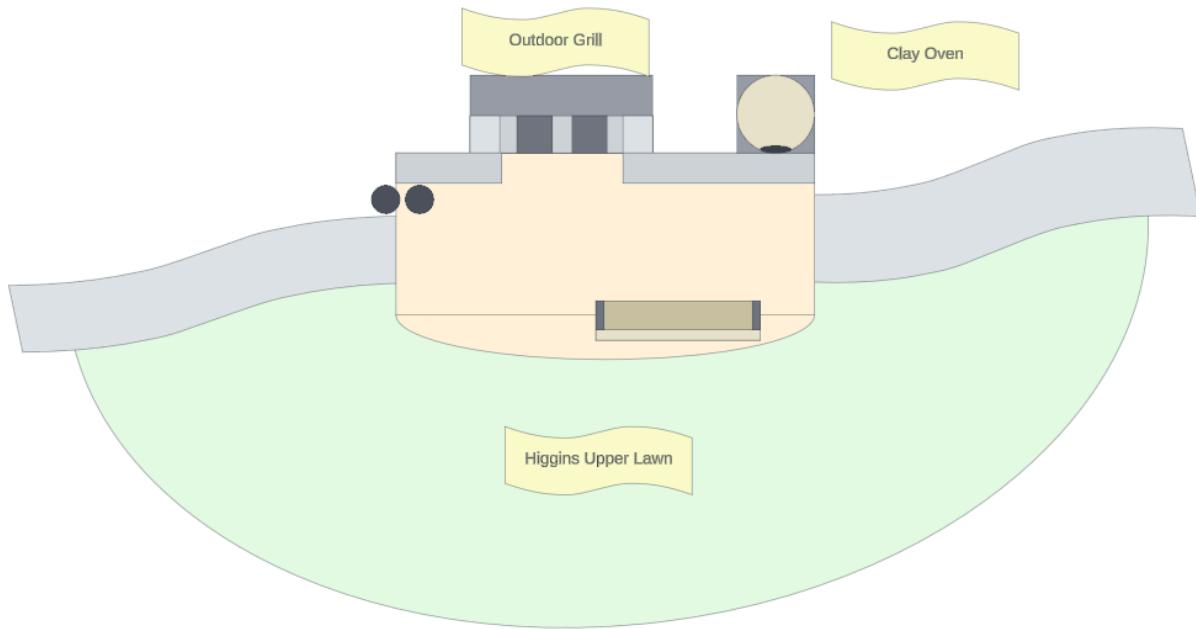
Isolated shot of a potential spot for the clay oven, next to the outdoor grills. Notice a couple of impediments to potential future construction: (1) the storm drain and (2) the hill sloping towards the camera.

Upward shot from the other side of HUL. Campus Center and outdoor patio space on the left and the Innovation Studio in the background to the right. Just below and in front of the Innovation Studio is the outdoor grills and potential site for the clay oven.



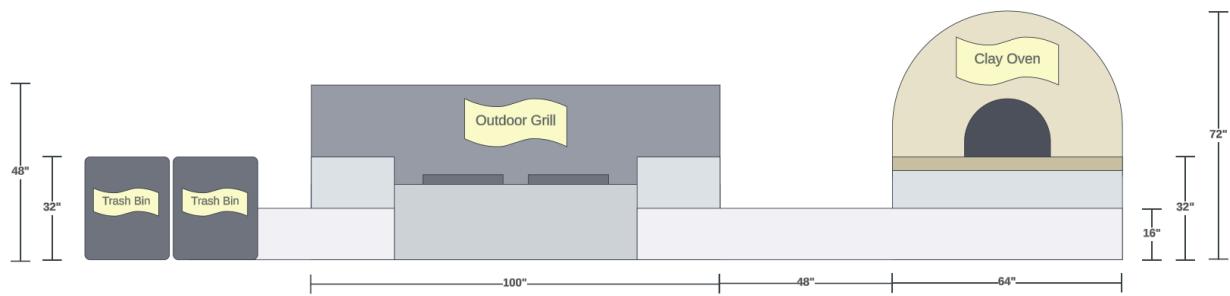
2.3 Blueprint Designs

2.3.1 Birds-Eye View

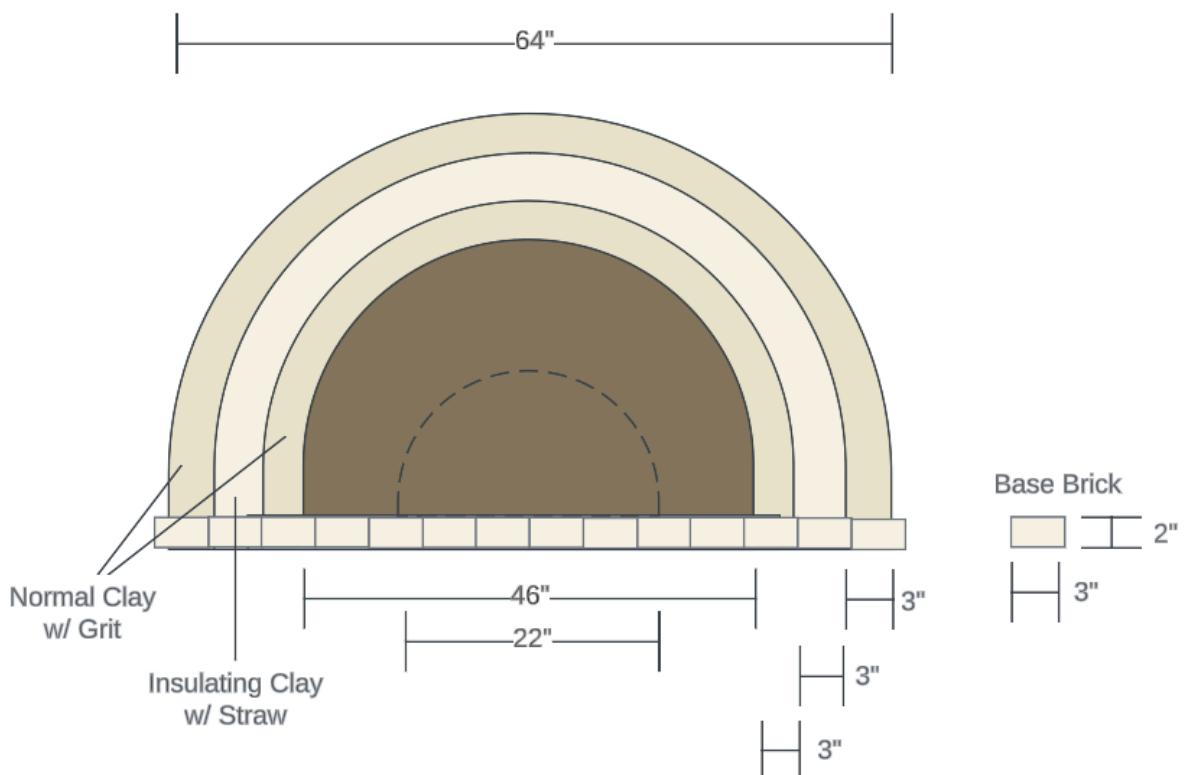


Notice that we intend to place the clay oven next to the existing outdoor grill. We believe this will be a key selling point to WPI sponsors, as it will increase use of the outdoor grill space and Higgins Upper Lawn.

2.3.2 Front View



2.3.3 Cross-Section



Notice here that the 3" measurements represent the size of the base brick as well as the thickness of each layer of the clay oven. Also notice the dashed line, which represents the opening for the clay oven.

2.4 Multi-Purpose Pizza Paddle & Turkey Scooper



One of our teammates theorized the multi-purpose paddle and scooper for a minor deliverable during the project, then they actually made it! Based off of Smoky's initial requirements for an oven that could bake 10" pizzas and 25 lb turkeys, we went ahead and said "Why not make a tool that could match those requirements as well!" Not to mention, this contraption will certainly draw attention from our society of engineers.

III. Project Cost Management

3.1 Recommended Oven Dimensions

To accommodate a 25 lb turkey while ensuring enough space between the top of the oven and the food for heat circulation, the interior height of the oven needs to be at least 16 to 18 inches.

For the interior width and depth: to simultaneously hold two 10-inch pizzas and provide ample space to prevent the edges from burning, as well as considering the size of a 25 lb turkey, the oven's interior width and depth should be at least 34 to 36 inches.

So the recommended interior dimensions are:

Width: At least 34 to 36 inches

Depth: At least 34 to 36 inches

Height: At least 16 to 18 inches

Such dimensions will ensure that the oven has enough space to cook these foods while also maintaining high temperatures for even cooking. It's important to note that these dimensions are for the interior, and construction will need to account for the thickness of the oven walls, which typically adds an additional 4 to 6 inches to the width and depth, as well as the thickness of the insulation material on top.

3.2 Materials and Construction Costs

Estimate costs & Determine budget

- **Firebricks:** May need more than 24 9-inch bricks. Assuming an average price of \$70 for 12 bricks, the cost is \$140.
- **Clay and Concrete:** Used for bonding bricks and covering surfaces. The clay costs ¥40/20 lbs.
- **Insulation Material:** Ceramic fiber blanket \$20-\$30, Reflective coating \$20-\$30 (optional). The estimated cost is \$40-\$60.
- **Metal Door and Chimney:** The estimated cost is \$50-\$70.
- **Thermometer:** \$20-\$50.
- **Construction Team:** \$20~\$25/hour for individual worker, Requiring 2~3 People to build it, the total working hours are initially estimated to be between 15 and 20 hours.
- **Site Surveyor:** Estimating \$500 to survey the site for construction
- **Risk Analyst:** Estimating \$500 to survey construction risks and risks of clay oven use

3.3 Estimated Total Cost

Based on these, we can estimate a new total cost range:

- **Firebricks:** \$140
- **Refractory Material:** \$40
- **Insulation Material:** \$40-\$60
- **Metal Door and Chimney:** \$50-\$70
- **Thermometer:** \$20-\$50
- **Construction Team:** \$600~\$1500
- **Site Surveyor:** \$500
- **Risk Analyst:** \$500

The total cost range for building the clay oven is estimated at \$1890~\$2860.

3.4 How We Innovated

Our financial planning is strategic, with a special focus on specialty materials. The firebricks we've selected are not merely foundational; they're engineered for endurance. Additionally, our refractory material, priced at an affordable \$40, is uniquely capable of withstanding extreme temperatures. Simultaneously, our clay oven features a unique and innovative design with an interior lined by Aluminum Bubble Reflective Film, enhancing heat reflection and insulation, stabilizing temperature, and speeding up the heating process, surpassing standard ovens in performance.

On the other hand, we're investing in a metal door and chimney that do more than simply endure heat—they redefine durability. Our insulation isn't just a barrier; it's a crucial element that ensures our oven remains hot and efficient, preventing heat from dissipating into the environment.

To complement our internal team, we'll recruit skilled workers and specialists for tasks like construction, site surveying, and risk analysis, ensuring our total labor costs remain within a reasonable budget.

IV. Project Quality Management

4.1 Plan Quality Management

The following plan is offered to guarantee quality for WPI stakeholders during the wood-fired clay oven development project lifecycle:

1. Plan for Ensuring Quality:

- Quality will be a central focus throughout all project phases, from design to construction and beyond.

- Review and update the quality management plan bi-weekly during project status meetings to ensure alignment with project progress.

2. Quality Standards and Metrics:

- Define quality standards and metrics for project deliverables during the first month of the project.
- Metrics for evaluating the quality of project deliverables will include factors such as functionality, durability, ease of use, and adherence to sustainability goals.

3. Processes, Tools, and Techniques:

- Quality assurance processes will include regular inspections, reviews, and testing of design concepts, materials, and construction methods.
- Tools and techniques such as checklists, risk assessments, and reviews within the team will be employed to ensure quality at each stage of the project.

4. Roles and Responsibilities:

- The project manager will be responsible for quality management and will oversee the implementation of quality assurance and control processes during the clay oven construction life cycle.
- The project manager will hand over overall responsibility for quality management to stakeholders and they will oversee the implementation of quality assurance and control processes after the installation of the clay oven on campus.
- Team members will be assigned specific roles and responsibilities related to quality assurance, including conducting inspections, documenting quality issues, and implementing corrective actions.

5. Continuous Improvement Process:

- A process for continuous improvement of quality management processes will be implemented, incorporating lessons learned from project experiences.
- Conduct monthly retrospectives to analyze project performance, identify areas for improvement, and implement corrective actions.
- Feedback from stakeholders and project team members will be solicited and analyzed to identify areas for improvement and implement corrective actions as needed via email follow-up. We will ask for feedback via email survey.

Our team intends to guarantee that the wood-fired clay oven satisfies the highest quality standards and requirements of the design competition and WPI's customers by practicing this quality management strategy.

4.2 Control Quality

Quality control measures will be implemented throughout the project to ensure that the wood-fired clay oven meets the defined quality standards and requirements. The following strategies will be employed to control the quality of project deliverables:

1. **Inspection and Testing:** Regular inspections and testing will be conducted at key stages of the project to verify that design concepts, materials, and construction methods meet quality standards. This includes inspecting the clay oven structure, flooring, insulating materials, and accessories to ensure they align with project specifications.
2. **Compliance Check:** A compliance check will be performed to ensure that the design and construction of the wood-fired clay oven adhere to all project requirements outlined in the client's specifications. This includes verifying that the oven is capable of simultaneously baking two 10" round pizzas or roasting one 25lb turkey and that it burns seasoned hardwood efficiently to achieve the required temperature.
3. **Peer Review:** Peer review sessions will be conducted to review project deliverables and identify any potential quality issues. Team members will provide feedback and suggestions for improvement to ensure that all aspects of the clay oven design and construction meet quality standards.
4. **Stakeholder Feedback:** Feedback from stakeholders, including the client Vance "Smoky" Wilson and WPI stakeholders, will be solicited and analyzed to assess satisfaction with project deliverables. Any concerns or suggestions for improvement will be addressed promptly to maintain quality standards.
5. **Corrective Action:** If quality issues are identified during inspections, testing, or stakeholder feedback, corrective action will be taken to address these issues promptly. This may involve revising design plans, adjusting construction methods, or replacing materials to ensure that quality standards are met.
6. **Documentation Review:** All project documentation, including design models, production prototypes, and proofs-of-concept, will undergo thorough review to ensure accuracy and completeness. Any discrepancies or errors will be corrected before final submission to ensure that project deliverables meet quality standards.

By implementing these control quality measures, our team aims to uphold the highest quality standards throughout the wood-fired clay oven project, meeting the requirements and ensuring satisfaction among WPI stakeholders.

4.3 How We Innovated

Our team innovated project quality management most significantly through our plan to keep stakeholders involved in our continuous improvement process. While the base requirements were to design the construction of the clay oven, our team stretched the timeline beyond that to include regular stakeholder surveys to query users for their feedback on the oven. This process will help us improve the physical aspects of the clay oven as well as the organizational aspects of the booking system. Also, prompting users for feedback is a great marketing strategy because it shows users we care about the quality of their experience!

V. Project Risk Management

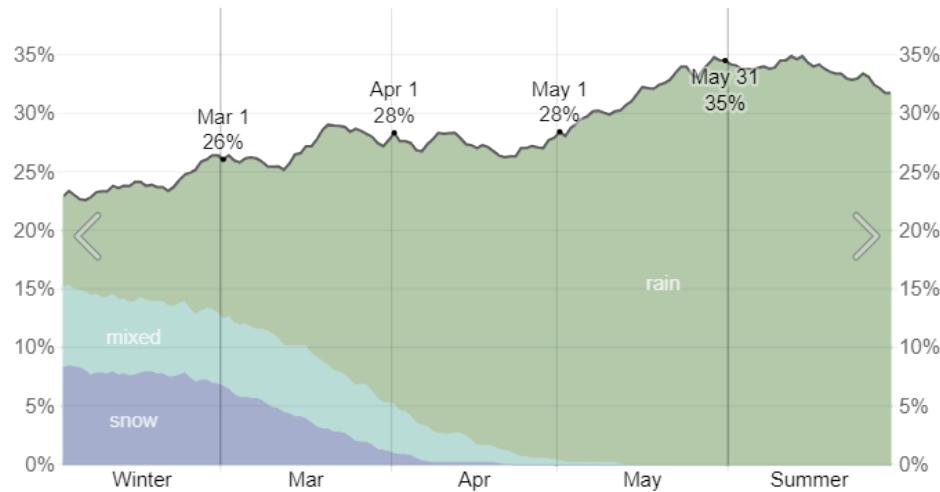
The project team has identified the following risks for the WPI clay oven project. The team has provided qualitative risk level and reasoning to support each of the risks:

5.1 Outdoor Construction Site/Weather

Description: To abide with fire safety, the clay oven will be constructed outside to allow for proper heat and exhaust gas dissipation. Since the construction site is outside, the speed and timing of construction work will be dependent on the Worcester weather. Some construction tasks requiring certain external temperatures and moisture content will not be able to be performed in, for example, rain or high humidity weather days.

Risk Level: High

Reasoning: This risk impacts project schedule timing and quality of the clay oven. The probability of rain is high during the spring and summer months in Worcester (see graph). With an average probability around 30%, the team will experience rain often in execution of the project.



Source: weatherspark.com. (2024). “Average Spring Weather in Worcester, United States.” [\[Online Weather Site\]](#).

Mitigation Actions:

- Provide temporary shelter (e.g. canopy tent) for clay oven curing times and inclement weather
- Consult weather on a weekly basis and update construction schedule accordingly

5.2 Worcester Fire Marshal

Description: The final design will have to be approved by the Worcester fire marshal in order to progress the project. Project timelines will be dependent on this approval. In addition, if the project designs or final site walkthrough are below adequate for the Worcester fire marshal, then project tasks will need to be reworked, extending the project deadline further.

Risk Level: Medium

Reasoning: As stated the project timeline and execution start date is highly dependent on the Worcester fire marshal approval of site plans and fire prevention mitigations. Depending on the number of site approvals in the cue, the Worcester fire marshal may not get to the clay oven site approval in a timely manner.

Mitigation Actions:

- Start early communications with Worcester fire marshal via email, phone call, planned fire station visit
- Review of governing fire safety and building codes found on the Massachusetts state website or distributed by local Worcester fire department:
 - [Massachusetts General Law Chapter 148](#)
 - [Massachusetts Fire Safety Code \(527 CMR 1.00\)](#)
 - [Massachusetts State Board of Building Regulations and Standards \(CMR 780\)](#)

5.3 Injury Risk

Description: There is risk of injury to 1) the workers on the construction site 2) the general public around the construction site; in this project the general public is the WPI student and faculty body. In addition, there is risk of injury for the students that plan on using the clay oven once built.

Risk Level: Construction Worker (High), General Public (Low)

Reasoning: There will be an active construction site while the clay oven project is in execution phase. Construction workers using power tools are more prone to injury. The construction site is not in a high foot traffic area of the WPI campus, therefore there is a low probability of WPI general public members accidentally entering the construction site.

Mitigation Actions:

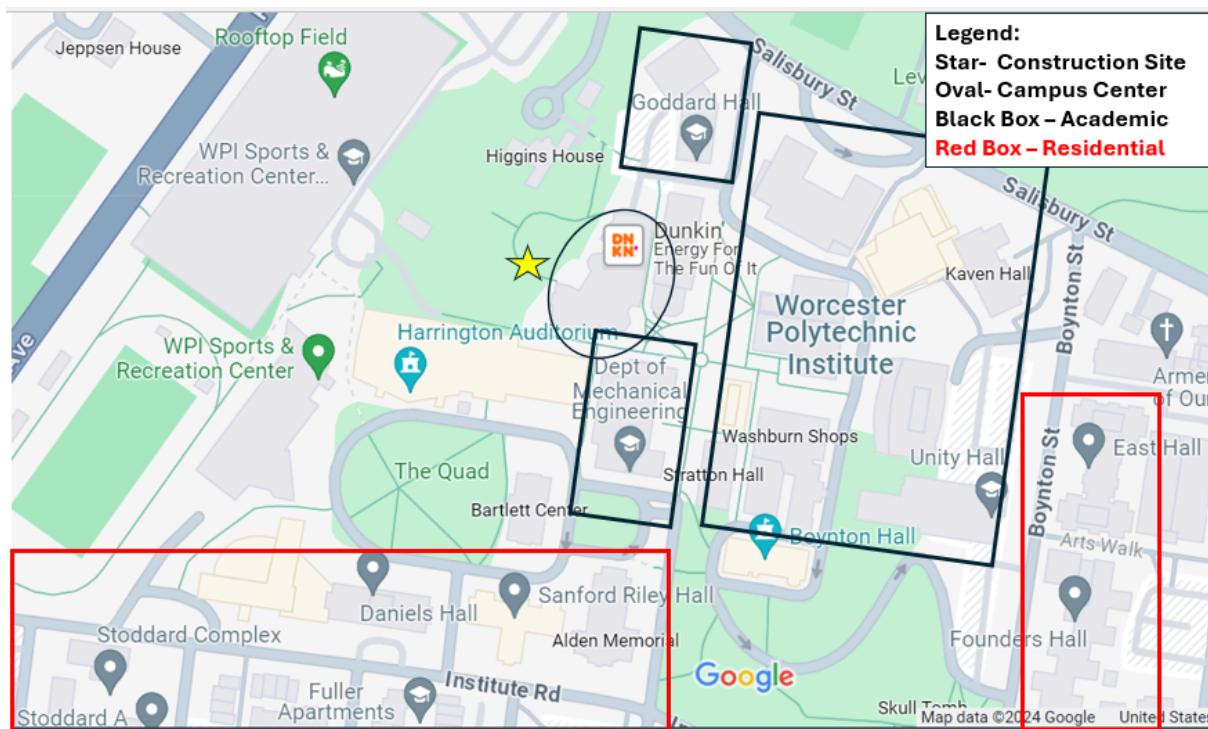
- Signage in the Campus Center to deter WPI general public from entering the upper Higgins lawn.
- Proper physical barrier around the active construction site
- Occupational Safety and Health Administration (OSHA) requirements on an active construction zone ([29 CFR 1926 Standard](#))

5.4 Noise Complaints

Description: The construction of the clay oven may cause abnormal level of noise in the WPI campus, leading to disruption to normal WPI schedule (classes, meetings, availability of quiet places, etc.). This added noise could lead to complaints and decrease in the endorsement and flexibility of the WPI student and faculty body for the clay oven project.

Risk Level: Low

Reasoning: The construction site is located in the upper Higgins lawn which faces towards Higgins House, WPI Sports Complex, and Park Ave. In the below photo, we have highlighted academic and residential buildings. Due to the orientation of the WPI buildings, majority of the construction noises will be dampened by the Campus Center building. Some noise will be experienced by the Goddard Hall academic building.



Mitigation Actions:

- Institute construction site operation hours
 - Avoid between 8PM-8AM
 - Avoid active construction on last week of WPI terms
 - High probability of final exams and project presentations
- Construct noise reducing fences around construction site

5.5 Risk Monitoring

The project team will monitor the identified risks in weekly meetings and determine impact to the project timeline. In addition, the project team is aware that unknown risks or obstacles may appear throughout the project life span. The project team plans to meet ad-hoc whenever an unknown obstacle arises and triage it accordingly. In the event that an risk or obstacle significantly impacts the project timeline, the sponsor, WPI administration, and the client, “Smoky” Wilson, will be contacted to participate in discussion on path forward and potential changes to the project scope, deliverables, and/or timeline.

VI. Project Communications Management

6.1 Stakeholders Interaction

The project team has identified the following individuals or groups as stakeholders of the WPI clay oven project:

- 1) Project Managers
- 2) “Smoky” Wilson (Client)
- 3) WPI Administration (Sponsor)
- 4) WPI Students (End User)
- 5) WPI Faculty (End User)
- 6) Worcester Fire Marshal (Fire Safety/Protection SME)
- 7) Architect (Construction SME)
- 8) Construction Team (Technical Workers)

The stakeholders can be broken into six groups: Project Managers, Client, Sponsor, End Users, Technical SMEs, and Technical Workers.

Project Managers:

Project managers will work collectively throughout the project to ensure the project tasks, timeline, and deliverables are communicated to the project team. In addition, the team will field any questions from the stakeholders and provide the correct answer or person to contact.

Client:

Project managers will communicate with the client, Smoky, via email when questions or uncertainties arise during the project. This could include clarifying questions, scope change proposals, and client approval of deliverables. Communication with Smoky will happen throughout the project, when seen fit.

Sponsor:

WPI administration is the sponsor of the project and will be a key part of the scoping, planning, and closing phases of the project. At these phases, communication with WPI administration will be conducted in official check-in meetings in order to gain the approval to proceed with the next phase or close out of the project.

End Users:

Communication with the end users (WPI faculty and students) will be a key part of the planning and executing, and monitoring phases of the project. During the planning phase, a survey will be distributed to all students and faculty via Google forms link to WPI domain email addresses from the Student Activities Office. Proposed survey questions can be found in Appendix 3. End user inputs will be beneficial in planning the project. In addition, during the executing and monitoring phases, it is key to allow the end user to provide feedback and further insights. The project team plans to accomplish acquisition of this feedback by posting major project updates (site preparation, installation of the clay oven, opening of the clay oven for public use, etc.) on the online WPI hub, via email to survey flagged interested students/faculty, and postings on physical bulletin boards around campus.

Technical SMEs:

Communication with the technical subject matter experts will occur during planning and monitoring phases of the project. Architect and Fire Marshals will be contributors to design of the clay oven and provide approval for both the site location and clay oven blueprints. Once the clay oven is completed, the Fire Marshal will provide the final approval before it can be put into public use. Like the project client, the technical SMEs will be contacted on a need basis, often setting up ad-hoc meetings to address project questions and concerns.

Technical Workers:

Technical workers of the construction team will be communicated through their supervisor who will participate in project team discussions. The construction team supervisor will need to be available during the planning, launching, and executing phases of the project in order to provide technical insight on project timeline building, obstacles experienced, and project execution updates. These project execution updates are expected to be delivered to the project managers on a weekly basis, or ad-hoc when a major project obstacle occurs. The project managers hope to keep an open, fluid line of communication with the construction team during the execution phase.

6.2 Distribution of Informational Brochure

The project team has created an informational brochure based on Project Change Order 0001 placed by the client “Smoky” Wilson on 09Apr2024. This informational brochure provides recipes for cooking pizza and turkey within the clay oven. It also includes project team contact information for interested parties of the WPI community to receive more information on the WPI clay oven, its anticipated schedule for booking, and link to the survey via Google forms as discussed in the End User Stakeholder section. Depicted below is an image of the proposed information brochure.

<p>Homemade Pizza Recipe</p> <p>To make 10" pizzas</p> <p>Ingredients:</p> <ul style="list-style-type: none"> ❖ 65g of plain white flour ❖ 45 mL warm water ❖ 1 g of dried yeast ❖ 1 g of fine kosher salt ❖ Splash of olive oil ❖ Favorite toppings <p>Dough Instructions:</p> <ol style="list-style-type: none"> 1. Combine dry ingredients into a medium sized bowl 2. Add water slowly until dough ball forms 3. Knead dough and add oil as needed 4. Roll out dough into pizza crusts 5. Add favorite toppings <p>Cooking Instructions:</p> <ol style="list-style-type: none"> 1. Fire clay oven for at least 2 hours prior to cooking 2. Scrap oven floor with wired brush 3. Using a pizza peel, load pizza into clay oven 4. After 1 minute, use pizza peel to rotate pizza 180 degrees in order not to burn one side 5. Remove pizza from clay oven onto wooden cutting board 6. Cut and enjoy! 	<p>WPI Clay Oven Project</p>    <p>What is the project? Physical clay oven construction on the Higgins Upper Lawn behind the Campus center and distribution of information on the use and skills for cooking in a clay oven</p> <p>Who can use the clay oven? Anyone in the WPI Community! That includes students, faculty, and graduates</p> <p>How do I learn more? Email clay-oven@wpi.edu and be on the lookout for more information to come!</p>	<p>Roasted Turkey Recipe</p> <p>Ingredients:</p> <ul style="list-style-type: none"> ❖ 20-25 lb turkey, cleaned ❖ 10-20 garlic cloves, to taste ❖ 1-1.5 cups, packed, chopped fresh herbs <ul style="list-style-type: none"> ❖ Ex: Thyme, oregano, sage, tarragon ❖ Salt and pepper, to taste ❖ Olive oil, for drizzling <p>Preparation Instructions:</p> <ol style="list-style-type: none"> 1. Mince garlic cloves and chop herbs 2. Blend the garlic and herbs a bowl with salt and pepper 3. Drizzle oil over the entire turkey 4. Spread the garlic and herbs throughout the turkey <p>Cooking Instructions:</p> <ol style="list-style-type: none"> 1. Fire clay oven for at least 2 hours prior to cooking and maintain oven temperature between 500-600 degrees 2. Place turkey in a cooking pan, cover with foil, then into the oven 3. Turkey will take 4 hours to cook, last 15 minutes can be cooked uncovered for browning 4. Ensure internal temperature is 165 degrees and remove the turkey from oven 5. Let turkey rest for 15 mins and enjoy!
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The project team plans to distribute electronic versions of the informational brochure via the Student Activities Office email address to the WPI community. Physical paper copies of the informational brochure will be placed on the Rubin Campus Center and major academic buildings (Atwater Kent Laboratories, Goddard Hall, Higgins Laboratories, Kaven Hall, and Salisbury Laboratories) bulletin boards.

VII. Plan Procurements

7.1 Identifying needs

Based on our assessment in the Cost management section, here are all the building materials we need:

- Firebricks
- Clay
- Insulation Material
- Metal Door and Chimney

7.2 Identify suppliers

7.2.1 Firebricks

We will choose **GIRtech** as our firebricks supplier, because GIRtech USM-6 fire bricks offer improved thermal conductivity compared to traditional chamotte products and price is decent. It can let us experience superior heat transfer and distribution, maximizing the efficiency of our heating clay oven.



7.2.2 Clay

We have chosen **Rheart Company** as our clay supplier. They produce low-fire clay, which is not only affordably priced, but also specifically designed for crafting various art pieces such as ceramics. Its low melting point and high plasticity make it ideal, and it is non-toxic and odorless, making it very suitable as the primary material for clay ovens.



7.2.3 Insulation Material

We have chosen **Zaaaslsm Company** as our supplier for insulation materials. They specialize in providing industrial-grade materials, specifically the Ceramic Fiber Insulation Blanket. Its advantages include high temperature resistance, heat insulation, and fireproofing. With a high density, low thermal conductivity, and high tensile strength, it helps reduce heat loss and can withstand temperatures up to 2600 degrees Fahrenheit. Additionally, it has excellent flexibility and is easy to cut, allowing us to shape it into any form we desire.

HIGH TEMPERATURE RESISTANCE

CERAMIC FIREPROOF INSULATION

2600°F

Temperature that can withstand

SUITABLE FOR DIFFERENT SCENARIOS

This product has multiple application ranges, such as the steel industry, non-ferrous metal industry, ceramic industry, glass industry, and so on

Boiler insulation

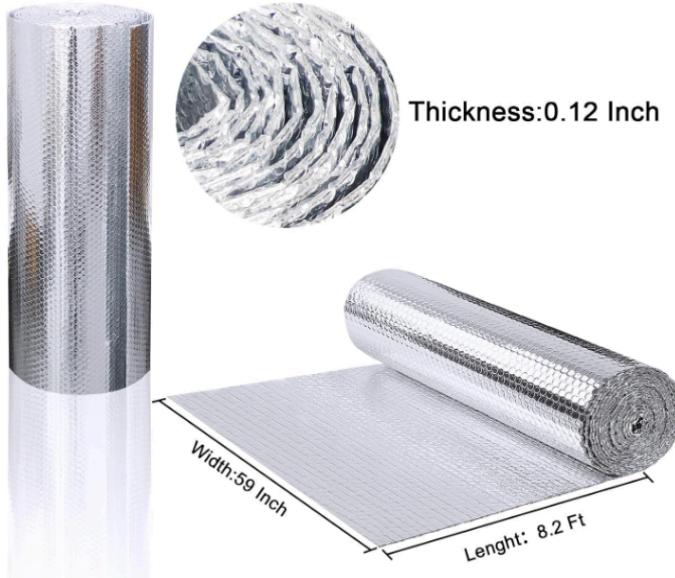
High insulation pipeline

Tunnel kiln insulation

At the same time, we have an innovative design for the clay oven, which involves lining the interior with an aluminum bubble reflective film. Made from double-sided aluminum foil and

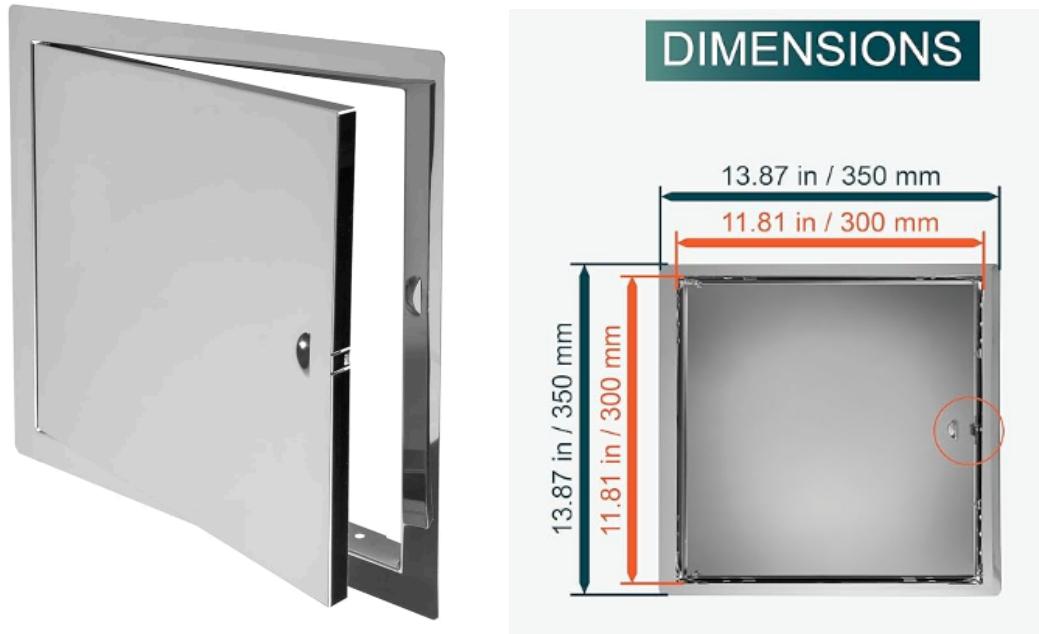
bubbles, this soft and highly pliable material significantly enhances heat reflection and insulation efficiency. It helps stabilize the oven temperature and speeds up the heating process compared to a standard clay oven.

We had a business discussion with **AGHITG Store**, and they assured us that their inventory is very well-stocked. So we believe they will also be a perfect material supplier for us.



7.2.4 Metal Door and Chimney

We have chosen **LOWE'S** as our supplier for metal door and chimney. We plan to purchase a metal door from them, which is exactly 12x12 in size, perfectly suited to our needs for the clay oven. At the same time, we have selected a chimney specifically designed for outdoor barbecues/camping to be part of our oven.



7.3 Determine Budget of materials:

- Firebricks: \$140 for more than 24 bricks
- Clay and Concrete: \$40/20 lbs
- Insulation Material: \$40-\$60, depending on whether you opt for the reflective coating
- Metal Door and Chimney: \$50-\$70
- Contingency: Add a contingency budget of 10-15% for unforeseen expenses.

7.4 Managing delivery and payment

So far, we have completed our procurement plan for all materials, and we have relatively stable relationships with our suppliers. All of our suppliers inventory is sufficient, and all goods will be arranged to complete the delivery process before May 1st 2024. During this period, we will actively follow up and monitor in real time with suppliers and logistics providers to ensure that all materials are delivered on time to meet the project schedule. All payments will be made upon the delivery of the goods.

VIII. Project Integration Management

8.1 Integrated change control

Integrated change control was a crucial process within the Clay Oven project, ensuring that changes to project scope, schedule, or resources were carefully evaluated, approved, and implemented in a coordinated manner. This process encompassed both external change orders initiated by stakeholders external to the project team, as well as changes initiated by our project team.

8.1.1 External Change Orders

- All external change orders, including those requested by the sponsor "Smoky" or regulatory authorities such as the Worcester fire marshal, will be documented and reviewed by the project manager and relevant stakeholders.
- The impact of external change orders on project scope, schedule, budget, and objectives will be assessed, considering factors such as feasibility, resource availability, and potential risks.
- Change requests will be formally submitted using the designated change request form, providing a detailed description of the proposed change, rationale, and expected outcomes.
- The change control board, consisting of key project stakeholders and the project manager, will convene to review and evaluate each change request. The board will assess the impact of the change on project objectives, and determine whether to approve, reject, or defer the change.
- Approved external change orders will be integrated into the project plan and communicated to the project team and relevant stakeholders. The project manager will update project documentation, schedules, and budgets to reflect approved changes.
- Regular monitoring and control mechanisms will be implemented to ensure that approved external changes are effectively implemented and do not adversely impact project progress or outcomes.

8.1.2 Changes Initiated by the Project Team

- Changes initiated by the project team, such as adjustments to project scope, schedule, or resources, will also follow a structured change control process.
- Project team members are encouraged to identify and communicate potential changes to the project manager in a timely manner.
- Proposed changes will be evaluated based on their alignment with project goals, feasibility, and potential impact on project objectives.
- The project manager will review proposed changes with relevant stakeholders to assess their implications and obtain necessary approvals.
- Approved changes initiated by the project team will be incorporated into the project plan, with updates communicated to the project team and stakeholders as appropriate.
- The project manager will ensure that changes are implemented effectively and do not compromise project quality, schedule, or budget.

By effectively managing changes through integrated change control, the Clay Oven project minimized the risk of scope creep, ensured alignment with stakeholder expectations, and enhanced the likelihood of project success.

8.2 Closing the Project

As we complete our plans, deadlines, and designs for the clay oven project, it is important to consider how we will hand-off to stakeholders to execute the plan. To communicate our results, we will share this report and a 10-minute pre-recorded presentation with our stakeholder, Smoky. Both of these resources contain all that is necessary for Smoky to understand what sets our project apart and for him to understand how to execute the plan with or without our team's involvement.

THANK YOU!!!