Mitigating the Use and Waste of Water in the Construction Sector Regarding Stucco

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Capstone Document for the Bachelor of Science in Sustainable Built Environments Program

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Abstract

This Capstone research was conducted to assess the issue of water waste in construction, more specifically how it is involved with the process of stucco; a very popular construction practice that is used here in Arizona and how the water use could be mitigated. Construction is already a process that puts a very heavy use on water due to several factors including requirements from common practices, clean up, and dust control. In the state of Arizona, these factors are somewhat multiplied due to the various materials that are used and the plentitude of dust that requires water to keep settled. With fresh water access and water use already being a worldwide problem, it is imperative that water management becomes one the top priorities. Millions of gallons of water are used everyday in stucco assembly and clean up so it is critical to create and implement methods that help cut back on how much water is used. To spearhead finding a solution, this research used interviewing, first person observations and document analysis. The discussions and conclusions allowed to develop a formula that can help quantify how much water is needed for a given amount of stucco plaster and ideas regarding how this practice can be implemented on all job sites.

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Introduction

Water scarcity is one of the most pressing global challenges of the 21st century, exacerbated by rapid population growth, climate change, and unsustainable consumption patterns. As demand for freshwater continues to rise, sectors that rely heavily on water, such as construction must urgently reevaluate their practices. Construction processes require significant volumes of water for tasks such as mixing materials, cleaning equipment, and controlling dust on job sites. Among these activities, the use of water in stucco application stands out due to its frequency, scale, and potential for inefficiency.

In the arid climate of Arizona, where this research takes place, stucco is a dominant exterior finish for residential and commercial buildings, this issue becomes even more critical. Stucco is valued for its thermal performance, durability, and visual appeal, yet its application process, especially the curing and cleanup phases, demands extensive water use. The cumulative impact of repeated coats and site-wide rinsing can result in the use of thousands of gallons of potable water on a single project.

This research focuses specifically on the water demands of stucco construction in Arizona and aims to explore practical methods for mitigating water use without compromising quality or compliance with building specifications. Through a combination of case study observations, interviews with experienced construction professionals, and solution-based analysis, the project seeks to identify not only where water is being overused but also how alternative materials, water sources, and policies can support more sustainable building practices. As freshwater availability continues to dwindle in desert regions, understanding and addressing this issue is no longer optional but imperative.

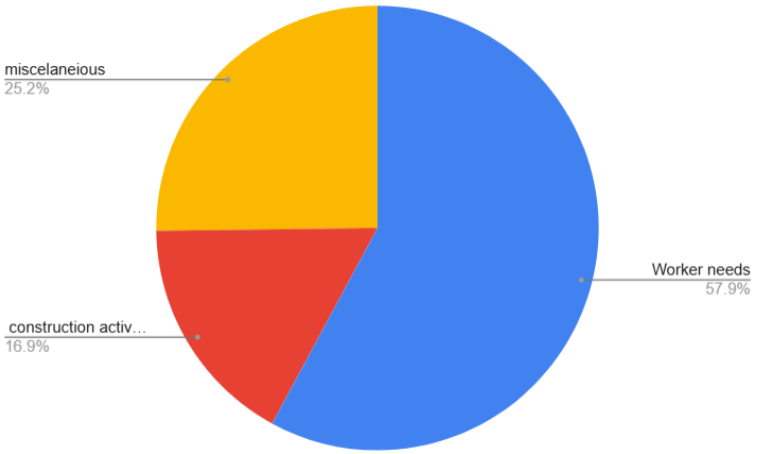
Literature review

Water consumption and pollution in the construction sector have become major concerns for sustainable development, particularly in arid environments like Arizona. The construction industry is estimated to account for approximately 15% of global freshwater consumption, primarily through processes such as concrete and stucco mixing, curing, dust suppression, and equipment cleaning (CEMEX Ventures, 2023). These practices contribute significantly to both direct water usage and indirect environmental degradation, especially when discharge is unmanaged.

One of the most water-intensive materials used in construction is **stucco**, which relies on multiple coats requiring water for mixing and curing. Each coat, typically part of a three-coat system, must be cured over several days using sprayed water, adding up to thousands of gallons on a single large project. Furthermore, improper cleanup procedures lead to runoff containing high pH levels and hardened plaster waste, which pose hazards to both soil and stormwater systems.

A detailed study on construction sites in Recife, Brazil, found that 57.9% of site water use was allocated to worker-related activities, while 16.9% went directly into construction materials and processes such as mixing and application. The remaining 25.2% was consumed through indirect activities, including washing tools and suppressing dust (Ferreira et al., 2016)**(A visual shown in Figure 1**.) This study also estimated 0.83 cubic meters per square meter, or approximately 2 gallons per square foot, of water use during the full construction cycle highlighting the scale of consumption in material intensive activities like stuccoing.

Figure 1.



From a regulatory standpoint, Arizona has developed various programs to address these concerns. The Arizona Department of

Environmental Quality (ADEQ) and Arizona Department of Water Resources (ADWR) promote reclaimed water usage for dust control and construction activities, allowing builders to reduce dependence on potable sources. Cities like Gilbert and Scottsdale have implemented municipal reclaimed water networks to support such reuse applications (ADEQ, 2023; GilbertAZ.gov, 2023).

Methodology

Research Question

There are three research questions that will be answered and they are:

1. What are the different ways or processes that water use could be mitigated in the construction process of stucco?
2. Are there different sources of water that could be used for stucco so that valuable potable water does not have to be tainted?
3. How could we implement different rules and regulations so that it is possible to enforce practices that help with the mitigation of water waste correlated with stucco?

This research was conducted by using a mix-method approach based on three different research methods. The first method is a **Case Study Analysis**. The purpose of this method was to observe the process first hand and use knowledge from my construction background to observe and document any and all parts of the process while on a jobsite that I currently work at every single day. The second method of research is **Interview**. This interview was executed by embedding myself into the stucco crew itself and having a sit down and recorded conversation with the stucco foreman where he was asked a series of questions about the stucco process, what the dynamic of a stucco crew is and how it works, such as the number of workers, each workers responsibility and the hierarchy of each crew. The third method of research used is that of **Perception of Solutions.** This is executed by taking information from my interview and doing research that considers different methods in which the stucco process can happen and formulating ways that less water could be used for it.

Results

Method 1: Case Study Analysis

I was fortunate enough to be able to observe this process at my place of employment every single day. To give some background information, I am currently a field engineer for a large General Contractor operating nationwide. I am currently stationed in Phoenix, Arizona for a project. Due to an Non Disclosure Agreement that I have signed prior to my employment I can not share all of the details regarding my project or what it is exactly that we are building. My role as a field engineer granted me many opportunities to have a front row view of the stucco construction process and the chance to document its progress throughout our project. My responsibilities as a field engineer include ensuring and documenting the quality control and the quality assurance of all construction final products on the jobsite, organizing and scheduling upcoming work, organizing and maintaining job site logistics, and keeping records of documentation such as verifications on dust control and stormwater protections. In the hierarchy of my company's work force I am on the lower end. To explain the hierarchy, there is a graphic in **Figure 2.** To the right that explains the dynamic of the job site. Since I am a field engineer I obviously work for the field side of all jobsite operations. The field team is essentially directed by the office side of the operation. As shown, every project will have a project manager who spearheaded the project and can be seen as one of the higher ranking jobsite representatives. They give orders that go down to project engineers who have the duty of assisting the project manager with any and all tasks and duties necessary. Project managers also pass on information and duties to the project superintendent. The project superintendent is then able to delegate responsibilities down to the other field engineers, who can also provide assistance to the office side of the operation such as project engineers and the project manager themselves by documenting progress, addressing requests for information and being a mouthpiece for the office side of things out in the field. **Figure 2.** Shows what the common practice is for the jobsite title hierarchy for my company.

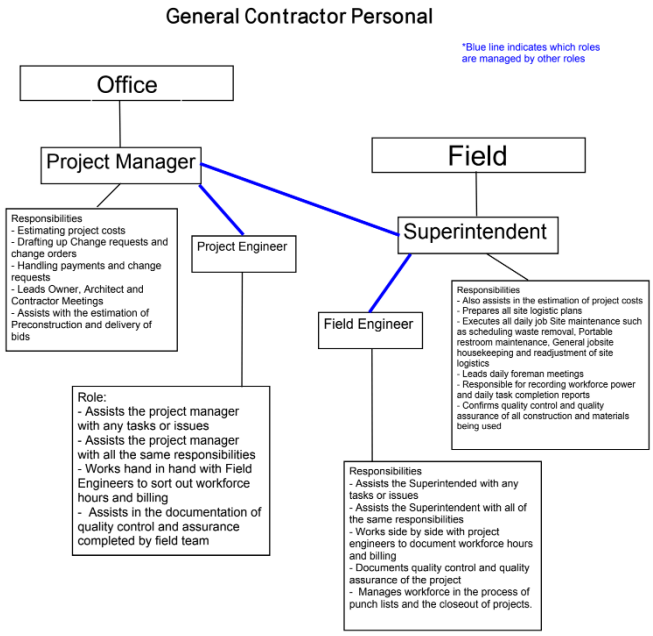


Figure 2.

However, the scale of the project I am currently working on is quite large and one of my office's largest projects yet. **Figure 3.** Shows what the current workforce we have as a General Contractor looks like. As shown, the office side of the operation has a Lead Project Manager, two Project Managers below them and then four Project Engineers under them. For the field side of the project there is a Senior Superintendent, who is then supported by two Superintendents, who in turn are supported by four Field Engineers. I am one of those four Field engineers. Like I've stated previously, my position as a field engineer has given me plenty of opportunities to witness the Stucco the Stucco Process myself. The stucco Process goes as follows:

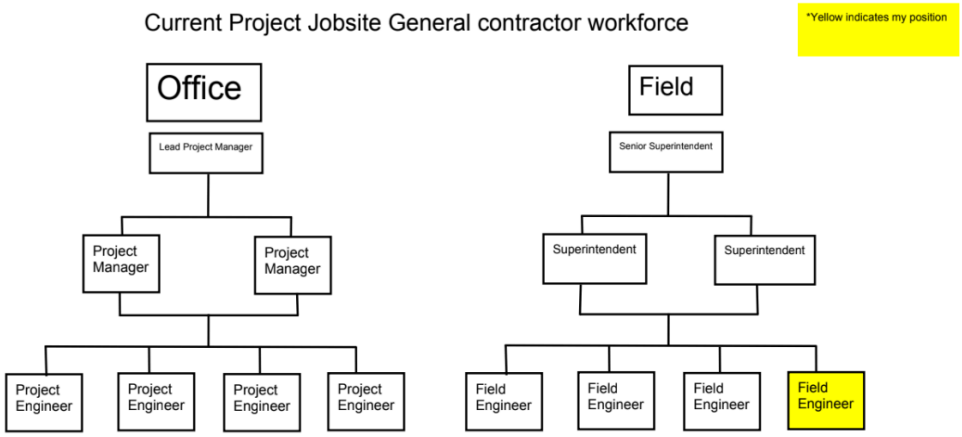


Figure 3.

1. After rough carpentry and sheathing is completed on a building, the wooden sheathing has a layer of foam board applied, which is essentially just a piece of styrofoam **(Figures 4 & 5.)**

Figure 4.

Figure 5.

2. This styrofoam then has a layer of Tyvek, a waterproof membrane attached followed by chicken wire being secured to it. This chicken wire is just thin metal that comes in an almost fence like pattern that provides a better surface for the stucco plaster to attach itself to. **(Figures 4 & 5.)**

3. Large bags of Stucco are then transported to the site, those bags are then lifted via a forklift and poured into a vertical mixing silo attached to a pump. **(Figure 6.)**

Figure 6.

4. The mixing silo then pumps the stucco into a hose that is used to apply it to the wall. **(Figure 7.)**

Figure 7.

5. After the first coat of Stucco is applied, it is sprayed by water and left to cure for around forty eight to seventy two hours. After this another coat of Stucco is applied and the same curing process ensues. This process is repeated 3 times to ensure water tightness and a strong seal on the entire surface. **(Figure 8.)**

Figure 8.

6. After all three base coats are applied to the building a fourth color coat is applied. The color coat is simply the same simple plaster that is used in the base coats but has had colorful additives applied to it so that it matches the color of the building called for in the project drawing specifications. **(Figure 9.)**

Figure 9.

7. Immediately following the hose on the color coat, a touch up crew of about five to six workers comes through and applies the stucco to hard to reach areas. **(figure 10.)**

8. Following the touch up crew is a group of about five workers who are responsible for the finish work. Finishing touches covers getting even tighter to reach places than that touch up crew and carves all of the panel seams, similar to the panel seams seen in concrete walkways.

Figure 10.

9. After the touch up crew comes through they are trailed by a clean up crew. This is just a crew of about five workers who are equipped with hoses and power washers that clean up any residue or leftover Stucco that may have fallen onto walkways or other areas that do not need Stucco.

This is the process that I was able to view myself and document. This case study analysis was one of the most useful tools in this research because it was not information that came from other sources, it was able to be viewed in the first person. One interesting and saddening item that came up during my documentation of the process was the fear many of the workers had of being photographed. I had to explain every time before I took a picture that it was simply going to be of their work and their faces would not be in it. The most interesting part of the observation was being able to see how the process was done in real time and being able to visually quantify the amount of water and material used throughout the process, along with how much discharge and pollution comes from the process. Attached are several photos documenting just how dirty Stucco can leave a jobsite. **(Figures 11, 12 and 13)**

Figure 11.

Figure 12.

Figure 13.

Method 2: Interview

Interview was a very effective method for research in this project. As stated previously, I was able to embed myself among the stucco installation crew and interview the foreman myself. Upon his consent I was actually able to record the conversation. This was not my first time interacting with this foreman due to my role on the jobsite, so I had already built a relationship with him which was a very large help in getting the process going. Before the interview I had drafted up several questions for the process that go as follows:

1. Tell me about the stucco process
2. Why is there so much water use and why is there so much left over discharge?
3. Why do you use the process that you are currently using?
4. Is there any way that you could change this process so that less water is used?
5. What is your main water source?
6. Could you use other water sources ?
7. How could you use less water?
8. What is the size of your crew and what are the responsibilities of its members?

I was unable to create a 100% accurate transcript of the conversation from the recording but I can give the answers he gave me. To accurately display the conversation, the question and a summary of his answer including the most relevant and important information.

1. Tell me about the stucco process
   The foreman explained to me the stucco process in the same order that it was presented in the case study analysis. He explained how the siding first requires foam board and then followed by chicken wire, then having the stucco plaster mixed in the mixing silo and then applied to the building by the appropriate crews.

2. Why the water use / discharge?

After asking this question the foreman explained to me that the majority of the water used in the construction of stucco comes from the curing process. This is when they apply the stucco to all of the wall and then spray it down with a hose so that it is able to cure. Since this process is done several times to a wall in between coats it is very easy for all of that water use to build up over time. When asked about the discharge and remnants of stucco plaster left all over the jobsite he chuckled a little bit, explaining to me that he can do everything he can to keep his crew inline with their housekeeping of their work area, but he can only do so much. He explained to me that the discharge always stems from having too much stucco left over, and once stucco is mixed it only has about twenty to forty minutes before it begins to harden. So when they are left with a surplus of stucco and no where to install it they usually end up dumping it if not in washout pans (Large metal basins for excess concrete and stucco as shown in **Figure 14.**) then on the ground.

Figure 14.

3. Why do you use this process?
   When I asked him why he uses this process gave me a very blunt answer: “It’s how y’all told me to do it”. This made me chuckle, and then asked him to explain further. He explained to me that when they were awarded the job they were given the specifics for the project and their contract. Their contract explains that they are going to install the stucco per the instruction in the specifications sheet. The specification sheet calls for the same process of using foam board, tyvek and chicken wire, applying a coat, water curing it and doing the same process up to three times.

4. How could this process be changed?
   This question could have been broken out into several different questions but the foreman had so many ideas that I couldn’t think of at first. In this section I kind of let him take the lead on different ways that the process could be changed. Firstly he said that we could provide siding before stucco that creates a larger mass so that less stucco plaster would be needed in the first place. He explained that this can be done by using a product called densglass, which is a sheathing material that also serves as an insulation barrier **(Figure 15.)** He explained that using thicker sheets of this can make it possible so that there are not nearly as many coats of stucco needed.

Figure 15.

To quantify that, instead of using the amount of water it takes to cure and mix up to four coats of stucco, it would only require the amount of water for one.

5 & 6. What is your main water source?

When I asked the foreman this question, he once again had a pretty blunt answer. He explained to me that they just tie into the mainline that the rest of the construction site uses. I asked him if it were possible to use less desirable water, which is in correlation with question six, such as reclaimed water. He told me that if we could use water that passes a standardized test that proves it is sanitarily safe to work with and install on a structure then there should be no problem with it. He also explained that the water used in this process does not need to be potable, so it is possible to use sanitary reclaimed water from other under utilized water sources.

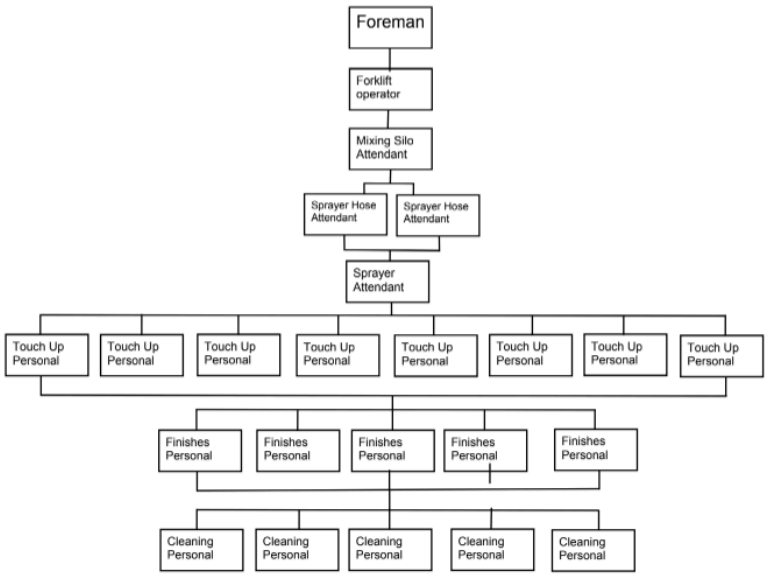
7. How could you use less water?

This question brought forth some very thoughtful questions and solutions. The stucco foreman had referred back to his earlier answer where he discussed that it is possible to use larger sheathing and siding so that it is possible to use less stucco plaster and still have the same sealing and insulation effects. I prompted him to consider what can be done about the amount of water used during the curing process. We ended up coming to the conclusion that it could be possible to consider how many square feet of stucco must be applied and quantify the amount of water needed for the curing process. If this can be done accurately, it is possible to calculate the approximate amount of water needed for an entire stucco process. Once this amount of water is determined it could lead to regulation surrounding the amount of water used in not only stucco construction but also all construction practices requiring large volumes of water

8. What is the size of your crew and the responsibilities of its members?

The foreman explained to me how much of a workforce he had and each responsibility of all the roles involved. Much of the information falls inline with the breakdown of the stucco process explained previously. The foreman explained to me that he has a large crew of about 7 different roles that are covered by around sixteen personnel, with some doing up to two or three different roles.

Figure 16.



To explain it as he did, the crew organization goes as follows: 1 foreman, who is responsible for all of the office and organizational work, A forklift operator who picks up the stucco bags and suspends them above the mixing silo, a silo attendant who runs the mixing silo, two sprayer hose attendants who maintain the line for the stucco sprayer by preventing it to get crushed or tangled, a sprayer attendant who has the job of spraying the stucco to the wall, eight touch up personnel, five finishes personnel and a crew of about 5 cleaners. A diagram showing the crew hierarchy is provided as well. **(Figure 16.)**

Method 3 : Perception of Solutions

The third method of research I used was the Perception of solutions. This gave me the chance to take information from my interview and from my case study analysis and compare it to how others practice stucco construction, how they use water, and how it could be implemented on my jobsite. The first solution that I discussed with the stucco.

Use of Alternative Sheathing

The perceived benefit of using DensGlass as an insulation barrier and as means to take up more void space on a wall so that there are not as many coats of stucco required is one very feasible solution. Traditional stucco assemblies typically rely on foam board layered over plywood or OSB, followed by a weather barrier and a wire mesh substrate. While this assembly is standard, it provides minimal bulk, which necessitates multiple coats of stucco plaster to build out the required surface thickness and weatherproofing. Each coat demands significant amounts of water for mixing and curing, compounding the overall consumption.

DensGlass sheathing, a fiberglass-mat gypsum panel, introduces an efficient alternative by serving both as a substrate and a weather-resistant barrier. Its dimensional stability and water resistance allow for better adhesion and reduce the need for multiple plaster coats. In many cases, switching to this type of sheathing can eliminate at least one to two base coats of stucco, cutting water use over the course of a project. This represents a meaningful savings in regions like Arizona where water is both scarce and expensive.

From a sustainability perspective, using enhanced sheathing reduces not only water usage but also labor hours, material transport, and stucco waste. Fewer coats mean less overmixing, shorter curing cycles, and reduced runoff from slurry and overspray. Additionally, since products like

DensGlass often include recycled content, they align well with sustainable construction certification goals.

There are, however, some implementation barriers. Builders must be willing to adjust design specifications and budget slightly more for upgraded sheathing. However, these costs can be offset by lower labor demands and fewer water related issues such as dust control and runoff mitigation. Education and communication across teams particularly between architects, contractors, and owners are essential to ensure early buy-in and contract alignment.

Overall, integrating alternative sheathing materials into stucco assemblies presents a realistic and impactful opportunity to address water waste. By reducing plaster volume and streamlining application, this approach modernizes stucco practices and aligns them with both environmental responsibility and construction efficiency.

Quantifying Water Use Per Square Foot of Stucco Application

A very practical application to reducing the water consumption in Stucco is to establish a quantifiable metric of water use per square foot of applied surface. Currently most stucco applications are done based on job experience and site specific judgment with little to no regard for how much water is actually needed versus how much is actually used. This lack of a guideline is what usually leads to the excessive amounts of water used during both the mixing and the curing process, especially when multiple coats of stucco are being applied across large building faces.

By creating a standardized formula or bench mark, such as gallons of water per square foot of stucco installed, builders and contractors can more accurately predict the total amount of water required for a project before the work even begins. According to some technical specification from *Cemex* it is calculated that around 1.5 gallons of water is needed per bag of plaster mixture. Further calculations for the mixture can determine how many bags will be needed to cover a specific area. Using this information, quality take offs completed by contractors can help them have the ability to know approximately how much stucco they are going to need and how much water they are going to need.

Once baseline values are established, general contractors can incorporate this data into the project management system and site specific environmental protection plans. Which in turn would allow superintendents and field engineers to track the water consumption in real time, or have a member from the stucco crew perform the duty. This would be a very valuable tool on the jobsite where this research took place because Arizona is a very drought prone area and water conservation is one of our top priorities.

Initially adopting this system will require investment in water metering tools and training on digital tracking systems. Which in turn could be a large barrier due to issues such as contractors not wanting to hire out more employees for the task. However, the long term benefit of reduced costs, improved environmental compliance and scalable industry best practices justify the effort. This solution would bring together sustainable intention and field level execution by turning a process that has predominantly been qualitative and evolving it into a measurable performance target.

Using Non-Potable or Reclaimed Water for Stucco Mixing

Another impactful solution to reduce water waste in stucco construction is the substitution of potable water with non-potable or reclaimed water for both mixing and curing. For the jobsite that is the subject of this research and other drought-prone regions, potable water is an increasingly scarce and valuable resource, and using it for non-consumptive construction tasks represents a significant inefficiency. Given that stucco application does not require drinking-quality water, especially for curing and cleanup, using non-potable alternatives offers a promising opportunity for conservation without compromising performance or safety.

Reclaimed water refers to treated wastewater that has undergone filtration and disinfection to remove contaminants, rendering it safe for non-potable purposes such as landscape irrigation, industrial processes, and dust control. According to the U.S. Environmental Protection Agency (EPA, 2019), reclaimed water that meets local and federal reuse standards can be used safely in construction, provided that it is handled appropriately and does not create aerosol exposure risks for workers or nearby residents.

In the context and applications of Stucco, reclaimed grey water could be used for both mixing the stucco plaster, granted that the water is clean enough to avoid interfering with the chemical bonding process and spraying the stucco during the curing phase, where the water is used externally to maintain the moisture in the applied stucco.

Using this solution would mean that the jobsite would need to integrate on site water storage tanks. This could raise an issue for job sites in crowded areas that already do not have enough room to operate smoothly. However, this water could come from designated pipelines or coordinated with municipal reclaimed water distribution systems. The distribution systems however would need to be planned out far in advance for their operation to be successful. This would still be a very viable option for the project involved in this research because a temporary pipeline could be tied into the pre existing reclaim water network since the City of Scottsdale does permit the use of grey reclaim water in construction activities (Snell, 2023).

The largest challenge that can come from this solution mainly stem from regulatory limitations, inconsistent water quality standards and lack of contractor familiarity with safe handling protocols. However, these can be addressed through clear permitting processes, testing procedures and training programs.

Revising Subcontractor Specifications and Contracts to Encourage Water Efficiency

Material choices and water source substitutions are very important parts of reducing water waste in stucco construction, having those changes implemented will depend on formalizing the changes contractually. One of the most powerful tools for promoting sustainability on construction sites is the revision of subcontractor specifications and contract language to include water conservation measures. Since stucco crews operate under the guidance of specification sheets and contract scopes provided by general contractors and design teams, these documents determine not only what is built but also the processes in which it is built.

As shown in this research, subcontractors often default to practices that are heavy on water usage because they are contractually obligated to follow specifications that do not prioritize resource efficiency. This includes the multiple and redundant stucco coats, unrestricted water usage during curing and no accountability for slurry and run off. The stucco foreman telling me “That’s how y’all told me how to do it” shows the degree to which subcontractors will defer to general contractor direction and contract specifications.

To address this, general contractors and owners can revise stucco specifications to require water use budgeting, use of alternative sheathing, non potable water use, slurry containment and washout requirements and submittals and certifications verifying the subcontractors compliance with water efficiency practices.

In summary, revising subcontractor specifications and contracts could create a foundational shift on how water efficiency is utilized on construction sites. It takes sustainability from a theoretical idea into a contractually enforceable standard, which would ensure consistency and accountability.

Discussion

The results of this research clearly illustrate the significant impact that stucco construction has on water consumption in the built environment, particularly in arid regions like Arizona where the practice is not only common but often taken for granted. The multi-layered methodology combining case study analysis, interviews, and perception of solutions presented the opportunity to possess a larger understanding of the practical realities, inefficiencies, and opportunities for reform in stucco practices.

The case study analysis revealed that water usage in stucco is deeply embedded in routine jobsite workflows, particularly during the multi-phase curing process and cleanup activities. Each wall assembly receives several coats, with water sprayed between each layer to cure the stucco properly. While this process ensures durability and compliance with aesthetic and structural standards, it is very water intensive. Observation of the jobsite further confirmed the excess stucco waste and water runoff, indicating a broader lack of planning and resource efficiency.

My interview with the stucco foreman provided valuable qualitative insight into why these practices persist. His responses underscored how subcontractor behavior is largely dictated by contractual specifications and long standing expectations. The remark, “It’s how y’all told me to do it,” reflects a common issue in construction: workers and subcontractors follow the directions they are given, even if those directions fail to use sustainable best practices. However, the foreman also offered constructive alternatives, such as using thicker sheathing materials like DensGlass to reduce the need for multiple coats, as well as openness to using non-potable or reclaimed water provided it passes safety standards. These insights validated that solutions exist but are rarely implemented due to project planning and execution.

Through the Perception of Solutions, this research evaluated four main opportunities for improvement. Each proposed solution, using alternative sheathing, quantifying water use per square foot, integrating reclaimed water, and revising contract language, was found to be both feasible and impactful when tailored to specific project contexts. The analysis showed that implementing thicker sheathing like DensGlass can reduce the number of stucco coats required, lowering both labor costs and water use. Quantifying water use per square foot transforms a previously qualitative process into a measurable performance target, fostering accountability and allowing for regulatory benchmarking. Using non-potable water aligns with existing water reuse infrastructure in cities like Scottsdale, and could significantly ease demand on municipal potable water supplies. Finally, updating subcontractor specifications ensures that water efficiency is no longer left to chance, but contractually enforces sustainability into the project's DNA.

My research also revealed barriers that must be addressed to implement these solutions. These include upfront costs, space constraints for on site water storage, regulatory inconsistencies, and limited knowledge with water saving materials and techniques among field personnel. However, these challenges are not impossible to overcome. As my research argues, the key to change lies in education, planning, and institutional commitment from project owners, architects, and contractors alike.

Broadly, this research contributes to a growing conversation about how construction practices must evolve in the face of global resource scarcity. In a state like Arizona, where water shortages are not hypothetical but ongoing, the construction industry has a responsibility to adapt its methods and materials to prioritize conservation. By leveraging both on-the-ground experience and sustainable design strategies, my findings highlight a realistic path forward, one where performance, cost, and environmental responsibility are no longer at odds, but aligned.

Conclusion

My research set out to examine the substantial yet often overlooked water use in stucco construction, with a focus on practices common for my jobsite in Arizona, a region where water conservation is not only necessary but urgent. By utilizing a mixed method approach that combined firsthand case study observation, direct interviews with construction personnel, and an analytical exploration of potential solutions, this capstone has uncovered the inefficiencies embedded in traditional stucco processes and identified realistic, implementable strategies for water mitigation.

The case study revealed how ingrained the water intensive curing and clean-up procedures are in the daily operations of stucco crews, and how even well meaning teams produce excessive runoff due to lack of guidance, overmixing, and rigid contract requirements. Through the interview method, the stucco foreman's insight illuminated the industry's deep reliance on outdated specifications and the limited autonomy subcontractors have to pursue more sustainable methods. Yet, these same interviews revealed strong potential for innovation especially when crews are empowered with clear expectations, better materials, and data-driven practices.

Four key solutions emerged as most promising: (1) using alternative sheathing such as DensGlass to reduce the need for multiple coats; (2) quantifying water use per square foot to support planning and accountability; (3) incorporating reclaimed or non-potable water into mixing and curing phases; and (4) revising subcontractor specifications and contracts to formally include water conservation requirements. Each of these strategies is feasible and aligns with both environmental goals and industry performance standards. While there are barriers—such as cost, space constraints, and regulatory hurdles, none are impossible to get by with proper planning.

Ultimately, this research underscores the need for a paradigm shift in construction practices, one where sustainability is not treated as an afterthought or marketing point, but as a core design and execution principle. If adopted widely, the solutions proposed here have the potential to drastically reduce water use not only in stucco applications but across a range of high-impact construction processes.

In a time defined by climate pressures and resource limitations, the building industry must evolve to meet both performance and environmental responsibilities. By combining field experience, practical solutions, and institutional reform, my research lays the groundwork for a more efficient, accountable, and sustainable future in construction.

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