Southwest Guide to Masonry
Our Purpose

BUILDING A STRONGER FOUNDATION FOR ARIZONA'S MASONRY INDUSTRY

The Arizona Masonry Council, Inc. (AMC) established in July of 2018 is a non-profit formed with the overall goal of promoting the interests of the concrete masonry industry in Arizona.

Our mission is to create significant and lasting positive change for the Arizona masonry industry and to reinforce that our systems provide the premier building envelope solution in the minds of public and private owners, developers, architects, engineers, general contractors, and the general public.

AMC represents and supports both Masonry Contractors and Block Producers in Arizona. AMC focuses on four main pillars:

+ **Education & Promotion**
+ **Workforce Development**
+ **Building Code & Material Standard Advocacy**
+ **Government Relations**

LAST Architects is a partnership formed by a shared belief in the potential of the built environment to uplift the lives of its inhabitants. With over 25 years of combined experience, Brad Lang and Eric Sterner established LAST as a practice dedicated to civic life and the public realm. Through a commitment to place-making rooted in a research-focused, collaborative, and performance-based approach, LAST seeks integrated design solutions in service of community and collective memory.

+ **LAST promotes a process of engagement, facilitating conversations between all project constituents**
+ **LAST distills disparate sets information, from cultural & historical to financial & legal into cohesive project frameworks**
+ **LAST reveals, discovering design solutions greater than our preconceptions, devised to amplify meaning and clarity**

At LAST, sustainable solutions are inherent to our process – with each project, we strive for meaning and purpose derived from the opportunity of place – designed to last, to the last detail, for a lasting impact.

Executive Summary

purpose + approach

Unlike other Masonry Systems Guides, The Southwest Guide to Masonry undertakes a comparative analysis model, where masonry systems are put in relation to other common enclosure systems – specifically, those enclosure systems most commonly associated with multi-family housing. The Masonry Systems Guides out there implicitly assume the project is of masonry. Our resource guide positions itself to demonstrate why your project can and should be of masonry. We are directed towards an audience deciding between systems. ***Through the comprehensive nature of our approach, we are advocating for and undoing the many presumptions owners and architects may have about masonry and its viability for their projects.***

Another important aspect our guide brings forth is inspirational – the SW region has an incredible collection of masonry precedents. Many guides have incredible amounts of information, but you're not necessarily excited by masonry's potential upon first read. Technical guides tend toward "typical" conditions to capture their audience. ***We are supplementing the Comparative Analysis with inspiring Case Studies that illustrate creative applications of masonry to show its depth and breadth as a material.***

What are we doing for 2025?

Our request supports the continuation and advancement of work initiated in 2022 with the development of Volume 1 of the Southwest Guide to Masonry. Our ongoing research is currently under expert review by professionals in cost estimation, wall assembly performance, and sustainability. These evaluations aim to quantify and clarify material system differences in measurable, objective terms. With the support of this grant, we will incorporate findings and feedback from Volume 1 to guide the next phase of development. This includes the expansion of key sections, deeper comparative analyses, and the addition of new research areas that address gaps identified by technical reviewers. The outcome will be an enhanced and more comprehensive Volume 2 of the Southwest Guide—further establishing it as a trusted, data-driven resource for design professionals, contractors, and decision-makers across the region.

View Our Progress of the Guide:

https://www.dropbox.com/scl/fi/pf2ey7k6xie521yevehvh/25_0710-SW-Guide.pdf?rlkey=mpn0ysdbsh6mx2kvllw8vfzss&st=nz2i1f41&dl=0

The Team

The Southwest Guide to Masonry was conceived and being led by the Arizona Masonry Council Technical Committee with LAST Architects serving as the Principal Investigators.

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Currently, the Guide Includes:

The highlighted sections will be further evaluated with grant monies received by the MCAA

While there are other masonry books and manuals, Arizona Masonry Council seeks to develop the first Southwest Guide to Masonry. The Guide is envisioned as a source book for both technical and aesthetic information, and the go to resource for all things Southwest Masonry.

SOUTHWEST GUIDE TO MASONRY

technical + aesthetic

Masonry in the Southwest
The Southwest Defined +
Climate Zones +
The Benefits of Masonry , Wood and Steel Wall Systems +
Construction Marketplace vs. Consumer Ownership +
Wall System Benefit Themes +

Choosing Masonry
Masonry's Perception in the Marketplace +
Defining Project Success +

The Argument for Duration
The Ephemeral Nature of Modern Architecture: A Troubling Trend +
The Circular Product Cycle +
Opportunities of the Circular Material Cycle +
The Knowledge Handover +
Timeless Buildings, Sustainable Future +

The comparison analysis goes beyond standard shapes and bonds and address sustainability issues related life-cycle cost and energy, to budgetary performance both short and long-term against other common wall assemblies.

Comparative Analysis
A | Single Wythe Concrete Masonry Bearing Walls +
B | Structural Platform Framing with Concrete Masonry Veneer +
C | Structural Platform Framing with Clay Brick Veneer +
D | Structural Platform Framing with an Exterior Insulated Finish System +
E | Structural Platform Framing with Fiber Cement Siding +

Comparative Analysis Summation
Category Rankings +
Performance Rankings +
Weighted Scoring +

Cost Comparison Analysis

Case Studies showcase the groundbreaking masonry work across the southwest. Case Studies combine technical and aesthetic information with manufacturer and construction testimonials. The aim is to personalize the work capturing all aspects of its production and execution closing the gap between disciplines.

Southwest Case Studies
World of Concrete Pavilion 2022 +
Marfa Suite +
Jones Studio Office +
White Stone Flats +
ASU Durham Hall +
Desert Masonry at Taliesin West +
World of Concrete Pavilion 2023 +

Resources
Appendix

With additional grant money, we will:

Expand, Research and Evolve the topics under the current sections of the Southwest Guide to Masonry:

Wall System Benefits:

+ Lifecycle Cost Analysis
+ Regional Risks and Insurabilty Analysis
+ Case Studies Showcasing Wall System Benefits

Masonry's Perception in the Marketplace

+ Maintenance vs. Speed of Construction vs. Life Cycle Cost
+ Case Studies Showcasing Projects with Either Cost, Time or Quality as Primary Focus
+ Examples of ROI on 30+ Year Old Buildings

Defining Project Success

+ Flexibility through Modular and Hybrid Masonry Systems
+ Digital Design (BIM Integration)
+ Cost of Change Comparisons
+ Reframe Masonry's Permanence Perception as a Benefit

Comparative Analysis | Comparative Analysis Summation and Cost Comparison Analysis

+ Expand the Basis of Scoring for Energy Efficiency
+ Insurance Cost Review
+ Maintenance Comparison for Life Cycle Cost

Southwest Case Studies

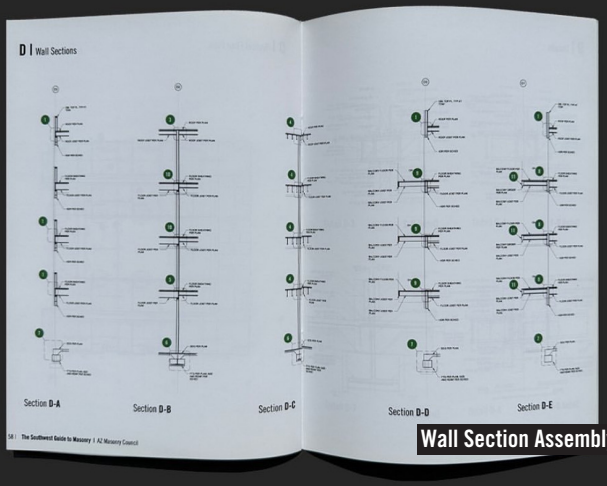
+ Expand the Basis of Scoring for Energy Efficiency
+ Insurance Cost Review
+ Maintenance Comparison for Life Cycle Cost

Additionally, we will:

+ Hire a copyright/publication editor to review the Southwest Guide for the following:
    - Grammar, spelling, and formatting consistency
    - Citation and Source Validation
    - Image Rights Audit
    - Readability and Legibility
+ Create an AIA Continuing Education Approved Course from the Southwest Guide Information

What does the Guide currently entail?

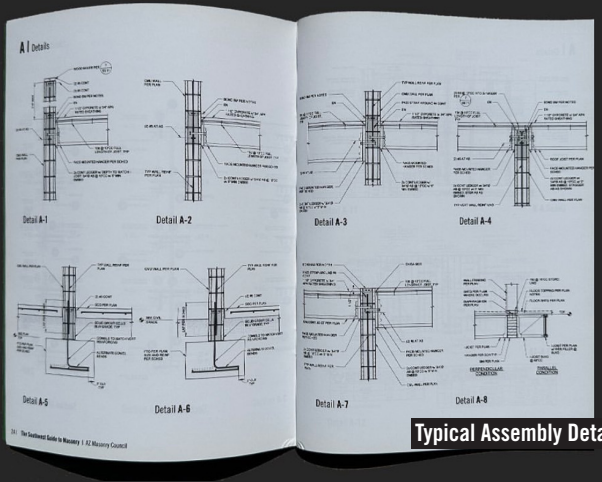
Scan the QR Code to review the current Volume of the Southwest Guide to Masonry



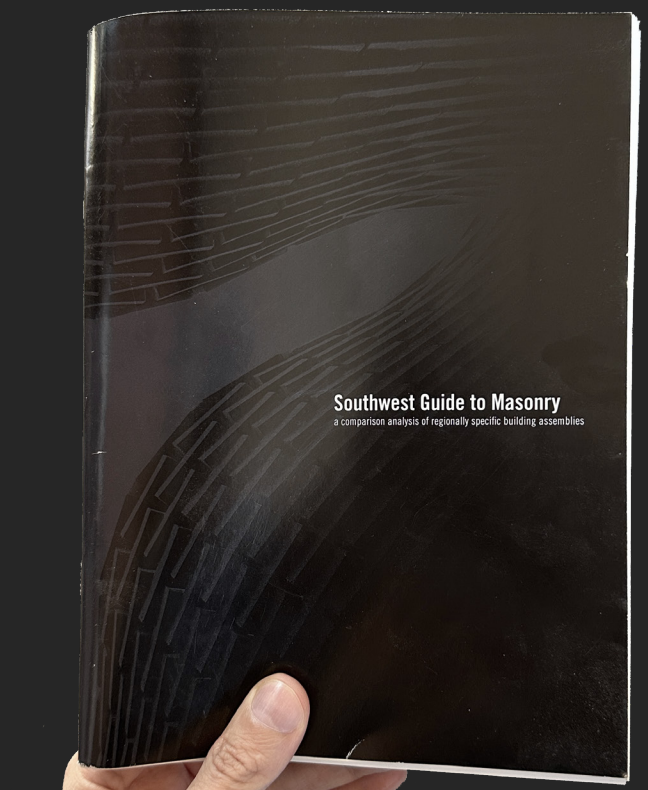
Wall Section Assembly Comparisons

Taliesin West Case Study

Marfa Suite Case Study



Typical Assembly Detail Analysis/Comparison



Exhibit

Masonry in the Southwest | Wall System Benefit Themes (P.12-19)

Ref. P.16-17

Wall System Benefit Themes Explained (continued)

Enhanced Insurance Values

Reducing Insurance Costs with Resilient Construction

Recent studies reveal that builders can significantly lower insurance premiums by choosing concrete masonry over wood framing for multi-residential structures. For instance:

+ **Dallas: 40% lower combined builder's risk and general liability insurance**
+ **Charlotte and Atlanta: 50% reduction in combined insurance policies**

This trend is particularly important given the rising insurance costs, with renewal increases jumping close to 20% year-over-year (Marsh's Global Insurance Market Index, Q3 2020). As a result, contractors, property owners, and developers are exploring the insurance benefits of building with concrete masonry units (CMUs).

How are Insurance Costs determined? A look beyond the flat rate on your bill:

Insurance pricing is established by Insurance Services Office, Inc. (ISO), in its Commercial Lines Manual (CLM) for purposes of developing rates for insuring commercial property based on susceptibility to damage by fire. The six ISO CLM building construction categories and the associated ISO construction codes, from the least fire-resistive category to the most fire-resistive category, are as follows:

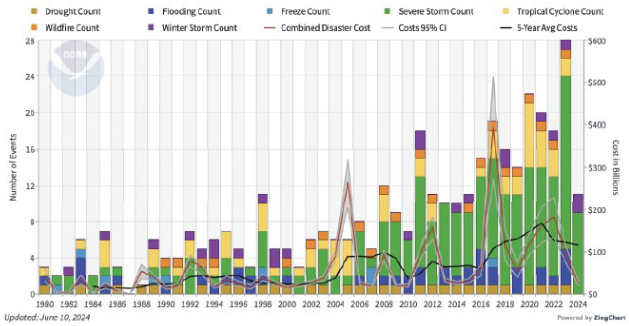
+ Frame. Exterior walls of wood, brick veneer, stone veneer, wood ironclad, or stucco on wood **(Construction Code 1)**
+ Joisted masonry. Exterior walls of masonry material (adobe, brick, concrete, gypsum block, hollow concrete block, stone, tile, or similar materials) with combustible floor and roof **(Construction Code 2)**
+ Noncombustible. Exterior walls, floor, and supports made of metal, asbestos, gypsum, or other noncombustible materials **(Construction Code 3)**
+ Masonry noncombustible. Same as joisted masonry except that the floors and roof are of metal or other noncombustible materials **(Construction Code 4)**
+ Modified fire resistive. Exterior walls, floors, and roof of masonry or fire-resistive material with a fire resistance rating of at least 1 hour but less than 2 hours **(Construction Code 5)**
+ Fire resistive. Exterior walls, floors, and roof of masonry or fire-resistive materials with a fire resistance rating of at least 2 hours **(Construction Code 6)**

The American Association of Insurance Services (AAIS) uses nearly identical building construction categories in its materials addressing the development of rates for insuring commercial property in several of its programs.

The overall purpose of the ISO Classification System is to match the exposure with the premium. By grouping like businesses with like exposures, ISO is able to develop loss costs that allow the matching of exposures with premiums.

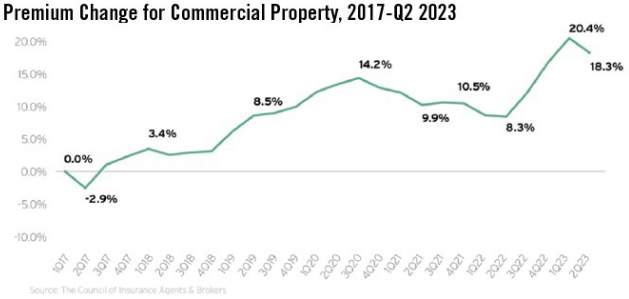
16 | **The Southwest Guide to Masonry** | AZ Masonry Council

United States Billion-Dollar Disaster Events 1980-2024 CPI Adjusted



Disaster Events directly correlate to the premiums of insurance companies. With increases in disaster events expected to rise, insurance premiums will follow.

Premium Change for Commercial Property, 2017-Q2 2023



Are the upfront cost savings of a framing wall assembly worth the future long term costs of the fluctuating insurance rate?

Since 2017, Commercial Building Insurance rates have increased 18.3%

LAST Architects | 17

What we will improve with grant funding:

+ Lifecycle Cost Analysis

Total Ownership Costs (e.g., maintenance, repair, depreciation) analyzed for all wall systems. This will be included in the "Wall System Benefit Themes" as well as included as a sub-parameter in the "Cost Comparison."

+ Regional Risks and Insurabilty Analysis

Further investigations into insurance claims/costs in the Southwest of both current and projected disasters. Utilizing an insurance consultant, the team will utilize available data of the compared assembly types. The data will be studied from some of the following categories:

+ Fire Resistance
+ Impact and Wind Resistance
+ Moisture and Mold Resistance
+ Repairability and Claim Costs
+ Industry Actuarial Data
+ Structural Integrity after Southwest Disasters
+ Loss History by Wall Type

+ Case Studies Showcasing Wall System Benefits

While the current case studies showcase typologies of design-centric masonry projects, the additional case studies will also include projects that highlight durability and lifespan, repair and replacement, energy efficiency and insurability.

Exhibit

Choosing Masonry | Masonry's Perception in the Marketplace

Ref. P.24-25

Defining Project Success | Masonry's Entry Into Discussions

Project success requires striking a balance between cost and value. Project objectives, such as time, cost, or quality, are prioritized based on the project's nature. According to the Society of Construction Law (CIOB, 2014), project failures often result from two primary factors:

+ **Poor alignment between project goals and the client's strategic priorities**
+ **Misunderstandings regarding key performance indicators (KPIs) and measures of success**

The Project Triangle

Key Project Success Indicators

+ **Manage Change**
+ **Clarify Priorities**
+ **Clear Client Communication and Intent**
+ **Reduce Risk**

Potts, K., 2008. Construction Cost Management. London: Taylor & Francis.
Dalton, M., 2008. Why Public Sectors projects fail. In: s.l.:construction manager, p. 23.
CIOB, 2014. Code of Practice for Project Management for Construction and Development. s.l.:John Wiley & Sons, Incorporated.

Top 10 risk sources

Detailed examination of 25 National Audit Office reports into major projects identified 234 different risk sources. The table below shows the most common. Those in bold are down to the project management capability of the client.

RISK SOURCE	
Procurement	29%
Project definition	16.5%
Finance	16.13%
Project organisation	15.8%
Project design	10%
Client organisation	4.6%
Contractual	3.47%
Regulatory context	2.5%
Handover	2%
Project execution	1.25%
TOTAL	100%

Can Wall Assemblies Aid in Managing Expectations?

The primary use and type of a project dictate the prioritization of time, cost, or quality/performance. However, as emphasized by the Society of Construction Law (CIOB, 2014), unclear links between project goals and client strategic priorities, coupled with misaligned success metrics, often lead to project failures and unmet deliverables.

A seminal study by Dalton (2008) reveals that a staggering **75-80% of major project failures can be attributed to just three key factors: flawed procurement processes, inadequate definition of project requirements, and deficient client management capabilities (Table 1).**

Project success parameters begin before design. Masonry's positive differentiators need to be understood and marketed to owners - not just engineers.

What we will improve with grant funding:

+ Maintenance vs. Speed of Construction vs. Life Cycle Cost

While the guide highlights the above mentioned topics independently and in various sections, the team will (by assembly type) analyze the competing project triangle elements to further the decision making ability in this section.

+ Case Studies Showcasing Projects with Either Cost, Time or Quality as Primary Focus

The Case Studies will expand our currently highlighted projects and compare/contrast the above weighing factors. New case studies will include schools, housing, urban infill and cultural projects to broaden relatability.

+ Examples of ROI on 30+ Year Old Buildings

Testimonials go a long way - especially when highlighting an owners experience with the cost of maintaining and operating a building that is requiring large amounts of maintenance and repair bills. Through project owner testimonials (and case studies) we will expand on the good, bad and ugly of ownership of the varying type of assemblies.

Exhibit

Choosing Masonry | Defining Project Success

Scope of Change vs. Cost of Change

The need to revise a project's scope or brief, can have a profound impact on its overall cost. As illustrated in Figure 1, the relationship between the potential for change and the associated costs is inherently dynamic. Notably, the cost of implementing changes escalates dramatically as the project advances toward completion, underscoring the importance of upfront planning and stakeholder alignment in mitigating cost overruns.

Typical Relationship Between Scope for Change and Cost of Change

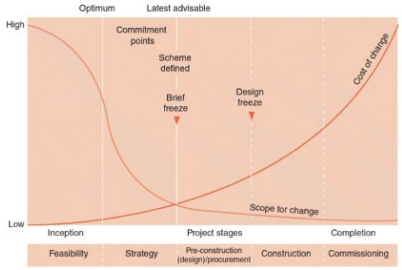
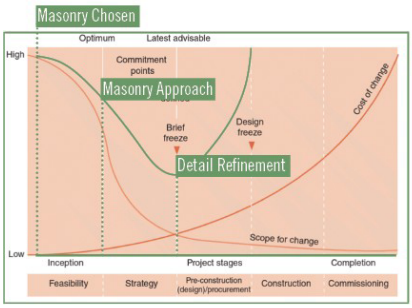


Figure 1 | CIOB, 2014. Code of Practice for Project Management for Construction and Development. s.l.:John Wiley & Sons, Incorporated.



The Imperative of Early Decision-Making in Masonry Design

Unlike more flexible wall assemblies, masonry's solidity and permanence demand clarity and commitment from the outset. To avoid costly revisions and delays, project owners must explicitly define their preferred building type during the initial feasibility phase, setting the course for a successful and efficient masonry construction process.

Optimizing Project Success: Balancing Competing Objectives

Ref. P.30-31

Common Mistakes when Specifying and Using Masonry Products

Poor Specifications

A fundamental yet pervasive mistake in material procurement and selection is the failure to clearly define the required materials. Without precise specifications, vendors are left to interpret the buyer's needs, often resulting in erroneous orders. This miscommunication can lead to incompatible or subpar components, causing costly delays, returns, and potential downtime. Additionally, requiring mock-ups of assemblies and product samples during design can alleviate this concern.

To access specification writers for your project, see:
https://csiphoenix.org/

Poor Supplier Selection

The communication between General Contractor and Architect is imperative when defining the exact product and expectation. Prioritizing price over performance can prove disastrous for businesses. The pursuit of cost savings can lead to suppliers that deliver poor quality, unreliable delivery, and inadequate customer support, causing operational chaos. When price becomes the sole focus, critical considerations like supplier dependability, quality control, and capacity are often overlooked. A thorough selection process, rather than relying on personal recommendations or word-of-mouth, is essential to avoiding costly mistakes.

To access Arizona producers for your project, see:
https://masoncontractors.azurewebsites.net/CompanyPageList?company_type=28

Lack of Lead Time Consideration

Neglecting lead times can wreak havoc on production schedules, leading to missed deadlines, expedited shipping, and costly emergency procurement. Companies, particularly those relying on international suppliers or new materials, often fall into this trap due to overly optimistic delivery expectations and failure to account for potential delays.

Ignoring Hidden Costs

Failure to account for hidden costs can lead to budget overruns and miscalculations in total cost of ownership of a product. Owners and General Contractors often overlook these expenses when seduced by attractive prices, only to discover that hidden costs eclipse initial savings. We indicated in the guide so far insurance costs over the life of a building with various wall types. In addition, understanding the location of material procurement and the ability to have better support during the design stage from the producer are inherent benefits that far exceed initial lower cost.

The "Scope of Change vs Cost of Change" addresses the cost of change in relation to project phases and highlights common procurement pitfalls with masonry. However, it currently leans heavily on emphasizing the importance of early decisions and may unintentionally reinforce the notion that masonry is inflexible or change-resistant. To better balance the argument and positively shape perception, we will build upon this section to highlight solutions for practitioners that benefit cost and schedule on masonry projects.

What we will improve with grant funding:

+ Flexibility through Modular and Hybrid Masonry Systems

Discuss and highlight modular and hybrid systems that have afforded successful outcomes in building and facade design.

+ Digital Design (BIM Integration)

BIM has evolved and is allowing for easier upfront decision making before construction occurs. An analysis of the benefit and use of the BIM platforms will be integrated. Applications to be discussed include but are not limited to: Masonry IQ, BIM-M, IMI, TREVIT, NCMA Direct Design Software, TEK and SCIA.

+ Cost of Change Comparisons

The graph on page 30 will be evolved to include comparative overlays showing cost of design in the differing assembly types. This information will relate back to the new Case Studies.

+ Reframe Masonry's Permanence Perception as a Benefit

Permanence during construction is helpful but only if it is planned for and correctly executed. We will include examples where this currently perceived detriment is a benefit that has aided in avoiding mid-construction design reversals.

Exhibit

Comparative Analysis

In order to contextualize the various properties and conditions of masonry, the Guide adopts a comparative analysis methodology using a common baseline wall assembly. The wall assembly proposes a standard 4-story, multi-family structure with balcony. The multi-family model was chosen as the Guide's initial departure point given the growth of the southwest region and the current need for housing. From this common organization and assembly, various structural and enclosure pairings will be examined.

Ref. P.52+53

Wall Assemblies
For Comparison

Purpose & Methodology: This comparative analysis evaluates five common wall assemblies used in standard multi-family layouts to assess their strengths and weaknesses as both structural components and enclosures across various considerations. Each assembly was designed and analyzed for its relative costs, including both the overall building structure and envelope costs. Additional attributes for each assembly type—such as life cycle costs, energy efficiency, maintainability, and insurance costs—were researched and analyzed using a variety of resources.

Assemblies:
- **A** | *Single Wythe Concrete Masonry Bearing Walls*
- **B** | *Structural Platform Framing with Concrete Masonry Veneer*
- **C** | *Structural Platform Framing with Clay Brick Veneer*
- **D** | *Structural Platform Framing with an Exterior Insulated Finish System*
- **E** | *Structural Platform Framing with Fiber Cement Siding*

The comparative analysis aims to provide a comprehensive understanding of these wall assembly types, moving beyond a sole focus on initial costs. This approach offers owners, architects, and contractors a valuable resource when evaluating options for multi-family developments.

While framed within the context of a multi-family development, the analysis offers insights that can be applied to other project types and scales, highlighting the strengths and weaknesses of each enclosure.

Evaluation Matrix:

Cost	Performance	Engineering
Upfront	Energy Efficiency	Primary Structure
Life-cycle	Durability	Foundation Type
Schedule	Water Intrusion	Floor Type
Material Availability	Mold Resistance	Roof Type
Insurance	Snow/Freezing	Wood or Metal Framing

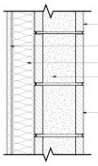
Summary Score: Performance score metrics and definitions per attribute and overall.

Unweighted **10**
0 | *Worst* - 10 | *Best*

- **+Initial Cost** | *Construction Cost* — High Cost … Low Cost
- **+Life Cycle Cost** | *Longevity & Adaptability* — Short Life/Low Adaptability … Long Life/High Adaptability
- **+Energy Efficiency** | *R-Value & U-Factor* — Low Thermal Resistance … High Thermal Resistance
- **+Durability & Maintainability** | *O & M* — High Maintenance Costs … Low Maintenance Costs
- **+Insurance** | *Rates* — High Susceptibility to Damage … Low Susceptibility

0 1 2 3 4 5 6 7 8 9 10

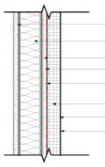
A CMU Single Wythe



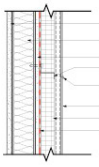
B CMU Veneer

C Brick Veneer

D EIFS



E Fiber Cement Siding



How are the "Baseline Assemblies" being evaluated?

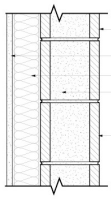
Through comparison of systems and materials, the above baseline assemblies are examined and compared to and against the assemblies listed above that highlight framing and cladding, concrete, various forms of masonry and stone applications and metal panel. Common to the Southwest, these assemblies comprise most of the existing and new buildings in the area. It is the goal of the comparison not to highlight just the positives, but reveal where some applications render greater success as defined by several parameters discussed in the next section of the guide.

Ref. P.54+55

A | CMU Single Wythe

Description: Single-wythe concrete masonry unit (CMU) structures, acting as both the structural wall and finished exterior, require careful design to manage moisture and ensure durability, including water-shedding surfaces, water control layers, and potentially reinforcement for structural stability.

Assembly:



Design Considerations:

Water Resistance | *Single-wythe walls, unlike cavity walls, require meticulous attention to water penetration issues.*

Flashing and Weeps | *Implement flashing at the base of the wall and over openings, along with weeps to allow for drainage of any moisture that may penetrate the wall.*

Mortar Joints | *Ensure full mortar joints, especially head joints, and properly tool the joints for optimal water resistance.*

Surface Protection | *Consider surface water repellents or coatings to further protect the wall from moisture penetration.*

Movement Joints | *Implement movement joints (control joints) at regular intervals to accommodate shrinkage and differential movement, reducing cracking and maintaining the water-shedding surface.*

Sealing | *Apply a clear, breathable, and penetrating sealant after the wall is built and cleaned to further protect against moisture penetration.*

Attributes:

Water-Shedding Surface | *The primary water-shedding surface is the CMU wall itself, including mortar joints, and is enhanced by features like sheet-metal flashings, drip edges, sealant joints, and fenestration systems.*

Water-Repellent Materials | *Incorporating water-repellent admixtures within the CMU and mortar, and applying a surface-applied clear water repellent, can reduce moisture absorption and encourage water shedding.*

Mortar Joint Tooling | *Concave or "V" shaped mortar joints improve rain resistance by directing water away from the wall surface and sealing the joints.*

Flashing and Weep Holes | *While solid grouting can eliminate the need for flashing at openings in some cases, flashing and weep holes are still crucial for managing water penetration, especially at the base of the wall and around openings.*

Condensation Control | *Design should also address condensation and air leakage, which can lead to moisture problems.*

Noise Abatement | *The solid nature of the CMU blocks provides good sound insulation.*

Shrinkage Cracks | *Design should address the potential for shrinkage cracks in the CMU and mortar, which can be mitigated through proper detailing and materials.*

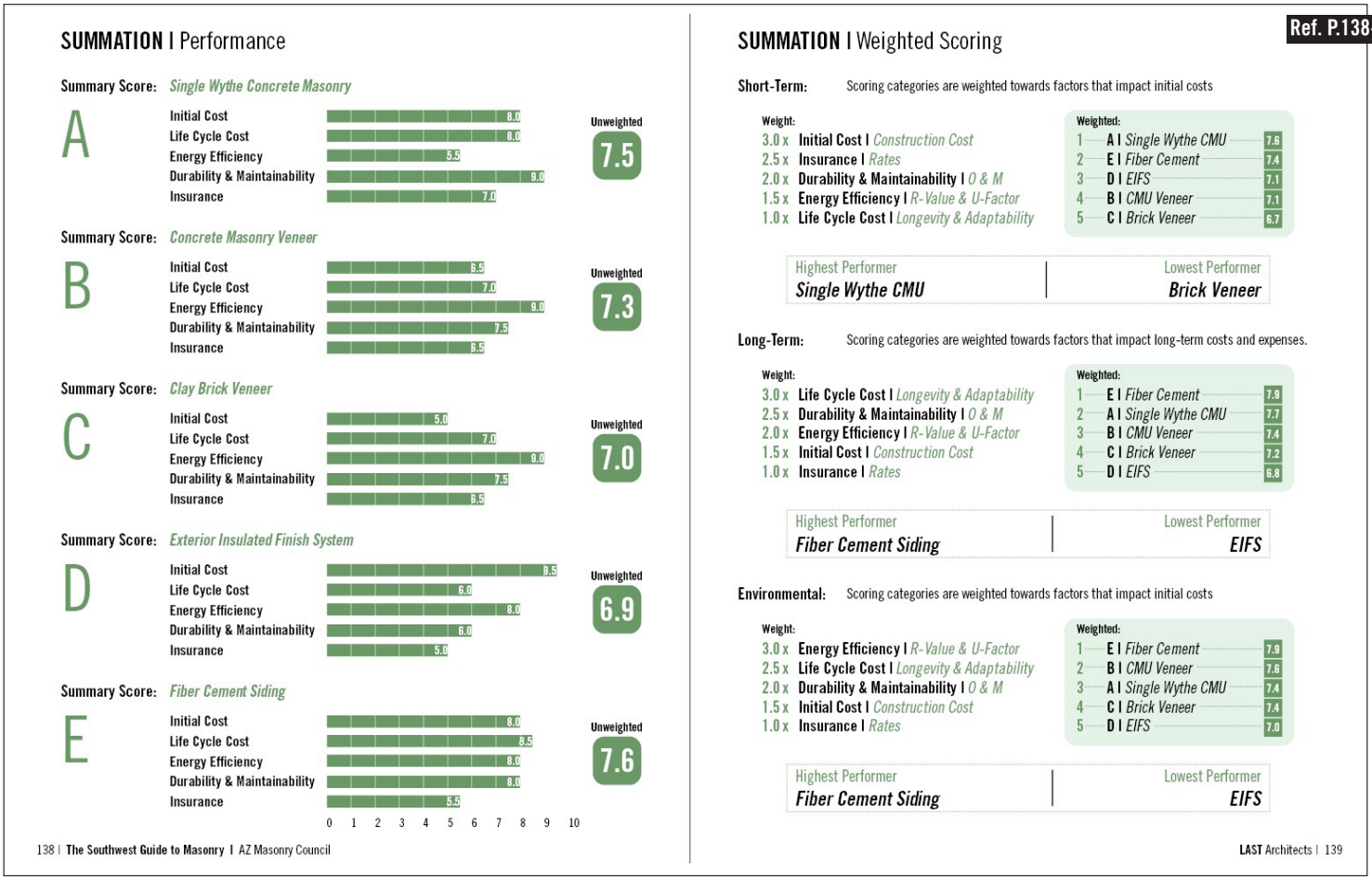
Load-Bearing Capacity | *Single-wythe CMU walls are designed to bear both vertical and lateral loads, including wind loads.*

Wall System R-Value:

Wall Assembly Component	R-Value (Studs 20%)	R-Value (Cavity 80%)	
Outside Air Film	0.17	0.17	
Concrete Masonry Unit (Grouted Cells 16" o.c.)	1.11	1.11	
R-11 Batt Insulation 3-5/8" Metal Studs @ 16" o.c.		11.0	R-Value 11.32
5/8" Gypsum Board	0.56	0.56	
Inside Air Film	0.68	0.68	
TOTAL COMPONENT R-VALUE	2.52	13.52	
U-FACTOR (1/R-Value)	0.40	0.074	U-Factor 0.088
Effective R-Value	11.32		
Effective U-Factor	0.088		

Exhibit

Rankings and Performance



SUMMATION I Performance

Summary Score: *Single Wythe Concrete Masonry*

A

Initial Cost	8.0
Life Cycle Cost	8.0
Energy Efficiency	5.5
Durability & Maintainability	9.0
Insurance	7.0

Unweighted 7.5

Summary Score: *Concrete Masonry Veneer*

B

Initial Cost	6.5
Life Cycle Cost	7.0
Energy Efficiency	9.0
Durability & Maintainability	7.5
Insurance	6.5

Unweighted 7.3

Summary Score: *Clay Brick Veneer*

C

Initial Cost	5.0
Life Cycle Cost	7.0
Energy Efficiency	9.0
Durability & Maintainability	7.5
Insurance	6.5

Unweighted 7.0

Summary Score: *Exterior Insulated Finish System*

D

Initial Cost	9.5
Life Cycle Cost	6.0
Energy Efficiency	8.0
Durability & Maintainability	6.0
Insurance	5.0

Unweighted 6.9

Summary Score: *Fiber Cement Siding*

E

Initial Cost	8.0
Life Cycle Cost	8.5
Energy Efficiency	8.0
Durability & Maintainability	8.0
Insurance	5.5

Unweighted 7.6

0 1 2 3 4 5 6 7 8 9 10

138 I **The Southwest Guide to Masonry** I AZ Masonry Council

SUMMATION I Weighted Scoring

Ref. P.138-139

Short-Term: Scoring categories are weighted towards factors that impact initial costs

Weight:	Weighted:
3.0 x **Initial Cost I** *Construction Cost*	1 **A I** *Single Wythe CMU* 7.6
2.5 x **Insurance I** *Rates*	2 **E I** *Fiber Cement* 7.4
2.0 x **Durability & Maintainability I** *O & M*	3 **D I** *EIFS* 7.1
1.5 x **Energy Efficiency I** *R-Value & U-Factor*	4 **B I** *CMU Veneer* 7.1
1.0 x **Life Cycle Cost I** *Longevity & Adaptability*	5 **C I** *Brick Veneer* 6.7

Highest Performer: ***Single Wythe CMU*** | Lowest Performer: ***Brick Veneer***

Long-Term: Scoring categories are weighted towards factors that impact long-term costs and expenses.

Weight:	Weighted:
3.0 x **Life Cycle Cost I** *Longevity & Adaptability*	1 **E I** *Fiber Cement* 7.9
2.5 x **Durability & Maintainability I** *O & M*	2 **A I** *Single Wythe CMU* 7.7
2.0 x **Energy Efficiency I** *R-Value & U-Factor*	3 **B I** *CMU Veneer* 7.4
1.5 x **Initial Cost I** *Construction Cost*	4 **C I** *Brick Veneer* 7.2
1.0 x **Insurance I** *Rates*	5 **D I** *EIFS* 6.8

Highest Performer: ***Fiber Cement Siding*** | Lowest Performer: ***EIFS***

Environmental: Scoring categories are weighted towards factors that impact initial costs

Weight:	Weighted:
3.0 x **Energy Efficiency I** *R-Value & U-Factor*	1 **E I** *Fiber Cement* 7.9
2.5 x **Life Cycle Cost I** *Longevity & Adaptability*	2 **B I** *CMU Veneer* 7.6
2.0 x **Durability & Maintainability I** *O & M*	3 **A I** *Single Wythe CMU* 7.4
1.5 x **Initial Cost I** *Construction Cost*	4 **C I** *Brick Veneer* 7.4
1.0 x **Insurance I** *Rates*	5 **D I** *EIFS* 7.0

Highest Performer: ***Fiber Cement Siding*** | Lowest Performer: ***EIFS***

LAST Architects I 139

What we will improve with grant funding:

+ Expand the Basis of Scoring for Energy Efficiency

R-Values per wall type were/are the basis for the current assembly energy analysis. While industry accepted and trusted, the value lacks the ability to compare regionally specific intricacies like thermal mass in the Southwest's benefits and the effect of operational energy per wall type over time vs. passive benefits.

+ Insurance Cost Review

The additional investigations per "Masonry in the Southwest I Wall System Benefit Themes (P.12-19)" will aid in solidifying this analysis through our studies of regional risks and insurability analysis.

+ Maintenance Comparison for Life Cycle Cost

An investigation into the 5-10-15-30 year maintenance items that have both cost and insurance implications.

Exhibit

Southwest Case Studies

What we will improve with grant funding:

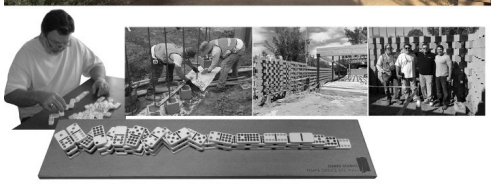
We will continue to add case studies that align with the prompt of the guide to further explore how Masonry is perceived by architects, engineers and owners.

Case Studies Showcasing:

+ **Wall System Benefits**
+ **Projects with Either Cost, Time or Quality as Primary Focus**
+ **Masonry's Permanence Perception as a Benefit**

The Case Studies highlight thought-provoking work that reveals possibilities and clarifies our understanding of current means and methods. The Case Studies showcase projects not only as glossy images, but tell the story of process, macro impact and micro solutions to affirm readers understanding or challenge preconceptions.

Ref. P.154-155



HIDDEN IN PLAIN SIGHT, AN OASIS IN THE DESERT

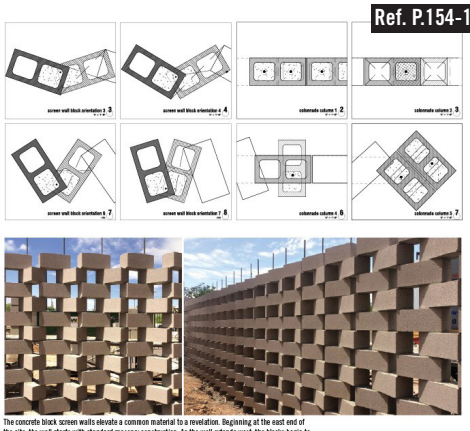
MASONRY AS A REVELATION

Schedule: Design Start | November 2012
Construction Start | October 2014
Construction Completion | December 2016

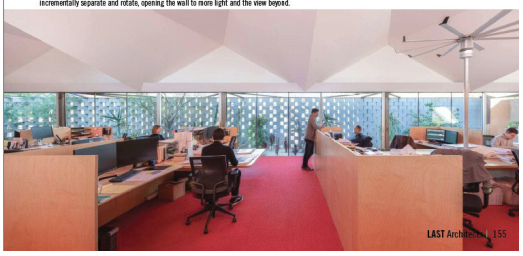
Size: 6700 sf

Project Team: Jones Studio | Eddie Jones, Neal Jones, Brian Farling, Rob Huff

After more than three decades in the hallowed modernist office building designed by local architect Al Beadle, the Jones brothers were compelled to craft a studio space to call their own. Not only would the new office provide a home better tailored to the evolving needs of the studio, but also the opportunity to exhibit the sustainable practices and innovative, bioclimatic design we pursue in all of their projects. The chosen site was a previously undeveloped infill lot in a quiet, mixed-density residential neighborhood, close to Arizona State University, the vibrant downtown area of Tempe, and a growing transportation network connecting the Valley of the Sun. The goal was to create an environment to inspire and stimulate our senses, while remaining sensitive to our site and integrated into the community.



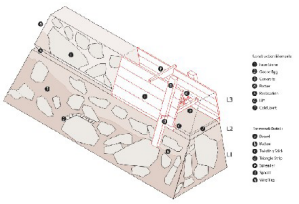
The concrete block screen walls elevate a common material to a revelation. Beginning at the east end of the site, the wall starts with standard masonry construction. As the wall extends west, the blocks begin to incrementally separate and rotate, opening the wall to more light and the view beyond.



Ref. P.162-163

The image to the right identifies the principal construction elements and formwork components of desert masonry. Illustrated is a typical knee wall with rustication. The first group of terms describes the wall's construction elements. Batter means the angle of the masonry, creating a slope. Lift refers to the sequential layers of concrete poured and cured on top of one another. In this diagram, there are three lifts. (L1, L2, L3) Rustication refers to horizontal grooves cast into the masonry. These are triangular in section and used as a method to hide cold joints and sometimes individual lifts. A cold joint is the connection between two separate pours of concrete that have been allowed to harden before the next pour is added. These can be sequential and superimposed during construction of a wall or evidence of alterations years later.

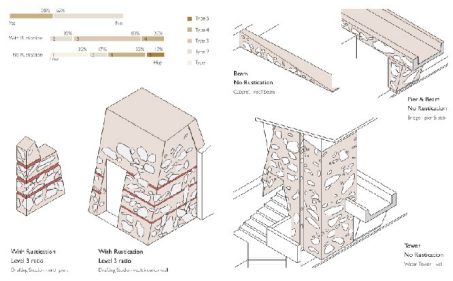
The second group of terms relates to formwork details, including board, batten, twisting stick, triangle strip, spreader, spacer and wire ties. With this type of formwork, spacers are used to ensure maintaining the proper distance between the retaining boards. The tie wire braces are tightened by twisting. All these elements make the form rigid against pressure due to the weight of the raw masonry. Wire ties were used to tie the two sides of the formwork together during the construction, and many of them remain visible on the desert masonry surface today.



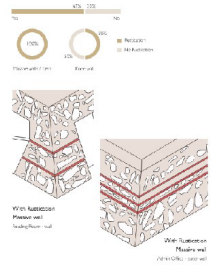
Desert masonry represents not only a way of building but a concrete testament to the pedagogical system of learning by doing championed by Wright and those who have followed.

Period 1: Structures with rustication in Period 1 are mostly of Level 3 face rock ratio

Period 2: All desert masonry structures in Period 2 have no rustication.



Period 3: All massive wall structures have rustications, and half of the knee walls have rusticat ons – revival of the practice in Period 1



Through its constant deployment on site, desert masonry also represents Taliesin's evolving nature and the continual additions and alterations made by Wright and his apprentices over the years. Although no specific chronological style could be identified, the many attributes associated with the construction method reveal a complex and subtle play of choices and typologies of form and aesthetics. Desert masonry techniques continue to be passed down from generation to generation of Fellows through oral tradition and practical experience.

Southwest Guide to Masonry

Budget Total

The LAST team requires funding to build upon the insights and feedback gathered from Volume 1 to inform the next stage of development. This work will involve expanding critical content areas, conducting more in-depth comparative analyses, and introducing new lines of inquiry to address gaps identified by subject-matter experts. The result will be an enriched and more robust Volume 2 of the Southwest Guide—strengthening its role as a trusted, research-driven tool for architects, engineers, contractors, and policy-makers throughout the Southwest.

LAST Architects - Principal Investigators

Time for Research and Documentation

45 hours per month needed of dedicated time by LAST staff

this amount of hours proposed was determined as we distilled the exhibits showcased in the grant application and learned collectively all that will be encompassed within the Southwest Guide to Masonry

12 month duration of work
4 quarters in 12 months

2025 MCAA GRANT TOTAL: $25,000

Note:
The Arizona Masonry Council and Concrete Masonry Hardscapes Association will be matching the $25,000 ask for a total of $75,000 to support this overall effort.

Question Responses

Does the project address a major challenge facing the industry?

In the Southwest, masonry is seeing a shrinking market share in major markets like housing. The reasons for this change are many – more building system options, evolving performance goals, both short-term and long-term by owners and developers, and a general perception surrounding the accessibility and viability of masonry as a uniquely high-end product. **The Southwest Guide to Masonry is conceived to deal with this challenge on multiple fronts with a one-stop source for both technical, and inspirational masonry content.**

The industry is unarguably robust, with a lot of available information. However, the industry is often challenged by the accessibility and presentation of the information, creating a narrower audience for its message. **The Guide's fundamental purpose is to be a broad resource for all stakeholders in the AEC industry – not just Architects and Contractors, but Owners, Client Representatives, and Facility Managers to present masonry as a potential solution in the early decision-making window of projects.**

Are the goals and objectives and the plans and procedures for achieving them well-developed, worthwhile, and realistic?

The goal is to develop a Southwest Guide to Masonry with the objective to raise awareness and market share for masonry across the region. What could be seen as a formidable task becomes less so when broken down into its constituent parts. **The Guide is composed of two foundational research types – the Comparative Analysis and Case Studies.** Each is then supplemented by interviews, featurettes, product resources, etc. The component pieces guard against what is often a tripping point for major research initiatives – unrealistic deliverables.

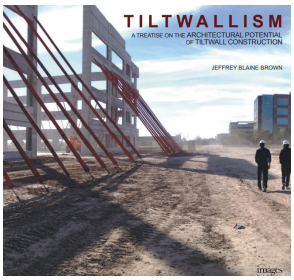
For instance, as the more quantitative Comparison Analysis is being prepared, quarterly Case Studies are being delivered and shared. The work does not remain hidden for long stretches of time. The goal achieving strategy of a consistent roll out of sections and content keeps the research moving and fresh, allowing the team to address current industry issues and relevant projects as they arise.

Is the project informed by research in teaching and learning, current issues, what others have done, and relevant literature?

The Southwest Guide to Masonry was conceived as the next evolution in Masonry understanding and promotion. We are not starting from scratch and are building upon industry knowledge and previous efforts to not only inform our approach, but to enhance our reach and audience.

The question regarding "what others have done" is an interesting one. Our involvement through previous design work exposed us to a similar and quite successful undertaking by another competing industry – the Tilt-up Concrete Association and their sponsored research publication: "Tiltwallism, A Treatise on the Architectural Potential of Tiltwall Construction." We saw firsthand how this resource elevated an industry known for flat and repetitive architectural responses by expanding people's perception of Tiltwall as a potential design solution.

While masonry's challenges differ, the format of creating a comprehensive guide that presents more akin to an inspiration book filled with answers to the material's most pressing and pertinent questions to decision makers looking to specify masonry in their projects.



captures of "Tiltwallism"

Does the project have the potential to provide fundamental improvements in teaching and/or learning through effective uses of technology?

We see technology as a means to overcoming the issue of access and relevancy. **Where traditional publications can stagnate, the flexibility provided by digital formats and the ease by which they can be shared, offered, and updated will be key to improving the educational mission of the Guide.** Digital formats offer other advantages as well – hyperlinking both within and to outside resources will only expand the Guide's reach and usability.

Question Responses continued

Is the project led by and supported by the involvement of capable, trained professionals who have recent and relevant experience?

The Southwest Guide is led and supported by a team of over 20 people that are actively practicing engineers, architects, tradesman, and publication specialist.

Is the project supported by adequate facilities and resources, and by an institutional and department commitment?

The project has the full backing of the AZ Masonry Council who have already allocated resources to get the project started.

What are the broader impacts of the proposed outcomes?

A broader impact inherent in the approach to the Guide is bridging the gap that often exists between various industry stakeholders. This is true especially between Owners, Architects, and the craftspeople in the field. This disconnect often comes at the expense of the project via misinterpretations or avenues unexplored. The Guide will focus on the entire ecosystem of masonry. Case studies will not only be explored through the Owner, Architect, and Contractor, but also the suppliers and masons themselves.
Opening communication between all parties will be one of the more impactful outcomes of the Guide.

To what extent will the results of the project contribute to the improvement of the masonry industry as a whole?

The SW Guide to Masonry will result in a greater understanding as to the Total Value Package of masonry use in building projects. From this understanding, additional project opportunities will come. And those opportunities will be better informed from both an artistic and technical lens.

+ **The guide will support strengthened dialogue across disciplines and encourage more engagement and input from masons during the early stages of project conception and development.**
+ **Case Studies will showcase the amazing work coming from the region, inspiring others to use masonry as a focal material for their projects in smart and creative ways.**

Are the plans for evaluation of the project appropriate and adequate?

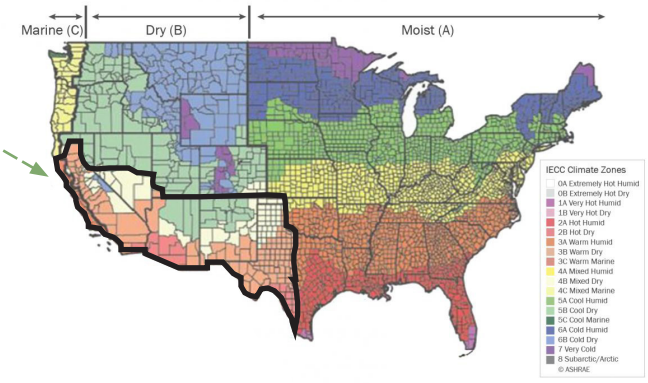
With quarterly deliverables, the Southwest Guide maintains its accountability through the life of the Grant. Quarterly evaluations for multiple points of engagement and feedback so we will continue to refine the work with our successive efforts.

Are the results of the project likely to be useful nation-wide?

Building systems, especially enclosure systems perform at their peek when designed for the climate they inhabit. For this reason, the SW Guide to Masonry has a regional focus based on 2021 IECC Climate Zones

+ 2B; Hot Dry
+ 3B; Warm Dry
+ 4B; Mixed Dry
+ 5B; Cool Dry

Southwest



That said, the ideas and information provided will have national reach. Masonry projects from the Southwest continue to garner national interest through award programs and publications. The uniqueness of the Southwest climate informs design thinking and approaches that has historically pushed the bounds of masonry and its expression. The Southwest remains an epicenter of masony thought and experimentation and because so, maintains a national following.

Question Responses continued

Is all budget information included? Is it complete and unambiguous?

We have attempted to provide a complete and clear budget to meet the goals of the project. **The project relies heavily on the time of experts and specialists to document, organize, and present needed information.** Compensation for their time and efforts supporting the Masonry industry is needed.

Is the cost of the project realistic?

As we have started the project, we come to the Masonry Foundation Grant Submittal with a clear understanding of the financial needs of the project. **With matching funds from the AZ Masonry Council, the project will have the resources necessary to carry through on the ambitious but focused nature of the project.**

How will the progress of the project be measured and reported?

The Guide progress will be reported quarterly with a new Case Study and Wall System analysis available for review. **The approach we've taken is to ensure periodic updates with presentable/marketable work so there is a consistent engagement with the Masonry and affiliated AEC communities.**

How will the requested funds be needed, i.e., will start-up funds be needed, how are payments requested?

Start-up funding has been provided by the Arizona Masonry Council, allowing us to successfully launch the research and begin foundational work. We are now seeking additional funding to advance the project into its next phase, which includes: further investigations of the Comparative Analysis and Case Studies, developing an AIA Education Class Certification program, and expanding critical content areas to support the creation of Volume 2 of the Southwest Guide to Masonry.