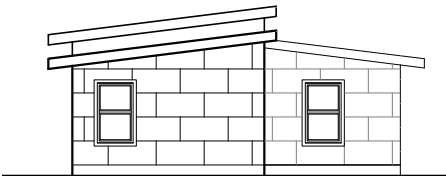
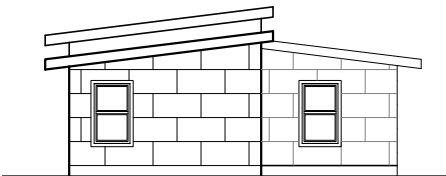
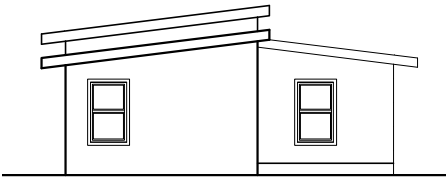
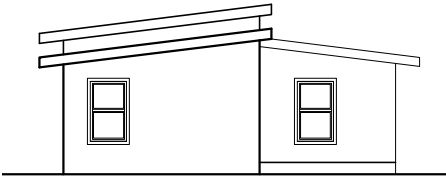
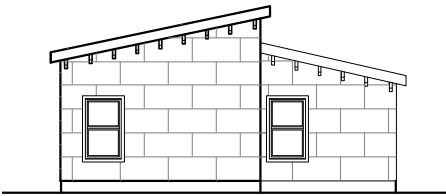


2014 AMERICAN INSTITUTE OF ARCHITECTURE INNOVATION AND PRACTICE IN HOUSE DESIGN RESEARCH GRANT

# ACCESSORY DWELLING UNITS: DESIGN, DELIVERY, AND DEVELOPMENT



## ACKNOWLEDGEMENTS

This report was funded through the 2014 AIA Innovation and Practice in House Design Research Grant. I wish to extend my gratitude to the AIA, the grant committee members, and especially to my advisor, Ann Harris. My thanks and appreciation to all the individuals, organizations and manufactures who contributed their time and knowledge to assist with this report: Austin Community Design and Development Center, Shiloh Travis, Jerry Fryer, EZ Log, Hebel, and Steko. Special thanks to my mentor, Michael Gatto, whose insight, assistance, and guidance made this report possible.

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in areas that may benefit from a more balanced socioeconomic mix. Diversifying neighborhoods has the catalytic potential to set widespread benefits in motion extending beyond those in immediate need of affordable housing. Growing cities not currently experiencing housing shortages would benefit from the early adoption of strategies, such as incentivizing ADU development, that encourage efficient and economic growth. ADU development is just one of the many innovative strategies needed in closing the affordable housing gap, playing an integral role for a time sensitive solution.

#### *Benefits of Accessory Dwelling Units*

ADUs are beneficial to cities as a more effective and economically appropriate use of existing infrastructure. And offer a quick and affordable solution to increasing housing stock. For homeowners, they allow for the option of housing family members, or the ability to supplement income

#### **SOCIAL, ENVIRONMENTAL, AND ECONOMIC BENEFITS OF ADUS:**

***Neighborhood stabilization.*** ADUs integrate with the character of existing neighborhoods and the income they provide can help to stem the tide of displacement.

***Mitigating sprawl.*** Infill housing strategies such as these reduce vehicle pollution and congestion, preserve rural land, and make use of existing city infrastructure.

***Social capital.*** ADUs can foster mutually beneficial arrangements such as help with home maintenance, child or adult care, shopping, transportation, eyes on the street for crime prevention, wellness checks for disabled or ill residents, and social interaction. They also provide a rare opportunity to smoothly integrate low-income residents into single-family environments.

***Income.*** By providing rental income, homeowners who might otherwise lose their homes can retain them, and those in less dire financial straits can garner funds for home maintenance, improvement and taxes. ADUs are also a relatively painless method for mixing incomes.

***Improved alleys.*** Many ADUs are built on alleys, improving these unique spaces and making them cleaner, safer, and more usable.

#### INTRODUCTION

As the national trend of urbanization continues, so does the increasing need of affordable housing. According to the U.S. Census Bureau, over 20% of Americans spend more than 50% of their income on housing. In efforts to curtail increasing housing shortages many cities have municipal programs that actively promote the development of accessory dwelling units (ADUs): small detached homes built on existing single-family properties, commonly called secondary apartments, in-law flats, or Alley Flats. ADUs provide urban infill housing that not only increases density within existing infrastructure and mitigates urban sprawl, but also has the unique ability to preserve the character of existing neighborhoods. This allows gentrifying neighborhoods to maintain diversity, and also provides a way to increase diversity

through rent. The demographics of household sizes are changing, ADUs can help provide the wider range of options that more appropriately fulfills resident needs. This in turn creates availability for larger family homes that may otherwise be occupied by an individual who resides there due to limited alternatives.

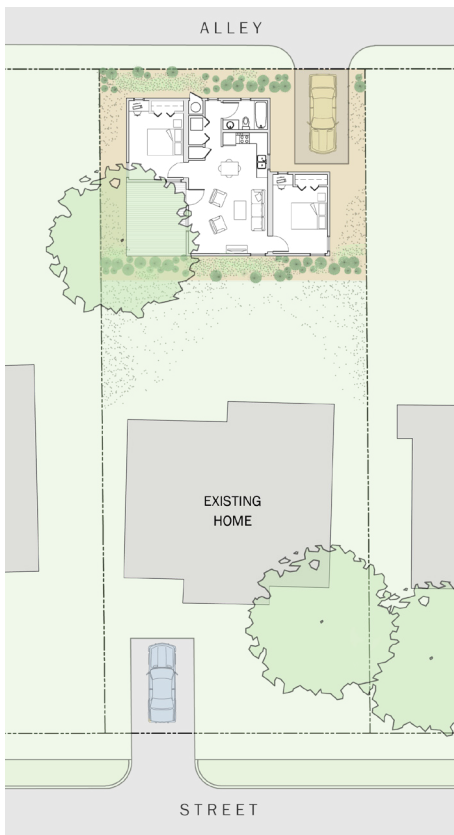


Figure 1: Typical ADU site plan for a standard east Austin lot (50'x140' - 7,000 SF). Source: ACDDC

### *Barriers to ADU development*

There are many financial and regulatory barriers that restrict the development of ADUs. The red tape alone can be enough of a deterrent to interested homeowners and developers. One of the main issues is the sheer amount of time and effort it takes to traverse through local city codes. Permitting restrictions have led to a higher percentage of illegally built ADUs, inhibiting potential benefits. This assumed risk taken on by homeowners may adversely affect anticipated results. Barnstable, MA offers a good example of an amnesty program allowing compliance for existing illegal ADUs upon agreement to rent to low-income

tenants earning less than 80% of the area median income.

For many cities ADUs are an exception to the code, which means that the option to build at all may be easily overlooked. Cities have shown success with updating codes to encourage ADU development by lifting regulatory barriers. Seattle and Santa Cruz have both implemented good examples of successful infill housing programs that not only waive prohibitive code restrictions, but also actively encourage and incentivize.

Few individual homeowners have the financial means to develop on their own and non-profit affordable housing providers lack sufficient subsidies to build. This puts the cost of construction at the forefront of ADU development considerations.

### *Austin Community Design and Development*

The Austin Community Design and Development Center (ACDDC) is assuming a leadership role in Austin for realizing ADU potential and overcoming barriers. They are a non-profit committed to providing sustainable design, planning and development services to low- and moderate- income individuals, families and neighborhoods. In collaboration with the Guadalupe Neighborhood Development Corporation and the University of Texas Center for Sustainable Development, ACDDC has managed the development of three ADUs, through the award-winning Alley Flat Initiative.

The City of Austin is in the process of rewriting the Land Development Code, which includes a re-assessment of the regulatory barriers to ADU development, including units up to 850 square feet. All single-family properties greater than 7,000 square feet are eligible for accessory dwelling unit development, as well as properties greater than 5,750 square feet in neighborhoods that have adopted the Secondary Apartment Special Use Infill Tool.

Austin is currently one of the fastest growing cities in the country, and is ranked second by the Brookings Institute for rate of growth of suburban poverty. Increased home values compounded by a rise in property taxes are rapidly displacing long time homeowners. A 2014 housing market study showed a gap of 48,000 units of affordable hous-

ing in Austin for those with incomes of \$25,000, this is an increase of 12,000 units since 2009. From 2004 to 2014, the average home value in Austin rose by almost 50% but median family income remained virtually the same (NAHB Housing Opportunity Index, Austin MSA, 2000-2013). Median rental rates have risen 49% over the same time period.

There are over 42,000 single-family lots with the potential for ADU development. This could provide much-needed income for the longtime homeowners who are now getting pushed out of the city, while also providing new affordable housing units that double the density of existing single family properties.

In order to address the ADU financing problem, ACDDC has been working on another venture called YardHomes Austin which proposes to lease a portion of a homeowner's back yard (through a ground lease) and allow a separate development entity to develop, own and manage an Accessory Dwelling Unit for 30 – 40 years, after which the unit would convey to the owner. In the meantime, the owner will receive monthly rent from the ground lease and a property tax pass through for that portion of the land that has been leased. Thus YardHomes Austin will allow "land rich but cash poor" property owners to monetize some of the value of their land while retaining ownership. YardHomes Austin seeks to assist long-term homeowners, and the goal is that 75% of all YardHomes developed either preserve the affordability of the existing home (by providing a hedge against rising property tax) or are rented at an affordable rate. Last year a team led by ACDDC achieved second place in a national affordable housing competition called 'Lowering the Cost of Housing' sponsored by Deutsche Bank, Enterprise Community Partners and Syracuse University for the YardHomes ground lease concept, a very innovative approach to financing that could be easily replicated.

From this experience it is clear that ACDDC and the Alley Flat Initiative provide an innovative, workable path to increasing the affordable housing supply, and its approach could be applied to other cities throughout the country.



Figure 2: Lydia Street Alley Flat

Source: ACDDC

In summary, the need for affordable housing in Austin is great; the development of Alley Flats offers great potential toward meeting that need, but so far this potential has remained largely unrealized. This analysis of innovative construction methods aims to allay barriers associated with ADU construction and provide developers like ACDDC with strategies to circumvent common constraints.

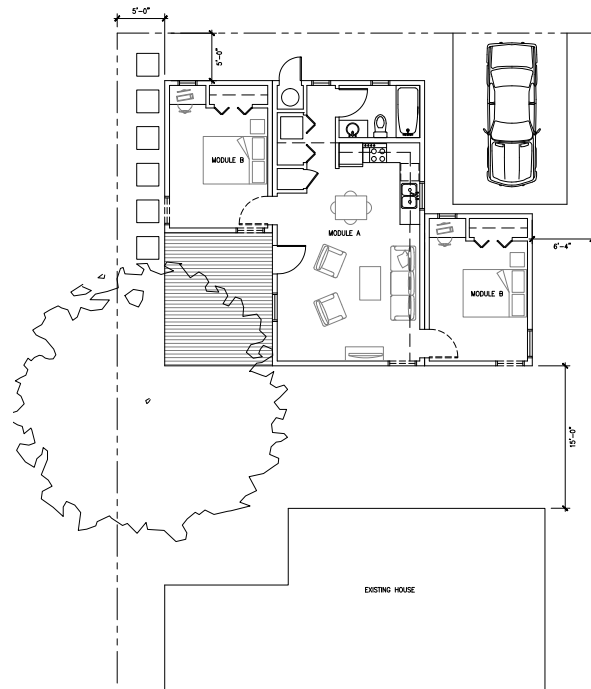


Figure 3: AF2.0 modular floor plan

Source: ACDDC

impact and thermal performance, and not necessarily by their price point. An increased initial cost that lowers living expenses for low-income occupants is a particularly relevant consideration. As with any affordable housing project the primary concern is keeping construction costs low, but this must be weighed with the benefit of lifetime savings, environmental impacts, and quality of living.

In order to lower costs and increase efficacy for the wide variation of site conditions in the back of single-family lots, an ADU delivery system is needed that optimizes flexibility and reduces customization. Prefabricated construction methods are of great interest due to their efficiency and versatility, but limitations of availability from the construction industry hinders their potential for widespread application. Site access is another important consideration impacting utilization, as size constraints can be prohibitive for mechanical equipment needed with some construction methods. This promotes investigation into a low-tech building system with smaller components that can be easily maneuvered in tight spaces.

ACDDC's AF2.0 design has been adapted for comparison of the following building systems: (1) EZ Log, (2) Hebel AAC, (3) Steko, and (4) Conventional light-frame wood construction.

## BUILDING SYSTEMS

In addition to conventional stick frame site-built construction, the following building systems were investigated in detail: modular construction, panelized construction, autoclaved aerated concrete block, and a DIY wood log system. In order to suggest the most energy and cost efficient building system and its potential for replicability, the following data was collected for comparison: turnkey cost estimates, specifications, energy calculations, and design development drawings.

Though the main objective is identifying the most cost effective strategy for the design and implementation of ADUs, this doesn't mean building the cheapest house possible. Materials were chosen with attention to occupant health, environmental



## 1 | EZ LOG

EZ Log is a DIY wood log system made of kiln dried Baltic Spruce. The logs are milled with tongue-and-groove joints and interlocking corners, which can be assembled without the use of skilled or specialized labor. EZ Log's kits are marketed worldwide and primarily consist of structures like sheds and cabins, which means that meeting residential building code is the main challenge with this system. Their kits typically consist of all interior and exterior walls and doors, roof boards, flooring and trim, but no finished roof or insulation. The Baltic Spruce flooring often provided with their kits is not durable enough for daily use, so instead we opted to go with sealed concrete. This was a choice made across the board for each system, in order to provide a more direct comparison between them. For this reason, and

in preference of more affordable and energy efficient options, we also chose not to include the windows and exterior doors in our kit. One of the primary benefits of this system, aside from its DIY potential, is the ability to expose the wood logs either to the interior or exterior, eliminating the need for gypsum boards or exterior cladding. This of course is more of a climatic consideration than an aesthetic one, for Austin's hot and humid climate we have located the insulation and weather barrier to the exterior. As you can see in the plan detail, each log overlaps at the corner for structural purposes, these are called horns, which can either be concealed or exposed depending on exterior cladding and desired aesthetics. For externally applied insulation this created a set cavity space we found convenient for fitting insulation. The choice of insulation was based on R-value for the specified size that could fit within this space.

### 1.1 Design and Installation

The EZ Log kit can be assembled in less than a day, this is a time estimate for the structure itself, but is slightly increased with the addition of insulation. When the concrete foundation is ready, a treated base plate that can be supplied with the kit is anchored to the concrete before installing the logs in order to avoid moisture on the bottom logs. If a timber sub-floor is used, then no base plate is needed. The most complicated part of this system is figuring out the best way to add insulation. Studs or furring strips can be attached with adjustable brackets that allow for movement from the inevitable shrinkage caused by the continuously decreasing moisture content of the logs. This solution proved to be too costly and materially inefficient to make this system feasible. Through the recommendation of Jerry Fryer, an EZ Log distributor in Austin, we chose to instead screw each log down during installation and then attach a rigid insulation to the exterior. The insulation was specifically chosen for its thickness, which is the same depth as the horns, allowing for an easier installation of exterior siding. For climates that require insulation on the interior side of the wall assembly, the Baltic Spruce logs can also be sealed and exposed to the outside as the exterior finish.

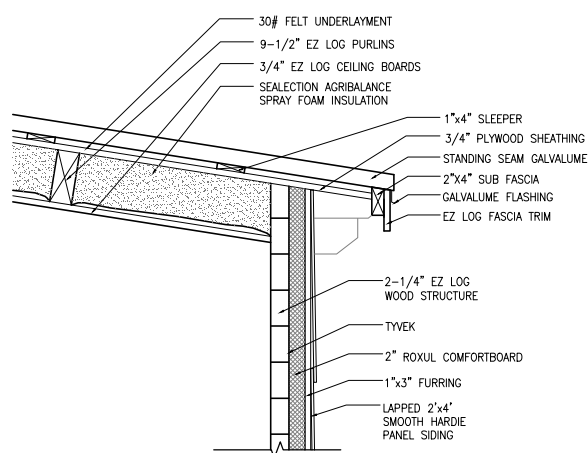


Figure 4: EZ Log AF2.0 roof section

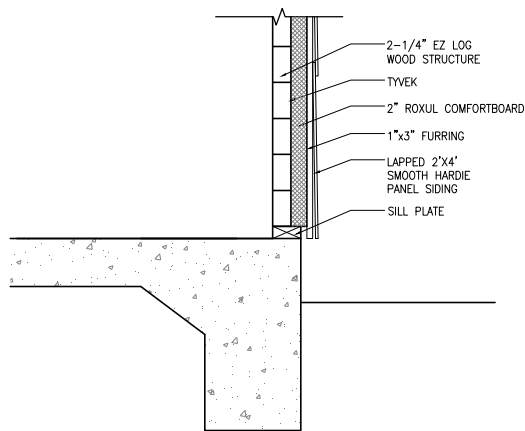


Figure 5: EZ Log AF2.0 exterior wall section

Another consideration when designing with this system is the lack of cavity space for plumbing or electrical work. Small openings can be made in the logs to allow for electrical wiring while still remaining structurally sound. Alternatively, running wires through exposed conduit on the interior is another common solution. Typically the roof boards are placed on top of the purlins, which limits

its insulation options. We chose to attach the EZ Log tongue-and-groove roof boards to the underside of the purlins, allowing us to use the space for wiring fans and lighting without the need of conduits, while still leaving the Baltic Spruce finish exposed on the interior. The purlins included in these kits are usually 6-1/2", but deeper purlins can be requested in order to achieve a sufficient R-value with cavity insulation that affordably meets code requirements. For the purposes of this report we chose to price out spray foam insulation across the board, which once again helps with a more direct comparison between each system. As for the plumbing, furring out the wall between the bathroom and kitchen with 2x4 studs allows for enough room to run pipes through. This means that an efficient design with only one wet wall should be a high priority with this system.

#### **ADDITIONAL NOTES ON INSTALLATION:**

- Take care to seal unfinished wood equally on both sides to prevent one side from absorbing more moisture than the other.
- Some cladding manufacturers limit warranties for installing their products over insulation that exceeds a certain thickness.
- Layering rigid insulation with staggered seams that are horizontally and vertically offset provides better thermal performance than one equally thick layer, even though the stated R-value will be the same. Keep in mind that this will likely result in an increased labor cost.
- Fasteners are expensive; this additional cost of rigid insulation should not be overlooked when comparing product prices. A thinner seemingly more expensive product may be more cost effective by eliminating the need for expensive fasteners.

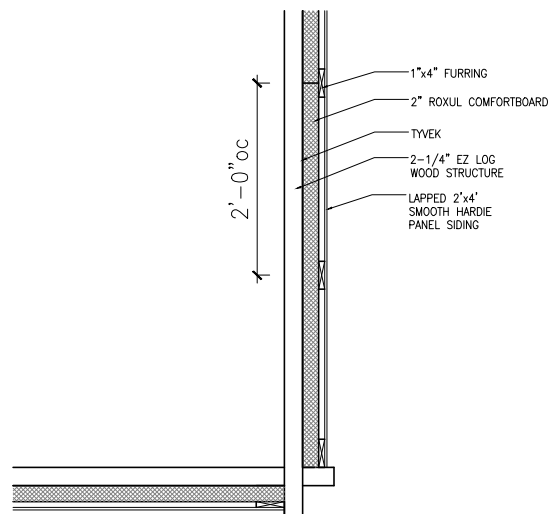


Figure 6: EZ Log AF2.0 exterior wall plan detail

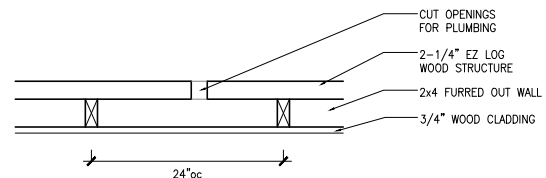


Figure 7: EZ Log AF2.0 interior furred out wet wall detail

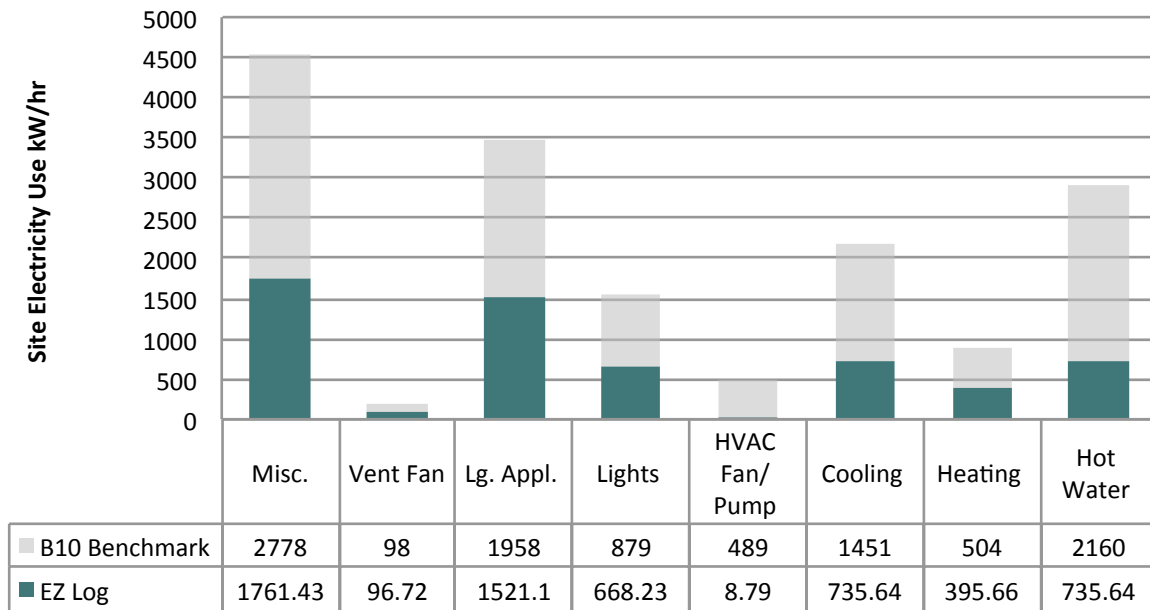


Figure 8: EZ Log AF2.0 and B10 Benchmark electricity usage breakdown.

### 1.2 Energy Analysis

According to the energy modeling estimates, EZ Log's annual consumption of electricity is 5,923 kWh/yr. It performs well below standard construction of this design, noted as the B10 Benchmark, which is estimated at 10,317 kWh/yr. EZ Log is considered a mass wall by the IRC, which has lower R-value requirements due to inherently more efficient thermal properties. In order to meet the 2012 IRC requirement of R-38 for the roof assembly, we requested purlins with a 9-1/2" depth, which allowed for a thicker layer of insulation. Depending on the energy efficiency goals of the project, additional rigid insulation on both the roof and wall assemblies would greatly increase performance. It should be noted that layering rigid insulation with staggered seams that are horizontally and vertically offset performs better than one equally thick layer, even though the stated R-value will be the same.

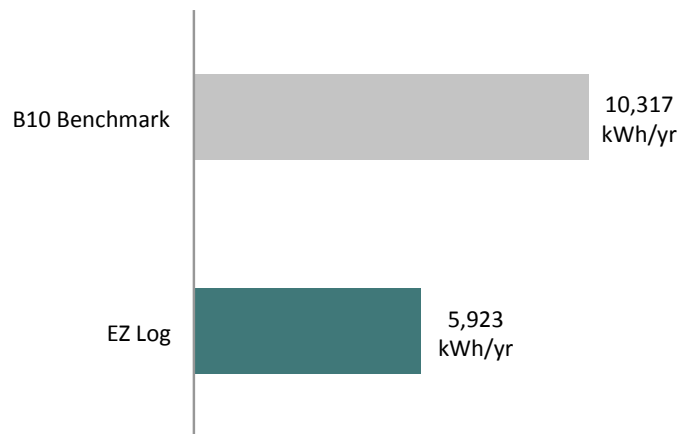


Figure 9: EZ Log AF2.0 annual electricity usage compared to B10 Benchmark.

### 1.3 Cost Estimates

The total turnkey cost estimate for the AF2.0 design is just over \$109,000; this includes the cost of semi-professional labor, but taking advantage of the DIY option with this system reduces estimates to \$102,000. This system would be even more cost competitive if it weren't for the cost of transport included in the kit price. Unfortunately, being shipped from Estonia subtracts some the cost benefits of this system. In addition to DIY labor potential, one of the largest cost savings comes from eliminating the need for drywall installation. The design decision for tongue-and-groove cladding over the furred out wet wall was made with this in mind. Even though drywall is often considered a more cost effective option, this

is not necessarily true when only dealing with one small wall. The EZ Log windows turned out to not be energy efficient enough to be considered cost effective for our purposes, but a quality of living argument could be made for their premium windows that may lead some to a different conclusion.

### 1.4 Summary

One of the major draws of this system is its ease of assembly and DIY potential. This is not only beneficial for the costs savings, but also for the opportunity to engage and strengthen a community through volunteer labor. It could also help to foster a sense of pride and ownership for future residents, a value that cannot be measured monetarily.

Baltic Spruce wood logs are certified by the Forest Stewardship Council (FSC), but even so this may not be an environmentally ideal choice considering the long distance of shipping from Estonia. This varies by location, in the case of Austin, the kit only has to travel a short distance by land from a shipping port in Houston, Texas, and therefore may have a lesser environmental impact than landlocked destinations.

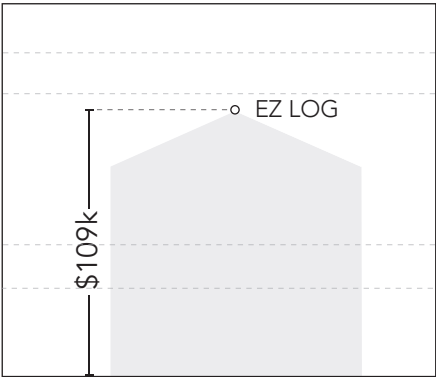


Figure 10: EZ Log AF2.0 total construction cost estimate

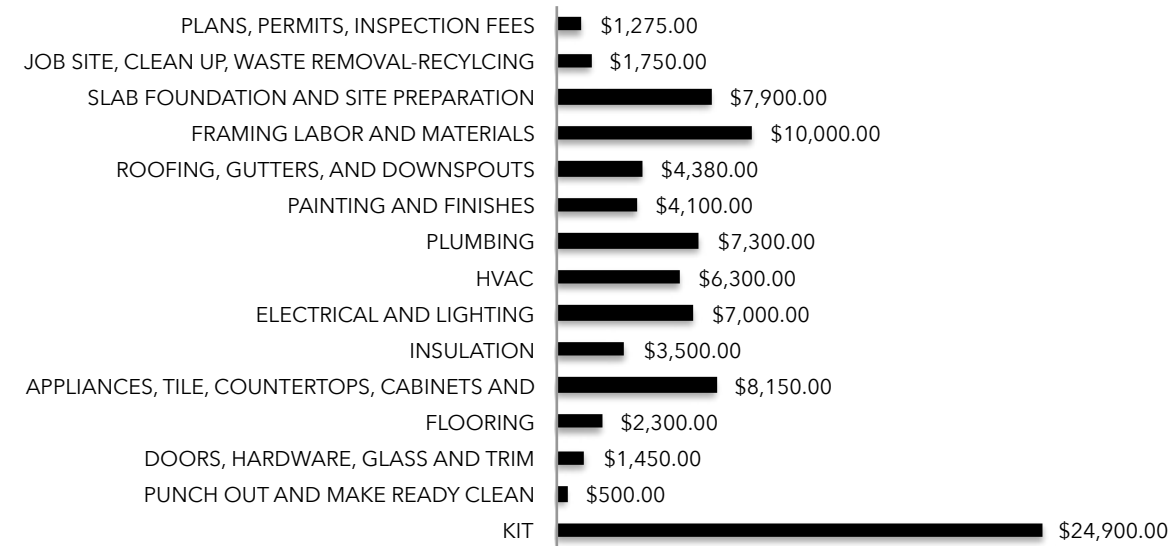


Figure 11: EZ Log AF2.0 construction cost estimate breakdown

A large grain leveling bed of mortar (3/8" - 1" thick) is used between the foundation and first course of blocks, and then the thin-bed mortar (1/16" - 1/8") is used between each successive course and joint. Control joints between (3/8" - 1/2") are spaced at 3 times the height of the wall, typically with a maximum of 24' on center, and metal ties are located every two courses, at the connections.

For the panels, only a thin-bed layer of mortar is needed underneath them. Each joint between panels will either also have a layer of thin bed mortar, or where vertical reinforcement is needed, a grout cell to place rebar and fill with fine grout mortar. The panels and blocks both come in a variety of sizes, but if need be they are also fairly easy to cut with a circular saw on site.

## 2 | HEBEL AAC

Autoclaved aerated concrete (AAC) is a mixture of fine, tightly bound quartz sand, that boasts lightweight, high strength, and natural insulating properties. Hebel offers structural building components in the form of both blocks and panels. AAC was developed in Sweden as an alternative to wood construction, and is used extensively throughout Europe. Although it is not a new technology, it has only recently become widely accessible in the United States.

### 2.1 Design and Assembly

The largest difference between Hebel's block and panel systems is in the installation process; panels have a shorter assembly time, but require the use of a crane. The block units are assembled in a comparable manner to concrete masonry units (CMUs), but it should be noted that although the installation process is very similar it is not the same. AAC blocks require more precision than is typical with CMUs, with an even and consistent application of mortar, and therefore do require a small learning curve even for those competent in CMU construction.

#### ADVANTAGES OF AAC:

- *LIGHTWEIGHT*
- *DURABLE*
- *HIGH STRUCTURAL CAPACITY*
- *NATURALLY FIRE RESISTANT*
- *FAST INSTALLATION*
- *LOW WASTE*
- *INSULATION PROPERTIES*
- *SOUND ATTENUATION*

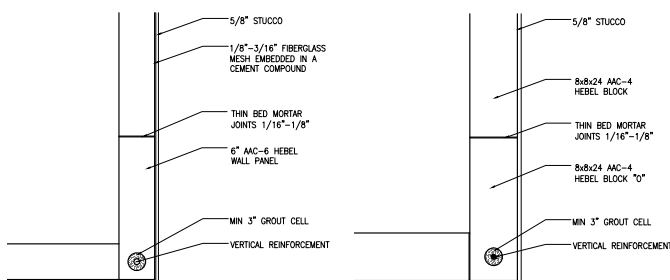


Figure 12: Hebel Panel (left) and Block (right) AF2.0 exterior wall plan details

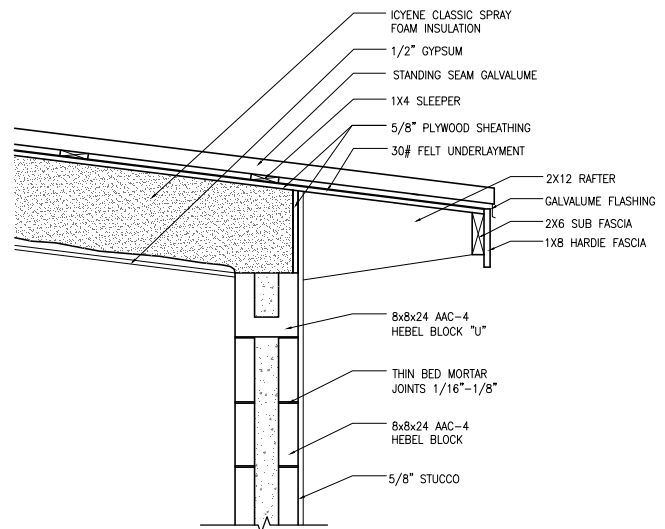


Figure 13: Hebel Block AF2.0 roof section

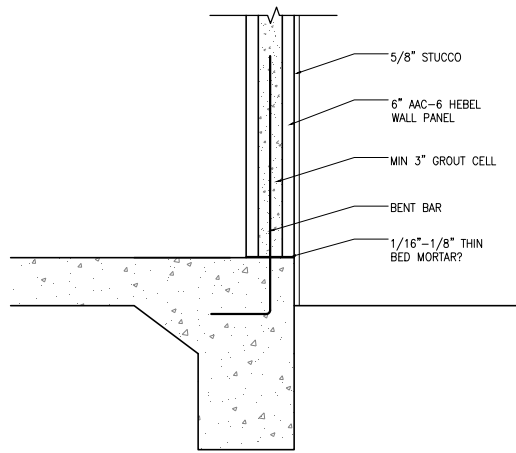


Figure 14: Hebel Panel AF2.0 exterior wall section

Due to the naturally high insulating properties of AAC, no additional insulation is needed in the wall assembly. This means the walls can simply be finished with a single layer of paint or stucco, left exposed, or if a different aesthetic is desired, than attaching drywall or exterior cladding is also an option. Doors and windows can be directly installed to the AAC, or if needed, buck strips made of pressure treated wood can be attached with 3" deck screws.

## 2.2 Energy Analysis

Hebel AAC is defined in the IECC as a mass wall, which means because of the lower thermal conductance and higher heat capacity it provides bet-

ter thermal performance than standard light-frame wood construction and therefore are only required to have an R-value of R-5 (climate zone 3) according to the 2012 IECC. Hebel's AAC greatly surpasses this at R-30, which makes the use of additional insulation unnecessary. Another benefit of AAC is that it has the same thermal conductance in all directions, and therefore reduces the effects of thermal bridging. Both the block and panel systems perform better than the B10 benchmark, and even though they have different thicknesses, they perform very similarly to each other.

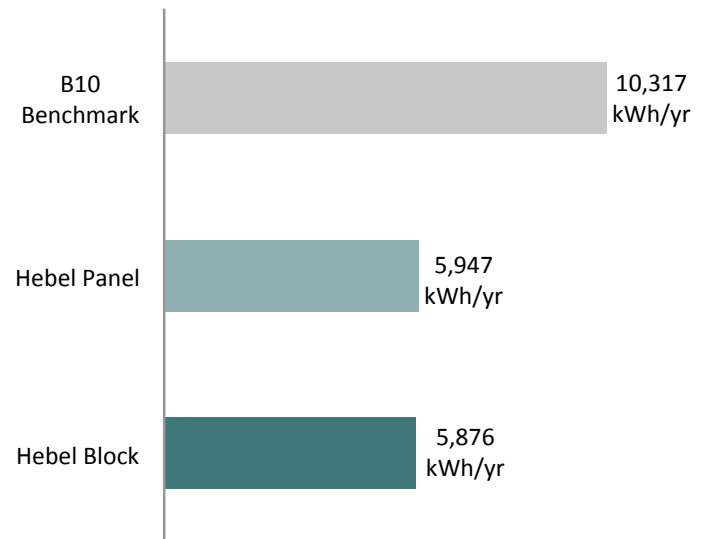


Figure 15: Hebel AF2.0 annual electricity usage compared to the B10 Benchmark.

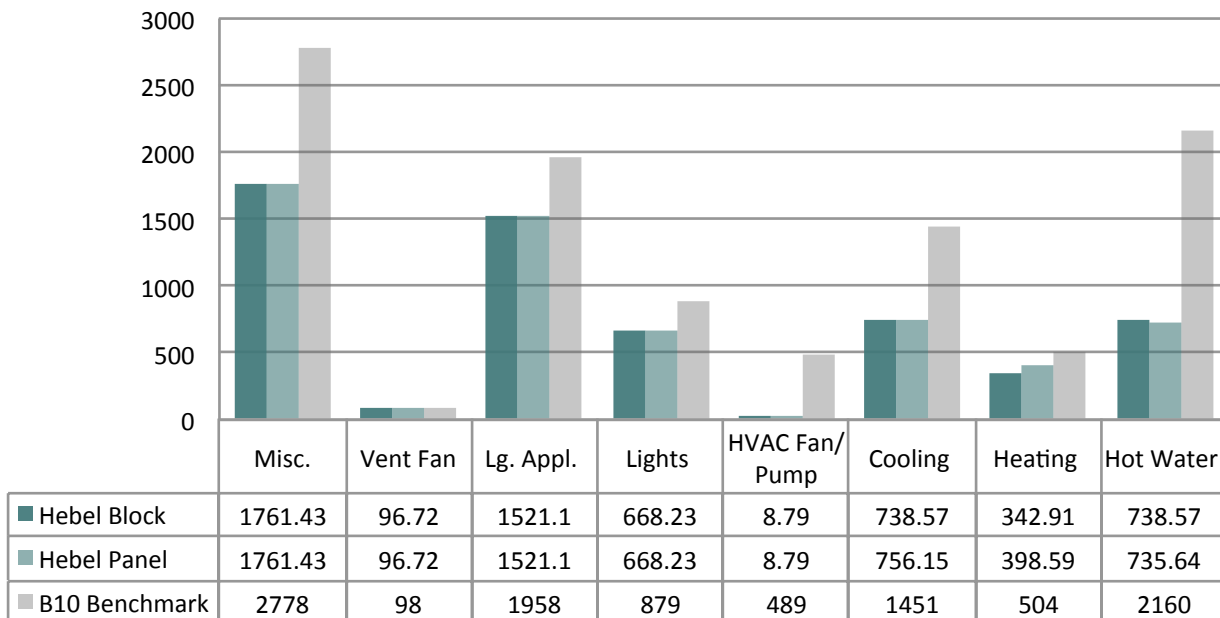


Figure 16: Hebel AF2.0 and B10 Benchmark electricity usage breakdown.



### 2.3 Cost Estimates

Due to the mechanical equipment requirements of the panels they cost \$0.75 per square foot more for labor than the block system. The material cost alone is more expensive as well. The AAC block is comparable in price to that of CMUs, with potentially lower labor costs due to their lighter weight and therefore faster installation.

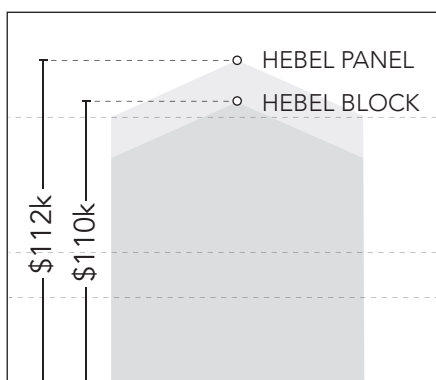


Figure 17: Hebel AF2.0 construction cost estimates

### 2.4 Summary

The similarity in size and construction of Hebel's AAC block system and conventional concrete masonry units (CMUs) provides one of its major advantages, as this is an already widely familiar installation process. The panel system boasts a shorter installation time, but this may not prove to be true for laborers inexperienced in the installation of this system. This learning curve is a common concern for contractors/builders and a large part of why new construction systems are met with such hesitation. (Although, panelized systems are becoming increasingly more common, and Hebel's assembly process eases this curve as much as possible.)

Although Hebel does not currently seem to be the most cost effective or efficient system for small scale residential uses like accessory dwelling units, it does have many attributes that may be better suited for multifamily housing or commercial projects.

The block system is less expensive than their panel option, but the main deterrent for ADU con-

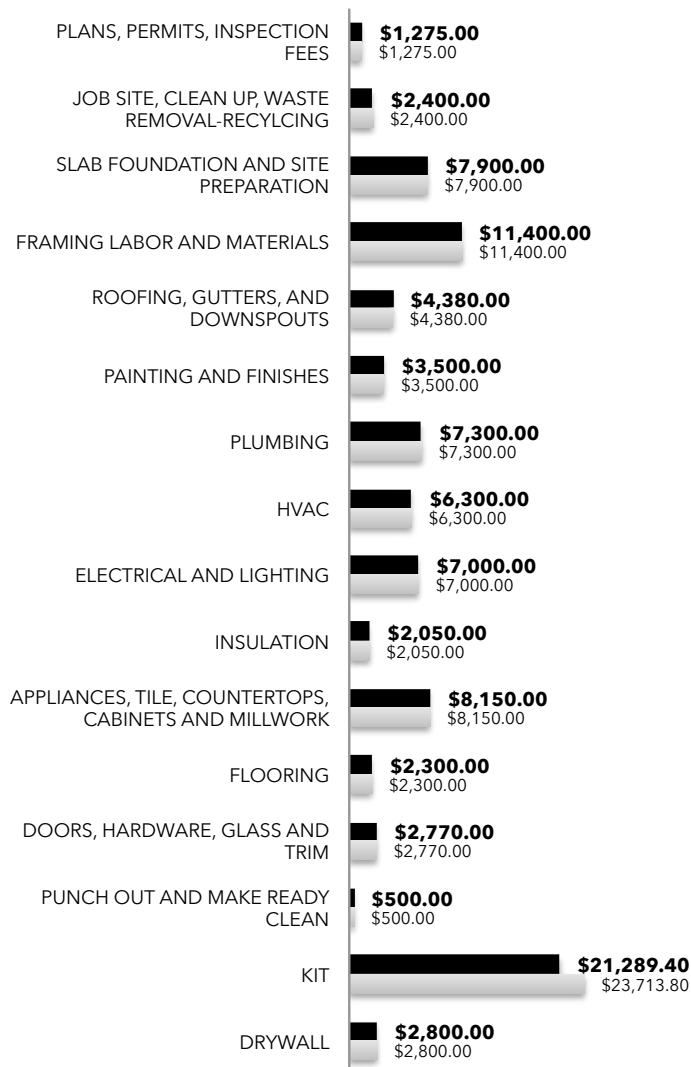


Figure 18: Hebel AF2.0 construction cost estimate breakdown

struction is the use of cranes for installation. Site accessibility can be difficult for infill development, and the requirement of cranes reduces the number of potential lots for a replicable design and system. The panels do have a slightly shorter construction time, but this may be offset by the learning curve since the process is less familiar than block construction.

### 3 | STEKO

Steko is a modular wood block system with small easy to maneuver components that can be assembled by hand, eliciting comparison to a life-sized LEGO® set. Steko blocks come in a range of sizes, providing more design flexibility than larger panelized options.

The Steko system is also a product of Swiss engineering, and even though only it was developed less than 10 years ago, it's becoming increasingly popular throughout Europe. It is not yet widely available in the U.S., EcoHome International, located in Massachusetts, is currently the only distributor.

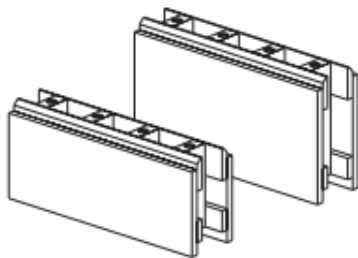


Figure 19: Steko building blocks  
Source: Steko

#### 3.1 Design and Assembly

The Steko system doesn't require skilled labor or specialized tools for installation. A threshold module is secured to the foundation that allows for the remaining modules to simply be stacked on top and push-fit together. Each row of blocks are staggered to form an interlocking pattern so as the joints do not overlap. The structure is assembled first, leaving openings where the doors and windows are located. Once the wall is complete, dows are inserted into the cavity to secure them in place, and they are then filled with insulation. A row of smaller modules is placed on top to cap the wall assembly.

The modules are made out of solid wood that regulates transfer of temperature and moisture, and therefore do not require a moisture barrier or wood sealant to be applied. There are three different grades of wood available that allow for the timber finish to be exposed on either the interior or exterior façade, or both. A standard gypsum layer could be applied to the interior as well, and the exterior could be stuccoed or cladding could be attached with a rainscreen layer.

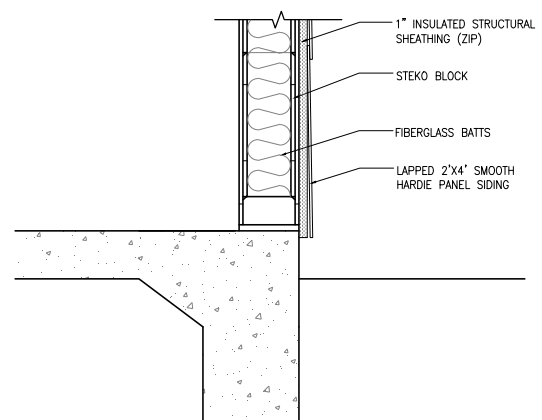


Figure 20: Steko AF2.0 exterior wall section

**Wood:** Spruce or Fir

**Moisture content of wood:** 12%

**Adhesive:** emission-free polyurethane

**Module thickness:** 160mm

**Weight per module:** approx. 6.5 kg



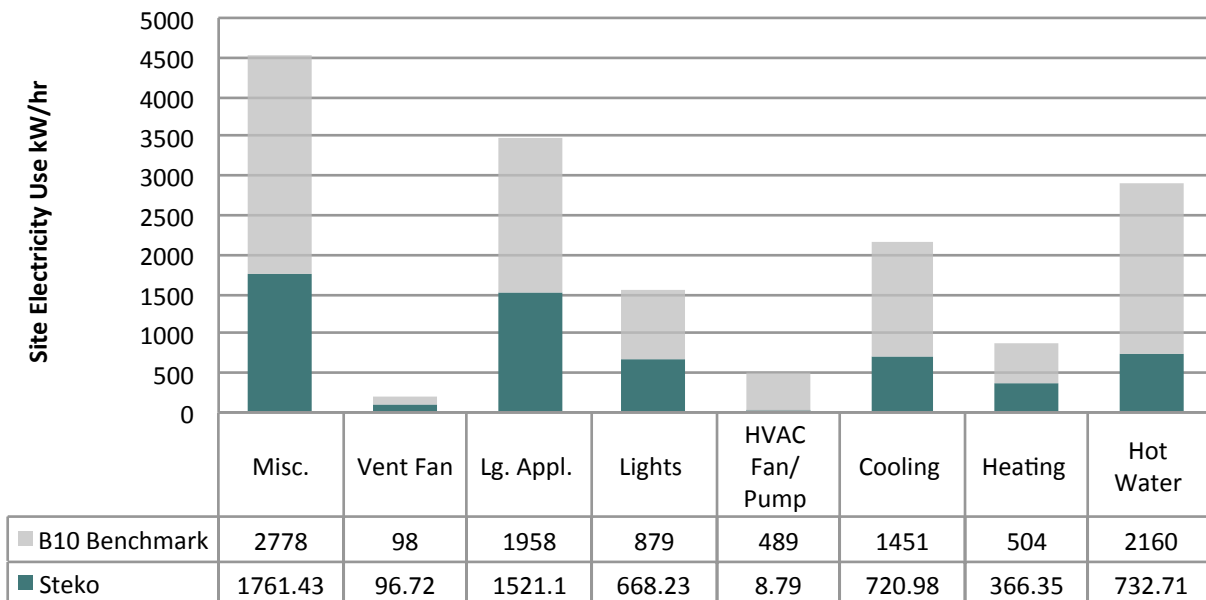


Figure 21: Steko AF2.0 and B10 Benchmark electricity usage breakdown.

### 3.2 Energy Analysis

Steko's energy simulation of the AF2.0 design estimates an annual consumption of 5,876 kWh/yr for electricity usage. This system also proves to perform much more efficiently than standard code compliant structures, at almost half the B10 Benchmark estimate of 10,317 kWh/yr. The same fiberglass batt insulation used for the light-frame wood simulation was used to fill the Steko wall cavities in order to create a comparison of the structure itself. Steko recommends cellulose insulation, which although initially more expensive, does provide better thermal performance that will balance out with lifetime costs. A rigid insulation layer applied to the outside of the structure is also common with this system to further improve energy performance.

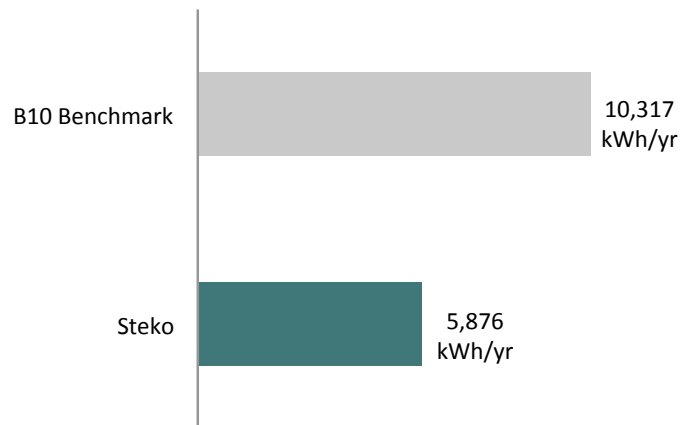


Figure 22: Steko AF2.0 annual electricity usage compared to the B10 Benchmark.

### 3.3 Cost Estimates

The Steko system is currently more expensive than conventional building methods in the U.S., but proves to be very cost competitive for ADU sized construction. As the square footage grows the gap between these systems will grow as well. Reduction in construction time and waste produced may provide enough benefit to offset the cost difference for some. The only thing holding this system back is availability, with increased familiarity and distributor locations, this system has the potential to challenge stick frame for the low cost title.

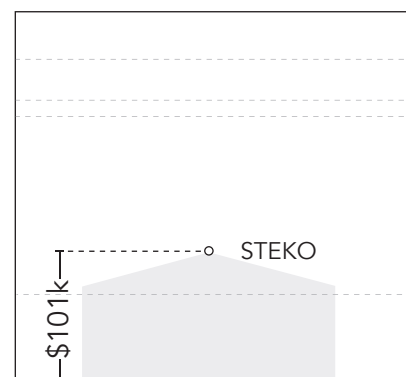


Figure 23: Steko AF2.0 total construction cost estimate

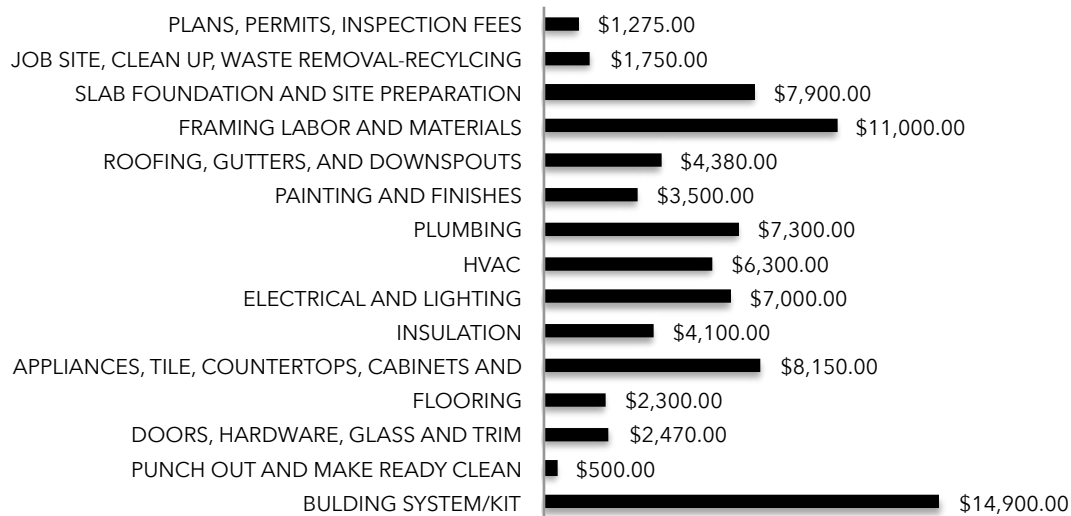


Figure 24: Steko AF2.0 construction cost estimate breakdown

### 3.4 Summary

A panel system that doesn't require machinery to lift is a huge plus when it comes to accessory dwelling units that often have accessibility issues due to the close proximity of existing homes. Another benefit of this system over one of the larger panelized options is its versatility, by not being limited to a strict grid, it is more adaptable to existing designs. When considering a replicable ADU design, Steko's interior and exterior finish options add additional flexibility through allowing for individual aesthetic preferences. Most homeowners want a certain level of customization with new construction; this is a common setback for implementing replicable designs, but having more built in options could help curtail this.

A prefabricated system also has the benefit of safer labor conditions, controlled environment, and therefore increased quality. The amount of time on-site is reduced and the speed of the overall construction process is increased. In addition to ease of assembly, the Steko system has the added benefit of disassembly as well. The entire structure can be disassembled and reused or recycled, if need be.

## 4 | LIGHT-FRAME WOOD

Conventional light-frame wood construction, commonly referred to as stick frame, has been the predominant building method in the United States since the 19th century. This is the method for which contractors are most familiar and therefore most comfortable implementing. Considering its prevalence, the main reason for its inclusion in this report is for comparison purposes, but this investigation also serves to inform on the performance of conventional ADU assemblies.

### 4.1 Design and Assembly

The AF2.0 wall assembly for light-frame wood consists of the traditional 2x4 members spaced at 16" on center. The cavity is filled with fiberglass batts and a 1" ZIP structural sheathing layer has been included for additional thermal performance instead of the more typical application of plywood. The wall surfaces conform to convention with gypsum drywall on the interior and fiber cement cladding on the exterior.

This on site construction of the structure alone takes around 2-3 weeks to complete. This time line is conditional on the weather. Additionally, exposure to the elements can result in a less reliable quality of craftsmanship and durability.

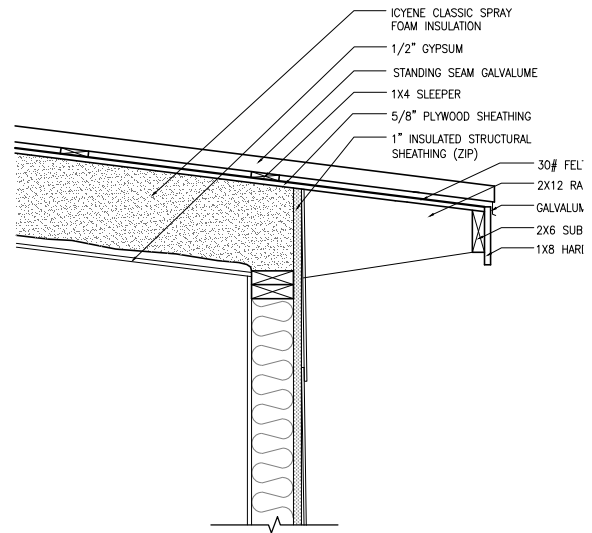


Figure 25: Stick-frame AF2.0 roof section

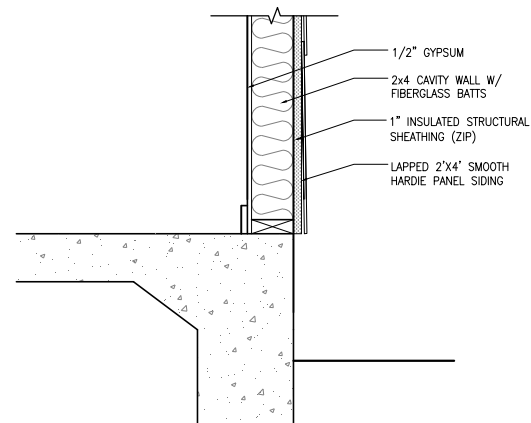


Figure 26: Stick-frame AF2.0 exterior wall section

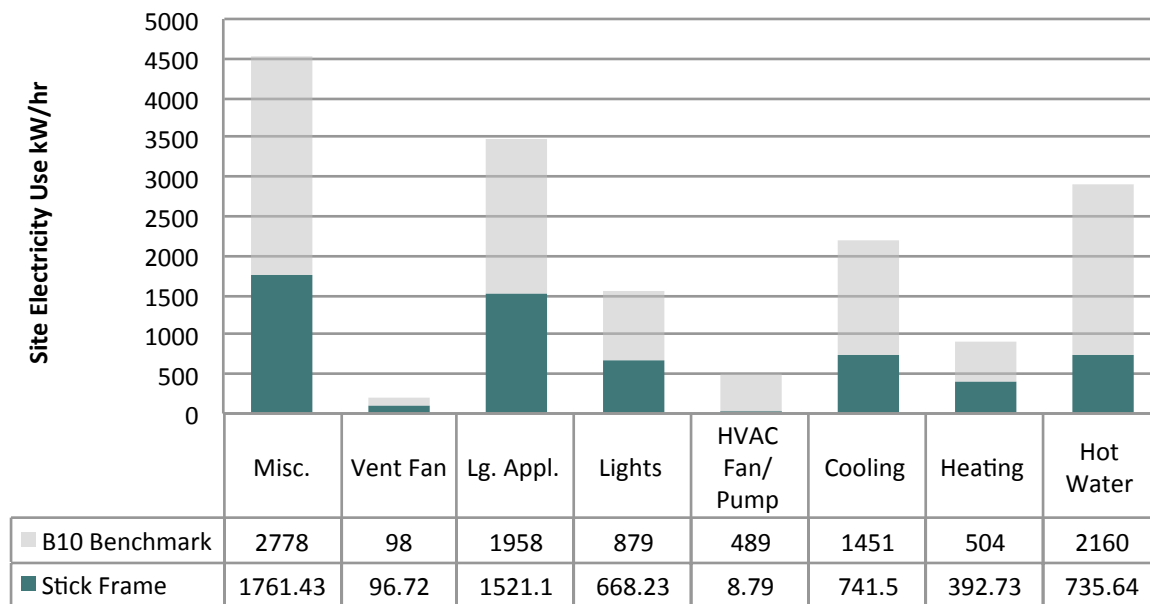


Figure 27: Stick-frame AF2.0 and B10 Benchmark electricity usage breakdown.

#### 4.2 Energy Analysis

The AF2.0 assembly out performs the B10 Benchmark due to improvements in insulation choices and energy efficient appliances and equipment. The 1" ZIP sheathing layer has an added R-value of R-3, and was included in order for AF2.0 to meet ACDDC's energy efficiency goals.

#### 4.3 Cost Estimates

Light-frame wood construction is economically hard to beat in the U.S. due to its overwhelming percentage of the market share. Considering it is the default building method, and ACDDC has already constructed Alley Flats out of light-frame wood, this estimate is of most value in its use for comparison to the other building systems.

However, this cost estimate is a little higher than a conventionally built stick frame ADU would be, due to the priority for energy efficiency and occupant health. Products were chosen in order to reach a minimum 3 star rating in the Austin Energy Green Building Program, a goal ACDDC has committed to achieving for all ADU development. A review of price and performance of the latest products assists with future implementation of this goal.

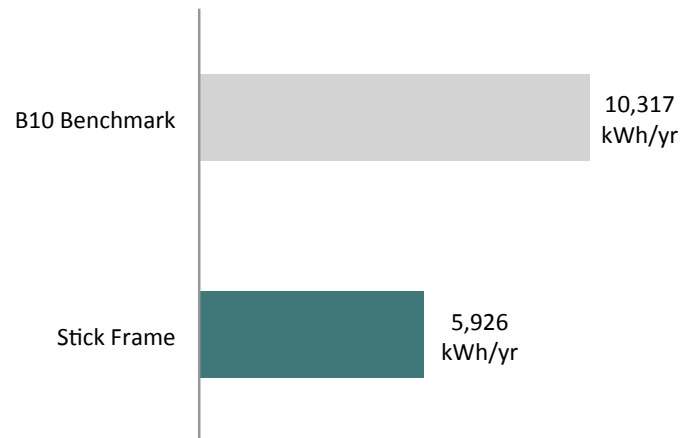


Figure 28: Stick-frame AF2.0 annual electricity usage compared to the B10 Benchmark.

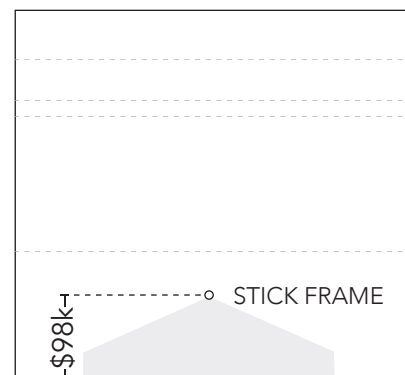


Figure 29: Stick-frame AF2.0 total construction cost estimate

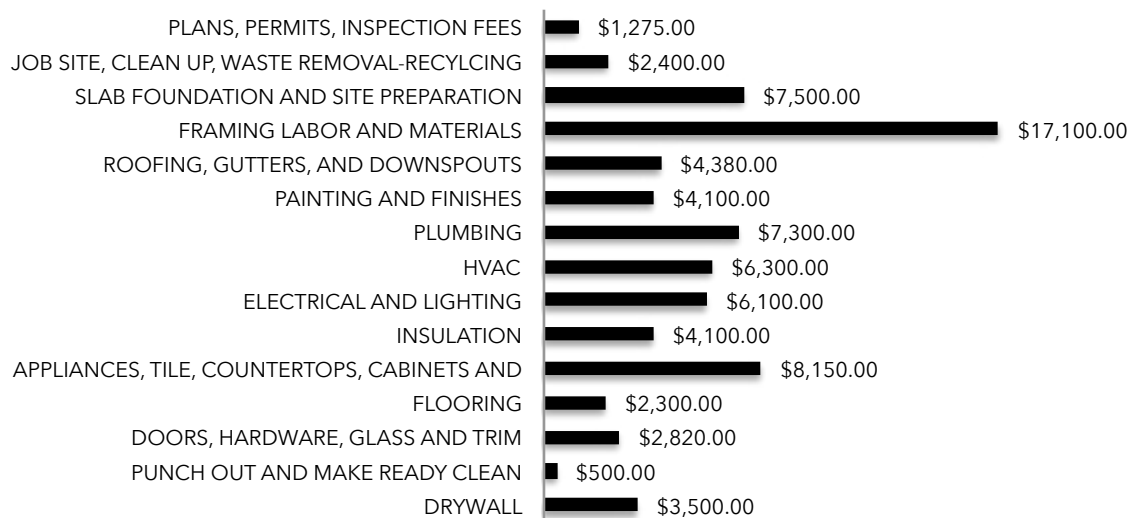


Figure 30: Stick-frame AF2.0 construction cost estimate breakdown

#### 4.4 Summary

The on-site assembly process of 2x4 lumber takes considerably more construction time than the previously mentioned systems. The entire assembly process takes place on site, which creates a much higher potential for weather to delay the construction process. Exposure to the elements can also degrade quality and durability, and has been shown to have higher safety risks for workers.

This system does however have sweat equity potential (as shown through Habitat for Humanity's program), but a more neophyte friendly system could increase volunteer turnout.

COMPARISONS



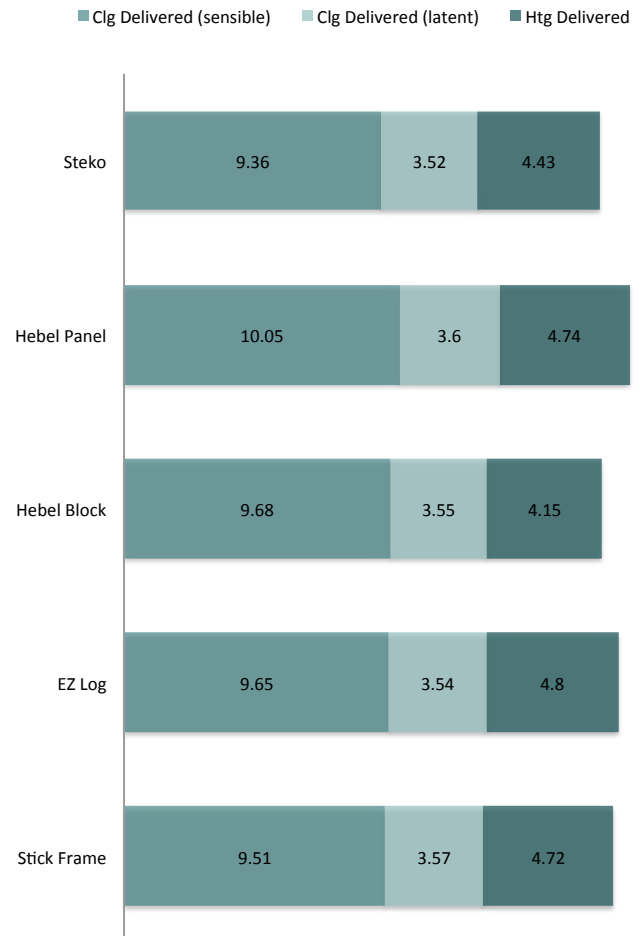


Figure 31: AF2.0 estimates for annual heating and cooling loads (MMBtu/yr)

## AF2.0 ENERGY ANALYSIS

In anticipation of the Austin Climate Protection Plan's directive for all new single-family homes to be net-zero energy capable by 2015, a replicable AF2.0 design will need to produce as much energy as it consumes annually. This is possible for each AF2.0 case study using a standard 6 kW direct current system, which is estimated to generate 8,413 kW/h annually. Having a thermally efficient envelope avoids the requirement of expensive, top of the line photovoltaic systems, and is more conducive to the application of ADU development.

Each structure has a wide range of varying design options, choices for the foundation and roofing assemblies were made for the best options that could be most similarly applied across the board. This allowed for a more direct comparison on how each wall assembly performs. Even though it would seem to make sense to choose the most efficient combination for each system and then compare, the issue is that we wouldn't really know if it's the structural system affecting the performance, or a specific insulation product, or the difference between a pier-and-beam and slab foundation. An energy and cost comparison for all the varied options of each individual system is beyond the scope of this report, but is a suggestion for further analysis.

All 5 construction systems for the AF2.0 design outperform the B10 Benchmark. This benchmark is a reference structure based on the most common lighting and electrical loads from 2010, and is currently the standard for comparison. It repre-

<b>EPW Location:</b>	
USA_TX_AustinMueller.Muni.AP.722540_TMY3.epw	
<i>Terrain</i>	Suburban
<i>Project Analysis Period</i>	40 years
<i>Inflation Rate</i>	2.40%
<i>Discount Rate (Real)</i>	3%
<i>Mortgage Period</i>	30 years
<i>Mortgage Interest Rate</i>	4%
<i>Marginal Income Tax Rate</i>	28%
<i>Material Cost Multiplier</i>	1
<i>Labor Cost Multiplier</i>	1
<i>PV Federal Tax Credit</i>	30%
<i>Electricity Rate Type</i>	State
<i>Electricity Marginal Rate</i>	0.1066204 [\$/kWh]
<i>Electricity Fixed Charge</i>	8 [\$/month]
<i>Electricity Average Rate</i>	0.1137 [\$/kWh]
<i>Electricity Source/Site Ratio</i>	3.15
<i>Electricity Carbon Factor</i>	1.53 lb/kWh

Figure 32: BEopt energy simulation data

sents a typical code compliant simulation of the AF2.0 design as it would be built according to the 2009 IRC; however, AF2.0 was updated to follow the newly released 2012 IRC, and there is not yet an updated energy modeling benchmark for reference. Decisions for each assembly were made with the intention of balancing energy efficiency with costs. Performance of each of these systems could easily be improved, but these measures are often prohibitively expensive for affordable ADU development.

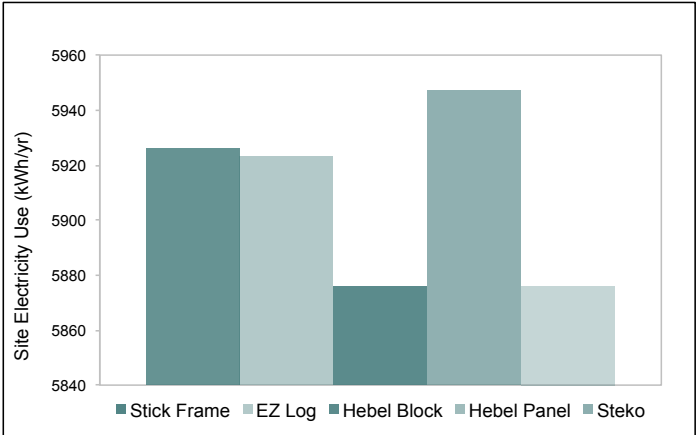


Figure 33: AF2.0 annual electricity usage comparison for each building system.

AF2.0 COST COMPARISONS

One of the main objectives of this report was to compare costs of construction for each building system in order to determine its feasibility for ADU development. These prices are meant for comparison purposes, and will of course vary by contractor, location, and labor rates. Materials and assembly decisions were made in effort to bal-

ance energy-efficiency, costs, construction time, occupant health and quality of living. A concerted effort was made to source products and materials that support each one of these goals.

Cost estimates can vary greatly by contractor, but those who work with affordable housing providers are less likely to take advantage of the market, usually offering more stable rates. Fortunately for ACDDC this is true of local Austin contractor Shiloh Travis, of Truehome Design.Build. Travis graciously provided us with a Schedule of Values (SOVs) for each building system, offered advice on reducing costs, and helped troubleshoot design constraints. After multiple SOV iterations we were able to realize the most cost competitive strategy for each system.

Site work, such as utility connections and flatwork are not included in the cost totals. Estimating is

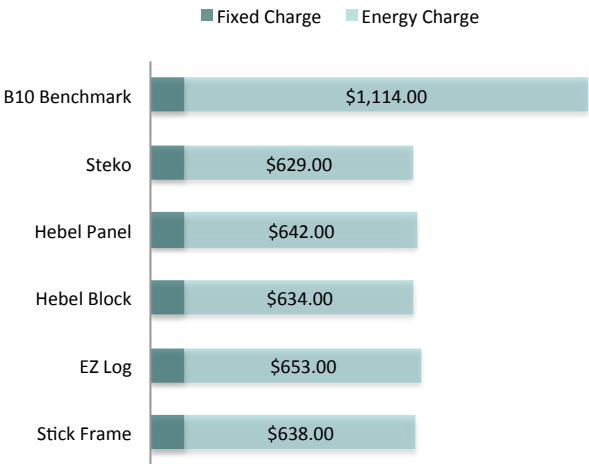


Figure 34: AF2.0 Annualized Utility Bills (\$/yr)

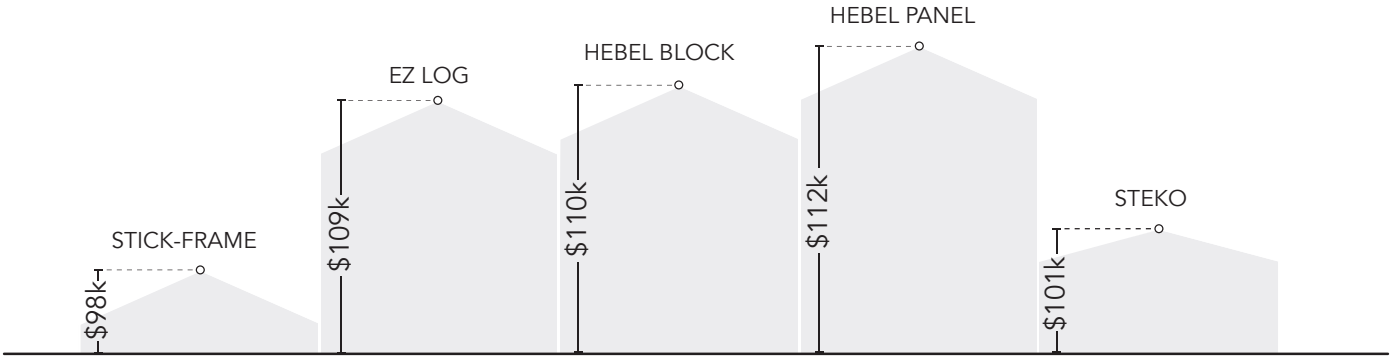


Figure 35: AF2.0 cost estimate comparison for each building system.



ineffective due to a wide variability that is highly determinate on the site and service provider.

Contractor overhead and profit markups is another important consideration when dealing with unfamiliar construction methods. Travis offered the same 23% markup for each system as he would for conventional light wood frame, but this is often not the case for contractors who often raise the standard rate to offset potential learning curve setbacks.

The structural comparisons of this report were focused on wall assemblies, but as the roof is shown to be one of the most expensive aspects of construction, an further investigation into innovative roof assemblies would benefit ADU development.

CONCLUSION

The demand for affordable housing greatly outweighs the need, this is visibly apparent in the growing numbers of our nation’s homeless lining the streets. Demographics are changing and the population is increasing, according to the U.S. Census Bureau there are projected to be another 80 million residents to house by 2050. ADUs offer a more suitable option for changing occupant needs, and as indicated by these numbers, they will eventually become a necessary strategy across the nation. The sooner municipalities reevaluate code restrictions on ADUs, lift prohibitive regulatory barriers, and offer programs to encourage their development, the better they will fare. Setting a framework in place to guide future growth now will allow for a smoother transition.

In order to keep up with the projected need of future housing, a complete reevaluation of the construction process is essential. As history can attest, there is a common tendency to apply new technologies to antiquated practices. The goal is not to merely improve upon current methods and operations; we must start back at the fundamental and examine alternatives from a revitalized vantage point. The construction industry is slow to change, but the increasing need for assembly friendly, quick, low-cost, quality construction methods make this change inevitable.

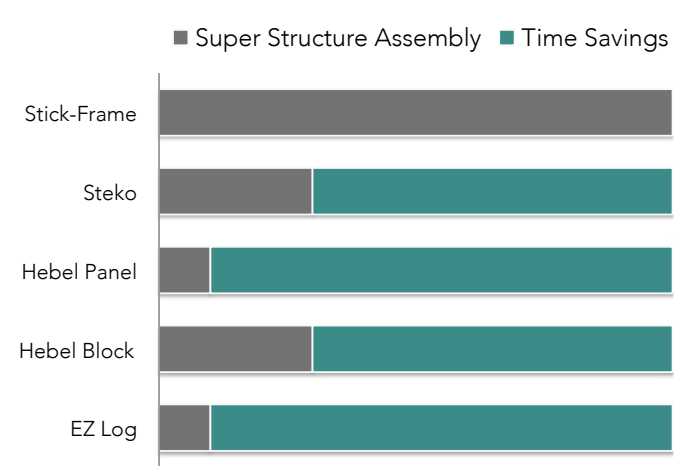


Figure 36: AF2.0 time savings comparison

The aim of this report was to compare less widespread, innovative construction systems with the conventional light-frame wood that accounts for the majority of American housing. Hebel, EZ Log, and Steko were all three developed in Europe, this was not the reason they were chosen, but in hindsight looking to other countries that are seemingly more adaptable to new technological innovations may help the U.S. building industry allay the fears of change.

On site construction of light wood frame homes is not efficient in time, energy, materials, or labor; however, it is still the least expensive way to build. The other 4 systems are cost competitive and offer enough advantages to be promising players in the future of American housing. The concepts behind these systems are much more conducive to ADU development and housing construction in general. Their performance is a positive indication of their eventual application, but until their prominence evens out the financial playing field it will be difficult for affordable housing to progress past conventional, outmoded construction methods.

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**APPENDIX**

A | Specifications for Alley Flat 2.0

B | Design Drawings for Alley Flat 2.0

C | AF2.0 SOVs Spreadsheet

Appendix A | Specifications for Alley Flat 2.0

- EZ Log
- Hebel Block
- Hebel Panel
- Steko
- Light-Frame Wood
- Modular

# **SPECIFICATIONS FOR ALLEY FLAT 2.0 – EZ LOG**

## **1. FOUNDATION**

**GENERAL:** CONCRETE SLAB FOUNDATION PER ENGINEER DESIGN: ALL MATERIALS, DESIGNS AND PROCEDURES PER SPECIFIC ARCHITECT'S PLAN: MINIMUM FOUNDATION HEIGHT ABOVE SURROUNDING SOIL IS 12" AT ANY POINT.

**CONCRETE SLAB MIX:** 1:2:4 (5 BAG) WITH 20% MINIMUM FLY ASH CONTENT

**SLAB REINFORCEMENT:** STEEL RE-BAR PER ENGINEER PLAN

**MEMBRANE:** 6 MIL POLYETHYLENE VAPOR BARRIER UNDER SLAB

**FILL UNDER SLAB:** 4" MINIMUM CRUSHED GRAVEL OVER COMPACTED SOIL/SANDY LOAM

**ADDITIONAL INFORMATION:** PRESSURE TREATED SILL PLATES AT ALL EXTERIOR WALLS, SILL PLATES 6" MINIMUM ABOVE OUTSIDE SOIL (12" NOMINAL) NO FOUNDATION TERMITE PRE-TREATMENT

**FOUNDATION:** EXTERIOR BEAMS-PER SEALED FOUNDATION PLAN: INTERIOR BEAMS-PER SEALED FOUNDATION PLAN: SLAB TO BE A MINIMUM OF 4" THICK W/ # 3'S PER SEALED FOUNDATION PLAN

## **2. EXTERIOR WALLS**

**CONSTRUCTION:** 58MM EZ LOG

**STUDS:** WOOD GRADE/ SPECIES; SPF STANDARD/BETTER; 2x4 @ 24"OC

**WEATHER BARRIER:** TYVEK OR EQUAL

**SHEATHING:** 3/8" DOW SUPER TUFF-R POLYISOCYANURATE RIGID INSULATION OR EQUAL

**SIDING:** SMOOTH 2' X 4' X 5/16" HARDIEPANEL SIDING OR EQUAL LAPPED WITH 22" EXPOSURE, (INSTALL PER MANUFACTURERS INSTRUCTIONS)

**EXTERIOR PAINT:** ACRYLIC LATEX

## **3. INSULATION**

**ROOF:** DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION OR EQUAL

**WALLS:** 3/8" DOW SUPER TUFF-R POLYISOCYANURATE RIGID INSULATION OR EQUAL

## **4. INTERIOR WALLS**

**PARTITIONS:** 58MM EZ LOG

## **5. FLOORING**

**ALL FLOORS:** SEALED CONCRETE

## **6. CEILING**

**ALL CEILINGS:** EZ LOG 3/4" TONGUE AND GROOVE ROOF BOARDS

## **7. ROOFING**

**UNDERLAYMENT:** 30-POUND ASPHALT IMPREGNATED FELT

**ROOFING:** GALVALUME STANDING SEAM OR EQUAL

**FLASHING:** GALVALUME

**FASCIA:** EZ LOG FASCIA TRIM

## **8. CABINETS & INTERIOR DETAILS**

**KITCHEN WALL AND BASE CABINETS:** MATERIAL; 3/4" ALL SOLID WOOD CONSTRUCTION FRONTS; 1/2" SOLID WOOD SIDES & 3/4" SOLID WOOD SHELVES

**BATHROOM CABINET:** MATERIAL; 3/4" SOLID WOOD FRONTS; 1/2" WOOD SIDES

**CABINETS FINISH:** FINISH COLOR TBD

**CABINET MATERIALS AND ADHESIVES:** A) MEET E1 STANDARD; OR B) CARB PHASE I STANDARD; OR C) HAVE NO ADDED

UREA-FORMALDEHYDE

**WOOD SHELVES/PANTRY & STORAGE:** 3/4" SOLID WOOD SHELVES

**KITCHEN COUNTERTOPS:** PLASTIC LAMINATE FINISHED W/ 4" BACKSPALSH; FORMALDYHDYE FREE ADHESIVES ONLY.

## 9. INTERIOR DOORS & TRIM

**DOORS:** EZ LOG

**TRIM:** EZ LOG

## 10. HARDWARE

**DOOR HARDWARE:**

**NOTE:** ALL DOOR HARDWARE PROVIDED BY EZ LOG EXCEPT FOR THE FRONT DOOR, WHICH REQUIRES THE FOLLOWING:

- KWIK-SET TITAN/NICKEL PLATES; LEVER DOOR HARDWARE THROUGHOUT
- KEYED LEVER AND KEYED DEADBOLT (1" MIN. THROW) AT FRONT ENTRY
- SECURITY VIEWER ON FRONT ENTRY DOOR

## 11. WINDOWS

**TYPE, MAKE, MATERIAL:** SEE SCHEDULE

**TRIM:** FULL STOOL AND APRON AT ALL SILLS; SHEETROCK RETURNS AT TOP AND SIDES, SEE DRAWINGS

**SCREENS:** BUG

**ADDITIONAL INFORMATION:**

- SEE ATTACHED WINDOW SCHEDULE
- HEAD FLASHING OVER EXPOSED WINDOWS
- CONTINUOUS SELF-ADHERING MOISTOP AROUND ALL ROUGH EDGES

## 12. INTERIOR FINISHES

**NOTE:** ALL INTERIOR FINISHES TO BE LOW VOC SUCH THAT THE VOC CONTENT MUST BE LESS THAN 10 G/L

**WALLS:** ZERO VOC WOODSHIELD INTERIOR SATIN VARNISH OR EQUAL

**TRIM:** ZERO VOC WOODSHIELD INTERIOR SATIN VARNISH OR EQUAL

**INTERIOR DOORS:** ZERO VOC WOODSHIELD INTERIOR SATIN VARNISH OR EQUAL

**CEILING:** ZERO VOC WOODSHIELD INTERIOR SATIN VARNISH OR EQUAL

## 13. ENTRANCE AND EXTERIOR DETAILS

**MAIN ENTRANCE DOOR:** JELD-WEN 6-PANEL STEEL 'ALL PANEL' EXTERIOR DOOR OR EQUAL

**HEAD FLASHINGS:** GALVANIZED OR ALUMINIUM; EXPOSED DOORS AND WINDOWS

**PAINT:** ACRYLIC LATEX

**EXTERIOR MILLWORK:** HARDIE FIBER-CEMENT TRIM OR EQUAL

## 14. GUTTERS & DOWNSPROUTS

**GENERAL:** ALUMINUM GUTTERS/DOWNSPROUTS

## 15. SPECIAL EQUIPMENT / APPLIANCES

**RANGE:** ELECTRIC

**RANGE HOODS:** ENERGY STAR

**FANS:** ENERGY STAR

**DISHWASHER:** ENERGY STAR

**WASHER/DRYER:** ENERGY STAR

**REFRIGERATOR:** ENERGY STAR

## 16. PLUMBING

**KITCHEN SINK:** MOEN EXCALIBUR DOUBLE BOWL KITCHEN SINK MODEL: 22821 WITH SOUNDSHIELD UNDERCOATING AND

7-1/2" DEEP BOWLS, 3-HOLES (CENTERED). INSTALL WITH BADGER 5, 1/2 HP, 120V/1PH, 6.9 F.L.A UNIT WITH WALL ON/OFF SWITCH

**BATHROOM SINK:** IKEA BOHOLMEN SINGLE BOWL INSET SINK, STAINLESS (ARTICLE # 998.972.21) WITH ATLANT WASTE STRAINER OR EQUAL

**TOILET:** NIAGARA STEALTH 0.8 GPF ROUND – MODEL: N7716 OR WATER SENSE DUAL FLUSH OR EQUAL

**BATHTUB:** BOOTZ INDUSTRIES ALOHA 60" BATHTUB 40" LUMBAR SUPPORT PORCELAIN ON STEEL STANDARD OUTLET (MODEL # 011-2364 RH DRAIN, SLIP RESISTANT BOTTOM, COORDINATE WITH LEFT/RIGHT DRAIN LOCATION

**SHOWER:** MOEN POSI-TEMP VALVE PRESSURE-BALANCING VALVE WITH 1/4 TURN STOPS – MODEL: 62370 (CC) WITH MOEN CHATEAU SERIES – TUB/SHOWER TRIM WITH EITHER 1.5 GPM SHOWERHEAD OR OMNI INLINE FLOW CONTROL @ 1.5 GPM (MODEL A-710-VR-1.5-LF)

**WATER SUPPLY:** PUBLIC

**SEWAGE DISPOSAL:** PUBLIC

**HOUSE DRAIN (INSIDE):** PVC

**HOUSE SEWER (OUTSIDE):** PVC YARDLINE AND CONNECTION TO PUBLIC SEWER.

**WATER PIPING:** PEX OR EQUAL; INSULATED HOT WATER LINES THROUGHOUT; NO JOINTS IN SLAB WATER LINES SET INSIDE INSULATION AT WALLS AND FOUNDATION PVC YARDLINE AND CONNECTION TO PUBLIC WATER SUPPLY. PLUMB IN STUD WALLS WHEN POSSIBLE – COORDINATE LAYOUT

**SILLCOCKS:** PIPING, FITTINGS AND BACK SIPHON PROTECTORS FOR EXT. HOSE BIBS (2x) NOT SHOWN IN PLAN

**DOMESTIC WATER HEATER:** PROVIDE 40 GAL RHEEM HYBRID HEAT PUMP OR EQUAL

**OTHER:**

- SERVICE PIPING FROM UTILITY METER AT HOUSE EXTERIOR

## 17. HVAC

**HVAC SYSTEM:** PROVIDE DUCTLESS MINI-SPLIT WITH INVERTER TECHNOLOGY

- PROVIDE ONE DAIKIN 3MXS24JVJU OR EQUAL OUTDOOR UNIT

- PROVIDE THREE DAIKIN CTXS07LVJU OR EQUAL INDOOR UNITS

**ADDITIONAL INFORMATION:**

- PROVIDE CONDENSATE LINES FOR INDOOR UNITS PER CODE AND MANUFACTURER'S INSTRUCTIONS

- PROVIDE POWER ASSISTED AIR TRANSFER DUCT BETWEEN LIVING AND BATHROOM ABOVE BATHROOM DOOR SWITCHED TO BATHROOM LIGHT FIXTURE

- PROVIDE EXHAUST FAN IN BATHROOM WITH INDEPENDENT SWITCH

- PROVIDE KITCHEN EXHAUST FAN TO THE OUTSIDE

## 18. ELECTRIC WIRING

**SERVICE:** UNDERGROUND OR OVERHEAD AS REQUIRED

**PANEL(S):** 100AMP/ CIRCUIT BREAKER WITH COPPER SERVICE CABLING

**INTERIOR WIRING:** COPPER; NON-METALLIC CABLE

**SPECIAL OUTLETS:** DRYER 120/240V OR 120/208V; GFI AT KITCHEN/BATHS/OUTSIDE; WP AT OUTSIDE - FRONT AND REAR

**DOORBELL:** TWO-TONE DOOR CHIM AT FRONT ENTRY

**ADDITIONAL INFORMATION:**

- SMOKE DETECTORS INSIDE AND OUTSIDE ALL BEDROOM DOORS PER CODE

- PRE-WIRE FOR TELEPHONE AND TV (BEDROOMS KITCHEN & LIVING AREAS)

- SWITCHED MOTION DETECTING SECURITY LIGHT AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

- ELECTRIC SWITCHES AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE ELECTRIC OUTLETS AT 18-INCH HEIGHT MAX.

- WHITE COVER PLATES FOR SWITCHES AND OUTLETS

- BREAKER BOX LOCATED INSIDE HOUSE AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

## 19. LIGHTING FIXTURES & FANS

**QUANTITY:** TOTAL # AND STYLE OF FIXTURES PER PLAN OR SCHEDULE BELOW

**FIXTURES:** FIXTURE SCHEDULE AS FOLLOWS:



- CEILING FANS (LIVING ROOM AND BEDROOMS):
  - HARBOR BREEZE BDB52BNK5N OR EQUAL
- CEILING FAN LIGHT KITS:
  - LKG635BNK OR EQUAL
- BATHROOM (WALL MOUNTED):
  - LIGHTWAY BDFV-24-A-A-2F17-NL-P2-WSA OR EQUAL
- KITCHEN (CEILING MOUNTED):
  - SUNSET LIGHTING F7185-53

**NOTES:** AREAS NOT SPECIFICALLY MENTIONED IN THIS SPECIFICATION SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE CITY AND COUNTY BUILDING CODES. ALL LIGHT FIXTURES AND FANS TO BE ENERGY STAR RATED

## **20. MISCELLANEOUS**

- ALL EXTERIOR NAILS, BOLTS, ANCHORS, HANGERS, SHEATHING NAILS (INCLUDING FLOOR AND ROOF) AND NAILS PENETRATING P.T. LIMBER SHALL BE HOT DIPPED GALVANIZED
- 1/2" CEMENTIOUS BACKER BOARD SHALL BE INSTALLED BEHIND ALL SHOWER ENCLOSURES AND WET AREA
- THE GENERAL CONTRACTOR AND SUB CONTRACTORS MUST CERTIFY THAT ALL MATERIALS ARE FREE OF ADDED UREA FORMALYHYDE

# **SPECIFICATIONS FOR ALLEY FLAT 2.0**

## **HEBEL 8" AAC MASONRY BLOCKS**

### **1. FOUNDATION**

**GENERAL:** CONCRETE SLAB FOUNDATION PER ENGINEER DESIGN

**CONCRETE SLAB MIX:** 1:2:4 (5 BAG) WITH 20% MINIMUM FLY ASH CONTENT

**SLAB REINFORCEMENT:** STEEL RE-BAR PER ENGINEER PLAN

**MEMBRANE:** 6 MIL POLYETHYLENE VAPOR BARRIER UNDER SLAB

**FILL UNDER SLAB:** 4" MINIMUM CRUSHED GRAVEL OVER COMPACTED SOIL/SANDY LOAM

**ADDITIONAL INFORMATION:** PRESSURE TREATED SILL PLATES AT ALL EXTERIOR WALLS, SILL PLATES 6" MINIMUM ABOVE OUTSIDE SOIL (12" NOMINAL) NO FOUNDATION TERMITE PRE-TREATMENT

**FOUNDATION:** EXTERIOR BEAMS-PER SEALED FOUNDATION PLAN: INTERIOR BEAMS-PER SEALED FOUNDATION PLAN: SLAB TO BE A MINIMUM OF 4" THICK W/ # 3'S PER SEALED FOUNDATION PLAN

### **2. EXTERIOR WALLS**

**CONSTRUCTION:** HEBEL 8" AAC-4 MASONRY BLOCKS

**VERTICAL REINFORCEMENT:** BENT BAR W/ MIN 3" GROUT CELL DRILLED OR NOTCHED, SPACING PER ENGINEER PLAN

**EXTERIOR FINISH:** STUCCO, PROVIDED BY HEBEL

### **3. INSULATION**

**WALLS:** NO ADDITIONAL INSULATION NEEDED

**ROOF:** ICYENE CLASSIC (LD-C-50) OPEN CELL SPRAY FOAM INSULATION OR EQUAL

**BID ALTERNATE 1:** DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION OR EQUAL (WITH 2x10 RAFTERS)

### **4. INTERIOR WALLS**

**PARTITIONS:** 2x4 WOOD STUDS WITH 1/2" TYPE X GYP BOARD ON BOTH SIDES.

**FINISH:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**PLATES:** ALL INTERIOR WALL PLATES (SOLE, TOP, DOUBLE) SPF STANDARD OR BETTER

**STUDS:** WOOD GRADE/ SPECIES; SPF STANDARD/BETTER

**SIZE/SPACING:** 2x4 @ 24" OC

### **5. FLOORING**

**ALL FLOORS:** SEALED CONCRETE, ATLAS ZERO-VOC ELITE-HS CONCRETE SEALER OR EQUAL.

### **6. CEILING**

**ALL CEILINGS:** 1/2" PAINTED TYPE X DRYWALL UNLESS OTHERWISE NOTED

### **7. ROOFING**

**UNDERLAYMENT:** 30-POUND ASPHALT IMPREGNATED FELT

**ROOF SHEATHING:** 5/8" PLYWOOD, APA RATED, CDX

**ROOFING:** GALVALUME STANDING SEAM OR EQUAL

**FLASHING:** GALVALUME

**ADDITIONAL INFORMATION:** HARDIE FIBER-CEMENT FASCIA OR EQUAL

**FRAMING:** 2x12 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 24" OC AS PER CODE (WITH THE CLASSIC ICYNENE AS NOTED ABOVE)

**BID ALTERNATE 1:** 2x10 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 16" OC AS PER CODE (WITH THE

DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION AS NOTED ABOVE)

## 8. CABINETS & INTERIOR DETAILS

**KITCHEN WALL AND BASE CABINETS:** MATERIAL; 3/4" ALL SOLID WOOD CONSTRUCTION FRONTS; 1/2" SOLID WOOD SIDES & 3/4" SOLID WOOD SHELVES

**BATHROOM CABINET:** MATERIAL; 3/4" SOLID WOOD FRONTS; 1/2" WOOD SIDES

**CABINETS FINISH:** FINISH COLOR TBD

**CABINET MATERIALS AND ADHESIVES:** A) MEET E1 STANDARD; OR B) CARB PHASE I STANDARD; OR C) HAVE NO ADDED UREA-FORMALDEHYDE

**WOOD SHELVES/PANTRY & STORAGE:** 3/4" SOLID WOOD SHELVES

**KITCHEN COUNTERTOPS:** PLASTIC LAMINATE FINISHED W/ 4" BACKSPALSH; FORMALDYHDYE FREE ADHESIVES ONLY.

## 9. INTERIOR DOORS & TRIM

**DOORS:** SEE ATTACHED DOOR SCHEDULE

**DOOR JAMS:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYE FREE MDF JAMBS AT ALL DOORS

**DOOR TRIM:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF, 2"

**BASE:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF

**ADDITIONAL:** ALL PASSTHROUGH DOORS WHEELCHAIR ACCESSIBLE

## 10. HARDWARE

**DOOR HARDWARE:**

- KWI-K-SET TITAN/NICKEL PLATES; LEVER DOOR HARDWARE THROUGHOUT
- KEYED LEVER AND KEYED DEADBOLT (1" MIN. THROW) AT FRONT ENTRY
- SECURITY VIEWER ON FRONT ENTRY DOOR
- KEYED LEVER AND BLIND DEADBOLT AT OTHER EXTERIOR DOORS
- PRIVACY LEVERS AT BEDROOM/BATHS, PASSAGE LEVERS, ELSEWHERE

## 11. WINDOWS

**TYPE, MAKE, MATERIAL:** SEE SCHEDULE

**TRIM:** FULL STOOL AND APRON AT ALL SILLS, SEE DRAWINGS

**SCREENS:** BUG

**ADDITIONAL INFORMATION:**

- SEE ATTACHED WINDOW SCHEDULE
- HEAD FLASHING OVER EXPOSED WINDOWS
- CONTINUOUS SELF-ADHERING MOISTOP AROUND ALL ROUGH EDGES

## 12. INTERIOR FINISHES

**KITCHEN:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**BATHS:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**OTHER WALLS:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**TRIM:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT

**INTERIOR DOORS:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT, INTERIOR FINISH OF ALL EXTERIOR DOORS SAME AS INTERIOR DOORS

**ADDITIONAL INFORMATION:**

- ALL PAINT APPLIED DIRECTLY TO HEBEL MUST BE VAPOR PERMEABLE
- ALL INTERIOR FINISHES TO BE LOW VOC SUCH THAT THE VOC CONTENT MUST BE LESS THAN 10 g/L

## 13. ENTRANCE AND EXTERIOR DETAILS

**MAIN ENTRANCE DOOR:** 6-PANEL JELD-WEN STEEL ALL PANEL EXTERIOR DOOR OR EQUAL

**HEAD FLASHINGS:** GALVANIZED OR ALUMINIUM; EXPOSED DOORS AND WINDOWS

**PAINT:** ACRYLIC LATEX

**EXTERIOR MILLWORK:** HARDIE FIBER-CEMENT TRIM OR EQUAL

## **14. GUTTERS & DOWNSPOUTS**

**GENERAL:** ALUMINUM GUTTER AND DOWNSPOUTS

## **15. SPECIAL EQUIPMENT / APPLIANCES**

**RANGE:** ELECTRIC

**RANGE HOODS:** ENERGY STAR

**FANS:** ENERGY STAR

**DISHWASHER:** ENERGY STAR

**WASHER/DRYER:** ENERGY STAR

**REFRIGERATOR:** ENERGY STAR

## **16. PLUMBING**

**KITCHEN SINK:** MOEN EXCALIBUR DOUBLE BOWL KITCHEN SINK MODEL: 22821 WITH SOUNDSHIELD UNDERCOATING AND 7-1/2" DEEP BOWLS, 3-HOLES (CENTERED). INSTALL WITH BADGER 5, 1/2 HP, 120V/1PH, 6.9 F.L.A UNIT WITH WALL ON/OFF SWITCH

**BATHROOM SINK:** IKEA BOHOLMEN SINGLE BOWL INSET SINK, STAINLESS (ARTICLE # 998.972.21) WITH ATLANT WASTE STRAINER OR EQUAL

**TOILET:** NIAGARA STEALTH 0.8 GPF ROUND — MODEL: N7716 OR WATER SENSE DUAL FLUSH OR EQUAL

**BATHTUB:** BOOTZ INDUSTRIES ALOHA 60" BATHTUB 40" LUMBAR SUPPORT PORCELAIN ON STEEL STANDARD OUTLET (MODEL# 011-2364 RH DRAIN, SLIP RESISTANT BOTTOM, COORDINATE WITH LEFT/RIGHT DRAIN LOCATION

**SHOWER:** MOEN POSI-TEMP VALVE PRESSURE-BALANCING VALVE WITH 1/4 TURN STOPS — MODEL: 62370 (CC) WITH MOEN CHATEAU SERIES — TUB/SHOWER TRIM WITH EITHER 1.5 GPM SHOWERHEAD OR OMNI INLINE FLOW CONTROL @ 1.5 GPM (MODEL A-710-VR-1.5-LF)

**WATER SUPPLY:** PUBLIC

**SEWAGE DISPOSAL:** PUBLIC

**HOUSE DRAIN (INSIDE):** PVC

**HOUSE SEWER (OUTSIDE):** PVC YARDLINE AND CONNECTION TO PUBLIC SEWER.

**WATER PIPING:** PEX OR EQUAL; INSULATED HOT WATER LINES THROUGHOUT; NO JOINTS IN SLAB WATER LINES SET INSIDE INSULATION AT WALLS AND FOUNDATION PVC YARDLINE AND CONNECTION TO PUBLIC WATER SUPPLY. PLUMB IN STUD WALLS WHEN POSSIBLE — COORDINATE LAYOUT

**SILLCOCKS:** PIPING, FITTINGS AND BACK SIPHON PROTECTORS FOR EXT. HOSE BIBS (2x) NOT SHOWN IN PLAN

**DOMESTIC WATER HEATER:** PROVIDE 40 GAL RHEEM HYBRID HEAT PUMP OR EQUAL

**OTHER:** SERVICE PIPING FROM UTILITY METER AT HOUSE EXTERIOR

## **17. HVAC**

**HVAC SYSTEM:** PROVIDE DUCTLESS MINI-SPLIT WITH INVERTER TECHNOLOGY

- PROVIDE ONE DAIKIN 3MXS24JVJU OR EQUAL OUTDOOR UNIT

- PROVIDE THREE DAIKIN CTXS07LVJU OR EQUAL INDOOR UNITS

**ADDITIONAL INFORMATION:**

- PROVIDE CONDENSATE LINES FOR INDOOR UNITS PER CODE AND MANUFACTURER'S INSTRUCTIONS

- PROVIDE POWER ASSISTED AIR TRANSFER DUCT BETWEEN BATHROOM AND MAIN LIVING SPACE ABOVE BATHROOM DOOR SWITCHED TO BATHROOM LIGHT FIXTURE

- PROVIDE EXHAUST FAN IN BATHROOM WITH INDEPENDENT SWITCH

-PROVIDE KITCHEN EXHAUST FAN TO THE OUTSIDE

## **18. ELECTRIC WIRING**

**SERVICE:** UNDERGROUND OR OVERHEAD AS REQUIRED

**PANEL(s):** 100AMP/ CIRCUIT BREAKER WITH COPPER SERVICE CABLING

**INTERIOR WIRING:** COPPER; NON-METALLIC CABLE

**SPECIAL OUTLETS:** DRYER 120/240V OR 120/208V; GFI AT KITCHEN/BATHS/OUTSIDE; WP AT OUTSIDE - FRONT AND REAR

**DOORBELL:** TWO-TONE DOOR CHIM AT FRONT ENTRY

**ADDITIONAL INFORMATION:**

- SMOKE DETECTORS INSIDE AND OUTSIDE ALL BEDROOM DOORS PER CODE
- PRE-WIRE FOR TELEPHONE AND TV (BEDROOMS KITCHEN & LIVING AREAS)
- SWITCHED MOTION DETECTING SECURITY LIGHT AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE
- ELECTRIC SWITCHES AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE ELECTRIC OUTLETS AT 18-INCH HEIGHT MAX.
- WHITE COVER PLATES FOR SWITCHES AND OUTLETS
- BREAKER BOX LOCATED INSIDE HOUSE AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

## 19. LIGHTING FIXTURES & FANS

**QUANTITY:** TOTAL # AND STYLE OF FIXTURES PER PLAN OR SCHEDULE BELOW

**FIXTURES:** FIXTURE SCHEDULE AS FOLLOWS:

- ☐ CEILING FANS (LIVING ROOM AND BEDROOMS, EXPOSED CONDUIT):
  - HARBOR BREEZE BDB52BNK5N OR EQUAL
- ☐ CEILING FAN LIGHT KITS:
  - LKG635BNK OR EQUAL
- ☐ BATHROOM (WALL MOUNTED):
  - LIGHTWAY BDFV-24-A-A-2F17-NL-P2-WSA OR EQUAL
- ☐ KITCHEN (CEILING MOUNTED):
  - SUNSET LIGHTING F7185-53

**NOTES:** AREAS NOT SPECIFICALLY MENTIONED IN THIS SPECIFICATION SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE CITY AND COUNTY BUILDING CODES. ALL LIGHT FIXTURES AND FANS TO BE ENERGY STAR RATED

## 20. MISCELLANEOUS

- ALL EXTERIOR NAILS, BOLTS, ANCHORS, HANGERS, SHEATHING NAILS (INCLUDING FLOOR AND ROOF) AND NAILS PENETRATING P.T. LIMBER SHALL BE HOT DIPPED GALVANIZED
- 1/2" CEMENTIOUS BACKER BOARD SHALL BE INSTALLED BEHIND ALL SHOWER ENCLOSURES AND WET AREA
- THE GENERAL CONTRACTOR AND SUB CONTRACTORS MUST CERTIFY THAT ALL MATERIALS ARE FREE OF ADDED UREA FORMALYHYDE

# **SPECIFICATIONS FOR ALLEY FLAT 2.0**

## **HEBEL 6" AAC-6 WALL PANELS**

### **1. FOUNDATION**

**GENERAL:** CONCRETE SLAB FOUNDATION PER ENGINEER DESIGN

**CONCRETE SLAB MIX:** 1:2:4 (5 BAG) WITH 20% MINIMUM FLY ASH CONTENT

**SLAB REINFORCEMENT:** STEEL RE-BAR PER ENGINEER PLAN

**MEMBRANE:** 6 MIL POLYETHYLENE VAPOR BARRIER UNDER SLAB

**FILL UNDER SLAB:** 4" MINIMUM CRUSHED GRAVEL OVER COMPACTED SOIL/SANDY LOAM

**ADDITIONAL INFORMATION:** PRESSURE TREATED SILL PLATES AT ALL EXTERIOR WALLS, SILL PLATES 6" MINIMUM ABOVE OUTSIDE SOIL (12" NOMINAL) NO FOUNDATION TERMITE PRE-TREATMENT

**FOUNDATION:** EXTERIOR BEAMS-PER SEALED FOUNDATION PLAN: INTERIOR BEAMS-PER SEALED FOUNDATION PLAN: SLAB TO BE A MINIMUM OF 4" THICK W/ # 3'S PER SEALED FOUNDATION PLAN

### **2. EXTERIOR WALLS**

**CONSTRUCTION:** HEBEL 6" AAC-6 PANELS

**VERTICAL REINFORCEMENT:** BENT BAR W/ MIN 3" GROUT CELL DRILLED OR NOTCHED, SPACING PER ENGINEER PLAN

**EXTERIOR FINISH:** STUCCO, PROVIDED BY HEBEL

### **3. INSULATION**

**WALLS:** NO ADDITIONAL INSULATION NEEDED

**ROOF:** ICYENE CLASSIC (LD-C-50) OPEN CELL SPRAY FOAM INSULATION OR EQUAL

**BID ALTERNATE 1:** DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION OR EQUAL (WITH 2x10 RAFTERS)

### **4. INTERIOR WALLS**

**PARTITIONS:** 2x4 WOOD STUDS WITH 1/2" TYPE X GYP BOARD ON BOTH SIDES.

**FINISH:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**PLATES:** ALL INTERIOR WALL PLATES (SOLE, TOP, DOUBLE) SPF STANDARD OR BETTER

**STUDS:** WOOD GRADE/ SPECIES; SPF STANDARD/BETTER

**SIZE/SPACING:** 2x4 @ 24" OC

### **5. FLOORING**

**ALL FLOORS:** SEALED CONCRETE, ATLAS ZERO-VOC ELITE-HS CONCRETE SEALER OR EQUAL.

### **6. CEILING**

**ALL CEILINGS:** 1/2" PAINTED TYPE X DRYWALL UNLESS OTHERWISE NOTED

### **7. ROOFING**

**UNDERLAYMENT:** 30-POUND ASPHALT IMPREGNATED FELT

**ROOF SHEATHING:** 5/8" PLYWOOD, APA RATED, CDX

**ROOFING:** GALVALUME STANDING SEAM OR EQUAL

**FLASHING:** GALVALUME

**ADDITIONAL INFORMATION:** HARDIE FIBER-CEMENT FASCIA OR EQUAL

**FRAMING:** 2x12 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 24" OC AS PER CODE (WITH THE CLASSIC ICYNENE AS NOTED ABOVE)

**BID ALTERNATE 1:** 2x10 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 16" OC AS PER CODE (WITH THE

DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION AS NOTED ABOVE)

## 8. CABINETS & INTERIOR DETAILS

**KITCHEN WALL AND BASE CABINETS:** MATERIAL; 3/4" ALL SOLID WOOD CONSTRUCTION FRONTS; 1/2" SOLID WOOD SIDES & 3/4" SOLID WOOD SHELVES

**BATHROOM CABINET:** MATERIAL; 3/4" SOLID WOOD FRONTS; 1/2" WOOD SIDES

**CABINETS FINISH:** FINISH COLOR TBD

**CABINET MATERIALS AND ADHESIVES:** A) MEET E1 STANDARD; OR B) CARB PHASE I STANDARD; OR C) HAVE NO ADDED UREA-FORMALDEHYDE

**WOOD SHELVES/PANTRY & STORAGE:** 3/4" SOLID WOOD SHELVES

**KITCHEN COUNTERTOPS:** PLASTIC LAMINATE FINISHED W/ 4" BACKSPALSH; FORMALDYHDYE FREE ADHESIVES ONLY.

## 9. INTERIOR DOORS & TRIM

**DOORS:** SEE ATTACHED DOOR SCHEDULE

**DOOR JAMS:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYE FREE MDF JAMBS AT ALL DOORS

**DOOR TRIM:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF, 2"

**BASE:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF

**ADDITIONAL:** ALL PASSTHROUGH DOORS WHEELCHAIR ACCESSIBLE

## 10. HARDWARE

**DOOR HARDWARE:**

- KWI-K-SET TITAN/NICKEL PLATES; LEVER DOOR HARDWARE THROUGHOUT
- KEYED LEVER AND KEYED DEADBOLT (1" MIN. THROW) AT FRONT ENTRY
- SECURITY VIEWER ON FRONT ENTRY DOOR
- KEYED LEVER AND BLIND DEADBOLT AT OTHER EXTERIOR DOORS
- PRIVACY LEVERS AT BEDROOM/BATHS, PASSAGE LEVERS, ELSEWHERE

## 11. WINDOWS

**TYPE, MAKE, MATERIAL:** SEE SCHEDULE

**TRIM:** FULL STOOL AND APRON AT ALL SILLS, SEE DRAWINGS

**SCREENS:** BUG

**ADDITIONAL INFORMATION:**

- SEE ATTACHED WINDOW SCHEDULE
- HEAD FLASHING OVER EXPOSED WINDOWS
- CONTINUOUS SELF-ADHERING MOISTOP AROUND ALL ROUGH EDGES

## 12. INTERIOR FINISHES

**KITCHEN:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**BATHS:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**OTHER WALLS:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**TRIM:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT

**INTERIOR DOORS:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT, INTERIOR FINISH OF ALL EXTERIOR DOORS SAME AS INTERIOR DOORS

**ADDITIONAL INFORMATION:**

- ALL PAINT APPLIED DIRECTLY TO HEBEL MUST BE VAPOR PERMEABLE
- ALL INTERIOR FINISHES TO BE LOW VOC SUCH THAT THE VOC CONTENT MUST BE LESS THAN 10 g/L

## 13. ENTRANCE AND EXTERIOR DETAILS

**MAIN ENTRANCE DOOR:** 6-PANEL JELD-WEN STEEL ALL PANEL EXTERIOR DOOR OR EQUAL

**HEAD FLASHINGS:** GALVANIZED OR ALUMINIUM; EXPOSED DOORS AND WINDOWS

**PAINT:** ACRYLIC LATEX

**EXTERIOR MILLWORK:** HARDIE FIBER-CEMENT TRIM OR EQUAL

## **14. GUTTERS & DOWNSPOUTS**

**GENERAL:** ALUMINUM GUTTER AND DOWNSPOUTS

## **15. SPECIAL EQUIPMENT / APPLIANCES**

**RANGE:** ELECTRIC

**RANGE HOODS:** ENERGY STAR

**FANS:** ENERGY STAR

**DISHWASHER:** ENERGY STAR

**WASHER/DRYER:** ENERGY STAR

**REFRIGERATOR:** ENERGY STAR

## **16. PLUMBING**

**KITCHEN SINK:** MOEN EXCALIBUR DOUBLE BOWL KITCHEN SINK MODEL: 22821 WITH SOUNDSHIELD UNDERCOATING AND 7-1/2" DEEP BOWLS, 3-HOLES (CENTERED). INSTALL WITH BADGER 5, 1/2 HP, 120V/1PH, 6.9 F.L.A UNIT WITH WALL ON/OFF SWITCH

**BATHROOM SINK:** IKEA BOHOLMEN SINGLE BOWL INSET SINK, STAINLESS (ARTICLE # 998.972.21) WITH ATLANT WASTE STRAINER OR EQUAL

**TOILET:** NIAGARA STEALTH 0.8 GPF ROUND — MODEL: N7716 OR WATER SENSE DUAL FLUSH OR EQUAL

**BATHTUB:** BOOTZ INDUSTRIES ALOHA 60" BATHTUB 40" LUMBAR SUPPORT PORCELAIN ON STEEL STANDARD OUTLET (MODEL# 011-2364 RH DRAIN, SLIP RESISTANT BOTTOM, COORDINATE WITH LEFT/RIGHT DRAIN LOCATION

**SHOWER:** MOEN POSI-TEMP VALVE PRESSURE-BALANCING VALVE WITH 1/4 TURN STOPS — MODEL: 62370 (CC) WITH MOEN CHATEAU SERIES — TUB/SHOWER TRIM WITH EITHER 1.5 GPM SHOWERHEAD OR OMNI INLINE FLOW CONTROL @ 1.5 GPM (MODEL A-710-VR-1.5-LF)

**WATER SUPPLY:** PUBLIC

**SEWAGE DISPOSAL:** PUBLIC

**HOUSE DRAIN (INSIDE):** PVC

**HOUSE SEWER (OUTSIDE):** PVC YARDLINE AND CONNECTION TO PUBLIC SEWER.

**WATER PIPING:** PEX OR EQUAL; INSULATED HOT WATER LINES THROUGHOUT; NO JOINTS IN SLAB WATER LINES SET INSIDE INSULATION AT WALLS AND FOUNDATION PVC YARDLINE AND CONNECTION TO PUBLIC WATER SUPPLY. PLUMB IN STUD WALLS WHEN POSSIBLE — COORDINATE LAYOUT

**SILLCOCKS:** PIPING, FITTINGS AND BACK SIPHON PROTECTORS FOR EXT. HOSE BIBS (2x) NOT SHOWN IN PLAN

**DOMESTIC WATER HEATER:** PROVIDE 40 GAL RHEEM HYBRID HEAT PUMP OR EQUAL

**OTHER:** SERVICE PIPING FROM UTILITY METER AT HOUSE EXTERIOR

## **17. HVAC**

**HVAC SYSTEM:** PROVIDE DUCTLESS MINI-SPLIT WITH INVERTER TECHNOLOGY

- PROVIDE ONE DAIKIN 3MXS24JVJU OR EQUAL OUTDOOR UNIT

- PROVIDE THREE DAIKIN CTXS07LVJU OR EQUAL INDOOR UNITS

**ADDITIONAL INFORMATION:**

- PROVIDE CONDENSATE LINES FOR INDOOR UNITS PER CODE AND MANUFACTURER'S INSTRUCTIONS

- PROVIDE POWER ASSISTED AIR TRANSFER DUCT BETWEEN BATHROOM AND MAIN LIVING SPACE ABOVE BATHROOM DOOR SWITCHED TO BATHROOM LIGHT FIXTURE

- PROVIDE EXHAUST FAN IN BATHROOM WITH INDEPENDENT SWITCH

-PROVIDE KITCHEN EXHAUST FAN TO THE OUTSIDE

## **18. ELECTRIC WIRING**



**SERVICE:** UNDERGROUND OR OVERHEAD AS REQUIRED

**PANEL(s):** 100AMP/ CIRCUIT BREAKER WITH COPPER SERVICE CABLING

**INTERIOR WIRING:** COPPER; NON-METALLIC CABLE

**SPECIAL OUTLETS:** DRYER 120/240V OR 120/208V; GFI AT KITCHEN/BATHS/OUTSIDE; WP AT OUTSIDE - FRONT AND REAR

**DOORBELL:** TWO-TONE DOOR CHIM AT FRONT ENTRY

**ADDITIONAL INFORMATION:**

- SMOKE DETECTORS INSIDE AND OUTSIDE ALL BEDROOM DOORS PER CODE
- PRE-WIRE FOR TELEPHONE AND TV (BEDROOMS KITCHEN & LIVING AREAS)
- SWITCHED MOTION DETECTING SECURITY LIGHT AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE
- ELECTRIC SWITCHES AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE ELECTRIC OUTLETS AT 18-INCH HEIGHT MAX.
- WHITE COVER PLATES FOR SWITCHES AND OUTLETS
- BREAKER BOX LOCATED INSIDE HOUSE AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

## 19. LIGHTING FIXTURES & FANS

**QUANTITY:** TOTAL # AND STYLE OF FIXTURES PER PLAN OR SCHEDULE BELOW

**FIXTURES:** FIXTURE SCHEDULE AS FOLLOWS:

- ☐ CEILING FANS (LIVING ROOM AND BEDROOMS, EXPOSED CONDUIT):
  - HARBOR BREEZE BDB52BNK5N OR EQUAL
- ☐ CEILING FAN LIGHT KITS:
  - LKG635BNK OR EQUAL
- ☐ BATHROOM (WALL MOUNTED):
  - LIGHTWAY BDFV-24-A-A-2F17-NL-P2-WSA OR EQUAL
- ☐ KITCHEN (CEILING MOUNTED):
  - SUNSET LIGHTING F7185-53

**NOTES:** AREAS NOT SPECIFICALLY MENTIONED IN THIS SPECIFICATION SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE CITY AND COUNTY BUILDING CODES. ALL LIGHT FIXTURES AND FANS TO BE ENERGY STAR RATED

## 20. MISCELLANEOUS

- ALL EXTERIOR NAILS, BOLTS, ANCHORS, HANGERS, SHEATHING NAILS (INCLUDING FLOOR AND ROOF) AND NAILS PENETRATING P.T. LIMBER SHALL BE HOT DIPPED GALVANIZED
- 1/2" CEMENTIOUS BACKER BOARD SHALL BE INSTALLED BEHIND ALL SHOWER ENCLOSURES AND WET AREA
- THE GENERAL CONTRACTOR AND SUB CONTRACTORS MUST CERTIFY THAT ALL MATERIALS ARE FREE OF ADDED UREA FORMALYHYDE

# **SPECIFICATIONS FOR ALLEY FLAT 2.0 – STEKO**

## **1. FOUNDATION**

**GENERAL:** CONCRETE SLAB FOUNDATION PER ENGINEER DESIGN: ALL MATERIALS, DESIGNS AND PROCEDURES PER SPECIFIC ARCHITECT'S PLAN: MINIMUM FOUNDATION HEIGHT ABOVE SURROUNDING SOIL IS 12" AT ANY POINT.

**CONCRETE SLAB MIX:** 1:2:4 (5 BAG) WITH 20% MINIMUM FLY ASH CONTENT

**SLAB REINFORCEMENT:** STEEL RE-BAR PER ENGINEER PLAN

**MEMBRANE:** 6 MIL POLYETHYLENE VAPOR BARRIER UNDER SLAB

**FILL UNDER SLAB:** 4" MINIMUM CRUSHED GRAVEL OVER COMPACTED SOIL/SANDY LOAM

**ADDITIONAL INFORMATION:** PRESSURE TREATED SILL PLATES AT ALL EXTERIOR WALLS, SILL PLATES 6" MINIMUM ABOVE OUTSIDE SOIL (12" NOMINAL) NO FOUNDATION TERMITE PRE-TREATMENT

**FOUNDATION:** EXTERIOR BEAMS-PER SEALED FOUNDATION PLAN: INTERIOR BEAMS-PER SEALED FOUNDATION PLAN: SLAB TO BE A MINIMUM OF 4" THICK W/ # 3'S PER SEALED FOUNDATION PLAN

## **2. EXTERIOR WALLS**

**CONSTRUCTION:** STEKO KIT

**WEATHER BARRIER:** TYVEK OR EQUAL

**SIDING:** SMOOTH 2' X 4' X 5/16" HARDIEPANEL SIDING OR EQUAL LAPPED WITH 22" EXPOSURE, (INSTALL PER MANUFACTURERS INSTRUCTIONS)

**EXTERIOR PAINT:** ACRYLIC LATEX

## **3. INSULATION**

**WALLS:** INSULATION SHALL BE INSTALLED PER ENERGY STAR GRADE 1 STANDARDS AND SHALL BE UNFACED FORMALDYHDYE FREE BATTS AS INDICATED ON DRAWING

**ROOF:** DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION OR EQUAL

## **4. INTERIOR WALLS**

**PARTITIONS:** STEKO

## **5. FLOORING**

**ALL FLOORS:** SEALED CONCRETE

## **6. CEILING**

**ALL CEILINGS:** 1/2" PAINTED GYPSUM BOARD UNLESS OTHERWISE NOTED

## **7. ROOFING**

**UNDERLAYMENT:** 30-POUND ASPHALT IMPREGNATED FELT

**ROOFING:** GALVALUME STANDING SEAM OR EQUAL

**FLASHING:** GALVALUME

## **8. CABINETS & INTERIOR DETAILS**

**KITCHEN WALL AND BASE CABINETS:** MATERIAL; 3/4" ALL SOLID WOOD CONSTRUCTION FRONTS; 1/2" SOLID WOOD SIDES & 3/4" SOLID WOOD SHELVES

**BATHROOM CABINET:** MATERIAL; 3/4" SOLID WOOD FRONTS; 1/2" WOOD SIDES

**CABINETS FINISH:** FINISH COLOR TBD

**CABINET MATERIALS AND ADHESIVES:** A) MEET E1 STANDARD; OR B) CARB PHASE I STANDARD; OR C) HAVE NO ADDED UREA-FORMALDEHYDE

**WOOD SHELVES/PANTRY & STORAGE:** 3/4" SOLID WOOD SHELVES

**KITCHEN COUNTERTOPS:** PLASTIC LAMINATE FINISHED W/ 4" BACKSPALSH; FORMALDEHYDE FREE ADHESIVES ONLY.

## 9. INTERIOR DOORS & TRIM

**DOORS:** SEE ATTACHED DOOR SCHEDULE

**DOOR JAMS:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF JAMBS AT ALL DOORS

**DOOR TRIM:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF, 2"

**BASE:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF

**ADDITIONAL:** ALL PASSTHROUGH DOORS WHEELCHAIR ACCESSIBLE

## 10. HARDWARE

**DOOR HARDWARE:**

- KWIK-SET TITAN/NICKEL PLATES; LEVER DOOR HARDWARE THROUGHOUT
- KEYED LEVER AND KEYED DEADBOLT (1" MIN. THROW) AT FRONT ENTRY
- SECURITY VIEWER ON FRONT ENTRY DOOR
- KEYED LEVER AND BLIND DEADBOLT AT OTHER EXTERIOR DOORS
- PRIVACY LEVERS AT BEDROOM/BATHS, PASSAGE LEVERS, ELSEWHERE

## 11. WINDOWS

**TYPE, MAKE, MATERIAL:** SEE SCHEDULE

**TRIM:** FULL STOOL AND APRON AT ALL SILLS; SHEETROCK RETURNS AT TOP AND SIDES, SEE DRAWINGS

**SCREENS:** BUG

**ADDITIONAL INFORMATION:**

- SEE ATTACHED WINDOW SCHEDULE
- HEAD FLASHING OVER EXPOSED WINDOWS
- CONTINUOUS SELF-ADHERING MOISTOP AROUND ALL ROUGH EDGES

## 12. INTERIOR FINISHES

**KITCHEN:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**BATHS:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**OTHER WALLS:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**TRIM:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT

**INTERIOR DOORS:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT, INTERIOR FINISH OF ALL EXTERIOR DOORS SAME AS INTERIOR DOORS

**ADDITIONAL INFORMATION:**

- ALL INTERIOR FINISHES TO BE LOW VOC SUCH THAT THE VOC CONTENT MUST BE LESS THAN 10 g/L

## 13. ENTRANCE AND EXTERIOR DETAILS

**MAIN ENTRANCE DOOR:** JELD-WEN 6-PANEL STEEL 'ALL PANEL' EXTERIOR DOOR OR EQUAL

**HEAD FLASHINGS:** GALVANIZED OR ALUMINIUM; EXPOSED DOORS AND WINDOWS

**PAINT:** ACRYLIC LATEX

**EXTERIOR MILLWORK:** HARDIE FIBER-CEMENT TRIM OR EQUAL

## 14. GUTTERS & DOWNSPROUTS

**GENERAL:** ALUMINUM GUTTERS/DOWNSPROUTS

## 15. SPECIAL EQUIPMENT / APPLIANCES

**RANGE:** ELECTRIC

**RANGE HOODS:** ENERGY STAR

**FANS:** ENERGY STAR

**DISHWASHER:** ENERGY STAR

**WASHER/DRYER:** ENERGY STAR

**REFRIGERATOR:** ENERGY STAR

## 16. PLUMBING

**KITCHEN SINK:** MOEN EXCALIBUR DOUBLE BOWL KITCHEN SINK MODEL: 22821 WITH SOUNDSHIELD UNDERCOATING AND 7-1/2" DEEP BOWLS, 3-HOLES (CENTERED). INSTALL WITH BADGER 5, 1/2 HP, 120V/1PH, 6.9 F.L.A UNIT WITH WALL ON/OFF SWITCH

**BATHROOM SINK:** IKEA BOHOLMEN SINGLE BOWL INSET SINK, STAINLESS (ARTICLE # 998.972.21) WITH ATLANT WASTE STRAINER OR EQUAL

**TOILET:** NIAGARA STEALTH 0.8 GPF ROUND – MODEL: N7716 OR WATER SENSE DUAL FLUSH OR EQUAL

**BATHTUB:** BOOTZ INDUSTRIES ALOHA 60" BATHTUB 40" LUMBAR SUPPORT PORCELAIN ON STEEL STANDARD OUTLET (MODEL # 011-2364 RH DRAIN, SLIP RESISTANT BOTTOM, COORDINATE WITH LEFT/RIGHT DRAIN LOCATION

**SHOWER:** MOEN POSI-TEMP VALVE PRESSURE-BALANCING VALVE WITH 1/4 TURN STOPS – MODEL: 62370 (CC) WITH MOEN CHATEAU SERIES – TUB/SHOWER TRIM WITH EITHER 1.5 GPM SHOWERHEAD OR OMNI INLINE FLOW CONTROL @ 1.5 GPM (MODEL A-710-VR-1.5-LF)

**WATER SUPPLY:** PUBLIC

**SEWAGE DISPOSAL:** PUBLIC

**HOUSE DRAIN (INSIDE):** PVC

**HOUSE SEWER (OUTSIDE):** PVC YARDLINE AND CONNECTION TO PUBLIC SEWER.

**WATER PIPING:** PEX OR EQUAL; INSULATED HOT WATER LINES THROUGHOUT; NO JOINTS IN SLAB WATER LINES SET INSIDE INSULATION AT WALLS AND FOUNDATION PVC YARDLINE AND CONNECTION TO PUBLIC WATER SUPPLY. PLUMB IN STUD WALLS WHEN POSSIBLE – COORDINATE LAYOUT

**SILLCOCKS:** PIPING, FITTINGS AND BACK SIPHON PROTECTORS FOR EXT. HOSE BIBS (2x) NOT SHOWN IN PLAN

**DOMESTIC WATER HEATER:** PROVIDE 40 GAL RHEEM HYBRID HEAT PUMP OR EQUAL

**OTHER:**

- SERVICE PIPING FROM UTILITY METER AT HOUSE EXTERIOR

## 17. HVAC

**HVAC SYSTEM:** PROVIDE DUCTLESS MINI-SPLIT WITH INVERTER TECHNOLOGY

- PROVIDE ONE DAIKIN 3MXS24JVJU OR EQUAL OUTDOOR UNIT

- PROVIDE THREE DAIKIN CTXS07LVJU OR EQUAL INDOOR UNITS

**ADDITIONAL INFORMATION:**

- PROVIDE CONDENSATE LINES FOR INDOOR UNITS PER CODE AND MANUFACTURER'S INSTRUCTIONS

- PROVIDE POWER ASSISTED AIR TRANSFER DUCT BETWEEN LIVING AND BATHROOM ABOVE BATHROOM DOOR SWITCHED TO BATHROOM LIGHT FIXTURE

- PROVIDE EXHAUST FAN IN BATHROOM WITH INDEPENDENT SWITCH

- PROVIDE KITCHEN EXHAUST FAN TO THE OUTSIDE

## 18. ELECTRIC WIRING

**SERVICE:** UNDERGROUND OR OVERHEAD AS REQUIRED

**PANEL(S):** 100AMP/ CIRCUIT BREAKER WITH COPPER SERVICE CABLING

**INTERIOR WIRING:** COPPER; NON-METALLIC CABLE

**SPECIAL OUTLETS:** DRYER 120/240V OR 120/208V; GFI AT KITCHEN/BATHS/OUTSIDE; WP AT OUTSIDE - FRONT AND REAR

**DOORBELL:** TWO-TONE DOOR CHIM AT FRONT ENTRY

**ADDITIONAL INFORMATION:**

- SMOKE DETECTORS INSIDE AND OUTSIDE ALL BEDROOM DOORS PER CODE

- PRE-WIRE FOR TELEPHONE AND TV (BEDROOMS KITCHEN & LIVING AREAS)

- SWITCHED MOTION DETECTING SECURITY LIGHT AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

- ELECTRIC SWITCHES AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE ELECTRIC OUTLETS AT 18-INCH HEIGHT MAX.

- WHITE COVER PLATES FOR SWITCHES AND OUTLETS

- BREAKER BOX LOCATED INSIDE HOUSE AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

## 19. LIGHTING FIXTURES & FANS

**QUANTITY:** TOTAL # AND STYLE OF FIXTURES PER PLAN OR SCHEDULE BELOW

**FIXTURES:** FIXTURE SCHEDULE AS FOLLOWS:

- ☐ CEILING FANS (LIVING ROOM AND BEDROOMS):
  - HARBOR BREEZE BDB52BNK5N OR EQUAL
- ☐ CEILING FAN LIGHT KITS:
  - LKG635BNK OR EQUAL
- ☐ BATHROOM (WALL MOUNTED):
  - LIGHTWAY BDFV-24-A-A-2F17-NL-P2-WSA OR EQUAL
- ☐ KITCHEN (CEILING MOUNTED):
  - SUNSET LIGHTING F7185-53

**NOTES:** AREAS NOT SPECIFICALLY MENTIONED IN THIS SPECIFICATION SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE CITY AND COUNTY BUILDING CODES. ALL LIGHT FIXTURES AND FANS TO BE ENERGY STAR RATED

## 20. MISCELLANEOUS

- ALL EXTERIOR NAILS, BOLTS, ANCHORS, HANGERS, SHEATHING NAILS (INCLUDING FLOOR AND ROOF) AND NAILS PENETRATING P.T. LIMBER SHALL BE HOT DIPPED GALVANIZED
- 1/2" CEMENTIOUS BACKER BOARD SHALL BE INSTALLED BEHIND ALL SHOWER ENCLOSURES AND WET AREA
- THE GENERAL CONTRACTOR AND SUB CONTRACTORS MUST CERTIFY THAT ALL MATERIALS ARE FREE OF ADDED UREA FORMALYHYDE

# **SPECIFICATIONS FOR ALLEY FLAT 2.0**

## **CONVENTIONAL STICK FRAME CONSTRUCTION**

### **1. FOUNDATION**

**GENERAL:** CONCRETE SLAB FOUNDATION PER ENGINEER DESIGN

**CONCRETE SLAB MIX:** 1:2:4 (5 BAG) WITH 20% MINIMUM FLY ASH CONTENT

**SLAB REINFORCEMENT:** STEEL RE-BAR PER ENGINEER PLAN

**MEMBRANE:** 6 MIL POLYETHYLENE VAPOR BARRIER UNDER SLAB

**FILL UNDER SLAB:** 4" MINIMUM CRUSHED GRAVEL OVER COMPACTED SOIL/SANDY LOAM

**ADDITIONAL INFORMATION:** PRESSURE TREATED SILL PLATES AT ALL EXTERIOR WALLS, SILL PLATES 6" MINIMUM ABOVE OUTSIDE SOIL (12" NOMINAL); NO FOUNDATION TERMITE PRE-TREATMENT

**FOUNDATION:** EXTERIOR BEAMS-PER SEALED FOUNDATION PLAN; INTERIOR BEAMS-PER SEALED FOUNDATION PLAN; SLAB TO BE A MINIMUM OF 4" THICK W/ # 3'S PER SEALED FOUNDATION PLAN

### **2. EXTERIOR WALLS**

**STUDS:** WOOD GRADE/ SPECIES; SPF NO. 2 OR BETTER

**SHEATHING:** 1" ZIPP R-SHEATHING OR EQUAL

**SIDING:** SMOOTH 2' X 4' X 5/16" HARDIEPANEL SIDING OR EQUAL LAPPED WITH 22" EXPOSURE, (INSTALL PER MANUFACTURERS INSTRUCTIONS)

**ADDITIONAL INFORMATION:** EXTERIOR WALL SHALL BE 2x4 STUD WALL W/ 1" ZIPP R-SHEATHING OR EQUAL (INSTALL PER MANUFACTURERS INSTRUCTIONS — TAPE ALL JOINTS WITH ZIP TAPE AS PER MANUFACTURER'S INSTRUCTIONS)

### **3. INSULATION**

**WALLS:** INSULATION SHALL BE INSTALLED PER ENERGY STAR GRADE 1 STANDARDS AND SHALL BE UNFACED FORMALDYHDYE FREE BATTS AS INDICATED ON DRAWING

**FOUNDATION:** N/A

**ROOF:** ICYENE CLASSIC (LD-C-50) OPEN CELL SPRAY FOAM INSULATION OR EQUAL

**BID ALTERNATE 1:** DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION OR EQUAL (WITH 2x10 RAFTERS)

#### **ADDITIONAL INFORMATION:**

- ALL INTERIOR WALLS AND CEILINGS BID AS GYPSUM BOARD — 1/2" GYPSUM BOARD ON WALLS AND CEILINGS.
- LIGHT ORANGE PEEL TEXTURE BID FOR ALL AREAS. CONTRACTOR TO PROVIDE TEXTURE SAMPLES FOR OWNER APPROVAL PRIOR TO COMMENCING OF GYPSUM BOARD WORK

### **4. INTERIOR WALLS**

**PARTITIONS:** 2x4 WOOD STUDS WITH 1/2" GYP BOARD ON BOTH SIDES.

**PLATES:** ALL INTERIOR WALL PLATES (SOLE, TOP, DOUBLE) SPF NO. 2 OR BETTER

**STUDS:** WOOD GRADE/ SPECIES; SPF STANDARD/BETTER

**SIZE/SPACING:** 2x4 @ 24" OC; SET TO ALIGN WITH ANY ROOF/CEILING RAFTERS/JOISTS.

### **5. FLOORING**

**ALL FLOORS:** SEALED CONCRETE, ATLAS ZERO-VOC ELITE-HS CONCRETE SEALER OR EQUAL.

### **6. CEILING**

**ALL CEILINGS:** 1/2" PAINTED GYPSUM BOARD UNLESS OTHERWISE NOTED

### **7. ROOFING**

**UNDERLAYMENT:** 30-POUND ASPHALT IMPREGNATED FELT

**ROOFING:** GALVALUME STANDING SEAM OR EQUAL

**FLASHING:** GALVALUME

**ADDITIONAL INFORMATION:** HARDIE FIBER-CEMENT FACIA OR EQUAL

**FRAMING:** 2x12 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 24" OC AS PER CODE (WITH THE CLASSIC ICYNENE AS NOTED ABOVE)

**BID ALTERNATE 1:** 2x10 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 16" OC AS PER CODE (WITH THE DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION AS NOTED ABOVE)

## 8. CABINETS & INTERIOR DETAILS

**KITCHEN WALL AND BASE CABINETS:** MATERIAL; 3/4" ALL SOLID WOOD CONSTRUCTION FRONTS; 1/2" SOLID WOOD SIDES & 3/4" SOLID WOOD SHELVES

**BATHROOM CABINET:** MATERIAL; 3/4" SOLID WOOD FRONTS; 1/2" WOOD SIDES

**CABINETS FINISH:** FINISH COLOR TBD

**CABINET MATERIALS AND ADHESIVES:** A) MEET E1 STANDARD; OR B) CARB PHASE I STANDARD; OR C) HAVE NO ADDED UREA-FORMALDEHYDE

**WOOD SHELVES/PANTRY & STORAGE:** 3/4" SOLID WOOD SHELVES

**KITCHEN COUNTERTOPS:** PLASTIC LAMINATE FINISHED W/ 4" BACKSPALSH; FORMALDYHDYE FREE ADHESIVES ONLY.

## 9. INTERIOR DOORS & TRIM

**DOORS:** SEE ATTACHED DOOR SCHEDULE

**DOOR JAMS:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYE FREE MDF JAMBS AT ALL DOORS

**DOOR TRIM:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF, 2"

**BASE:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF

**ADDITIONAL:** ALL PASSTHROUGH DOORS WHEELCHAIR ACCESSIBLE

## 10. HARDWARE

**DOOR HARDWARE:**

- KWIK-SET TITAN/NICKEL PLATES; LEVER DOOR HARDWARE THROUGHOUT
- KEYED LEVER AND KEYED DEADBOLT (1" MIN. THROW) AT FRONT ENTRY
- SECURITY VIEWER ON FRONT ENTRY DOOR
- KEYED LEVER AND BLIND DEADBOLT AT OTHER EXTERIOR DOORS
- PRIVACY LEVERS AT BEDROOM/BATHS, PASSAGE LEVERS, ELSEWHERE

## 11. WINDOWS

**TYPE, MAKE, MATERIAL:** SEE SCHEDULE

**TRIM:** FULL STOOL AND APRON AT ALL SILLS; SHEETROCK RETURNS AT TOP AND SIDES, SEE DRAWINGS

**SCREENS:** BUG

**ADDITIONAL INFORMATION:**

- SEE ATTACHED WINDOW SCHEDULE
- HEAD FLASHING OVER EXPOSED WINDOWS
- CONTINUOUS SELF-ADHERING MOISTOP AROUND ALL ROUGH EDGES

## 12. INTERIOR FINISHES

**KITCHEN:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**BATHS:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**OTHER WALLS:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**TRIM:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT

**INTERIOR DOORS:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT, INTERIOR FINISH OF ALL EXTERIOR DOORS SAME AS INTERIOR DOORS

**ADDITIONAL INFORMATION:**

- ALL INTERIOR FINISHES TO BE LOW VOC SUCH THAT THE VOC CONTENT MUST BE LESS THAN 10 g/L

### 13. ENTRANCE AND EXTERIOR DETAILS

**MAIN ENTRANCE DOOR:** 6-PANEL JELD-WEN STEEL ALL PANEL EXTERIOR DOOR OR EQUAL

**HEAD FLASHINGS:** GALVANIZED OR ALUMINIUM; EXPOSED DOORS AND WINDOWS

**PAINT:** ACRYLIC LATEX

**EXTERIOR MILLWORK:** HARDIE FIBER-CEMENT TRIM OR EQUAL

### 14. GUTTERS & DOWNSPROUTS

**GENERAL:** GUTTERS/DOWNSPROUTS, OR GABLES AT FRONT OF THE HOUSE AND ALL EXTERIOR DOORS

### 15. SPECIAL EQUIPMENT / APPLIANCES

**RANGE:** ELECTRIC

**RANGE HOODS:** ENERGY STAR

**FANS:** ENERGY STAR

**DISHWASHER:** ENERGY STAR

**WASHER/DRYER:** ENERGY STAR

**REFRIGERATOR:** ENERGY STAR

### 16. PLUMBING

**KITCHEN SINK:** MOEN EXCALIBUR DOUBLE BOWL KITCHEN SINK MODEL: 22821 WITH SOUNDSHIELD UNDERCOATING AND 7-1/2" DEEP BOWLS, 3-HOLES (CENTERED). INSTALL WITH BADGER 5, 1/2 HP, 120V/1PH, 6.9 F.L.A UNIT WITH WALL ON/OFF SWITCH

**BATHROOM SINK:** IKEA BOHOLMEN SINGLE BOWL INSET SINK, STAINLESS (ARTICLE # 998.972.21) WITH ATLANT WASTE STRAINER OR EQUAL

**TOILET:** NIAGARA STEALTH 0.8 GPF ROUND — MODEL: N7716 OR WATER SENSE DUAL FLUSH OR EQUAL

**BATHTUB:** BOOTZ INDUSTRIES ALOHA 60" BATHTUB 40" LUMBAR SUPPORT PORCELAIN ON STEEL STANDARD OUTLET (MODEL # 011-2364 RH DRAIN, SLIP RESISTANT BOTTOM, COORDINATE WITH LEFT/RIGHT DRAIN LOCATION

**SHOWER:** MOEN POSI-TEMP VALVE PRESSURE-BALANCING VALVE WITH 1/4 TURN STOPS — MODEL: 62370 (CC) WITH MOEN CHATEAU SERIES — TUB/SHOWER TRIM WITH EITHER 1.5 GPM SHOWERHEAD OR OMNI INLINE FLOW CONTROL @ 1.5 GPM (MODEL A-710-VR-1.5-LF)

**WATER SUPPLY:** PUBLIC

**SEWAGE DISPOSAL:** PUBLIC

**HOUSE DRAIN (INSIDE):** PVC

**HOUSE SEWER (OUTSIDE):** PVC YARDLINE AND CONNECTION TO PUBLIC SEWER.

**WATER PIPING:** COPPER; INSULATED HOT WATER LINES THROUGHOUT; NO JOINTS IN SLAB WATER LINES SET INSIDE INSULATION AT WALLS AND FOUNDATION PVC YARDLINE AND CONNECTION TO PUBLIC WATER SUPPLY. PLUMB IN STUD WALLS WHEN POSSIBLE — COORDINATE LAYOUT

**SILLCOCKS:** PIPING, FITTINGS AND BACK SIPHON PROTECTORS FOR EXT. HOSE BIBS (2x) NOT SHOWN IN PLAN

**DOMESTIC WATER HEATER:** PROVIDE 40 GAL RHEEM HYBRID HEAT PUMP OR EQUAL

**OTHER:**

- SERVICE PIPING FROM UTILITY METER AT HOUSE EXTERIOR

### 17. HVAC

**HVAC SYSTEM:** PROVIDE DUCTLESS MINI-SPLIT WITH INVERTER TECHNOLOGY

- PROVIDE ONE DAIKIN 3MXS24JVJU OR EQUAL OUTDOOR UNIT

- PROVIDE THREE DAIKIN CTXS07LVJU OR EQUAL INDOOR UNITS

**ADDITIONAL INFORMATION:**

- PROVIDE CONDENSATE LINES FOR INDOOR UNITS PER CODE AND MANUFACTURER'S INSTRUCTIONS

- PROVIDE POWER ASSISTED AIR TRANSFER DUCT BETWEEN BATHROOM AND MAIN LIVING SPACE ABOVE BATHROOM DOOR SWITCHED TO BATHROOM LIGHT FIXTURE



- PROVIDE EXHAUST FAN IN BATHROOM WITH INDEPENDENT SWITCH
- PROVIDE KITCHEN EXHAUST FAN TO THE OUTSIDE

## 18. ELECTRIC WIRING

**SERVICE:** UNDERGROUND OR OVERHEAD AS REQUIRED

**PANEL(S):** 100AMP/ CIRCUIT BREAKER WITH COPPER SERVICE CABLING

**INTERIOR WIRING:** COPPER; NON-METALLIC CABLE

**SPECIAL OUTLETS:** DRYER 120/240V OR 120/208V; GFI AT KITCHEN/BATHS/OUTSIDE; WP AT OUTSIDE - FRONT AND REAR

**DOORBELL:** TWO-TONE DOOR CHIME AT FRONT ENTRY

**ADDITIONAL INFORMATION:**

- SMOKE DETECTORS INSIDE AND OUTSIDE ALL BEDROOM DOORS PER CODE
- PRE-WIRE FOR TELEPHONE AND TV (BEDROOMS KITCHEN & LIVING AREAS)
- SWITCHED MOTION DETECTING SECURITY LIGHT AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE
- ELECTRIC SWITCHES AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE ELECTRIC OUTLETS AT 18-INCH HEIGHT MAX.
- WHITE COVER PLATES FOR SWITCHES AND OUTLETS
- BREAKER BOX LOCATED INSIDE HOUSE AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

## 19. LIGHTING FIXTURES & FANS

**QUANTITY:** TOTAL # AND STYLE OF FIXTURES PER PLAN OR SCHEDULE BELOW

**FIXTURES:** FIXTURE SCHEDULE AS FOLLOWS:

- ☐ CEILING FANS (LIVING ROOM AND BEDROOMS):
  - o HARBOR BREEZE BDB52BNK5N OR EQUAL
- ☐ CEILING FAN LIGHT KITS:
  - o LKG635BNK OR EQUAL
- ☐ BATHROOM (WALL MOUNTED):
  - o LIGHTWAY BDFV-24-A-A-2F17-NL-P2-WSA OR EQUAL
- ☐ KITCHEN (CEILING MOUNTED):
  - o SUNSET LIGHTING F7185-53

**NOTES:** AREAS NOT SPECIFICALLY MENTIONED IN THIS SPECIFICATION SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE CITY AND COUNTY BUILDING CODES. ALL LIGHT FIXTURES AND FANS TO BE ENERGY STAR RATED

## 20. MISCELLANEOUS

- ALL EXTERIOR NAILS, BOLTS, ANCHORS, HANGERS, SHEATHING NAILS (INCLUDING FLOOR AND ROOF) AND NAILS PENETRATING P.T. LIMBER SHALL BE HOT DIPPED GALVANIZED
- 1/2" CEMENTIOUS BACKER BOARD SHALL BE INSTALLED BEHIND ALL SHOWER ENCLOSURES AND WET AREA
- THE GENERAL CONTRACTOR AND SUB CONTRACTORS MUST CERTIFY THAT ALL MATERIALS ARE FREE OF ADDED UREA FORMALYHYDE

# **SPECIFICATIONS FOR ALLEY FLAT 2.0 - MODULAR**

## **1. FOUNDATION**

**GENERAL:** CONCRETE SLAB FOUNDATION PER ENGINEER DESIGN

**CONCRETE SLAB MIX:** 1:2:4 (5 BAG) WITH 20% MINIMUM FLY ASH CONTENT

**SLAB REINFORCEMENT:** STEEL RE-BAR PER ENGINEER PLAN

**MEMBRANE:** 6 MIL POLYETHYLENE VAPOR BARRIER UNDER SLAB

**FILL UNDER SLAB:** 4" MINIMUM CRUSHED GRAVEL OVER COMPACTED SOIL/SANDY LOAM

**ADDITIONAL INFORMATION:** PRESSURE TREATED SILL PLATES AT ALL EXTERIOR WALLS, SILL PLATES 6" MINIMUM ABOVE OUTSIDE SOIL (12" NOMINAL); NO FOUNDATION TERMITE PRE-TREATMENT

**FOUNDATION:** EXTERIOR BEAMS-PER SEALED FOUNDATION PLAN; INTERIOR BEAMS-PER SEALED FOUNDATION PLAN; SLAB TO BE A MINIMUM OF 4" THICK W/ # 3'S PER SEALED FOUNDATION PLAN

## **2. EXTERIOR WALLS**

**STUDS:** WOOD GRADE/ SPECIES; SPF NO. 2 OR BETTER

**SHEATHING:** 1" ZIPP R-SHEATHING OR EQUAL

**SIDING:** SMOOTH 2' X 4' X 5/16" HARDIEPANEL SIDING OR EQUAL LAPPED WITH 22" EXPOSURE, (INSTALL PER MANUFACTURERS INSTRUCTIONS)

**ADDITIONAL INFORMATION:** EXTERIOR WALL SHALL BE 2x4 STUD WALL W/ 1" ZIPP R-SHEATHING OR EQUAL (INSTALL PER MANUFACTURERS INSTRUCTIONS — TAPE ALL JOINTS WITH ZIP TAPE AS PER MANUFACTURER'S INSTRUCTIONS)

## **3. INSULATION**

**WALLS:** INSULATION SHALL BE INSTALLED PER ENERGY STAR GRADE 1 STANDARDS AND SHALL BE UNFACED FORMALDYHDE FREE BATTS AS INDICATED ON DRAWING

**FOUNDATION:** N/A

**ROOF:** ICYENE CLASSIC (LD-C-50) OPEN CELL SPRAY FOAM INSULATION OR EQUAL

**BID ALTERNATE 1:** DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION OR EQUAL (WITH 2x10 RAFTERS)

### **ADDITIONAL INFORMATION:**

- ALL INTERIOR WALLS AND CEILINGS BID AS GYPSUM BOARD — 1/2" GYPSUM BOARD ON WALLS AND CEILINGS.
- LIGHT ORANGE PEEL TEXTURE BID FOR ALL AREAS. CONTRACTOR TO PROVIDE TEXTURE SAMPLES FOR OWNER APPROVAL PRIOR TO COMMENCING OF GYSUM BOARD WORK

## **4. INTERIOR WALLS**

**PARTITIONS:** 2x4 WOOD STUDS WITH 1/2" GYP BOARD ON BOTH SIDES.

**PLATES:** ALL INTERIOR WALL PLATES (SOLE, TOP, DOUBLE) SPF NO. 2 OR BETTER

**STUDS:** WOOD GRADE/ SPECIES; SPF STANDARD/BETTER

**SIZE/SPACING:** 2x4 @ 24" OC; SET TO ALIGN WITH ANY ROOF/CEILING RAFTERS/JOISTS.

## **5. FLOORING**

**ALL FLOORS:** SEALED CONCRETE, ATLAS ZERO-VOC ELITE-HS CONCRETE SEALER OR EQUAL.

## **6. CEILING**

**ALL CEILINGS:** 1/2" PAINTED GYPSUM BOARD UNLESS OTHERWISE NOTED

## **7. ROOFING**

**UNDERLAYMENT:** 30-POUND ASPHALT IMPREGNATED FELT

**ROOFING:** GALVALUME STANDING SEAM OR EQUAL

**FLASHING:** GALVALUME

**ADDITIONAL INFORMATION:** HARDIE FIBER-CEMENT FACIA OR EQUAL

**FRAMING:** 2x12 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 24" OC AS PER CODE (WITH THE CLASSIC ICYNENE AS NOTED ABOVE)

**BID ALTERNATE 1:** 2x10 SOUTHERN YELLOW PINE NO. 2 OR EQUAL @ 16" OC AS PER CODE (WITH THE DEMILEC SEALECTION AGRIBALANCE OPEN CELL SPRAY FOAM INSULATION AS NOTED ABOVE)

## 8. CABINETS & INTERIOR DETAILS

**KITCHEN WALL AND BASE CABINETS:** MATERIAL; 3/4" ALL SOLID WOOD CONSTRUCTION FRONTS; 1/2" SOLID WOOD SIDES & 3/4" SOLID WOOD SHELVES

**BATHROOM CABINET:** MATERIAL; 3/4" SOLID WOOD FRONTS; 1/2" WOOD SIDES

**CABINETS FINISH:** FINISH COLOR TBD

**CABINET MATERIALS AND ADHESIVES:** A) MEET E1 STANDARD; OR B) CARB PHASE I STANDARD; OR C) HAVE NO ADDED UREA-FORMALDEHYDE

**WOOD SHELVES/PANTRY & STORAGE:** 3/4" SOLID WOOD SHELVES

**KITCHEN COUNTERTOPS:** PLASTIC LAMINATE FINISHED W/ 4" BACKSPALSH; FORMALDYHDYE FREE ADHESIVES ONLY.

## 9. INTERIOR DOORS & TRIM

**DOORS:** SEE ATTACHED DOOR SCHEDULE

**DOOR JAMS:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYE FREE MDF JAMBS AT ALL DOORS

**DOOR TRIM:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF, 2"

**BASE:** PAINT GRADE FJ WHITE PINE OR FORMALDEHYDE FREE MDF

**ADDITIONAL:** ALL PASSTHROUGH DOORS WHEELCHAIR ACCESSIBLE

## 10. HARDWARE

**DOOR HARDWARE:**

- KWIK-SET TITAN/NICKEL PLATES; LEVER DOOR HARDWARE THROUGHOUT
- KEYED LEVER AND KEYED DEADBOLT (1" MIN. THROW) AT FRONT ENTRY
- SECURITY VIEWER ON FRONT ENTRY DOOR
- KEYED LEVER AND BLIND DEADBOLT AT OTHER EXTERIOR DOORS
- PRIVACY LEVERS AT BEDROOM/BATHS, PASSAGE LEVERS, ELSEWHERE

## 11. WINDOWS

**TYPE, MAKE, MATERIAL:** SEE SCHEDULE

**TRIM:** FULL STOOL AND APRON AT ALL SILLS; SHEETROCK RETURNS AT TOP AND SIDES, SEE DRAWINGS

**SCREENS:** BUG

**ADDITIONAL INFORMATION:**

- SEE ATTACHED WINDOW SCHEDULE
- HEAD FLASHING OVER EXPOSED WINDOWS
- CONTINUOUS SELF-ADHERING MOISTOP AROUND ALL ROUGH EDGES

## 12. INTERIOR FINISHES

**KITCHEN:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**BATHS:** LOW VOC ACRYLIC LATEX SATIN PAINT, COLOR TBD

**OTHER WALLS:** LOW VOC ACRYLIC LATEX MATTE PAINT, COLOR TBD

**TRIM:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT

**INTERIOR DOORS:** LOW VOC ACRYLIC LATEX. SEMI GL PAINT COLOR TBD; OVER PRIMER OR UNDERCOAT, INTERIOR FINISH OF ALL EXTERIOR DOORS SAME AS INTERIOR DOORS

**ADDITIONAL INFORMATION:**

- ALL INTERIOR FINISHES TO BE LOW VOC SUCH THAT THE VOC CONTENT MUST BE LESS THAN 10 g/L

### 13. ENTRANCE AND EXTERIOR DETAILS

**MAIN ENTRANCE DOOR:** 6-PANEL JELD-WEN STEEL ALL PANEL EXTERIOR DOOR OR EQUAL

**HEAD FLASHINGS:** GALVANIZED OR ALUMINIUM; EXPOSED DOORS AND WINDOWS

**PAINT:** ACRYLIC LATEX

**EXTERIOR MILLWORK:** HARDIE FIBER-CEMENT TRIM OR EQUAL

### 14. GUTTERS & DOWNSPROUTS

**GENERAL:** GUTTERS/DOWNSPROUTS, OR GABLES AT FRONT OF THE HOUSE AND ALL EXTERIOR DOORS

### 15. SPECIAL EQUIPMENT / APPLIANCES

**RANGE:** ELECTRIC

**RANGE HOODS:** ENERGY STAR

**FANS:** ENERGY STAR

**DISHWASHER:** ENERGY STAR

**WASHER/DRYER:** ENERGY STAR

**REFRIGERATOR:** ENERGY STAR

### 16. PLUMBING

**KITCHEN SINK:** MOEN EXCALIBUR DOUBLE BOWL KITCHEN SINK MODEL: 22821 WITH SOUNDSHIELD UNDERCOATING AND 7-1/2" DEEP BOWLS, 3-HOLES (CENTERED). INSTALL WITH BADGER 5, 1/2 HP, 120V/1PH, 6.9 F.L.A UNIT WITH WALL ON/OFF SWITCH

**BATHROOM SINK:** IKEA BOHOLMEN SINGLE BOWL INSET SINK, STAINLESS (ARTICLE # 998.972.21) WITH ATLANT WASTE STRAINER OR EQUAL

**TOILET:** NIAGARA STEALTH 0.8 GPF ROUND — MODEL: N7716 OR WATER SENSE DUAL FLUSH OR EQUAL

**BATHTUB:** BOOTZ INDUSTRIES ALOHA 60" BATHTUB 40" LUMBAR SUPPORT PORCELAIN ON STEEL STANDARD OUTLET (MODEL # 011-2364 RH DRAIN, SLIP RESISTANT BOTTOM, COORDINATE WITH LEFT/RIGHT DRAIN LOCATION

**SHOWER:** MOEN POSI-TEMP VALVE PRESSURE-BALANCING VALVE WITH 1/4 TURN STOPS — MODEL: 62370 (CC) WITH MOEN CHATEAU SERIES — TUB/SHOWER TRIM WITH EITHER 1.5 GPM SHOWERHEAD OR OMNI INLINE FLOW CONTROL @ 1.5 GPM (MODEL A-710-VR-1.5-LF)

**WATER SUPPLY:** PUBLIC

**SEWAGE DISPOSAL:** PUBLIC

**HOUSE DRAIN (INSIDE):** PVC

**HOUSE SEWER (OUTSIDE):** PVC YARDLINE AND CONNECTION TO PUBLIC SEWER.

**WATER PIPING:** COPPER; INSULATED HOT WATER LINES THROUGHOUT; NO JOINTS IN SLAB WATER LINES SET INSIDE INSULATION AT WALLS AND FOUNDATION PVC YARDLINE AND CONNECTION TO PUBLIC WATER SUPPLY. PLUMB IN STUD WALLS WHEN POSSIBLE — COORDINATE LAYOUT

**SILLCOCKS:** PIPING, FITTINGS AND BACK SIPHON PROTECTORS FOR EXT. HOSE BIBS (2x) NOT SHOWN IN PLAN

**DOMESTIC WATER HEATER:** PROVIDE 40 GAL RHEEM HYBRID HEAT PUMP OR EQUAL

**OTHER:**

- SERVICE PIPING FROM UTILITY METER AT HOUSE EXTERIOR

### 17. HVAC

**HVAC SYSTEM:** PROVIDE DUCTLESS MINI-SPLIT WITH INVERTER TECHNOLOGY

- PROVIDE ONE DAIKIN 3MXS24JVJU OR EQUAL OUTDOOR UNIT

- PROVIDE THREE DAIKIN CTXS07LVJU OR EQUAL INDOOR UNITS

**ADDITIONAL INFORMATION:**

- PROVIDE CONDENSATE LINES FOR INDOOR UNITS PER CODE AND MANUFACTURER'S INSTRUCTIONS

- PROVIDE POWER ASSISTED AIR TRANSFER DUCT BETWEEN BATHROOM AND MAIN LIVING SPACE ABOVE BATHROOM DOOR SWITCHED TO BATHROOM LIGHT FIXTURE

- PROVIDE EXHAUST FAN IN BATHROOM WITH INDEPENDENT SWITCH
- PROVIDE KITCHEN EXHAUST FAN TO THE OUTSIDE

## 18. ELECTRIC WIRING

**SERVICE:** UNDERGROUND OR OVERHEAD AS REQUIRED

**PANEL(S):** 100AMP/ CIRCUIT BREAKER WITH COPPER SERVICE CABLING

**INTERIOR WIRING:** COPPER; NON-METALLIC CABLE

**SPECIAL OUTLETS:** DRYER 120/240V OR 120/208V; GFI AT KITCHEN/BATHS/OUTSIDE; WP AT OUTSIDE - FRONT AND REAR

**DOORBELL:** TWO-TONE DOOR CHIME AT FRONT ENTRY

**ADDITIONAL INFORMATION:**

- SMOKE DETECTORS INSIDE AND OUTSIDE ALL BEDROOM DOORS PER CODE
- PRE-WIRE FOR TELEPHONE AND TV (BEDROOMS KITCHEN & LIVING AREAS)
- SWITCHED MOTION DETECTING SECURITY LIGHT AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE
- ELECTRIC SWITCHES AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE ELECTRIC OUTLETS AT 18-INCH HEIGHT MAX.
- WHITE COVER PLATES FOR SWITCHES AND OUTLETS
- BREAKER BOX LOCATED INSIDE HOUSE AT 42-INCH HEIGHT MAX. WHEELCHAIR ACCESSIBLE

## 19. LIGHTING FIXTURES & FANS

**QUANTITY:** TOTAL # AND STYLE OF FIXTURES PER PLAN OR SCHEDULE BELOW

**FIXTURES:** FIXTURE SCHEDULE AS FOLLOWS:

- ☐ CEILING FANS (LIVING ROOM AND BEDROOMS):
  - o HARBOR BREEZE BDB52BNK5N OR EQUAL
- ☐ CEILING FAN LIGHT KITS:
  - o LKG635BNK OR EQUAL
- ☐ BATHROOM (WALL MOUNTED):
  - o LIGHTWAY BDFV-24-A-A-2F17-NL-P2-WSA OR EQUAL
- ☐ KITCHEN (CEILING MOUNTED):
  - o SUNSET LIGHTING F7185-53

**NOTES:** AREAS NOT SPECIFICALLY MENTIONED IN THIS SPECIFICATION SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE CITY AND COUNTY BUILDING CODES. ALL LIGHT FIXTURES AND FANS TO BE ENERGY STAR RATED

## 20. MISCELLANEOUS

- ALL EXTERIOR NAILS, BOLTS, ANCHORS, HANGERS, SHEATHING NAILS (INCLUDING FLOOR AND ROOF) AND NAILS PENETRATING P.T. LIMBER SHALL BE HOT DIPPED GALVANIZED
- 1/2" CEMENTIOUS BACKER BOARD SHALL BE INSTALLED BEHIND ALL SHOWER ENCLOSURES AND WET AREA
- THE GENERAL CONTRACTOR AND SUB CONTRACTORS MUST CERTIFY THAT ALL MATERIALS ARE FREE OF ADDED UREA FORMALYHYDE

## Appendix B | Design Drawings for Alley Flat 2.0

EZ Log A100-A200

Hebel Block A100-A200

Hebel Panel A100-A200

Light-Frame Wood A100-A200



Legend

Owner

**The Alley Flat Initiative**  
1100 East Franklin Avenue  
Austin, TX 78723

Architect

**ACDDG**  
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# Alley Flat 2.0

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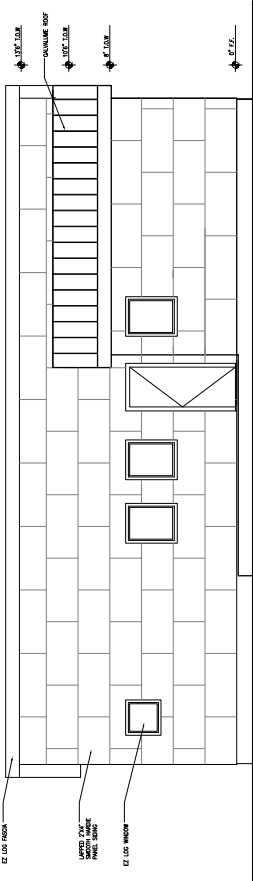
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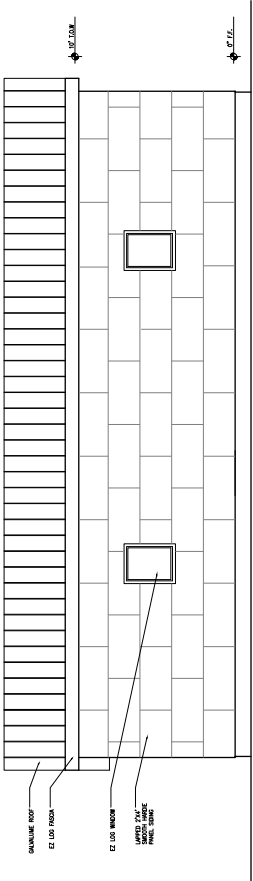
Elevations (EZ Log)

Sheet No.

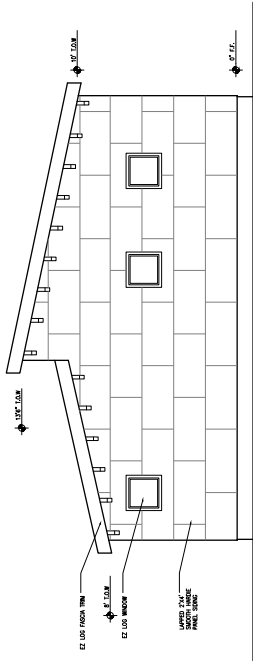
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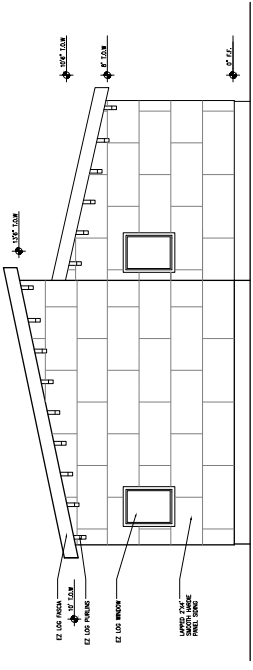
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1/8" = 1'-0"



1 | EAST ELEVATION  
1/8" = 1'-0"



4 | NORTH ELEVATION  
1/8" = 1'-0"

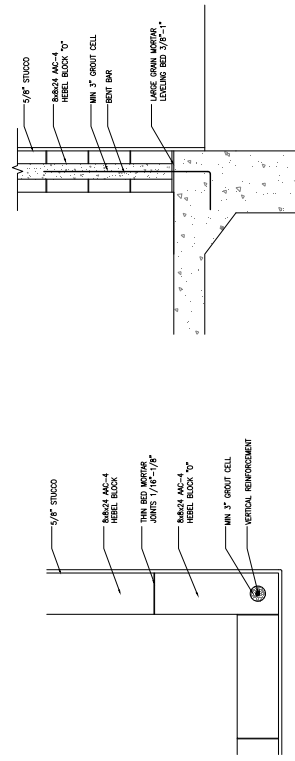
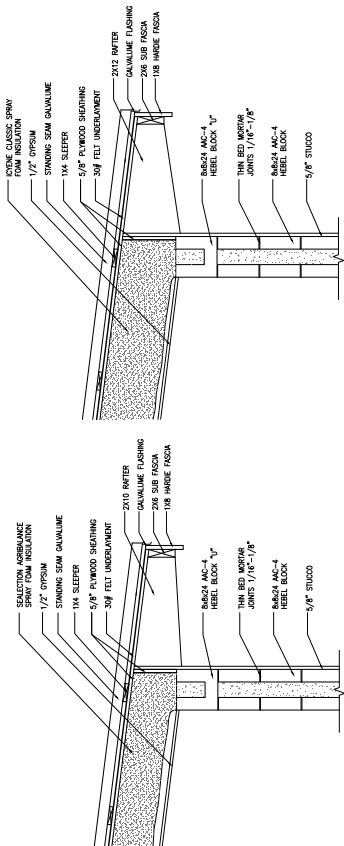


3 | SOUTH ELEVATION  
1/8" = 1'-0"



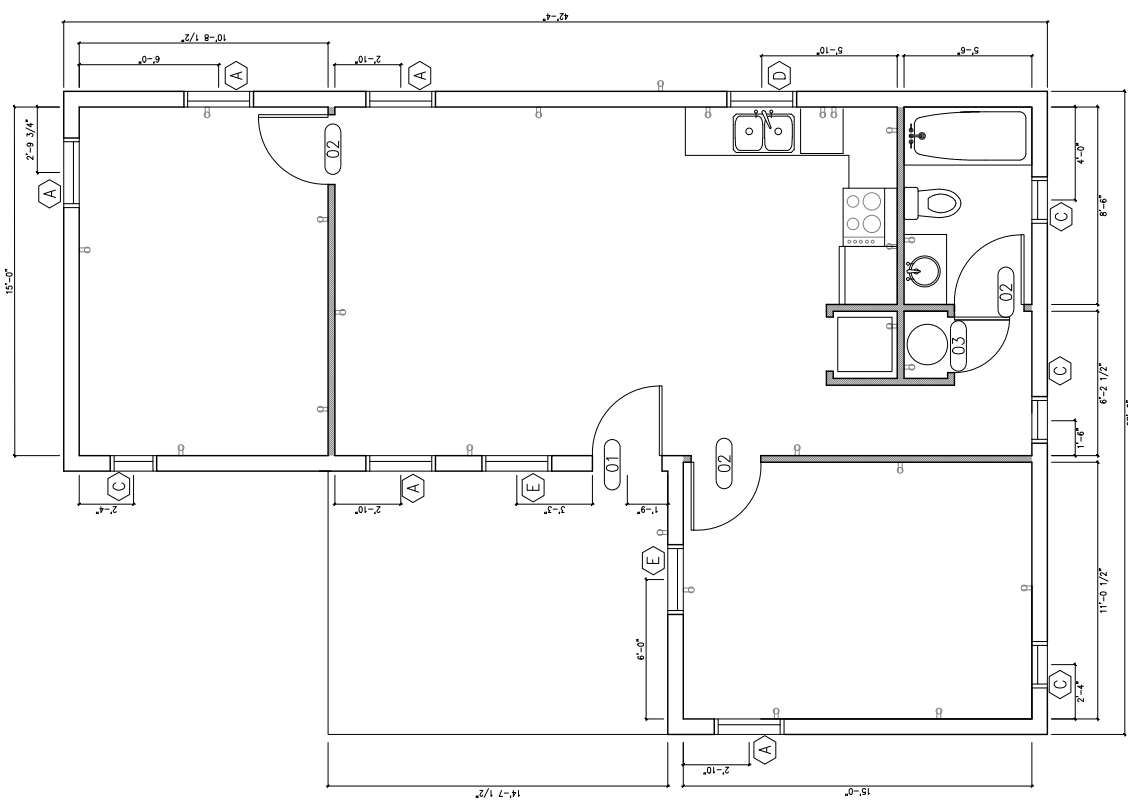
DOOR SCHEDULE							
ID	QTY	MATERIAL	HARDWARE	LOCATION	SIZE	HEAD HGT.	NOTES
01	1	H.C. STEEL	DEAD BOLT AND LEVER	FRONT DOOR	3'0" x 6'8"	6'8"	INSULATED
02	3	SOLID WD. PAINT GRADE	PRIVACY	BEDROOMS/ BATHROOM	3'0" x 6'8"	6'8"	
03	1	SOLID WD. PAINT GRADE	PRIVACY	HOT WATER HEATER CLOSET	2'6" x 6'8"	6'8"	

WINDOW SCHEDULE						
ID	QTY	TYPE	SIZE	HEAD HGT. (A.F.F.)	U-VALUE/SHGC	NOTES
A	5	SINGLE HUNG	3'0" X 5'0"	6'8"	0.30/0.25	BUG SCREEN
B	2	FIXED	3'0" X 1'3"	9'10"	0.30/0.25	
C	4	AWNING	2'0" X 2'0"	6'8"	0.30/0.25	BUG SCREEN
D	1	AWNING	3'0" X 3'0"	6'8"	0.30/0.25	BUG SCREEN
E	2	SINGLE HUNG	3'0" X 5'0"	6'8"	0.30/0.25	BUG SCREEN, TEMPERED



**4 | PLAN** 1/2" = 1'-0"

**2 | EXTERIOR WALL SECTION** 1/2" = 1'-0"



Logos

Owner: **The Alley Flat Initiative**  
2108 EM Farnham Avenue  
Austin, TX 78723

Architect: **ACDDG**  
Austin Community Design & Development Center  
Design Matters  
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Sheet Name: **Plant-Section (Hebel Block)**

Sheet No.: **A100**

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Project

**AF2.0**

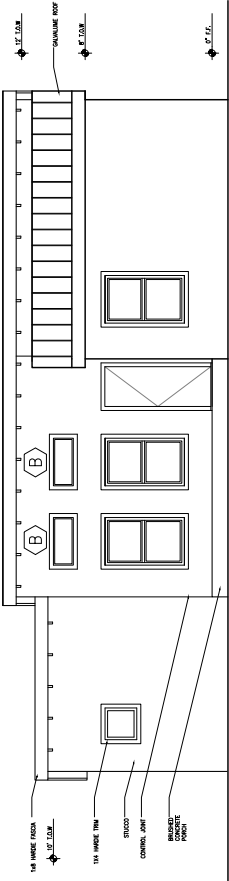
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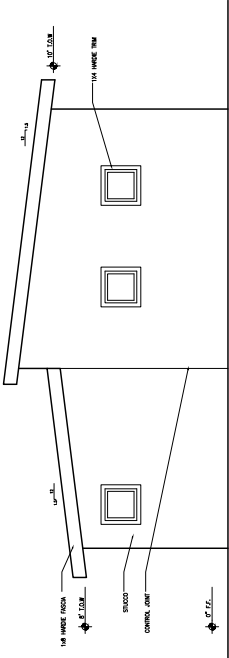
Elevations (Hebel Block)

Sheet No.

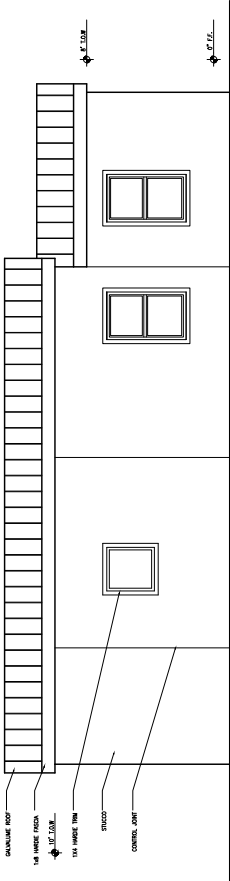
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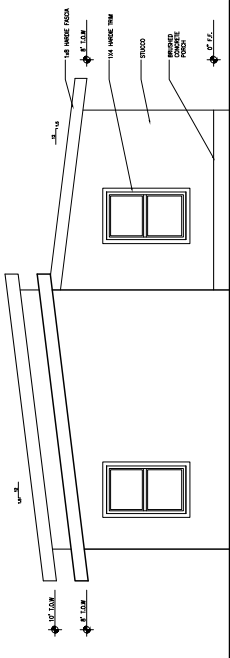
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1/8" = 1'-0"



4 | NORTH ELEVATION  
1/8" = 1'-0"



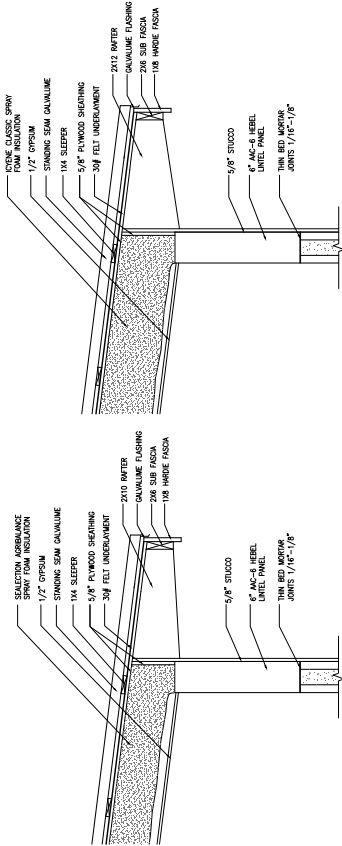
1 | EAST ELEVATION  
1/8" = 1'-0"



3 | SOUTH ELEVATION  
1/8" = 1'-0"

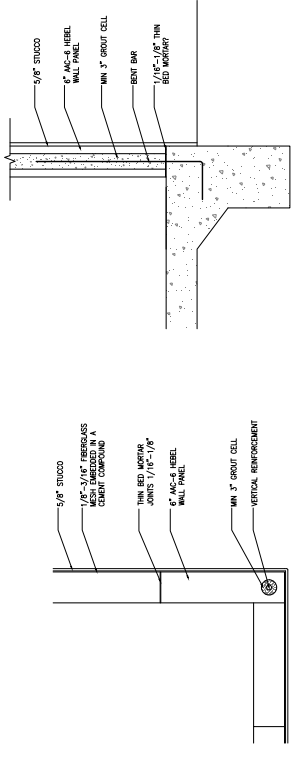
DOOR SCHEDULE					
ID	QTY	MATERIAL	HARDWARE	LOCATION	NOTES
01	1	H.C. STEEL	DEAD BOLT AND LEVER	FRONT DOOR	6'8" INSULATED
02	3	SOLID WD. PAINT GRADE	PRIVACY	BEDROOMS/BATHROOM	6'8"
03	1	SOLID WD. PAINT GRADE	PRIVACY	HOT WATER HEATER CLOSET	6'8"

WINDOW SCHEDULE					
ID	QTY	TYPE	SIZE	HEAD HT. (A.F.F.)	U-VALUE/SHGC
A	5	SINGLE HUNG	3'0" X 5'0"	6'8"	0.30/0.25
B	2	FIXED	3'0" X 1'3"	9'10"	0.30/0.25
C	4	AWNING	2'0" X 2'0"	6'8"	0.30/0.25
D	1	AWNING	3'0" X 3'0"	6'8"	0.30/0.25
E	2	SINGLE HUNG	3'0" X 5'0"	6'8"	0.30/0.25



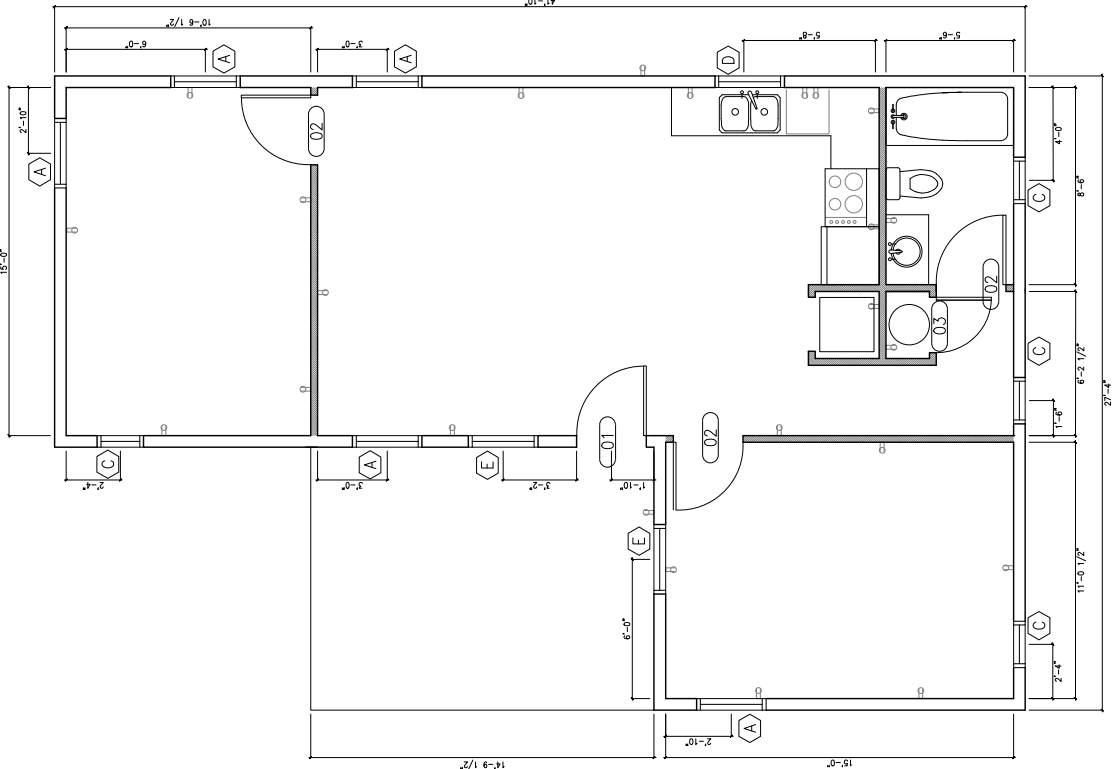
5 BID ALTERNATE 1  
1/2" = 1'-0"

4 ROOF SECTION  
1/2" = 1'-0"



2 PLAN DETAIL  
1/2" = 1'-0"

3 EXTERIOR WALL SECTION  
1/2" = 1'-0"



1 PLAN  
3/16" = 1'-0"

Legend

Owner  
**The Alley Flat Initiative**  
2108 EM Franklin Avenue  
Austin, TX 78723

Architect  
**ACDDG**  
Austin Community Design Center  
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Sheet Name  
**Plan-Section (Hebel Panel)**

Sheet No.  
**A100**

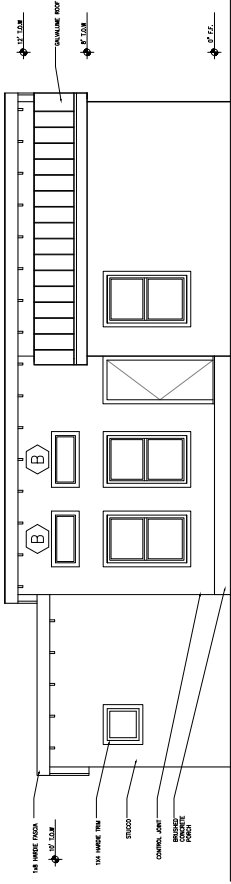
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Owner  
**The Alley Flat Initiative**  
2108 EM Franklin  
Austin, TX 78723

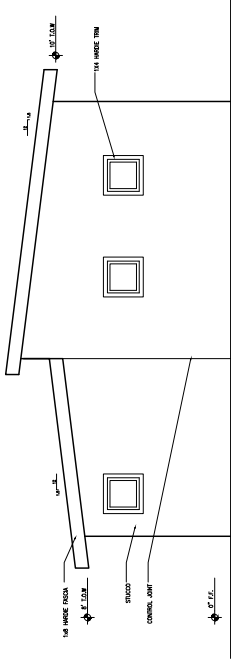
Architect  
**ACDDC**  
Austin Community Development Center  
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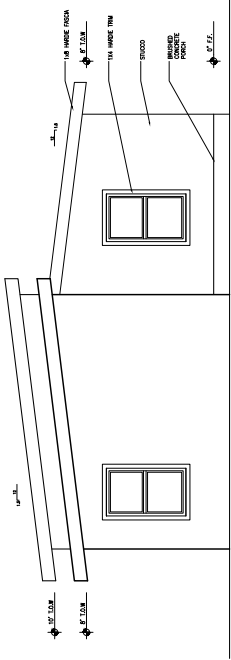
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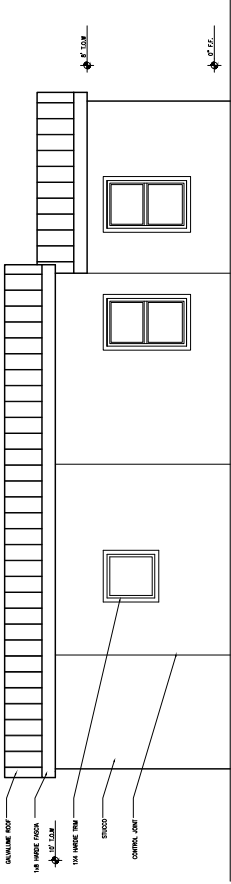
2 | NORTH ELEVATION  
1/8" = 1'-0"



4 | WEST ELEVATION  
1/8" = 1'-0"



3 | EAST ELEVATION  
1/8" = 1'-0"



1 | SOUTH ELEVATION  
1/8" = 1'-0"

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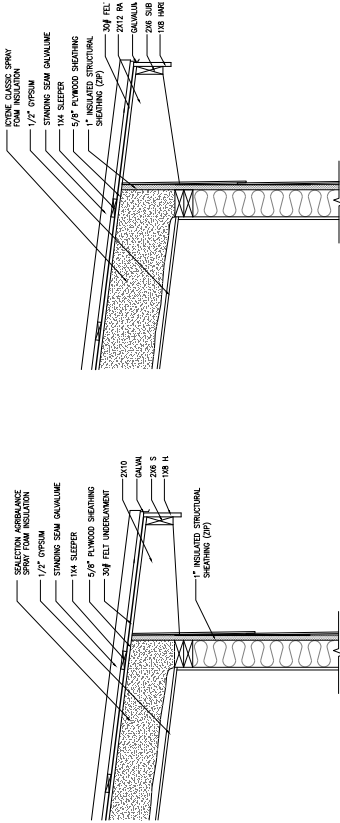
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Sheet Name  
**Elevations (Hebel  
Panel)**

Sheet No.  
**A200**

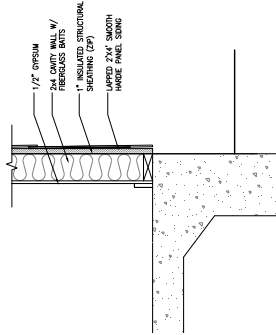
DOOR SCHEDULE						
ID	QTY	MATERIAL	HARDWARE	LOCATION	SIZE	HEAD HGT.
01	1	H.C. STEEL	DEAD BOLT AND LOCKER	FRONT DOOR	3'0" X 6'8"	6'8"
02	3	SOLID WD. PAINT GRADE	PRIVACY	BEDROOMS/BATHROOM	3'0" X 6'8"	6'8"
03	1	SOLID WD. PAINT GRADE	PRIVACY	HOT WATER HEATER CLOSET	2'6" X 6'8"	6'8"

WINDOW SCHEDULE					
ID	QTY	TYPE	SIZE	HEAD HGT. (A.F.F.)	U-VALUE/SHGC
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B	2	FIXED	3'0" X 1'3"	9'10"	0.30/0.25
C	4	AWNING	2'0" X 2'0"	6'8"	0.30/0.25
D	1	AWNING	3'0" X 3'0"	6'8"	0.30/0.25
E	2	SINGLE HUNG	3'0" X 5'0"	6'8"	0.30/0.25

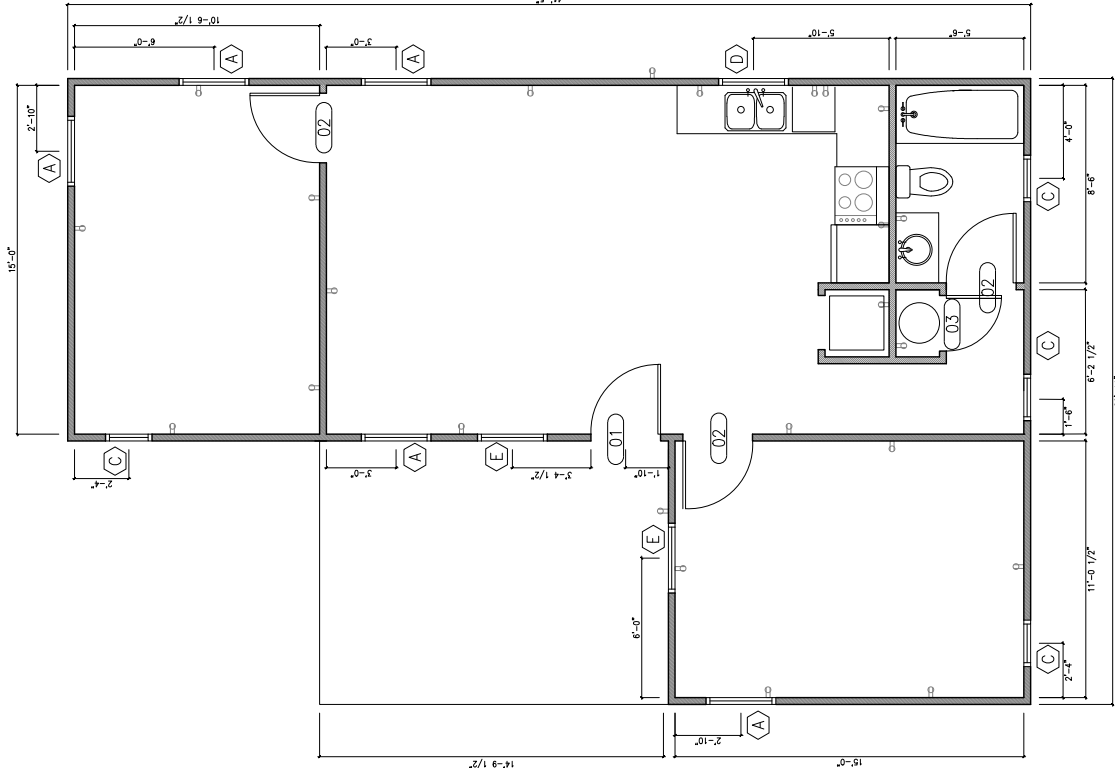


4 BID ALTERNATE 1  
1 1/2" = 1'-0"

3 ROOF SECTION  
1 1/2" = 1'-0"



2 EXTERIOR WALL SECTION  
1 1/2" = 1'-0"



1 PLAN  
3/16" = 1'-0"

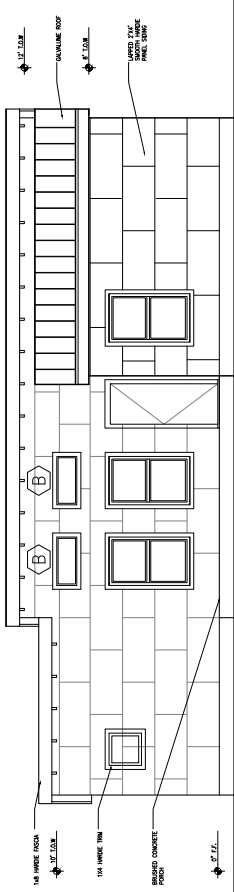
Legend

Owner:  
**The Alley Flat Initiative**  
2108 EM Franklin  
Austin, TX 78723

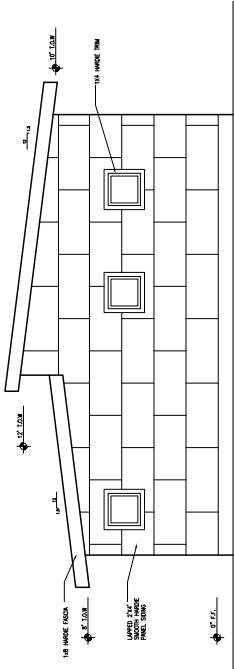
Architect:  
**ACDDC**  
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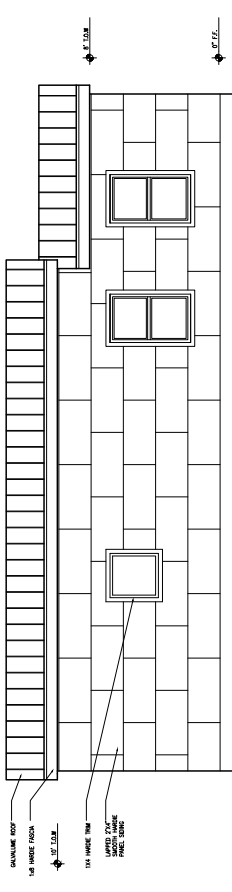
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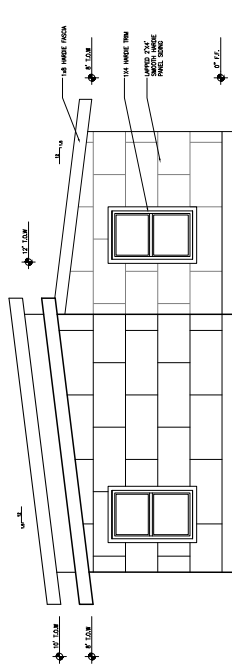
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1/8" = 1'-0"



4 WEST ELEVATION  
1/8" = 1'-0"



1 SOUTH ELEVATION  
1/8" = 1'-0"



3 EAST ELEVATION  
1/8" = 1'-0"

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Sheet Name:  
Elevations (Stick  
Frame)

Sheet No.

A200

Appendix C | AF2.0 SOVs Spreadsheet

AF2.O SOVs Comparison		Stick frame	EZ Log	Hebel Block	Hebel Panel	Steko
1.0	Plans and Permits	\$375.00	\$375.00	\$375.00	\$375.00	\$375.00
1.4	Inspection Fees	\$900.00	\$900.00	\$900.00	\$900.00	\$900.00
2.2	Temporary Toilet	\$450.00	\$450.00	\$450.00	\$450.00	\$450.00
2.2	Waste Mgmt.	\$1,450.00	\$900.00	\$1,450.00	\$1,450.00	\$900.00
2.3	Job Site clean	\$500.00	\$400.00	\$500.00	\$500.00	\$400.00
4.0	Concrete	\$7,500.00	\$7,900.00	\$7,900.00	\$7,900.00	\$7,900.00
6.1	Framing Labor	\$8,000.00	\$7,200.00	\$6,500.00	\$6,500.00	\$6,500.00
6.2	Framing Materials	\$9,100.00	\$2,800.00	\$4,900.00	\$4,900.00	\$4,500.00
8.0	Windows	\$2,600.00	\$2,600.00	\$2,600.00	\$2,600.00	\$2,600.00
9.1	Exterior Doors	\$400.00	\$400.00	\$400.00	\$400.00	\$400.00
9.3	Interior Doors	450.00	-	450.00	\$450.00	\$450.00
11.0	Roofing	\$3,900.00	\$3,900.00	\$3,900.00	\$3,900.00	\$3,900.00
11.1	Gutters	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00
12.0	Painting	\$4,100.00	\$4,100.00	\$3,500.00	\$3,500.00	\$3,500.00
14.0	Plumbing	\$5,900.00	\$5,900.00	\$5,900.00	\$5,900.00	\$5,900.00
14.1	Plumbing Fixtures	\$1,400.00	\$1,400.00	\$1,400.00	\$1,400.00	\$1,400.00
15.0	HVAC	\$6,300.00	\$6,300.00	\$6,300.00	\$6,300.00	\$6,300.00
16.0	Electrical & Lighting	\$5,100.00	\$6,000.00	\$6,000.00	\$6,000.00	\$6,000.00
16.2	Light Fixtures	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00
17.0	Insulation	\$4,100.00	\$3,500.00	\$2,050.00	\$2,050.00	\$4,100.00
18.0	Drywall	\$3,500.00	-	\$2,800.00	\$2,800.00	-
19.0	Interior Trim (material+labor)		\$650.00			
19.1	Interior Trim Labor	\$750.00	-	\$700.00	\$700.00	\$700.00
19.2	Interior Trim Material	\$520.00	-	\$520.00	\$520.00	\$520.00
20.0	Cabinets & Millwork	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00
20.1	Appliances	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00
21.0	Tile	\$900.00	\$900.00	\$900.00	\$900.00	\$900.00
22.0	Countertops	\$750.00	\$750.00	\$750.00	\$750.00	\$750.00
23.3	Decorative Concrete	\$2,300.00	\$2,300.00	\$2,300.00	\$2,300.00	\$2,300.00
24.0	Glass and Mirror	\$200.00	\$200.00	\$200.00	\$200.00	\$200.00
25.1	Finish Hardware Install	\$150.00	\$100.00	\$150.00	\$150.00	\$100.00
25.2	Finish Hardware Mater...	\$350.00	\$100.00	\$350.00	\$350.00	\$100.00
27.0	Punch Out	\$200.00	\$200.00	\$200.00	\$200.00	\$200.00
28.2	Make Ready Clean	\$300.00	\$300.00	\$300.00	\$300.00	\$300.00
	<b>Total Estimated Direct Costs</b>	<b>\$80,425.00</b>	<b>\$68,505.00</b>	<b>\$72,625.00</b>	<b>\$72,625.00</b>	<b>\$70,525.00</b>
	Mark Up	\$18,497.75	\$15,756.15	\$16,703.75	\$16,703.75	\$16,220.75
30	Building System/Kit	-	\$24,900.00	\$21,289.40	\$23,713.80	\$14,900.00
	<b>Subtotal</b>	<b>\$98,922.75</b>	<b>\$109,161.15</b>	<b>\$110,618.15</b>	<b>\$113,042.55</b>	<b>\$101,645.75</b>
	Bid Alternate credit	\$600.00	-	\$650.00	\$650.00	\$650.00
	<b>Total</b>	<b>\$98,322.75</b>	<b>\$109,161.15</b>	<b>\$109,968.15</b>	<b>\$112,392.55</b>	<b>\$100,995.75</b>