Single Family Homes less than 3,000 sq.ft.

3 Sisters Project, Ft. Worth, TX

SIP walls: 4” and 6-1/2” with EPS insulating core

SIP roof: 6” roof with EPS insulating core

Ferrier Builders
Heather Laminack
3 Sisters Project
Ft. Worth, TX

2019 Winner

Structural Insulated Panel Association
Single Family Homes less than 3,000 sq.ft.
3 Sisters Project, Ft. Worth, TX

Ferrier Builders
Heather Laminack
5017 Byers Ave
Fort Worth, TX 76107

Phone: 817-237-6262
Email Address: heather@ferriercustomhomes.com
Website: www.ferriercustomhomes.com

3 Sisters Project
Fort Worth, TX 76107

Date Completed: 06/07/2018

Dimensions:
1st floor 54'x20'
2nd floor 61'x20'

Total sq. ft. of conditioned space: 1,950sf

Built By:
Ferrier Builders
Heather Laminack
5017 Byers Ave
Fort Worth, TX 76107

Panels Manufactured By: FischerSIPS

Designed By:
Daniel Van Kunschik
Ferrier Builders
4748 Slippery Rock Drive
Fort Worth, TX 76123

Describe the end use of the building: Single family residence. Owners sought out SIPs specifically because they wanted to incorporate into their project.
Describe the benefits of using SIPs on this project. Did SIPs help save time, labor, construction costs, or energy? SIP's were incorporated into the project's design from the very beginning, as the owners desired the high performance aspects derived from SIP's (extreme air tightness, great insulation & incredible strength with its reduced homeowners insurance premiums). Install went quickly, and the SIP’s walls & roof contributed to an extremely tight home envelope, which eventually resulted in a HERS score of 9.

Describe any innovative design elements or structural engineering involved: This home is the first of three very similar homes. We had a buildable lot size of 21’ wide and the owner desired a modern look for all three homes. The design also called for a single slope roof & a lot of windows for ample daylighting. The placement of the windows created a challenge to obtain the proper Shear wall strengths. SIP’s contributed greatly to the needed increased Shear Wall strength, and when coupled with extra structural anchors in the concrete slab, exceeded the requirements. SIP’s were the ideal choice for the single slope roof. Simplifying the roof erection on very tight space and giving us an excellent platform for our highly reflective standing seam Galvalume metal roof.


**HERS Index:** 9  
**Blower door test:** 1.9 ACH50

15 SEER 3 ton heat pump, 8.5 HSPF. 3 ton air handler unit (for 1950sf living space & large vaulted center section) above second floor bathroom. Ducts installed in open web floor trusses or 2nd floor flat ceiling areas & with exposed metal spiral ducts in center vault area. Includes 2 zone damper system and Panasonic 50 CFM spot ERV.
Passive solar design on an urban infill lot: the lot primarily faces east and west, creating a challenge. We incorporated a Passive solar design by eliminating all west windows (our biggest enemy of energy efficiency) except for 6 very small rectangular units. The largest are completely shaded by an existing pecan tree. We provided ample daylighting by use of east, south and north windows. The large east windows created too much heat gain during our hot summer months, so we mitigated that by use of carefully sized metal awnings. This allows the cooler morning sun to shine directly into the living space but keeps the hot sun out by 10AM. The south windows are also shaded by computer-sized awnings, which allow the warm winter sun into the living space while keeping the hot summer sun out. Highly reflective Galvalume standing seam roof & wall panels on west side of home, 100% ENERGY STAR appliances, (1) Steibel Eltron electric tankless water heater with 0.99 energy efficient factor, ENERGY STAR LED lighting throughout home, ENERGY STAR ceiling fans in living & bedrooms, all plumbing fixtures are low-flow Water Sense compliant and within a maximum 20’ of water supply line.

Solar Panels: 4.88 kW PV system

SITE: infill with high density (3 homes on a 92’ wide x 124’ long lot), native adapted (low water need) landscaping & turf grass (side note: landscaping plan was created by local university as part of their sustainable landscaping program), pervious walkways around perimeter of home & pervious alley leading to garage entry. NATURAL RESOURCES: Preserved the native trees & protected non-construction areas. RESOURCE EFFICIENCY & RECYCLED CONTENT/RENEWABLE MATERIALS: Stacked stories, SIP's (sustainable OSB reduces lumber used on project), interior walls framed with Advanced Framing, renewable wood materials, framing layout and structural SIP and framing plans, prefabricated open web floor trusses, James Hardie fiber cement exterior siding with recycled content (with locally supplied sand & cement in a local plant), reclaimed hardwoods installed on second floor from dwelling that was previously located on that property, locally sourced Shou Sugi Ban wood for rain screen and balcony and handrail, Trex decking contains recycled content, high recycled content standing seam roof, recycled content steel posts, concrete foundation of house was simply sealed (no added flooring) as final floor finish, concrete in foundation, garage approach and sidewalks contained local cement, sand & gravel, quartz countertops (recycled material), pre-finished windows/exterior sliding door/galvalume metal roof/Trex decking/Tamilyn Extreme Trim. Separate dumpster to recycle all wasted wood. Recycled cardboard, paper & metal. Life Cycle Analysis of SIP's, roofing, siding, steel awnings, James Hardie vertical siding & Tamilyn Extreme Trim. INDOOR AIR QUALITY: detached garage, no fireplace, hard surface flooring, no carpet in home, formaldehyde-free cabinetry, non-toxic pest control, all paints & stains used on interior of home were low or no VOC content, return air ducts in all bedrooms, properly sized vent-a-hood and wet area exhaust fans.
Single Family Homes less than 3,000 sq.ft.

3 Sisters Project, Ft. Worth, TX

HERS Rating

Home Energy Rating Certificate
Final Report

<table>
<thead>
<tr>
<th>HERS® Index Score: 9</th>
<th>Annual Savings $2,685</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use [MBtu]</td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>7.6</td>
</tr>
<tr>
<td>Cooling</td>
<td>4.8</td>
</tr>
<tr>
<td>Hot Water</td>
<td>4.3</td>
</tr>
<tr>
<td>Lights/Appiances</td>
<td>19.2</td>
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<tr>
<td>Service Charges</td>
<td>29.0</td>
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<tr>
<td>Generation (e.g., Solar)</td>
<td>0</td>
</tr>
<tr>
<td>Total:</td>
<td>35.8</td>
</tr>
<tr>
<td>Annual Cost</td>
<td>$336</td>
</tr>
</tbody>
</table>

Your Home's Estimated Energy Use:

- Heating: $301
- Cooling: $193
- Hot Water: $171
- Lights/Appiances: $764
- Service Charges: $64
- Generation (e.g., Solar): -$1,157
- Total: $336

This home meets or exceeds the criteria of the following:
- Energy Star 3.0
- 2012 International Energy Conservation Code
- 2009 International Energy Conservation Code

Rating Completed by:
- Energy Rater: LaTonya Davis
  RESNET ID: 90927972
- Rating Company: Fox Energy Specialists
  3301 West Frey, Fort Worth, TX 76107
  817-546-0160
- Rating Provided: Fox Energy Specialists
  3301 West Frey, Fort Worth, TX 76107
  817-546-0160

LaTonya Davis, Certified Energy Rater
Digitally signed 12/16/16 at 12:37 PM

Structural Insulated Panel Association
Single Family Homes less than 3,000 sq.ft.
3 Sisters Project, Ft. Worth, TX

Floor Plan
Single Family Homes less than 3,000 sq.ft.
3 Sisters Project, Ft. Worth, TX

Floor Plan
**Single Family Homes** less than 3,000 sq.ft.

**3 Sisters Project, Ft. Worth, TX**

### General Building Information

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bedrooms</td>
<td>2</td>
</tr>
<tr>
<td>Number of Floors</td>
<td>2</td>
</tr>
<tr>
<td>Unconditioned Attached Portion</td>
<td>No</td>
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<tr>
<td>Conditioned Floor Area</td>
<td>1,940 sq. ft.</td>
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<tr>
<td>Total Usable Area</td>
<td>19,248 sq. ft.</td>
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<tr>
<td>Residence Type</td>
<td>Single Family Detached</td>
</tr>
<tr>
<td>Model</td>
<td>Single Family Detached</td>
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<tr>
<td>Community</td>
<td>N/A</td>
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<tr>
<td>Engineered Zone</td>
<td>3A</td>
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### Framed Floor Library List

<table>
<thead>
<tr>
<th>Name</th>
<th>R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-43.0</td>
<td>30 Rnd</td>
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### Rim Joint

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Surface Area</th>
<th>Location</th>
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<tbody>
<tr>
<td>R18 Brick Masonry</td>
<td>R 21.9</td>
<td>101.5 sq. ft.</td>
<td>Exposed Exterior</td>
</tr>
<tr>
<td>R18 Siding Vapor</td>
<td>R 22.9</td>
<td>122.5 sq. ft.</td>
<td>Exposed Exterior</td>
</tr>
</tbody>
</table>

### Rim Joint Library List

<table>
<thead>
<tr>
<th>Name</th>
<th>R-Value</th>
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</thead>
<tbody>
<tr>
<td>R 21.9</td>
<td>20.00</td>
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### Slab

<table>
<thead>
<tr>
<th>Name</th>
<th>Library Type</th>
<th>Perimeter</th>
<th>Floor Grade</th>
<th>R Value</th>
<th>Exposed</th>
<th>Location</th>
<th>Encasing</th>
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<tbody>
<tr>
<td>Slab</td>
<td>Uninsulated</td>
<td>134.0</td>
<td>0.23</td>
<td>0</td>
<td>5,020 sq. ft.</td>
<td>Exposed Exterior</td>
<td>Conditioned Space</td>
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### Slab Library List

<table>
<thead>
<tr>
<th>Name</th>
<th>Wall Construction Type</th>
<th>Slab Complth</th>
<th>Insulation</th>
<th>Insulation Depth</th>
<th>Insulation R Value</th>
<th>R-Value</th>
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<tbody>
<tr>
<td>Uninsulated</td>
<td>Wood Frame / Other</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
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</table>

### Wall

<table>
<thead>
<tr>
<th>Name</th>
<th>Library Type</th>
<th>Surface Color</th>
<th>Surface Area</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade/Cladding</td>
<td>SLP 25.0</td>
<td>Medium</td>
<td>2,132.9 sq. ft.</td>
<td>Exposed Exterior</td>
</tr>
<tr>
<td>Siding Vapor</td>
<td>SLP 25.0</td>
<td>Medium</td>
<td>191.9 sq. ft.</td>
<td>Exposed Interior</td>
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</tbody>
</table>

### Wall Library List

<table>
<thead>
<tr>
<th>Name</th>
<th>R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLP 25.0</td>
<td>26.008</td>
</tr>
</tbody>
</table>
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3 Sisters Project, Ft. Worth, TX

Electrical Plan

4.88KW SOLAR ARRAY INSTALL AT WARE RESIDENCE

G.C. DON FERRIER: 1 (817) 475-8881

<table>
<thead>
<tr>
<th>ONCOR METER</th>
</tr>
</thead>
<tbody>
<tr>
<td>200A BUSBAR 200A MAIN BREAKER W/ (1) 2 POLE 20A BACKFED BREAKER</td>
</tr>
<tr>
<td>ENVOY COMBINER ABOVE VISIBLE LOCKABLE LABELED 60A 240V PV AC DISCONNECT</td>
</tr>
</tbody>
</table>

(16) 305W MODULES
Single Family Homes less than 3,000 sq.ft.
3 Sisters Project, Ft. Worth, TX

Electrical Plan

WIRE CALCULATIONS

1. PER SINGLE MODULE (PHASE MEG) INVERTER COMBO
   
   MAX AC CURRENT PER LARGEST STRING
   
   1")15" = 15 A
   
   1")15" = 10 A
   
   1")15" = 5 A
   
   1")15" = 3 A

2. COMBINED INVERTER OUTPUT 16A
   
   1")15" = 10 A
   
   1")15" = 5 A
   
   1")15" = 3 A

KEYED NOTES

1. AC DISCONNECT MUST HAVE VISUAL BREAK AND BE LOCKABLE IN THE OPEN POSITION AND COMPLY WITH NEC 250.79 (D)

NOTES

1. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH NEC ARTICLE 690.
2. CONDUCTORS ARE TO BE COPPER UNLESS OTHERWISE NOTED AND COMPLY WITH NEC 110.14.
3. ALL PV SYSTEM COMPONENTS SHALL BE LISTED AND COMPLY WITH UL 1703 AND UL 1741.
4. WIRING MATERIALS NOT PROTECTED IN CONDUIT SHALL BE SUITABLE FOR HCN EXPOSURE AND WET LOCATIONS.
5. CIRCUIT BREAKER TO BE SUITABLE PER NEC 490.64 (EEX).
6. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE CONTINUOUS PER NEC 690.4.
7. THE GROUNDING ELECTRODE CONDUCTOR SHALL BE INSTALLED IN ACCORDANCE WITH NEC 690.43, 490.43, AND 250.122.
8. THE GROUNDING CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #4 COPPER WIRE (NEC 250.42).