TULSA PRESERVATION COMMISSION

STAFF REPORT
Thursday, March 9, 2023
HP-0433-2023

HP PERMIT NUMBER: HP-0433-2023

PROPERTY ADDRESS: 1121 EAST 19TH STREET

DISTRICT: NORTH MAPLE RIDGE

APPLICANT: CLARK PLOST

REPRESENTATIVE: NONE

A. CASE ITEMS FOR CONSIDERATION
   1. Construction of fence and gate in street yard
      Project initiated without an historic preservation permit
      Historic Preservation Permit Subcommittee Review Date: March 2, 2023

B. BACKGROUND
   DATE OF CONSTRUCTION: 1986
   ZONED HISTORIC PRESERVATION: 1993; ORDINANCE AMENDMENT 2005
   NATIONAL REGISTER LISTING: MAPLE RIDGE HISTORIC RESIDENTIAL DISTRICT: 1983
   CONTRIBUTING STRUCTURE: NO
   PREVIOUS ACTIONS:
   HP-18-003 – JANUARY 11, 2018 – TPC APPROVAL
   Replacement of front door with Rogue Valley Door 4032
   Application of paint to unpainted masonry on the façade

   HP-18-003 – JANUARY 11, 2018 – STAFF APPROVAL
   Removal of leaded glass to reveal panels by the front door and the repair and replacement in
   kind of the damaged frames and clear panes of glass in those panels

   HP-18-006 – JANUARY 23, 2018 – TPC APPROVAL
   Installation of window on west façade

   HP-0082-2019 – MARCH 14, 2019 – TPC APPROVAL
   Replacement of windows

C. ISSUES AND CONSIDERATIONS
   1. Construction of fence and gate in street yard
      i. In response to a report of activity, staff conducted a site visit and discovered Work in
         progress. Poles for a fence and gates had been installed. Staff sent a letter of notification
         to the owner, who responded promptly with an application for an historic preservation
         permit. Proposed is the installation of a forty-two-inch (3’-6") tall fence, a pedestrian gate,
and a driveway gate. The fence and gates will be manufactured from wrought iron, and four (4) piers will be constructed from brick, which will be painted to match the house. The fence will have a level height across the site, and the yard will be re-graded to meet the bottom of the fence on the west side of the site. The applicant has submitted a detailed project description, which is attached. During the review on March 2, the Historic Preservation Permit Subcommittee forwarded the application to the Tulsa Preservation Commission with a recommendation of approval.

ii. Reference: Tulsa Zoning Code

SECTION 70.070-F Standards and Review Criteria

In its review of HP permit applications, the preservation commission must use the adopted design guidelines to evaluate the proposed work and must, to the greatest extent possible, strive to affect a fair balance between the purposes and intent of HP district regulations and the desires and need of the property owner. In addition, the preservation commission must consider the following specific factors:

1. The degree to which the proposed work is consistent with the applicable design guidelines;
2. The degree to which the proposed work would destroy or alter all or part of the historic resource;
3. The degree to which the proposed work would serve to isolate the historic resource from its surroundings, or introduce visual elements that are out of character with the historic resource and its setting, or that would adversely affect the physical integrity of the resource;
4. The degree to which the proposed work is compatible with the significant characteristics of the historic resource; and
5. The purposes and intent of the HP district regulations and this zoning code.

Reference: Unified Design Guidelines - Residential Structures

SECTION A – GUIDELINES FOR REHABILITATION OF EXISTING STRUCTURES

A.1 General Requirements

Use the following guidelines as the basis for all exterior work:

A.1.1 Retain and preserve the existing historic architectural elements of your home.
A.1.2 If replacement of historic architectural elements is necessary, match the size, shape, pattern, texture, and directional orientation of the original historic elements.
A.1.3 Ensure that work is consistent with the architectural style and period details of your home.
A.1.4 Return the structure to its original historic appearance using physical or pictorial evidence, rather than conjectural designs.

SECTION E – GUIDELINES FOR NON-CONTRIBUTING STRUCTURES

E.1 General Requirements

E.1.1 For the purposes of this chapter, non-contributing structures are those listed as not contributing to the historic character of the district due to age or architectural style in the National Register Nomination for the district.
E.1.2 Non-contributing structures will be considered products of their own time. Do not attempt to create a false appearance of the predominant character and architectural style of the rest of the district.
E.1.3 Follow Section A (Rehabilitation) and Section B (Additions) as they relate to the character-defining elements of the non-contributing structure.
E.1.4 Ensure that work on non-contributing structures does not detract from or diminish the historic character of the overall district.
SECTION G – GUIDELINES FOR LANDSCAPE FEATURES, PAVING, AND SIGNAGE

G.1 Landscape Features

G.1.1 Retain and preserve original historic walls, fencing, lighting, planters, and other landscape features through repair.

G.1.2 Removal of historic landscape features will be considered on a case-by-case basis. Removal of non-historic landscape features can be staff-approved.

G.1.3 Ensure that new landscape features are appropriate to the style of your home and consistent with the historic elements found along the same street and within the district.

G.1.4 Use fencing materials that are consistent with the historic fencing found along the same street and within the district. Chain-link fencing, wire fencing (12 gauge or less), vinyl fencing, or any fencing that blocks the view of structures is not allowed.

G.1.5 Use wall materials that are consistent with the historic walls found along the same street and within the district. Cinder block, segmental retaining wall systems, corrugated metal, and railroad ties are not allowed. Historically styled cast concrete block will be considered on a case-by-case basis.

1.1 Elmwood – dry-stack retaining walls are not allowed

1121 E. 19th St. – 2000
1121 E. 19th St. – present

1121 E. 19th St – Image submitted by applicant
Fence and gate designs – Images submitted by applicant
Iron driveway gate approximately (14) feet wide by 42 inches tall. The design will consist of 2” x 3” heavy steel frame along the sides and bottom, with double 1” x 2” channel top and ¾” inch square vertical pickets, occasionally running through to top rail. There will be a few decorative rectangular and square designs, running vertically in the gate, similar to drawing shown. The gate will be mounted on heavy square steel posts and will swing on sealed bearing hinges.

The gate will be automated by a commercial swing gate operator and will open toward the house (swing north) and be hinged on the east side of the driveway.

Matching iron fencing, varying in height to create a level top, across the front yard and returning toward the house at each end. The iron fence will be of varying heights to create a level top across the front of the yard with the max iron height of 42 inches. The design will be similar to the drawing shown and consist of double 3/4” x 1-1/2” channel top, single ¾” x 1-1/2” channel bottom, 3/4” square vertical pickets with an occasional one running through to top rail. The fence will be set on square steel posts. There will be a matching walk gate, approximately 40” wide, centered on the front steps.

Two brick columns will be built, approximately 23” x 23” x 50” next to driveway gate. Two brick columns will be built, approximately 13” x 13” x 50” next to the walk gate. The brick will be the exact same brick (color and size) as the brick on the house. See attached photo for scale of column and exact design (will mimic existing columns on the house exactly.

The fence contractor is Berryhill Ornamental Iron, LLC. Darin Berryhill is the owner of the company and has done many fence projects in the north maple ridge neighborhood similar to ours. He is very familiar with the neighborhood covenants and has confirmed that fence height/driveway gate are within the outlined criteria.

Please see drawings and photos attached.
TULSA PRESERVATION COMMISSION

STAFF REPORT
Thursday, March 9, 2023
HP-0434-2023

HP PERMIT NUMBER: HP-0434-2023

PROPERTY ADDRESS: 1703 SOUTH TROOST AVENUE

DISTRICT: SWAN LAKE

APPLICANT: JAKE LANDRY

REPRESENTATIVE: NONE

A. CASE ITEMS FOR CONSIDERATION
   1. Alteration of roof and dormer on east side of residence
   2. Replacement of two (2) doors and (1) window with one (1) window on dormer

Historic Preservation Permit Subcommittee Review Date: March 2, 2023

B. BACKGROUND
   DATE OF CONSTRUCTION: CA. 1924
   ZONED HISTORIC PRESERVATION: 1994
   NATIONAL REGISTER LISTING: SWAN LAKE 1998; ADDITIONAL DOCUMENTATION 2009
   CONTRIBUTING STRUCTURE: YES
   PREVIOUS ACTIONS:
   HP-16-010 – MARCH 10, 2016 – TPC APPROVAL
   Replace asphalt shingles with Timberline High Definition Architectural Shingles

   HP-16-040 – JUNE 28, 2016 – TPC APPROVAL
   Construct driveway according to plans submitted

C. ISSUES AND CONSIDERATIONS
   1. Alteration of roof and dormer on east side of residence
   2. Replacement of two (2) doors and one (1) window with one (1) window on dormer
      i. The described alterations to the roof and dormer are proposed to prevent water infiltration
         through the roof. Proposed is the removal of the flat section of the roof adjacent to the
dormer and the reframing of that section to match the pitch of the rest of the roof. This
would involve the removal of two (2) non-functional doors and a window, which would be
replaced with a single awning window. The proposed window is a fibrex (composite) window
in the 100 Series manufactured by Andersen. During the review on March 2, 2023, the
Historic Preservation Permit Subcommittee mainly discussed the single proposed window
to be installed in the dormer and ultimately forwarded the application to the Tulsa
Preservation Commission with a recommendation of approval with the condition that an
additional window be installed in the dormer. In response to the discussion during the
March 2 meeting, the applicant has submitted an image of the interior bathroom as well as
two additional sets of drawings showing what the dormer would look like with two (2)
windows and with no windows.
ii. Reference: *Tulsa Zoning Code*

**SECTION 70.070-F Standards and Review Criteria**

In its review of HP permit applications, the preservation commission must use the adopted design guidelines to evaluate the proposed work and must, to the greatest extent possible, strive to affect a fair balance between the purposes and intent of HP district regulations and the desires and need of the property owner. In addition, the preservation commission must consider the following specific factors:

1. The degree to which the proposed work is consistent with the applicable design guidelines;
2. The degree to which the proposed work would destroy or alter all or part of the historic resource;
3. The degree to which the proposed work would serve to isolate the historic resource from its surroundings, or introduce visual elements that are out of character with the historic resource and its setting, or that would adversely affect the physical integrity of the resource;
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5. The purposes and intent of the HP district regulations and this zoning code.

Reference: *Unified Design Guidelines – Residential Structures*

**A.1 General Requirements**

Use the following guidelines as the basis for all exterior work:

A.1.1 Retain and preserve the existing historic architectural elements of your home.
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A.1.3 Ensure that work is consistent with the architectural style and period details of your home.
A.1.4 Return the structure to its original historic appearance using physical or pictorial evidence, rather than conjectural designs.

**A.3 Doors and Door Surrounds**

A.3.1 Retain and preserve original historic doors and door surrounds, including frames, glazing, panels, sidelights, fanlights, and transoms.
A.3.2 Do not remove, cover, or move existing door, sidelight, fanlight, and transom openings.
A.3.3 To return the home to its original historic appearance, remove non-historic doors and replace them using physical or pictorial evidence of the originals. If no evidence exists, select doors and surrounds which are consistent with the architectural style of your home.
A.3.4 To gain thermal efficiency, storm doors which maintain the appearance and allow maximum visibility of the original historic doors may be installed. Unfinished or clear-finished metals are not allowed. (Storm doors can be staff approved.)
A.3.5 If replacement of deteriorated doors is necessary, select doors and surrounds which are consistent with the architectural style of your home.
A.3.6 If replacement of deteriorated trim is necessary, match the appearance, size, shape, pattern, texture, and detailing of the original historic trim.
A.3.7 When adding new door openings, maintain the proportions of the façade. Match the dimensions and trim details of other doors and surrounds on your home. Select doors and surrounds which are consistent with the architectural style of your home.
A.3.8 Use clear glass in new or replacement doors and sidelights.
A.3.9 Exterior security bars and grilles are discouraged.

**A.4 Windows and Window Trim**

A.4.1 Retain and preserve original historic windows, including glazing, trim, muntins, and character-defining details.
A.4.2 Do not remove, cover, or move existing window openings.
A.4.3 To return the home to its original historic appearance, remove non-historic windows and trim. When selecting replacements, use physical or pictorial evidence. If no evidence exists, select windows which are consistent with the architectural style of your home.

A.4.4 To gain thermal efficiency, storm windows which maintain the appearance and allow maximum visibility of the original historic windows may be installed. Unfinished and clear-finished metals are not allowed. (Storm windows can be staff approved.)

A.4.5 If replacement of deteriorated windows is necessary, match the original historic windows in sash design, size, shape, muntin pattern, location, glazing area, and tint. Insulated glass (double-pane) windows may be used. Exterior muntins are required on simulated-divided-light windows.

.1 Brady Heights – Match the original historic window material.
.2 Elmwood – Match the original historic window material

A.4.6 If replacement of deteriorated trim is necessary, match the appearance, size, shape, pattern, texture, and detailing of the original historic trim.

A.4.7 When adding new window openings, maintain the proportions of the façade. Match the size, design, and pattern of the existing windows. Align the headers of new windows with the existing windows.

A.4.8 Exterior security bars and grilles are discouraged.

A.5 Roofs

A.5.1 Retain and preserve the original historic roof form (hipped, gabled, etc.) and pitch.

A.5.2 Do not remove character-defining architectural features of your roof, including, but not limited to, dormers, chimneys, cupolas, eaves, soffits, fascia boards, and decorative details, such as eave brackets, exposed rafter tails, or corbels.

A.5.3 If replacement of deteriorated architectural roof features is necessary, use materials that maintain the character of the structure and the size, shape, pattern, texture, dimensions, and directional orientation of the original historic roof features.

.1 Elmwood – Match the original historic roof material

A.5.4 To return the home to its original historic appearance, use physical or pictorial evidence. If no evidence exists, select architectural roof features which are consistent with the architectural style of your home.

A.5.5 Replacement of existing roof covering—wood shingles, asphalt shingles, clay tile, etc.—with the same material does not require HP Permit review (for example, replacing an asphalt-shingled roof with asphalt shingles). Architectural shingles are encouraged.

A.5.6 When proposing to change the materials of your roof covering, replacement materials that maintain the character of the structure and the size, shape, pattern, texture, and directional orientation of the original historic roof covering will be considered on a case-by-case basis.

.1 Yorktown – Metal roofing is not allowed.

A.5.7 When replacing your roof covering, replace an entire roof section if it is visible from the street.
Interior of bathroom – Image submitted by applicant
Abbreviated Quote Report - Customer Pricing

SOLD BY: 2500 W. ALBANY ST. BROKEN ARROW, OK 74012

SOLD TO: 

CREATED DATE 2/24/2023

LATEST UPDATE 2/24/2023

OWNER Jamin Swanson

QUOTE NAME | PROJECT NAME | QUOTE NUMBER | CUSTOMER PO# | TRADE ID
---|---|---|---|---
Landry-Watson | Landry-Watson | 3643831 | | |

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RO Size = 36" x 21 1/2" Unit Size = 35 1/2" x 21"

100AS 2' 11 1/2"X1' 9", Unit, 100 Series Awning, 1 3/8" Setback, White Exterior Frame, White Exterior Sash/Panel, w/White Interior Frame, w/White Interior Sash/Panel, Stationary, Dual Pane Low-E Standard Argon Fill Full Divided Light (FDL) 3 Wide, 1 High, Specified Equal Light Pattern, White, w/White, 3/4" Grille Bar, Stainless Glass / Grille Spacer

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SUB-TOTAL: $460.51
FREIGHT: $0.00
LABOR: $0.00
TAX: $39.22
TOTAL: $499.73

CUSTOMER SIGNATURE ___________________________ DATE ________________

Quote #: 3643831 Print Date: 2/24/2023 7:59:03 PM UTC All Images Viewed from Exterior
* All graphics as viewed from the exterior. ** Rough opening dimensions are minimums and may need to be increased to allow for use of building wraps or flashings or sill panning or brackets or fasteners or other items.

Thank you for choosing Andersen Windows & Doors
A MODERN LOOK THAT’S EASY ON THE BUDGET.

2022 PRODUCT GUIDE FOR PROFESSIONALS
FIBREX® MATERIAL

Developed by Andersen, Fibrex material is a revolutionary structural composite material that blends the very best attributes of vinyl and wood. Fibrex material saves on natural resources because it’s composed of 40% reclaimed wood fiber by weight. Special polymer formulations surround and fill each wood fiber, enabling top performance. The result is a material that provides uncommon value and enhances the quality of any project. In use for over two decades in Andersen® products, Fibrex material has proven its strength and durability in all types of climates.

REVOLUTIONARY BUILDING MATERIAL

• Twice as strong as vinyl so weathertight seals stay weathertight
• Blocks thermal transfer nearly 700 times better than aluminum to help reduce heating and cooling bills
• Retains its stability and rigidity in all climates for exceptional durability
• Offers superior scratch resistance compared to painted vinyl*

ENVIRONMENTALLY RESPONSIBLE

• Since Andersen developed the highly sustainable Fibrex material, reuse of waste wood fiber has prevented the harvesting of nearly 90 million board feet of timber
• 100 Series products can help builders earn LEED® points in three key categories: Energy & Atmosphere, Materials & Resources and Indoor Environmental Quality
• 100 Series products meet or exceed California Section 01350 Specification, a California indoor emission standard — one of the toughest in the country
• Like all Andersen products, 100 Series products are designed to last** and help reduce future waste streams

See how Andersen created Fibrex material at andersenwindows.com/fibrex.
WINDOW & DOOR TYPES

CASEMENT & AWNING WINDOWS
Casement windows are hinged on the side and open outward to the left or right, while awning windows are hinged at the top and open outward. Both are also available as non-operating stationary windows.

SINGLE-HUNG WINDOWS
Single-hung windows feature a fixed upper sash with an operable lower sash that slides up and down. For convenience, the hardware locks automatically when the window is closed. An arch single-hung is also available to add architectural interest.

GLIDING WINDOWS
Gliding windows have one stationary sash and one operating sash that glides horizontally. A three-sash configuration, where two sash glide past a fixed center sash, is also available.
**GRILLE OPTIONS**

Grilles for Andersen® 100 Series windows and patio doors are available in a wide variety of patterns to complement virtually any style of home. Plus, they have options for easy cleaning and architectural authenticity many vinyl windows can’t match.

**FINELIGHT™ GRILLES BETWEEN-THE-GLASS**

Make glass easy to clean and have an elegant, sculpted profile. Choose a two-sided color scheme to match both the interior and exterior of the window or patio door. Also available with exterior grilles to provide architectural style and detail.

- **Actual width shown.**
- **1" (25) width grille bar for patio doors.**
- **3/4" (19) width grille bar for windows.**

A 2 1/4" (57) width profile is available for most units to simulate a meeting rail or a multi-unit combination, such as a transom over a window or patio door.

**Grille Patterns**

- Prairie A
- Colonial
- Tall Fractional
- Short Fractional
- Specified Equal Light
- Custom

To see all of the standard patterns available for a specific window or door, refer to the detailed product sections in this product guide or contact your Andersen supplier.

**INSECT SCREEN OPTIONS**

Insect screens for venting windows have a fiberglass screen mesh. Optional TruScene® insect screens are made with a micro-fine stainless steel mesh, providing 50% greater clarity than our conventional insect screens. Insect screen frames for casement and awning windows are color matched to the product interior and for single-hung and gliding windows are matched to the product exterior.

- Gliding insect screens for 2-panel gliding patio doors have a fiberglass screen mesh. Insect screen frames for doors are color matched to the product exterior.

*Specify number of same-size rectangles across or down. Dimensions in parentheses are in millimeters.*
**FEATURES**

### CASEMENT & AWNING

**FRAME**
- A: The frame is constructed with Fibrex® composite material. This construction produces a rigid frame.
- B: Durable, low-maintenance finish won’t fade, flake, blister or peel.
- C: Concealed receiving brackets mounted on the hinge side of the frame keep the sash tightly secured within the window frame when closed.
- Four frame options are available. See “Common Features” for details.

**SASH**
- D: Fibrex material construction provides long-lasting performance.1 The sash, finished with a durable capping, provides maximum protection and a matte, low-maintenance finish.
- E: The dual weatherstrip system combines both an exterior watershed barrier against wind, water and dust.

**GLASS**
- F: A glazing bead and silicone provide superior weathertightness and durability.

See “Common Features” for details.

### SINGLE-HUNG

**FRAME**
- A: The frame is constructed with Fibrex composite material. This construction produces a rigid frame.
- B: A durable, side-loaded balancer provides for easy sash opening and closing. The lower sash can be removed without the use of tools.
- C: Durable, low-maintenance finish won’t fade, flake, blister or peel.
- D: Four frame options are available. See “Common Features” for details.

**HARDWARE**
- Sash operator provides almost effortless opening and closing, regardless of window size. Long-lasting stainless steel hinge channels are used at the head and sill to provide easy operation.
- **Single-Action Casement Lock**
  - A single-action lock easily releases all concealed locking points on the casement sash. The color or finish of the lock hardware matches the handle.
- **Awning Sash Locks**
  - Awning sash locks provide an added measure of security and weathertightness. Awning hardware style and color options are compatible with 100 Series casement windows to ensure a consistent appearance when used in combination designs.

**GLASS**
- A glazing bead and silicone provide superior weathertightness and durability.

See “Common Features” for details.

### COMMON FEATURES

**FRAME**
- Four frame options include:
  - 1 1/4" (35) flange setback for siding applications. An integral rigid vinyl flange helps seal the unit to the structure.
  - 1" (25) flange setback with stucco key. An integral rigid vinyl flange helps seal the unit to the structure.
  - No-flange option for window replacement in an existing framed opening.
  - Insert option for window replacement in an existing window frame.

**GLASS**
- High-Performance options include:
  - Low-E SmartSun™ glass
  - Low-E SmartSun HeatLock® glass
  - Low-E glass
  - Low-E HeatLock glass
  - Low-E Sun glass
  - Low-E PassiveSun® glass
  - Low-E PassiveSun HeatLock glass
  - Clear Dual-Fane glass

Tempered laminated and other glass options are available. Contact your Andersen supplier.

A removable translucent film helps shield the glass from damage during delivery and construction, and simplifies finishing at the job site.

**Patterned Glass**
- Patterned glass options are available. See page 12 for more details.

**Glass Spacers**
- Glass spacers are now available in black, in addition to stainless steel, to provide more ways to customize project designs and achieve a contemporary look. (E-Series window is shown above.)

**Performance Grade (PG) Upgrades**
- Optional performance grade upgrades are available for select sizes allowing units to achieve PG50. Performance Grade (PG) ratings are more comprehensive than Design Pressure (DP) ratings for measuring product performance. Choosing the PG50 upgrade doesn’t change the appearance of the unit.

**EXTERIOR COLORS**
- White
- Sandtone
- Terratone
- Dark Bronze
- Black

**INTERIOR COLORS**
- White
- Sandtone
- Dark Bronze
- Black

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*Visit [andersenwindows.com/warranty](http://www.andersenwindows.com/warranty) for details.

**Products with Sandtone, dark bronze and black interiors have matching exteriors.**

Dimensions in parentheses are in millimeters.

Printing limitations prevent exact duplications of colors. See your Andersen supplier for actual color samples.
Awning Window Details – New Construction

Scale 1 1/2" (38) = 1'-0" (305) – 1:8

• Drip cap is required to complete window installation as shown but may not be included with the window. Use of drip cap is recommended for proper installation.
• Light-colored areas are parts included with window. Dark-colored areas are additional Andersen® parts required to complete window assembly as shown.
• Minimum rough openings may need to be increased to allow for use of building wraps, flashing, sill panning, brackets, fasteners or other items. See Installation Information on page 116.
• Details are for illustration only and are not intended to represent product installation methods or materials. Refer to product installation instructions at andersenwindows.com.
• Dimensions in parentheses are in millimeters.
Awning Window Details – Replacement
Scale 1 5/8" (38) – 1.0" (305) – 1:8

**Horizontal Section**

**Existing Framed Opening**

- Low-E Glass
- Insect Screen
- Andersen® Extension Jamb Attachment Flange (optional)

**Vertical Section**

**Existing Framed Opening**

- Sill Stop to Subfloor Dimension
- Andersen® Extension Jamb Attachment Flange (optional)

**Horizontal Section**

**Existing Window Opening**

- Low-E Glass
- Insect Screen

**Vertical Section**

**Existing Window Opening**

- Andersen® Exterior Sill Extender Trim (optional)
- Sill Stop to Subfloor Dimension

- **Dimensions in parentheses are in millimeters.**

Installation accessories for insert frame shown on page 109.

See pages 84-87 for joining details.

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* Drip cap is required to complete window installation as shown but may not be included with the window. Use of drip cap is recommended for proper installation.
* Light-colored areas are parts included with window. Dark-colored areas are additional Andersen® parts required to complete window assembly as shown.
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* Details are for illustration only and are not intended to represent product installation methods or materials. Refer to product installation instructions at andersenwindows.com.
* Dimensions in parentheses are in millimeters.
LANDRY - WATSON RESIDENCE
PROJECT ADDRESS: 1703 S. TROOST AVE. TULSA, OK 74120

Drawings and Specifications as instruments of service are and shall remain the property of Bungalow Roots, LLC. They are not to be used on extensions of the project, or other projects, except by agreement in writing and appropriate compensation to Bungalow Roots, LLC. The General Contractor is responsible for confirming and correlating dimensions at the job site. Bungalow Roots, LLC will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the project. © Bungalow Roots, LLC

PROJECT NUMBER: 21-02

1st FLOOR PLAN / SITE PLAN

1/4" = 1'-0" SCALE

North

Front Yard

Rear Yard

S. TROOST AVE.  60'-0" R.O.W.

E. 17th ST. S.  60'-0" R.O.W.

15'-0" SIDE STREET SETBACK

20'-0" REAR YARD SETBACK

25'-0" FRONT YARD SETBACK

20'-0" SIDE YARD SETBACK

14 RISERS @ 8 3/8" = 9'-8 1/2"

UP

DOWN

TPC PRESENTATION

Printed: 2/24/23
Issued: Not for regulatory approval, permitting, or construction

A1.1

1st FLOOR PLAN / SITE PLAN
NEW WINDOW HEAD AT APPROXIMATELY 5'-9" ABOVE FINISH FLOOR.

REMOVE EXISTING WINDOWS AND DOORS AND INFILL WITH SIDING (AND ONE NEW WINDOW ABOVE NEW PITCHED ROOF)

© Bungalow Roots, LLC

PROJECT NUMBER: 21-02

LANDRY - WATSON RESIDENCE
PROJECT ADDRESS: 1703 S. TROOST AVE. TULSA, OK 74120

2nd FLOOR PLAN

SCALE: 1/4" = 1'-0"

NEW 2nd FLOOR PLAN

SCALE: 1/4" = 1'-0"

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION.

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**EXISTING ROOF PLAN**

- **6:12 PITCH**
- **3:12 PITCH**
- **2.5:12 PITCH**
- **VALLEY**
- **RIDGE**

**NEW ROOF PLAN**

- **6:12 PITCH**
- **2.5:12 PITCH**
- **VALLEY**
- **RIDGE**

**Details:**

- NEW ROOF PLAN will cover flat roof areas to match roof 6:12. Roofing material to be asphalt architectural shingles to match existing roof.

**Scale:** 1/4" = 1'-0"
LANDRY - WATSON RESIDENCE
PROJECT ADDRESS: 1703 S. TROOST AVE. TULSA, OK 74120

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© Bungalow Roots, LLC

PROJECT NUMBER: 21-02

REAR EXISTING
SCALE: 1/16" = 1'-0"
Remove existing windows and doors and infill with siding (and one new window above new pitched roof).
EXISTING CHIMNEY

NEW ROOF INFILL OVER FLAT ROOF AREA TO MATCH PITCH OF EXISTING SLOPED ROOF (6:12), ROOFING MATERIAL TO BE ASPHALT ARCHITECTURAL SHINGLES TO MATCH EXISTING ROOF

SCALE: 1/4" = 1'-0"
EXISTING & NEW SIDE/REAR ELEVATIONS

EXISTING PAN/FLAT ROOF (NOT VISIBLE)

NEW ROOF INFILL TO ALIGN WITH AND MATCH EXISTING PITCHED ROOF INFILL WITH SIDING TO MATCH EXISTING

EXISTING PAN/FLAT ROOF TO BE REMOVED AND INFILLED

REMOVE EXISTING BLOCKED CASEMENT WINDOW/DOORS

REMOVE EXISTING CASEMENT WINDOW

ROOF INFILLED (NOT VISIBLE)

EXISTING PAN/FLAT ROOF (NOT VISIBLE)

SCALE: 1/4" = 1'-0"
Drawings and Specifications are instruments of service and shall remain the property of Bungalow Roots, LLC. They are not to be used on extensions of the project, or other projects, except by agreement in writing and appropriate compensation to Bungalow Roots, LLC.

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© Bungalow Roots, LLC

PROJECT NUMBER: 21-02

REAR EXISTING
SCALE: 1/16" = 1'-0"

REAR PROPOSED
SCALE: 1/16" = 1'-0"
LANDRY - WATSON RESIDENCE

PROJECT ADDRESS:
1703 S. TROOST AVE.
TULSA, OK 74120

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© Bungalow Roots, LLC

NEW 2nd FLOOR PLAN

SCALE: 1/4" = 1'-0"

DEMO 2nd FLR. PLAN

SCALE: 1/4" = 1'-0"

REMOVE EXISTING WINDOWS AND DOORS AND INSTALL NEW WINDOW AND ONE NEW WINDOW ABOVE NEW PITCHED ROOF

NEW WINDOWS HEAD AT APPROXIMATELY 5'-9" ABOVE FINISH FLOOR

REMOVE EXISTING WINDOWS AND DOORS AND INFILL WITH SIDING (AND ONE NEW WINDOW) TO MATCH EXISTING ABOVE NEW PITCHED ROOF

NEW WINDOWS HEAD AT APPROXIMATELY 5'-9" ABOVE FINISH FLOOR

© Bungalow Roots, LLC

SCALE: 1/4" = 1'-0"
EXISTING ROOF PLAN

NEW ROOF PLAN

EXISTING CHIMNEY

NEW ROOF INFILL OVER FLAT ROOF AREA TO MATCH PITCH OF EXISTING SLOPED ROOF (6:12), ROOFING MATERIAL TO BE ASPHALT ARCHITECTURAL SHINGLES TO MATCH EXISTING ROOF

SCALE: 1/4" = 1'-0"
EXISTING & NEW SIDE/REAR ELEVATIONS

LANDRY - WATSON RESIDENCE

PROJECT ADDRESS: 1703 S. TROOST AVE. TULSA, OK 74120

Drawings and Specifications as of 02/24/2023 are and shall remain the property of Bungalow Roots, LLC. They are not to be used on extensions of the project, or other projects, except by agreement in writing and appropriate compensation to Bungalow Roots, LLC.

The General Contractor is responsible for confirming and correlating dimensions at the job site. Bungalow Roots, LLC will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the project.

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EXISTING PAN/FLAT ROOF (NOT VISIBLE)
EXISTING PAN/FLAT ROOF (NOT VISIBLE)

NEW ROOF INFILL TO ALIGN WITH AND MATCH EXISTING PITCHED ROOF INFILL WITH SIDING TO MATCH EXISTING

NEW FIXED WINDOWS TRIM TO MATCH SIMILAR WINDOWS AT FRONT DORMER

EXISTING PAN/FLAT ROOF TO BE REMOVED AND INFILLED

REMOVE EXISTING BLOCKED CASEMENT WINDOW/DOORS
REMOVE EXISTING CASEMENT WINDOW/DOORS

NEW FIXED WINDOWS TRIM TO MATCH EXISTING WINDOWS AT FRONT DORMER

SCALE: 1/4" = 1'-0"
Drawings and Specifications are instruments of service are and shall remain the property of Bungalow Roots, LLC. They are not to be used on extensions of the project, or other projects, except by agreement in writing and appropriate compensation to Bungalow Roots, LLC. The General Contractor is responsible for confirming and correlating dimensions at the job site. Bungalow Roots, LLC will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the project.
TULSA PRESERVATION COMMISSION

STAFF REPORT
Thursday, March 9, 2023
HP-0435-2023

HP PERMIT NUMBER:  HP-0435-2023

PROPERTY ADDRESS:  1701 SOUTH NEWPORT AVENUE

DISTRICT:  NORTH MAPLE RIDGE

APPLICANT:  CONNOR AND MADELEINE HASBROOK

REPRESENTATIVE:  NONE

A. CASE ITEMS FOR CONSIDERATION
   1. Construction of retaining wall
   2. Construction of fence and gates


B. BACKGROUND
   DATE OF CONSTRUCTION:  1925
   ZONED HISTORIC PRESERVATION:  1993; ORDINANCE AMENDMENT 2005
   NATIONAL REGISTER LISTING:  MAPLE RIDGE HISTORIC RESIDENTIAL DISTRICT:  1983
   CONTRIBUTING STRUCTURE:  No, but identified as contributing structure in 2021 survey of the Morningside Addition

PREVIOUS ACTIONS:
   COA – JULY 9, 2009 – TPC APPROVAL
   Construction of addition

   HP-0341-2022 – MARCH 22, 2022 – TPC APPROVAL
   Removal of the windows on the porch with the condition that the present height of the sills be retained
   Replacement of the floor on the porch
   Installation of windows on the west façade of the residence
   Installation of siding on the west façade of the residence

   HP-0417-2023 – FEBRUARY 28, 2023 – TPC DENIAL
   Construction of retaining wall
   Construction of fence and gates

C. ISSUES AND CONSIDERATIONS
   1. Construction of retaining wall
   2. Construction of fence and gates
i. Proposed is the construction of a fence, gate, and a retaining wall along the sidewalk. The yard will be regraded to a lower slope in order to achieve additional useable outdoor space. According to the applicants, the maximum height of the wall will be approximately thirty-four inches (2'-10") at its highest point. The brick and caps on the piers will match those on the exterior of the house with a soldier course and cast concrete or stone cap, and a brick cap will be used along the rest of the wall. According to the applicants, a steel Ameristar Montage fence and gates in the Majestic Style with Double Rings between the top rails are proposed. The fence will be between two feet and eight inches (2'-8") and three feet (3'-0") tall.

The previous application, HP-0417-2023, was reviewed twice by the Historic Preservation Permit Subcommittee and twice by the Tulsa Preservation Commission. During the review of the application on February 21, the subcommittee recommended approval of the application with the conditions that the wall have a cap, that information on the cap be provided, and that either a pier be added to the northwest corner or an explanation be provided as to why it is not present. The application was reviewed by the Tulsa Preservation Commission on February 28 but was denied because the requested conditions and additional information had not been addressed. The applicant has now submitted an amended application with updated plans to include a masonry cap along the wall and an additional pier at the northwest corner of the site.

ii. Reference: Tulsa Zoning Code

SECTION 70.070-F Standards and Review Criteria
In its review of HP permit applications, the preservation commission must use the adopted design guidelines to evaluate the proposed work and must, to the greatest extent possible, strive to affect a fair balance between the purposes and intent of HP district regulations and the desires and need of the property owner. In addition, the preservation commission must consider the following specific factors:
1. The degree to which the proposed work is consistent with the applicable design guidelines;
2. The degree to which the proposed work would destroy or alter all or part of the historic resource;
3. The degree to which the proposed work would serve to isolate the historic resource from its surroundings, or introduce visual elements that are out of character with the historic resource and its setting, or that would adversely affect the physical integrity of the resource;
4. The degree to which the proposed work is compatible with the significant characteristics of the historic resource; and
5. The purposes and intent of the HP district regulations and this zoning code.

Reference: Unified Design Guidelines - Residential Structures

SECTION A – GUIDELINES FOR REHABILITATION OF EXISTING STRUCTURES
A.1 General Requirements
Use the following guidelines as the basis for all exterior work:
A.1.1 Retain and preserve the existing historic architectural elements of your home.
A.1.2 If replacement of historic architectural elements is necessary, match the size, shape, pattern, texture, and directional orientation of the original historic elements.
A.1.3 Ensure that work is consistent with the architectural style and period details of your home.
A.1.4 Return the structure to its original historic appearance using physical or pictorial evidence, rather than conjectural designs.

SECTION E – GUIDELINES FOR NON-CONTRIBUTING STRUCTURES

E.1 General Requirements
E.1.1 For the purposes of this chapter, non-contributing structures are those listed as not contributing to the historic character of the district due to age or architectural style in the National Register Nomination for the district.
E.1.2 Non-contributing structures will be considered products of their own time. Do not attempt to create a false appearance of the predominant character and architectural style of the rest of the district.
E.1.3 Follow Section A (Rehabilitation) and Section B (Additions) as they relate to the character-defining elements of the non-contributing structure.
E.1.4 Ensure that work on non-contributing structures does not detract from or diminish the historic character of the overall district.

SECTION G – GUIDELINES FOR LANDSCAPE FEATURES, PAVING, AND SIGNAGE

G.1 Landscape Features
G.1.1 Retain and preserve original historic walls, fencing, lighting, planters, and other landscape features through repair.
G.1.2 Removal of historic landscape features will be considered on a case-by-case basis. Removal of non-historic landscape features can be staff-approved.
G.1.3 Ensure that new landscape features are appropriate to the style of your home and consistent with the historic elements found along the same street and within the district.
G.1.4 Use fencing materials that are consistent with the historic fencing found along the same street and within the district. Chain-link fencing, wire fencing (12 gauge or less), vinyl fencing, or any fencing that blocks the view of structures is not allowed.
G.1.5 Use wall materials that are consistent with the historic walls found along the same street and within the district. Cinder block, segmental retaining wall systems, corrugated metal, and railroad ties are not allowed. Historically styled cast concrete block will be considered on a case-by-case basis.

1701 S. Newport Ave. – Present
FLOOD PLAIN STATEMENT:
THIS PROPERTY IS LOCATED IN ZONE X (UNSHADED AREAS) PER FLOOD INSURANCE RATE MAP 4013502240L EFFECTIVE OCTOBER 16, 2012. ZONE X (UNSHADED) DEFINED AS AREA OF MINIMAL CHANCE OF FLOOD HAZARD.

SURVEYOR’S NOTE:
THE FOLLOWING FOUND IN TITLE COMMITMENT #509060, DATED 07/01/2021:
DOES AFFECT THE PROPERTY:
• #10 ITEMS CONTAINED IN THE PLAT AND DEED OF DEDICATION/COVENANTS AND RESTRICTIONS, OF AMENDED PLAT OF MORNINGSIDE ADDITION, BK 20 PG 364, BK 20 PG 365 (AS SHOWN)
• #11 ITEMS CONTAINED IN THE PLAT AND DEED OF DEDICATION/COVENANTS AND RESTRICTIONS, OF MORNINGSIDE ADDITION, DOC. #147-732
• #12 DOC. #2006114784 (HISTORIC PRESERVATION ZONING)
• #13 DOC. #201241992 (HISTORIC PRESERVATION ZONING)
DOES NOT AFFECT THE PROPERTY:
• #14 DOC. #2015018258, DOC. #2015061404

DATE OF FIELD INSPECTION:
JULY 27TH, 2021

LEGAL DESCRIPTION:
LOTS TWENTY-ONE (21), TWENTY-TWO (22), TWENTY-THREE (23), AND TWENTY-FOUR (24), BLOCK ELEVEN (11), AMENDED PLAT OF MORNINGSIDE ADDITION TO THE CITY OF TULSA, TULSA COUNTY, STATE OF OKLAHOMA, ACCORDING TO THE RECORDED PLAT NO. 108.
ALSO KNOWN AS:
1701 SOUTH NEWPORT AVENUE EAST, TULSA, OK 74120

CERTIFICATION:
THIS MORTGAGE INSPECTION REPORT WAS PREPARED FOR FIRSTTITLE/WESTCOR LAND TITLE INSURANCE COMPANY. IT IS NOT A LAND OR BOUNDARY SURVEY PLAT, AND IT IS NOT TO BE RELIABLE UPON FOR THE ESTABLISHMENT OF FENCE, BUILDING, OR OTHER FUTURE IMPROVEMENT LINES. THIS INSPECTION PLAT WAS PREPARED SOLELY FOR THE CLIENT LISTED HEREIN AND MAY NOT BE USED FOR ANY SUBSEQUENT LOAN CLOSING, REFINANCE, OR OTHER TRANSACTION; AND THAT NO RESPONSIBILITY OR LIABILITIES ASSUMED HEREIN OR HEREBY TO THE PRESENT OR FUTURE LAND OWNER OR OCCUPANT. THE ACCOMPANYING SKETCH IS A TRUE REPRESENTATION OF THE CONDITIONS THAT WERE FOUND AT THE TIME OF THE INSPECTION, AND THE LINEAR AND ANGULAR VALUES SHOWN ON THE SKETCH, IF ANY, ARE BASED ON RECORD OR DEED INFORMATION AND HAVE NOT BEEN VERIFIED UNLESS NOTED. ANY ERROR OR OMISSIONS IN THIS SKETCH SHALL NOT AFFECT THEQWidget38 TITLE TO USE IN THE LENDER’S OR BORROWER’S INSURANCE OR MORTGAGE LOAN OR OTHER USES. THIS SKETCH IS NOT TO SCALE.
WITNESS MY HAND AND SEAL THIS DATE: JULY 28TH, 2021

BAKER SURVEYING, LLC
4577 SOUTH 63RD EAST AVENUE
TULSA, OKLAHOMA 74145
OKLAHOMA CA #6816 EXPIRES 6/30/2022
(918) 271-5793

Page 5 of 9
Masonry and cap to be matched
Example 1

Example 2
Landscape – plant design plan
Examples of vegetation to be used
Hasbrook residence - alternate fencing

March 1, 2023

1701 S Newport Avenue

2'-6" to 2'-10"
2'-8" to 3'-0"
1'-4" to 1'-8" approx
Per reference photo
Stone cap per reference photo
3'-6" approx
1'-4" to 1'-8" approx
2'-8" to 3'-0"
2'-6" to 2'-8"
Surround yourself with beauty & protection.

The Montage ornamental steel fence is strong, terrain-adaptable and climate-tough, yet remains elegant and untouched by time.
**LIFETIME WARRANTY**

The Montage families of fencing products are manufactured from superior quality materials by skilled craftsmen with the highest standards of workmanship in the industry.

*We are so confident in this product, it comes with a lifetime warranty.*

---

**E-COAT VS. PAINTED STEEL**

Major corrosion problems start from the inside. That’s why Ameristar Montage products are coated inside and outside.

Our multi-stage pretreatment wash, duplex cathodic electrocoat system and acrylic topcoat provide superior corrosion protection to withstand adverse weathering effects.

The E-Coat process results in years of maintenance-free ownership.
PROFUSION WELDED STEEL VS. ALUMINUM

All Montage fence panels are fabricated using our ProFusion welding process. This technique creates a virtually invisible structural connection at every picket to rail intersection, producing sleek lines.

STYLES

CLASSIC™ MAJESTIC™ GENESIS™ WARRIOR™ CRESCENT™

Standard or flush bottom rail available for most styles.
RAKEABLE PANELS VS. STAIR-STEP

ProFusion welded panel designs enable maximum bias for virtually all terrains. As the only welded steel fence capable of following steep grade changes, Montage eliminates stair-stepping panels.

ENVIRONMENTALLY RESPONSIBLE

We lead the way in manufacturing programs and practices that reduce our carbon footprint — monitoring air emissions, stormwater runoff and waste water discharge and recycling all scrap steel, wood, cardboard, plastics, paper and oil products, giving our products the opportunity to earn project LEED points.
Enjoy sleek modernism.

Majestic’s flush top rail has a clean, streamlined look, making it one of the most popular styles in the Montage family. Single, double and arched walk gates are also available to match this style.
HEIGTHS

3'
3 1/2'
4'
4 1/2'
5'
6'

PANELS

3-RAIL PANELS
Available in 3’ to 6’ heights

2-RAIL PANELS
Available in 3’ to 5’ heights

BOTTOM OPTION

STANDARD BOTTOM RAIL
FLUSH BOTTOM RAIL

PICKET SPACING

4” GAP
Standard

3” GAP
Make a grand entrance.

Montage’s arched single swing, single swing and double swing gates are crafted with fully welded construction for years of durability. Fabricated with the same components as the fence panels, these gates provide a seamless transition from fence to gate. A variety of steel Estate® Entry Gates are also available.
GATE TYPES

ARCHED SINGLE SWING

SINGLE SWING

DOUBLE SWING

STYLES

CLASSIC™

MAJESTIC™

GENESIS™

WARRIOR™

CRESCEINT™
TULSA PRESERVATION COMMISSION

STAFF REPORT
Thursday, March 9, 2023
HP-0436-2023

HP PERMIT NUMBER: HP-0436-2023

PROPERTY ADDRESS: 1127 SOUTH NORFOLK AVENUE

DISTRICT: TRACY PARK

APPLICANT: CAMARON BENJAMIN

REPRESENTATIVE: NONE

A. CASE ITEM FOR CONSIDERATION
   1. Installation of solar panels on north, east, and south sides of residence

B. BACKGROUND
   DATE OF CONSTRUCTION: 2021
   ZONED HISTORIC PRESERVATION: 2023
   NATIONAL REGISTER LISTING: TRACY PARK HISTORIC DISTRICT: 1982
   CONTRIBUTING STRUCTURE: NO
   PREVIOUS ACTIONS: NONE

C. ISSUES AND CONSIDERATIONS
   1. Installation of solar panels
      Proposed is the installation of solar panels on the north, east, and south sides of the residence. The panels would be mounted parallel to the roof line and would extend no more than six inches (0'-6") from the face of the roof. The application has been forwarded directly to the Tulsa Preservation Commission with no review by the Historic Preservation Permit Subcommittee due to the applicant’s project timeline.

   ii. Reference: Tulsa Zoning Code
   SECTION 70.070-F Standards and Review Criteria
   In its review of HP permit applications, the preservation commission must use the adopted design guidelines to evaluate the proposed work and must, to the greatest extent possible, strive to affect a fair balance between the purposes and intent of HP district regulations and the desires and need of the property owner. In addition, the preservation commission must consider the following specific factors:
   1. The degree to which the proposed work is consistent with the applicable design guidelines;
   2. The degree to which the proposed work would destroy or alter all or part of the historic resource;
   3. The degree to which the proposed work would serve to isolate the historic resource from its surroundings, or introduce visual elements that are out of character with the historic resource and its setting, or that would adversely affect the physical integrity of the resource;
4. The degree to which the proposed work is compatible with the significant characteristics of the historic resource; and
5. The purposes and intent of the HP district regulations and this zoning code.

Reference: *Unified Design Guidelines - Residential Structures*

**SECTION A – GUIDELINES FOR REHABILITATION OF EXISTING STRUCTURES**

**A.1 General Requirements**

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A.1.2 If replacement of historic architectural elements is necessary, match the size, shape, pattern, texture, and directional orientation of the original historic elements.
A.1.3 Ensure that work is consistent with the architectural style and period details of your home.
A.1.4 Return the structure to its original historic appearance using physical or pictorial evidence, rather than conjectural designs.

**A.7 Awnings, Shutters, Mailboxes, Mechanical Systems, Etc.**

***

A.7.6 Install systems requiring exterior components, such as solar panels or devices, where they will have minimal impact, preferably at the rear of your house or yard or on an outbuilding. Install exterior components on a historic building in a manner that does not damage the historic roofing material or negatively impact the building’s historic character and is reversible. These considerations will be made on a case-by-case basis.

**SECTION E – GUIDELINES FOR NON-CONTRIBUTING STRUCTURES**

**E.1 General Requirements**

E.1.1 For the purposes of this chapter, non-contributing structures are those listed as not contributing to the historic character of the district due to age or architectural style in the National Register Nomination for the district.
E.1.2 Non-contributing structures will be considered products of their own time. Do not attempt to create a false appearance of the predominant character and architectural style of the rest of the district.
E.1.3 Follow Section A (Rehabilitation) and Section B (Additions) as they relate to the character-defining elements of the non-contributing structure.
E.1.4 Ensure that work on non-contributing structures does not detract from or diminish the historic character of the overall district.
Streetscape photo – May 2022

Photo submitted by applicant
Photo submitted by applicant
HOA PROPOSAL

CREATED FOR

Cameron Benjamin

1127 S Norfolk Ave, Tulsa OK 74120

918-752-5590

camaronben@gmail.com
# YOUR SOLAR DESIGN

![3D IMAGE IRRADIANCE MAP](image)

<table>
<thead>
<tr>
<th>SYSTEM SIZE</th>
<th>MICROINVERTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.03 kW</td>
<td>19 Micros</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NUMBER OF PANELS</th>
<th>MONITORING</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 Panels</td>
<td>Lifetime</td>
</tr>
</tbody>
</table>

*The production guarantee on proposals that assume tree removal is subject to change if inadequate or no tree removal is completed.*
BERKELEY LAB ILLUMINATES PRICE PREMIUMS FOR U.S. SOLAR HOME SALES

Largest-ever study quantifies the value of rooftop photovoltaics on homes that sold across eight states and 15 years

A multi-institutional research team of scientists led by the U.S. Department of Energy’s Lawrence Berkeley Laboratory (Berkeley Lab), in partnership with Sandia National Laboratories, universities, and appraisers found that home buyers consistently have been willing to pay more for homes with host-owned solar photovoltaic (PV) energy systems—averaging about $4 per watt of PV installed—across various states, housing and PV markets, and home types. This equates to a premium of about $15,000 for a typical PV system. The team analyzed almost 22,000 sales of homes, almost 4,000 of which contained PV systems in eight states from 1999 to 2013—producing the most authoritative estimates to date of price premiums for U.S. homes with PV systems.

“Previous studies on PV home premiums have been limited in size and scope,” says Ben Hoen, the lead author of the new report. “We more than doubled the number of PV home sales analyzed, examined a number of states outside of California, and captured the market during the recent housing boom, bust, and recovery.”

More than half a million U.S. homes had PV as of 2014, and the number is growing rapidly. The growth in home PV systems means that the real estate industry will need reliable methods to value these homes appropriately. Further, having greater certainty in those methods will likely facilitate additional growth in the residential PV market.

Hoen is a researcher in the Environmental Energy Technologies Division of Berkeley Lab, who collaborated with researcher from Adomatis Appraisal Services, REal Property Analytics/Texas A&M University, University of California at San Diego, San Diego State University, and Sandia National Laboratories.

The study also found only a small and non-statistically significant difference between PV premiums for new and existing homes. Additional findings include the existence of a PV “green cache” (home buyers paying a certain amount for a PV system of any size and incrementally more as system size increases) and an apparent sharp depreciation rate for the PV premium in home sales transactions as those PV systems age. the study also finds that
PV premium in home sales transactions as those PV systems age. The study also finds that market premiums are statistically similar to those estimated using the income and cost approaches, methods familiar to appraisers. This similarity to standard appraisal practices further bolsters the report’s usefulness to real estate professionals and markets.

“As PV systems become more and more common on U.S. homes, it will be increasingly important to value them accurately, using a variety of methods,” says co-author Sandra Adomatis, an appraiser who helped develop the Appraisal Institute’s Green Addendum and who has written and spoken extensively on valuing green features. She noted, “Our findings should provide greater confidence that PV adds a quantifiable premium to a wide variety of homes in California and beyond.

The research was supported by funding from the U.S. Department of Energy SunShot Initiative. The SunShot Initiative is a collaborative national effort that aggressively drives innovation to make solar energy fully cost-competitive with traditional energy sources before the end of the decade. Through SunShot, DOE supports efforts by private companies, universities, and national laboratories to drive down the cost of solar electricity to $0.06 per kilowatt-hour. Learn more at energy.gov/sunshot.
New research sponsored by the Department of Energy shows that buyers are willing to pay more for homes with rooftop solar panels - a finding that may strengthen the case for factoring the value of sustainable features into home appraisals.

The study, conducted by the Lawrence Berkeley National Laboratory in California, examined sales data for almost 23,000 homes in eight states from 2002 to 2013. About 4,000 of the homes had solar photovoltaic systems, all of them owned (as opposed to being financed through a lease with the solar company).

Researchers found that buyers were willing to pay a premium of $15,000 for a home with the average-size solar photovoltaic system (3.6 kilowatts, or 3,600 watts), compared with a similar home without one. Put another way, that translates to about four additional dollars per watt of solar power.

The study involved more solar property sales than previous research, making this sample particularly "robust," said Sandra Adomatis, an appraiser in Punta Gorda, Fla., who is considered an expert in "green" valuation and is one of the study's authors.

"This study is important for the buying public and the lending side," Ms. Adomatis said, "and appraisers can say, here's some proof there is some value to the system." More homeowners have been installing these systems as the cost of solar technology has dropped over the last decade. As of mid-2014, more than a half-million homes had solar systems, according to the report.

Real estate agents, appraisers and lenders are still trying to catch up with the technology, along with other energy-saving features, in terms of calculating their effect on home values - or lack thereof - in any given market.

Fannie Mae has acknowledged the growing proliferation of solar. Buyers are willing to pay more for a house with the electric bills to prove the savings attached to its solar system.

A version of this article appears in print on February 22, 2015, on Page RE6 of the New York edition with the headline: Appraising Solar Energy's Value.
ADDING SOLAR INCREASES THE VALUE OF YOUR HOME

“Homes with Solar sold 17% faster and for 20% more.”
-National Energy Renewable Laboratory
CHECKOUT THE BEAUTY OF SOLAR

To see more customer homes visit shinesolar.com/reviews
I went solar with Shine this summer and it has been a great experience! Their original proposal for how much money I would save has been spot on. My billing cycle with the local utility was a little funny for the first 2 months after installation (a 10 day cycle, then a 50 day cycle), but on my first normal cycle my electric utility bill was only $13. My utility payment plus my solar loan payment is less than I was paying for electricity before. Better yet, when my solar loan is paid off I’ll ONLY be paying roughly $13 per month for my electricity! Shine Solar was great to work with and everything they told me would happen has happened just as they said it would.”

TRECIA WILSON
May 14th, 2019
★★★★☆

My experience with the entire application process, loan and installation has been smooth and professional. Our sales lady worked very hard to get us the funding to complete both projects (solar and HVAC). I can’t wait to watch the electric bill go down. we were spending $450 average pay – some months as high as $750. solar became a must have for us.

LACY HUEY
April 30th, 2019
★★★★☆

Shine Solar was fantastic to work with. Their sense of urgency was great. Their product knowledge and ROI data was spot on. I really appreciate working with James and his “no pressure” approach. I’ve managed Commerical construction and their install team was very safe and professional. I’ve already recommended them to friends and will continue doing so. Thank you to the Shine Solar team!

ANTHONY MCNUTT
April 3rd, 2019
★★★★☆

This is truly a full turnkey solar product!!!!! It’s a full service company that makes it very easy and personal to each customer!!! The professional and courteous service of everyone I’ve come in contact is so refreshing and they answered all questions throughout the process I wish I could give them more stars!!!

DON WILKINSON
May 9th, 2019
★★★★☆
CAMARON BENJAMIN - 7.03kW DC, 5.665kW AC, 13.5kWh ENERGY STORAGE SYSTEM

SITE PLAN LAYOUT

ENGINEERING SCOPE OF WORK
1. ILLUMINE INDUSTRIES INC. HAS ONLY PROVIDED DRAFTING SERVICES FOR THE PERMIT DRAWINGS. NO ACTUAL ENGINEERING WORK, ENGINEERING REVIEW OR ENGINEERING APPROVAL HAS BEEN CONDUCTED BY ILLUMINE INDUSTRIES INC UNLESS NOTED OTHERWISE.

2. WHEN A PROFESSIONAL ENGINEER APPROVES AND SELLS THE DESIGN FOR COMPONENTS OF THEIR RESPECTIVE DISCIPLINE (STRUCTURAL/ELECTRICAL) SHOWN ON THESE PERMIT DRAWINGS, HE/SHE:
   a. TAKES FULL DIRECT CONTROL OF THE ENGINEERED DESIGN
   b. IS GIVEN ACCESS TO PERSONALLY SUPERVISE AND RECTIFY ANY ASPECT OF THE ENGINEERED DESIGN
   c. HAS FULLY ACCEPTED RESPONSIBILITY FOR THE ENGINEERED DESIGN

SCOPES OF WORK

GENERAL SYSTEM INFORMATION:
SYSTEM SIZE: 7.03kW DC, 5.665kW AC, 13.5kWh ENERGY STORAGE

MODULES: (19) SUN SOLAR V5/V6 370-120W (370W)

INVERTER:
(1) HOY MILES HM-300NT (240V), (1) HOY MILES HM-300NT (240V)

BRANCH DETAILS:
1x4, 1x3 MICRO INVERTERS BRANCHES

BATTERY:
(1) TESLA POWERWALL AC BATTERY SYSTEM-2.0-201270-00-X
(1) TESLA ENERGY GATEWAY 2-1222100-00-Z

APPLICABLE CODES
ELECTRIC CODE: NEC 2017
FIRE CODE: IFC 2018
BUILDING CODE: IRC 2015 w/ LOCAL AMENDMENTS

GENERAL NOTES
1. MODULES ARE LISTED UNDER UL 1703 AND CONFORM TO THE STANDARDS.

2. INVERTERS ARE LISTED UNDER UL 1741 AND CONFORM TO THE STANDARDS.

3. DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION MIGHT VARY.

4. WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.

5. ALL GROUND WIRING CONNECTED TO THE MAIN SERVICE GROUNDING IN MAIN SERVICE PANEL/SERVICE EQUIPMENT.

6. ALL CONDUCTORS SHALL BE 600V, 75°C STANDARD COPPER UNLESS OTHERWISE NOTED.

7. WHEN REQUIRED, A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.

8. THE SYSTEM WILL NOT BE INTERCONNECTED BY THE CONTRACTOR UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND/OR THE UTILITY.

9. ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREES, WIRES OR SIGNS.

10. PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING

COVER PAGE

CUSTOMER INFORMATION
NAME: CAMARON BENJAMIN
ADDRESS: 1127 S NORFOLK AVE, TULSA, OK 74120
LICENSE NUMBER: 2020012960
UTILITY: PSO
PRN NUMBER: SNS-70486
DATE: 1/16/2023
GENERAL NOTES

ROOF ACCESS PATHWAYS AND SETBACKS:

1204.1 GENERAL:
SOLAR PHOTOVOLTAIC SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH SECTIONS 1204.2 THROUGH 1204.5, AND THE INTERNATIONAL BUILDING CODE OR INTERNATIONAL RESIDENTIAL CODE. THE ELECTRICAL PORTION OF SOLAR PV SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 70.

1204.2 ACCESS AND PATHWAYS
ROOF ACCESS, PATHWAYS, AND SPACING REQUIREMENTS SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS 1204.2.1 THROUGH 1204.3.3. PATHWAYS SHALL BE OVER AREAS CAPABLE OF SUPPORTING FIRE FIGHTERS ACCESSING THE ROOF. PATHWAYS SHALL BE LOCATED IN AREAS WITH MINIMAL OBSTRUCTIONS, SUCH AS VENT PIPE, CONDUIT OR MECHANICAL EQUIPMENT.

EXCEPTIONS:
1. DETACHED, NONHABITABLE GROUP U STRUCTURES INCLUDING, BUT NOT LIMITED TO, DETACHED GARAGES SERVING GROUP R-3 BUILDINGS, PARKING SHADE STRUCTURES, CARPORTS, SOLAR TRELLISES AND SIMILAR STRUCTURES.
2. ROOF ACCESS, PATHWAYS AND SPACING REQUIREMENTS NEED NOT BE PROVIDED WHERE THE FIRE CODE OFFICIAL HAS DETERMINED THAT ROOFTOP OPERATIONS WILL NOT BE EMPLOYED.

1204.2.1 SOLAR PHOTOVOLTAIC SYSTEMS FOR GROUP R-3 BUILDINGS:
SOLAR PHOTOVOLTAIC SYSTEMS FOR GROUP R-3 BUILDINGS SHALL COMPLY WITH SECTIONS 1204.2.1.1 THROUGH 1204.2.1.3.

EXCEPTIONS:
1. THESE REQUIREMENTS SHALL NOT APPLY TO STRUCTURES DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE INTERNATIONAL RESIDENTIAL CODE.
2. THESE REQUIREMENTS SHALL NOT APPLY TO BUILDINGS WITH SLOPES MORE THAN 2 UNITS VERTICAL IN 12 UNITS HORIZONTAL OR LESS.

1204.2.1.1 PATHWAYS TO RIDGE:
NOT FEWER THAN TWO 36-INCH-WIDE (914 MM) PATHWAYS ON SEPERATE ROOF PLANES, FROM LOWEST ROOF EDGE TO RIDGE, SHALL BE PROVIDED ON ALL BUILDINGS. NOT FEWER THAN ONE PATHWAY SHALL BE PROVIDED ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANE WITH A PHOTOVOLTAIC ARRAY, NOT FEWER THAN ONE 36-INCH-WIDE (914 MM) PATHWAY FROM LOWEST ROOF EDGE TO RIDGE SHALL BE PROVIDED ON THE SAME ROOF PLANE AS THE PHOTOVOLTAIC ARRAY, ON AN ADJACENT ROOF PLANE OR STRADDLING THE SAME AND ADJACENT ROOF PLANES.

1204.2.1.2 SETBACKS AT RIDGE:
FOR PHOTOVOLTAIC ARRAYS OCCUPYING 33 PERCENT OR LESS OF THE PLAN VIEW TOTAL ROOF AREA, A SETBACK OF NOT LESS THAN 18 INCHES (457 MM) WIDE IS REQUIRED ON BOTH SIDES OF A HORIZONTAL RIDGE. FOR PHOTOVOLTAIC ARRAYS OCCUPYING MORE THAN 33 PERCENT OF THE PLAN VIEW TOTAL ROOF AREA, A SETBACK OF NOT LESS THAN 36 INCHES (457 MM) WIDE IS REQUIRED ON BOTH SIDES OF A HORIZONTAL RIDGE.

1204.2.1.3 ALTERNATIVE SETBACKS AT RIDGE:
WHERE AN AUTOMATIC SPRINKLER SYSTEM IS INSTALLED WITHIN THE DWELLING IN ACCORDANCE WITH SECTION 903.3.1.3, SETBACKS AT THE RIDGE SHALL CONFORM TO ONE OF THE FOLLOWING:
1. FOR PHOTOVOLTAIC ARRAYS OCCUPYING 66 PERCENT OR LESS OF THE PLAN VIEW TOTAL ROOF AREA, A SETBACK OF NOT LESS THAN 18 INCHES (457 MM) WIDE IS REQUIRED ON BOTH SIDES OF A HORIZONTAL RIDGE.
2. FOR PHOTOVOLTAIC ARRAYS OCCUPYING MORE THAN 66 PERCENT OF THE PLAN VIEW TOTAL ROOF AREA, A SETBACK OF NOT LESS THAN 36 INCHES (914 MM) WIDE IS REQUIRED ON BOTH SIDES OF A HORIZONTAL RIDGE.

1204.2.2 EMERGENCY ESCAPE AND RESCUE OPENINGS:
PANELS AND MODULES INSTALLED ON GROUP R-3 BUILDINGS SHALL NOT BE PLACED ON THE PORTION OF A ROOF THAT IS BELOW AN EMERGENCY ESCAPE AND RESCUE OPENING. A PATHWAY OF NOT LESS THAN 36 INCHES (914 MM) WIDE SHALL BE PROVIDED TO THE EMERGENCY ESCAPE AND RESCUE OPENING.

1204.3 OTHER THAN GROUP R-3 BUILDINGS:
ACCESS TO SYSTEMS FOR BUILDINGS, OTHER THAN THOSE CONTAINING GROUP R-3 OCCUPANCIES, SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS 1204.3.1 THROUGH 1204.3.3.

EXCEPTION:
WHERE IT IS DETERMINED BY THE FIRE CODE OFFICIAL THAT THE ROOF CONFIGURATION IS SIMILAR TO THAT OF A GROUP R-3 OCCUPANCY, THE RESIDENTIAL ACCESS AND VENTILATION REQUIREMENTS IN SECTIONS 1204.2.1.1 THROUGH 1204.2.1.3 ARE A SUITABLE ALTERNATIVE.

1204.3.1 PERIMETER PATHWAYS:
THERE SHALL BE A MINIMUM 6-FOOT-WIDE (1829 MM) CLEAR PERIMETER AROUND THE EDGES OF THE ROOF.

EXCEPTION:
WHERE EITHER AXIS OF THE BUILDING IS 250 FEET (76 200 MM) OR LESS, THE CLEAR PERIMETER AROUND THE EDGES OF THE ROOF SHALL BE PERMITTED TO BE REDUCED TO A MINIMUM WIDTH OF 4 FEET (1219 MM).

1204.3.2 INTERIOR PATHWAYS
INTERIOR PATHWAYS SHALL BE PROVIDED BETWEEN ARRAY SECTIONS TO MEET THE FOLLOWING REQUIREMENTS:
1. PATHWAYS SHALL BE PROVIDED AT INTERVALS NOT GREATER THAN 150 FEET (45 720 MM) THROUGHOUT THE LENGTH AND WIDTH OF THE ROOF.
2. A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE IN A STRAIGHT LINE TO ROOF STANDPIPES OR VENTILATION HATCHES.
3. A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE AROUND ROOF ACCESS HATCHES, WITH NOT FEWER THAN ONE SUCH PATHWAY TO A PARAPET OR ROOF EDGE.

1204.3.3 SMOKE VENTILATION:
THE SOLAR INSTALLATION SHALL BE DESIGNED TO MEET THE FOLLOWING REQUIREMENTS:
1. WHERE NONGRAVITY-OPERATED SMOKE AND HEAT VENTS OCCUR, A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE SHALL BE PROVIDED BORDERING ALL SIDES.
2. SMOKE VENTILATION OPTIONS BETWEEN ARRAY SECTIONS SHALL BE ONE OF THE FOLLOWING:
   1.4 A PATHWAY NOT LESS THAN 8 FEET (2438 MM) WIDE.
   2. WHERE GRAVITY-OPERATED DROPOUT SMOKE AND HEAT VENTS OCCUR, A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE ON NOT FEWER THAN ONE SIDE.
   2.3 A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE BORDERING 4-FOOT BY 8-FOOT (1219 MM BY 2438 MM) VENTING CUTOUTS EVERY 20 FEET (6096 MM) ON ALTERNATING SIDES OF THE PATHWAY.
### SITE INFORMATION - WIND SPEED: 115 MPH AND SNOW LOAD: 10 PSF

| SR. NO | AZIMUTH | PITCH | NO. OF MODULES | ARRAY AREA (SQ. FT.) | ROOF TYPE | ATTACHMENT | ROOF EXPOSURE | FRAME TYPE | FRAME SIZE | FRAME SPACING | MAX RAIL SPAN | OVER HANG |
|--------|----------|-------|----------------|----------------------|-----------|-------------|---------------|------------|------------|               |              |          |
| MP-01  | 180°     | 26°   | 6              | 119.2                | COMPOSITION SHINGLE | K2 SPLICEFOOT X (DECK MOUNT) | ATTIC RAFTERS | 2 X 4      | 1'-4"       | 4'-0"        | 1'-6"        |
| MP-02  | 90°      | 26°   | 7              | 139.1                | COMPOSITION SHINGLE | K2 SPLICEFOOT X (DECK MOUNT) | ATTIC RAFTERS | 2 X 4      | 1'-4"       | 4'-0"        | 1'-6"        |
| MP-03  | 0°       | 26°   | 6              | 119.2                | COMPOSITION SHINGLE | K2 SPLICEFOOT X (DECK MOUNT) | ATTIC RAFTERS | 2 X 4      | 1'-4"       | 4'-0"        | 1'-6"        |

**NOTE(N):** PENETRATIONS ARE STAGGERED

**SCALE:** 1/8" = 1'-0"
**DEAD LOAD CALCULATIONS**

<table>
<thead>
<tr>
<th>BOM</th>
<th>QUANTITY</th>
<th>LBS/UNIT</th>
<th>TOTAL WEIGHT (LBS)</th>
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<tbody>
<tr>
<td>MODULES</td>
<td>19</td>
<td>42.76</td>
<td>812.44</td>
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<tr>
<td>MID-CLAMP</td>
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<tr>
<td>END-CLAMP</td>
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<tr>
<td>RAIL LENGTH</td>
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<td>121.66</td>
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<tr>
<td>SPLICE BAR</td>
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<td>2.60</td>
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<tr>
<td>K2 SPLICE FOOT X (DECK MOUNT)</td>
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<td>76.85</td>
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<tr>
<td>MICRO-INVERTER-1 (200-NT)</td>
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<tr>
<td>MICRO-INVERTER-2 (600-NT)</td>
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<td>17.19</td>
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<tr>
<td>MICRO-INVERTER-3 (300-NT)</td>
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<td>3.85</td>
<td>3.85</td>
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<tr>
<td>TOTAL WEIGHT OF THE SYSTEM (LBS)</td>
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<td>1068.35</td>
</tr>
<tr>
<td>TOTAL ARRAY AREA ON THE ROOF (SQ. FT.)</td>
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<td>377.56</td>
</tr>
<tr>
<td>WEIGHT PER SQ. FT. (LBS)</td>
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<td></td>
<td>2.83</td>
</tr>
<tr>
<td>WEIGHT PER PENETRATION (LBS)</td>
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<td></td>
<td>20.16</td>
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**ATTACHMENT DETAIL-K2 SPLICE FOOT X (DECK MOUNT)**

- **Solar Module**: Mid-Clamp and End-Clamp Anatomy
- **Snaprack Rail**: Mid-Clamp and End-Clamp Anatomy
- **Rail to Rail**: Mid-Clamp and End-Clamp Anatomy

**ROOF FRAMING DETAILS**

- **Deck**: 2x4 rafters @1'-4" spacing
- **Composition Shingle Roof**: Structural Only, See associated Illumine-i Structural Report for more info.

**GROUNDING DETAILS**

- **Module to Module & Module to Rail**: Mid-Clamp and End-Clamp Anatomy
- **Snaprack Grounding**: Mid-Clamp and End-Clamp Anatomy
- **Rail to Rail**: Mid-Clamp and End-Clamp Anatomy

**MODULES DATA**

- **Module**: V54 Solar V51370-1200W (120W)
- **Module DIMS**: 69.37"x41.25"x1.18"
- **Lag Screws**: M5x60: 7/16" MIN EMBEDMENT

**INSTALLATION NOTES**

1. Structural roof member locations are estimated and should be located and verified by the contractor when lag bolt penetration or mechanical attachment to the structure is required.
2. Roof top penetrations for solar racking will be completed and sealed with approved sealant per code by a licensed contractor.
3. Lags must have a minimum 7/16" thread embedment into the structural member.
4. All PV racking attachments shall be staggered by row between the roof framing members as necessary.
5. Roof mounted standard rail requires one thermal expansion gap for every run of rail greater than 40'.
6. All conductors and conduits on the roof shall be minimum 1-1/2" above the roof surface (including cables underneath modules and racking).
7. The PV installation shall not obstruct any plumbing, mechanical, or building roof vents.

**DEAD LOAD CALCULATIONS**

- **BOM**: Quantity LBS/UNIT
  - MODULES: 19: 42.76 LBS
  - MID-CLAMP: 26: 0.170 LBS
  - END-CLAMP: 24: 0.300 LBS
  - RAIL LENGTH: 154: 0.790 LBS
  - SPLICE BAR: 26: 0.650 LBS
  - K2 SPLICE FOOT X (DECK MOUNT): 53: 1.45 LBS
  - MICRO-INVERTER-1 (200-NT): 3: 7.38 LBS
  - MICRO-INVERTER-2 (600-NT): 3: 5.73 LBS
  - MICRO-INVERTER-3 (300-NT): 1: 3.85 LBS
- **TOTAL WEIGHT OF THE SYSTEM (LBS)**: 1068.35 LBS
- **TOTAL ARRAY AREA ON THE ROOF (SQ. FT.)**: 377.56 FT
- **WEIGHT PER SQ. FT. (LBS)**: 2.83 LBS
- **WEIGHT PER PENETRATION (LBS)**: 20.16 LBS

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  - MODULES: 19: 42.76 LBS
  - MID-CLAMP: 26: 0.170 LBS
  - END-CLAMP: 24: 0.300 LBS
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- **Solar Module**: Mid-Clamp and End-Clamp Anatomy
  - **Snaprack Rail**: Mid-Clamp and End-Clamp Anatomy
  - **Rail to Rail**: Mid-Clamp and End-Clamp Anatomy

**GROUNDING ONLY**

- **Module to Module & Module to Rail**: Mid-Clamp and End-Clamp Anatomy
  - **Snaprack Grounding**: Mid-Clamp and End-Clamp Anatomy
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3. Lags must have a minimum 7/16" thread embedment into the structural member.
4. All PV racking attachments shall be staggered by row between the roof framing members as necessary.
5. Roof mounted standard rail requires one thermal expansion gap for every run of rail greater than 40'.
6. All conductors and conduits on the roof shall be minimum 1-1/2" above the roof surface (including cables underneath modules and racking).
7. The PV installation shall not obstruct any plumbing, mechanical, or building roof vents.
SINGLE LINE DIAGRAM: DC SYSTEM SIZE - 7.03kW, AC SYSTEM SIZE - 5.665kW AC, 13.5kWh ENERGY STORAGE SYSTEM

**SPECIFICATIONS**

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<thead>
<tr>
<th>Inverter-1</th>
<th>Inverter-2</th>
<th>Inverter-3</th>
</tr>
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<tbody>
<tr>
<td>Model</td>
<td>HOLYMILESHM-1200NT (240V)</td>
<td>HOLYMILESHM-600NT (240V)</td>
</tr>
<tr>
<td>Power Rating</td>
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<tr>
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<td>CEC Weighted Efficiency</td>
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<td>96.5%</td>
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<tr>
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<td>Max DC Voltage</td>
<td>60V</td>
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**MODULE SPECIFICATION**

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<tr>
<th>Module</th>
<th>Vsun Solar VSUN175-1200BH (370W)</th>
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<tr>
<td>Module Power @ STC</td>
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<td>Isc 11.26A</td>
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<tr>
<td>Max Power Current</td>
<td>Imp 10.72A</td>
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</table>

**NOTE(N):** EACH MICRO INVERTERS ARE RAPID SHUTDOWN COMPLIANT

**NOTE(N):**

* DISCONNECT TO BE PLACED WITHIN 10' OF PRODUCTION (PV) METER
* DO NOT COMISSION SYSTEM UNTIL UTILITY APPROVES
* KEEP SOLAR BREAKERS OFF (FOR INSTALLERS)
* REQUIRES REVENUE METER

**NOTE(N):**

1. EACH HOLYMILESHM-1200NT IS CONNECTED TO FOUR MODULES
2. EACH HOLYMILESHM-600NT IS CONNECTED TO TWO MODULES
3. EACH HOLYMILESHM-300NT IS CONNECTED TO ONE MODULE

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**ELECTRICAL NOTES**

1. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 310.10(D).
2. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.10(C).
3. MAXIMUM DC/AC VOLTAGE DROP SHALL BE NO MORE THAN 2%.
4. ALL CONDUCTORS SHALL BE IN CONDUIT UNLESS OTHERWISE NOTED.
5. BREAKER/FAUSE SIZES PER NEC 240.
6. AC EQUIPMENT GROUNDING CONDUCTOR SIZED PER NEC 250.122.
7. AMBIENT TEMPERATURE CORRECTION FACTOR IS BASED ON NEC 690.31(A).
8. AMBIENT TEMPERATURE ADJUSTMENT FACTOR IS BASED ON NEC 310.15(B)(2).
9. MAX. SYSTEM VOLTAGE CORRECTION 10 PER NEC 690.7.
10. CONDUCTORS ARE SIZED PER NEC TABLE 310.15(B)(16).

**CUSTOMER INFORMATION**

NAME: CAMARON BENJAMIN
ADDRESS: 1127 S NORFOLK AVE, TULSA, OK 74120
PHONE: 918-652-1140
EMAIL: info@shinesolarenergy.com

**LICENSE NUMBER:** 2020012960

**UTILITY:** PSO

**PRN NUMBER:** SNS-70486

**DRAFTED BY:** K. VINANTI
**QC’ED BY:** N. MAHALE
**PAPERSIZE:** 17"x11"
**SCALE:** AS NOTED
**REV:** B
**DATE:** 1/16/2023
**PAPERSIZE:** 17"x11"

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**SPECIFICATIONS**

- **Inverter-1**
  - Model: HOLYMILESHM-1200NT (240V)
  - Power Rating: 1200W
  - Max Output Current: 5A
  - CEC Weighted Efficiency: 96.5%
  - Max DC Voltage: 60V

- **Inverter-2**
  - Model: HOLYMILESHM-600NT (240V)
  - Power Rating: 590W
  - Max Output Current: 2.46A
  - CEC Weighted Efficiency: 96.5%
  - Max DC Voltage: 60V

- **Inverter-3**
  - Model: HOLYMILESHM-300NT (240V)
  - Power Rating: 295W
  - Max Output Current: 1.23A
  - CEC Weighted Efficiency: 96.5%
  - Max DC Voltage: 60V

**MODULE SPECIFICATION**

- **Module**
  - Model: Vsun Solar VSUN175-1200BH (370W)
  - Module Power @ STC: 370W
  - Open Circuit Voltage: Voc 41.4V
  - Max Power Voltage: Vmp 34.5V
  - Short Circuit Current: Isc 11.26A
  - Max Power Current: Imp 10.72A

**NOTE(N):** EACH MICRO INVERTERS ARE RAPID SHUTDOWN COMPLIANT

**NOTE(N):**

* DISCONNECT TO BE PLACED WITHIN 10' OF PRODUCTION (PV) METER
* DO NOT COMISSION SYSTEM UNTIL UTILITY APPROVES
* KEEP SOLAR BREAKERS OFF (FOR INSTALLERS)
* REQUIRES REVENUE METER

**NOTE(N):**

1. EACH HOLYMILESHM-1200NT IS CONNECTED TO FOUR MODULES
2. EACH HOLYMILESHM-600NT IS CONNECTED TO TWO MODULES
3. EACH HOLYMILESHM-300NT IS CONNECTED TO ONE MODULE
THREE LINE DIAGRAM: DC SYSTEM SIZE - 7.03kW, AC SYSTEM SIZE - 5.665kW AC, 13.5kWh ENERGY STORAGE SYSTEM

### Specifications

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<td>Holymolies 1200Wnt  (240V)</td>
<td>Holymolies 600Wnt  (240V)</td>
<td>Holymolies 300Wnt  (240V)</td>
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<td>1.23A</td>
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<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Max DC Voltage</td>
<td>60V</td>
<td>60V</td>
<td>60V</td>
</tr>
</tbody>
</table>

### Module Specification

<table>
<thead>
<tr>
<th>Module</th>
<th>Model</th>
<th>VSUN Solar VSUN170-120BHM  (370W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power @ STC</td>
<td>370W</td>
<td></td>
</tr>
<tr>
<td>Open Circuit Voltage</td>
<td>Vsc 41.4V</td>
<td></td>
</tr>
<tr>
<td>Max Power Voltage</td>
<td>Vmp 34.5V</td>
<td></td>
</tr>
<tr>
<td>Short Circuit Current</td>
<td>Isc 11.26A</td>
<td></td>
</tr>
<tr>
<td>Max Power Current</td>
<td>Imp 10.72A</td>
<td></td>
</tr>
</tbody>
</table>

### Electrical Notes

1. Conductors exposed to sunlight shall be listed as sunlight resistant per NEC 310.10(D).
2. Conductors exposed to wet locations shall be suitable for use in wet locations per NEC 310.10(C).
3. Maximum DC/AC voltage drop shall be no more than 2%.
4. All conductors shall be in conduit unless otherwise noted.
5. Breaker/fuse sizes per NEC 240.
6. AC equipment grounding conductor sized per NEC 250.122.
7. Ambient temperature correction factor is based on NEC 690.31(A).
8. Ambient temperature adjustment factor is based on NEC 310.15(B)(2).
9. Max. System voltage correction is per NEC Table 310.15(B)(16).

### Customer Information

**Name:** Cameron Benjamin

**Address:** 1127 S Norfolk Ave, Tulsa, OK 74120

**APN:** 353-009-21-213-640

**APN:** 353-009-21-213-640

**PRN Number:** SNS-70486

**License Number:** 2020012960

**Utility:** PSO

**Scale:** As Noted

**Date:** 1/16/2023

**Rev:** B

**Paper Size:** 17”x11”

**Drafted By:** K. Vinanti

**QC’ed By:** N. Mahale

**Three Line Diagram**

---

**Note (N):** Each Micro Inverters are Rapid Shutdown Compliant

**Note (N):**
- Do not commission system until utility approves
- Requires revenue meter

**Note (N):**
1. Each Holymolies H-1200Wnt is connected to four modules
2. Each Holymolies H-600Wnt is connected to two modules
3. Each Holymolies H-300Wnt is connected to one module
ELECTRICAL CALCULATIONS

AC WIRE SIZING CALCULATIONS BASED OF FOLLOWING EQUATIONS >>

Required Conductor Ampacity: Inverter Output Current X #of Inverters = Max Current Per 690.8(A)(3) X 125% = Max Current Per 690.8(B)(2)

Corrected Ampacity Calculations: Ampacity X Temperature Derate Factor X Conduit Fill Derate = Derated Conductor Ampacity Per 690.8(B)(2)

Derated Conductor Ampacity Check: Max Current Per 690.8(A)(3) < Derated Conductor Ampacity

<table>
<thead>
<tr>
<th>TAG ID</th>
<th>UNITS</th>
<th>NEUTRAL</th>
<th>GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FREE AIR</td>
<td>(2) 10AWG TRUNK CABLE PER BRANCH CIRCUIT</td>
<td>(1) 10AWG BARE COPPER</td>
</tr>
<tr>
<td>1A</td>
<td>FREE AIR</td>
<td>(4) 10/2 ROMEX WIRE</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1&quot; EMT</td>
<td>(4) 6AWG THHN/THWN-2</td>
<td>NONE</td>
</tr>
<tr>
<td>3</td>
<td>1&quot; EMT</td>
<td>(2) 6AWG THHN/THWN-2</td>
<td>(1) 6AWG THHN/THWN-2</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; EMT</td>
<td>(2) 10AWG THHN/THWN-2</td>
<td>(1) 10AWG THHN/THWN-2</td>
</tr>
</tbody>
</table>

ELECTRICAL NOTES

1. Conductors exposed to sunlight shall be listed as sunlight resistant per NEC 310.10(D).
2. Conductors exposed to wet locations shall be suitable for use in wet locations per NEC 310.10(C).
3. Maximum DC/AC voltage drop shall be no more than 2%.
4. All conductors shall be in conduit unless otherwise noted.
5. Breaker/fuse sizes per NEC 240.
6. AC equipment grounding conductor size per NEC 250.122.
7. Ambient temperature correction factor is based on NEC 690.31(A).
8. Ambient temperature adjustment factor is based on NEC 310.15(B)(2).
9. Max. System voltage correction factor is per NEC 690.7.
10. Conductors are sized per NEC Table 310.15(B)(16).
CAUTION: MULTIPLE SOURCES OF POWER

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN

SYSTEM UTILIZES MICRO-INVERTERS LOCATED UNDER SOLAR MODULE
1127 S NORFOLK AVE, TULSA, OK 74120

LABEL LOCATION
MAIN SERVICE PANEL
PER CODE: NEC 705.10

LABEL LOCATION
Rapid shutdown switch for solar PV system
PER CODE: NEC 690.56(C)(3)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

WEATHER RESISTANT MATERIAL, DURABLE ADHESIVE, UL969 AS STANDARD TO WEATHER RATING (UL LISTING OF MARKINGS NOT REQUIRED). MIN ¾” LETTER HEIGHT AERIAL OR SIMILAR FONT NON-BOLD, PLACED WITHIN THE MAIN SERVICE DISCONNECT, PLACED ON THE OUTSIDE OF THE COVER WHEN DISCONNECT IS OPERATED WITH THE SERVICE PANEL CLOSED.

DEDICATED PHOTOVOLTAIC SYSTEM COMBINER PANEL NO LOADS SHALL BE ADDED TO THIS PANEL

LABEL LOCATION
AC Photovoltaic combiner panel
PER CODE: NEC 690.56(C)(3)

NOTES:

ALL PLACARDS SHALL BE OF WEATHER PROOF CONSTRUCTION, BACKGROUND ON ALL PLACARDS SHALL BE RED WITH WHITE LETTERING U.O.N. PLACARD SHALL BE MOUNTED DIRECTLY ON THE EXISTING UTILITY ELECTRICAL SERVICE. FASTENERS APPROVED BY THE LOCAL JURISDICTION

WARNING

CAUTION: MULTIPLE SOURCES OF POWER

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN

SYSTEM UTILIZES MICRO-INVERTERS LOCATED UNDER SOLAR MODULE
1127 S NORFOLK AVE, TULSA, OK 74120

LABEL LOCATION
MAIN SERVICE PANEL
PER CODE: NEC 705.10

LABEL LOCATION
Rapid shutdown switch for solar PV system
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SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

WEATHER RESISTANT MATERIAL, DURABLE ADHESIVE, UL969 AS STANDARD TO WEATHER RATING (UL LISTING OF MARKINGS NOT REQUIRED). MIN ¾” LETTER HEIGHT AERIAL OR SIMILAR FONT NON-BOLD, PLACED WITHIN THE MAIN SERVICE DISCONNECT, PLACED ON THE OUTSIDE OF THE COVER WHEN DISCONNECT IS OPERATED WITH THE SERVICE PANEL CLOSED.

DEDICATED PHOTOVOLTAIC SYSTEM COMBINER PANEL NO LOADS SHALL BE ADDED TO THIS PANEL

LABEL LOCATION
AC Photovoltaic combiner panel
PER CODE: NEC 690.56(C)(3)

NOTES:

ALL PLACARDS SHALL BE OF WEATHER PROOF CONSTRUCTION, BACKGROUND ON ALL PLACARDS SHALL BE RED WITH WHITE LETTERING U.O.N. PLACARD SHALL BE MOUNTED DIRECTLY ON THE EXISTING UTILITY ELECTRICAL SERVICE. FASTENERS APPROVED BY THE LOCAL JURISDICTION
**VSUN370-120BMH**

370W
Highest power output

20.04%
Module efficiency

12 years
material & workmanship warranty

30 years
Linear power output warranty

---

**SPECSHEET**

**ADDRESS:** 1127 SNORFOLK AVE, TULSA, OK 74120

APN: 353-009-21-213-640

**CUSTOMER INFORMATION**

**NAME:** CAMARON BENJAMIN

**DATE:** 1/16/2023

**SCALE:** AS NOTED

**REV:** B

---

**Electrical Characteristics at Standard Test Conditions (STC)**

<table>
<thead>
<tr>
<th>Module Type</th>
<th>VSUN370-120BMH</th>
<th>VSUN365-120BMH</th>
<th>VSUN360-120BMH</th>
<th>VSUN355-120BMH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Power - Pmax (W)</td>
<td>370</td>
<td>365</td>
<td>360</td>
<td>355</td>
</tr>
<tr>
<td>Open Circuit Voltage - Voc (V)</td>
<td>41.4</td>
<td>41.1</td>
<td>40.8</td>
<td>40.4</td>
</tr>
<tr>
<td>Short Circuit Current - Isc (A)</td>
<td>11.29</td>
<td>11.19</td>
<td>11.12</td>
<td>11.08</td>
</tr>
<tr>
<td>Maximum Power Voltage - Vmp (V)</td>
<td>36.5</td>
<td>34.2</td>
<td>34.0</td>
<td>33.7</td>
</tr>
<tr>
<td>Maximum Power Current - Impp (A)</td>
<td>10.22</td>
<td>10.58</td>
<td>10.58</td>
<td>10.53</td>
</tr>
<tr>
<td>Module Efficiency</td>
<td>20.04%</td>
<td>19.79%</td>
<td>19.50%</td>
<td>19.22%</td>
</tr>
</tbody>
</table>

**Standard Test Conditions (STC):** Insolation 1000 Watts/m², AM 1.5, module temperature 25°C, Penultimate 0 - SW. Measuring Tolerance: ±2%. Remarks: Electrical data do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

**Electrical Characteristics with different rear side power gain (reference to 365 front)**

<table>
<thead>
<tr>
<th>Piex (W)</th>
<th>Voc (V)</th>
<th>Isc (A)</th>
<th>Vmp (V)</th>
<th>Impp (A)</th>
<th>Piex gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>388</td>
<td>41.4</td>
<td>11.29</td>
<td>34.2</td>
<td>10.88</td>
<td>10%</td>
</tr>
<tr>
<td>407</td>
<td>41.4</td>
<td>12.39</td>
<td>34.5</td>
<td>10.88</td>
<td>10%</td>
</tr>
<tr>
<td>463</td>
<td>41.5</td>
<td>13.51</td>
<td>34.4</td>
<td>11.87</td>
<td>10%</td>
</tr>
<tr>
<td>461</td>
<td>41.5</td>
<td>14.08</td>
<td>34.4</td>
<td>12.26</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Temperature Characteristics**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Temperature Coefficient (°C)</th>
<th>Maximum System Voltage (V)</th>
<th>Series-Rate Rating (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree</td>
<td>-0.26%/°C</td>
<td>1300</td>
<td>20</td>
</tr>
<tr>
<td>Current Temperature Coefficient</td>
<td>-0.25%/°C</td>
<td>6.8%</td>
<td></td>
</tr>
</tbody>
</table>

**Material Characteristics**

- Dimensions: 1750 x 1040 + 38mm (L-W-H)
- Frame: Black anodized aluminum profile
- Front Glass: White toughened safety glass, 3.2 mm
- Cell Encapsulation: EVA (Ethylene Vinyl Acetate) or EVA/M
- Back Sheet: Transparent black microfiber backsheet
- Cells: 12 x 10 pieces bifacial multicrystalline solar cells string
- Junction Box: IP65, 6-sections
- Cable/Connector: UL 984 in parallel length can be customized, 14 mm 2, compatible with MC4

**Packaging**

Dimensions: 1800 x 1125 x 101 mm

- Container (L): 216
- Container (W): 480
- Container (H): 99

**System Design**

- Maximum System Voltage: 1300 V
- Maximum System Current: 20 A
- Temperature Range: 40°C to 0°C
- Maximum Invertor 15 mm with impact speed of 23 m/s
- Maximum Surface Load: 5400 Pa
- Application Class: A

---

**DIMENSIONS**

- **ss-01**

---

**MODULE SPECSHEET**

**DRAFTED BY:** K. VINANTI

**DRAFTED BY:** N. MAHALE

**PAPERSIZE:** 17”x11”

**SCALE:** AS NOTED

**UTILITY:** PSO

**PRN NUMBER:** SNS-70486

---

**ENGINEERED IN JAPAN**

www.vsun-solar.com

---

**ShineSolar**

**LICENSE NUMBER:** 202012960

**ADDRESS:** 1127 S NORFOLK AVE, TULSA, OK 74120

**PHONE:** 353-909-21-213-640

**ANH:** OK, CITY OF TULSA

---

**ILLUMINE**

**DATE:** 1/16/2023

**DATE:** SS-01
Microinverter Datasheet

**HM-1200NT**

**HM-1500NT**

### Description

Hyonymiles 4-in-1 microinverter is one of the most cost-effective module-level solar solutions, as it can support up to 4 panels at once and maximize the PV production of your installation. With a maximum DC voltage of 65 volts, Hyonymiles microinverters are a PV Rapid Shutdown Equipment and complies with NEC-2017 and NEC-2020 Article 690.12 and NEC-2021 Sec. 64-218. Both models listed are equipped with reactive power control and can meet the requirements of IEEE 1547, UL 1741 and CA Rule27.

### Features

- Easy installation, just plug and play
- With Reactive Power Control, compliant with CA Rule 21
- Compliant with U.S. NEC-2017A/IEC-2020 690.12 rapid shutdown
- External antenna for stronger communication with DTU
- High reliability: NEMA 6 (IP67) enclosure, 6000 k surge protection

### Technical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>HM-1200NT</th>
<th>HM-1500NT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Data (DC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonly used module power (W)</td>
<td>240 to 450+</td>
<td>300 to 525+</td>
</tr>
<tr>
<td>Maximum input voltage (V)</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>MPPT voltage range (V)</td>
<td>16-60</td>
<td></td>
</tr>
<tr>
<td>Start-up voltage (V)</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Maximum input current (A)</td>
<td>4 x 11.5</td>
<td>4 x 11.5</td>
</tr>
<tr>
<td>Output Data (AC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak output power (W)</td>
<td>1200</td>
<td>1500</td>
</tr>
<tr>
<td>Maximum continuous output power (W)</td>
<td>1438</td>
<td>1500</td>
</tr>
<tr>
<td>Maximum continuous output current (A)</td>
<td>5.33</td>
<td>5.99</td>
</tr>
<tr>
<td>Nominal output voltage range (V)</td>
<td>740/111-744</td>
<td>740/111-744</td>
</tr>
<tr>
<td>Nominal Frequency range (Hz)</td>
<td>50-60</td>
<td>60-60</td>
</tr>
<tr>
<td>Power factor (adjustable)</td>
<td>0.95 Default 0.8 leading, 0.8 lagging</td>
<td></td>
</tr>
<tr>
<td>Total harmonic distortion</td>
<td>&lt;3%</td>
<td></td>
</tr>
<tr>
<td>Maximum units per 10kW branch</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

### Efficiency

- CEC peak efficiency: 96.7%
- CEC weighted efficiency: 96.5%
- Nominal MPPT efficiency: 99.8%
- Nighttime power consumption (mW): <50

### Mechanical Data

- Ambient temperature range (°C): -40 to +65
- Dimensions (W x H x D mm): 260 x 175 x 33
- Weight (kg): 3.35
- Enclosure rating: Outdoor-NEMA 6 (IP67)
- Cooling: Natural convection – No fans

### Manufacturing Details

- Customized by: K.VINANTI
- QC'ed by: N.MAHALE
- Papersize: 17"x11"
- Scale: AS NOTED
- Rev: B
- DATE: 1/16/2023
- SS-02

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**Microinverter Datasheet**

**HM-600NT**

**HM-700NT**

**HM-800NT**

**Description**

Hymiles 2 in 1 microinverter can connect up to 2 panels at once and maximize the PV production of your installation. With a maximum DC voltage of 60V, Hymiles microinverter is a PV Rapid Shutdown Equipment and conforms with NEC-2017 and NEC-2020 Article 690.12 and CEI-2021 Sec 64-218.

All of the three models listed are equipped with reactive power control and can meet the requirements of IEEE 1547, UL 1741 and CA Rule 21.

**Features**

- **01** Easy installation, just plug and play
- **02** With Reactive Power Control, compliant with CA Rule 21
- **03** Compliant with U.S. NEC-2017/NEC-2020 690.12 rapid shutdown
- **04** External antenna for stronger communication with DTU
- **05** High reliability: NEMA 6 (IP67) enclosure, 6000 e surge protection

---

**Technical Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>HM-600NT</th>
<th>HM-700NT</th>
<th>HM-800NT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Data (DC)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonly used module power (W)</td>
<td>240 to 405+</td>
<td>280 to 470+</td>
<td>320 to 540+</td>
</tr>
<tr>
<td>Maximum input voltage (V)</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT voltage range (V)</td>
<td>16-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-up voltage (V)</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum input current (A)</td>
<td>2 = 11.5</td>
<td>2 = 11.5</td>
<td>2 = 12.5</td>
</tr>
<tr>
<td><strong>Output Data (AC)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak output power (W)</td>
<td>600</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>Maximum continuous output power (VA)</td>
<td>590</td>
<td>696</td>
<td>766</td>
</tr>
<tr>
<td>Maximum continuous output current (A)</td>
<td>2.44</td>
<td>2.84</td>
<td>2.90</td>
</tr>
<tr>
<td>Nominal output voltage range (V)</td>
<td>240/211-234</td>
<td>208/183-232</td>
<td>208/183-232</td>
</tr>
<tr>
<td>Power factor (adjustable)</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Total harmonic distortion</td>
<td>&lt;3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum units per 10AWG branch</td>
<td>9</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Maximum units per 12AWG branch</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEC peak efficiency</td>
<td>96.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEC weighted efficiency</td>
<td>96.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal MPPT efficiency</td>
<td>99.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nighttime power consumption (W)</td>
<td>&lt;50</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical Data</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range (°C)</td>
<td>40 to 465</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W × H × D mm)</td>
<td>250 × 170 × 38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>Outdoor NEMA 6 (IP67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Natural convection - No fans</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Features**

- Communication: 2.4 GHz Proprietary RF (Nordic)
- Monitoring: S-Mile Cloud
- Warranty: Up to 25 years

---

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SPECSHEET

ADDRESS: 1127 SNORFOLK AVE, TULSA, OK 74120
36.146880, -95.978823
APN: 353-009-21-213-640
UTILITY: PSO
PRN NUMBER: SNS-70486

CUSTOMER INFORMATION
NAME: CAMARON BENJAMIN
ADDRESS: 1127 S NORFOLK AVE, TULSA, OK 74120
36.146880, -95.978823
APN: 353-009-21-213-640
UTILITY: PSO
PRN NUMBER: SNS-70486

INVERTER SPECSHEET
LICENSE NUMBER: 2020012960
PAPERSIZE: 17"X11"
SCALE: AS NOTED
REV: B
DATE: 1/16/2023

---

Microinverter Datasheet

**HM-300NT**
**HM-350NT**
**HM-400NT**

**Description**
Hoymiles 1-in-1 microinverter, which can be connected to one panel and used in various applications, is one of the most flexible solar solutions. With a maximum DC voltage of 60V, Hoymiles microinverter is a PV Rapid Shutdown Equipment and conforms with NEC-2017 and NEC-2020 Article 690.12 and CEC-2021 Sec 64-218.

All of the three models listed are equipped with reactive power control and can meet the requirements of IEEE 1547, UL 1741, and CA Rule 21.

**Features**

- **01** Easy installation, just plug and play
- **02** External antenna for stronger communication with DTU
- **03** With Reactive Power Control, compliant with CA Rule 21
- **04** High reliability: NEMA 6 (IP67) enclosure, 6000 E surge protection
- **05** Compliant with U.S. NEC-2017/NEC-2020 690.12 Rapid Shutdown

---

**Technical Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>HM-300NT</th>
<th>HM-350NT</th>
<th>HM-400NT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Data (DC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonly used module power (W)</td>
<td>240 to 405+</td>
<td>280 to 470+</td>
<td>320 to 540+</td>
</tr>
<tr>
<td>Maximum input voltage (V)</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT voltage range (V)</td>
<td>16-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-up voltage (V)</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum input current (A)</td>
<td>11.5</td>
<td>11.5</td>
<td>12.5</td>
</tr>
<tr>
<td>Output Data (AC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak output power (W)</td>
<td>300</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>Maximum continuous output power (W)</td>
<td>295</td>
<td>349</td>
<td>382</td>
</tr>
<tr>
<td>Maximum continuous output current (A)</td>
<td>1.23</td>
<td>1.42</td>
<td>1.68</td>
</tr>
<tr>
<td>Nominal output voltage range (V)</td>
<td>240/211-264</td>
<td>208/183-228</td>
<td>240/211-264</td>
</tr>
<tr>
<td>Nominal frequency range (Hz)</td>
<td>60/55-65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power factor (adjustable)</td>
<td>0.9 (default)</td>
<td>0.8 leading, 0.8 lagging</td>
<td></td>
</tr>
<tr>
<td>Total harmonic distortion</td>
<td>&lt;3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEC peak efficiency</td>
<td>96.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEC weighted efficiency</td>
<td>96.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal MPPT efficiency</td>
<td>99.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nighttime power consumption (W)</td>
<td>&lt;50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical Data**

- Ambient temperature range (°C): -40 to 405
- Dimensions (W x H x D mm): 182 x 164 x 29.5
- Weight (kg): 1.75
- Enclosure rating: NEMA 6 (IP67)
- Cooling: Natural convection - No fans
- Features: Communication 2.4GHz Proprietary (RF-Nordic)
- Monitoring: 5-Miles Cloud
- Warranty: Up to 25 years
- Compliance: UL 1741, IEEE 1547, UL 1741 SA (40 Vac), CA Rule 21 (40 Vac), CSA C22.2 No. 107.1-16, FCC Part 15B, FCC Part 15C
- PV Rapid Shutdown: Conforms with NEC-2017 and NEC-2020 Article 690.12 and CEC-2021 Sec 64-218 Rapid Shutdown of PV Systems

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*1) Nominal voltage/frequency range can vary depending on local requirements.
2) Refer to local requirements for exact number of microinverters per branch.
3) Hoymiles Monitoring System.

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General Duty Cartridge Fuse Safety Switch

DG222NRB

UPC:782113144221

Dimensions:
- Height: 7 IN
- Length: 6.41 IN
- Width: 8.4 IN

Weight: 9 LB

Notes: Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

Specifications:
- Type: General Duty/Cartridge Fuse
- Amperage Rating: 60A
- Enclosure: NEMA 3R
- Enclosure Material: Painted galvanized steel
- Fuse Class Provision: Class H fuses
- Fuse Configuration: Fusible with neutral
- Number Of Poles: Two-pole
- Number Of Wires: Three-wire
- Product Category: General Duty Safety Switch
- Voltage Rating: 240V

Supporting documents:
- Eaton's Volume 2-Commercial Distribution
- Eaton Specification Sheet - DG222NRB

Certifications:
- UL Listed

Product compliance: No Data

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SnapNrack Ultra Rail System

A sleek, straightforward rail solution for mounting solar modules on all roof types. Ultra Rail features two rail profiles; UR-40 is a lightweight rail profile that is suitable for most geographic regions and maintains all the great features of SnapNrack rail, while UR-60 is a heavier duty rail profile that provides a larger rail channel and increased span capabilities. Both are compatible with all existing mounts, module clamps, and accessories for ease of install.

The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with all the SnapNrack Mid Clamps and End Clamps customers love
- Universal End Clamps and snap-in End Caps provide a clean look to the array edge

Unparalleled Wire Management

- Open rail channel provides room for running wires resulting in a long-lasting quality install
- Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits, and Conduit Clamps
- System is fully bonded and listed to UL 2703 Standard

Heavy Duty UR-60 Rail

- UR-60 rail profile provides increased span capabilities for high wind speeds and snow loads
- Taller, stronger rail profile includes profile-specific rail splice and end cap
- All existing mounts, module clamps, and accessories are retained for the same great install experience

The Ultimate Value in Rooftop Solar

- Industry leading Wire Management Solutions
- Mounts available for all roof types
- Single Tool Installation
- All SnapNrack Module Clamps & Accessories are compatible with both rail profiles

Start Installing Ultra Rail Today

RESOURCES  snaprack.com/resources
DESIGN      snaprack.com/configurator
WHERE TO BUY snaprack.com/where-to-buy
**POWER WALL**

Backup Gateway 2

The Backup Gateway 2 for Tesla Powerwall provides energy management and monitoring for solar self-consumption, time-based control, and backup. The Backup Gateway 2 controls connection to the grid, automatically detecting outages and providing a seamless transition to backup power. When equipped with a main circuit breaker, the Backup Gateway 2 can be installed at the service entrance. When the optional internal panelboard is installed, the Backup Gateway 2 can also function as a load center.

The Backup Gateway 2 communicates directly with Powerwall, allowing you to monitor energy use and manage backup energy reserves from a mobile device with the Tesla app.

**PERFORMANCE SPECIFICATIONS**

- **AC Voltage (Nominal):** 120/240V
- **Feed in Type:** Split Phase
- **Grid Frequency:** 60 Hz
- **Current Rating:** 200 A
- **Maximum Input Short Circuit Current:** 10 kA

**Overvoltage Category:** Category IV

**AC Motor:** Revenue accurate (±1% – ±2 %)

**Primary Connectivity:** Ethernet, Wi-Fi

**Secondary Connectivity:** CyberArk® 172/REV

**User Interface:** Tesla App

**Operating Mode:** Support for solar self-consumption, time-based controls, and backup

**Backup Transition:** Automatic disconnection for seamless backup

**Modularity:** Supports up to 10 AC-occupied Residences

**Optional Internal Panelboard:** 300A-6-space / 12 circuit Eaton BR Circuit Breaker

**Warranty:** 10 years

1: When purchased by Class I users, Backup Gateway 2 is suitable for use in certain sizes of dwellings, which can be found in CSA C22.1, Part 1.

2: The customer is expected to provide internet connectivity for Backup Gateway 2. This feature should not be used as the primary mode of connectivity. CyberArk connectivity is subject to network operator service coverage and signal strength.

**MECHANICAL SPECIFICATIONS**

- **Dimensions:** 680 mm x 411 mm x 149 mm
- **Weight:** 20.4 kg (45 lbs)
- **Mounting options:** Wall mount, Semi-Rush mount

**COMPLIANCE INFORMATION**

- **Certifications:** UL 67, UL 950A, UL 916, UL 1441, CSA 22.2 N.18, CSA 22.2 No. 200

**EMISSIONS**

- **FCC Part 15, CE 053**

**ENVIRONMENTAL SPECIFICATIONS**

- **Operating Temperature:** -25°C to 50°C (-13°F to 122°F)
- **Operating Humidity (DRY):** Up to 100%, condensing
- **Maximum Elevation:** 3000 m (9843 ft)
- **Environment:** Indoor and outdoor rated
- **Enclosure Type:** NEMA 3R
Tesla Powerwall is a fully-integrated AC battery system for residential or light commercial use. Its rechargeable lithium-ion battery pack provides energy storage for solar self-consumption, time-based control, and backup.

Powerwall's electrical interface provides a simple connection to any home or building. Its revolutionary compact design achieves market-leading energy density and is easy to install, enabling owners to quickly realize the benefits of reliable, clean power.

**PERFORMANCE SPECIFICATIONS**

- **AC Voltage (Nominal)**: 120/240 V
- **Feed-In Type**: Split Phase
- **Grid Frequency**: 60 Hz
- **Total Energy**: 14 kWh
- **Usable Energy**: 13.5 kWh
- **Real Power, max continuous**: 4 kW (charge and discharge)
- **Real Power, peak (15%, off-grid/backup)**: 7 kW (charge and discharge)
- **Apparent Power, max continuous**: 9.8 kWh (charge and discharge)
- **Apparent Power, peak (15%, off-grid/backup)**: 7.2 kVA (charge and discharge)
- **Maximum Supply Fault Current**: 10 kA
- **Maximum Output Fault Current**: 32 A
- **Overcurrent Protection Device**: 30 A
- **Impedance for Split-Phase Loads**: 100%
- **Power Factor Output Range**: +/- 10 adjustable
- **Power Factor Range (Rated power)**: +/- 0.92
- **Input Rated DC Voltage**: 50 V
- **Round Trip Efficiency**: 100%
- **Warranty**: 10 years

**COMPLIANCE INFORMATION**

- **Certifications**: UL T444, UL 774L, IEC 62619, IEC 62413, ENEC 38
- **Grid Connection**: worldwide (Grid-tie or off-grid)
- **Environments**: FSC Part 5 Class B (DBS-004)
- **Environmental**: RoHS Directive 2015/863/EU
- **Seismic**: AC34, IEC 660-100 (light)

**ENVIRONMENTAL SPECIFICATIONS**

- **Operating Temperature**: -40°C to 50°C (-40°F to 122°F)
- **Storage Temperature**: -20°C to 50°C (-4°F to 122°F)
- **Storage Condition**: Up to 95% RH non-condensing
- **Humidity**: Up to 100%, non-condensing
- **State of Energy**: 10% - 100%
- **Maximum Discharge**: 5000 mAh (8841 Wh)
- **Environmental**: Indoor and outdoor rated
- **Enclosure**: NEMA 3A
- **Ingress Rating**: IP67 (Battery & Power Electronic), IP65 (Wiring Connection)
- **Wet Location Rating**: Yes
- **Noise Level**: < 43 dBA at 30°C (8871 Wh)

**TYPICAL SYSTEM LAYOUTS**

**WHOLE HOME BACKUP**

- **Solar**
- **Main panel**
- **Backup Gateway including service disconnect**
- **Utility meter**
- **Grid**

**PARTIAL HOME BACKUP**

- **Solar**
- **Sub panel**
- **Backup Gateway**
- **Main panel**
- **Utility meter**
- **Grid**

**TESSA POWERWALL 2**

**LICENSE NUMBER**: 2020012960

**CUSTOMER INFORMATION**

**NAME**: CAMARON BENJAMIN

**ADDRESS**: 1127 S NORFOLK AVE, TULSA, OK 74120

**APN**: 353-009-21-213-640

**UTILITY**: PSO

**PRR NUMBER**: SNS-70486