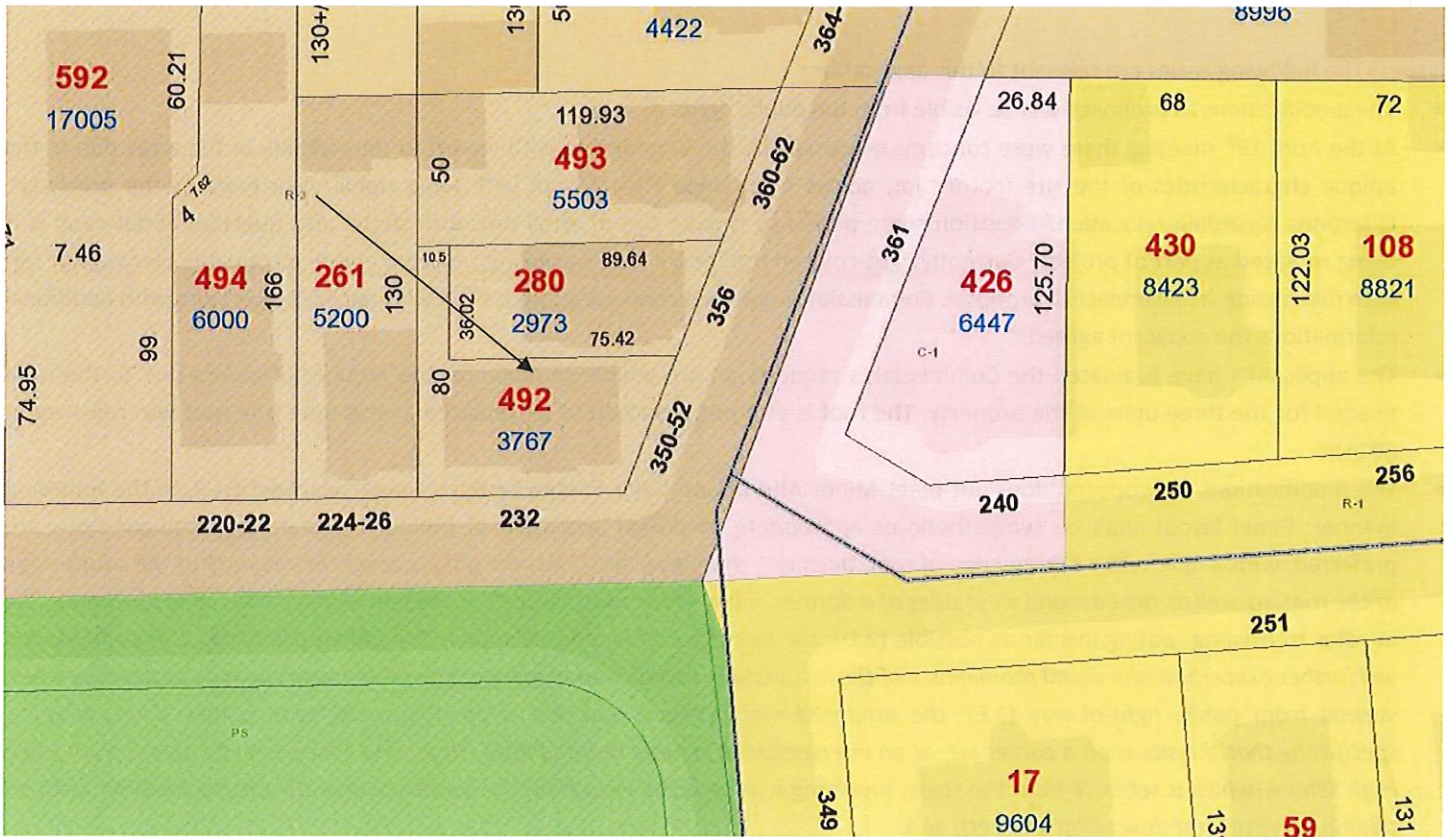


PROJECT REVIEW

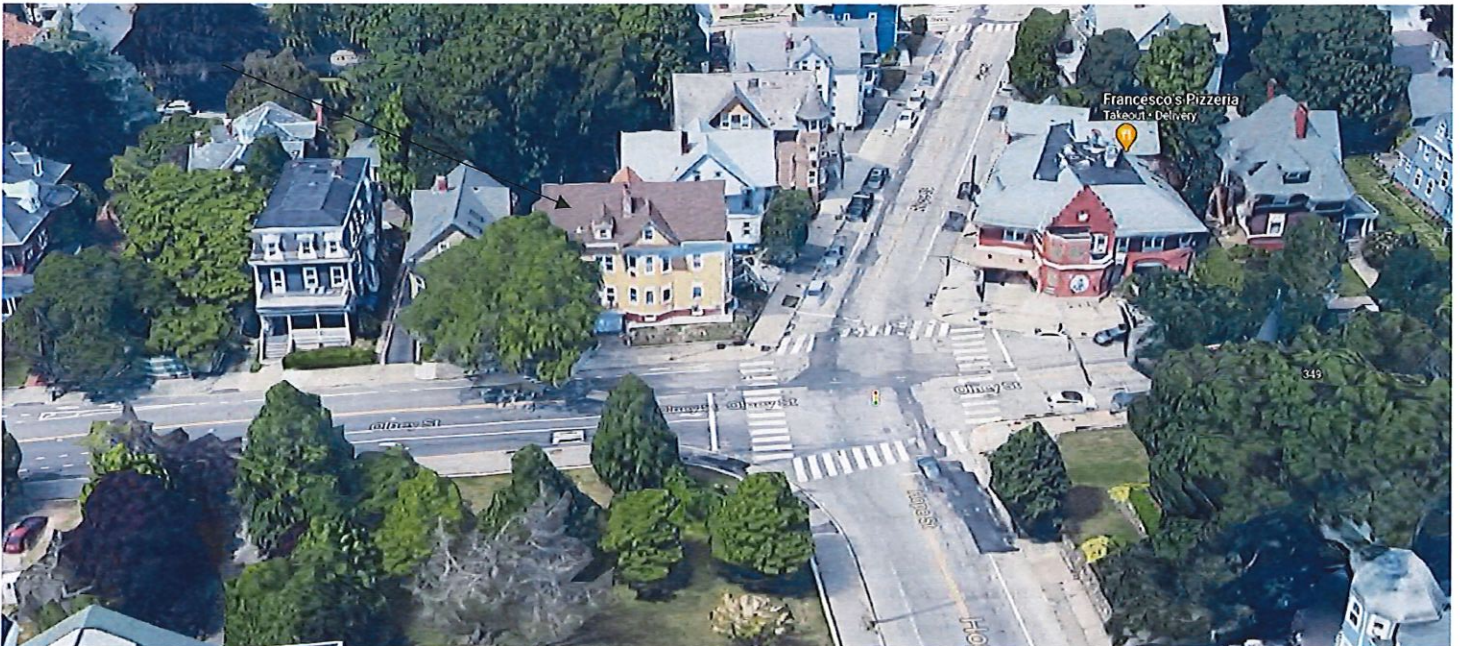
1. CASE 21.031, 350-352 HOPE STREET, House, c1910 (COLLEGE HILL)

Located within the boundaries CHNHLD, but not identified in the inventory, nor RIHPHC's database.

CONTRIBUTING



Arrow indicates 350-352 Hope Street.



Arrow indicates project location, looking north.

Applicant/Contractor: Matthew Markham, Freedom Forever RI LLC, 135 Robert Treat Paine Dr, Taunton, MA 02780
Owner: Kevin Lo, 352 Hope Street, Providence, RI 02906

Proposal: The scope of work proposed consists of Minor Alterations and includes the installation of 36 solar panels to the south slope of the end-gable roof.

Issues: The following issues are relevant to this application:

- The modifications as proposed will be visible from the public rights-of-way;
- At the April 19th meeting there were concerns expressed by the Commission with regard to the visibility of the array due to the unique characteristics of the site (corner lot, across from Hope High School with large uphill vista towards the property). Questions regarding relocation/reposition some panels to reduce size of array on south slope, also question about roof: is it being replaced as part of project? Currently light-colored roof and if roof was being replaced and made a dark color would help with minimizing visual impact of proposal. Commission suggested continuing application with applicant to return with additional information. The applicant agreed;
- The applicant's have evaluated the Commission's requests an are unable to minimize the number of panels due to the ratio needed for the three units at the property. The roof is also not proposed to be replaced at this time (the roof was replaced in 2011);
- The modifications as proposed does not meet Minor Alterations: Solar Energy Systems Guidelines, Section 2, in the following manner: Panel layout shall be sympathetic or appropriate to design and scale of building. Rectangular configurations are preferred, with ample setback from edge of roof, dormers, chimneys, etc. (2.A): *the panels cover the majority of the south slope of the roof, as well as the east and west sides of a dormer, which is the most visually prominent slope*; Panels shall be compatible in color to existing roofing insofar as possible (2.D): *the existing roof is reddish/brown. The panels are black. This combination will further exacerbate the visual prominence of the installation*; Installation of panels shall be as inconspicuous as possible when viewed from public right-of-way (2.E): *the proposed modification's location is on a property with unique characteristics, specifically that the site is on a corner lot, at an intersection of a main thoroughfare (Hope and Olney Streets) across from Hope High School (which is set back from the street providing a large uphill vista from the south towards the project location, with an additional vista west down Olney Street)*; and,
- Plans, specifications and pictures have been submitted.

Recommendations: The staff recommends the PHDC make the following findings of fact:

- a) 350-352 Hope Street is a structure of historical and architectural significance that contribute to the significance of the College Hill local historic district, being listed within the College Hill National Historic Landmarks District;
- b) The application is considered complete;
- b) The modifications as proposed does not meet Minor Alterations: Solar Energy Systems Guidelines, Section 2, and,
- c) The work as proposed is not in accord with PHDC Standard 8 as follows: the work will be done so that it destroys the historic character of the property or the district, as the proposed modification's location is on a property with unique characteristics, specifically that the site is on a corner lot, at an intersection of a main thoroughfare (Hope and Olney Streets) across from Hope High School (which is set back from the street providing a large uphill vista from the south towards the project location, with an additional vista west down Olney Street).

Staff recommends a motion be made stating that: The application is considered complete. 350-352 Hope Street is a structure of historical and architectural significance that contribute to the significance of the College Hill local historic district, being listed within the College Hill National Historic Landmarks District. The Commission, agreeing with the recommendations and findings of fact in the staff report, denies the proposal as submitted as the proposed alteration does not meet Minor Alterations: Solar Energy Systems Guidelines, Section 2.A, 2.D and 2.E, is inappropriate having determined that the proposed alteration destroys the historic character of the property or the district (Standard 8), and will have an adverse effect on the property or district.

PHOTOVOLTAIC SYSTEM

PV SYSTEM SUMMARY: 11.655 KW

RESIDENTIAL PHOTOVOLTAIC SYSTEM

| | |
|--------------------|--|
| SYSTEM SIZE (DC) | : STC: 37 X 315 = 11655W DC |
| | : PTC: 37 X 294.1 = 10811.7W DC |
| SYSTEM SIZE (AC) | : 11000W AC @ 240V |
| MODULES | : 37 X LONGI SOLAR: LR6-60HPB-315M |
| OPTIMIZERS | : 37 X SOLAR EDGE: P340 |
| INVERTERS | : (2)SOLAR EDGE: SE3000H-USRGM [S11] & (1) SE5000H-USRGM[S11] |
| TILT | : 40° |
| AZIMUTH | : 90°, 180°, 270° |
| ROOF | : COMPOSITION SHINGLE |
| RAFTER/TRUSS SIZE | : 2X8 RAFTER @ 20" O.C. |
| ATTACHMENT TYPE | : UNIRAC: FLASHKIT PRO WITH UNIRAC SM LIGHT RAIL |
| MAIN SERVICE PANEL | : EXISTING 100 AMPS MSP WITH (E) 100 AMPS MAIN BREAKER ON END FED |
| OCPD RATING | : 70 AMPS TOTAL (3 SYSTEMS) |
| UTILITY | : NATIONAL GRID - RI |

TABLE OF CONTENTS

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| PV-1 | SITE LOCATION AND HOUSE AERIAL VIEW |
| PV-2 | SITE PLAN |
| PV-2A | ROOF PLAN WITH MODULES LAYOUT |
| PV-3 | MOUNTING DETAILS |
| PV-4 | THREE LINE DIAGRAM |
| PV-5 | EXISTING SERVICE PANEL |
| PV-6 | NOTES AND EQUIPMENT LIST |
| PV-7 | LABELS |
| PV-7A | SITE PLACARD |
| PV-8 | OPTIMIZER CHART |
| PV-9 & 10 | SAFETY PLAN |

CITY NOTES:

THIS PROJECT COMPLIES WITH THE FOLLOWING:
 2019 RHODE ISLAND BUILDING CODE (RIBC)
 2019 RHODE ISLAND RESIDENTIAL CODE (RIRC)
 2019 RHODE ISLAND FIRE CODE (RIFC)
 2019 RHODE ISLAND PLUMBING CODE
 2019 RHODE ISLAND MECHANICAL CODE
 2019 RHODE ISLAND ENERGY CODE
 2019 RHODE ISLAND ADMINISTRATIVE CODE
 2019 RHODE ISLAND ELECTRICAL CODE (RIEC)
 AS ADOPTED BY CITY OF PROVIDENCE

CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.

ALL SOLAR ENERGY SYSTEM EQUIPMENT SHALL BE SCREENED TO THE MAXIMUM EXTENT POSSIBLE AND SHALL BE PAINTED A COLOR SIMILAR TO THE SURFACE UPON WHICH THEY ARE MOUNTED.

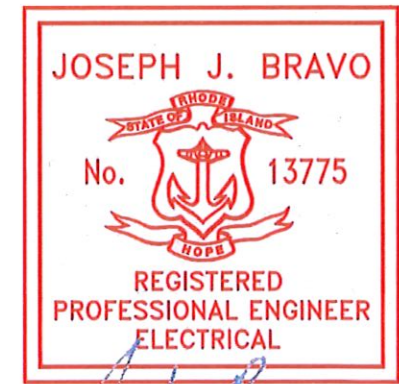
MODULES SHALL BE TESTED, LISTED AND IDENTIFIED WITH FIRE CLASSIFICATION IN ACCORDANCE WITH UL 2703. SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER SECTION R314 AND 315 TO BE VERIFIED AND INSPECTED BY INSPECTOR IN THE FIELD.

INSTALLATION NOTES:

PV WIRE SHALL BE USED ON DC RUNS FOR UNGROUNDED /TRANSFORMERLESS INVERTERS.

DIG ALERT (811) TO BE CONTACTED AND COMPLIANCE WITH EXCAVATION SAFETY PRIOR TO ANY EXCAVATION TAKING PLACE

INSTALL CREW TO VERIFY ROOF STRUCTURE PRIOR TO COMMENCING WORK. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNT.



Joseph Bravo

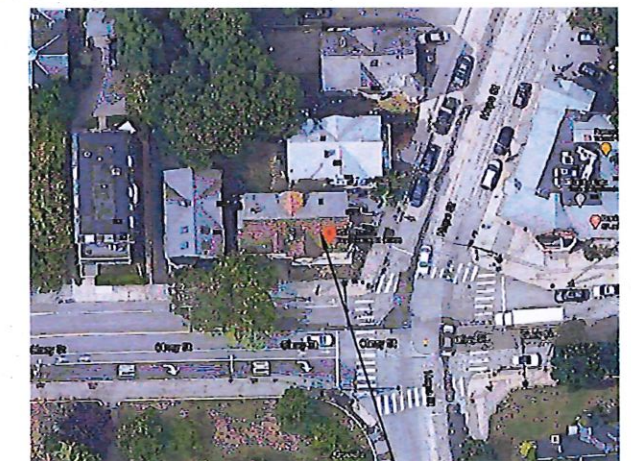
03-25-2021
EXP.
06-30-2021

SITE LOCATION:



SITE LOCATION

HOUSE AERIAL VIEW:

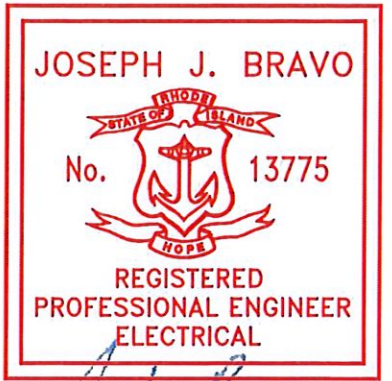


MODULE LOCATION

| DESCRIPTION | DATE | REVISION |
|-------------|------|----------|
| | | |
| | | |
| | | |

ROOF AREA : 1405.52 SQ FT

PV SYSTEM
 11.655 kW-DC
 11.000 kW-AC



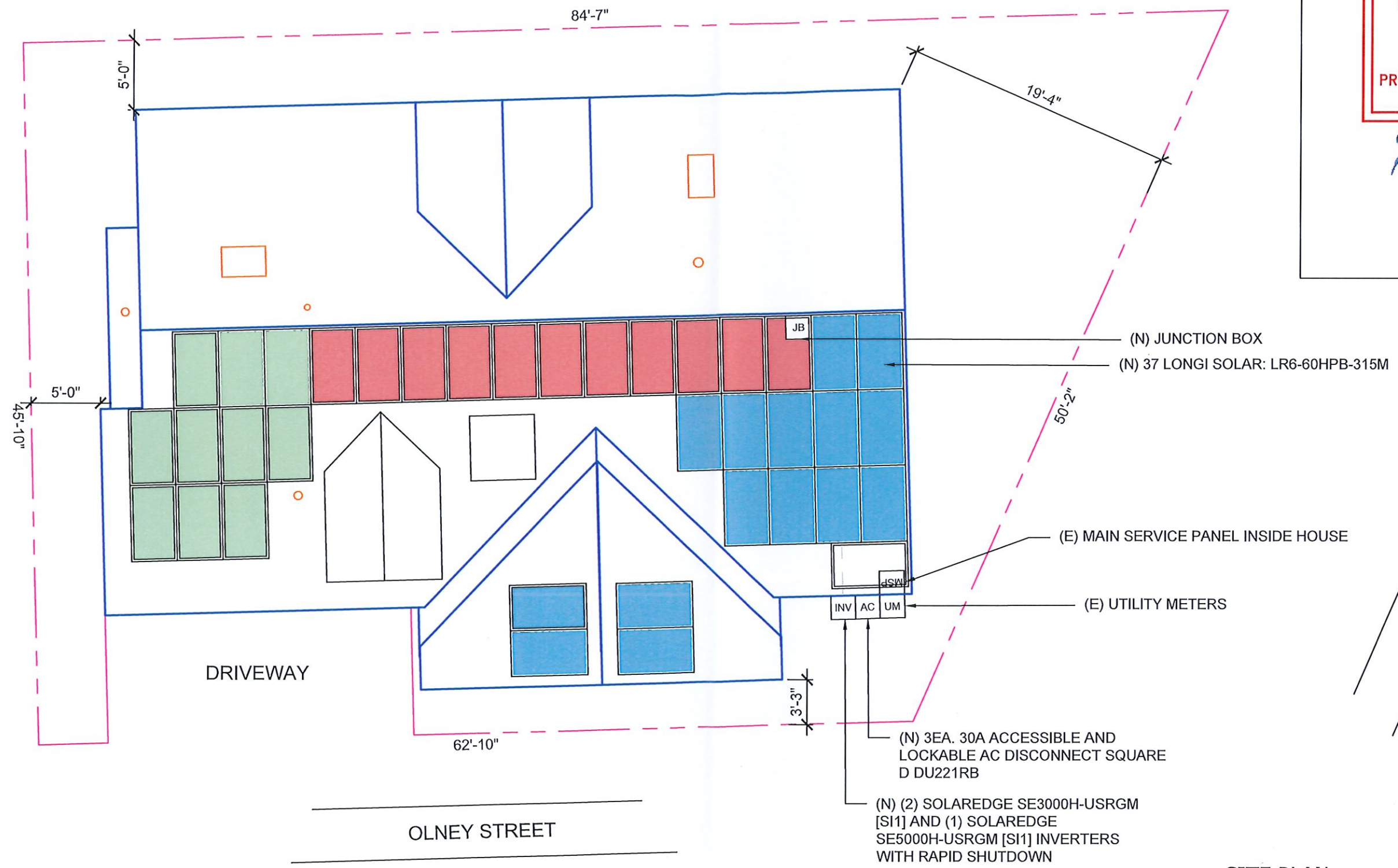
Joseph Bravo
 03-25-2021
 EXP.
 06-30-2021

SYSTEM LEGEND

APT 1

APT 2

APT 3



SITE PLAN
 SCALE: 1/8" = 1'-0"

1



freedom
 FOREVER

FREEDOM FOREVER RHODE ISLAND LLC
 135 ROBERT TREAT PAINE DR., TAUNTON, MA 02780
 Tel: (800) 385-1075

ELECTRICAL CONTRACTOR NO:
 EB01838900 ELECTRICAL
 CONTRACTOR AC005036; RENEWABLE
 ENERGY PROFESSIONAL CERTIFICATE
 REPC-199; GENERAL CONTRACTOR
 GC-44187

MATTHEW MARKHAM

Matthew Markham

CLIENT:
KEVIN LO 352 APT 1, 2, & 3
 352 HOPE STREET,
 PROVIDENCE, RI 02906

REVISIONS:

| DESCRIPTION | DATE | REVISION |
|-------------|------|----------|
| | | |
| | | |
| | | |
| | | |

DATE: 3/18/2021
 DESIGN BY: GREG
 JOB NO.: F079142

TITLE:
SITE PLAN

SHEET:
PV-2

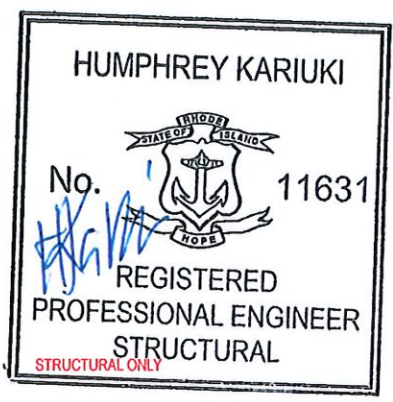
ROOF AREA : 1405.52 SQ FT

PV SYSTEM
11.655 KW-DC
 11.000 KW-AC

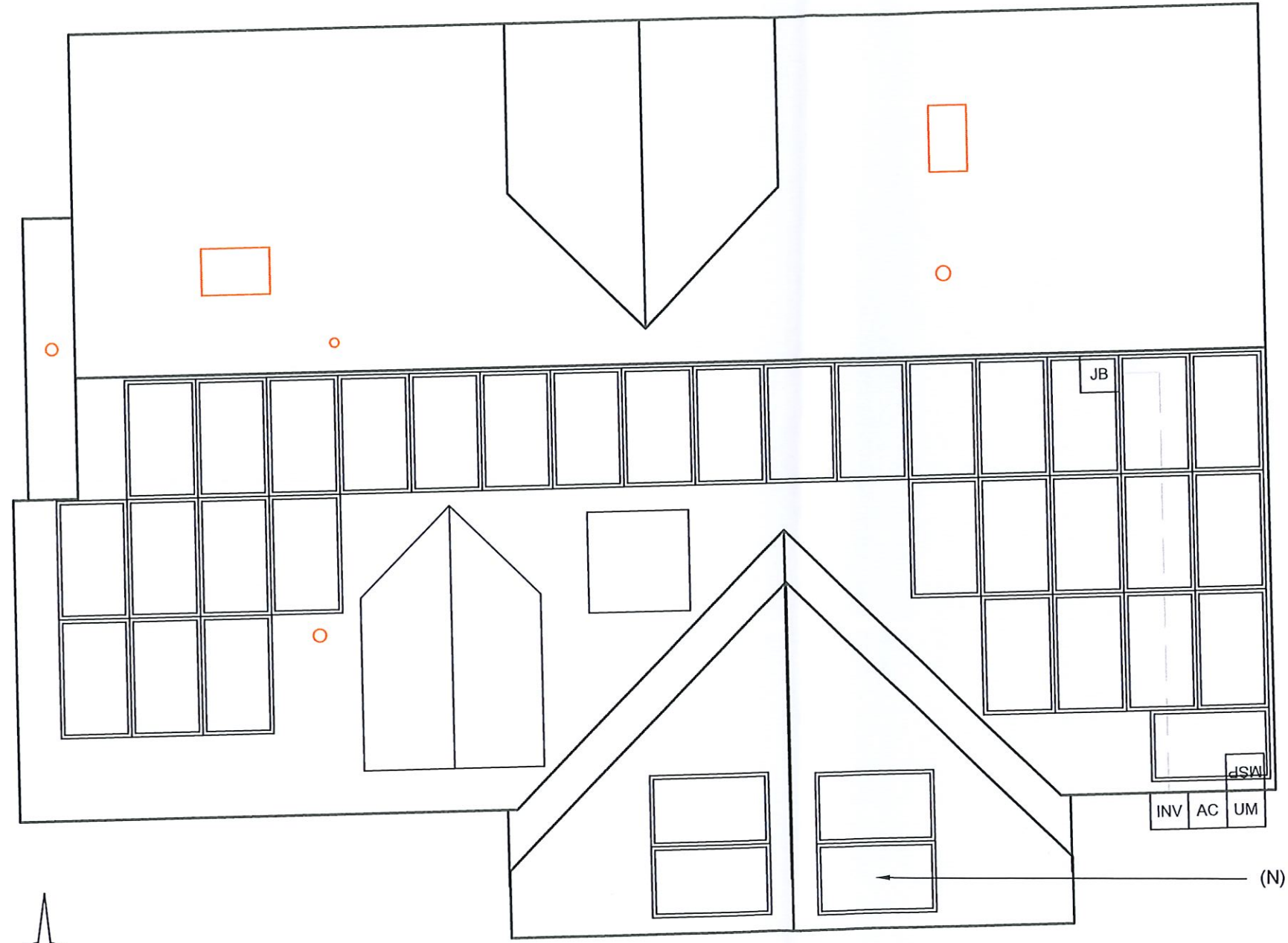
| ROOF AREA STATEMENT | | | | | | |
|---------------------|-------------|-------|---------|--------------|--------------|------------------|
| ROOF | MODULES QTY | PITCH | AZIMUTH | ROOF AREA | ARRAY AREA | ARRAY COVERAGE % |
| 1 | 33 | 40° | 180° | 964.85 SQ FT | 193.38 SQ FT | 18.87% |
| 2 | 2 | 40° | 90° | 159 SQ FT | 35.94 SQ FT | |
| 3 | 2 | 40° | 270° | 159 SQ FT | 35.94 SQ FT | |

HUMPHREY K
 KARIUKI:A01410D00000
 1783672F4E9000047D3

Digitally signed by HUMPHREY K
 KARIUKI:A01410D000001783672
 F4E9000047D3
 Date: 2021.03.25 15:21:50 -04'00'



THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY HUMPHREY K. KARIUKI, P.E. ON THE DATE SHOWN USING A DIGITAL SIGNATURE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.



LEGEND:

| | |
|--|--------------------|
| | OBSTRUCTION |
| | PIPE VENT |
| | MODULES |
| | CONDUIT |
| | SETBACK |
| | AC DISCONNECT |
| | MAIN SERVICE PANEL |
| | JUNCTION BOX |
| | INVERTER |
| | PRODUCTION METER |

- NOTES:
- EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNTS
 - ATTACHED CLAMPS AT 25% FROM THE EDGE AND 50% FROM THE CENTER OF THE MODULES
 - JUNCTION BOX IS MOUNTED TO THE RAIL.



ROOF PLAN
 SCALE: 0.012601

1

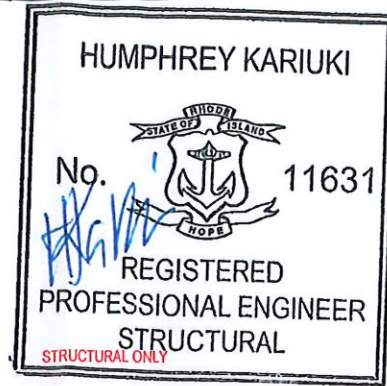
REVISIONS:

| DESCRIPTION | DATE | REVISION |
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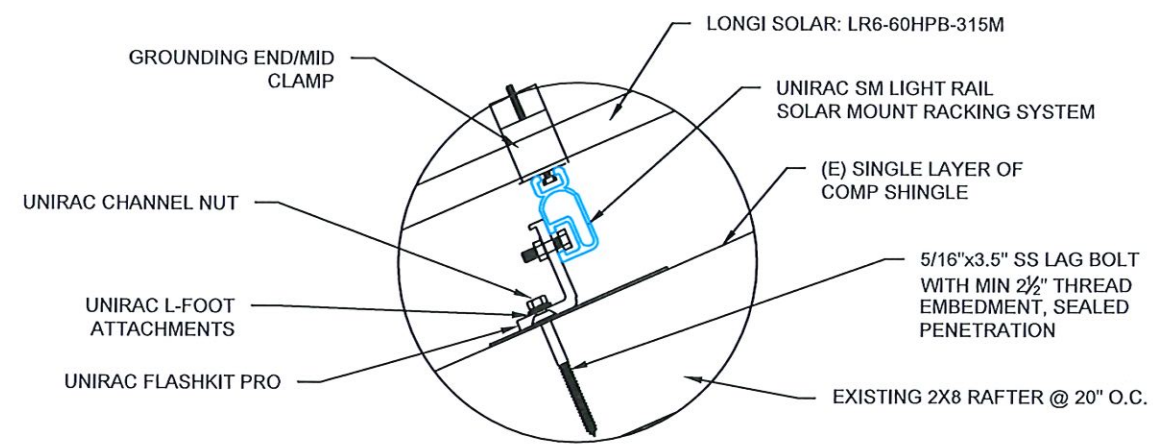
| | |
|------------|-----------|
| DATE: | 3/18/2021 |
| DESIGN BY: | GREG |
| JOB NO.: | F079142 |

HUMPHREY K
 KARIUKI:A01410D00000
 1783672F4E9000047D3

Digitally signed by HUMPHREY K
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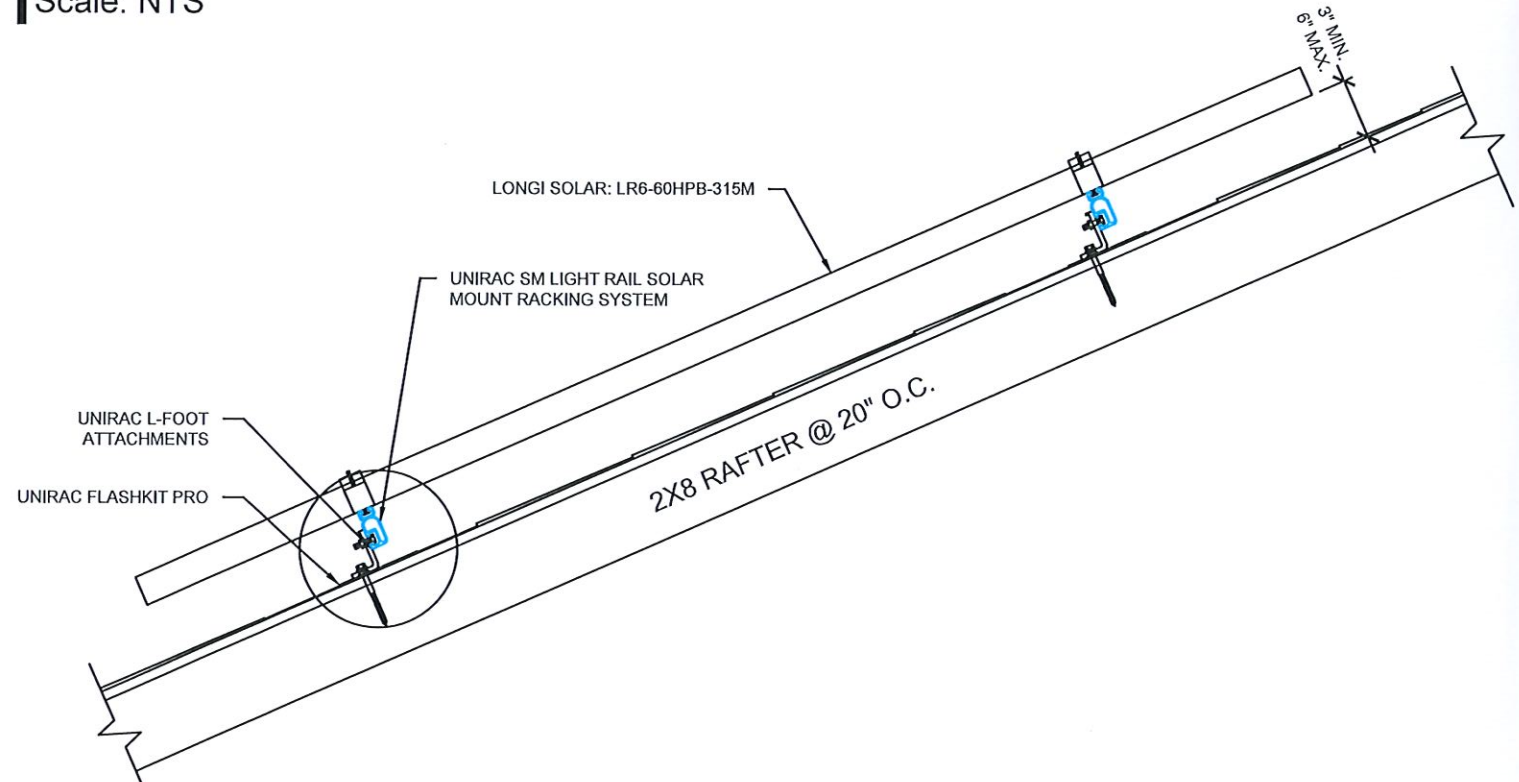


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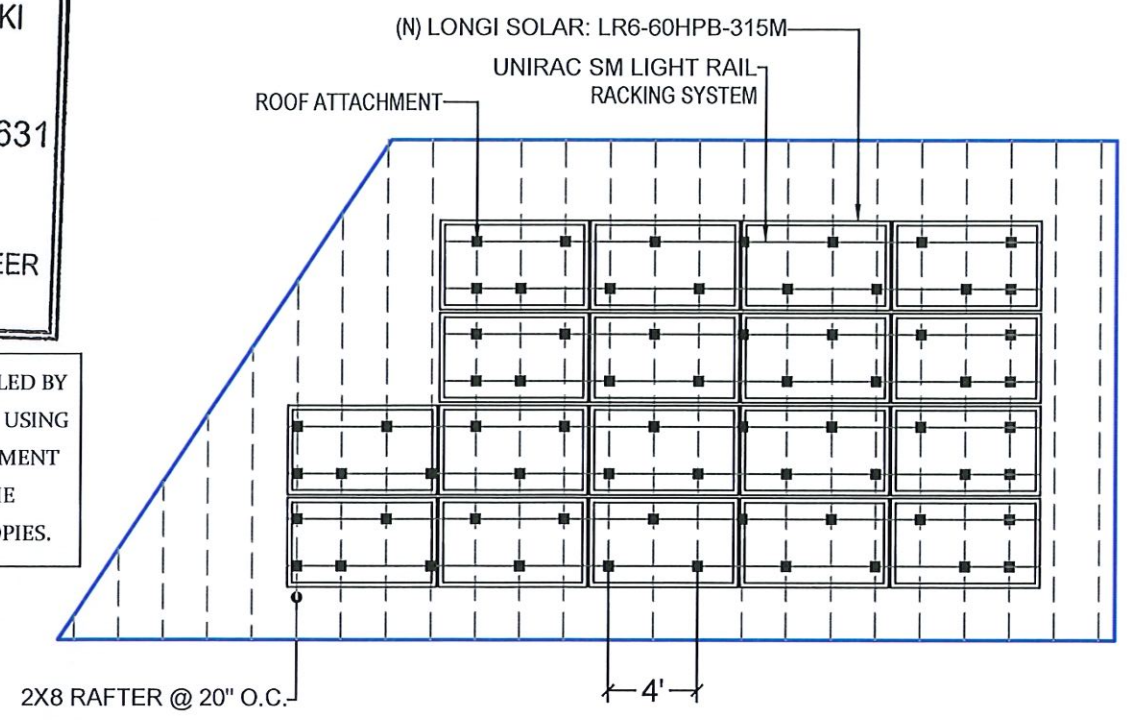
ATTACHMENT DETAIL

Scale: NTS



SOLAR PV ARRAY SECTION VIEW

Scale: NTS



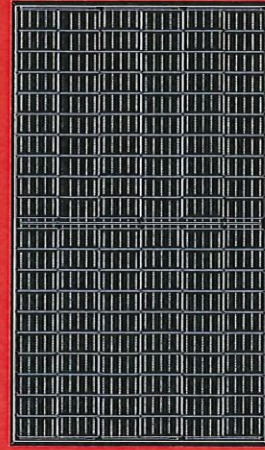
PARTIAL ROOF FRAMING PLAN

Scale: NTS

| REVISIONS: | | |
|-------------|------|----------|
| DESCRIPTION | DATE | REVISION |
| | | |
| | | |
| | | |

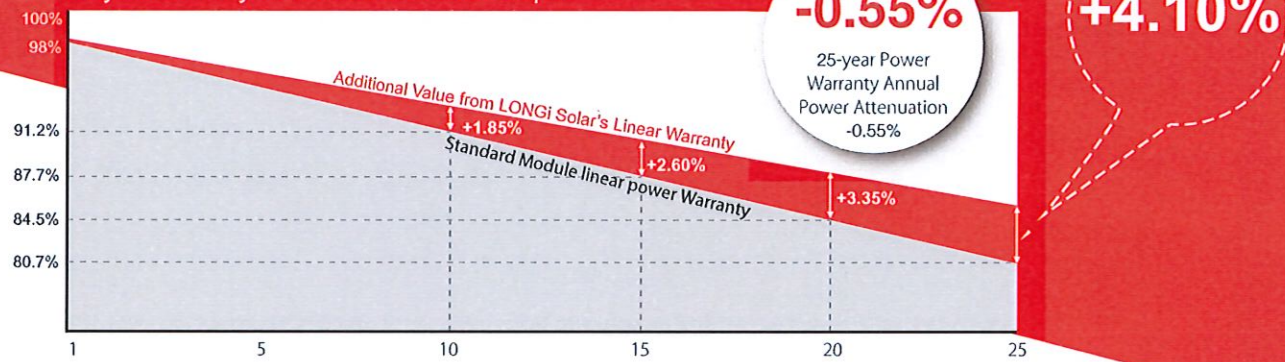
LR6-60HPB 300~320M

Hi-MO3m
(Black)



High Efficiency
Low LID Mono PERC with
Half-cut Technology

10-year Warranty for Materials and Processing;
25-year Warranty for Extra Linear Power Output



Complete System and Product Certifications

IEC 61215, IEC61730, UL1703
ISO 9001:2008: ISO Quality Management System
ISO 14001: 2004: ISO Environment Management System
TS62941: Guideline for module design qualification and type approval
OHSAS 18001: 2007 Occupational Health and Safety



* Specifications subject to technical changes and tests. LONGi Solar reserves the right of interpretation.

Positive power tolerance (0 ~ +5W) guaranteed

High module conversion efficiency (up to 19.1%)

Slower power degradation enabled by Low LID Mono PERC technology: first year <2%, 0.55% year 2-25

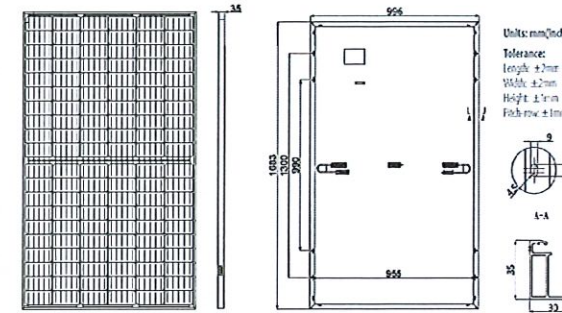
Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

Design (mm)



Mechanical Parameters

Cell Orientation: 120 (6×20)
Junction Box: IP67, three diodes
Output Cable: 4mm², 300mm in length
length can be customized
Glass: Single glass
3.2mm coated tempered glass
Frame: Anodized aluminum alloy frame
Weight: 18.9kg
Dimension: 1683×996×35mm
Packaging: 30pcs per pallet
180pcs per 20'GP
780pcs per 40'HC

Operating Parameters

Operational Temperature: -40 C ~ +85 C
Power Output Tolerance: 0 ~ +5 W
Voc and Isc Tolerance: ±3%
Maximum System Voltage: DC1000V (IEC/UL)
Maximum Series Fuse Rating: 20A
Nominal Operating Cell Temperature: 45±2 C
Safety Class: Class II
Fire Rating: UL type 1 or type 2

Electrical Characteristics

Test uncertainty for Pmax: ±3%

| Model Number | LR6-60HPB-300M | | LR6-60HPB-305M | | LR6-60HPB-310M | | LR6-60HPB-315M | | LR6-60HPB-320M | |
|----------------------------------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|
| | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT |
| Testing Condition | | | | | | | | | | |
| Maximum Power (Pmax/W) | 300 | 222.2 | 305 | 225.9 | 310 | 229.6 | 315 | 233.4 | 320 | 237.1 |
| Open Circuit Voltage (Voc/V) | 39.8 | 37.1 | 40.1 | 37.4 | 40.3 | 37.7 | 40.6 | 37.9 | 40.9 | 38.2 |
| Short Circuit Current (Isc/A) | 9.70 | 7.82 | 9.78 | 7.88 | 9.86 | 7.94 | 9.94 | 8.01 | 10.02 | 8.08 |
| Voltage at Maximum Power (Vmp/V) | 32.9 | 30.4 | 33.1 | 30.6 | 33.3 | 30.8 | 33.7 | 31.1 | 33.9 | 31.3 |
| Current at Maximum Power (Imp/A) | 9.13 | 7.32 | 9.21 | 7.38 | 9.30 | 7.46 | 9.36 | 7.50 | 9.43 | 7.56 |
| Module Efficiency(%) | 17.9 | | 18.2 | | 18.5 | | 18.8 | | 19.1 | |

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25 C, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20 C, Spectra at AM1.5, Wind at 1m/s

Temperature Ratings (STC)

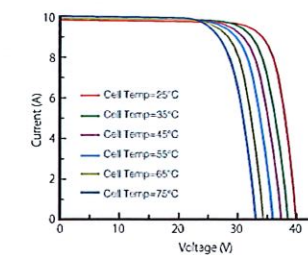
Temperature Coefficient of Isc +0.057%/C
Temperature Coefficient of Voc -0.286%/C
Temperature Coefficient of Pmax -0.370%/C

Mechanical Loading

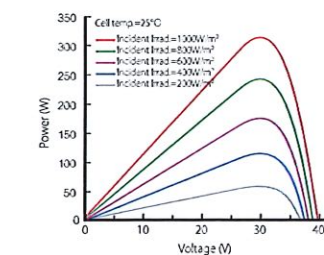
Front Side Maximum Static Loading 5400Pa
Rear Side Maximum Static Loading 2400Pa
Hailstone Test 25mm Hailstone at the speed of 23m/s

I-V Curve

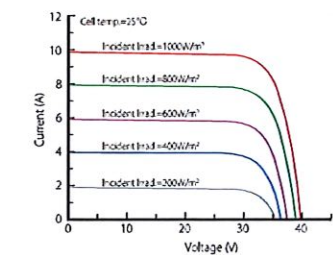
Current-Voltage Curve (LR6-60HPB-310M)



Power-Voltage Curve (LR6-60HPB-310M)



Current-Voltage Curve (LR6-60HPB-310M)



LONGi

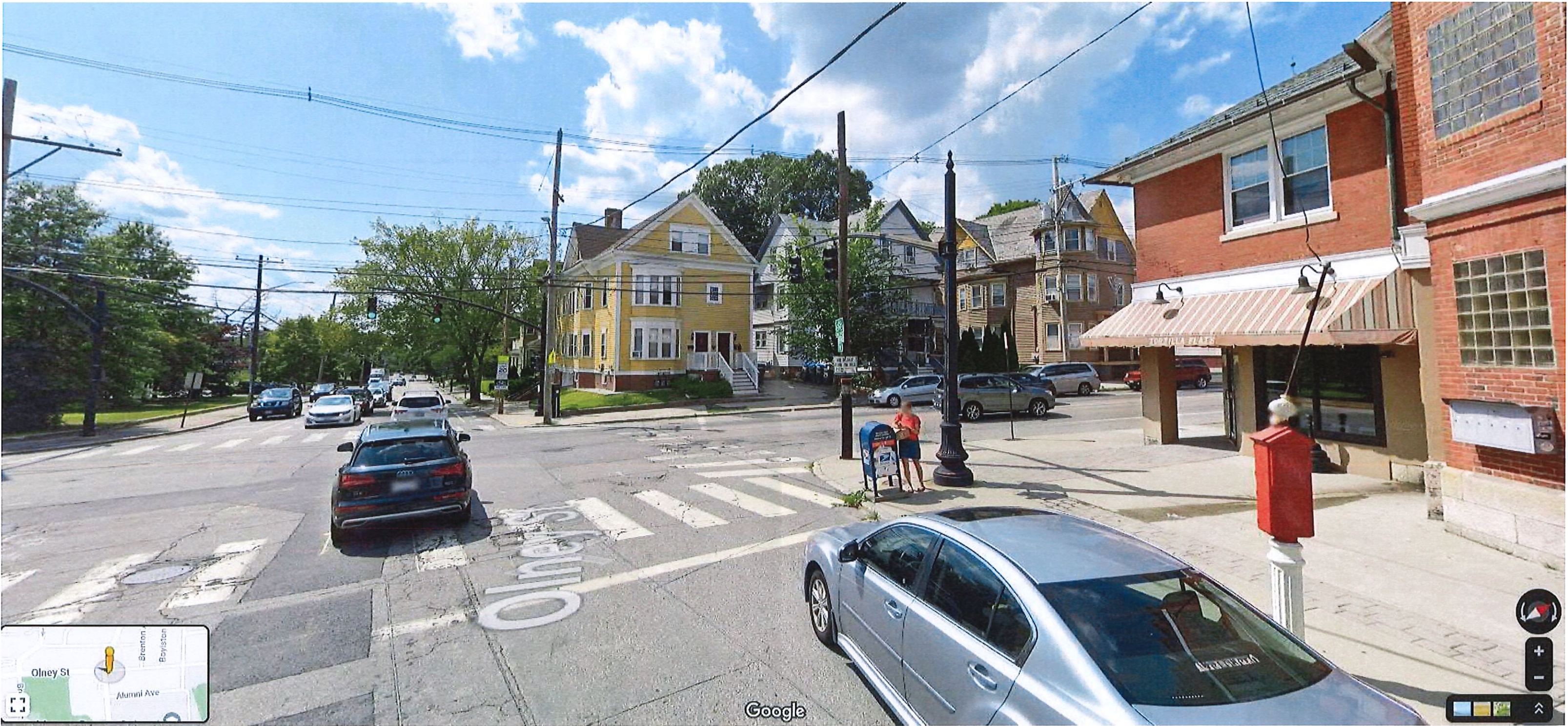
Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGi Solar have the sole right to make such modification at anytime without further notice; Demanding party shall request for the latest datasheet for such as contract need, and make it a consisting and binding part of lawful documentation duly signed by both parties.

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Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

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352 Hope St - looking west



352 Hope St - looking North