




MBTA Catalog 21-01



Exhibit 2

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PV Stop+ | Urban Solar

Solar lighting solution for
unsheltered bus stops



Tolar Manufacturing Company

As North America's most reputable leader in the design and fabrication of award-winning street furniture, Tolar delivers uniquely designed, quality-built products on time and on budget.

This does not happen by accident and is the result of Tolar's investment in purpose driven designs, 30 years' experience in quality material sourcing and standardized fabrication processes.

Tolar is known among industry peers for its end-to-end quality control standards and requires the same performance from its Partners in solar lighting, digital displays, and intelligence software. Any interest in the following products and services should be processed through Tolar, with the primary contact below.

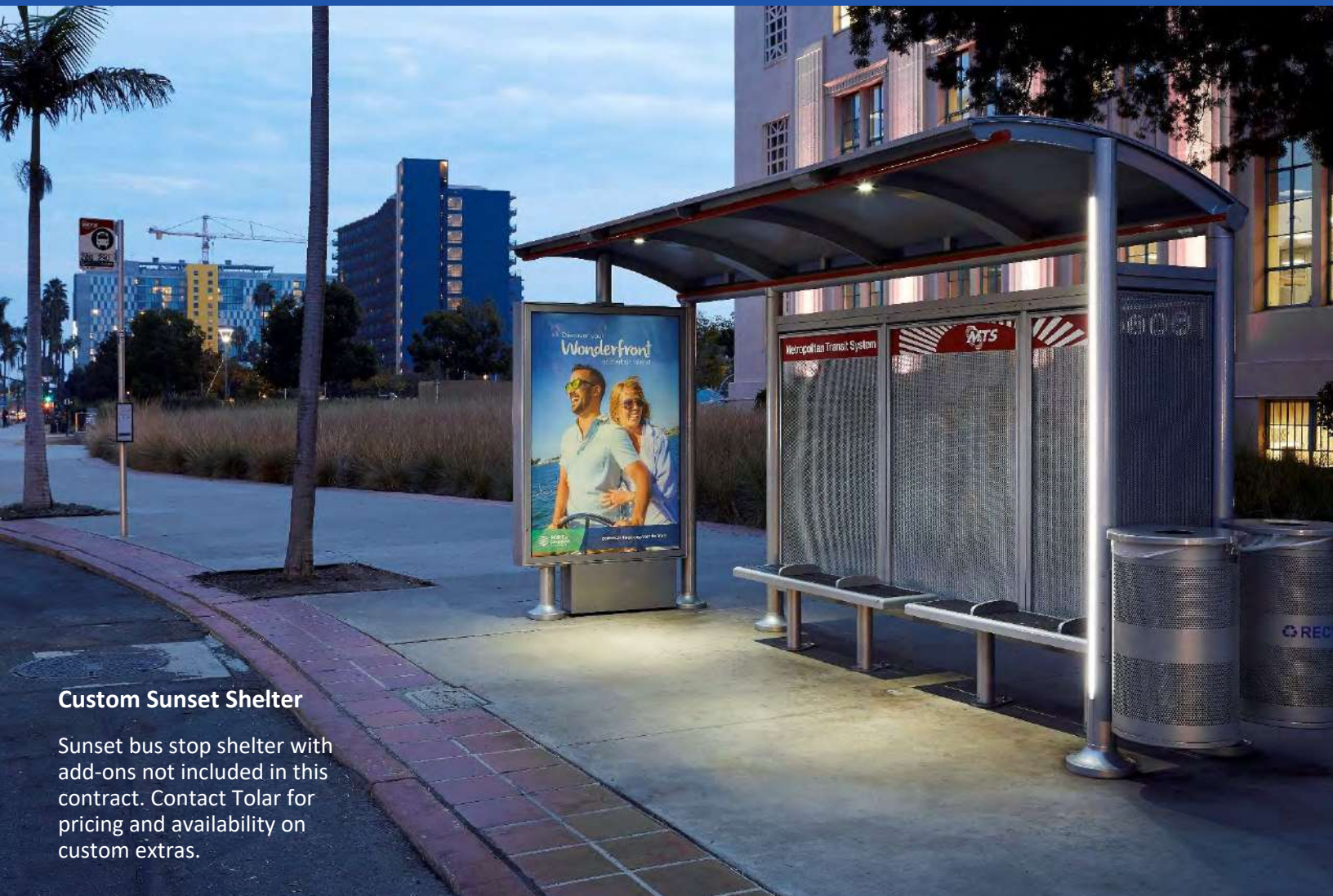
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Custom Sunset Shelter

Sunset bus stop shelter with add-ons not included in this contract. Contact Tolar for pricing and availability on custom extras.



Sunset Bus Stop Shelter

The Sunset bus stop shelter offers 4.5" round aluminum columns and a highly vandal resistant design. It has been engineered with modular components for ease of replacement parts and is available in 8 ft., 12 ft., and 16 ft. lengths.

The Sunset features a cantilevered roof for optimal coverage and a minimal footprint, in either a sloped or arched roof profile. Choose from aluminum, acrylic, or polycarbonate roof glazing for a range of light translucency.

Wall glazing options include glass, perforated metal, or no glazing, and add-ons include a bench, bike rack, trash receptacle, advertising panel, map case, and real-time displays.

Sunset Shelter Options

The Sunset shelter is available in two roof styles, three standard lengths, and with the add-ons listed below. All Sunset shelters and amenities are powder coated to the color of your choice.



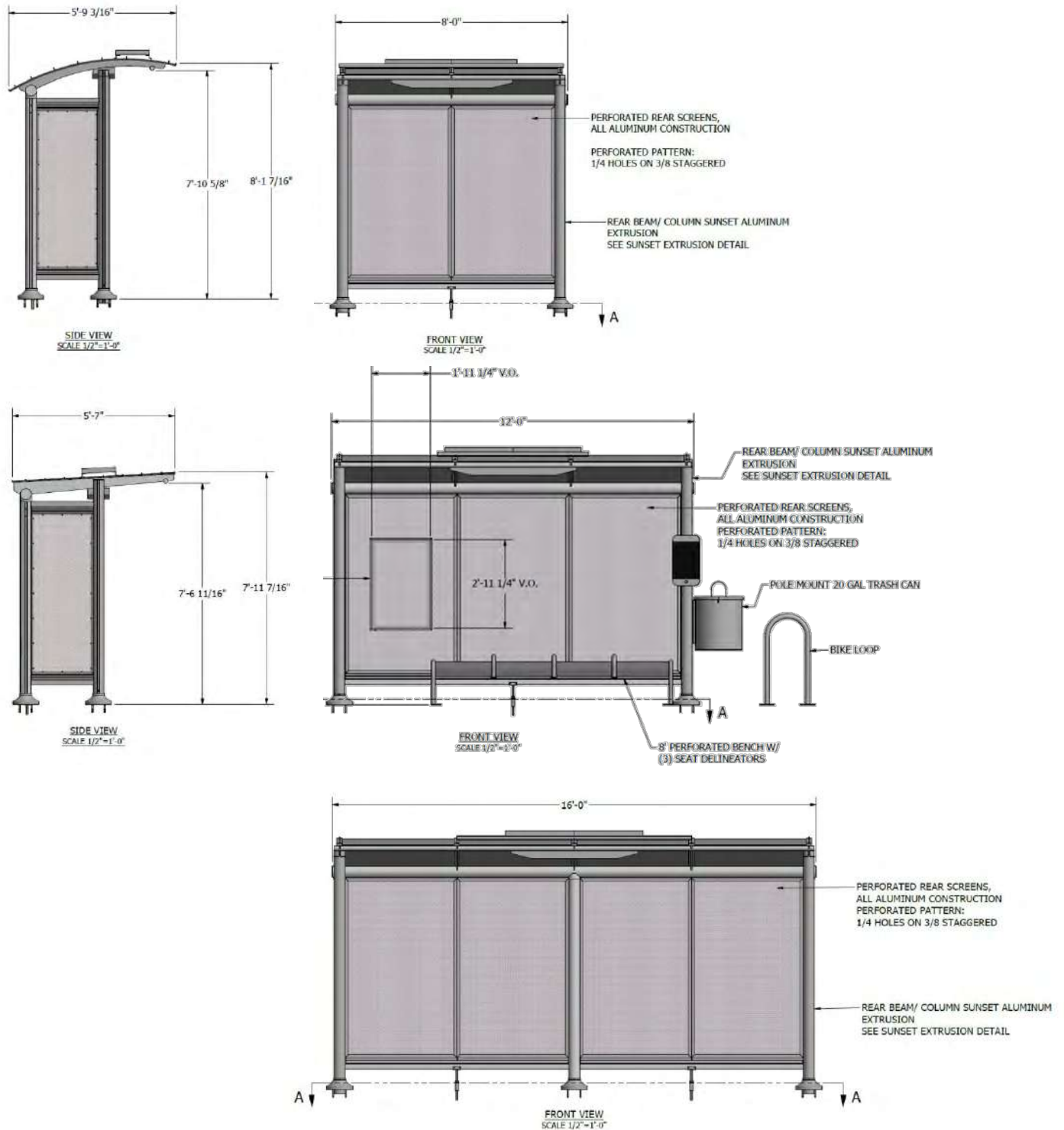
Available Configurations

Model	Size	Roof Style	Roof Material	Wall Glazing
Sunset	8	Arched	Aluminum	Perforated Metal
	12	Sloped	Acrylic	Glass
	16		Polycarbonate	None

Optional Add-Ons	Page
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Advertising Panel (solar powered or non-lit)	16
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Sunset Shelter Options

The Sunset bus stop shelter is available in the two roof styles and three lengths shown below.



Sunset Shelter with Arched Roof

Below is a custom Sunset shelter with an arched roof with acrylic roof glazing. MTD selected to have no wall glazing to reduce maintenance, and made possible by the mild weather in Goleta, CA.

Please contact Tolar for pricing and availability on custom extras not included in the MBTA / CALACT base contract.

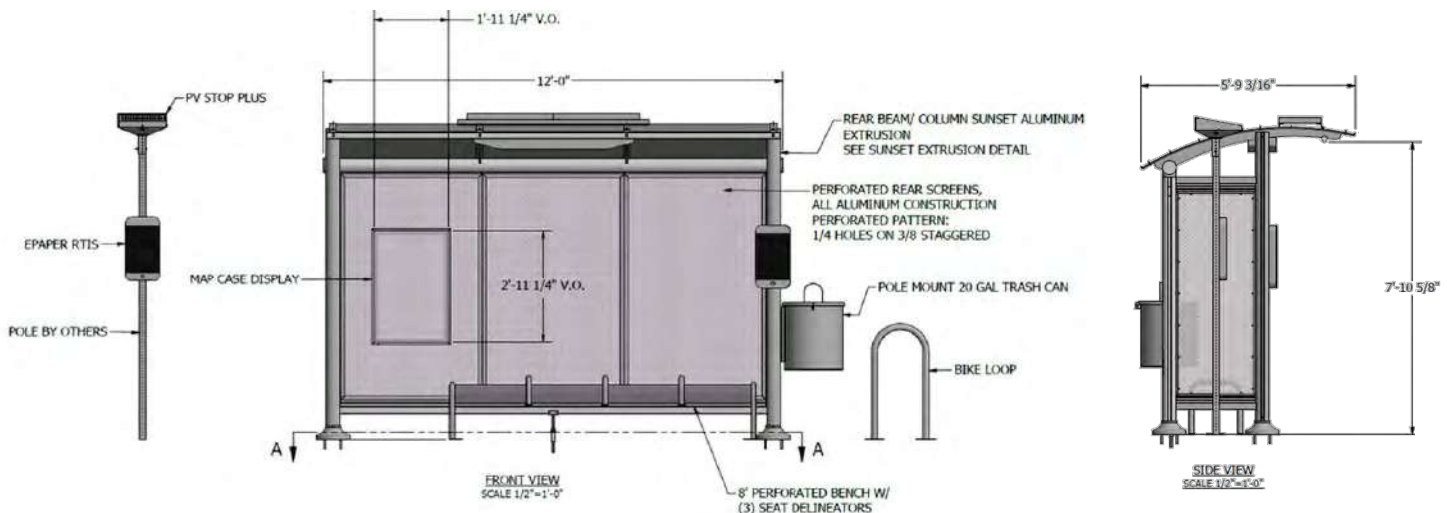




Sunset Shelter with Arched Roof

Above is the Sunset shelter with an arched roof, RMS solar lighting package, 13" e-paper real-time sign (LCD and LED are also available), map case, bench, trash receptacle, bike rack and PV Stop+.

The arched roof is slightly deeper than the sloped roof Sunset model but has the same roof glazing and wall glazing options. Aluminum roof glazing is recommended for optimal shade, and acrylic or polycarbonate is recommended for light translucency.

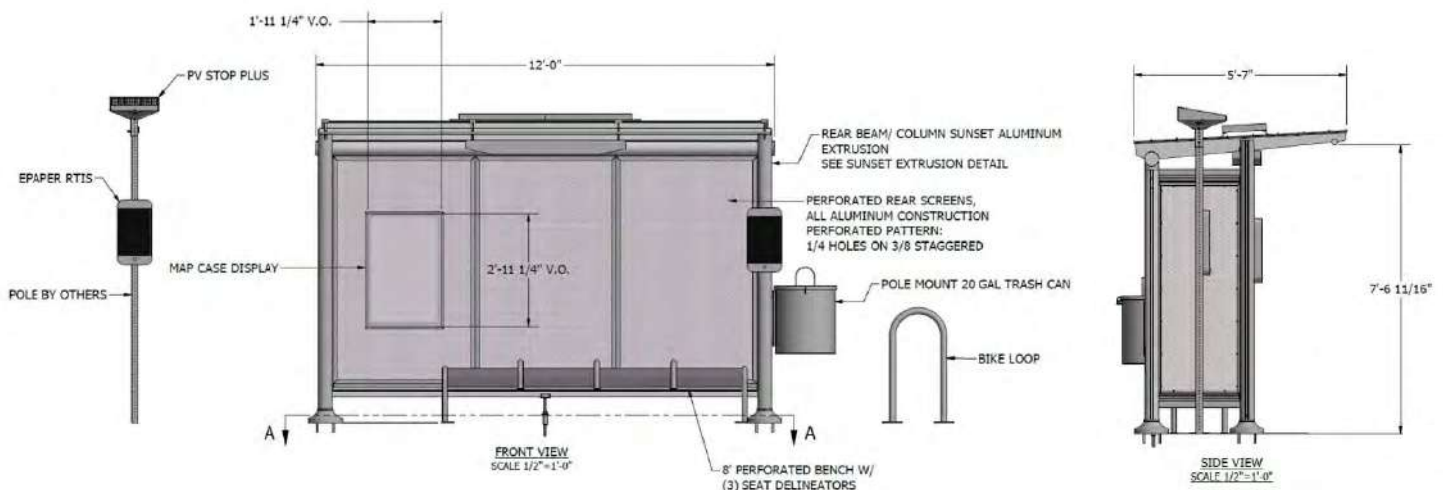




Sunset Shelter with Sloped Roof

Above is the Sunset shelter with a sloped roof, RMS solar lighting package, 13" e-paper real-time sign (LCD and LED are also available), map case, bench, trash receptacle, bike rack and PV Stop+.

For bus stops with high ridership, the PV Stop+ is a great solution for adding more illumination and signage without adding a second shelter. The PV Stop+ has a very small footprint and requires no trenching for power.





Sierra Bus Stop Shelter

The Sunset bus stop shelter offers 3" round columns and a classic Sierra fascia. It has been engineered with modular components for ease of replacement parts, and is available in 9 ft., 13 ft., 17 ft., and 21 ft. lengths.

The Sierra features a cantilevered roof in a high peak, low peak, and dome profile with roof glazing options of aluminum, Girard tiles, or polycarbonate.

Wall glazing options include glass, perforated aluminum, or no glazing, and add-ons include a bench, bike rack, trash receptable, advertising panel, map case, and real-time displays.

Sierra Shelter Options

The Sierra shelter is available in three roof styles, four lengths, and with the optional add-ons listed below. All Sierra shelters and amenities are powder coated to your color of choice.

High Peak Roof



Low Peak Roof



Dome Roof



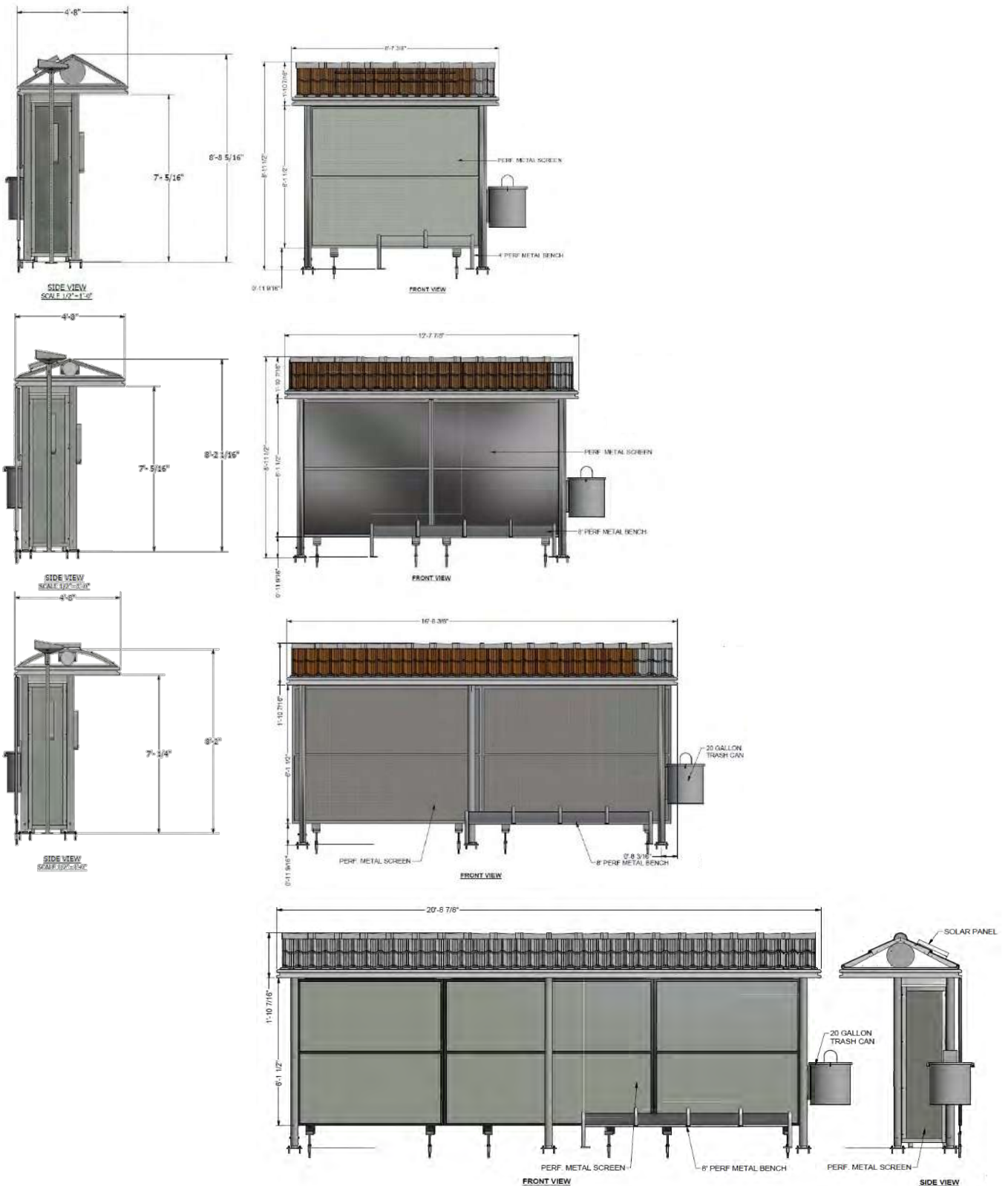
Available Configurations

Model	Size	Roof Style	Roof Material	Wall Glazing
Sierra	9	High Peak	Aluminum	Perforated Metal
	13	Low Peak	Girard Tiles	Glass
	17	Dome	Polycarbonate	None
	21			

Optional Add-Ons	Page
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Advertising Panel (solar powered or non-lit)	16
13" E-Paper Display	26
3-Row LCD Display	27
LED Shelter Display	30
Bench	17
Trash Receptacle	17
Map Case	17
Bike Rack	17

Sierra Shelter Options

The Sierra bus stop shelter is available in the three roof styles and four lengths shown below.

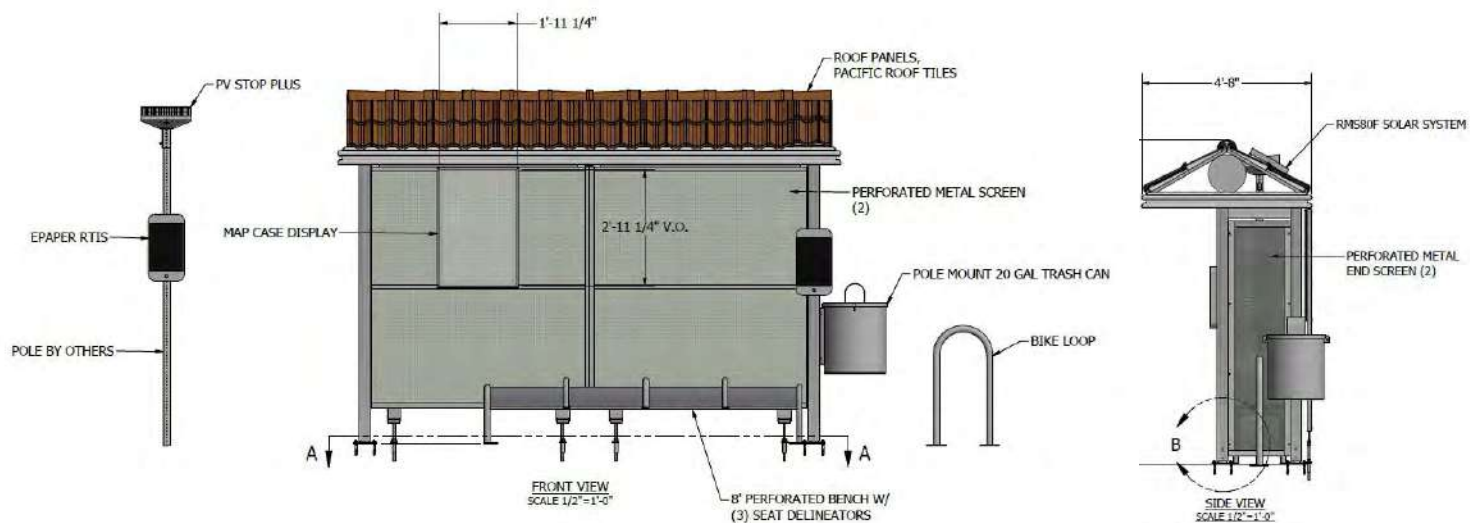




Sierra Shelter with High Peak Roof

Above is the Sierra shelter with a high peak roof with Girard tiles. Add-ons include an RMS solar lighting package, 13" e-paper real-time sign (LCD and LED are also available), map case, bench, trash receptacle, bike rack and PV Stop+.

All amenities can be powder coated to your color of choice for optimal branding.

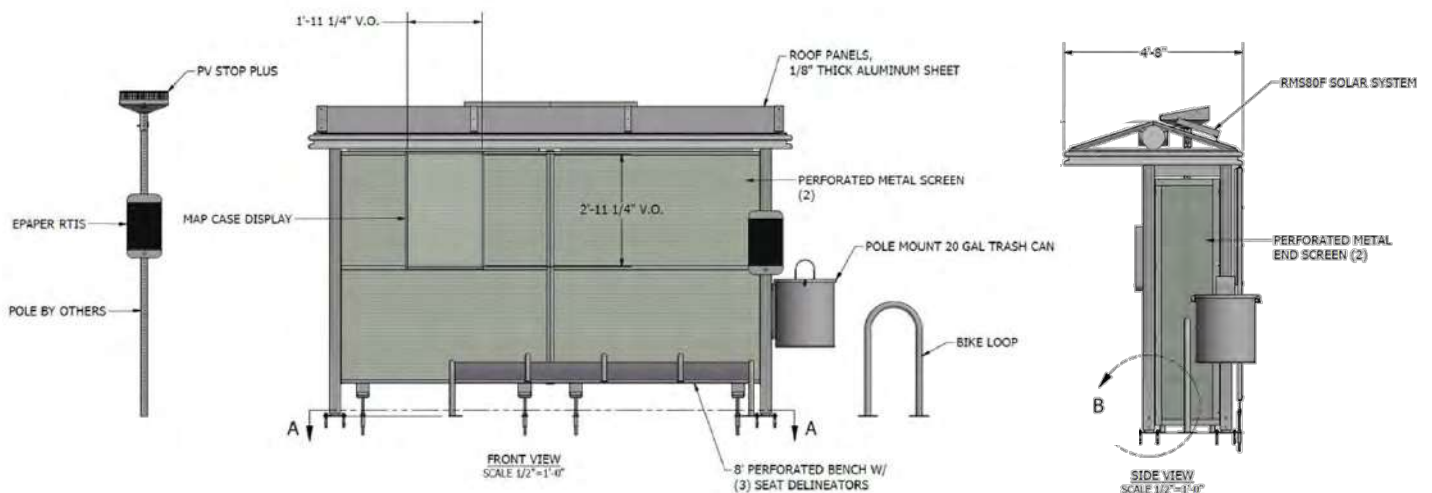




Sierra Shelter with Low Peak Roof

Above is the Sierra shelter with a low peak roof with powder coated aluminum roof glazing. Add-ons include an RMS solar lighting package, 13" e-paper real-time sign (LCD and LED are also available), map case, bench, trash receptacle, bike rack and PV Stop+.

All Sierra model shelters are delivered with fully assembled roofs for each of installation and have modular wall panels for easy replacement. Shown here are perforated metal wall panels, which are the most vandal resistant.

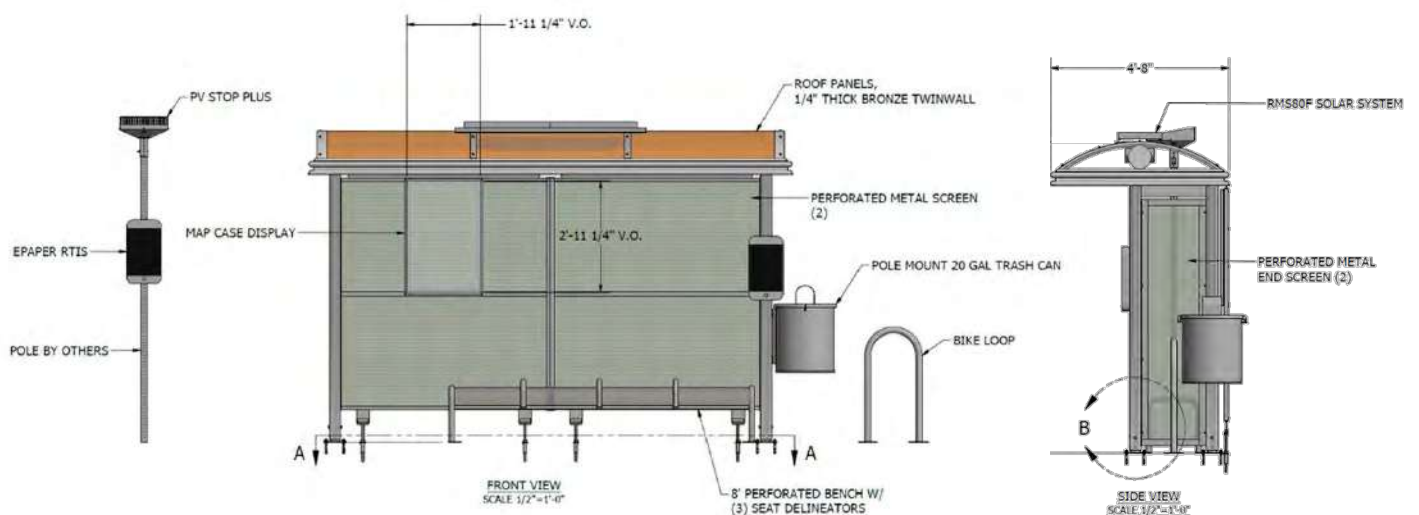




Sierra Shelter with Dome Roof

Above is the Sierra shelter with a dome roof with polycarbonate roof glazing. Add-ons include an RMS solar lighting package, 13" e-paper real-time sign (LCD and LED are also available), map case, bench, trash receptacle, bike rack and PV Stop+.

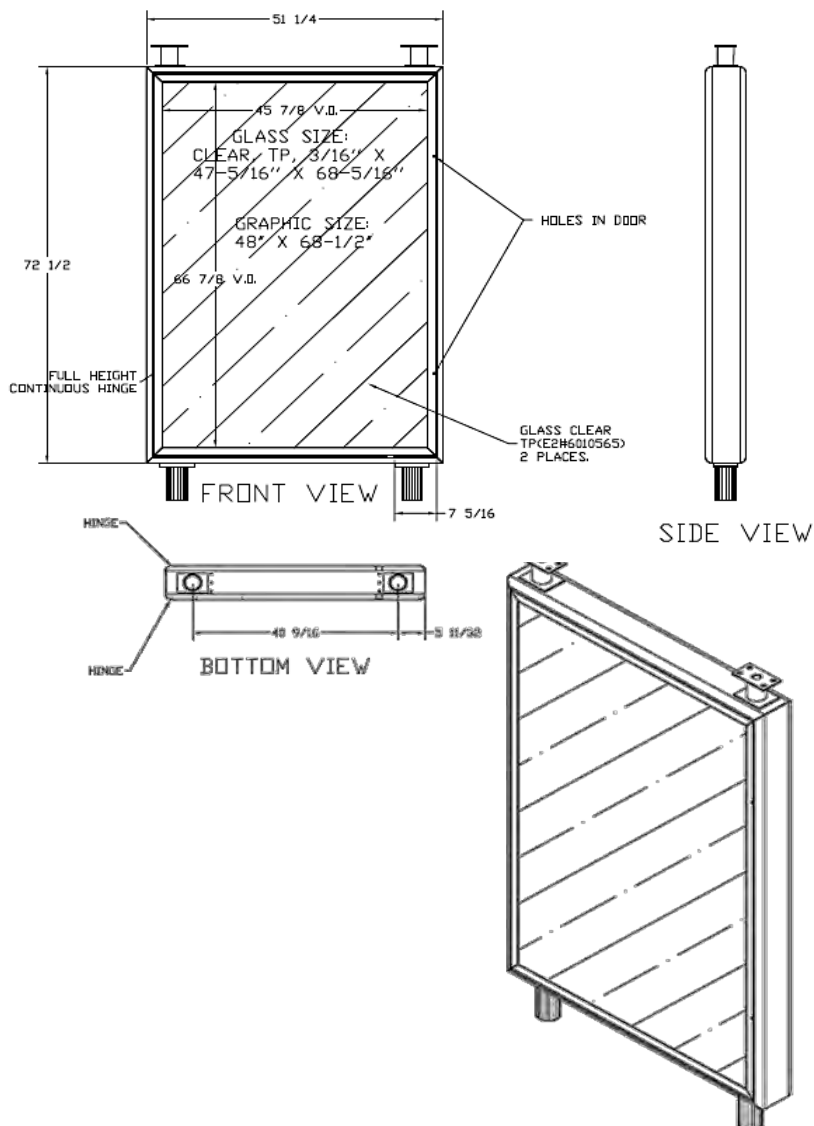
Acrylic and polycarbonate roof panels are available in different colors and allow for some light translucency, while still providing shade from the sun.



Advertising Panel

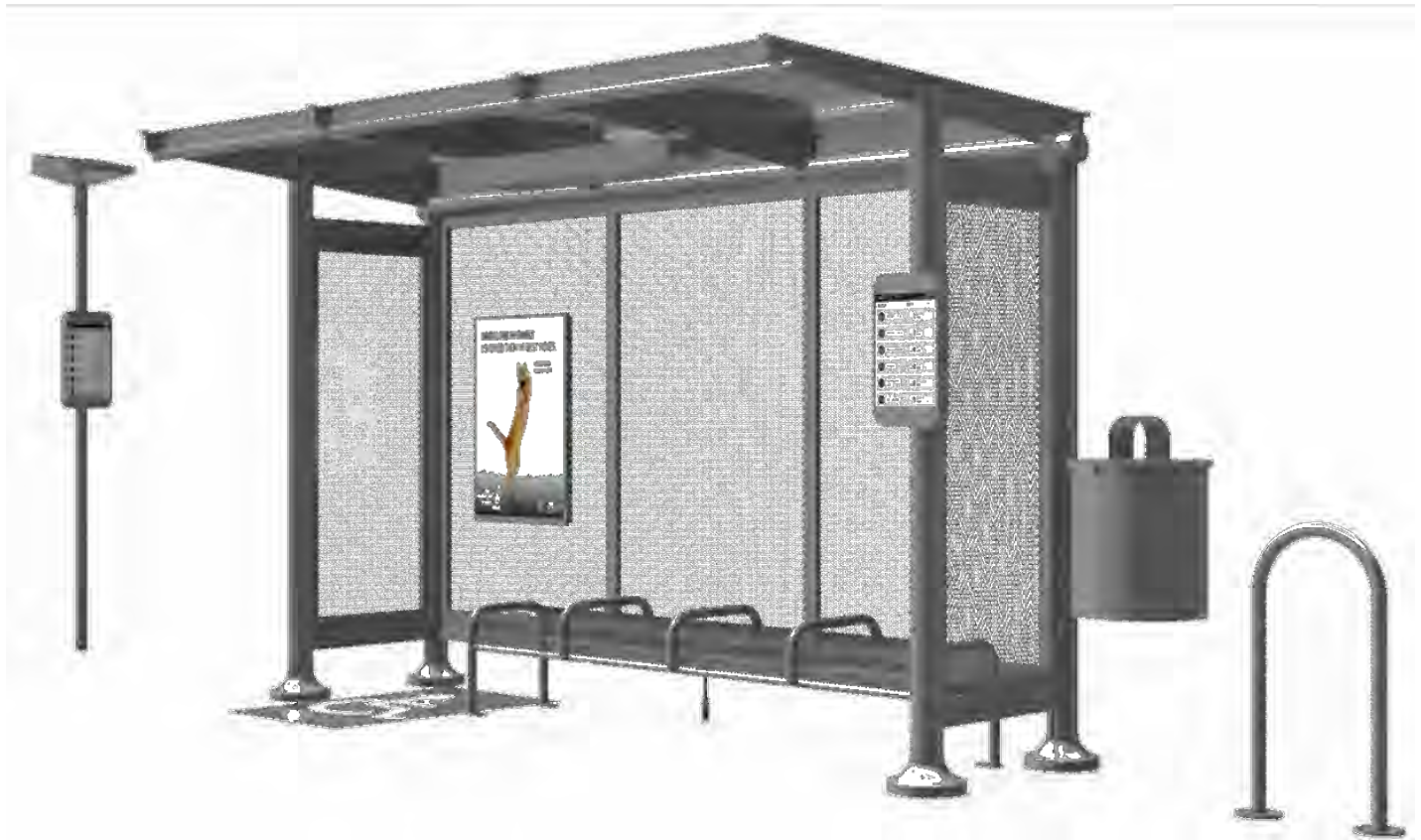
A two-sided 4 x 6 ft. advertising panel can be added to any bus stop shelter as a side wall. It can be illuminated with the RMS solar lighting package.

For added revenue streams, consider pairing the advertising panel with an e-paper display to promote complementary marketing campaigns.



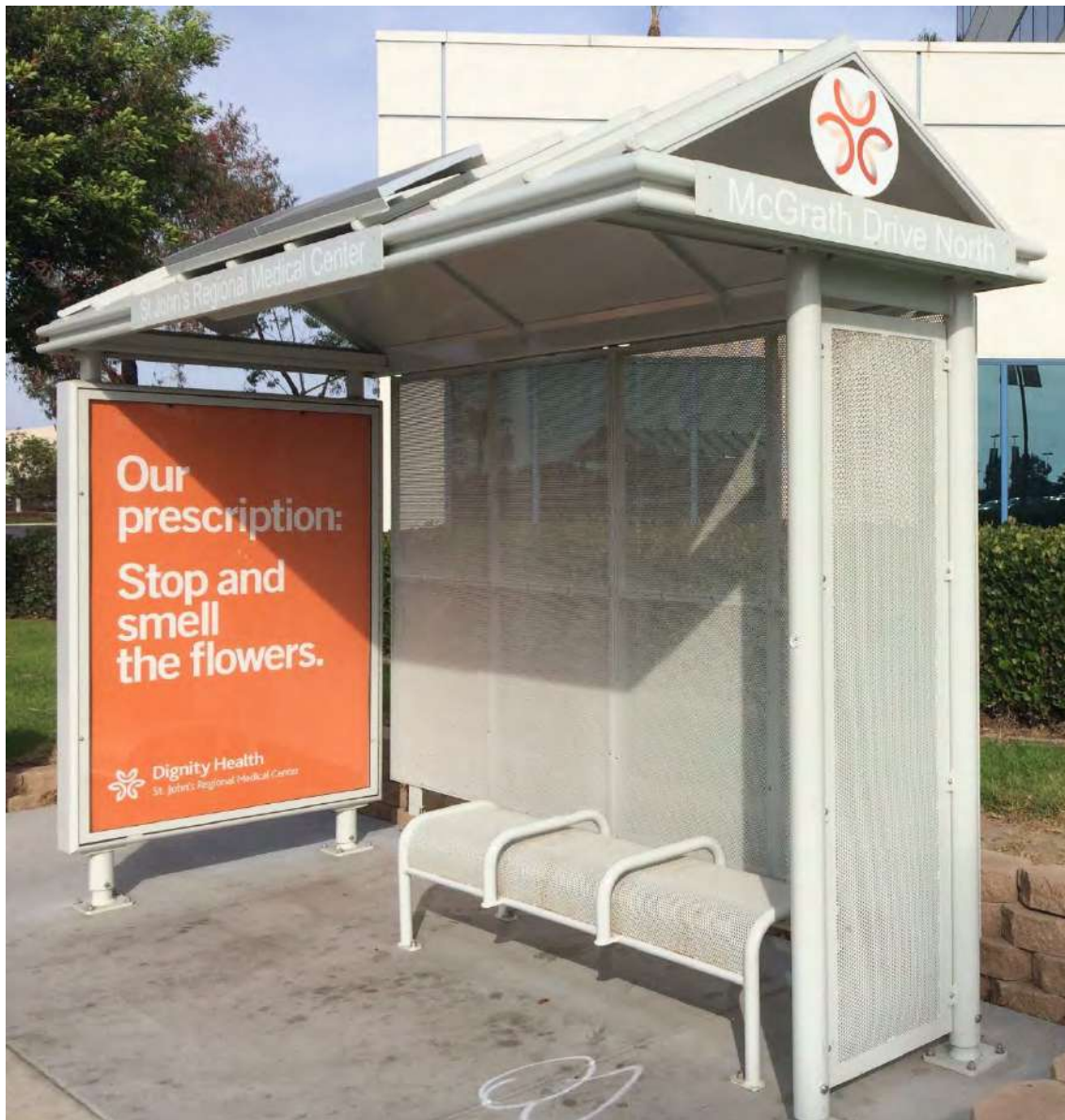
Additional Add-Ons

It's important to get the most value out of a limited bus stop footprint with functional shelter amenities. Below are the available add-ons for the Sunset and Sierra shelters, and all can be powder coated to match the shelter.



Bus Stop Shelter Add-Ons

Trash Receptacle	Column mounted trash receptacle with perforated metal frame & locking lid
Bike Rack	Surface mounted hoop-style metal bike rack
Bench	ADA compliant perforated metal bench with curved seat dividers
Map Case	Wall mounted metal map case with clear acrylic cover
PV Stop+	Adding a PV Stop+ near a shelter can provide additional lighting and real-time info
E-Paper Display	E-paper can display next departure information and marketing campaigns
LCD or LED Display (not shown)	LCD or LED can display next departure information and is mounted to the shelter side wall
Advertising Panel (not shown)	4 x 6 ft. aluminum advertising panel for shelter side wall (lit or unlit)



Sierra Shelter with Solar Powered Advertising Panel

Above is a 13 ft. long Sierra shelter with solar powered security lighting and illuminated advertising panel, perforated metal bench, perforated metal walls and custom decals.



Urban Solar manufactures solar power systems and LED lighting solutions for transit, parking lots, pathway, and general illumination applications.

With more than 20,000 bus stops improved across North America, Urban Solar delivers the highest level of solar powered LED illumination in an integrated, reliable, and customer focused design.

Urban Solar has developed more UL-Listed and Buy America compliant solar packages for North American transit agencies than any other supplier.

Urban Solar has been partnered with Tolar Manufacturing for over 10 years and supplies all Tolar shelters with solar lighting packages.





Unlit Bus Stop

Dark bus stops can make riders feel unsafe and often lead to driver pass-bys.



PV Stop+

The PV Stop+ provides 5W of LED lighting from dusk to dawn.



PV Stop Collection

Urban Solar developed the PV Stop Collection to provide security lighting, real-time information displays, and seating at unsheltered bus stops. There are two PV Stop+ sizes, the larger of which is referred to as the PV Stop Max.

The Urban Solar team will help determine which model is needed for your locations, based on annual solar exposure and the necessary power to run the security lighting and or a real-time display.

Model	LED	Real-Time Display Option
PV Stop+	5 W	13" E-Paper, LCD or LED Display
PV Stop Max	5-15 W	13" E-Paper, LCD or LED Display

PV Stop+

Urban Solar's PV Stop+ provides enough solar power to power LED security lighting and a real-time display.

Features and Benefits

- Reduces Rider Pass-Bys
- Enhances Public Safety and Deters Crime
- Mounts to Standard Transit Poles, No Special Footings
- UL-Listed and Buy America Compliant
- Agency Branding Options, Custom Colors & Decals
- 10 Year Warranty

Specifications

- 20W Solar Panel, 42W optional (PV Stop Max)
- 20Ah 12.8V Battery
- 5+ Days of Battery Autonomy
- Up to three 5W LED Downlights
- 4 - 140°F Operating Temperature
- Dusk to Dawn Run-time or Specific Scheduling Options

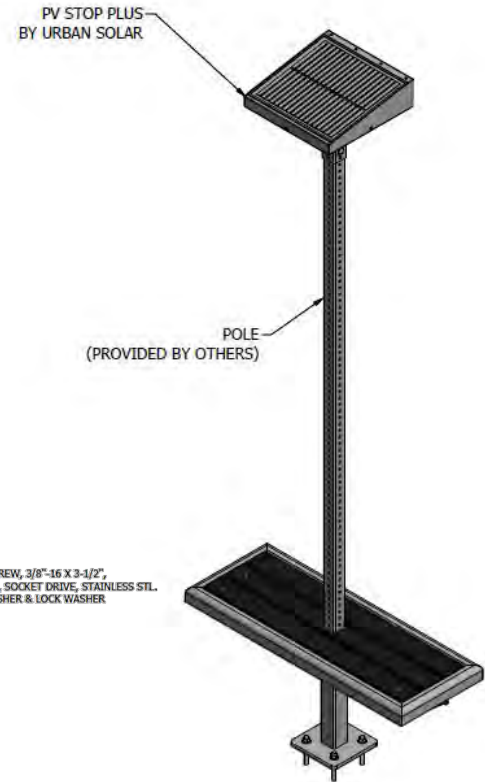
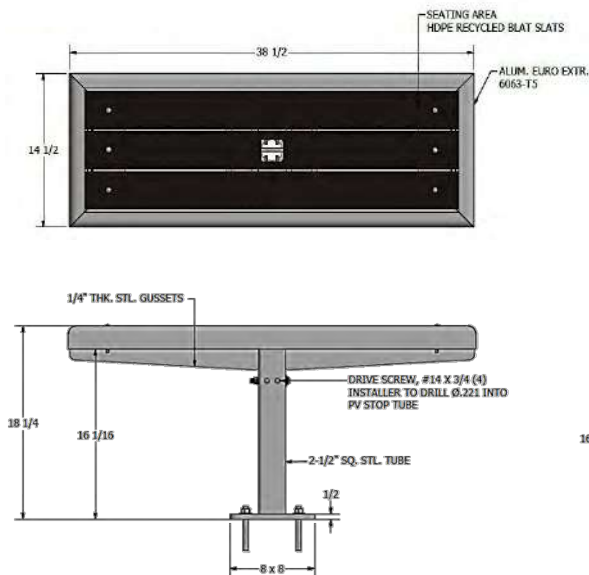
Add-Ons

- Remote Management
- EcoSeat
- Bike Rack
- Trash Receptable



PV Stop EcoSeat

The EcoSeat is manufactured by Tolar and provides a compact seating solution for unsheltered bus stops. The EcoSeat is ADA compliant and features a powder coated aluminum frame with HDPE slats.



PV Stop+ with EcoSeat and E-paper Display

To the left is the EcoSeat by Tolar with the PV Stop+ by Urban Solar and an e-paper display.

This combination of amenities is a great solution for a compact bus stop location without a shelter, and provides riders with seating, security lighting, and real-time departure information.



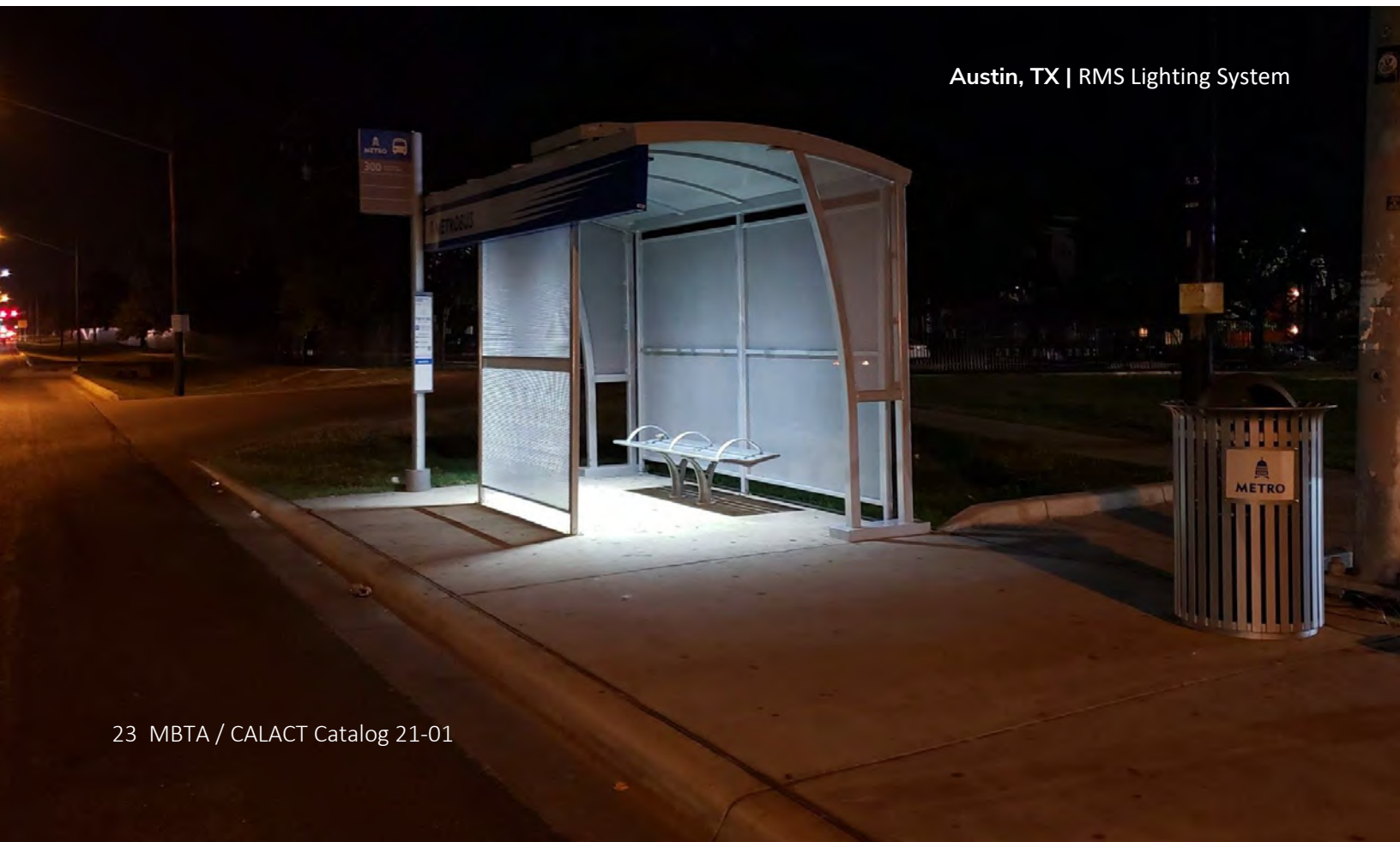
RMS Shelter Lighting System

Urban Solar's RMS Shelter System is a safe, powerful, and reliable solar powered LED lighting system designed specifically for the transit industry. It easily mounts to new or existing transit bus shelters, with various configurations for branding, and performance.

All solar components are housed in a self-contained aluminum enclosure mounted on the roof of any shelter. The LED fixtures are mounted inside the ceiling of the shelter with various fixture and mounting options available.

Features and Benefits	Specifications	Add-Ons
UL-Listed & Buy America Compliant	100W-340W Solar Panel	13" E-Paper Display
Easy Installation to New or Old Shelters	5-45 foot candle levels	3-Row LCD Display
Reduces Pass-Bys and Deters Crime	Dusk to Dawn Lighting with Dimming	LED Shelter Display
Custom Branding Available	5-10 Days Battery Autonomy	Remote Monitoring
Smart Remote Monitoring Controller	-40 to 176° F Operating Temp	Custom Branding

Austin, TX | RMS Lighting System





AXENTIA

Axentia is a leading company in developing cutting edge battery- and solar-operated real-time information display systems for public transport. We create opportunities for both society and people to move forward – with cost-effective, sustainable products and system solutions.

The low power iBus displays operate for 5 years on battery, only takes 5 minutes to install and requires no external wiring. Text-to-speech can be included to all displays.

Axentia's ultra-low powered displays ensure real-time information and customer communication can be improved at all transit stops within the network. Axentia's solutions do not rely on grid or solar power and therefore can be deployed where your riders will see the largest benefit

The screen layouts and functionality can be customized to align with your needs.

Display Features and Benefits

Cost efficient

- Simple installation; No wiring required
- Long operation; 5 years between battery replacements. No recharging needed.
- Uses existing mobile networks
- Low maintenance and procurement costs

Flexible

- Battery powered
- ADA Compliant with optional text-to-speech functionality
- Works on all stops, also on places without sunlight

Useful

- Displays real-time bus arrival information
- Improve communication with text messaging
- Make schedule changes simple; No more paper schedules
- Manage systems through easy-to-use web portal

Practical

- Weather and vandal resistant casing
- Simple configuration and administration
- Compact display module suitable also for integration



Transport for London, London (United Kingdom)

13" E-paper Display

Technical specifications overview

Physical	
Colour:	Colours on demand
Size (H x W x D):	12.7 x 18.0 x 4.8 inches
Weight:	Approx. 24 lbs
Environmental:	
Temperature:	-4° F to 158° F fully operational -13° F to 158° F reduced functionality
Humidity:	10 % – 100 %
MTBF:	80.000 hours
IP65, IK 09, UV-proof	
Display & graphical information	
Type:	EPD 13" (E-ink)
Resolution:	1600 x 1200 (150 dpi)
Front light:	LED
Active area:	10,6 x 8 inches
Single or double sided	

Accessories / options	
Text-To-Speech embedded module, speaker and wireless push button. AGC optional	
Accelerometer	
GPS	
Solar powered	
Graphical Information	
Fully configurable graphical area	
Real-time, time tables, line maps, pictures etc.	
Disruption messages and general messages	
Operation	
Battery:	Lithium
Battery life time:	5 years
Data communication:	Mobile communication
Antennas:	Embedded



De Lijn, Belgium

3 rows Monochrome LCD Display

Technical specifications overview

Physical	
Colour:	Colours on demand
Size (H x W x D):	16,1 x 19,3 x 2 inches
Weight:	Approx. 22 lbs
Environmental:	
Temperature:	-22° F to 158° F fully operational
Humidity:	10 % – 100 %
MTBF:	80.000 hours
IP65, IK 09, UV-proof	
Display & graphical information	
Type:	LCD with backlight
Row active area:	14,4 x 1,6 inches
Row resolution:	172 x 16 pixels / row
Active area:	10,6 x 8 inches
Single sided, 3 rows	

Accessories / options	
Text-To-Speech embedded module, speaker and wireless push button, AGC optional	
Graphical Information	
Fully configurable graphical area	
Font size height up to 1,6 inches	
Any characters, fonts and symbols	
Number of characters for Line/Destination/Time customizable	
Vertical scrolling	
Disruption messages up to 400 characters	
Operation	
Battery:	Lithium
Battery life time:	5 years
Data communication:	Mobile communication
Antennas:	Embedded



WaySine designs and manufactures LED real-time displays for shelters and on-bus announcement systems. WaySine manufactures all components in beautiful Aiea Hawaii, which is its headquartered office.

WaySine's sole purpose is in the design, development, and manufacturing of solar powered public transit amenities for bus stops and shelters.

With deployments in over 40 agencies across both USA and Canada, WaySine devices are robust enough to withstand the most extreme conditions. Deployments in Quebec have seen extreme temperatures of below -40 degrees F and pole mounted installations in Florida and Texas have seen some of the most intense hurricane winds.



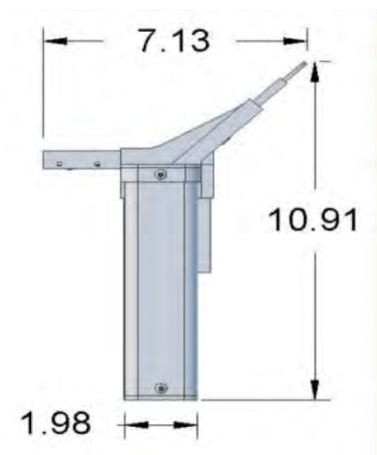
LED Pole Display

WaySine's LED pole display is an all-in-one solar powered system that mounts to the top of any transit pole. It includes front and rear solar panels, batteries, and integrated antenna. The compact solar package and display combination is easy to install and engineered for the harshest environments.

This display includes built-in diagnostics to monitor power and temperature to provide early failure detection.

System Specifications

Dimensions (H x L x D)	10.9 x 26 x 7 in.
Weight	13 lbs.
Character Count	2-line, 24 characters
Operating Temperature	-40 – 158° F
Text-to-Speech	Motion activated or push-button
Lighting	Two 1W LEDs for down lighting
Mounting Installation	Top of transit pole
Communication	Cellular, 4G / LTE + GPS
Environmental Rating	IP65

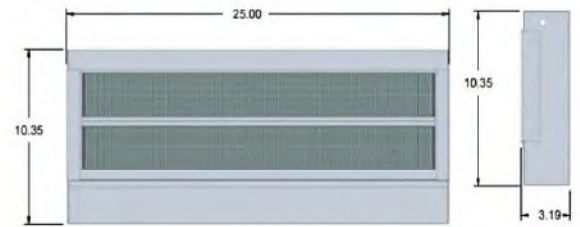


LED Shelter Display

WaySine's LED shelter display can be powered by solar or AC and mounts to the inside wall of a bus stop shelter. This display includes built-in diagnostics to monitor power and temperature to provide early failure detection.

System Specifications

Dimensions (H x L x D)	10.35 x 25 x 3 in.
Weight	7 lbs.
Character Count	2-line, 24 characters
Operating Temperature	-40 – 158° F
Text-to-Speech	Push-button
Solar Package	RMS Shelter System
Mounting Installation	Inside bus stop shelter
Communication	Cellular, 4G / LTE + GPS
Environmental Rating	IP65



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Below is a summary of the items available for purchase through the MBTA / CALACT 21-01 contract. Please contact Tolar with questions or to request a quote.

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Sierra Dome Roof	Bus stop shelter available in 9, 13, 17 and 21 ft. lengths	11
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Bike Rack	Optional Add-on to new or existing bus stop shelter	17
Bench	Optional Add-on to new or existing bus stop shelter	17
Map Case	Optional Add-on to new or existing bus stop shelter	17
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Axentia E-Paper and LCD Displays		
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WaySine LED Displays		
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