

Our “Los Gatos Casita” Spring 2023 Trip & Modifications

In 2021 we decided to purchase a [2023 Casita Liberty Deluxe Trailer](#) as backpack, canoe and kayak camping trips requiring us to sleep in a tent on the ground or in hammocks hung from trees was getting less fun. We selected the Liberty model which, like the Independence model, is specifically designed for couples with a king size sleeping area. A Casita trailer must be picked up in Rice Texas (i.e., Casita only does factory direct sales and has no dealerships that would take more of your money) and they have a long lead order time before pickup as demand for them is extremely high as they are reasonably priced, last forever and can be easily resold for significantly more than their purchase price. In addition to Munich Germany, Austin Texas was also Gayle's home town. So an opportunity to visit Texas was not viewed as an inconvenience to us. Upon returning to our remote southern Oregon homestead, Gayle named our Casita trailer “Los Gatos Casita” as a tribute to our wonderful cats who traveled with us...and we prefer animal companions over most people.

[Casita Travel Trailers](#), which are a direct descendant from the innovative and original 1968 [Canadian Boler Fiberglass Travel Trailer](#), are constructed of marine grade fiberglass (a single layer shell design that doesn't trap moisture in a cavity which then shortens the lifetime of most other RVs including other fiberglass RVs), have a strong steel frame (instead of an aluminum frame having a cyclic fatigue failure limited life and subject to galvanic and salted road corrosion failure like some other much more expensive fiberglass trailers), are aerodynamic (an Airstream trailer shape but much lighter weight and easier to economically repair if ever needed), are very lightweight (only 2,480 pound Curb/Empty weight with a 365 pound tongue weight that reduces to 274 pounds when our weight distribution hitch is used) and are very small (only 17 feet long) making them a dream to tow and do real camping in beautiful locations that larger RVs can only fantasize doing. And Casita trailers have all the functionality that one needs for very comfortable camping: Air Conditioning; Bathroom with sink, shower and toilet; Ceiling Fan, Furnace (optional and recommended); Tank Water Heater (6 gallons); Kitchen with large microwave oven (optional and NOT recommended), refrigerator (3 cubic feet), sink and proper exhaust vented hood/stove; 30A 120VAC Shore Power (which we upgraded to 50A 120/240VAC) and Shore Potable Water Hookup; Sleeping Area (King, Full or Double Single Berth sleeping configurations as desired) and Holding Tanks for Potable (25 gallons), Gray (32 gallons) and Black (15 gallons) water. So [Casita Travel Trailer](#) has created the perfect travel trailer for loving couples who enjoy closeness, they have been doing so since 1981 and nearly all of these original Casita trailers are still on the road today.

To tow our Casita trailer, we purchased a [2023 Honda Ridgeline](#) truck. The Ridgeline's high reliability, high MPG and associated long distance towing range, and modern unibody-based design with fully independent suspension system, which then enables having 3/4 ton truck bed payload volume (87 cubic feet) and payload weight (1,509 pounds) capacities while also having an unsurpassed comfortable/smooth ride for both passengers and trailer, made the Ridgeline the clear 1/2 ton truck winner to enable us to achieve our goal of traveling economically, far, and fast and then comfortably, securely dry camp with our cats in very beautiful and very remote locations for as long as we desire. In fact, Japanese vehicle reliability has now gotten so good that vehicles now come with a lifetime unlimited miles powertrain warranty. We also like that the Ridgeline has a clean and classy look free of any dodgy company sheep horn rebranding or other flashy decals/emblems and such used to create market hype to target the increasingly gullible, low intelligence and low self-esteem population that need to frequent social media for some deranged sense of self-worth and are thereby easily manipulated. The only significant limitation of the Ridgeline over the other 1/2 ton truck tow vehicle competition is the Ridgeline's low 7.6 inches of ground clearance which limits its off-road capability. However, we find ATV/UTVs and horses are far better suited for real off-road adventures than any available or modified off-road truck. And going on foot is truly by far the best way if you are physically able to do so. Furthermore, the Ridgeline's 7.6 inches of ground clearance and auto floor lowering seats provides an advantage in that it enables one to easily enter or depart the cab without needing an additional step or a ladder...highly valued by those of us with worn out joints from having actually lived an adventurous, meaningful and memorable full life.

We selected and installed a [REDARC Tow-Pro Liberty Electric Brake Controller](#) in our Ridgeline. To further enhance our towing performance and safety, we selected and acquired an [Andersen Weight Distribution Hitch \(WDH\)](#) and had Casita install it upon our arrival in Rice Texas. The Andersen WDH helps ensure towing stability and enables shifting the weight from the tow vehicle rear axle to the tow vehicle front axle and to the Casita trailer axle while also reducing the Casita trailer tongue weight. Restoring a tow vehicle's front axle load becomes increasingly important when road/weather conditions degrade because of rain, snow or ice in order to

retain good tow vehicle handling and retain a solid tow vehicle foundation to deal with a sway situation. The Andersen WDH also retains the comfortable/smooth ride provided by our Ridgeline while towing which significantly reduces wear and tear on both our Casita trailer and our Ridgeline. In addition, the Andersen WDH provides self-adjusting anti-sway control negating the need for a separate anti-sway bar. And unlike some other WDHs, the Andersen WDH does NOT need to be removed in order to back up the trailer.

Experts agree that WDHs work very well and work even better on modern unibody-based tow vehicles designed to use WDHs because unibody-based tow vehicle structure can be made extremely strong and rigid. There is no significant flexibility on unibody-based tow vehicles designed to use WDHs as is unfortunately the case with older frame-based tow vehicle designs. Frame flex may use up a significant portion of the WDH effort before the WDH can even begin to restore the load on the tow vehicle front axle.

It is often argued that a WDH isn't needed to tow a Casita trailer if it is hooked to a 3/4 or 1 ton tow vehicle. And this is indeed true because the front axle load of these behemoth tow vehicles is already so large that the relatively light tongue weight of the Casita trailer has no significant effect on their large front axle load. However, if you only need to tow a Casita trailer, you don't need anything larger than a 1/2 ton tow vehicle and you will also likely want to avoid the higher acquisition and operational costs associated with having a 3/4 or 1 ton fuel guzzling monstrosity that also struggles just to get out of its own way and find a place it can be parked. However, as [George Carlin](#) amply spotlighted, you will never be able convince people of this who have a psychological need to over-compensate with a behemoth truck and then fiercely defend their choice.

And also interestingly, a fully-loaded 1/2 ton tow vehicle and trailer with a WDH hitch can be made more stable than any size fully loaded tow vehicle by itself. This is because any size fully-loaded tow vehicle will experience understeer from the lighter front axle load that can't be corrected. This understeer can be easily corrected on any size tow vehicle/trailer combination with a WDH.

We developed an Andersen WDH calculator and a Casita Weight & Balance calculator to enable accurate and easy determination of all the critical towing parameters to help facilitate a safe towing setup:

[**Andersen Weight Distribution Hitch Calculator**](#)
[**Casita Travel Trailer Weight & Balance Calculator**](#)

When we selected/ordered our [**2023 Casita Liberty Deluxe Trailer**](#) and locked down our 1 March 2023 pickup date in Rice Texas, we decided to make a 3-4 month trip of it and visit some of the favorite places of our wild and wasted youth along with some new places that one or both of us had never been to before. Our trip began on 21 February and we safely returned to our remote southern Oregon homestead on 2 June 2023. We covered 12,630 miles total (we put about 10,000 miles on our Casita trailer), visited 24 States and had a truly wonderful time. Both our 2023 Casita trailer and our 2023 Honda Ridgeline performed great with an average of 20.8 MPG for this 12,630 mile trip. Subsequent to this trip, we added rails and an aerodynamic device to the Ridgeline Leer canopy that increased our average towing performance to 22-23 MPG. It is aerodynamic drag that largely and continuously reduces MPG while towing. Trailer weight only reduces MPG when accelerating to your steady state towing speed or when going uphill.

Annotated photos of all the campgrounds and the places we visited on this Casita pickup trip follow. Following these Casita trailer pickup trip photos, you will find a bookmarked bullet list summary of our many Casita trailer modifications, refinements and upgrades, photos, detailed descriptions, our rationale for doing them and our rationale for the specific way we elected to accomplish them. Please feel free to contact us at our engineering company website should you be interested in anything herein or perhaps have additional questions, etc.:

[**Borst Engineering & Construction LLC - Contact Us**](#)

Enjoy and Happy Trails!
Gayle & Bob Borst



Live everyday like it is your first!

And don't allow anything or anyone prevent you from doing otherwise & enjoy this video!

Departed Our Remote Southern Oregon Homestead on a Snowy 21 February 2023!







Waiting for SR58 to Open on Tehachapi Pass from Historic Blizzard Conditions, Tehachapi California



Finally Escaped the Blizzard Conditions, Kingsman & Winslow Arizona

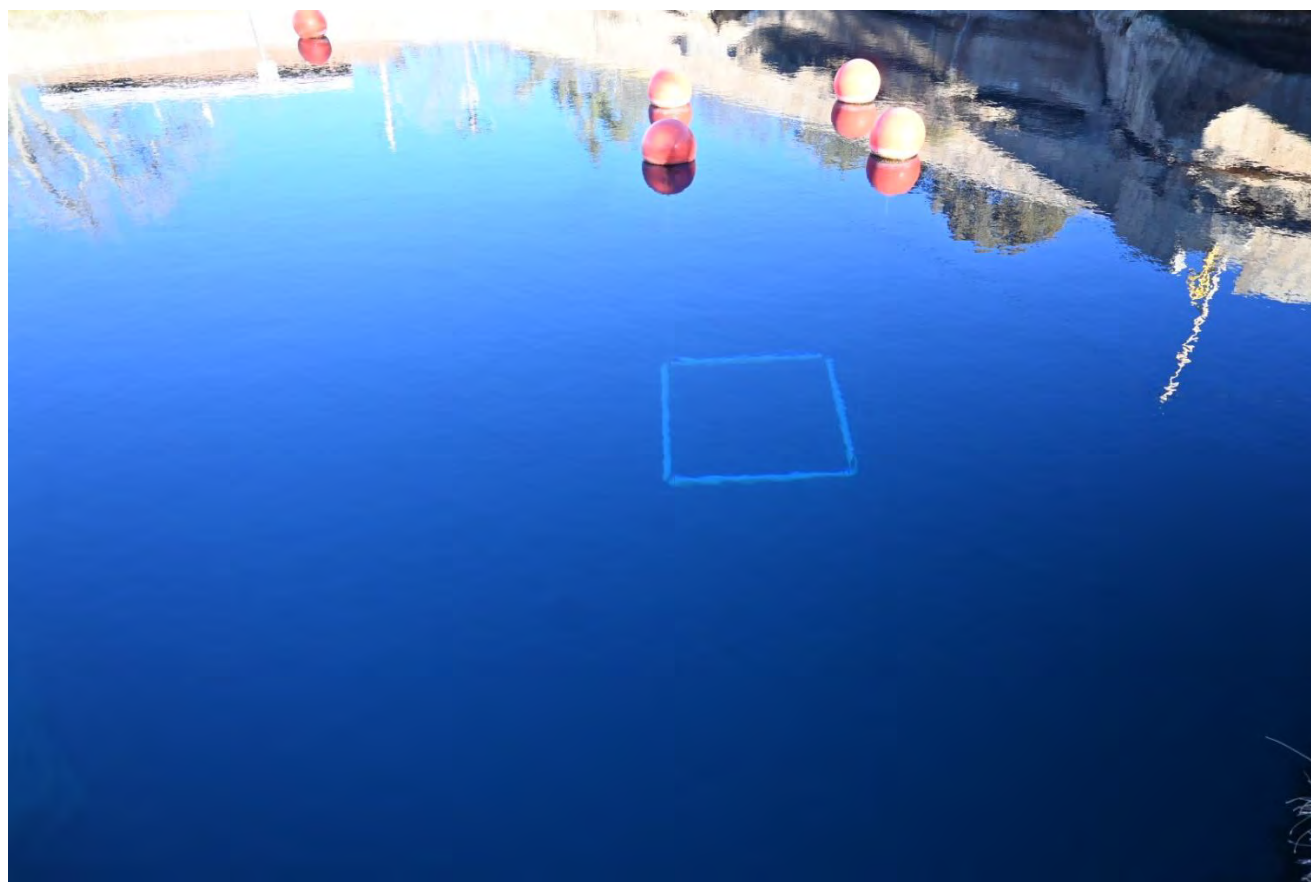






**The Blue Hole, Santa Rosa New Mexico
(Reliving Memories of Bob's College SCUBA & Sky Diving Years...)**



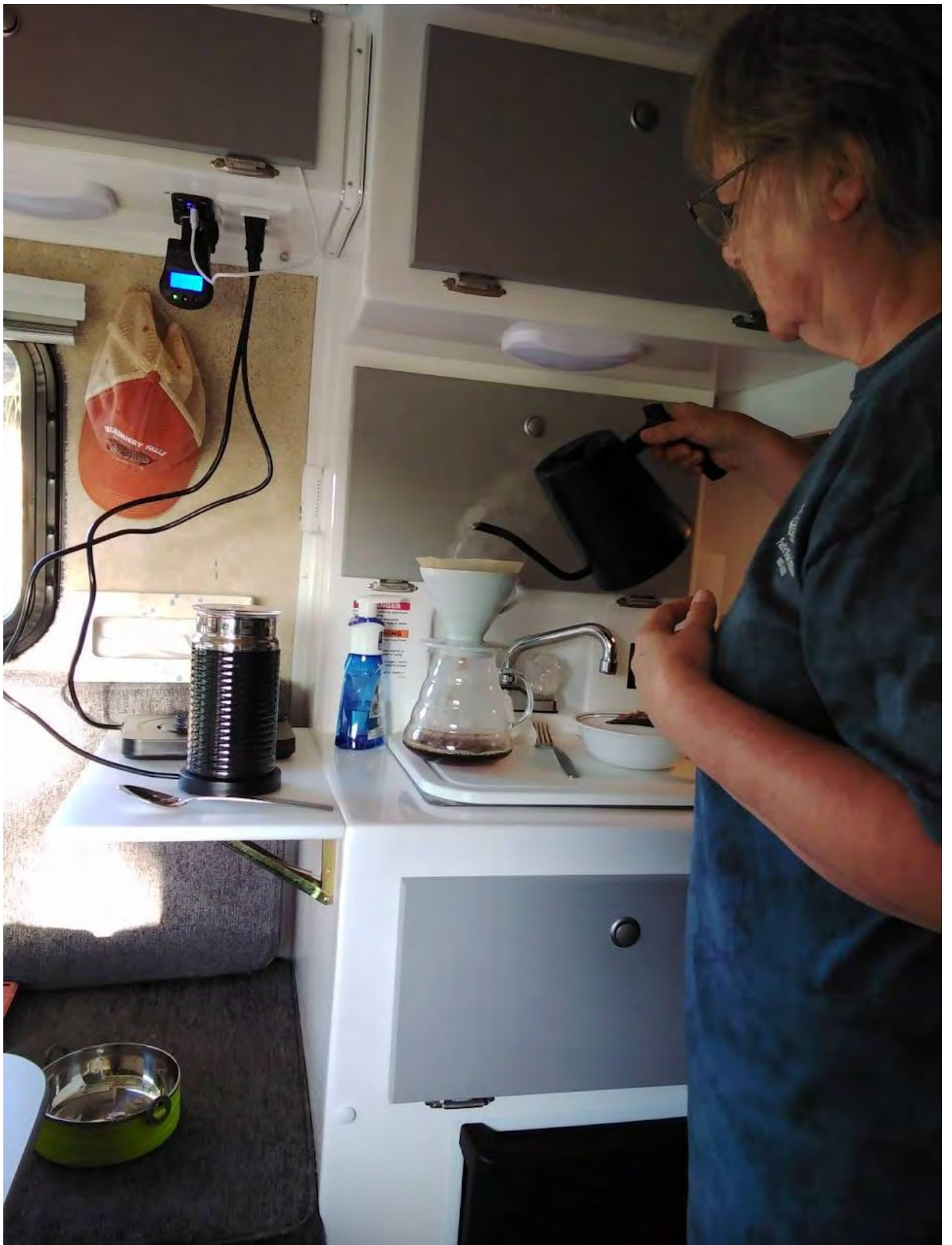


Our Casita Trailer Pickup on 1 March 2023, Rice Texas



Our First Night in our Casita Trailer, American RV Park, Corsicana Texas





Basin RV Resort, Bastrop Texas







McKinney Falls SP, Austin Texas













**Matt's El Rancho Restaurant in Austin Texas
(Gayle's Favorite Tex Mex Place and Childhood Waiter Mo!)**



South Padre Island KOA, South Padre Island Texas
(Our [SpaceX Affiliate](#))







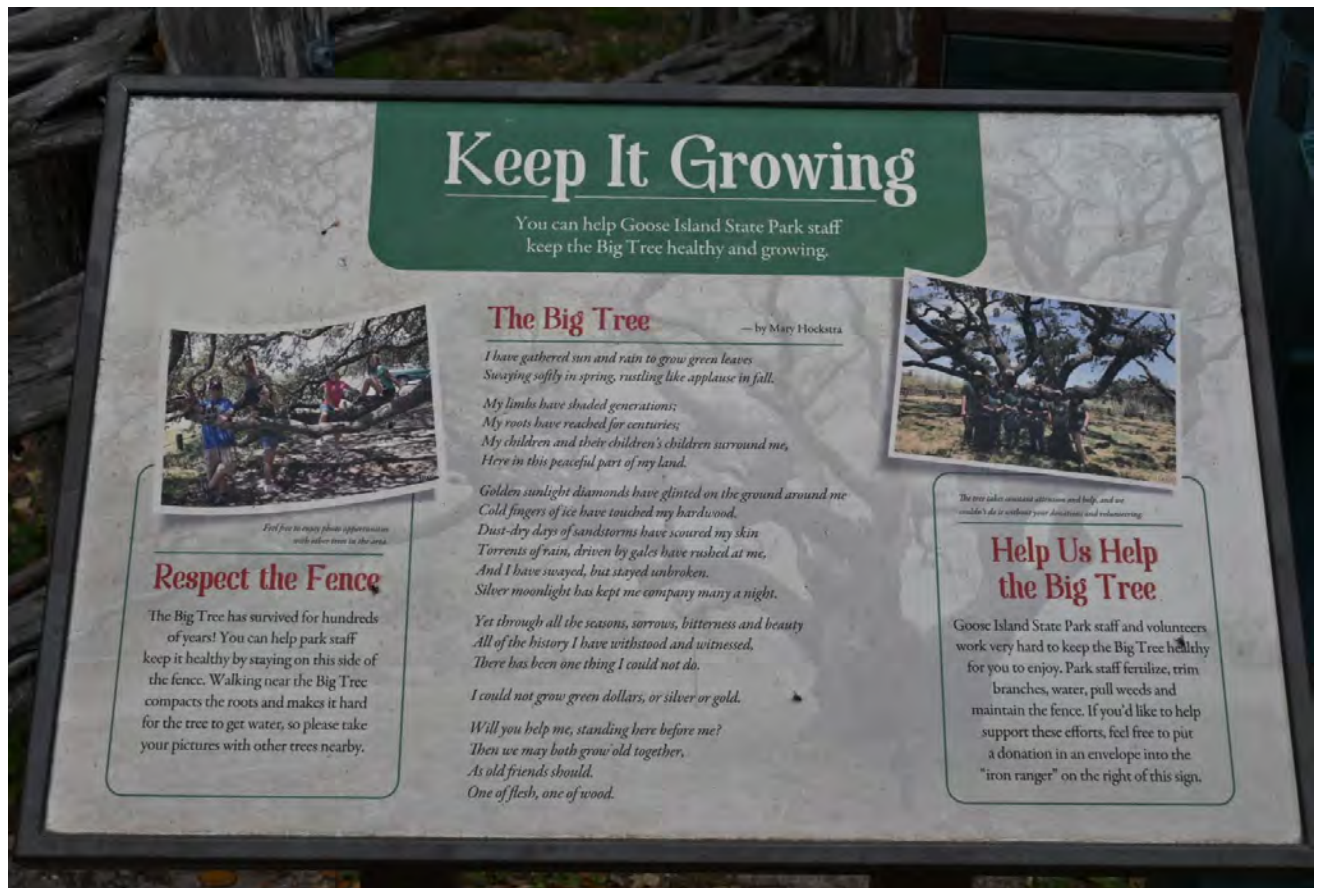


**Rockport KOA, Rockport Texas
(Gayle's Dad's Final Resting Place at The Big Tree)**









Beyond RV, Sulphur Louisiana





All About Relaxing RV Park, Theodore Alabama





**Sun Outdoors, Orange Beach Alabama
(Reliving Memories of Bob's College Spring Break Years...)**



Steinhatchee River Club, Steinhatchee Florida



**Sun Retreats Homosassa River, Homosassa Springs Florida
(Swimming with the Manatees)**





Long Key SP, Long Key Florida









**Boyd's Campground, Key West Florida
(Reliving Memories of Bob's College Spring Break Years...)**













Larry & Penny Thompson SP, Miami Florida







**SpaceX Falcon 9 Launch from Cape Canaveral Florida
(Our [SpaceX Affiliate](#))**



North Beach Camp Resort, Saint Augustine Florida









Myrtle Beach SP, Myrtle Beach South Carolina





Gayle's Childhood Friend Heidi's Home and Heidi's Mom, Gloucester Virginia











Gayle's Brother's Home, Durham/Rayleigh North Carolina





Mash Fork SP, Camp Creek West Virginia





Four Guys Campground near Red River Gorge, Slade Kentucky











D & W Lake Campground, Champaign Illinois





Wilder City Campground, Allison Iowa





Big Sioux SP, Brandon South Dakota



Snake Creek SP located on Missouri River, Platte South Dakota







Wall Drug Store, Wall South Dakota



Cedar Pass Campground in Badlands NP, Interior South Dakota









Big Pine Campground, Custer South Dakota















Big Horn National Forest, Cody Wyoming





Madison Campground, Yellowstone & Grand Teton NPs, 5 – 22 May 2023

























Grand Teton Peak (13,776 feet) where Bob nearly lost his life on the descent following a cam failure while living in Pueblo Colorado and working in a steel mill one summer during his college years.





A hotel and fine dining night in Jackson Hole Wyoming!





A visit to see our friend Veterinarian Bryan Umstead and Bob's 2006 MX5 Miata in Dubois Wyoming.







Back in Yellowstone...and our Casita trailer was still there!











Indian Hot Springs, American Falls Idaho









Crane Hot Springs, Burns Oregon





**A lunch stop at Beckie's near Crater Lake NP about 70 minutes from home!
(Photos of this year's Crater Lake snowpack taken by our favorite house sitter!)**







Returned Safely to Our Remote Southern Oregon Homestead on a Sunny 2 June 2023!











Casita Trailer Modifications, Refinements and Upgrades

While we did discover a few dangerous electrical safety issues requiring remedy, a Casita trailer is very capable “as is”. A Casita trailer also provides a good starting point for those people who have the capability and the competence to create a highly custom and refined trailer that meets ALL of THEIR unique specific needs.



Our [2023 Casita Liberty Deluxe Trailer](#) purchase and our modifications, refinements and upgrades were specifically chosen to enable us to travel economically, far, fast and then comfortably, securely dry camp with our cats in very beautiful and very remote locations for as long as we desire.

Our [2023 Casita Liberty Deluxe Trailer](#) modifications, refinements and upgrades are presented more or less in the order that we actually accomplished them...from our easy ones either accomplished while on this pickup trip...to our more challenging ones requiring a workshop or a larger time commitment to properly accomplish. To go beyond the usual BS and ignorance based opinions you will often encounter on social media, we have also documented our many Casita trailer modifications, refinements and upgrades with photos, detailed descriptions, our rationale for doing them and our rationale for the specific way we elected to accomplish them. A bookmarked bullet list summary of our many Casita trailer modifications, refinements and upgrades follow:

- [Electronic Monitoring Devices](#)
- [Entertainment, Internet and Radio Communications](#)
- [Generator Purchase, Propane Conversion & Propane System Expansion](#)
- [Entry Closet Organization](#)
- [Air Conditioning System Reduced Startup Power Modification](#)
- [Casita Trailer Decal Removal & Custom “Los Gatos Casita” Artwork](#)
- [Custom Mattress Sleeping Area](#)
- [Custom Dining Table Area](#)

- “Los Gatos Casita” Floor Plaque
- Custom Cat Bathroom & Storage Cabinet
- Bathroom Teak Shower Mat & Fold Down Chair
- Bathroom Ceramic Toilet & Toilet Bidet Seat
- Cat Scratching Post
- Improved Water Heater Control Panel Location/Functionality
- Improved Battery Disconnect Location/Functionality
- Improved Potable Water Pump Switch Functionality
- Improved Potable Water Tank Functionality
- Power Inverter and Additional Electrical Receptacle Outlets
- Floor Passageway Lamp
- Hepvo Sink Drain Valves
- Corrected Casita Trailer Black Water Tank Plumbing Deficiency
- Dimmable Chandelier Light
- Interior/Exterior LED Lights
- Entry Door Double Step
- Solar Panels
- Access Hatch Thumb Locks
- Awning, Accessories & Security
- Curtains
- Hitch & Scissor Jacks
- Sewer Hose Carrier
- Lithium Battery Upgrade
- 50A 120/240VAC True Split-Phase Service Capability
- 50A Power Inlet, Detachable Power Shore Cord & Larger Exterior Access Hatch
- Casita Shock Absorbers
- Casita Trailer Cover & Pole Barn
- Additional Windows
- Bathroom Sink
- Outdoor Cold/Hot Water Faucet
- Electric/Propane Kitchen Cooktop
- Bathroom Recessed Medicine Cabinet with Mirror
- “Gayle’s Casita Closet”
- Electric/Propane Tankless Water Heater

Applied Knowledge & Accomplishment Over BS, Degenerates, Ignorance & Incompetence!

Electronic Monitoring Devices

We added [RV Whisper](#) and [TRAK4](#) electronic monitoring systems and we use an affordable [DoHonest V35 True Wireless Backup Camera](#) system that we feel far outperforms the much more expensive Furion or TadiBrothers systems often touted about on social media.

The [RV Whisper](#) electronic monitoring system enables real time Internet alerting/monitoring of our Casita trailer 120VAC shore power status, 12VDC battery power status, Air Conditioning System status via [MicroAir EasyStart](#), battery compartment access hatch status, entry door status, interior humidity status, interior temperature status, motion detection status, propane tank status via [Mopeka Pro](#) propane tank sensors and water leak detection status.

The [TRAK4](#) electronic monitoring system enables real time Internet GPS location tracking of our Casita trailer via a month-by-month subscription plan. All these systems provide us with an additional level of comfort/security given that our cats must sometimes be left in our Casita trailer when we are out and about at places where we can't take them or can't leave them in our tow vehicle. This is the "Los Gatos Casita" after all!

The [DoHonest V35 True Wireless Backup Camera](#) system is totally wireless and this HD day/night vision camera has a solar panel making it fully mobile which enables it to be used for BOTH backing up our Casita trailer and for remote surveillance monitoring of our camp area surroundings from within our Casita trailer during daytime and nighttime. We use the standard mirrors on our 2023 Honda Ridgeline truck, our [DoHonest V35 True Wireless Backup Camera](#) system, and one of us outside to further confirm that all is well using UHF [Midland GXT GMRS Handheld Radios](#) to communicate so as to not have to shout at each other. Our backup camera mostly helps with setting the initial starting point for the backup maneuver and then provides some additional assurance and guidance during the backup maneuver. While the standard mirrors on our 2023 Honda Ridgeline truck perform very well given our truck and our Casita trailer sizes, we also carry extended mirrors with us that can be easily/quickly strapped on should a legal need dictate using them.


We specially selected our truck and trailer size combination to optimize aerodynamic performance. Having anymore frontal surface area than is absolutely necessary on a tow vehicle or on a trailer will increase aerodynamic drag force which also further increases by the square of the speed. So if you increase your speed from say 30 MPH to 60 MPH, you have doubled your speed, but you have quadrupled the amount of aerodynamic drag force! So having any more frontal surface area than necessary and driving at higher speeds than necessary greatly increases the required tow vehicle power, which then reduces the towing MPG, which then increases the expense of traveling.







Borst RV

 Connected to: Borst Engineering

 Oct 27, 2023 8:21am PDT



RV Indoor Temp



33°F

61% humidity

Updated: Oct 27, 2023 8:19am



Driver Side LPG Tank



100%

11 Inches of LPG

99% Sensor Battery

Updated: Oct 27, 2023 8:19am

Passenger Side LPG Tank



37%

4.7 Inches of LPG

99% Sensor Battery

Updated: Oct 27, 2023 8:19am

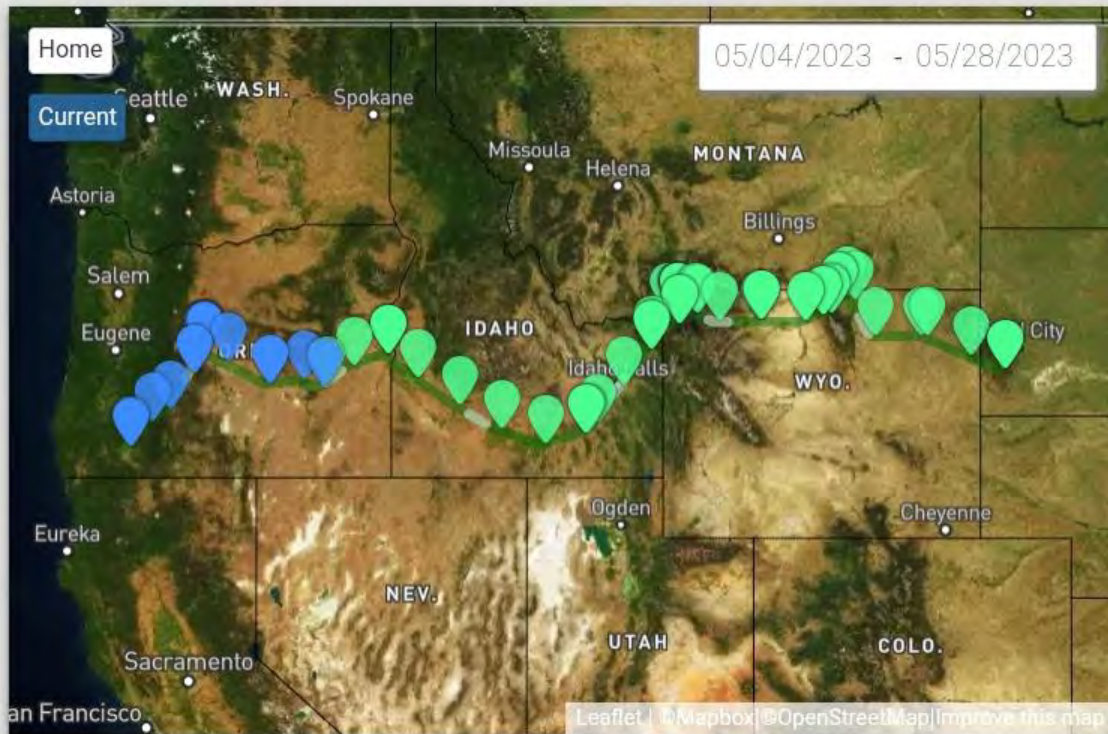
© 2023 RV Whisper. All Rights Reserved.

Version: 4.728, RV Name: Borst RV, Current time: Oct 27, 2023 8:21am PDT

SN: RVM3-0061

Model No.: RVM3

Devices > Borst RV



110 GPS reports loaded, 77 shown ? +



~~5/26/2022 2:22 PM DDT~~

Entertainment, Internet and Radio Communications

We live by choice where cable Internet, cellular phone and landline phone service will never be available and we often dry camp in even more remote locations. As such, we don't have or need cellular service at all and we communicate using our [Samsung Galaxy Tab A9+ Android Pads](#) that are only Bluetooth and Wi-Fi capable. Using only Wi-Fi Internet, [Gmail App](#), [Google Voice App](#) and [Google Meet](#) app, we have free business/personal email, phone calling, texting and video calling/conferencing capability. Using only Bluetooth and [Meshtastic App](#), we have free encrypted or unencrypted texting capability for general and emergency communications if needed using our UHF [Meshtastic Handheld Radio](#) without needing any FCC license whatsoever. Meshtastic is an open source, decentralized, self-healing, global mesh network built to run on affordable, low-power, long-range, LoRa radio devices that use chirp spread spectrum modulation technology. We can confirm that Meshtastic works well in Canada, Costa Rica, Guatemala, Mexico and USA. We can also confirm that Meshtastic also works well in New Zealand, but requires manually setting the [Meshtastic App](#) to use ANZ 915.125 Mhz through 927.875 Mhz frequency band and Channel 20 LongFast. Incidentally, placing dedicated Meshtastic antennas and systems at higher elevations can achieve impressive usable ranges for far off grid applications. Our UHF [inReach Satellite Communicator](#), which does require a fee subscription, is also used as a backup for emergency communications if needed too.

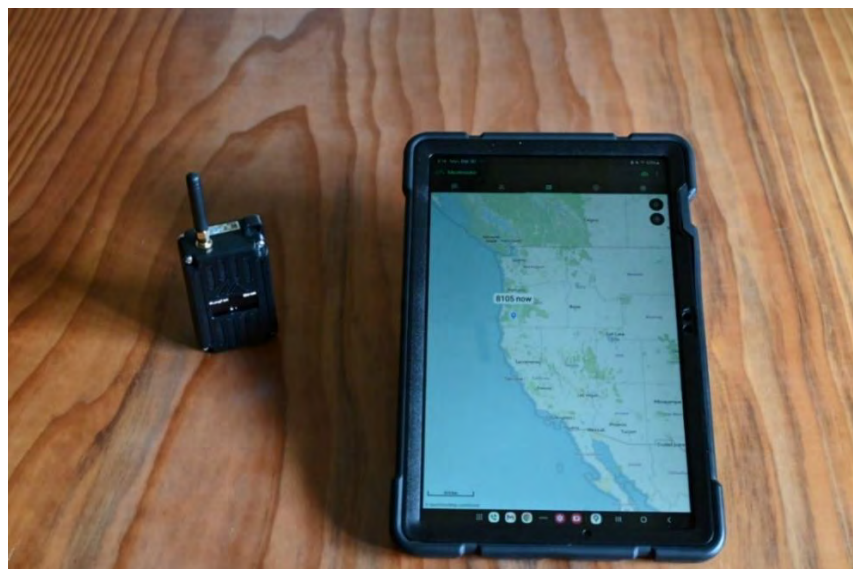
To enable creating and supporting an Internet satellite dish mast and an UHF/VHF/HF radio communication antenna mast, we added three [Bolt-on Rear Bumper 2 Inch Hitch Receivers](#) on each side and on the center of our Casita trailer rear bumper which is a light weight, low cost and non-invasive approach (i.e., they don't require bolting or welding a heavy rear hitch structure/receiver to the trailer frame) to accomplish his project. It should also be noted that 150 pounds is the maximum recommended load to place on the Casita trailer rear bumper to avoid creating a sway issue and potential accident. Each hitch receiver is rated for 200 pounds of load and each hitch receiver weighs 11.44 pounds. So three of these bolt-on hitch receivers increases our Casita trailer weight by 34.3 pounds, increases our trailer axle load by 50.9 pounds and reduces our tongue weight by 16.6 pounds. And adding an additional 115.7 pounds (i.e., 150 pounds minus 34.3 pounds) to reach the maximum recommended 150 pounds of total rear bumper load would increase our Casita trailer weight by 150 pounds, increase our trailer axle load by 222.5 pounds and reduce our tongue weight by 72.5 pounds. Please see our [Casita Travel Trailer Weight & Balance Calculator](#) for understanding and accurately quantifying this.


When we are stationary and camping, one side hitch receiver is used for our Internet satellite dish and the other side hitch receiver is used for our UHF/VHF/HF radio communication antenna mast. When we are moving and traveling, the center hitch receiver can be used to attach our [Kuat Sherpa Two Bike Bicycle Rack](#) and our gravel bicycles. It should be noted that older Casita trailers apparently had an inadequate bumper structure to support this approach. However, the newer Casita trailers don't have this limitation as they use a 4 inch square steel tube having a 0.125 inch thickness that is securely welded to the Casita frame.

We use [Hitch Mount Flag Pole Holders](#), a 20 feet [Telescoping Flag Pole](#) and an [Adapter Bushing](#) to create and support an Internet satellite dish mast for our [Starlink Roam System](#) from our [SpaceX Affiliate](#). Similar to what we used during our blue water sailing days, we designed/constructed a telescoping 20.5 feet off-center fed vertical dipole radio communications antenna mast expressly for our fiberglass Casita trailer that doesn't require using any ground radials or counterpoise to enable 33 and 70 centimeter UHF, 2 meter VHF and 6 to 40 meter HF radio communications. Using these [Hitch Mount Flag Pole Holders](#) enables smartly placing the entire weight of these masts on the ground instead of using some other expensive, problematic and weaker arrangement that would require fastening to the trailer structure. A Starlink Roam Plan provides high speed, low latency Internet via a month-by-month subscription plan which enables us to email/text, make voice phone calls, make video phone calls, surf the Internet, download our digital books onto our [Amazon Kindle Paperwhites](#) (which negates the need for using reading lights or storing paper books) and 4K stream our desired HD programming that is then projected via a light-weight, portable, tiny soda-can sized HD [Nebula Capsule Projector](#) onto a light-weight and portable 40 inch [Tecdigbo Projector Screen](#) that can be easily

hung when desired using two [Mini Hero Clips](#) that clip to two 6mm bolt/eye nuts installed in the existing roof upper cabinet fastener penetrations. With today's ambient light tolerant HD projection technology and Internet programming streaming technology, there's absolutely no need to use bulky, obsolete TVs or cable/satellite TV systems anymore...in RVs or in homes. This Bluetooth technology projector is also used as our Casita trailer music sound system. Having a FCC Extra Class radio license (NZ7N), we can also communicate via radio to anywhere in the US or the world using our UHF/VHF [Yaesu FT-60R Transceiver](#) and our HF [Elecraft KX2 Transceiver System](#) via voice or Morse code. In and around camp, we typically use our UHF [Midland GXT GMRS Handheld Radios](#) for personal communication.

Our Starlink Wi-Fi router and satellite dish power module were placed in our Casita trailer driver side bench seat storage area and can be powered from an added 120VAC 20A electrical receptacle outlet fed from either our added Inverter or from Shore Power, or powered from an added 12VDC 30A SAE power port (please see below for more details on all these refinements). To connect our Starlink Wi-Fi router and satellite dish we fabricated an externally detachable cable by using and cutting the provided Starlink cable and we added a RJ-45 cable receptacle located on Casita trailer driver side, below the floor, and near the rear bumper. To accomplish this, we used a [Neutrik NE8FDPU-TOP RJ-45 Receptacle](#), a [Neutrik SE8FD-TOP Sealing Kit](#) and a [Neutrik NE8MX-B-TOP RJ-45 Connector](#) which uses this Lichtenstein company's low cost, robust, IP65 water resistance rated, externally detachable cable approach that is highly favored by the professional music industry.



 Filter

RGB



Bob Borst

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ChUtil 0.0% AirUtilTX 1.2%

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451 m MSL

rak4631



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
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rak4631



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ROUTER_CLIENT

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CLIENT

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MHome

 5 min 4.09V

Hops Away: ?

SNR 0.50dB RSSI -104dBm Signal Good 

rak4631



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 5 min 0% 0.00V

Hops Away: 2

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
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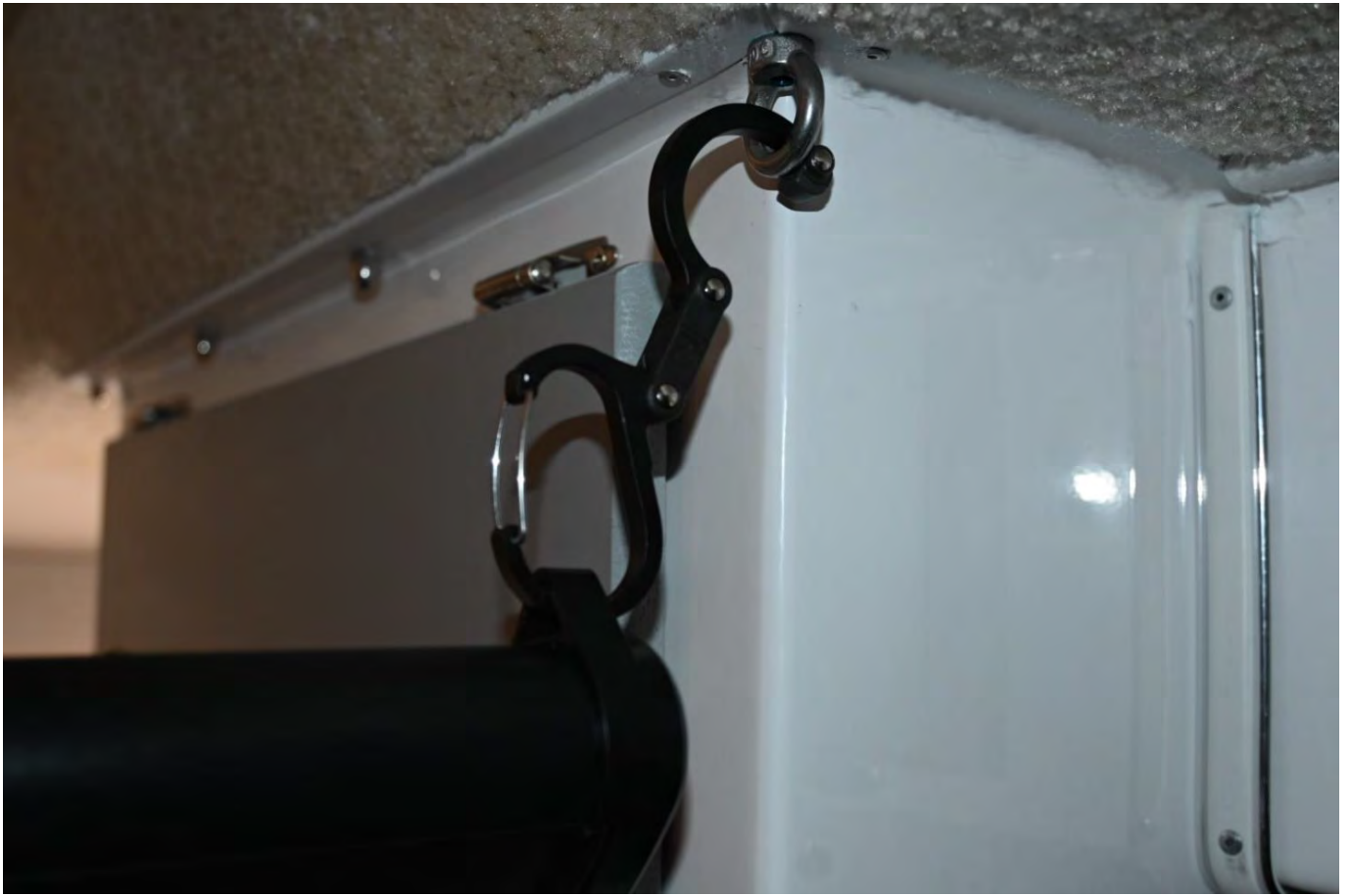


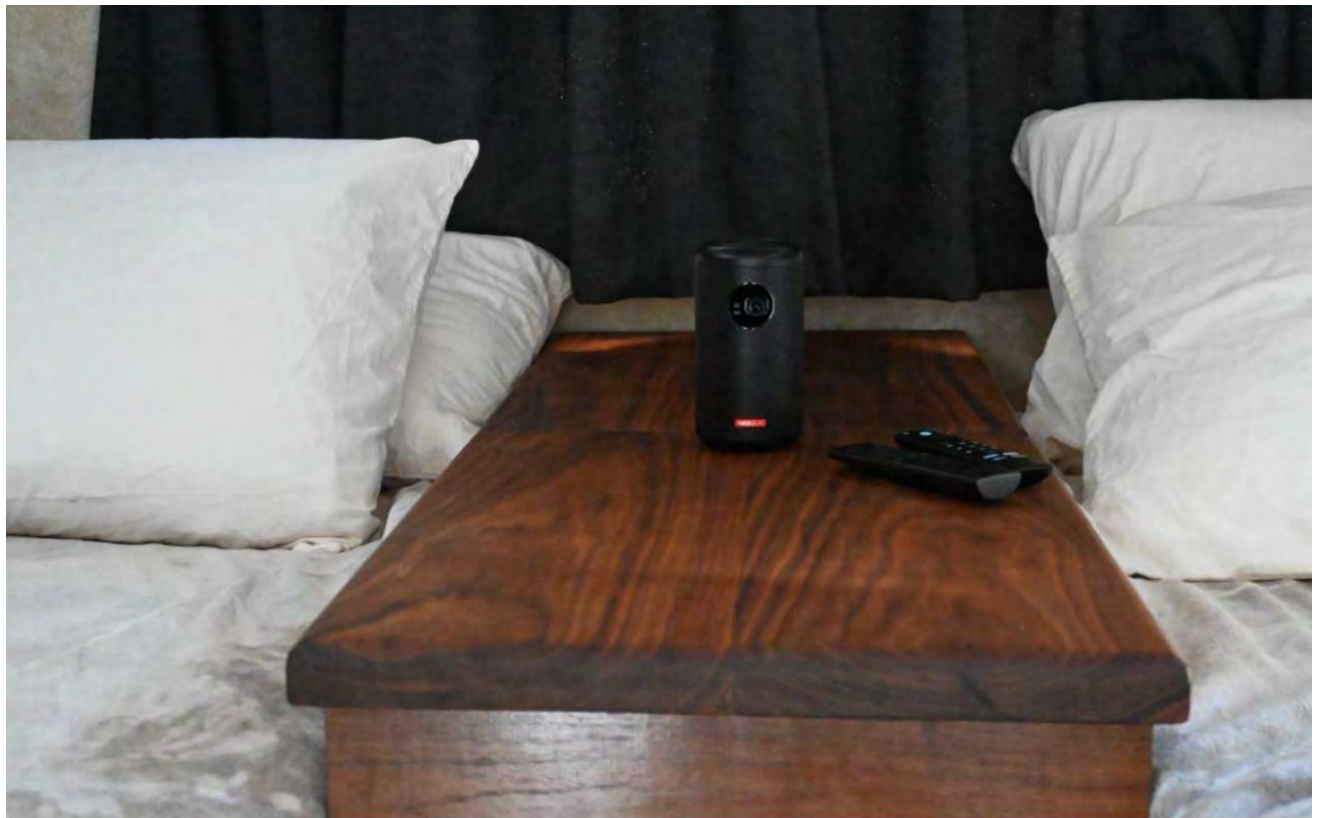
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Generator Purchase, Propane Conversion & Propane System Expansion

We purchased a [Honda EU2200i](#) generator and modified it to operate on propane using a [Hutch Mountain Conversion Kit](#). These convenient, light-weight, quiet and reliable propane generators are very popular within the RV community. As a backup and to provide additional power if desired (4,400 Watts), we subsequently also purchased a [Honda EU2200i Companion](#) and modified it to operate using propane too. Both of these generators can easily fit in our Ridgeline trunk space below the primary truck bed...so zero need for any additional, high aerodynamic drag, ugly exterior Casita trailer storage cabinets or shelves. Operating with propane eliminates any need or hassle of having to take along gasoline on camping trips or having the obnoxious smell of a gasoline powered generator in your camping area. Gasoline goes bad over time and can gum up the engine fuel system making it inoperable until repaired. Propane can be stored indefinitely and will never gum up the engine fuel system. And unless you also have a gasoline furnace, refrigerator, stove and water heater, you will still always need and use propane when dry camping anyhow.

We added two [MB Sturgis Sturgi-Stays](#) to our Casita trailer OEM 20 pound propane tanks to provide maximum BTU/H capability using high pressure propane directly from the tanks. The advantage of using high pressure propane directly from the tanks instead of using low pressure propane from the downstream side of our Casita trailer OEM propane regulator is that you are not limited to the relatively low BTU/H capability of the regulator. Using high pressure propane enables us to simultaneously operate all of our Casita trailer OEM propane appliances (i.e., furnace, refrigerator, stove and water heater) and all of our current propane accessories which include this generator, [Camp Chef Everest 2X Stove](#) with a [Lodge Reversible Griddle](#), [Camp Chef Explorer 14 System](#) and [Camco Campfire](#) plus any additional propane devices that we may add in the future without being BTU/H capability limited. When shore power isn't available, operating our generator enables charging our Casita trailer 12VDC battery and using our 120VAC appliances. When dry camping and before having our added [Renogy 3000 Watt Pure Sine Wave Inverter](#) and [Renogy Foldable Solar Suitcase](#) (please see below for more details on these two refinements), we would typically run our generator for a couple hours to fully charge our battery while having breakfast to enable using our breakfast 120VAC electric appliances such as our [Small Microwave Oven](#), [2-Slice Toaster](#), [Mini Toaster Oven](#), [Nespresso Aeroccino](#) and [Gooseneck Electric Kettle](#) for V60 coffee pour overs or hot tea. Now that we have an Inverter and solar panels (please see below for more details on these two refinements), we can operate all these appliances and our [Shark HV302 Rocket Pet Corded Stick Vacuum](#) without needing to use our generator when dry camping.

Our propane modified [Honda EU2200i](#) generator has a floating neutral and ground like most portable generators. Since our Casita trailer OEM Power Center is wired as a sub panel (i.e., per electrical code, a sub panel MUST NOT have the neutral and ground bonded together), our Casita trailer OEM Power Center fully expects to receive power from a source that is wired as a main panel (i.e., per electrical code, a main panel MUST have the neutral and ground bonded together) as is the case when our Casita trailer OEM Power Center receives shore power from a campground main panel hookup. As such, a [Generator Bonding Plug](#), which bonds the neutral and ground together, should always be used with a [Honda EU2200i](#) generator so the Casita trailer Ground Fault Circuit Interrupter (GFCI) system works properly to prevent electrical shock and your [Surge Protector](#) tests correctly and works properly. And NO, you should NEVER use a grounding rod on a generator that has a bonded neutral/ground that is supplying power to a single RV...and it is illegal to use ground rods in campgrounds too. "No Shock Zone RV Electrical Safety" by Michael Sokol is a great source of reliable information on this specific subject. Unfortunately, there is lots of bad advice on this subject on social media as is often the case as the brightest and best don't often frequent social media and such. And speaking of generators, you may also find our remote southern Oregon homestead self-constructed generator interesting too:

[Lister Engine Generator](#)

It should be noted that getting enough battery power to operate the Casita trailer Air Conditioning System for an adequate amount of time isn't currently feasible or practical given the small size of the Casita trailer (please see our Solar Panels refinement section for detailed explanation). So, shore power or a generator is required to operate the Casita trailer Air Conditioning System. Given all our additional 12VDC and 120VAC power system refinements detailed below, we can now dry camp for as long as we desire and we only need to use

our propane modified [Honda EU2200i](#) generator on the rare occasions that we also need our Casita trailer Air Conditioning System.



Entry Closet Organization

One of our first on-the road Casita trailer pickup refinements was to create a fully configurable, light-weight, low cost and strong [Closet Hanging Organizer](#) with five removable and light-weight 12 inches long by 9 inches wide by 6-1/2 inches deep [Plastic Bins](#) to the entry area closet which creates 3,510 cubic inches or about 2 cubic feet of storage which is more than adequate for our light-weight, small clothes items. We also have 10 strong stainless steel clothes hangers for our clothes items that need to be hung.

Given that the entry closet is the most forward storage area in the Casita trailer, it is the worst storage area because any weight stored here quickly increases the trailer tongue weight (please see our [Casita Travel Trailer Weight & Balance Calculator](#) for understanding and accurately quantifying this). So we only use this closet for storing our light-weight, small clothes items, broom and [Shark HV302 Rocket Pet Corded Stick Vacuum](#).

This 120VAC corded Shark vacuum only uses 500 Watts which enables it to be used when dry camping via our added [Renogy 100AH LiFePO4 Deep Cycle Self-Heating Battery](#) and our added [Renogy 3000 Watt Pure Sine Wave Inverter](#) (please see below for more details on these two refinements). This 120VAC corded Shark vacuum also performs far better than the much more expensive cordless Dyson Stick vacuums and also eliminates needing a separate battery and battery charger.

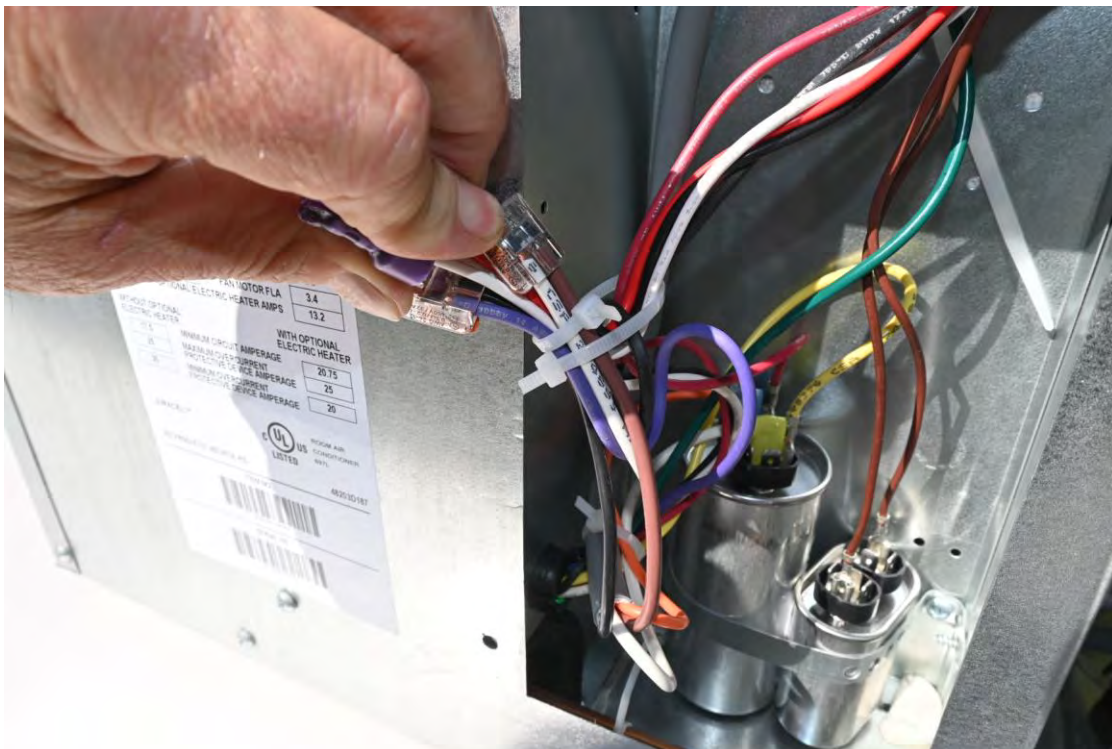
The large 14.5 cubic feet of heavy storage space created by our custom sleeping area cabinet (please see below for more details on this refinement) and the huge and easily accessible payload volume of our Honda Ridgeline tow vehicle negates any need to store items in our Casita trailer bench seat storage areas or any need to add additional, high aerodynamic drag, ugly exterior storage cabinets or shelves.

While this entry closet organization approach worked well enough for our Casita pickup trip and for perhaps a year or so afterward, we eventually decided that we wanted something similar to [Katys Casita Closet](#), but for far less cost, stronger and capable of accommodating all the other modifications that we made to this closet space area. Please see below for more details on ["Gayle's Casita Closet"](#) which we self-constructed.



Air Conditioning System Reduced Startup Power Modification

We added a [MicroAir EasyStart](#) to our Casita trailer Air Conditioning System unit to enable operating our Casita trailer Air Conditioning System using our propane modified [Honda EU2200i](#) generator when shore power isn't available. EasyStart is a Bluetooth microprocessor device that minimizes and monitors the Casita trailer Air Conditioning System starting amperage far better than a passive starting capacitor and which also interfaces with our [RV Whisper](#) system. It should be noted that getting enough battery power to operate the Casita trailer Air Conditioning System for an adequate amount of time isn't currently feasible or practical given the small size of the Casita trailer (please see our Solar Panels refinement section for detailed explanation). So, shore power or a generator is required to operate the Casita trailer Air Conditioning System.



Casita Trailer Decal Removal & Custom “Los Gatos Casita” Artwork

We removed all our Casita trailer advertising decals before the sun could permanently bake their images into the Casita trailer fiberglass gelcoat and eventually result in them cracking and peeling off. We also think this is a much cleaner and classier look similar to our Honda Ridgeline tow vehicle. Furthermore, it is much easier to clean and protect the exterior fiberglass shell without having these decals. Since new Casita trailer decals are always available from Casita, any future owner of our Casita trailer could always put them back on if desired.

Being long time sailors, we use [Bow to Stern Protectant \(BTS\)](#) to protect the exterior of our Casita trailer. BTS goes on and comes off very easily. BTS can be applied to fiberglass gel-coat, metal, plastics, and metal. Designed for the harsh marine sailing environment, BTS has outstanding UV protection and can be applied in direct sunlight. BTS creates a durable finish that guards against stains including mildew and mold. BTS provides a water repellant shield that fights corrosion. Unlike wax, BTS continues to protect even after many repeated washings.

We also added black [Crebri Wall Shield](#) protectors to keep the spare tire from scratching our Casita trailer gelcoat and we replaced our Casita trailer OEM spare tire cover (Camco model 45345) with a high quality spare tire cover from [Custom Tire Covers](#) using “Los Gatos Casita” artwork created by our very talented daughter-in-law Sydney. Should you desire to have artwork created for some similar application, Sydney frequently takes on commissions and we would be very happy to put you in touch with her if requested. This is the “Los Gatos Casita” after all!





Custom Mattress Sleeping Area

We eliminated all of our Casita trailer OEM uncomfortable cushions and replaced them with 8 inch thick mattresses from [Mattress Insider](#), a highly reputable company that has specialized in high quality Casita trailer mattresses for many years, which we had custom designed/shaped for us and custom built to each of our unique and preferred firmness levels. It should be noted that only the Casita Liberty and Independence models enable two people to sleep in close proximity to each other and still easily go to the bathroom in the middle of night without having to crawl over each other or disturb each other. Our custom mattress sleeping area design provides the preferable Independence model 30 inches wide sleeping berths in the upper torso area where highly beneficial while also still retaining the preferable Liberty model 28 inches wide aisle in the dining area. This avoids having the problematic Independence model 16 inches narrow aisle which results in having to play footsies when dining. These 8" thick mattresses also still allow us to use our Casita trailer OEM folding kitchen counter top shelf which provides desirable additional food preparation space.

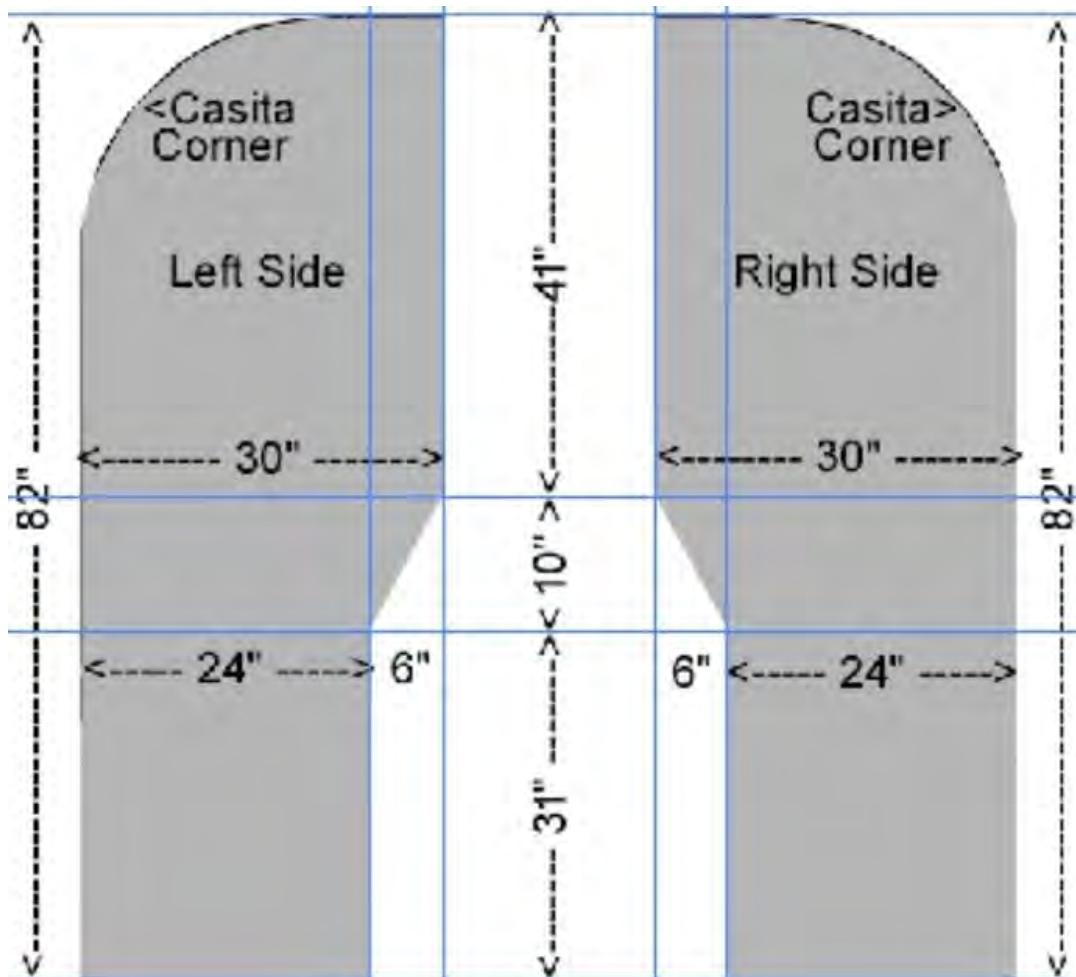
[RV Love](#) provides good general information about RV mattresses along with a 10% discount coupon code for [Mattress Insider](#). Mattress Insider use a combination of high quality cooling gel foam and high quality memory foams of various densities to create your preferred firmness level and they use [Hypervent Aire-Flow Moisture Barrier](#) between the mattress bottom and where they are placed to avoid having any mildew issues. Working with Mattress Insider was a real pleasure and we were also able to get custom mattress zipper enclosures and custom matching 300 thread count fitted sheets, flat sheets and pillow cases from them at a reasonable cost.

Please be aware that there are companies that sell lower quality Casita trailer mattresses for relatively high prices near the [Casita Travel Trailer](#) factory in Rice Texas. We recommend first using a mattress topper to initially address the Casita trailer OEM uncomfortable cushion situation until AFTER you fully sort out exactly how you want to permanently configure your specific sleeping area and exactly what specific mattress will be most comfortable for you. This is what we did for our Casita trailer pickup trip while using our king size bed configuration and we are sure glad that we did so. While the king size bed configuration was very nice when actually made up and sleeping, it had to be reconfigured whenever we needed to dine inside. Furthermore, placing the sheets/blankets on our king size bed that is squeezed between the trailer back and side walls was a very difficult chore. The only viable solutions for having an easily usable RV king size bed would be to either have a behemoth RV that enables having a permanent, walk-around, king size bed...or using essentially a large and expensive sleeping bag arrangement AKA a [Beddy](#)...no thank you!

[Mattress Insider](#) provides a 20 year warranty and a 365 day no risk trial period. Their mattresses are handcrafted in the USA and adhere to strict Volatile Organic Compounds (VOC) requirements unlike many other RV mattresses. So there's no obnoxious VOC smell and VOC off-gassing that has been linked to lung cancer. So perhaps this is something to consider and ask about too if you are health conscious and shopping for an RV mattress.

Our custom sleeping area design retains the Liberty model's advantageous design which makes it easier access to our Casita trailer lower bench seat and overhead storage areas, easier to sheet/blanket the mattresses and allows the mattresses to always be kept fully made up and always available. Our custom sleeping area in concert with our custom dining area [Lagun Table System](#) (please see below for more details on this refinement) enables us to ALWAYS have BOTH sleeping and dining capability and WITHOUT needing to reconfigure anything.

The minimal 16 inches of gap between the 30 inches wide torso sections of our custom mattresses retains our desired sleeping closeness factor while also enabling the creation of a custom sleeping area cabinet (please see below for more details on this refinement) created within the 28 inches wide by 41 inches long by 15 inches deep space below the mattresses and created within the 16 inches wide by 41 inches long by 12 inches deep space that goes through and 4 inches above the mattresses (which provides a total of 25,092 cubic inches or 14.5 cubic feet of storage volume for heavy items) and which supports the 30 inches wide torso sections of our custom mattresses without having to permanently modify our Casita trailer in any way.



Custom Dining Table Area

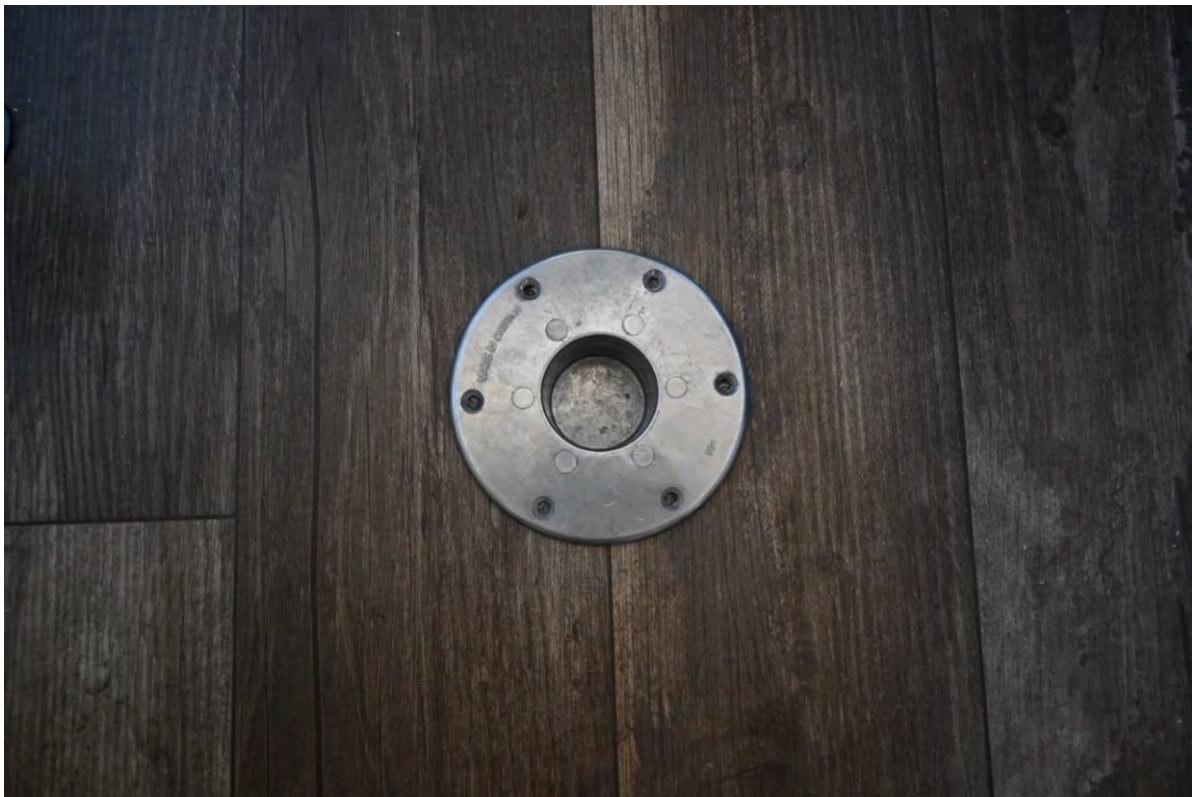
We added a light-weight [Lagun Table System](#) to the dining area with a handmade 24 inches round black walnut table top finished with [Rubio Monocoat Oil Plus Pure](#) eliminating all of our Casita trailer OEM heavy-weight bed and table configuration panels and steel support rods. Our custom Lagun Table System in concert with our custom sleeping area enables us to ALWAYS have BOTH dining and sleeping capability WITHOUT needing to reconfigure anything. The Lagun mounting plate was attached to the Casita trailer passenger side bench seat with a marine plywood backing plate, 2x4s and a steel angle bracket rated for 250 pounds. We used the long Lagun leg option which provides the ideal table dining height when dropped to rest on our Casita trailer floor and which also enables raising the table top to a sufficient height over the sleeping berth when stowed so as to not interfere with our feet or egress while sleeping at night.





“Los Gatos Casita” Floor Plaque

We added a sand cast brass “Los Gatos Casita” tribute plaque handcrafted in the UK by [The Metal Foundry](#) to cover the hole in the floor created by the removal of the obnoxious Casita trailer OEM table floor post support that would always collect dirt in its cavity that then would have to be vacuumed to remove it. The plaque holding screw holes were made identical to the floor post support screw holes. We also sealed the hole from underneath our Casita trailer to keep water, etc. from entering the floor structure.





Custom Cat Bathroom & Storage Cabinet

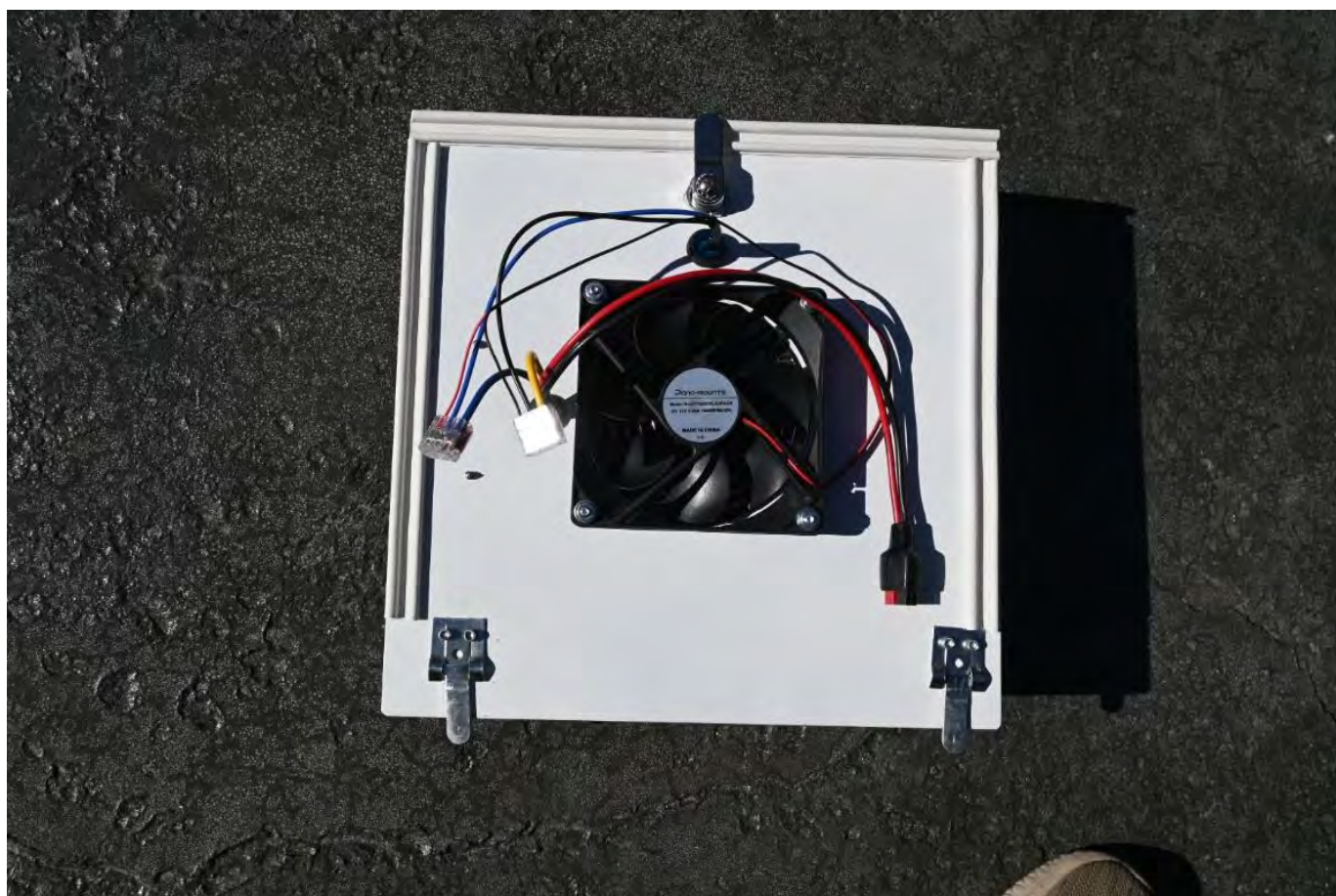
We added a custom cat bathroom and custom storage cabinet in our custom sleeping area created within the 28 inches wide by 41 inches long by 15 inches deep space below the mattresses and created within the 16 inches wide by 41 inches long by 12 inches deep space that goes through and 4 inches above the mattresses (which provides a total of 25,092 cubic inches or 14.5 cubic feet of storage volume for heavy items). This cabinet supports the 30 inches wide sections of our custom mattresses without having to permanently modify our Casita trailer in any way. The cabinet structure was constructed to be as light-weight as possible using the minimum amount of oak veneer marine plywood and corner bracket structure with black walnut panels in the visible areas. The oak veneer marine plywood was finished with [Minwax Premium Oil Dark Walnut Stain](#) and [Minwax Helmsman Spar Clear Satin Urethane](#). The black walnut cabinet front surface and the mattress width extension rails were finished with [Minwax Helmsman Spar Clear Satin Urethane](#). Like the custom dining area table top, the two black walnut cabinet top access hatches were finished with [Rubio Monocoat Oil Plus Pure](#). The two black walnut cabinet top access hatches provide an additional flat, sturdy surface that can be used as a table for books, drinks, laptops, snacks, etc. And Portuguese red wine never looks finer or tastes better than being served on black walnut and triggers our [Madeira](#) sailing memories!

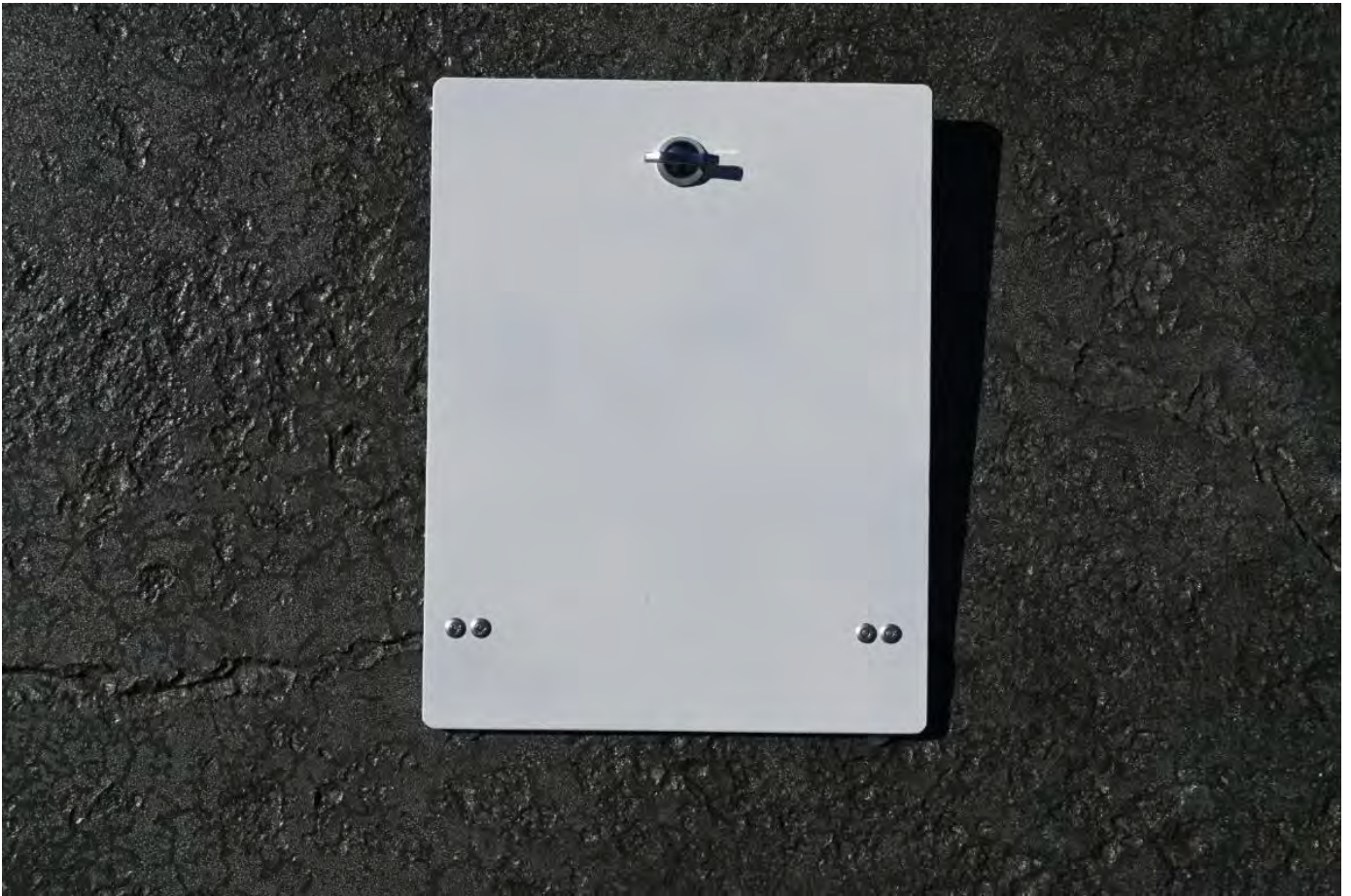
This cabinet provides two fully enclosed separate storage compartments at the most preferable furthest aft trailer loading location which reduces Casita trailer tongue weight (please see our [Casita Travel Trailer Weight & Balance Calculator](#) for understanding and accurately quantifying this). These two aft storage compartments can be easily accessed from the back top access hatch in the 16 inches by 41 inches section above the mattresses. The furthest aft storage compartment houses our added [Renogy 3000 Watt Pure Sine Wave Inverter](#) and is used for storage of all our entertainment items such as our [Nebula Capsule Projector](#). The central storage compartment is used for general storage of heavy items.

More importantly, this cabinet also provides a fully enclosed and separate compartment for our large 19-1/2 inches wide by 27-1/2 inches long by 6 inches deep cat litter box. When this “cat bathroom” is “in use”, a motion detector switch/timer is used to turn ON a blue LED mood light and a quiet 12VDC 0.25A 1600 RPM muffin fan that operates for 10 minutes after each use and exhaust vents to the outside via a 2 inches diameter hole in the floor using an aluminum louvered/screened vent located in driver side rear bench seat storage area. This vent also acts as water flood drain should there be a plumbing failure. The electronics (motion sensor switch/timer, muffin fan and LED light) are mounted on a 1/8 inch thick aluminum access panel which is used to close off the cat bathroom from the driver side rear bench seat storage area using two lower spring snap cleats and an upper thumb lock. Another access panel closes off the central cabinet compartment from the driver side rear bench seat storage area too. Anderson connectors were used to enable easy removal of the electronics access panel from the cabinet whenever needed. The cat litter box can be easily slid out from the front via a magnetically fastened access hatch and or accessed from above via the front top access hatch in the 16 inches by 41 inches section above the mattresses. This is the “Los Gatos Casita” after all!











Bathroom Teak Shower Mat & Fold Down Chair

The Casita trailer bathroom is a “wet” bathroom similar to the “head” in a sailboat. We very much prefer a wet bathroom for camping and for sailing because a wet bathroom takes up far less valuable space given the minimal time a bathroom is actually used, a wet bathroom is much easier to clean, sanitize and dry after our last shower than a larger “dry” bathroom, and a wet bathroom can accommodate any failures in the bathroom that result in water leaks, etc. In addition, it is also nice to be able to come in from stormy wet weather and simply remove our wet gear and hang it in an isolated space that self-drains the water which helps keep the humidity level low in our main living area.

We added a handmade sailboat teak shower mat and teak fold down chair to our Casita trailer wet bathroom. Our teak shower mat eliminates having a cold or wet bathroom floor. Our teak fold down chair enables sitting down while taking a shower and folds down to otherwise be completely out of the way.

These teak additions, in concert with our heated toilet bidet seat, our larger stainless steel sink, our added [Oxygenics Fury RV Shower Wand](#) (which provides an amazing shower experience with very little water usage) and detachable 40 inch long, extremely flexible, stainless steel [Delta Shower Wand Hose](#), our added wet clothes rotatable hangers, our added additional bathroom window, our added bathroom recessed medicine cabinet with mirror and our colorful fabric shower curtain (please see below for more details on all these refinements), truly makes our Casita trailer bathroom a much more comfortable and much more inviting space to use.









Bathroom Ceramic Toilet & Toilet Bidet Seat

We replaced our Casita trailer OEM low quality, tacky-looking, tacky-sounding, bacteria breeding, plastic Thetford toilet with a high quality ceramic [Dometic 311 Low Profile Round Toilet](#) and we added a 120VAC, residential, high quality [Brondell Swash 1400 Round Toilet Bidet Seat](#) which has a heated seat, blue night light and provides function rich control of endless toilet bidet seat warm water. Only clueless Americans wipe crap all over their butts with dry paper and think this is ok...but this is fully understandable given that most Americans have never lived in an advanced democratic socialist country. Having a toilet bidet seat enables saving potable water when dry camping by reducing the need for as frequent showers. One also doesn't need to use and put any toilet paper into the black water tank so the contents are 100% biodegradable waste that is suitable to dump anyplace you would normally dig a latrine and then subsequently re-cover with earth when doing backcountry "leave no trace" dry camping as is practiced in [Scouting \(Troop 455 Renton, WA\)](#) and by real outdoorsmen. The same can be said for the gray water tank's contents when biodegradable soaps are used as should always be the case anyhow.

Our Casita trailer OEM Thetford plastic toilet was installed without any toilet flange whatsoever using only two wood screws through the thin-walled black water tank and lots of clear silicone adhesive. So a proper Dometic toilet flange was first added using epoxy bonded stainless steel 1/4-20 backing plate nuts and flat Philip head recessed screws to enable easy future replacement if needed. To fit the new toilet flange, a larger diameter hole had to be drilled using a plywood positioning template and hole saw. This Dometic toilet DOES NOT have the problematic ceramic hump at the back of the toilet like nearly all other RV toilets have that will interfere with a toilet bidet seat installation and therefore would first need to be carefully grinded away to eliminate this interference. This Dometic toilet DOES have a standard vacuum breaker at the back that will interfere with a toilet bidet seat installation, but since this vacuum breaker is just inserted into a rubber sleeve in the ceramic bowl, it can be easily removed, lengthened and then reinserted to eliminate this interference. We initially fabricated our own extension for the standard vacuum breaker that came with our Dometic toilet, but a [Vacuum Breaker Kit](#), that has this required extension along with a hand sprayer to make cleaning the toilet bowl much easier and more pleasant, is now available from Dometic and may now just be purchased.

A tee fitting must be added to the pressurized water line to enable feeding pressurized water to the toilet bidet seat. In addition to adding a toilet water shutoff valve, we also added a dedicated toilet bidet seat water shutoff valve and a water filter. These shutoff valves are useful for performing future maintenance or to independently deal with a toilet or a toilet bidet seat leak while camping. Both the vacuum break device and hand sprayer only see pressurized water when the toilet is flushed. Both the toilet and the toilet bidet seat always see pressurized water unless the shutoff valves are closed. We used PEX-A and ProPEX brass expansion fittings for this plumbing. Unlike the Casita trailer OEM PEX-B and crimp fittings, PEX-A won't be damaged by freezing and ProPEX brass fittings will never fail and leak as is all too common with crimp fittings. As such, with the exception of the shower hot water line, we are slowly replacing all our Casita trailer OEM 1/2 inch diameter PEX-B and crimp fittings with 1/2 inch diameter PEX-A and ProPEX brass expansion fittings when the opportunity or need arises. We replaced the shower hot water line with 1/4 inch diameter PEX-A to reduce the hot water delay time and further save potable water when using the shower when dry camping. Additional potable water savings are expected in the future by using a RV optimized tankless water heater (please see last page for more details on this).

A 120VAC 20A electrical receptacle outlet was added to our Casita trailer bathroom to power this toilet bidet seat. This electrical receptacle outlet uses a dedicated [Inverter/Shore Power Selection Switch](#) to enable manually selecting between No Power, Shore Power or Inverter Power from our added [Renogy 3000 Watt Pure Sine Wave Inverter](#) (please see below for more details on this refinement). This added toilet bidet seat uses a maximum of 700 Watts when in actual use when heating the water to the maximum temperature. This added toilet bidet seat doesn't exceed 10 Watts at other times and typically uses much less when in standby Eco mode. This added bathroom 120VAC 20A electrical receptacle outlet uses a water resistant in-use cover and has Ground Fault Circuit Interrupter (GFCI) and Arc Fault Circuit Interrupter (AFCI) protection like all of our other Casita trailer 120VAC 20A electrical receptacle outlets. GFCI prevents electrical shock and AFCI prevents electrical fires. While using GFCI protection, weather resistant electrical receptacle outlet and water resistant in-use cover in our bathroom should provide adequate safety from any potential risk of electrical shock, also having the ability to use the aforementioned dedicated [Inverter/Shore Power Selection Switch](#) to

completely turn OFF the power to this bathroom electrical receptacle outlet when taking a shower further eliminates all risk of electrical shock. We added a Warning Placard adjacent to our [Oxygenics Fury RV Shower Wand](#) (which provides an amazing shower experience with very little water usage) as a reminder to take this extra safety precaution too.







Cat Scratching Post

We added a handmade 36 inches tall cat scratching post made from marine plywood and sisal rope to the bathroom and entry closet wall corner which is 3-1/4 inches wide by 3-1/4 inches wide by 36 inches tall. Unfortunately, [Casita Travel Trailer](#) didn't make this corner a normal 90 degree angle...it's more like a 70 degree angle. To remedy this issue, we used a 3/4 inch leg by 1/2 inch leg by 30 inches long aluminum angle to create a 3/4 inch standoff behind this cat scratching post on the side facing the entry door to properly install the cat scratching post at a true 90 degree angle. The carpet conceals the aluminum angle and this remedy hides this [Casita Travel Trailer](#) construction sin. This is the "Los Gatos Casita" after all!



Improved Water Heater Control Panel Location/Functionality

We removed the obnoxious Casita trailer OEM water heater control panel from the low floor area where it was always getting inadvertently hit by our legs. This Casita trailer OEM water heater control panel only had a non-illuminated gas switch and used an incandescent illuminated gas ignition confirmation indicator. We then added a [Suburban Water Heater Control Panel](#) having LED illuminated electric switch, LED illuminated gas switch and LED illuminated gas ignition confirmation indicator to the kitchen sink area. We chose this specific location as a provision for a future electric & propane tankless water heater control panel which requires being in a more visible location in order to use the functionality and view the display that enables selecting a precise hot water temperature (please see last page for more details on this). A 12VDC activated [Suburban Water Heater Relay](#) was also required for this modification to provide and switch 120VAC to the water heater heating element. We used epoxy bonded stainless steel 8-32 backing plate nuts and button socket cap screws in lieu of rivets to enable easy future replacement if needed.

Our added inside LED illuminated electric switch avoids needing to go outside to use our Casita trailer OEM electric switch located inside the water heater compartment or using the water heater circuit breaker as a switch. Our Casita trailer OEM electric switch inside the water heater compartment is now only used as a safety feature (turned OFF) when the tank is emptied for Winterization or other maintenance tasks are being performed to prevent having the electric heating element inadvertently operate while the tank is empty causing it to self-destruct. Circuit breakers should NOT be used as switches as this shortens their life potentially creating a situation where they won't function when needed to function.



Improved Battery Disconnect Location/Functionality

We removed the obnoxious Casita trailer OEM Battery Disconnect Switch from the low floor area where it was always getting inadvertently hit by our legs. We added robust [Anderson SB350 Connectors](#) rated for disconnecting/connecting the battery with a 450A active load and we used flexible, well-insulated 4/0 AWG [WindyNation Battery Cable](#) also rated for 450A to enable BOTH easy battery disconnect and easy battery removal. Furthermore, having the battery disconnect close to the battery reduces the electrical fire risk from having the Casita trailer OEM Battery Disconnect Switch 13.8VDC bare terminals in close proximity of where kitchen pots are often stored, puts the battery disconnect outside the Casita trailer which is considered a safer location if there is a fire, and disconnects BOTH the positive side (considered mandatory) and negative side (considered optional but desirable) of the battery. We added an [AMOMD 600A DC Bus Bar](#) on the interior side of the battery compartment which was used to connect our added Anderson SB350 connectors and our Casita trailer OEM 12VDC 8 AWG wire which goes to our Casita trailer OEM 12VDC 40A auto resetting circuit breaker and then to our Casita trailer OEM Power Center. Our Casita trailer OEM 12VDC 40A auto resetting circuit breaker was eventually replaced with a high quality [Del City 50A Auto Resetting Circuit Breaker with Ignition Protection](#) AND an [Eaton 60A Maxi Blade EasyID Fuse](#) for the reasons detailed and explained in the below Lithium Battery Upgrade refinement section.

And while on the subject of DC auto resetting circuit breakers, it should be noted that they are typically polarized meaning that the Source (normally the battery) MUST be connected to a specific terminal and the Load (normally the DC Distribution Panel) MUST be connected to a specific terminal. This is because an electromagnet needing a specific polarization is used to increase the electric arc distance when the auto resetting circuit breaker is initially tripped to extinguish this electric arc. If a DC auto resetting circuit breaker is installed such that its polarization requirement is NOT followed, when it is initially tripped this electric arc may never get extinguished and this may cause the circuit breaker to catch fire as shown [here](#). High quality auto resetting circuit breakers have Ignition Protection to prevent this from occurring. **However, this was NOT the case for our Casita trailer OEM 12VDC 40A polarized auto resetting circuit breaker...but fortunately our Casita trailer OEM auto resetting circuit was at least installed correctly.** But the astute reader might then wonder what happens when the Charger is charging the battery which then reverses things by making the Charger the Source and the battery the Load which then violates the polarization requirements of the installed auto resetting circuit breaker. If the amperage rating of the auto resetting circuit breaker and the wire were properly sized to be greater than the maximum amperage that the Charger can physically generate, nothing bad happens as the auto resetting circuit breaker never gets tripped and the wire can handle the maximum current generated by the Charger. **Unfortunately, [Casita Travel Trailer](#) installed a Charger that can potentially generate 55A when charging LiFiPO4 batteries and only installed a 40A auto resetting circuit breaker...which we consider a potential safety issue.**

To easily and conveniently eliminate all battery parasitic current drain (measured to be 0.15A) from our Casita trailer OEM electrical devices (i.e., the MaxxFan, propane leak detector, thermostat, USB port LEDs, etc.) while inside our Casita trailer, we disconnect our Casita trailer OEM Power Center from the positive side of the battery using an added robust [Solid State Relay](#) (SSR) and an added robust [Aircraft Guarded Switch](#) now located in a non-intrusive location. Bob couldn't resist using an aircraft guarded switch someplace in our Casita trailer from being fascinated with aerospace since childhood and having had a [distinguished 35 year Boeing career](#) back when they were a great aerospace engineering company. When this aircraft guarded switch is in its guarded lower ON position, the switch powers the normally open state SSR causing it to close and the battery is then connected. When this switch guard is opened and the switch is then toggled to its upper OFF position, power is removed from the SSR causing it to return to its normally open state and the battery is then disconnected. This SSR is rated for 60A at 100VDC, only uses 0.14 Watts (i.e., 10mA times 13.6VDC) when powered to its closed state, uses 0 Watts when unpowered in its open state and has a Mean Time Between Failures (MTBF) of 2,441 years.

Long lengths of negative 12VDC wire are not a problem (the entire Casita trailer metal structure is grounded to negative 12VDC after all), but one should always avoid long lengths of unprotected positive 12VDC wire. [Casita Travel Trailer](#) properly addresses this by locating our Casita trailer OEM 40A auto resetting circuit breaker on our battery compartment using as short a length of positive 12VDC 8 AWG wire as

possible. In a similar fashion, our positive 12VDC SSR battery disconnect is also located on our battery compartment and AFTER the auto resetting circuit breaker protection using 8 AWG wire. Positive 12VDC for SSR control is also taken AFTER the auto resetting circuit breaker protection but BEFORE the SSR (the importance of this order being that you need to retain SSR control power to enable reconnecting the battery after the battery is disconnected by the SSR), then is further protected with an ATC 3A fuse and then is connected to the SSR positive control input terminal using as short a length of 14 AWG wire as possible. Negative 12VDC for SSR control is taken close to the guarded switch, then connected to one switch terminal and the other switch terminal is then routed back to the battery compartment and connected to the SSR negative control input terminal using 14 AWG wire.

While working on the battery compartment, we took the opportunity to provision it for our added [Renogy 3000 Watt Pure Sine Wave Inverter](#), which is also even capable of 6000 Watts for short durations, and our [Renogy 100AH LiFePO4 Deep Cycle Self-Heating Battery](#) upgrade (please see below for more details on these two refinements). We also considered constructing a battery compartment sliding drawer to make removing the Casita trailer OEM lead acid battery easier to accomplish given that lead acid batteries require frequent maintenance. However, we concluded that after we eventually upgraded to a 50% lighter LiFePO4 battery that wouldn't require any maintenance at all and which could also be easily disconnected directly at the battery, there wouldn't be any significant benefit of having a battery compartment sliding drawer. Furthermore, a battery compartment sliding drawer would make it much more challenging to adequately secure this more expensive LiFePO4 battery from potential theft. ***So if you plan to have a LiFePO4 battery, a battery compartment sliding drawer likely makes little sense!***

For LiFePO4 batteries, it is recommended to use a conservative 10VDC (i.e., the typical LiFePO4 Battery Management System low voltage cutoff) for battery discharging calculations. ***So, assuming a 90% Inverter efficiency, to obtain 120VAC at 20A or 2,400 Watts of power (i.e., 120VAC times 20A), our LiFePO4 battery would potentially need to supply the Inverter 267A (i.e., 2,400 Watts divided by 10VDC divided by 0.9 Inverter efficiency).*** We used a total of 10 feet (5 feet for the positive wire side and 5 feet for the negative wire side) of flexible, well-insulated 4/0 AWG [WindyNation Battery Cable](#) (which results a 2.8% voltage drop at our conservative 10VDC and 267A design condition) to connect the aforementioned added [AMOMD 600A DC Bus Bar](#) to an added [Blue Sea Systems 400A Class T Fuse Block](#) which uses a [Blue Sea Systems Class T Fuse](#), an added high quality [Del City Auto Resetting Circuit Breaker with Ignition Protection](#) and then to our added Inverter. We used epoxy bonded stainless steel 8-32 backing plate nuts and button socket cap screws in lieu of rivets to enable easy future replacement of all these components if needed. Our current 125A Class T fuse (which can be easily replaced in the future with a 350A Class T fuse) is used to prevent our current 120A auto resetting circuit breaker (which can be easily replaced in the future with a 300A auto resetting circuit breaker) from resetting multiple times if there is some Casita trailer electrical system failure causing a very high current in excess of our design limits. ***There have been reports of auto resetting circuit breakers resetting multiple times until there is a circuit breaker or a wire insulation meltdown that then results in an electrical fire. And allowing this auto resetting circuit breaker to repeatedly trip and reset will cause premature failure of both the circuit breaker and the Inverter. We don't want to experience this while camping.***

However and unfortunately, LiFePO4 batteries currently only typically have a C1.0 maximum discharge current rating (i.e., 1A maximum discharge current per battery Amp Hour capacity or 100A for a 100AH battery). This current 100A limitation is much less than our 267A system design objective. And any LiFePO4 battery larger than 100AH will NOT currently fit in our Casita trailer OEM Group 27 battery compartment and, as explained in great detail in the below Solar Panels and Lithium Battery Upgrade refinement sections, it makes little sense to have more than 100AH LiFePO4 battery capacity in a Casita trailer. But future Group 27 100AH LiFePO4 batteries with a C2.7 or higher maximum discharge current rating (i.e., 2.7A or higher maximum discharge current per battery Amp Hour capacity or 270A or higher for a 100AH battery) and also perhaps having higher AH capacities too are reportedly in development and this would indeed be the cat's meow in Los Gatos Casita speak!

While our Inverter has BOTH AC and DC voltage protection should it experience a large AC load needing higher DC amperage than the battery can provide causing the battery voltage to sag or surge beyond

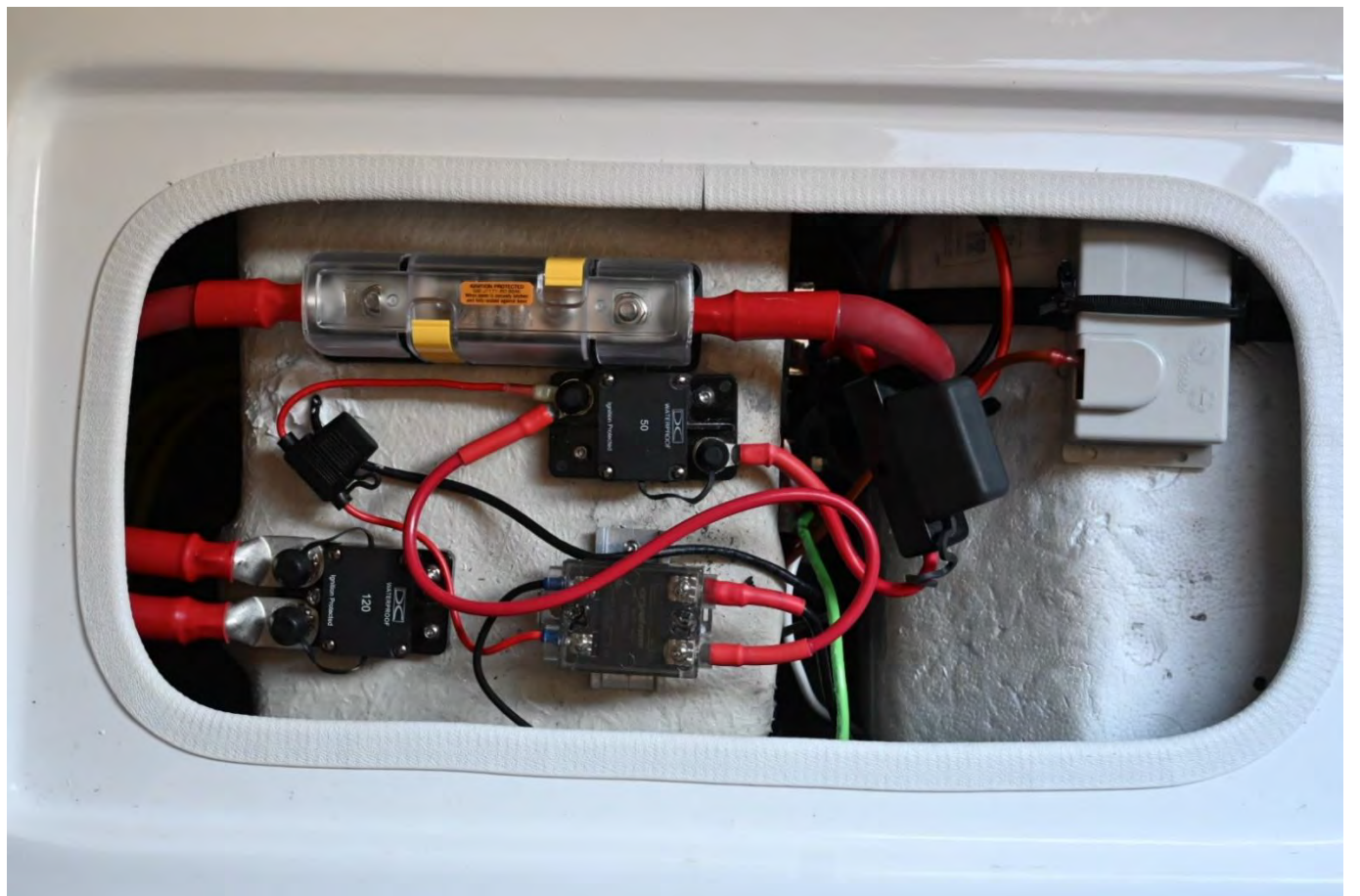
specifications, we don't want to use or solely rely on this protection. So, we currently limit our 120VAC Inverter output amperage using an 8A dedicated Inverter AC circuit breaker so our maximum continuous AC Inverter power should never exceed 960 Watts (i.e., 8A times 120VAC). And therefore, our maximum continuous DC Inverter input amperage should never exceed about 107A (i.e., 960 Watts divided by 10VDC divided by 0.9 Inverter efficiency). While this DC amperage is greater than our current battery C1.0 or 100A maximum continuous discharge current limit, it is well less than our current battery C1.3 or 130A maximum short duration discharge current limit. 960 Watts easily satisfies all our current 120VAC short duration power needs (e.g., our coffee/tea makers, hair dryer, microwave oven, 2-slice toaster, mini toaster oven, toilet bidet seat, vacuum, etc.) without needing to operate our propane modified [Honda EU2200i](#) generator when shore power isn't available. In the future, this 8A dedicated Inverter circuit breaker can be resized to as high as 20A to provide the full 2,400 Watts of AC power capability supported by our overall system design when expected lithium battery technology improvements will increase our current C1.3 maximum discharge current rating to C2.7 or higher (i.e., 2.7A or higher maximum discharge current per battery Amp Hour capacity or 270A or higher for a 100AH battery).

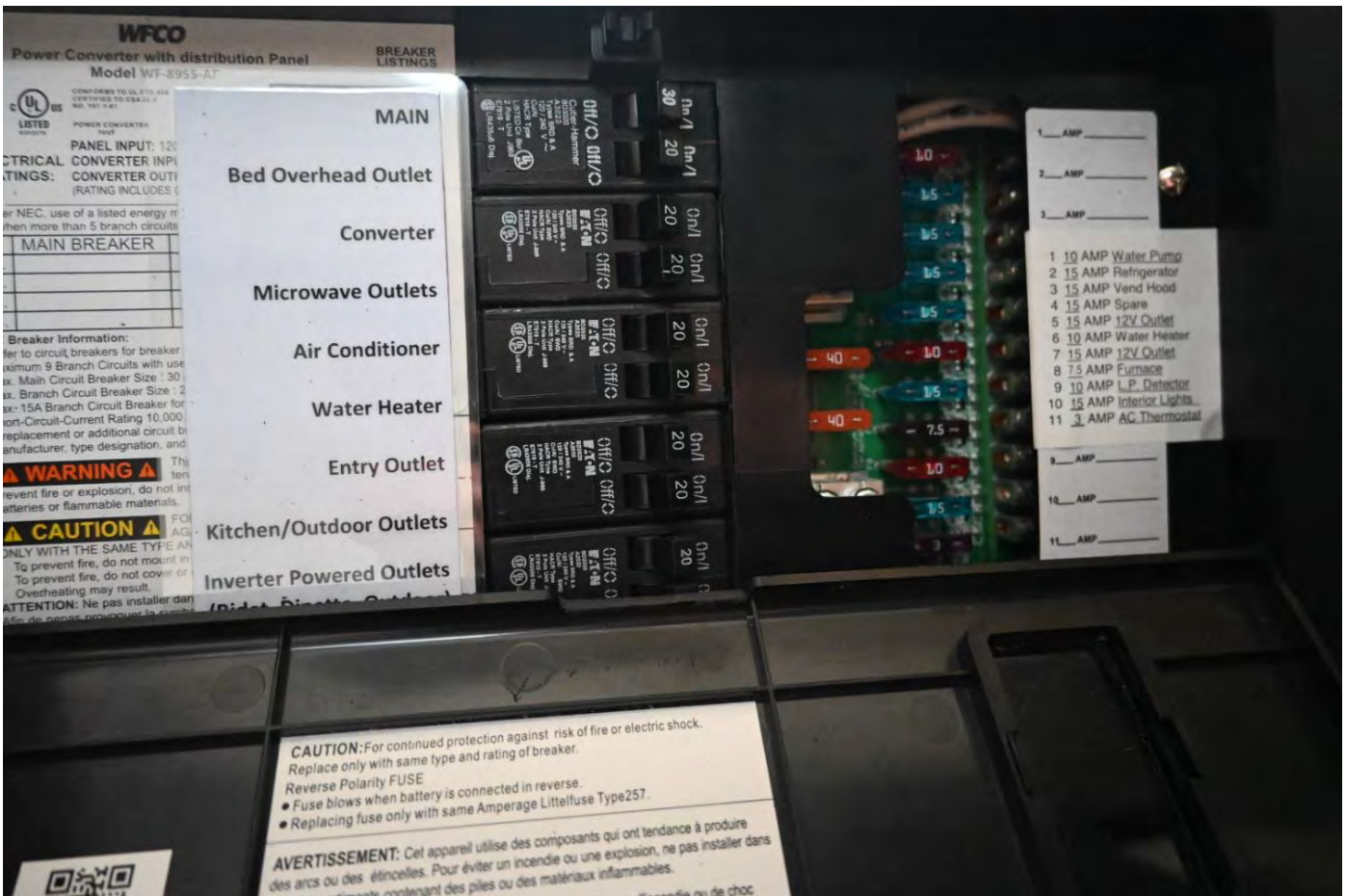
It is always wise to future-proof a system design when economical and practical, especially in a Casita trailer that will likely have an extremely long life (having a marine grade fiberglass single layer shell design that doesn't trap moisture in a cavity which then shortens the lifetime of most other RVs) and certainly has an actual demonstrated lifetime that is far longer than any other available RV at any price point. Hence our rationale for using a 3000 Watt Inverter that can supply 120VAC at 20A, 450A rated Anderson SB350 DC connectors, 450A rated DC battery cable, a 600A DC bus bar, a 400A DC Class T fuse block, a dedicated auto resetting circuit breaker (currently 120A) that can be easily resized to 300A in future, a dedicated DC Class T fuse (currently 125A) that can be easily resized to 350A in the future, 120VAC electrical receptacle outlets rated for 20A and a dedicated 120VAC Inverter circuit breaker (currently 8A) that can be easily resized to 20A in the future.

[Casita Travel Trailer](#) installed more than one wire under some of the circuit breakers so we initially added more circuit breakers to comply with electrical code and we relabeled the circuit breakers accordingly. However, we eventually decided to upgrade our Casita trailer OEM Power Center marginal 30A (3,600 Watts) 120VAC only capability to 50A (12,000 Watts) 120/240VAC true split-phase capability. Please see below for more details on this refinement.











Improved Potable Water Pump Switch Functionality

We replaced the non-illuminated and unlabeled Casita trailer OEM potable water pump switch with a blue LED illuminated and labeled marine [Water Pump Switch](#). We used epoxy bonded stainless steel 8-32 backing plate nuts and button socket cap screws in lieu of rivets to enable easy future replacement if needed. We have literally sailed all over the world and adding marine themed accessories to our marine fiberglass Casita trailer provides us a nice sense of nostalgia.



Improved Potable Water Tank Functionality

We added a PVC low profile, full port, [Hose Bib Valve](#) to the potable water tank to enable both easier 6 gallon jug filling via our spare backup Casita trailer OEM water pump (FloJet model R3526144D) setup and easier city water connection filling via a potable water hose. We find that using a couple 6 gallon jugs and topping off our potable water tank every couple days works well when dry camping. Since PVC is highly susceptible to UV sunlight degradation, we also painted this plumbing with a white bonding primer expressly designed for plastic adhesion and a white semi-gloss acrylic paint expressly designed for UV protection.

We added a marine [Sea Dog Stainless Steel Vent](#) to the potable water tank fill cap so it doesn't need to be removed when filling from the hose bib valve. We also removed our Casita trailer OEM vent tube and plugged where it entered the tank which then enables filling the tank to its full 25 gallon capacity and traveling without any potable water spillage...although we often travel with ALL tanks empty. We have literally sailed all over the world and adding marine themed accessories to our marine fiberglass Casita trailer provides us a nice sense of nostalgia.





Power Inverter and Additional Electrical Receptacle Outlets

We added a [Renogy 3000 Watt Pure Sine Wave Inverter](#) which is also even capable of 6000 Watts for short durations. We also subsequently added a [Renogy 100AH LiFePO4 Deep Cycle Self-Heating Battery](#) (please see below for more details on this refinement).

We added a 120VAC 20A electrical receptacle outlet where the obnoxious Casita trailer OEM Water Heater Panel was previously located. This motivated us to add five additional 120VAC 20A electrical receptacle outlets where also needed. We added a 120VAC 20A outdoor electrical receptacle outlet on driver side in the identical location as the Casita trailer OEM passenger side outdoor electrical receptacle outlet. We also used high quality [Hubbell HBLSS83R Stainless Steel Weatherproof Covers](#), which uses EPDM rubber gaskets, for this added driver side outdoor electrical receptacle outlet and for the Casita trailer OEM passenger side outdoor electrical receptacle outlet. We added a 120VAC 20A electrical receptacle outlet inside the driver side bench seat storage area to power our [Starlink Roam System](#) from our [SpaceX Affiliate](#). We added a 120VAC 20A electrical outlet to our custom sleeping area cabinet. We added a 120VAC 20A electrical receptacle outlet adjacent to our bathroom toilet to power our bathroom toilet bidet seat. We used a water resistant in-use cover for this bathroom toilet bidet seat electrical receptacle outlet. We added a 120VAC 20A electrical receptacle outlet to our bathroom cabinet to charge our Sonicare toothbrushes and to use our hairdryer. We used a high quality [Hubbell HBLSS263R Stainless Steel Weatherproof GFCI Cover](#), which uses EPDM rubber gaskets, for this added bathroom cabinet electrical receptacle outlet.

We added four 12VDC powered USB outlets inside the driver side bench seat storage area to power our RV Whisper and TRAK4 electronic monitoring systems, we added four 12VDC powered USB outlets to our custom sleeping area cabinet to power our entertainment systems and we added a 12VDC 30A SAE power outlet inside the driver side bench seat storage area for additional future flexibility.

All six of these aforementioned added 120VAC 20A electrical receptacle outlets (plus the existing microwave oven and refrigerator circuit which contains two 120VAC 20A electrical receptacle outlets) use a dedicated 120VAC 20A circuit and [Inverter/Shore Power Selection Switch](#) to enable manually selecting between No Power, Shore Power or Inverter Power via our added [Renogy 3000 Watt Pure Sine Wave Inverter](#). 12VDC power to the Inverter from our LiFePO4 battery is accomplished using 450A rated Anderson SB350 connectors, 450A rated battery cable, a [Blue Sea Systems 400A Class T Fuse Block](#), a [Blue Sea Systems Class T Fuse](#) (currently 125A to align with our current LiFePO4 battery 130A maximum discharge current limit that can be resized to 350A in the future) and a high quality [Del City Auto Resetting Circuit Breaker with Ignition Protection](#) (currently 120A to align with our current LiFePO4 battery maximum discharge current limit that can be easily resized to 300A in the future) for the reasons described in detail in the above Improved Battery Disconnect Location/Functionality section. This Inverter can currently provide us with 960 Watts of 120VAC power (currently limited by an 8A dedicated Inverter circuit breaker) which should hopefully increase to 2,400 Watts of 120VAC power in the future when Group 27 LiFePO4 battery technology is expected to improve. However, 960 Watts easily satisfies all our current 120VAC short duration power needs (e.g., our coffee/tea makers, hair dryer, microwave oven, 2-slice toaster, mini toaster oven, toilet bidet seat, vacuum, etc.) without needing to operate our propane modified [Honda EU2200i](#) generator when shore power isn't available.

We elected to use the Inverter for ONLY powering the aforementioned added six 120VAC 20A electrical receptacle outlets (plus the existing microwave oven and refrigerator circuit which contains two electrical receptacle outlets) and NOT the entire Casita trailer OEM Power Center to avoid creating a situation where the Inverter could be potentially turned ON when the air conditioner, water heater, etc. also happens to be ON thereby creating an immediate Inverter over-load situation requiring resetting Inverter circuit breakers. We also wanted to use a dedicated 120VAC 20A circuit and [Inverter/Shore Power Selection Switch](#) to provide the flexibility to enable manually selecting between No Power, Shore Power or Inverter Power. This switch was specifically located to enable easily using it by just slipping a hand under our driver mattress, sliding the recessed cabinet hatch slightly open, and then toggling the switch by feel from knowing that the outward switch position is Shore Power, the center switch position is OFF and the inward switch position is Inverter Power. The Inverter must also be manually turned ON too. Circuit breakers should NOT be used as switches as this

shortens their life potentially creating a situation where they won't function when needed to function. **Having the flexibility to use BOTH our Inverter Power (2,400 Watts) and Shore Power (12,000 Watts) at the SAME TIME enables having 14,400 Watts of power capability which makes the use of much higher power appliances (e.g., a 3,500 Watt Induction Cooktop and a 6,500 Watt electric/propane Tankless Water Heater, etc.) feasible and practical while also avoiding the complexity and expense of needing a transfer switch.**

This Inverter has a bonded neutral and ground like most Inverters. Since our Casita trailer OEM Power Center is properly wired as a sub panel (i.e., per electrical code, a sub panel MUST NOT have the neutral and ground bonded together), our Casita trailer OEM Power Center fully expects to receive power from a source that is wired as a main panel (i.e., per electrical code, a main panel MUST have the neutral and ground bonded together) as is the case when our Casita trailer OEM Power Center receives shore power from a campground main panel hookup. As such, this Inverter does not need any further modification to be used either as a direct power source for some limited electrical receptacle outlets or as a power source to the entire Casita trailer OEM Power Center. However, all Inverters MUST be grounded to the RV metal structure. "No Shock Zone RV Electrical Safety" by Michael Sokol is a great source of reliable information on this specific subject.

When using LiFePO4 batteries and Inverters larger than about 1500 Watts AFTER the battery has been disconnected for an extended period of time or AFTER the Inverter has been turned off for an extended period of time, the Inverter capacitors MUST FIRST be PRE-CHARGED. Our 13.6VDC 100AH LiFePO4 battery using a short length of 4/0 AWG cable only has about 0.005 Ohm resistance which will result in a horrific 2,700A (i.e., 13.6VDC divided by 0.005 Ohm) short duration (i.e., less than a microsecond) Inverter capacitor inrush current. If the Inverter capacitors are NOT first pre-charged, this capacitor inrush current will exceed the LiFePO4 Battery Management System (BMS) maximum discharge current limit (130A for our 13.6VDC 100AH LiFePO4 battery) and the battery will (if it has NOT been previously damaged and is still properly functioning) be immediately shut down by the BMS. Circuit breakers and fuses will NOT react at all to this high amperage, short duration inrush current. However, this high inrush current from the battery into the Inverter capacitors (having a total capacitance value of 0.18 Farads for our 3000 Watt Inverter) can easily damage the sensitive MOSFET transistors used in the BMS and can also damage the Charger/Converter and Inverter too. We suspect that many people are totally unaware of this destructive situation and frequently damage their BMS, Charger/Converter and Inverter without ever having a clue or gaining the understanding why. Here is an excellent white paper on this specific subject:

Explanation of Inverter DC Capacitance and Inrush Current

For our 13.6VDC 100AH LiFePO4 battery and our 3000 Watt Inverter, capacitor pre-charging is accomplished using a 1 Ohm 200 Watt **Power Resistor** and a **Blue Sea Systems 3-Way Switch** which is rated for 300A continuous and is rated for 900A intermediate (30 seconds). This 3-way switch, was placed in a non-obtrusive, hidden but easily accessible location on driver side of our custom sleeping area cabinet in the pillow area. This 3-way switch has three positions. Position 1 connects the battery to the pre-charge circuit and then the Inverter. Position 2 completely disconnects the battery from the Inverter. Position 3 connects the battery only and directly to the Inverter. This 3-way switch is FIRST selected to Position 1 to ONLY ALLOW 13.6A (i.e., 13.6VDC divided by 1 Ohm) of current or 185 Watts (i.e., 13.6A times 13.6VDC) of power to flow from the battery through the power resistor to fully pre-charge the Inverter capacitors in about 0.9 seconds (i.e., 5 capacitor time constants times 1 Ohm times 0.18 Farads). Then this 3-way switch is selected to Position 3 to enable the battery to provide its maximum discharge current to the Inverter hence forth. The pre-charge circuit is protected with a 15A ATC fuse and is physically connected between the 3-way switch Position 1 and Position 3 terminals. The battery positive 4/0 AWG cable from the auto resetting circuit breaker is connected to the 3-way switch Output terminal and the Inverter positive 4/0 AWG cable is connected to the 3-way switch Position 3 terminal. All of our Inverter 120VAC power loads are also FIRST removed BEFORE accomplishing this capacitor pre-charge procedure and BEFORE turning the Inverter ON or turning OFF (using its remote switch) by using our dedicated **Inverter/Shore Power Selection Switch** and setting it to the OFF Position.

All of our previous Casita trailer OEM 120VAC **15A** electrical receptacle outlets and all of our added electrical receptacle outlets are now 120VAC **20A** electrical receptacle outlets having green LEDs to indicate when they

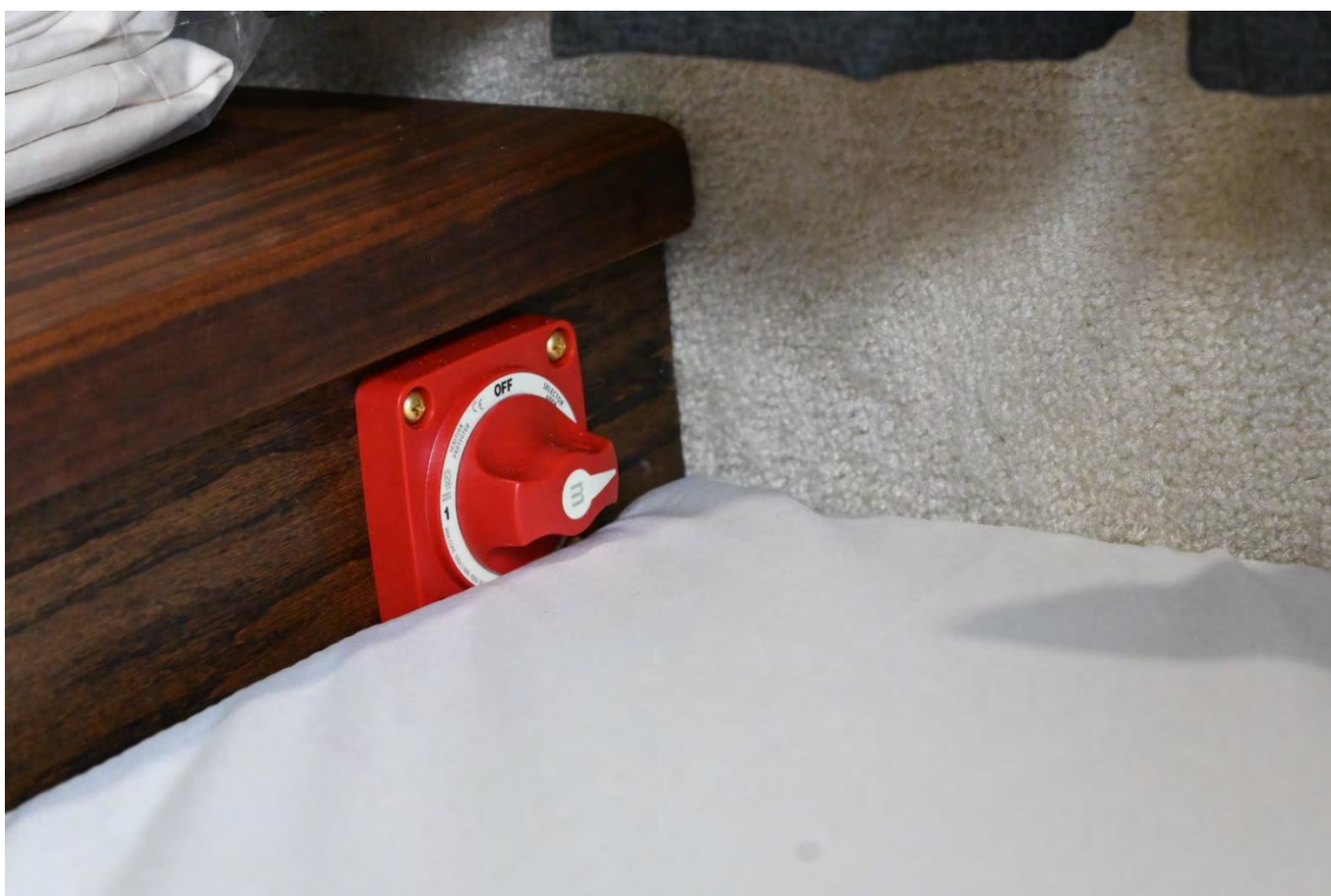
are actually powered and have Ground Fault Circuit Interrupter (GFCI) and Arc Fault Circuit Interrupter (AFCI) protection. GFCI prevents electrical shock and AFCI prevents electrical fires. While using GFCI protection, weather resistant electrical receptacle outlets and water resistant covers in our bathroom should provide adequate safety from any potential risk of electrical shock, also having the ability to use the aforementioned dedicated [Inverter/Shore Power Selection Switch](#) to completely turn OFF the power to these bathroom electrical receptacle outlets when taking a shower further eliminates all risk of electrical shock...and a Warning Placard was added adjacent to the shower wand as a reminder to take this extra safety precaution.

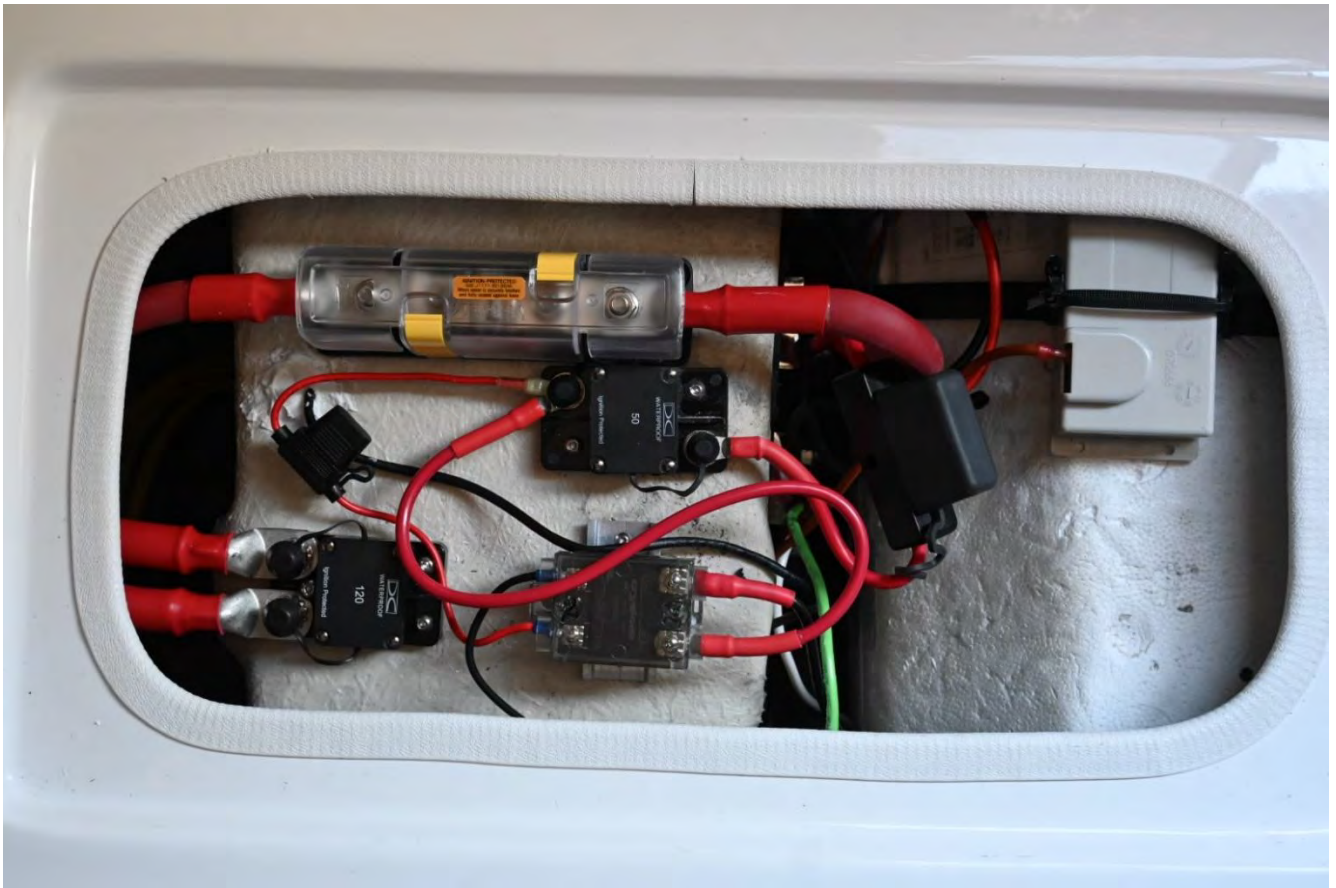
While replacing all of our Casita trailer OEM electrical receptacle outlets, we discovered that the electrical receptacle outlet in the microwave cabinet was dangerously miss-wired. Apparently, the ground wire was cut too short so [Casita Travel Trailer](#) didn't use it at all. Instead, [Casita Travel Trailer](#) just connected the outlet neutral screw to the outlet ground screw. While this results in this electrical receptacle outlet still testing as if properly wired, this wiring approach dangerously places 120VAC on the ground path when an appliance is plugged into this electrical receptacle outlet and then used which could then cause an electrical shock and potentially death. Fortunately, the Casita trailer shell is fiberglass and is not metal which likely kept us from encountering this fate on our Casita trailer pickup trip. This type of miss-wired electrical receptacle outlet is very difficult to detect without actually looking at the electrical receptacle outlet wiring. Anyhow, we corrected this [Casita Travel Trailer](#) quality control issue and we mention this for people's awareness. Again, "No Shock Zone RV Electrical Safety" by Michael Sokol is a great source of reliable information on this specific subject.











Floor Passageway Lamp

We added a marine [Sea Dog Blue LED](#) floor passageway lamp where the obnoxious Casita trailer OEM Battery Disconnect Switch was previously located. We used epoxy bonded stainless steel 8-32 backing plate nuts and button socket cap screws in lieu of rivets to enable easy future replacement if needed.

We have literally sailed all over the world and adding marine themed accessories to our marine fiberglass Casita trailer provides us a nice sense of nostalgia. We find blue light to be very calming and relaxing while still retaining our full night vision. So the blue light from this floor passageway lamp, our "cat bathroom" mood light, our water pump switch and our toilet bidet seat provides the night time ambience we like very much without compromising our night vision which we may need. In fact, we like blue light at night so much that we even backlight our "backyard" mountain stream waterfall features in blue light which looks especially amazing from our patio when our propane Tiki torches are also lit!

We also took the opportunity to remove the rivets from our Casita trailer OEM Propane Leak Detector and used epoxy bonded stainless steel 8-32 backing plate nuts and button socket cap screws to enable easy future replacement if needed. We changed our Casita trailer OEM Propane Leak Detector 12VDC wiring to use [WAGO Connectors](#) to enable easy disconnection of the detector should it fail during a camping trip. We often use these innovative connectors and highly recommend them.





Hepvo Sink Drain Valves

We winterize our Casita trailer by putting RV antifreeze into the potable water system which includes the water tank, the water heater and all the faucet/toilet plumbing. The black and gray tanks are cleaned and completely emptied. Then we sanitize and flush the potable water system just prior to camping. We consider this to be an easier and far safer approach than blowing air through the potable water system and hoping you removed all the water. We replaced the P-traps in the bathroom and kitchen sinks with [Hepvo Valves](#) to eliminate winterizing maintenance and sink drain freezing risk. Hepvo valves may be installed either horizontal or vertical. However, a vertical installation is preferred as this approach is less prone to clogs and failure. It was also reported that getting a Hepvo valve into a Casita Liberty Deluxe with our Casita trailer OEM furnace wasn't possible because of inadequate space, however, we didn't have this issue at all and we accomplished an easy and preferred vertical Hepvo valve installation. However, given the close proximity that [Casita Travel Trailer](#) put the bathroom sink drain connection relative to the PVC drain pipe that goes into the entry closet area, we had to get creative and we used 1 inch hose barbs on both the sink drain and PVC drain pipe, 1 inch black flexible silicone hose and two stainless steel screw hose clamps then enabling us to accomplish an easy and preferred vertical Hepvo valve installation in the entry closet area. [Casita Travel Trailer](#) already used a Hepvo valve for the bathroom shower floor drain.





Corrected Casita Trailer Black Water Tank Plumbing Deficiency

This is more of a correction to a Casita trailer OEM black water tank plumbing design/installation deficiency than an actual Casita trailer refinement. Our Casita trailer OEM 3" ABS female NPT by Sprocket elbow that [Casita Travel Trailer](#) uses to connect the dump out plumbing to the black tank male NPT outlet was 90 degrees but [Casita Travel Trailer](#) just forced it to bend down to where the Valterra black and gray dump valves are located. As such, this elbow is put under significant stress and is very prone to crack, fail and leak. This actually occurred to us about 5,000 miles into our 12,640 mile Casita trailer pickup trip. Fortunately, it was the female NPT elbow end that failed and NOT the black tank male NPT outlet which would have then required replacing the entire black tank. We initially stopped this leak with duct tape, dumped the black tank and then ground up some ABS into powder and mixed it with ABS glue to accomplish an on-the-road temporary repair. Yes, we could have requested a [Casita Travel Trailer](#) warranty repair, but given the high value of our time that would be lost coordinating this, the time and expense to get our Casita trailer to some [Casita Travel Trailer](#) authorized repair location and the high likelihood of just getting the same deficient plumbing design/installation back again, we elected to properly and permanently correct this deficiency ourselves after returning to our remote southern Oregon homestead.

To remedy this issue, we lowered the elbow height about 1-1/2 inches by adding an ABS 3" female NPT by Spigot adapter to the Sprocket end of the standard [Casita Trailer OEM Elbow](#) where it is then connected to the black tank 3" male NPT outlet. And we also added a second ABS 3" male NPT by Spigot adapter to the female NPT end of the standard Casita trailer OEM elbow to then enable adding a 3" [Fernco Flexible Coupler](#) to relieve the elbow stress. Valterra also makes a 3" [Valterra Flexible Coupler](#) for just this purpose too that [Casita Travel Trailer](#) should have likely used, but the Fernco adapter being double the length actually provides better overall flexibility and better support. It should be noted that that this second added ABS 3" male NPT by Spigot adapter MUST be installed AFTER first screwing the elbow onto the black tank outlet to allow turning it given the restricted space in this area. [Zialoc 2200 Clear Silicone Sealant](#) was used to seal the threaded fittings and ABS glue was used for the Sprocket/Spigot fittings. Since ABS is highly susceptible to UV sunlight degradation, we also painted this plumbing with a white bonding primer expressly designed for plastic adhesion and a white semi-gloss acrylic paint expressly designed for UV protection.

We also have a spare [Valterra Dump Valve Assembly](#) and we fabricated a spare set of dump out plumbing that can now be easily and quickly used to deal with any future dump out plumbing system failure should the need ever arise again. We like and use [Camco TST Max RV Toilet Treatment](#). We use a modified dump valve cover to enable discharging our gray water through a garden hose, better control any nasty spills should the valve fail and to air out our tanks via the screened port when our Casita is not in use to keep odor forming bacteria from thriving on the wet surfaces of our tanks. We took the opportunity to lubricate the dump valves using [Molykote 111 Compound](#) which we highly recommend and use for all our water filter canister O-rings in our remote southern Oregon homestead self-constructed mountain stream and well water filtration system which you may find interesting:

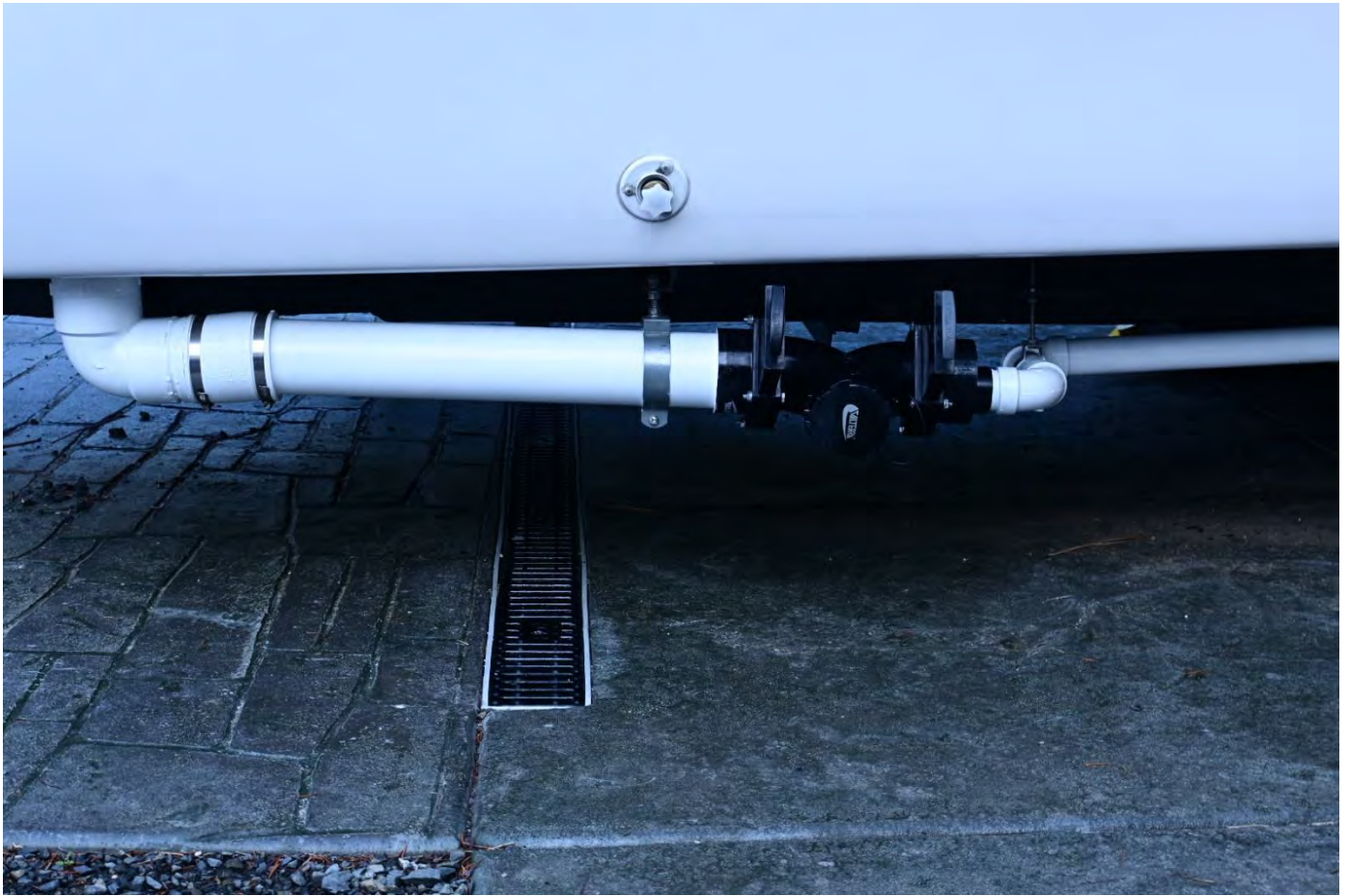
[Our Water Filtration System](#)

And if you like construction stuff, you will find lots of photos of our remote southern Oregon homestead here that we constructed entirely ourselves except for help with the concrete pours:

[Construction of Our Garage/Shop/Guest Quarters](#) [Construction of Our Residence](#)

We have found doing things ourselves is far more personally satisfying, meaningful and memorable than just buying things and bragging about them for some deranged sense of self-worth from having lived an insignificant and superficial life. Same with being a dependable, faithful, unselfish life partner and doing things that benefit future generations like fostering healthy child development and conservation. At the end of your life journey you can't take anything with you and you only have the great memories you made along the way!

[Scouting \(Troop 455 Renton, WA\)](#) [Roque River Watershed Council](#) [WaterWatch](#)

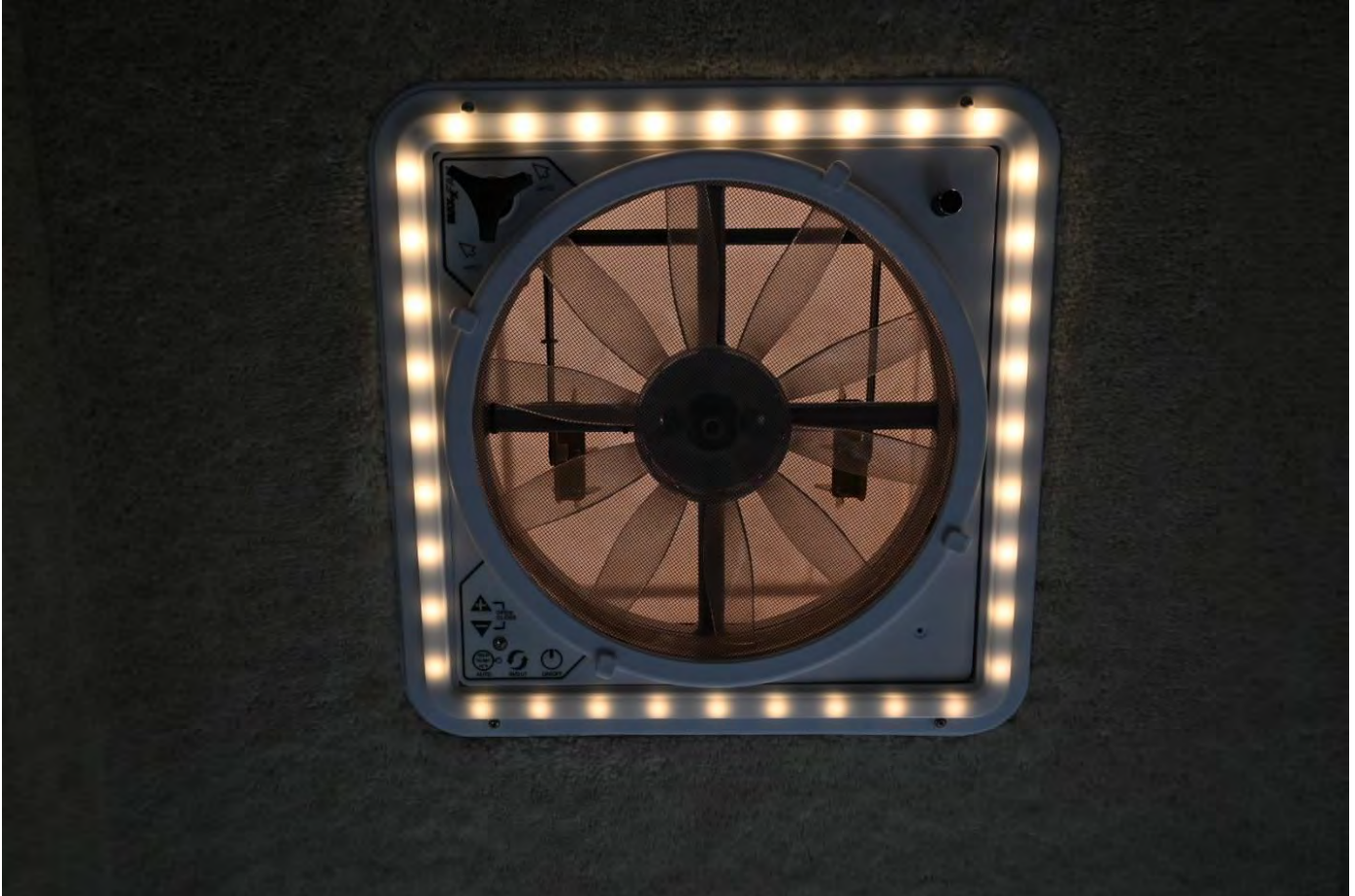


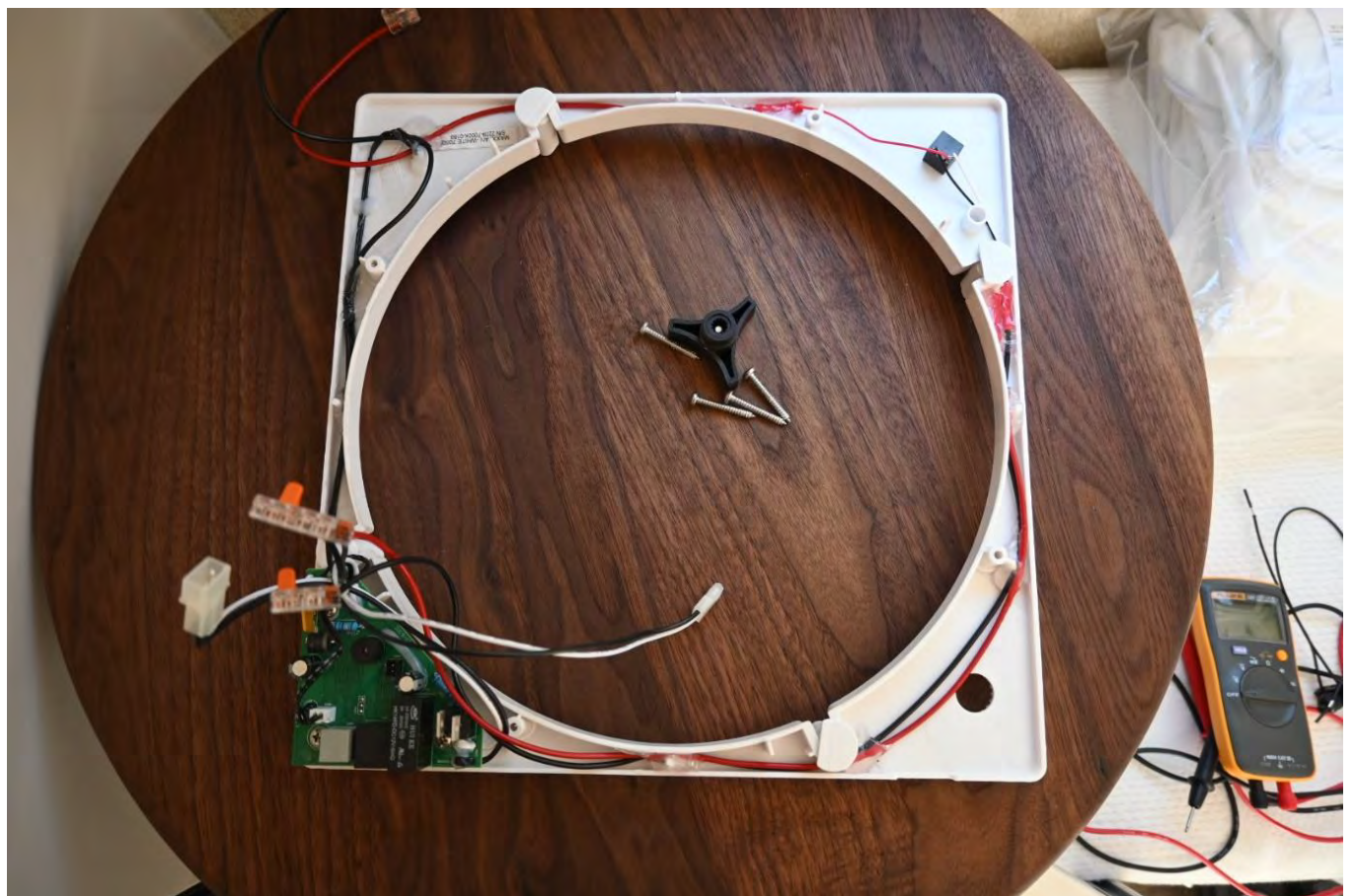




Dimmable Chandelier Light

We added [Heng's LED Chandelier](#) with the warm white color option and added a [Manual LED Dimming Switch](#) to our Casita trailer OEM Maxxair Fan. This dimmable chandelier in concert with our blue "cat bathroom" mood light, blue floor passageway lamp, blue toilet bidet seat light and blue potable water pump switch light create a nice night time ambience. The Heng's LED chandelier bezel was directly attached to the original Maxxair Fan bezel using epoxy bonded stainless steel 8-32 backing plate nuts and button socket cap screws in lieu of rivets to enable easy future replacement if needed. The Heng's LED chandelier bezel had to have the interior corners filed to fit Maxxair Fan electronics section. A remote control LED dimming unit could also be installed, but given the small size of our Casita trailer and the desire to keep things simple and not having remote controls requiring batteries, we elected to use the simpler manual LED dimming switch approach.





Interior/Exterior LED Lights

We replaced all our Casita trailer OEM exterior and interior lights with high quality, low power, modern-looking, simple electronics lights from [Leisure LED](#) that use replaceable T10 LED wedge panels in our desired brightness (Lumens) and our desired light color temperature (Kelvins) for each of our specific Casita trailer lighting areas. [Zialoc 2200 White Silicone Sealant](#) was used to seal the exterior light fixtures.





Entry Door Double Step

We replaced our Casita trailer OEM Entry Door Single Step with a [LHC Entry Door Double Step](#). A great feature and improvement especially given Gayle's knee issues and required knee replacement surgeries in June and October shortly after our Casita trailer pickup trip.



Solar Panels

We added a portable 200 Watt, 12VDC Monocrystalline [Renogy Foldable Solar Suitcase](#) that charges our battery via an added SAE Port mounted through the floor of the battery compartment which keeps it out of sight and out of the weather. This SAE Port is connected to an added terminal block on the interior side of the battery compartment that is connected directly to the battery using [Anderson SB350 Connectors](#) rated for disconnecting/connecting the battery with a 450A active load. This SAE Port is protected with an ATC 30A fuse. We use one 10 feet long and two 20 feet long 10AWG [Renogy Solar Panel Extension Cables](#) that enables us to place our portable solar suitcase at either a 10, 20, 30, 40 or 50 feet distance from the added SAE Port. We use a SAE to MC4 adapter to connect these extension cables to our added SAE Port while properly placing the IP67 water resistant and 20A charge current rated [Renogy Voyager Solar Charge Controller](#) in very close proximity to our battery as is required for good charging performance. We drilled and tapped small holes for stainless steel M4 by 0.7 machine screws into the bumper frame to enable securing the charge controller with stainless steel knurled thumb nuts when it is actually being used.

We also have a SAE to Anderson adapter to enable using this added SAE Port for other applications such as powering our 12VDC air compressor which we use for inflating tires and for blowing air out of our Casita trailer plumbing when Winterizing it and powering our aforementioned spare backup Casita trailer OEM water pump (FloJet model R3526144D) setup which we use to enable easier potable water tank filling from 6 gallon jugs.

The Casita trailer Air Conditioning System operates on 120VAC and uses about 13A which equates to needing 1,560 Watts of power to operate it (i.e., 120VAC times 13A). So at least 1,560 Watt solar panels, which is about 98 square feet of panels which would weigh about 300 pounds, would be required to operate the Casita trailer Air Conditioning System without depleting the battery bank during daylight hours. A 12VDC battery bank would also have to produce 144A (i.e., 1,560 Watts divided by 12VDC divided by 0.9 Inverter efficiency) to operate the Casita trailer Air Conditioning System. To operate the Casita trailer Air Conditioning System for 8 hours at night time would require a battery bank with at least 1152 Amp Hours (AHs) of usable capacity (i.e., 144A times 8 hours) which is at least twelve 100AH lithium batteries which would weigh about 312 pounds and about two times more than that or about 624 pounds if lead acid batteries are used. And you will then have a fully depleted battery bank come morning. It should hopefully and quickly become very obvious that the large battery footprint and the large solar panel footprint necessary to operate the Casita trailer Air Conditioning System for an adequate amount of time isn't currently feasible or very practical given the small footprint of the Casita trailer. So, shore power or a generator is required to operate the Casita trailer Air Conditioning System...and this is a much more economical, lighter weight, practical and safer solution too.

We replaced our Casita trailer OEM 12VDC lead acid battery with a [Renogy 100AH LiFePO4 Deep Cycle Self-Heating Battery](#) (please see below for more details on this refinement). For LiFePO4 batteries, it is recommended to use 13.6VDC (i.e., the lower Idle Stage charging voltage) for battery charging calculations. Our 200 Watt solar panels use a 75% efficient, low cost, simple and robust Pulse Width Modulation (PWM) solar charge controller which can generate a maximum charge current of 11.0A (i.e., 0.75 times 200 Watts divided by 13.6VDC). We could fully charge a 100% depleted 100AH LiFePO4 battery in 9.1 hours (i.e., 100AH divided by 11.0A) under perfect solar conditions...and perhaps twice that long (18.2 hours) under marginal solar conditions. However, in reality, we will at most only need to fully charge 50% of our battery capacity (i.e., our worst case battery depletion given our worst case 24 hour maximum power usage rate) which will take 4.5 hours (i.e., 50AH divided by 11A) under perfect solar conditions...and perhaps twice that long (9 hours) under marginal solar conditions. If one elects to use a 98% efficient but much more complicated and expensive Maximum Power Point Tracking (MPPT) solar charge controller which can generate a maximum charge current of 14.4A (i.e., 0.98 times 200 Watts divided by 13.6VDC), this time can be reduced to 3.5 hours (i.e., 50AH divided by 14.4A) under perfect solar conditions...and perhaps twice that long (i.e., 7 hours) under marginal solar conditions. Bottom line, we will always be able to adequately replenish our 100AH LiFePO4 battery with our 200 Watt solar panels with only 4.5 to 9 hours of solar exposure. So we think our 100AH LiFePO4 battery, our 200 Watt solar panels and our low cost, robust 20A rated PWM solar charge controller is about perfect for our Casita trailer.

Our portable solar suitcase in concert our added 100AH LiFePO4 battery and our added [Renogy 3000 Watt Pure Sine Wave Inverter](#) easily satisfies all our 12VDC long duration power needs (e.g., our electronic

monitoring, entertainment, internet, lighting, etc.) and easily satisfies all of our 120VAC short duration power needs (e.g., our coffee/tea makers, hair dryer, microwave oven, 2-slice toaster, mini toaster oven, toilet bidet seat, vacuum, etc.) without needing to operate our propane modified [Honda EU2200i](#) generator when shore power isn't available. Our portable solar suitcase enables us to easily and quickly move and place it in sunny locations to address the reality that these sunny locations often change over the course of the day when camping in forested areas.

Solar panels mounted on the Casita trailer roof would require the Casita trailer to be in a sunny location which is very undesirable in hot weather. Solar panels mounted on the Casita trailer roof can be damaged by road debris and adverse weather conditions, e.g., dust storms, hail, wind, etc. Solar panels mounted on the Casita trailer roof are more difficult to keep clean of dust and snow. Solar panels mounted on the Casita trailer roof significantly increase the aerodynamic drag when towing which reduces MPG. And solar panels mounted on the Casita trailer roof require making multiple penetrations into the Casita trailer fiberglass structure for fastening and routing wire which can then become future water leak points.

Adding solar panels to the roof of a behemoth RV does have some merit, if you already made the mistake of owning a behemoth RV, since it has plenty of space and towing capacity for large solar panels, batteries and power Inverters and you will nearly always be staying in a sunny asphalt parking lot thereby often requiring air conditioning. But adding behemoth LiFiPO4 AH capacity to enable running air conditioning when dry camping is an expensive and potentially dangerous proposition too. The advantage and real benefit of owning a small RV like the Casita trailer is that you can easily do real camping in small tent sites in nicer places that have some scenery, trees and wildlife while avoiding being near the typically gluttonous and obnoxious people who own these obscene behemoth RVs that block the sun/view and run their smelly generators all night long. Nevertheless, we have found that remote backcountry camping where you only take the minimal stuff that you really need and can personally carry is far more enjoyable and fulfilling than even Casita trailer camping. If you are fortunate enough to live in the Pacific Northwest and are adventurous, physically-able and self-reliant, we highly recommend joining the [Mountaineers](#) and being around people who don't live a degenerate, gluttonous and greed-based life.











Access Hatch Thumb Locks

We removed all our Casita trailer OEM keyed thumb locks on the four exterior access hatches to eliminate the needless frustration of having to fumble around with keys to open and close them. [Casita Travel Trailer](#) uses the same CH751 keys that likely every RV OEM uses so there isn't any real security in using their keyed thumb locks. We replaced the thin, uninsulated water fill exterior access hatch and shore power cord exterior access hatch Casita trailer OEM keyed thumb locks with [JR Products](#) non-keyed thumb locks (J4500115, 5/8 inch). We subsequently replaced the Casita trailer OEM shore power cord small exterior access hatch with a larger exterior access hatch (please see below for details on this refinement). We replaced the thick, insulated water tank exterior access hatch Casita trailer OEM keyed thumb lock with a non-keyed thumb lock (J4500135, 1-1/8 inch). We replaced the thick, insulated battery compartment exterior access hatch Casita trailer OEM keyed thumb lock with a unique, non-CH751 keyed thumb lock (J4500185, 1-3/8 inch) and we also use a [RV Whisper](#) door sensor on this battery compartment hatch and battery holding angle bolt locks for additional security too. And finally, we replaced the two low quality, plastic Casita trailer OEM non-keyed thumb locks on the bathroom vanity interior access hatches with a non-keyed thumb lock (J4500115, 5/8 inch) and a non-keyed thumb lock (J4500125, 7/8 inch).







Awning, Accessories & Security

We added a [Keder Rail Awning System](#) which is far more aerodynamic, far lighter weight, far less complex and thus far less prone to failure, and far less expensive than the Casita trailer OEM Fiamma Awning Installation. We think the aerodynamic streamlined Casita trailer just looks and performs much better without an afterthought, boxy looking and ugly Casita trailer OEM Fiamma Awning Installation. The COMBINED cost of BOTH our Keder Rail Awning System and our [Clam Pavilion Screen Tent](#) was far less than the cost of a Casita trailer OEM Fiamma Awning Installation which also helped fund our other refinements.

We specially selected our truck and trailer size combination to optimize aerodynamic performance. Having anymore frontal surface area than is absolutely necessary on a tow vehicle or on a trailer will increase aerodynamic drag force which also further increases by the square of the speed. So if you increase your speed from say 30 MPH to 60 MPH, you have doubled your speed, but you have quadrupled the amount of aerodynamic drag force! So having any more frontal surface area than necessary and driving at higher speeds than necessary greatly increases the required tow vehicle power, which then reduces the towing MPG, which then increases the expense of traveling. Many people under-appreciate the cumulative effect and benefit that reducing aerodynamic drag and reducing tow vehicle power has on increasing MPG and thereby reducing overall fuel usage/expense. Taking advantage of several small reductions in aerodynamic drag (e.g., not having a Casita trailer OEM Fiamma Awning, roof mounted solar panels, external storage containers/shelves and using a smaller, aerodynamic streamlined tow vehicle and trailer, etc.) and reducing parasitic tow vehicle power losses (e.g., not using tow vehicle alternator to charge the trailer battery or power the trailer refrigerator, etc.) whenever possible does all add up to increase MPG and thereby significantly reduce overall fuel usage/expense, especially when one considers the many years and long distance one may tow a trailer.

We used and installed [Keder 8.5mm Aluminum Awning Rail](#) on BOTH the driver side and the passenger side of our Casita trailer for maximum camping flexibility. These Keder rails accept 6mm, 7.5mm and 8.5mm awning welts. Our 90 inch long (driver side) and our 82 inch long (passenger side) Keder rails were installed using [3M VHB 5952 Tape](#) and four stainless steel 1/4-20 1-1/8 inch long button socket cap screws and stainless steel acorn nuts on each side using the existing penetrations that [Casita Travel Trailer](#) used to fasten our Casita trailer upper cabinets. This approach avoids the need to create additional penetrations which can then become future water leak points and this approach also utilizes the upper cabinet structure as a backing plate which further increases the Keder rail pullout strength. When the awnings are installed at these Keder rail locations, the awnings are 79 inches in height above ground level with our Casita trailer bolt-on Dexter 3,500 pound TORFLEX 10 degree down axle. [Zialoc 2200 White Silicone Sealant](#) was also used to further seal these penetration holes and the Keder rails. We currently use two 81 inch by 96 inch awnings with a 7.5mm welt custom made by [Marti's Awnings](#) and we use [Green Elephant Telescoping Poles](#) and [Glow in the Dark Tent Stakes](#) to support the far end of the awnings. We use 8mm stainless steel stops on the rail ends to keep the awnings in place. Working with Kelly Franklin from Marti's Awnings on this project was a real pleasure.

Our Keder Rail Awning System is advantageous for short stops and enables keeping the hot sun off either or both sides of our Casita trailer as desired given our specific camping location. Our Keder Rail Awning System does NOT allow rain water to flow between it and the Casita trailer which is a common complaint for the Casita trailer OEM Fiamma Awning Installation. These awnings in combination with our custom [Window Louvers](#), who we worked with 3dPartsbyJG to create, also prevent rain from entering our open windows and enable fully shading both the driver and passenger sides from hot sun enabling our refrigerator to operate far more efficiently and reducing our need to run our air conditioner. One can also select whatever color and style of awning one desires and one can then easily replace it in the future if this is ever needed or desired.

Nevertheless and for longer stays, our best camping accessory by far has been our [Clam Pavilion Screen Tent](#). It provides a large outdoor space free from bugs and weather that can be easily heated with our propane [Camco Campfire](#) while also providing a great enclosed and secure space for our cats to safely enjoy the outdoors. As a digression and for energy efficient residential building fire ambience and heating, you might

find our self-constructed wood-fired [Masonry Heater](#) very interesting too. Our Clam Pavilion Screen Tent can be easily set-up or taken down in 60 seconds or less and it can be placed wherever desired as it is not limited by the Casita trailer location like Fiamma Awning Installation or our Keder Rail Awning System. The only real disadvantage of the Clam Pavilion Tent is that it is somewhat bulky, heavy and long. However, the Clam Pavilion Tent easily fits within the canopy of our Honda Ridgeline truck and the two of us can easily set it up and take it down. We have played many backgammon games and enjoyed many happy hour drinks and meals in our Clam Pavilion Screen Tent in the fine company of our cats in all sorts of weather.

Additional sundry accessories added to our Casita trailer include: hanging cooking utensils, a paper towel rack, and a wine glass holder. To improve our microwave cabinet top upward swinging drawer functionality, a [Marine Hatch Spring](#) was added to hold it up when opened. To increase kitchen counter top working space, we hand built a black walnut cutting board and a stove cover which were finished with food grade mineral oil. The cutting board and stove cover are held in place using rubber legs which keeps them secured both when camping and when traveling.

















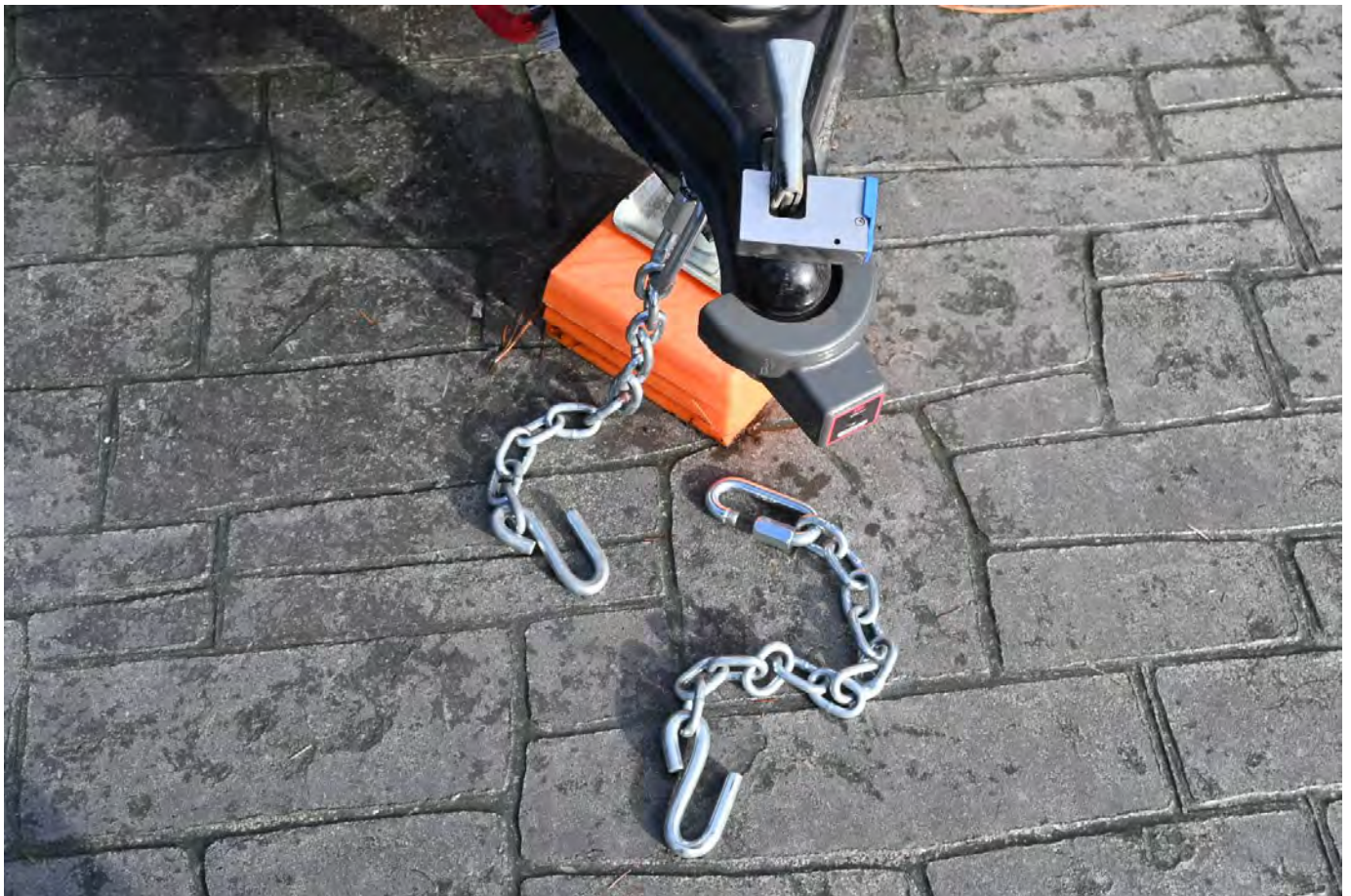
And speaking of accessories, all of our locks (i.e., battery compartment access hatch lock, battery holding angle bolt locks, entry door lock, hitch ball lock, hitch coupler lock, propane tank clamp lock, tire lock lugs, wheel clamp locks and window clamp locks), removable safety chains, [RV Whisper](#) and [TRAK4](#) have provided us some peace of mind. While there isn't a lock or security system that can't be easily defeated by a determined thief, defeating multiple locks and security systems does take some additional time which may enable one to employ other measures to defeat the thieves. Furthermore, thieves are more likely to strike softer targets than more difficult and riskier targets. And there are always behemoth and expensive RVs in campgrounds owned by the more money than brains crowd who don't take any security measures at all which has provided us with even more peace of mind.

Pursuant to federal law [USC § 926A](#), firearms can currently be transported with you while traveling across all States. And a good attorney will successfully defend you should you ever need to access and use them should you fear for your life while traveling or while staying in your temporary Casita trailer home in an increasingly dangerous and life threatening Country. Peace Officers can currently also conceal carry in all States too. And to be perfectly clear, we fully support extensive and vigorous firearm background checks and prosecuting and confiscating firearms from those individuals who have them and can't pass a vigorous background check. Like driving, towing a RV and running for public office, we believe some things are only privileges that must first be earned by demonstrating that one is first a competent, law-abiding, intelligent, trustworthy citizen in good standing.

Unfortunately, our Constitution has been proven to be completely ineffective and obsolete in preventing modern day corruption and tyranny. Our obsolete Constitution was written long ago by old, rich, white men before women were allowed to vote, who kept minorities as slaves back when firearm technology was flintlock pistols/muskets and communication/transportation was accomplished at the speed of a horse. Our obsolete constitution is now only politically interpreted to accomplish the specific agenda of self-serving Oligarchs by puppets who are not elected can't be removed, who are easily bribed and influenced, who are not required to represent the majority interests of the general population and who can't be held accountable for any of their actions. And it also makes little sense to continuously waste our national treasure by endlessly electing several hundred puppets to Congress who can't accomplish anything in a timely manner, who are easily bribed and influenced and who are not required to represent the majority interests of the general population either. And when the majority interests of the general population are not truly represented, you don't have a [Democracy](#) where power is vested with the general population. You have an [Autocracy](#) where only a select group of powerful and wealthy self-serving Oligarchs have this vested power.

History has amply demonstrated that deranged self-serving Oligarchs who gain power will ultimately always take away all general population personal freedoms that can threaten or weaken them including the privilege to have firearms, speak the truth and even make personal decisions that only affect the individual in order to advance their deranged self-serving agenda to increase their control, power and wealth. If you do NOT believe this, simply study history or talk in private sometime with a person from China, Iran, North Korea, Philippines, Russia or Saudi Arabia. We have extensively traveled the world and have talked to many people who have lived in Autocratic governments. These are not places that you will enjoy or feel safe living in, so you might want to seriously consider trading your mistaken anger/fear-induced faux news and social media brainwashing beliefs for actual critical thinking skills, reality and truth before it is too late. No matter the specific political affiliation of a tyrant, it's always better to be able to remove them by voting than by revolution. It is truly amazing to us how effective these carefully orchestrated brainwashing and propaganda machines created by these deranged self-serving Oligarchs can so easily con and convince seemingly normal and intelligent people to believe untruths and do things that go totally against their best interests and personal welfare.

In the past, a good RV insurance policy would normally provide the ultimate peace of mind and security with regard to RV and other property damage/loss. However, a country's security is only as good as a country's ability to ultimately maintain and keep it safe from domestic and foreign adversaries. And given that our national security secrets have been badly compromised in recent years by deranged self-serving Oligarchs, we wonder if anything can be truly secured and kept safe in this country for much longer. We may well be headed to a future like Ukraine experienced and we doubt that their RV and other property losses will be covered by insurance policies. While our insurance policies have always had exclusions for acts of God or War, they now also have exclusions for Nuclear Fallout too.







Curtains

We replaced our Casita trailer OEM hard, heavy-weight, and noisy metal blinds with soft, light-weight and quiet curtains. For the curtain hanging hardware, we used [RECMAR 3208](#) PVC plastic curtain tracks, [RECMAR 3050](#) black ABS plastic eye slides, and [RECMAR 3030](#) black stainless steel end stops. The curtain tracks were fastened to the window frame in same location that [Casita Travel Trailer](#) uses for the blinds using five ¾ inch sheet metal screws per window. Well-secured curtain tracks perform way better than curtain rods in moving vehicles. We initially used low cost (\$30 total), thin fabric, standard/widely available, 24 inches length, [light green Café curtains](#). After testing our curtain system and determining the perfect curtain sizes needed for each window, we purchased and are awaiting delivery of thicker insulated/blackout fabric, custom sized, [dark gray Pinch Pleat curtains](#) from [BelleCoseHome](#), which while costing significantly more than our initial Café curtains, were significantly less cost than the other custom curtain options often suggested on social media (e.g., Dyers RV, Gary Manufacturing, etc.) and reportedly of better quality too. We shall see...and we should hopefully have them after returning from our 2024 Spring desert wildflower super bloom trip to the Arizona desert and [Puerto Penasco Mexico](#) on the Sea of Cortez where we sailed with our children in past years. Our Casita trailer OEM metal blind elastic fabric locks were retained and repurposed for use as open curtain tie points.

Unlike metal blinds, curtains do NOT need to be locked into place before traveling and do NOT create condensation, corrode/rust and create the potential for mildew. There's nothing worse than hitting these noisy metal blinds in the middle of the night and then sometimes also have cold water fall onto your face! And speaking of condensation and humidity, we use several [DampRid Dehumidifiers](#) which are a desiccant type of dehumidifier to mitigate this issue when storing our Casita trailer. Unlike refrigerant or thermo-electric types of dehumidifiers, desiccant dehumidifiers work well at very low temperatures and don't use any electrical power at all. When actually camping in our Casita trailer while in high humidity conditions, we use a [Pro Breeze Mini Dehumidifier](#), which is a thermo-electric type of dehumidifier which are far lower cost, far quieter and use far less electric power (only 23 Watts) than a refrigerant type of dehumidifier. We can operate this Pro Breeze Mini Dehumidifier continuously for about 35 hours using only our 100AH LiFiPO4 battery power without recharging it...and we typically recharge after only 12 hours of overnight usage via our solar panels. This Pro Breeze Mini Dehumidifier would normally use 120VAC to operate, but we also constructed a cable that can be plugged into a 12VDC receptacle and which uses a 12VDC to 9VDC buck converter to enable efficiently operating it when dry camping. To learn more about dew point temperature and condensation formation, please see our [Psychrometrics Calculator](#) and our [Building Assembly Moisture Analysis Calculator](#).











Hitch & Scissor Jacks

We replaced the Casita trailer OEM hitch jack with an [Ultimate Trailer Jack](#) rated for a 2000 pounds lift capacity and a 3000 pounds support capacity to enable easier and faster operation without needing to use any blocks whatsoever. We also replaced the Casita trailer OEM two weak Scissor "Stabilizers" with four strong [BAL 24002D Scissor "Jacks"](#), to provide better Casita trailer stabilization when camping and to enable easy Casita trailer jacking for an on-the-road failed tire replacement and easy accomplishment of maintenance tasks underneath our Casita trailer without having to rely on or trust someone else to properly jack our Casita trailer without damaging it. For example, these BAL Scissor Jacks enable easily replacing the wheel bearings which need to be replaced every 12,000 miles or 3 years, whichever occurs first and it is always the mileage that occurs first for us. Maximum Casita trailer weight is limited to its maximum axle load of 3,500 pounds. These BAL Scissor Jacks are each rated for 7,500 pounds load capacity. So jacking up a maximum weight 3,500 pound Casita trailer on four of these BAL Scissor Jacks only uses about 12% (i.e., 3,500 divided by 30,000 times 100) of their rated load capacity. Nevertheless, it would still be dangerous and foolish to work under any vehicle ONLY supported on jacks and proper jack stands or blocks MUST also be properly placed and used whenever working underneath a vehicle or for keeping a vehicle jacked up for long durations.

When we removed and replaced the Casita trailer OEM hitch jack we discovered that [Casita Travel Trailer](#) did NOT use any backup nuts. The OEM hitch jack was only secured via the threads in the 1/8 inch thick hitch structure which we consider to be negligent and unsafe. We used grade 8 (150,000 PSI tensile strength) zinc plated steel 3/8-16 by 1 inch long bolts, washers, split lock washers and backup nuts to install our replacement [Ultimate Trailer Jack](#).

Our replacement Scissor Jacks needed to be properly welded onto the proper sections of our Casita trailer frame using proper welding plates that have the proper Scissor Jack bolt mounting hole spacing which may be obtained from [Little House Customs](#). These welding plates come with grade 2 bolts (74,000 PSI tensile strength) that enable the Scissor Jacks to be easily replaced should they ever become damaged or fail. While the supplied bolts are entirely adequate for this application, we elected to use stronger grade 5 (120,000 PSI tensile strength) stainless steel 3/8-16 by 1 inch long bolts, nuts and split lock washers installed with [Permatex Anti-Seize Lubricant](#) to prevent corrosion and galling. ***It should be noted that the BAL scissor jack handles are designed to intentionally fail at a very light load, likely as a company legal insurance policy, so we sent them to our scrap pile to be decarbonized and converted into wrought iron which is then used to make handmade fire tools and other useful items.*** We primarily use a [Camco Scissor Jack Socket](#) and our DeWalt cordless drill (NEVER use a cordless impact driver) for extending/retracting our Scissor Jacks and we use our [Craftsman Speeder Handle](#) as a secondary manual backup.

We used our portable [Lincoln 140MP "Multi-Process" Welder](#) in MIG mode and [Lincoln Innershield NR-211-MP](#) 0.035 inch steel wire (polarity DC -) to accomplish this relatively simple welding task. We use [BOESHIELD T9](#) to lubricate and protect our Scissor Jack Acme threads. BOESHIELD T9 performs far better than WD40 or any other dry lubricants we are aware of and one should definitely NEVER use greasy or wet lubricants which will collect road grit and then cause high friction, binding and eventual failure of the Acme threads. BOESHIELD T9 was developed by Boeing. Bob had a [distinguished 35 year Boeing career](#) back when they were a great aerospace engineering company.

We retained our Casita trailer OEM Scissor Stabilizer brackets that are welded onto the frame along with the mounting hardware to repurpose them to support a sewer hose carrier custom constructed from 72 inches long and 6 inches in diameter PVC pipe and end fittings (please see below for more details on this refinement).

It should be noted that holes should NEVER be drilled into the Casita trailer structural frame because of how frame structure transmits and addresses the associated forces and moments it experiences. For example, the horizontal elements of an I-beam are called the flanges and the vertical element is called the web. The web resists shear forces and the flanges resist the bending moment experienced by the I-beam. Drilling holes into either the web or flanges will create stress concentration points that significantly weaken the frame structure causing it to be much more susceptible to failure which can even occur at other locations than where the holes were drilled.









Sewer Hose Carrier

We custom constructed a sewer hose carrier from 72 inches long and 6 inches in diameter PVC pipe and end fittings and supported it under our Casita trailer using the existing Casita trailer OEM scissor stabilizer brackets that were welded onto the frame. Some people use the Casita trailer OEM hollow rear bumper to store their sewer hose, but it makes little sense to us to put a wet hose into a steel container that will then ultimately rust. Furthermore, our Casita trailer OEM rear bumper isn't nearly big enough to hold our sewer hose with their associated fittings. Our 6 inches in diameter PVC sewer hose carrier can easily hold our [Camco RhinoFlex 15 Feet Sewer Hose Kit](#), our [Camco RhinoFlex 5 Feet Sewer Hose Extension](#), our [Camco RhinoFlex 10 Feet Clean Out Hose Kit](#), our [Camco Holding Tank Flexible Swivel Stik](#), our sanitary gloves and our hand cleaner. We placed this sewer hose carrier such as to be the first place that will bottom out on uneven terrain to ensure not damaging our potable water tank hose bib valve, rear bumper, or scissor jacks. We also lined the inside of our Casita trailer rear bumper with a square PVC fence tube and we use it to store our satellite dish mast for our [Starlink Roam System](#) from our [SpaceX Affiliate](#) and our [Keder Rail Awning System](#) poles.



Lithium Battery Upgrade

A Group 27 LiFePO₄ battery has 2 times the usable Amp Hour (AH) capability of the Casita trailer OEM Group 27 lead acid battery and at least 3 times the life expectancy. Some LiFePO₄ battery manufacturers even claim as much as 10 times the life expectancy. So if a replacement Group 27 LiFePO₄ battery can be obtained for less than 6 times the cost of a Group 27 lead acid battery (2 times AH capacity and 3 times life expectancy), it will most certainly have a positive Return on Investment...that is, if you happen to camp or live that long... A LiFePO₄ battery can also be charged 5 times faster than a lead acid battery which makes small solar panel charging very practical and extremely effective. A LiFePO₄ battery does NOT require any maintenance at all. A Group 27 LiFePO₄ battery is about half the weight of the Casita trailer OEM Group 27 lead acid battery which weighs 52 pounds. And one doesn't need a battery compartment sliding drawer with a LiFePO₄ battery.

Our Casita trailer OEM lead acid battery was showing signs of nearing the end of its dependable life from having undergone many charge cycles during our first year of very active dry camping ownership so we elected to upgrade to a [Renogy 100AH LiFePO₄ Deep Cycle Self-Heating Battery](#) having a C1.0 maximum continuous discharge current rating (i.e., 1A maximum discharge current per battery Amp Hour capacity or 100A for a 100AH battery) and a C1.3 maximum short duration discharge current rating (i.e., 1.3A maximum discharge current per battery Amp Hour capacity or 130A), weighs 26 pounds, automatically self-heats using charge power to enable charging the battery in cold weather, and fits in our Casita trailer OEM Group 27 battery compartment without needing any modification other than drilling and using 2-1/2 inch leg holding angles in lieu of our Casita trailer OEM 2 inch leg holding angles.

Although this LiFePO₄ battery reduces our Casita trailer weight by 26 pounds and reduces our trailer axle load by 34.4 pounds, it does increase our trailer tongue weight by 8.4 pounds. However, with our modified/refined and fully-loaded 3,437 pound Casita trailer, our fully-loaded 5,242 pound Ridgeline truck and using our Andersen Weight Distribution Hitch, our trailer tongue weight reduces from 426 pounds to 335 resulting in a 9.7% trailer tongue weight to trailer weight ratio and a 75.0% tow vehicle front axle load restoration which are within the recommended ranges for good all-weather tow vehicle handling and safe trailer towing. Please see our [Casita Travel Trailer Weight & Balance Calculator](#) and our [Andersen Weight Distribution Hitch Calculator](#) for understanding and accurately quantifying this.

For LiFePO₄ batteries, it is recommended to use 13.6VDC (i.e., the lower Idle Stage charging voltage) for battery charging calculations. Our replacement [Progressive Dynamics PD9145ALV Converter/Charger](#), designed expressly for LiFePO₄ batteries and capable of providing a 45A maximum charge current (please see below for more details on this refinement), can fully charge our 100% depleted 100AH LiFePO₄ battery in 2.2 hours (i.e., 100AH divided by 45A) or our 50% depleted LiFePO₄ battery in 1.1 hours. Under perfect solar conditions our 200 Watt solar panels with a 75% efficient Pulse Width Modulation (PWM) solar charge controller can generate a 11A charge current (i.e., 0.75 times 200 divided by 13.6VDC) and can fully charge our 50% depleted LiFePO₄ battery (i.e., our absolute extreme worst case battery depletion given our worst case 24 hour maximum power usage rate) in 4.5 hours (i.e., 50AH divided by 11A)...and perhaps twice this long (i.e., 9.1 hours) under marginal solar conditions.

We do NOT allow our tow vehicle to charge our LiFePO₄ battery at all as this isn't required at all given our 100AH LiFePO₄ battery capacity, our 200 Watt solar panel charging capability and our 45A Charger/Converter charging capability which can be used with either shore power or our propane modified [Honda EU2200i](#) generator. This thoughtful, integrated design approach and operational plan eliminates any need of having to use an additional and very expensive DC to DC battery charger (e.g., [Renogy DC to DC Battery Charger](#)) to accomplish this purpose, reduces stress on our tow vehicle alternator and slightly increases our tow vehicle MPG. ***However, please be forewarned to NEVER suggest anything like this on so called [Casita Forums](#), which are NOT affiliated in any way with the highly reputable [Casita Travel Trailer](#) company that actually manufactures and only directly sells their Casita trailers, or you will likely be quickly fire-stormed.*** And as Mark Twain so eloquently well stated..."Never argue with idiots as they will only bring you down to their low level and beat you with experience." It has also been alleged that there are some people who hawk their products/services via these Casita forums and associated superficial rallies who have the ability to initiate these fire-storms and thereby effectively censor anything that could adversely affect their

personal agenda. Perhaps more importantly, all contributions made to these Casita forums are not Internet searchable because all the information on these forums are excluded from Internet search engines and these forums are essentially black holes. So participation on these Casita forums quickly becomes very boring and tedious if one has critical thinking skills and is also not the best use of one's precious time for making enduring contributions that can then be subsequently searched and found by other people also having critical thinking skills seeking useful information. However, if you Google "Los Gatos Casita" plus the specific subject you are interested in, you may find useful contributions that we made to the RV community on other more reputable and Internet searchable RV forums. But again, social media forums are not the best place to obtain factual and truthful information and we tend to avoid them in general. ***So be wise and do your own independent research and carefully consider all the pros/cons before making any decisions that you may later badly regret!***

LiFePO4 battery voltage doesn't decrease in a predictable and reliable fashion like lead acid batteries, so one can't accurately determine the State of Charge (SOC) of LiFePO4 batteries by only just using the battery voltage. A fully charged nominal 12VDC LiFePO4 battery should read between 13.4VDC for an older battery and 13.6VDC for a newer battery when the battery is at rest (i.e., is NOT being charged or discharged). At a low 20% SOC level, which is the recommended lowest SOC level one should go to maximize LiFePO4 battery life, this drops to about 12.8VDC and this is only a valid approximation when a constant 0.2C discharge rate (i.e., 20A for a 100AH battery) was used to reach this 20% SOC level. Fortunately, the Renogy LiFePO4 Battery Management System (BMS), which is currently considered the most capable and safest BMS in the lithium battery RV industry, can very accurately determine SOC and many other useful parameters (e.g., voltage, current, remaining AH capacity, remaining hours of time, warning codes, battery self-heating status and number of active paralleled batteries in a battery bank) and can conveniently display all this information along with easily enabling one to put this LiFePO4 battery into an optimal hibernation state for long term storage. So this Renogy BMS eliminates any need of having to use an additional and very expensive battery shunt device (e.g., [Victron Smartshunt](#)) to accomplish this purpose. Consequently, we used the [Renogy Battery Monitoring Screen](#) that came with their LiFePO4 battery and mounted it adjacent to our Renogy Inverter Control Panel.

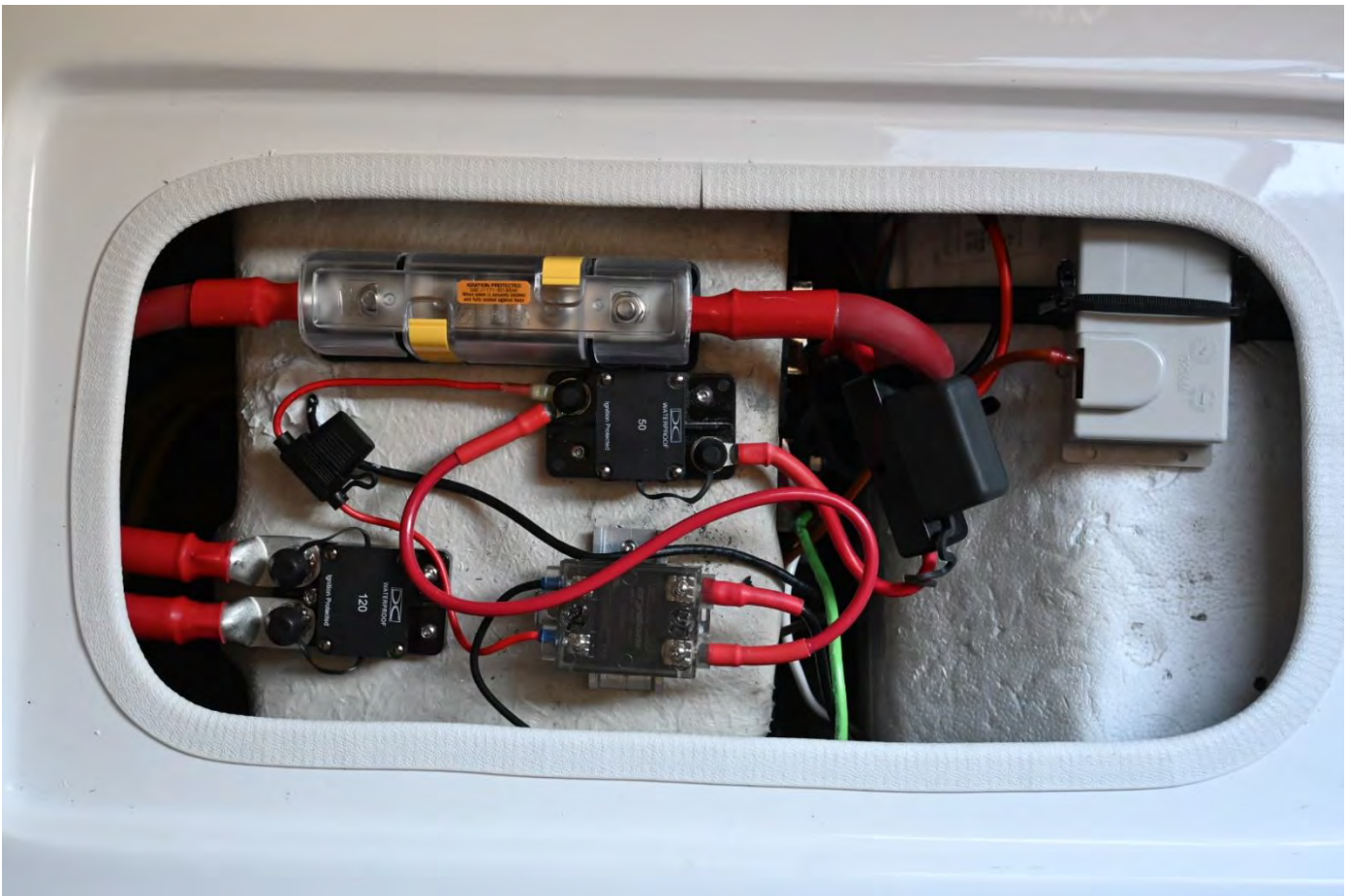
It should be noted that LiFePO4 batteries charge much faster than lead acid batteries by using a much higher charge current. To handle our LiFePO4 Charger/Converter 45A maximum charge current, our Casita trailer OEM 40A auto resetting circuit breaker was replaced with a high quality 50A auto resetting circuit breaker with Ignition Protection AND a 60A Maxi Blade fuse was also placed in series with this auto resetting circuit breaker to prevent it from resetting multiple times if there is some Casita trailer electrical system failure causing a very high current in excess of our design limits. There have been reports of auto resetting circuit breakers resetting multiple times until there is a circuit breaker or a wire insulation meltdown that then results in an electrical fire. And allowing this auto resetting circuit breaker to repeatedly trip and reset will cause premature failure of both this circuit breaker and the Charger/Converter. We don't want to experience this while camping.

Hopefully, our LiFePO4 battery will last until battery technology improves further and a C2.7 or higher maximum discharge current rating Group 27 battery becomes available (i.e., 2.7A or higher maximum discharge current per battery Amp Hour capacity or 270A or higher for a 100AH battery). Yes, one could also double or triple both the AH and maximum discharge current rating by creating a battery bank of multiple batteries all connected in parallel, i.e., connecting all the positive battery terminals together and connecting all the negative battery terminals together. For example, connecting two 100AH batteries in parallel together, each rated for a 100A maximum discharge current limit would create a battery bank having a 200AH and a 200A maximum discharge current limit. However, if you also have a convenient, light-weight, quiet and reliable propane generator, there is little benefit to creating a battery bank at all as your generator can supply all of your long duration 120VAC power needs and is far more cost effective and lighter weight than a large battery bank, large solar panels and large power Inverter too. ***Update: We subsequently and successfully modified our LiFePO4 battery to enable it to provide a 270A maximum discharge current (i.e., achieve a C2.7 maximum discharge current rating) for up to 20 minutes. However, given the potentially dangerous nature of this modification, we are not at liberty to provide details how this was accomplished.***

Our 100AH LiFePO4 battery in concert with our added [Renogy Foldable Solar Suitcase](#) and our added [Renogy 3000 Watt Pure Sine Wave Inverter](#) easily satisfies all our 12VDC long duration power needs (e.g., our electronic monitoring, entertainment, internet, lighting, etc.) and easily satisfies all of our 120VAC short duration power needs (e.g., our coffee/tea makers, hair dryer, microwave oven, 2-slice toaster, mini toaster oven, toilet bidet seat, vacuum, etc.) which enables us to conveniently dry camp for as long as we desire without needing to operate our propane modified [Honda EU2200i](#) generator in places that don't require air conditioning. But having and operating our generator also enables us to conveniently dry camp for as long as we desire in places that do require air conditioning as long as we can obtain propane...which we will always need anyhow for our refrigerator, stove and water heater when dry camping in hot weather...and which we will also always need anyhow for our furnace, refrigerator, stove and water heater when dry camping in cold weather.

Now if you always camp in places with shore power, you don't even need a battery or a generator at all as 120VAC shore power will enable you to use your 120VAC air conditioner, refrigerator and water heater and will also power your Charger/Converter which will enable you to satisfy all your 12VDC power needs. And you will NOT need a propane furnace or a propane stove either as you can use an [Electric Space Heater](#) and an [Electric Induction Stove](#), which is what we use when we have shore power to avoid using any propane at all. And if you are adventurous, physically-able and self-reliant, you don't even need a RV at all as you can go on foot and camp in the best places in the country and in the world with few needs and few people to ruin your experience and create great lasting memories which is all you will have at the end of your life journey.

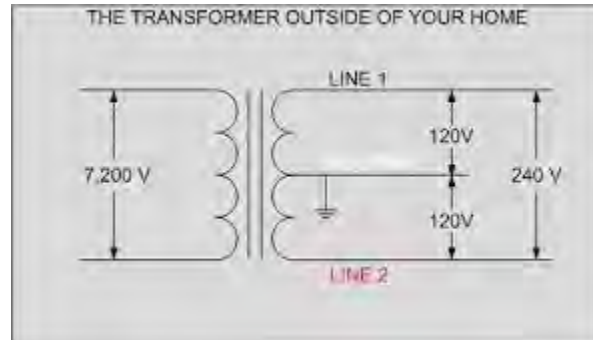






50A 120/240VAC True Split-Phase Service Capability

The 30A (3,600 Watts) 120VAC only capability Casita trailer OEM [WFCO WF-8955-AD Power Center](#) is used to convert 120VAC to 12VDC, charge RV batteries, protect all 120VAC circuits using circuit breakers, protect all 12VDC circuits using ATC fuses and provide the central distribution wiring point for all Casita trailer 120VAC and 12VDC circuits. Here is a reliable and simple to understand [RV 30A versus 50A Service Electrical Tutorial](#) if your knowledge of this specific subject is lacking. And here is both a very interesting and very detailed [Electricity Tutorial](#) if you truly want to greatly expand your overall knowledge on this subject. Anyhow, after giving this some deep thought and doing much research, we decided to upgrade our marginal 30A (3,600 Watts) 120VAC only capability Casita trailer OEM Power Center to 50A (12,000 Watts) 120/240VAC true split-phase capability for any future Casita trailer refinements that could benefit from having this increased power and additional 240VAC circuit capability.



We selected the [Progressive Dynamics PD55K000 AC Distribution Panel](#) which has a 50A rated staggered split-phase bus bar option that supports using standard residential, low cost single-pole 120VAC circuit breakers, tandem single-pole 120VAC circuit breakers and double-pole 240VAC circuit breakers. Every other power center or AC distribution panel we researched only had bus bars that could support single-pole 120VAC circuit breakers and tandem single-pole 120VAC circuit breakers and typically could only use non-standard and expensive circuit breakers.

We selected a [Progressive Dynamics PD60A DC Distribution Panel](#) which can hold eighteen 20A ATC fuses (three of which can even be 30A ATC fuses) with LED indicators to alert/identify blown fuses and uses our favorite WAGO connectors for the positive wire circuit connections, but uses lug terminals on the negative wire circuit bus bar. Since DC circuits use stranded wire which is prone to fail or get loose when using lug terminals, we used [Crimped Insulated Wire Ferrules](#) for connecting all the negative wire circuit ends to the negative bus bar lug terminals. We also used crimped insulated wire ferrules for connecting the positive/negative main wire ends to the DC distribution panel main lug terminals. It should be noted that the safest policy is to only use ATC fuses for boats and RVs that could experience a propane leak which could then result in an explosion if ATO fuses are used. The "C" in ATC means these fuses are closed and sealed from the environment. The "O" in ATO means these fuses are open and NOT sealed from the environment.

The hole in the seat bench for our Casita trailer OEM Power Center was 12 inches wide by 11-1/2 inches high. This hole was made 4 inches wider to 16 inches wide total and oak hardwood was used to construct a strong doweled 19 inches wide by 12-1/4 inches high frame for mounting the electrical flush mount AC and DC distribution panels. The oak frame was finished with [Minwax Premium Oil Dark Walnut Stain](#) and [Minwax Helmsman Spar Clear Satin Urethane](#). A 2x6 header was placed above the hole to strengthen the bench seat in this area. This header is supported by 2x4s on the sides and a 2x4 was placed at the bottom of the AC and DC distribution panels to provide additional support and strength. This 2x6 and 2x4 structure also acts as a backing plate for the AC and DC distribution panels allowing them to be fastened with 8 wood screws.

For some bizarre reason, our Casita trailer OEM [WFCO WF-8955-AD-MBA Converter/Charger](#) used a microprocessor and firmware to "Auto Detect" (AD) the type of the battery in order to then select the proper battery charge profile (e.g., lead acid battery, lithium battery, etc.). There have been many reports of this WFCO-8955-AD-MBA Converter/Charger reverting from the lithium battery charge profile to the lead acid battery charge profile (even AFTER getting it updated with the latest firmware...v1.19 as of this writing). We

decided we just didn't want to risk and experience this while camping. Frankly, it makes little sense to us why a company would complicate what should be a very simple and robust battery charging device with a microprocessor and firmware when a simple jumper pin or switch would certainly be more reliable? Perhaps to help address the situation of having to deal with an increasing clueless and ignorant population working on RVs who might not be capable of toggling the jumper pin or switch correctly given the type of battery being used? In any event and sad to say, this WFCO design approach and wasting much time working with WFCO to resolve this issue to no avail didn't instill us with very much confidence in their products in general.

Furthermore, our Casita trailer OEM Converter/Charger when in the lithium battery Bulk charge profile charged at 14.6VDC and 55A and our [Renogy 100AH LiFePO4 Deep Cycle Self-Heating Battery](#) calls for a 14.4VDC maximum charge voltage and is only rated for a maximum charge current of 50A. There have been reports that exceeding the maximum charge voltage or maximum charge current rating of lithium batteries that use a Battery Management System (BMS) by even a small amount can cause the BMS to disconnect the battery which can then require having to accomplish a complicated BMS reset procedure. And then there is also the remote but potential situation of the lithium battery BMS completely failing and allowing the lithium battery to charge above its maximum charge current rating which could then cause the lithium battery to fail and self-ignite. So, we didn't feel the need to push these limits or personally test this out while camping.

Therefore, after giving this some deep thought and doing much research, we also decided to replace our Casita trailer OEM WFCO WF-8955-AD-MBA Converter/Charger with a [Progressive Dynamics PD9145ALV Converter/Charger](#) which automatically only uses proper LiFePO4 charge profiles (14.4VDC Bulk Stage and 13.6VDC Idle Stage) given the charge state and actual real-time usage of the LiFePO4 battery and can only physically provide a maximum charge current of 45A. And we also have a [Progressive Dynamics PD92201 Converter/Charger Remote Pendant](#) which provides remote annunciation of the current LiFePO4 charge profile being used and also enables manual selection if desired.

In summary, a reliable Charger/Converter which automatically uses proper LiFePO4 Bulk Stage and Idle Stage voltage profiles, provides remote annunciation of the actual voltage stage profile being used while also enabling manual selection of the desired voltage profile stage charge to use, and charges at a lower maximum charge current (i.e., 45A) than the maximum charge current rating of our LiFePO4 battery (i.e., 50A), our replacement auto resetting circuit breaker (i.e., 50A) and our added Maxi Blade fuse (i.e., 60A) seemed like a much better approach and also remedied our safety concern with the original Casita trailer OEM arrangement (please see our Improved Battery Disconnect Location/Functionality section for additional details on this). Our Charger/Converter was mounted on a shelf created above the back of the AC and DC distribution panels and simply plugs into a 120VAC electrical receptacle outlet on the back of our AC distribution panel and easily connects to our DC distribution panel. This location also makes our Charger/Converter very convenient/easy to access and keeps it out of harm's way should our Casita trailer plumbing ever fail resulting in a water leak.

To bring shore power into our Casita trailer, we selected a [Mighty Cord 50A & 25 Feet Long Shore Power Cord](#) which deploys and stores reasonably well using the Casita trailer OEM shore power cord small exterior access hatch and compartment space. This 50A rated shore power cord can be connected directly to 50A service, indirectly connected to 30A service (using a proper 30/50A adapter) or indirectly connected to 20/15A service (i.e., using a proper 15/50A adapter OR using a proper 15/30A AND a proper 30/50A adapter). While our [Mighty Cord 50A & 25 Feet Long Shore Power Cord](#) deployed and stored reasonably well using the Casita trailer OEM shore power cord small exterior access hatch and compartment space, we subsequently added a 50A RV Inlet and we replaced the Casita trailer OEM shore power cord small exterior access hatch with a larger exterior access hatch (please see below for more details on these two refinements).

Despite the ignorance you may encounter on social media, properly connecting a RV 50A shore power cord to 30A service, 20/15A service or even to electrical code non-complaint "cheater" 50A service (a single-pole 50A circuit breaker providing only 120VAC instead of a double-pole 50A circuit breaker providing 240VAC) when using PROPER code-compliant adapters (i.e., an adapter that properly shares the one hot 120VAC leg from the service with BOTH hot legs of the 50A shore power cord) will have no adverse consequences to your RV, your shore power cord, the campground electrical wiring or anything else whatsoever other than that any double-pole 240AC circuit breakers in your AC distribution panel will no longer provide 240VAC (i.e., they will present zero VAC across their two hot legs). And again, you will first need an AC distribution panel with a 50A

rated staggered true split-phase bus bar that supports having BOTH 120VAC and 240VAC circuits...and all RV 50A Power Centers and nearly all RV 50A AC distribution panels do NOT have a staggered true split-phase bus bar and therefore can NOT support 240VAC circuits!

When connected to 50A, 30A or 20/15A service, all of our Casita trailer OEM 120VAC circuits receive 120VAC exactly like they originally received with our 30A (3,600 Watts) 120VAC only capability Casita trailer OEM Power Center and there was no need to rewire any of our Casita trailer OEM 120VAC circuits beyond just connecting them to the new AC distribution panel 120VAC circuit breakers. And when connected to 50A service, we now have 12,000 Watt power 120/240VAC circuit capability for any future Casita trailer refinements we may make that require this increased power and 240VAC circuit capability. We use low cost, portable and small [Progressive Industries 30A and 50A Kits](#) which provide protection against power surges that could damage electronics and which also have testers to confirm correct shore power wiring and adequate power quality BEFORE actual hookup. We feel this is a better approach than using an expensive, hard-wired Electrical Management System (EMS) that would consume limited and valuable Casita trailer interior space where it would need to be installed (and could then also fail during an inconvenient time to enable quick remedy) or using an expensive, portable EMS that could be easily stolen. This was a relatively low cost and simple refinement and we now have a much more capable AC/DC power system than even many multi-million dollar Class A motor homes.

It should be noted that [Casita Travel Trailer](#) and likely the entire RV industry's wiring color code doesn't follow normal convention and this can create serious issues for the uninformed and uninitiated. Casita uses Black wire for positive 12VDC and White wire for negative 12VDC. And [Casita Travel Trailer](#) uses Black wire for Hot 120VAC, White wire for Neutral 120VAC and Green or bare copper wire for Ground 120VAC. Every other electrical industry uses Red wire for positive 12VDC and Black wire for negative 12VDC. And uses either Black or Red wire for Hot 120/240VAC, White wire for Neutral 120/240VAC and Green or bare copper wire for Ground 120/240VAC. So one has to wonder why the RV industry and [Casita Travel Trailer](#) didn't follow this normal convention and use Red wire for positive 12VDC and Black wire for negative 12VDC. And use Red wire for Hot 120VAC, White wire for Neutral 120VAC and Green or bare copper wire for Ground 120VAC? In any event, please be aware of this and please be very careful when working with the Casita trailer wiring, especially with 12VDC circuits where you might be mistakenly tempted to think the Black wire is NEGATIVE 12VDC when it is in fact POSITIVE 12VDC. This likely explains why RV Chargers/Converters need and typically have reverse battery polarity fuse protection...









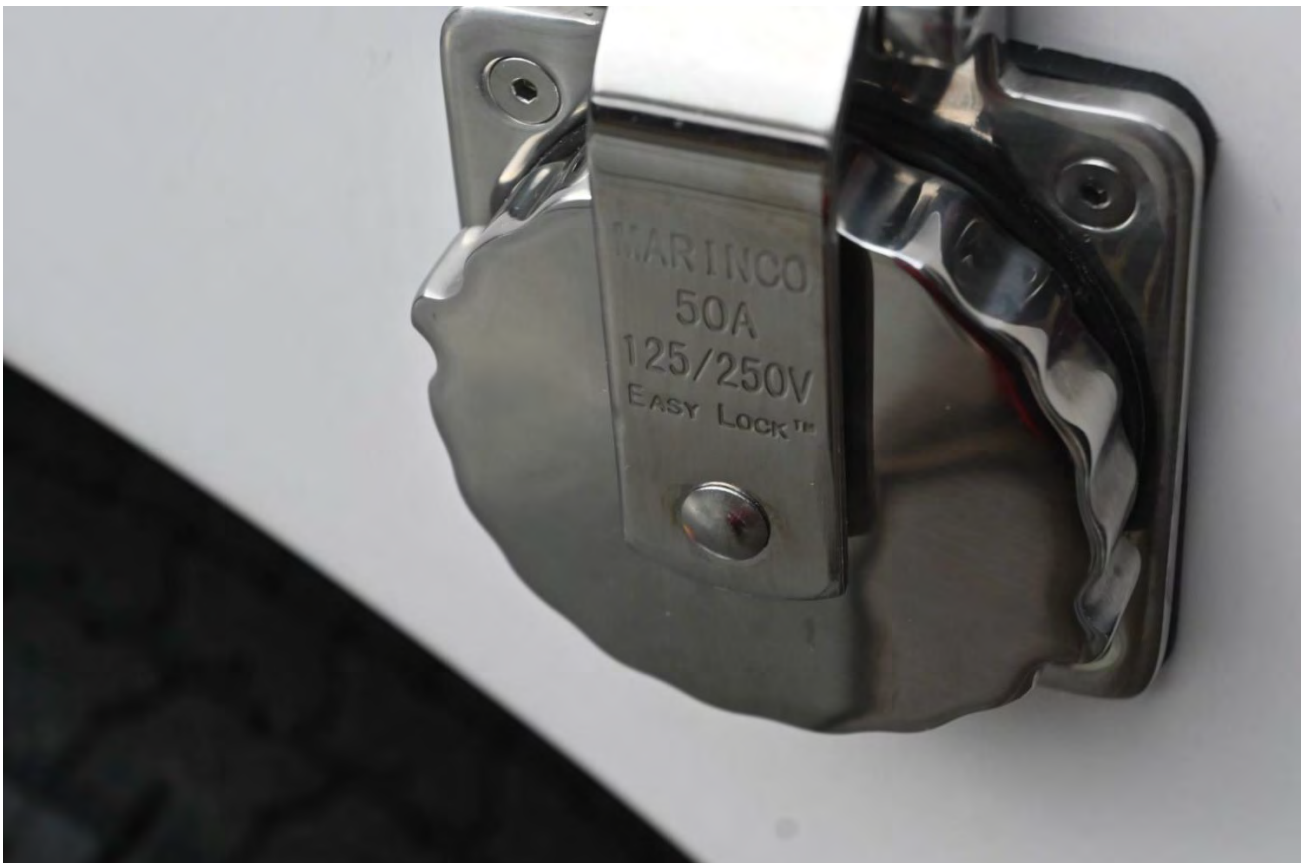


50A Power Inlet, Detachable Shore Power Cord & Larger Exterior Access Hatch

While our [Mighty Cord 50A & 25 Feet Long Shore Power Cord](#) deployed and stored reasonably well using the Casita trailer OEM shore power cord small exterior access hatch and compartment space, we decided to add a [Marinco 6373EL Stainless Steel RV 50A 120/240VAC Locking Male Power Inlet](#) and we replaced the Casita trailer OEM shore power cord small exterior access hatch with a larger exterior [JR Products ZE102-A Access Hatch](#) to free up this storage space for other storage items. Having a detachable shore power cord also makes deploying and stowing the shore power cord much easier. This larger exterior access hatch avoids needing to have to first lift up and remove our driver side mattress in order to access this storage space.

We reused our [Mighty Cord 50A & 25 Feet Long Shore Power Cord](#) by cutting it to then enable wiring the existing section which was already connected to our [Progressive Dynamics PD55K000 AC Distribution Panel](#) to the added [Marinco 6373EL Stainless Steel RV 50A 120/240VAC Locking Male Power Inlet](#). We wired the remaining long length section and now a detachable shore power cord to an added [Marinco 6364CRN 50A 120/240VAC Locking Female Connector](#). We also placed a [Marinco 7715ELN Cover](#) on this [Marinco 6364CRN 50A 120/240VAC Locking Female Connector](#) to enable creating a water resistant connection. All of these components use the Marinco "Easy Lock" System thereby eliminating any need to thread spin/tighten the detachable shore power cord connection or thread spin/tighten the power inlet cover and thereby risk damaging the threads by potentially cross-threading them in the process.

For fastening our added [Marinco 6373EL Stainless Steel RV 50A 120/240VAC Locking Male Power Inlet](#), we used the provided EPDM rubber gasket, epoxy bonded stainless steel 8-32 backing plate nuts and flat socket cap screws in lieu of rivets to enable easy future replacement if needed. For fastening our replacement [JR Products ZE102-A Access Hatch](#), we used [Zialoc 2200 White Silicone Sealant](#) and 3/16 inch diameter by 1/2 inch grip rivets in keeping with the Casita trailer OEM hatch installation philosophy. Given that the backside of these rivets were accessible, we also used aluminum backup POP rivet washers. We replaced the [JR Products ZE102-A Access Hatch](#) plastic thumb lock with a [JR Products](#) non-keyed thumb lock (J4500115, 5/8 inch).







Casita Shock Absorbers

[Little Home on the Road](#) has a shock absorber kit for Casita trailers having the bolt-on Dexter 3,500 pound TORFLEX 10 degree down axle. We installed this shock absorber kit on our Casita trailer. It was not necessary for us to remove the wheels or jack up our Casita trailer and the overall installation was relatively easy. This shock absorber kit uses Monroe Magnum 555003 shock absorbers. The end result is a Casita trailer that takes far less punishment from rougher roads and has better tire wear and associated longer tire life. Reportedly, this shock absorber kit also slightly improves the tow vehicle MPG. However, if this is true, we are currently at a loss to explain the physics of why this occurs.





Casita Trailer Cover & Pole Barn

And of course, to complete these first year 2023 refinements, we purchased a Casita trailer cover from [CalMark](#) to protect our Casita trailer. While the CalMark website indicated that they were using [Sunbrella](#) material, we were thrilled to discover that CalMark is now actually using [WeatherMax](#) material. We have decades of experience using both Sunbrella and WeatherMax for various sailboat covers and we have found WeatherMax to be preferable as WeatherMax is both lighter weight (which makes putting covers on and off much easier) and more durable long-term in windy and high UV maritime environments than Sunbrella material. There was about a 2 month CalMark production/delivery time, but we still received it just before Christmas...completing our first year of refinements just in time for our 2024 Winter trip to the Arizona desert and [Puerto Penasco Mexico](#) on the Sea of Cortez where we sailed with our children in past years.

In the Fall of 2024 we started construction of our pole barn for our Casita trailer and our [Kubota L3901 Tractor](#). It is nice living and having plenty of acreage in a beautiful remote mountain retreat so our Casita trailer is always close at hand and avoid wasting any money storing it someplace distant having questionable security. The first phase of our pole barn construction was creating an engineered, level and compacted 3-4" minus rock pad in a low tree covered area of our property. Then 3/4" minus gravel containing lime was used to cover this rock pad to create a durable, solid and water permeable surface on which to construct the pole barn. This phase was left to settle in over the Winter and the actual pole barn construction was started in March 2025 and was completed within a couple months before our southern Oregon hot Summer weather arrived.

We selected [VersaTube](#) steel for our pole barn structure which was fastened to our engineered rock pad using 12 inches wide by 16 inches deep reinforced concrete footings. We chose a steel pole barn structure for long life and wildfire resistance which is becoming more problematic with man-made global warming. We wanted our pole barn to look similar to our other buildings so we used [ASC](#) for our steel standing seam roof and steel siding. We used plywood and synthetic roof underlayment below our steel standing seam roof to avoid condensation formation that would then drip down into the pole barn interior. We also wanted our pole barn to be fully sided on three sides so as to fully protect our Casita trailer from the harmful effects of UV sunlight. Many pole barns constructed for RVs only have a roof which only protects the RV from hail, rain and snow. Our southern Oregon Summers often have prolonged periods of triple digits so we left one side of the pole barn open to prevent excessive heat buildup and provide maximum entry accessibility.

We put a 20/30/50A RV pedestal, frost-proof outdoor cold water faucet and dump out system in our pole barn. Our pole barn dump out system enables using our Casita trailer potable and gray tank water for supplemental irrigation of our landscaping in the pole barn area and also enables transfer of the black tank water to our septic system. The final touch to make this steel pole barn unique will be to use reclaimed, rustic-looking mushroom board on the fully sided gable side to create a home for a barn owl family based on [Steve Simmons Barn Owl Box](#). The following photos illustrate the construction of our pole barn which was constructed single-handedly by Bob like all our other buildings.























Additional Windows

To provide more natural sunlight into our Casita trailer bathroom and kitchen during daytime to avoid needing to use powered lights and to enable being able to view ALL outside directions from WITHIN our Casita trailer for both scenic view and security reasons, we decided to add two additional windows. For the bathroom, we selected a nominal 10 inches wide by 6 inches high (11-1/2 inches by 7-1/2 inches outside frame) oblong (2-1/2 inches radius) fixed window having a light gray tint manufactured for a 2-1/2 inches Casita trailer wall thickness accomplished using a 1-1/8 inches depth outside glass assembly and a 1-1/4 inches depth inside frame by [Motion Windows](#). For the kitchen backsplash, we purchased the identical window that [Casita Travel Trailer](#) used for our Casita trailer bathroom window which is a sliding glazed glass window with a screen. Given the different horizontal orientation that we used, four 1/4 inch water weep holes were drilled into the external lower frame. We use butyl tape to seal these windows. In addition to providing more light to what was a relatively dark corner of the kitchen area of our Casita trailer, having a window that opens from this kitchen area to our outside covered awning area on the driver side of our Casita trailer is very convenient for passing items between these two areas. Furthermore, this kitchen backsplash window enables having a direct and short makeup air path into and across our propane burners when operating the kitchen cooktop range hood exhaust fan.





Bathroom Sink

The Casita trailer OEM bathroom sink molded into the bathroom fiberglass cabinet was too small, both in overall size (only 11 inches long by 7 inches wide) and in depth (only 4 inches deep). And the Casita trailer OEM Bathroom faucet was low quality with poor water flow characteristics. This combination made the bathroom sink difficult to use in general and water would also easily splash out of this sink into the bathroom. As such, we decided to replace the Casita trailer OEM bathroom sink with a [Stainless Steel Sink](#) having dimensions of 16 inches long by 8 inches wide by 6 inches deep and replace the Casita trailer OEM bathroom faucet with a higher quality [Valterra Faucet](#).

The Casita trailer bathroom fiberglass cabinet counter top was cut out such so as to create a tight fit for this new sink and [Zialoc 2200 White Silicone Sealant](#) was used to hold the sink in place. The toilet paper compartment also had to be cut shorter to accommodate this new longer sink. The cut end of this toilet paper compartment was fully sealed closed using an end plate made from the scrap fiberglass left over from cutting out the hole in bathroom fiberglass cabinet counter top for this new sink. Again, [Zialoc 2200 White Silicone Sealant](#) was used to hold to hold this toilet paper compartment end plate in place. This toilet paper compartment can now only hold one roll of toilet paper, but since we have a toilet heated bidet seat, this is more than adequate for our needs. We also took the opportunity to add a rubber gasket to this toilet paper compartment hatch making it water resistant like the Casita trailer OEM main bathroom cabinet hatch.





Outdoor Cold/Hot Water Faucet

We came to the realization that having an outdoor cold/hot water faucet would be useful to create an outdoor dish washing area and create an outdoor cowboy/girl shower...we often dry camp in very remote locations... Our outdoor dish washing area and our outdoor cowboy/girl shower avoids putting this water into our gray tank which reduces our frequency of gray tank dumping when dry camping. Our cowboy/girl shower also enables removing sand from our bodies after enjoying beach time without putting this sand into our gray tank and potentially causing issues with our dump valve. We selected the [Valterra Outdoor Water Faucet](#) because it requires less space and has a stainless steel quick connect port that enables using a detachable [Valterra Coiled Water Hose](#). While Casita Trailer locates their optional Casita Liberty trailer OEM outdoor water faucet on the driver side adjacent to the kitchen sink, we elected to locate our outdoor water faucet on the passenger side adjacent to the entry closet. This location places our outdoor water faucet close to the Casita trailer entry door which better satisfies all of our aforementioned desires for having an outdoor water faucet. We use a [Valterra Flexible Gooseneck Spout](#) to create our outdoor water faucet dish washing station. Valterra also makes a [Valterra Quick Connect Garden Hose Adapter](#) which enables washing our Casita trailer and truck when dry camping.

We plumbed our outdoor water faucet into the existing cold and hot water lines located in the entry closet that are used to plumb the Casita trailer OEM bathroom sink water faucet. We used PEX-A and ProPEX brass expansion fittings and we added four shutoff valves to enable independently shutting off the cold/hot water sides of both the bathroom sink water faucet and our added outdoor water faucet. These shutoff valves better enable accomplishing maintenance if needed and enable quickly dealing with a potential faucet leak when dry camping with limited potable water availability. The associated electrical/plumbing was designed to be compatible with ["Gayle's Casita Closet"](#) to enable passing wiring/plumbing through holes in our new closet floor for better support/protection instead of using slots and placing the shutoff valves where they can be easily used (please see below for more details on this refinement). We used [Zialoc 2200 White Silicone Sealant](#) and 3/16 inch diameter by 1/2 inch grip rivets in keeping with the Casita trailer OEM hatch installation philosophy. Given that the backside of these rivets were accessible, we also used aluminum backup POP rivet washers. We replaced the [Valterra Outdoor Water Faucet](#) plastic thumb lock with a [JR Products](#) non-keyed thumb lock (J4500115, 5/8 inch).







Electric/Propane Kitchen Cooktop

We want the ability to use propane for our kitchen cooktop while dry camping, but NOT use any propane when we are paying for electrical shore power. We prefer electric induction as it enables more precise control of cooking temperature and has the ability to heat water much faster than other electric or propane cooktop options. Given that we now have 240VAC and 50A capability (i.e., 12,000 Watts), we also want to take advantage of this to enable having more powerful and higher wattage induction capability than 120VAC can provide. In reality, given our added 3,000 Watt Inverter which can be used independently and in addition to shore power, we now actually have a total of 15,000 Watts of 120/240VAC power capability.

The challenge with this project was finding a way to accomplish our objective given that our Casita trailer OEM [Suburban Propane Cooktop](#), which is a 3-burner propane design (a single 9,000 BTU burner and two 6,500 BTU burners) was a slide-in and NOT a drop-in cooktop. This Casita trailer OEM cooktop weighed 21 pounds and had dimensions of 21-1/2 inches wide by 18-3/4 inches deep on the counter top, but which also extended an additional 3-3/4 inches past the front of the counter top. Our maximum available counter top space for a cooktop was only 23-1/2 inches wide by 21-1/2 inches deep and given that this Casita trailer OEM cooktop was a slide-in and not a drop-in, we also had to “fill-in” the opening in the counter top front. The other issue was providing acceptable propane burner clearance from the back and side walls. However, we always love a good challenge...

We considered using a [True Induction Cooktop](#), which is a 1-burner induction and 2-burner propane design, uses 120VAC, but only provides 1,600 Watts of induction capability and 6,500 BTU capability at each propane burner. This cooktop weighs 28 pounds and has dimensions of 23-1/4 inches wide by 20-1/2 inches deep enabling it to fit within our counter top space. However, this cooktop requires 2 inches of clearance from the back wall and 6 inches of clearance from side walls which isn't possible for us given the location of the propane burners. And given that the propane burner caps are loose and are not permanently attached, this cooktop isn't at all well-suited for RVs either. And finally, we found customer service to be non-existent from this company.

So after much research, we concluded the current best way to accomplish our objective was to get two separate cooktop units (i.e., a dedicated 240VAC induction cooktop unit and a dedicated propane cooktop unit) that we could integrate into our available counter top space. This approach enables placing the propane cooktop adjacent to the kitchen sink thereby avoiding the side wall clearance issue. And the induction cooktop can then be placed close to the side wall without any clearance issue. We then just had to find two cooktop units that when placed adjacent to each other would fit within our available counter top space width and depth limits.

For our induction cooktop, we selected the [Kenyon Bridge Induction Cooktop](#), which is a 2-burner induction design that can be “bridged” together to enable large griddle use, uses 240VAC and provides 3,500 Watts of total induction capability...either all used by one single burner, shared by both single burners or bridged together to create a large cooking area suitable for our [Lodge Reversible Griddle](#). And 3,500 Watts of induction capability enables boiling water unbelievably fast. This high-end marine quality induction cooktop weighs 12 pounds and has dimensions of 12 inches wide by 21 inches deep.

For our propane cooktop, we selected the [Contoure Propane Cooktop](#), which is a 2-burner propane design, has 12VDC electronic ignition, provides 7,500 BTU and 5,800 BTU capability (which are relatively low power burners, but are appropriate for inside a small RV) and which also has desirable safety features including push-to-turn knobs and a thermocouple sensor that terminates the propane flow if no flame is detected. This propane cooktop weighs 6 pounds and has dimensions of 11-3/8 inches wide by 18-3/4 inches deep. So 12 inches wide plus 11-3/8 inches wide is a total of 23-3/8 inches wide which just barely fits within our 23-1/2 inches maximum counter top space width limit. And 21 inches deep and 18-3/4 inches deep fits within our 21-1/2 inches maximum counter top space depth limit too.

The first construction step was cutting out the fiberglass kitchen cabinet counter top to the required size of our two cooktop units plus the thickness of the aluminum frame used to hold and secure them in place plus 1/16 inch margin (i.e., a total of 23-5/8 inches wide by 21-3/16 inches deep and 18-15/16 inches deep). The left rear small side wall section had to be notched about 1/8 inch to the thickness of the propane cooktop to accommodate the 23-5/8 inches wide aluminum frame dimension. This notch was subsequently made invisible by using [Zialoc 2200 White Silicone Sealant](#) to fill the gap after the propane cooktop was installed. A 6063-T52 aluminum frame was constructed using 1 inch by 1 inch and 1/16 inch thick aluminum angle to be placed around the counter top perimeter so as to grip the counter top without creating a significant gap between the cooktops and counter top. 1 inch by 1 inch by 1/8 inch thick aluminum angle was used between the cooktops for strength. The aluminum angle was first riveted together to achieve the required dimensions and then test fitted with the cooktops. Then we used our portable [Lincoln 140MP "Multi-Process" Welder](#) in MIG mode with 100% Argon Gas, a [Lincoln Magnum Pro 100SG Spool Gun \(8-Pin Connector\)](#) and [Lincoln SuperGlaze 4043](#) 0.035 inch aluminum wire (polarity DC +) to accomplish this relatively simple welding task. A 3 inches wide by 1/4 inch thick aluminum plate was used to fill the opening in the front of the counter top which was riveted to the aluminum frame and to the counter top to lock the aluminum frame in place. 1-1/2 inches by 1/8 inch thick aluminum back plates were placed and riveted on each side of this 1/4 inch thick plate so as to prevent being able to pull this plate out. Three holes were drilled into this 1/4 inch thick aluminum plate to enable subsequently screwing on a 3/4 inch thick black walnut front piece from behind this 1/4 inch plate to enable setting it at the correct cooktop height and thereby also sandwiching and securing this entire front piece assembly to the fiberglass kitchen cabinet so it can't move. [Zialoc 2200 Clear Silicone Sealant](#) was used around the entire perimeter of the aluminum frame to also secure it in place on the counter top. Neoprene rubber was placed around the entire perimeter and center support section of the aluminum frame and the two cooktops were then installed. The Casita trailer OEM propane copper tube was cut to size, the cut end was then flared and the copper tube was then plumbed to the propane cooktop. The propane cooktop was wired for 12VDC, which is used to ignite the burners, from our [Progressive Dynamics PD60A DC Distribution Panel](#) using 14AWG cable and a 3A ATC fuse. The induction cooktop was wired for 240VAC from our [Progressive Dynamics PD55K000 AC Distribution Panel](#) using metal-clad 12AWG cable and a 20A double-pole circuit breaker. The 3/4 inch thick walnut front piece was finished with [Rubio Monocoat Oil Plus Pure](#) and installed using three 3/4 inch long #10 wood screws from the back of the 1/4 inch thick aluminum plate. An 18 inches long wrought iron towel handle was hand forged and installed on the black walnut front piece using epoxy bonded stainless steel 10-32 backing plate nuts and 2 inches long button socket cap screws that go through the 1/4 inch thick aluminum plate further increasing the overall strength of the front piece assembly.

To fully complete this project, we also replaced the kitchen cabinet lower gray drawers with matching black walnut drawers finished with [Rubio Monocoat Oil Plus Pure](#) to create kitchen area uniformity and some contrast with our Casita trailer general living space while also complementing our custom black walnut dining table and our custom black walnut sleeping area cabinet. We retained the other remaining Casita trailer cabinet gray drawers to keep the Casita trailer general living space from perhaps becoming too dark and we are very happy with this new look.

It should also be noted that we mostly do dry camping as a couple and when doing so, we usually cook outdoors using our light weight and portable [Camp Chef Everest 2X Stove](#) (with our [Lodge Reversible Griddle](#)), which is a 2-burner propane design, has a piezo electric ignition and provides 20,000 BTU capability at each burner. When dry camping with family and friends, we usually use our [Camp Chef Explorer 14 System](#) which is a 2-burner propane design and provides 30,000 BTU capability at each burner. To provide convection oven cooking capability without taking up much space or using much weight, we use our innovative Swedish design [Omnia Cooktop Oven](#) which we absolutely love as it vastly expands our camping menu options. We also have a [Small Microwave Oven](#) and [Mini Toaster Oven](#) that both operate using our Inverter power.















Bathroom Recessed Medicine Cabinet with Mirror

While the Casita trailer OEM bathroom open shelving cavity was acceptable for a couple years, we decided that we wanted a recessed medicine cabinet with a mirror to make the bathroom seem more light/spacious, provide a bathroom mirror and create a water resistant location for the items that we store and use in this location. We selected a [**TEHOME Farmhouse Recessed Aluminum Medicine Cabinet with Mirror**](#) having outside dimension of 16 inches wide by 24 inches high and having recessed cutout dimensions of 13-1/2 inches wide by 18 inches high. This medicine cabinet came with two tempered glass shelves which can be placed at five different heights as desired. However, to eliminate any glass breakage risk and to reduce weight, we replaced them with three Plexiglas shelves 13-5/16 inches long by 3-3/4 inches wide by 1/4 inch thick. When traveling, we also place a plastic latch that we constructed into the adjacent stainless steel shower wand holder which is used to prevent the medicine cabinet door from opening.

After first carefully considering the location of the plumbing in the entry closet and considering where the medicine cabinet would be located relative to the bathroom sink and faucet, a 13-1/2 inches wide by 18 inches high hole was cut in the fiberglass to mostly remove the 13-1/2 inches wide by 20 inches high Casita trailer OEM open shelving cavity and to create the required medicine cabinet cutout dimensions. Given that the Casita trailer OEM open shelving cavity was about 2 inches higher than the medicine cabinet cutout dimensions, an excess gap and open cavity remained above the medicine cabinet that had to be addressed. A 5/8 inch thick (i.e., the same thickness as the medicine cabinet flange) by 2 inches wide by 15 inches long aluminum flat bar was used to cover this excess gap and a 1/4 inch thick by 6 inches wide by 15 inches long aluminum flat plate was placed on the backside of the cabinet to create a wall strong back in preparation for supporting the entry closet clothes rod at the required height used for [**"Gayle's Casita Closet"**](#) (please see below for more details on this refinement). The aluminum flat bar and aluminum flat plate were secured together by drilling/ tapping the 5/8 inch thick flat bar to accept two 3/8-24 inch by 4 inches long hex bolts with washers and lock washers that were fastened through the 1/4 inch flat plate. The 1/4 inch flat plate was also fastened to the back of the medicine cabinet using 3/16 inch diameter by 1/2 inch grip rivets. The cavity was then filled from the backside of the medicine cabinet using [**Wind-Lock Foam2Foam Adhesive**](#) (which is often used in ICF building construction which is the only sensible way to construct one's home nowadays). The 5/8 inch thick flat bar was painted flat black to match the medicine cabinet flange and isn't visible when the medicine cabinet door is closed. The two sides of the medicine cabinet were secured to the fiberglass wall using two pieces of 1 by 3 inch Douglas fir lumber placed inside the entry closet and then fastened using four stainless steel wood screws from within the medicine cabinet. [**Zialoc 2200 White Silicone Sealant**](#) was also used around the 5/8 inch thick medicine cabinet flanges to create a water resistant seal and further secure the medicine cabinet to the fiberglass wall.

To address our [**Oxygenics Fury RV Shower Wand**](#) hose running between the bathroom sink faucet and the shower wand holder, which would otherwise interfere with our medicine cabinet, we installed a quick connect [**Valterra Quick Connect Faucet Adapter**](#) on this faucet and a [**Valterra Quick Connect Shower Hose Adapter**](#) on our new 40 inch long, extremely flexible, stainless steel [**Delta Shower Wand Hose**](#) to enable it to be easily REMOVED when NOT being used and thereby creating a detachable quick connect shower wand. When this shower wand is being used, it is placed on a stainless steel shower wand holder which was installed in the original Casita trailer OEM plastic shower holder location and this shower wand is then easily and quickly connected to the bathroom sink faucet. When this shower wand is NOT being used, it is hung from another stainless steel shower wand holder located behind the PVC black tank waste vent pipe adjacent to the toilet. In this way, any residual water in the shower wand and hose will drain out and run down the bathroom floor channel into the shower drain and the lower end of the hose can be secured to this vent pipe when traveling. This detachable quick connect shower wand can now also be used with our previously described [**Outside Hot/Cold Water Faucet**](#) since it also uses a quick connect fitting too. And since these Valtterra quick connect fittings are identical, they also provide spare part capability to each other. Valtterra also makes a [**Valterra Quick Connect Garden Hose Adapter**](#) which enables washing our Casita trailer and truck when dry camping.







“Gayle’s Casita Closet”

As previously described, one of our first on-the-road Casita trailer pickup trip refinements was to create a fully configurable, light-weight, low cost and strong [Closet Hanging Organizer](#) with five removable and light-weight 12 inches long by 9 inches wide by 6-1/2 inches deep [Plastic Bins](#) to the entry area closet which creates 3,510 cubic inches or about 2 cubic feet of storage which is more than adequate for our light-weight, small clothes items. We also used 10 strong stainless steel clothes hangers for our clothes items that needed to be hung. While this entry closet organization approach worked well enough for our Casita pickup trip and for perhaps a year or so afterward, we decided that we wanted something similar to a [Katys Casita Closet](#), but for far less cost, significantly stronger and also capable of accommodating all of the other modifications that we made to this closet space which included our previously described added bathroom medicine cabinet with mirror, our added bathroom sink drain Hepvo Valve plumbing, our added bathroom cabinet electrical outlet receptacle wiring and our added outdoor cold/hot water faucet.

We first constructed cardboard templates using a 36 inch flexible curve ruler to exactly determine and transfer the Casita trailer closet curvature at the exact height of our new secondary closet floor installed above the Casita trailer primary floor and at the exact height of each of our added five shelf locations. We designed/located each shelf to keep the passenger and forward facing sides of the shelving assembly plumb and straight in order to create/retain a 7 inches wide by 18 inches deep space for hanging some of our clothes. As such, the shelving depths then decrease as you go higher up and further towards the passenger and forward side of the closet because of the Casita trailer closet curvature. This results in our lowest and widest shelf depth varying from 15 to 13 inches of depth on the passenger side with a constant 12 inches of depth on the forward side and results in our highest and narrowest shelf varying from 14 to 9 inches of depth on passenger side with a constant 6 inches of depth on the forward side. These cardboard templates were then used to cut 1/2 inch thick Baltic Birch plywood to create our new closet floor and to create our five shelves. Incidentally, the metal siding, metal roofing and plywood seen in the photos of the cardboard templates and the cut Baltic Birch plywood are for our future pole barn that will be used for storing our Casita trailer and our [Kubota L3901 Tractor](#) to provide additional protection from the elements. It is nice living and having plenty of acreage in a beautiful remote mountain retreat so our Casita trailer is always close at hand and avoid wasting any money storing it someplace distant having questionable security. We purchased these pole barn components well in advance of our pole barn construction project in case the Oligarchs take control of the US, reduce their taxes, impose tariffs and drive up inflation so as to benefit themselves to the detriment of everyone else again.

Our new closet floor height was made to be 3/4 inch below the closet door lower opening height so as to create a lip that prevents items placed on our new closet floor from shifting during travel and potentially exerting an opening force against the closed closet door. We used 1 by 3 inch Douglas fir lumber to create four “walls” that were fastened to each other using L brackets and screwed to Casita trailer floor using stainless steel wood screws. Our new closet floor was then fastened to these four walls using stainless steel wood screws after making additional holes in the exact locations for the all plumbing and wiring that must pass through this new closet floor. All flexible plumbing and wiring passing through this new closet floor were protected with pipe insulation to prevent chafing while our Casita trailer is travelling. A 12-1/2 inches wide by 12-1/2 inches deep hinged floor hatch was placed in this new closet floor to enable access to our new below floor cavity space used to store items. The three unhinged sides of this floor hatch are each fully supported using a 1/4 inch from each of these associated three walls. In keeping with our preferred sailing nostalgia, we used two marine grade stainless steel hinges on this floor hatch. Two pieces of 3/4 inch thick by 1-1/2 inches wide by 31-1/2 inches long birch trim board were used to trim the perimeter of the two straight sections of the new closet floor. A rubber flange was placed in the new floor corner using rubber adhesive to enable removing and replacing the bathroom sink Hepvo Valve in the future if needed.

Our first, lowest and widest shelf was placed above our new closet floor using two 2x6 spacers 12-3/4 inches long. This length was chosen to enable our new floor hatch to fully open without any interference. Our next second shelf was then placed above this first shelf using one 2x6 spacer 8 inches long. Our next third shelf

was then placed above this second shelf using one 2x6 spacer 8 inches long. Our next fourth shelf was then placed above this third shelf using one 2x6 spacer 6 inches long. Our last, fifth, highest and narrowest shelf was then placed above this fourth shelf using one 2x6 spacer 6 inches long. A 2x4 spacer 5 inches long was then placed on top of this highest shelf to enable attaching the top hinge of the closet door.

The net result of this shelving placement is that our highest shelf surface is 43-1/4 inches above our new closet floor and the top of the lip trim is 44-1/4 inches above our new closet floor. We used 3/4 inch thick by 1-1/2 inches wide birch board to trim the front of all our shelves and thereby create shelf lips 1 inch in height to help prevent items from shifting and falling off the shelves. A 3/4 inch thick by 1-1/2 inches wide by 31-1/2 inches long vertical birch trim board was then vertically mounted from the lowest shelf to the highest shelf in the corner of the shelving assembly. This vertical birch board was fastened to the 3/4 inch thick by 1-1/2 inches wide birch shelf lip boards at this location using stainless steel wood screws. Two spacers 7 inches long and two spacers 5 inches long made from 3/4 inch thick by 1-1/2 inches wide birch board were also fastened on backside of the vertical birch board using stainless steel screws to provide a much stronger load path than only using screws would provide.

The Casita trailer OEM 1-1/4 inch clothes rod was repurposed, resized and one side was mounted on the backside of our medicine cabinet using the aluminum wall strong back (which was previously created as previously described in the medicine cabinet modification) to which a 1-1/4 inch stainless steel clothes rod holder was fastened using drilled/tapped holes and three 8-32 by 5/16 inch long stainless steel button socket cap screws. The other side of the clothes rod was mounted to an added 4 inches tall by 4 inches wide by 1/4 inch thick aluminum right angle to which a 1-1/4 inch stainless steel clothes rod holder was fastened using drilled/tapped holes and three 8-32 by 5/16 inch long stainless steel button socket cap screws. This added right angle was painted flat black and was fastened to our highest shelf using three 10-32 by 1 inch long stainless steel button socket cap screws, washers and nylon insert nuts. This approach kept the clothes rod from intruding into our highest shelf space having 14 to 9 inches depth and also allows the clothes rod to be easily removed if desired. The 1-1/4 inch stainless steel clothes rod holders we used also have retaining screws which prevents the clothes rod from potentially coming loose and then falling with all of our hanging clothes.

An added 6 inches tall by 4 inches wide by 1/4 inch thick aluminum right angle was also fastened to our highest shelf using three 10-32 by 1 inch long stainless steel button socket cap screws, washers and nylon insert nuts. This added right angle was first heated to 600 degrees F, hydraulically bent/formed, water quenched to the exact angle of the Casita trailer fiberglass wall structure, painted flat black and then fastened to this wall structure via the existing penetration originally used for the Casita trailer OEM 1-1/4 inch clothes rod using a 10-32 by 2 inch long stainless steel button socket cap screws, washers and nylon insert nuts. The two upper shelves adjacent to our added medicine cabinet were also fastened to the side of our medicine cabinet using L brackets and stainless steel wood screws.

All of these additional structural details greatly increased the overall rigidity and the strength of the closet shelving assembly. Our new closet floor, shelving and other components were first finished with [Minwax Premium Oil Dark Walnut Stain](#) and [Minwax Helmsman Spar Clear Gloss Urethane](#) prior to final assembly of our closet shelving assembly. We choose a gloss finish to increase light reflectivity inside the closet. The Casita trailer OEM closet door was then rehung using the existing holes in the fiberglass wall and using the new 2x6 shelving spacers in this location. Three [MaraFansie Wire Storage Baskets](#) were fastened to the interior side of the closet door and located so as to fit between the shelving and not interfere with the hanging clothes.

We also added a [BTF-Lighting 528 LED Strip Light](#) having our favorite warm white color. This LED strip light was fastened to the 1-1/2 inch backside of a 3/4 inch thick by 1-1/2 inches wide by 47-3/4 inches long birch trim board which was vertically mounted from the new closet floor to the top of the closet door opening along the fiberglass wall where the closet door hinges are fastened. This vertical birch board was fastened to the 3/4 inch thick by 1-1/2 inches wide birch shelf lip boards at this location using stainless steel wood screws. This vertical birch board was also fastened to the new closet floor using an L bracket and stainless steel wood screws. This location better protects this LED strip light from being damaged while also fully lighting both our

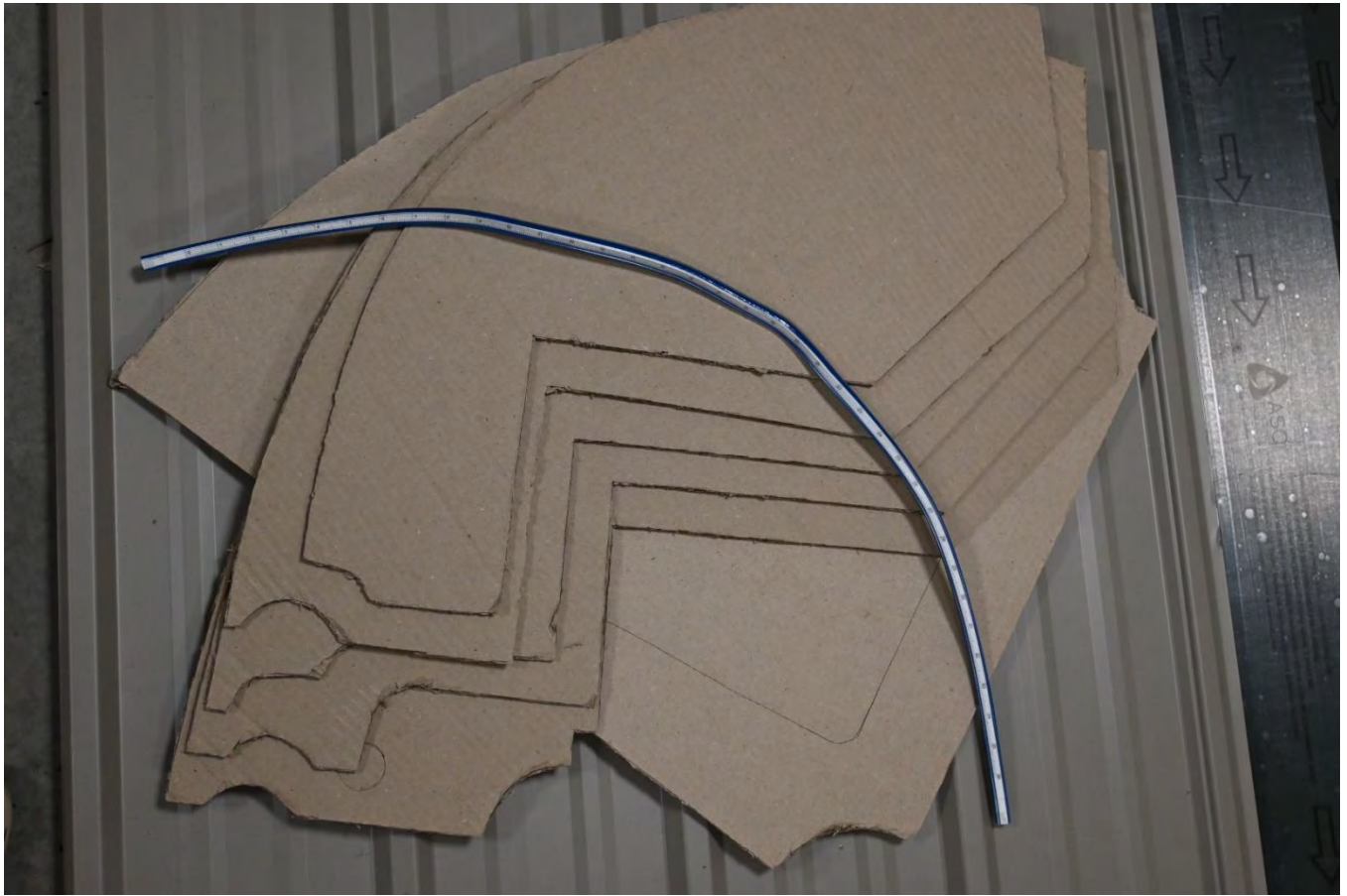
new below floor cavity space used to store items and the interior of our closet from a good angle that doesn't shine directly into our face.

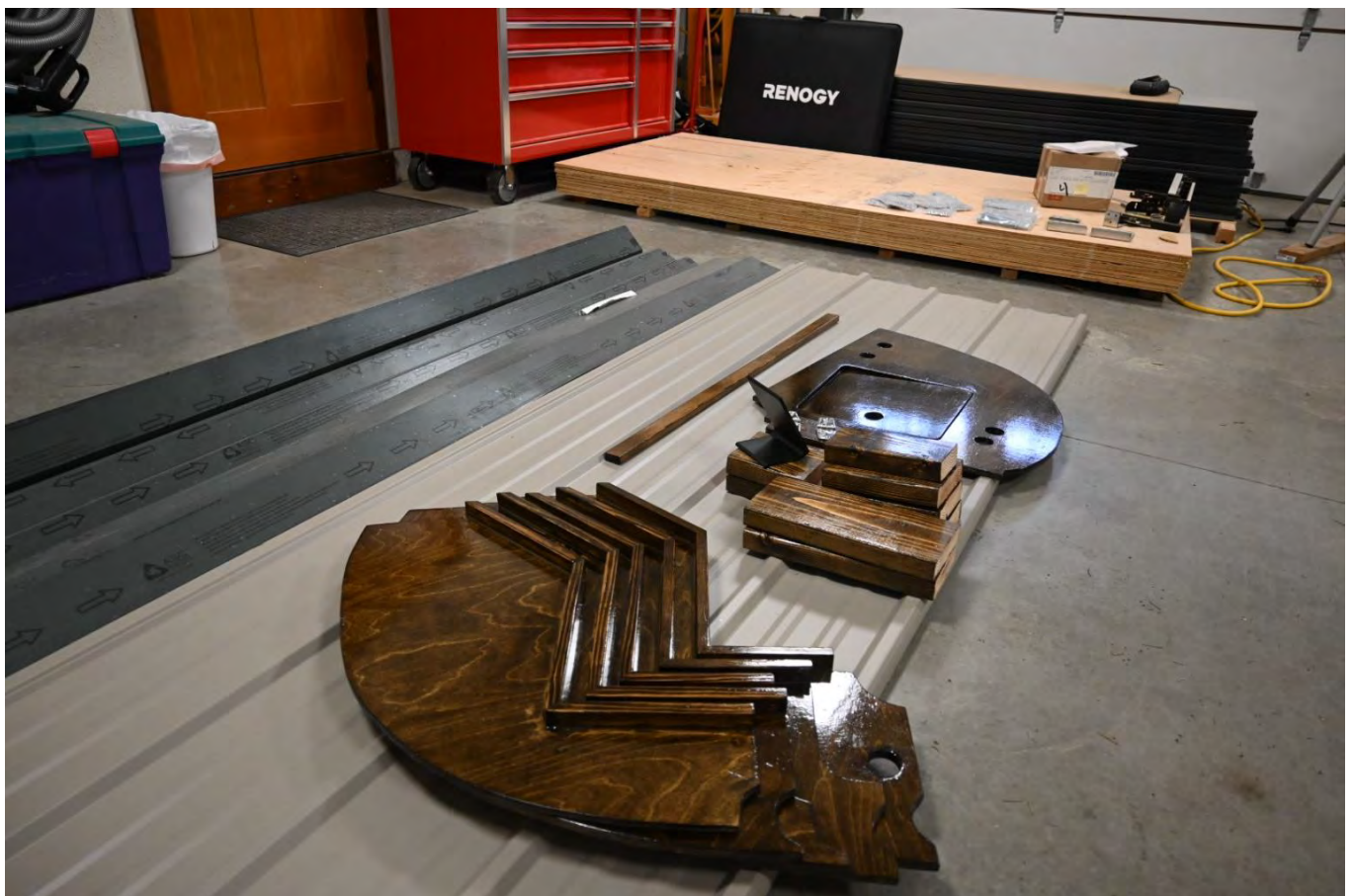
This 12VDC LED strip light was wired to the 7 Pin connector cable that passes through the Casita closet using two [Ohlectric 4-Port 4-14AWG Connectors](#), a 5A fused 10AWG cable having a SAE connector, then to a 14AWG cable have a SAE connector on one end and a 5.5 by 2.1 millimeter connector on the other end to mate with the LED strip light 5.5 by 2.1 millimeter connector to enable easy replacement of this \$5 LED strip light should it ever fail. Having a 12VDC fusible 10 AWG cable with an SAE connector in this location may prove useful for other currently unforeseen future needs. This LED strip light circuit was connected to an [Automatic Cabinet Door Switch](#) placed on the closet door hinge side lowest 2x6 spacer which automatically turns ON the LED tape light whenever we open our closet door thereby eliminating any need to manually turn it ON when our hands are occupied with carrying items while opening the closet door. A small slot was cut through the thin section of fiberglass at the switch location to enable the push button to protrude and make contact with the closet door. The 3/4 inch thick by 1-1/2 inches wide by 47-3/4 inches long vertical birch trim board which was used to mount the LED strip light hides this switch from view and keeps the negative 12VDC wires that this switch is connected out of the way and well-protected.

We completed this relatively trivial woodworking project for less than \$150 and about 4 hours of our time while successfully accomplishing all of our design objectives. Our closet shelving assembly weighs 36 pounds in total which increases our Casita trailer weight by 36 pounds, increases our trailer axle load by 14 pounds and increases our tongue weight by 22 pounds. Please see our [Casita Travel Trailer Weight & Balance Calculator](#) for understanding and accurately quantifying this.

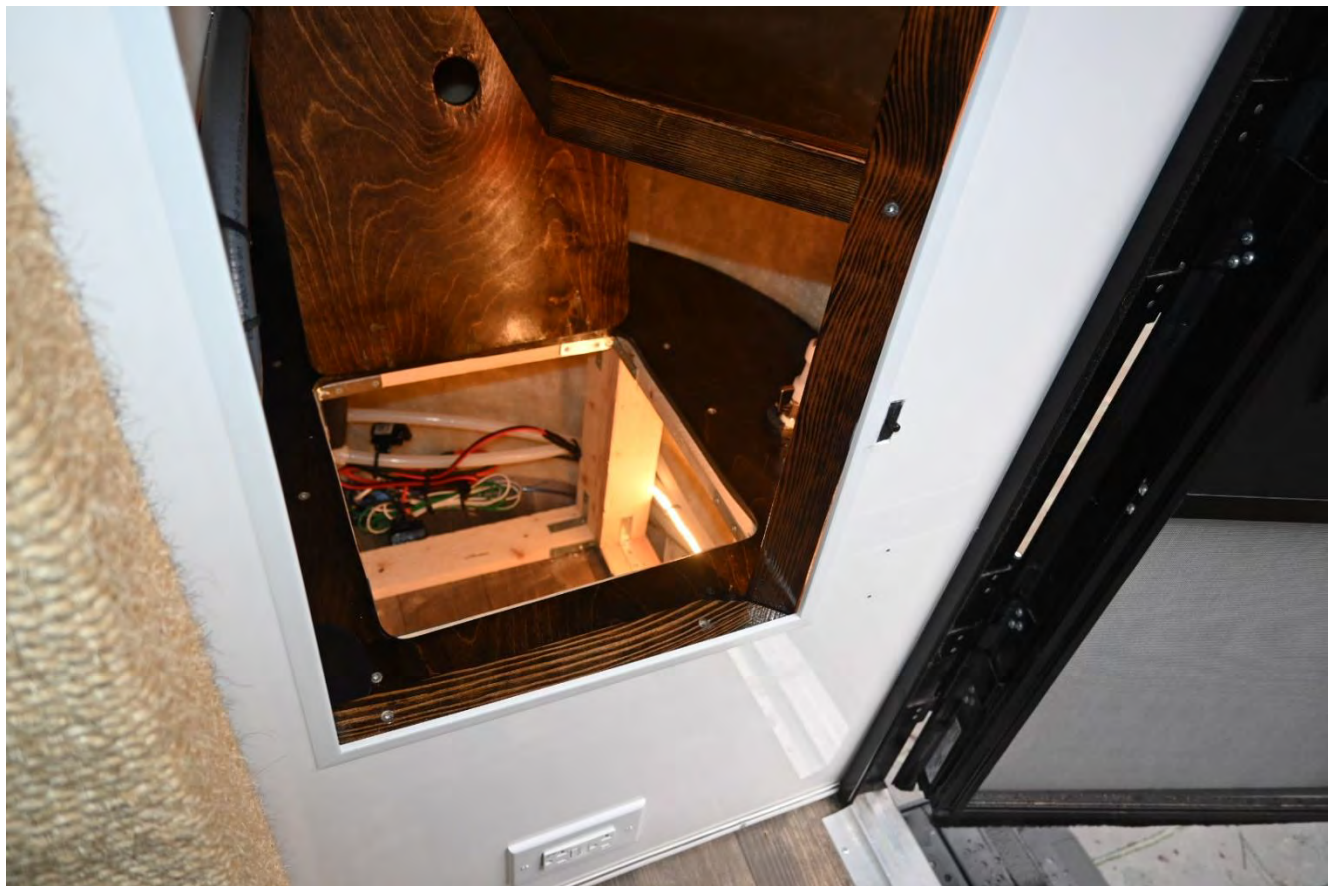
We are now fully ready for what will likely become our annual drive to Guatemala and Costa Rica and our flight from there to New Zealand to get a 6 month reprieve from the US insanity and self-destruction that's not unlike the [Boeing Company Self-Destruction](#) that Bob also unfortunately had to experience too. As history has amply and repeatedly demonstrated, Democracy doesn't work well when the population is gullible, uneducated and easily angered by BS propaganda and then brainwashed. Should you have similar thoughts and desires, you might find useful information in [International Living](#). We are very fond of Mexico and Latin America from having designed and sold various [Hydraulic Ram Pumps](#) over the years and having tested them in Guatemala at the [Finca Ixobel](#) ecological resort.



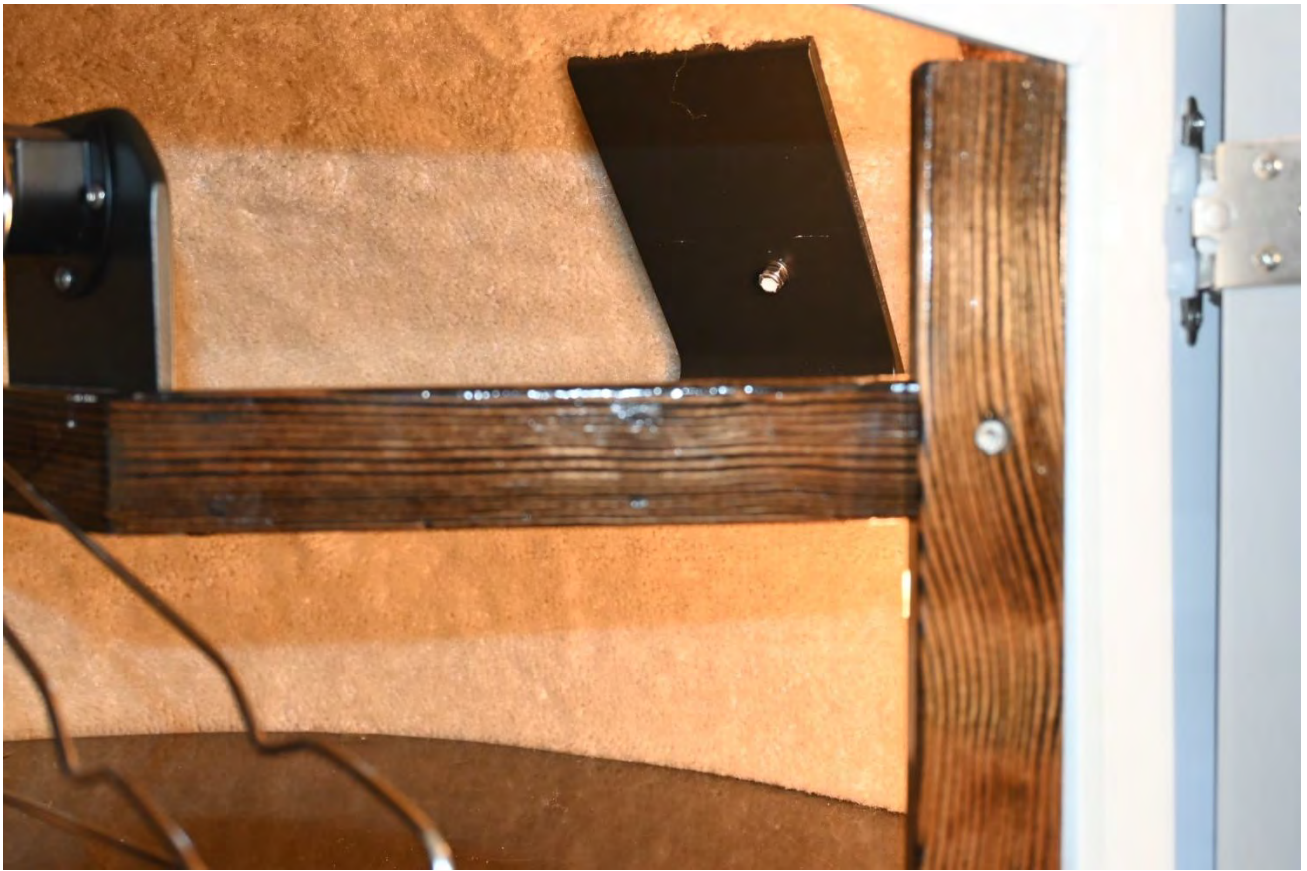














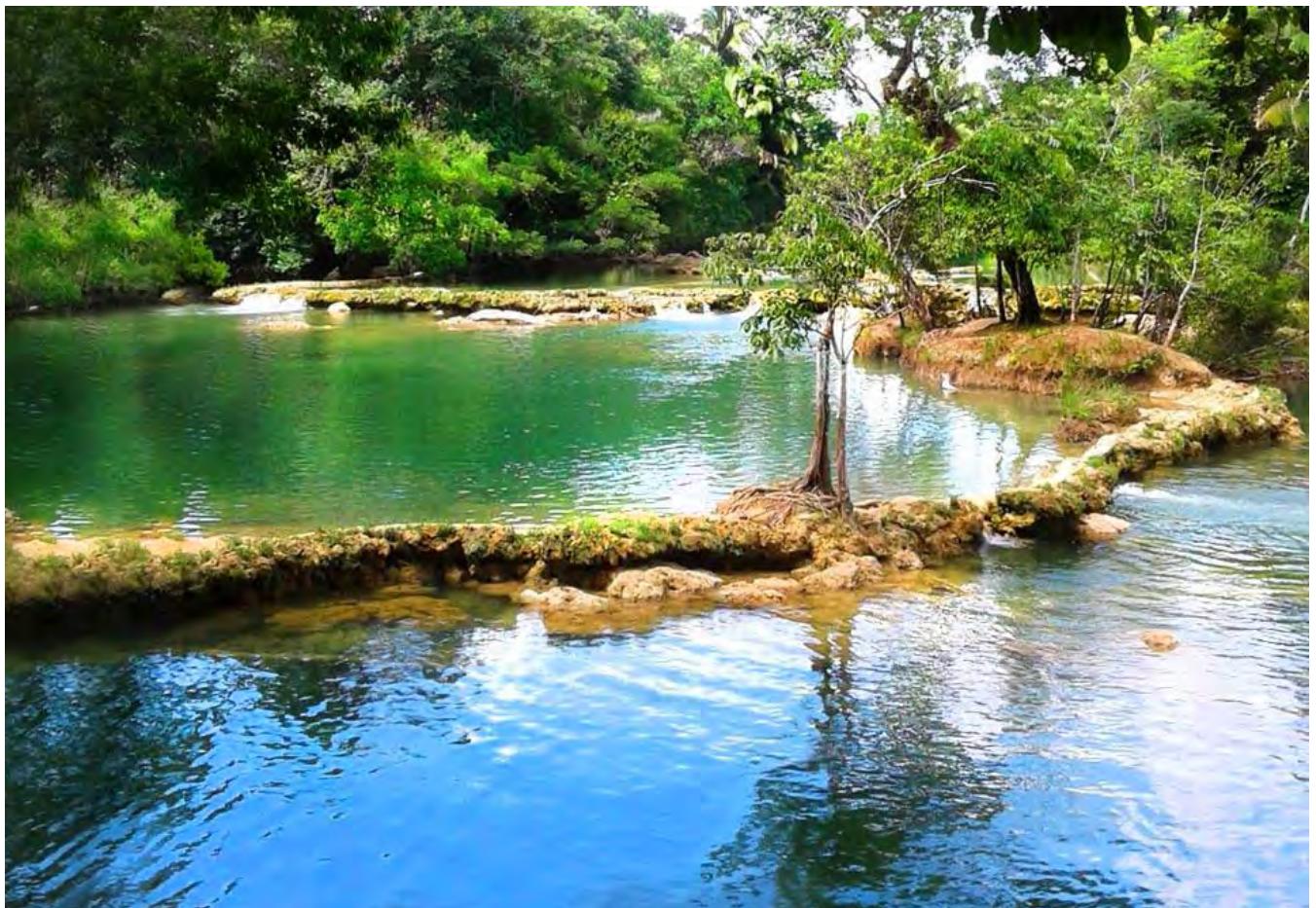














Electric/Propane Tankless Water Heater

If and when our Casita trailer OEM Electric/Propane 6 gallon tank water heater fails, we hope to take advantage of our added 50A (12,000 Watts) 120/240VAC true split-phase service capability and replace this obsolete tank water heater with a dedicated and optimized RV Electric/Propane tankless water heater to provide endless hot water capability when using propane or when connected to 50A 120/240VAC shore power when we also have a readily-available supply of potable water and a convenient means to easily empty the gray water tank...which is now always the case for us when we are in campgrounds with hookups and even when we are dry camping too.

Well-designed, modern tankless water heaters don't have any significant delay and don't waste a significant amount of water. Despite the ignorance you may encounter on social media, tankless water heaters are ALWAYS more energy efficient than tank water heaters because they only heat water to the temperature you select and only for the short amount of time that you actually use this hot water as opposed to heating a tank of water to some high temperature and then having to keep heating it because of the continuous heat loss of the tank into the surroundings. This means that tankless water heaters use significantly less propane when dry camping than tank water heaters. Tankless water heaters require less space and weigh less than tank water heaters. Tankless water heaters don't need or use anodes that have to be frequently replaced and they don't have tanks that will collect grime, create Legionnaires disease, corrode and eventually fail. Tankless water heaters do require periodic descaling using bypass valves in the system to allow pumping a descaling solution through just the tankless water heater. And while tankless water heaters are ALWAYS more energy efficient and thereby use less overall energy than tank water heaters, tankless water heaters do need and do use a lot of energy during the actual short duration they are actually heating the water.

RV propane tankless water heaters are already readily available that can generate 40 to 60 kBTU/H. However and unfortunately, RV Electric/Propane tankless water heaters are currently NOT available yet. We do NOT want to be forced to use propane to heat our hot water when we are paying for 50A service, water and sewer hookup and when we want to take a long hot shower!

How much electric power a tankless water heater requires is solely a function proportional to the hot water flow rate and the water temperature rise that is required (i.e., required power in BTU/H equals flow rate in GPM times delta temperature rise in degrees F times a proportionality constant of 500). Ideal shower temperature is 105 degrees F. A 0.8 GPM shower head is fairly common for dry camping when water isn't as readily available. If you set the tankless water heater to produce a maximum of 105 degrees F at the shower head, you don't need to also mix in and waste cold water to reduce the temperature to 105 degrees F. The objective here being to only create the minimum flow rate of hot water needed at only the highest water temperature needed to reduce the tankless water heater flow rate and water temperature rise requirements and hence also reduce the associated electric and propane requirements. The end result being a much more energy efficient, far longer life, RV water heater optimized for RV flow rates when dry camping using propane or when in campgrounds with 50A service without using propane.

A 240VAC circuit using a double-pole 30A circuit breaker (and actually only using a maximum of 27A) will generate 6.5 kW (i.e., 240VAC times 27A) or 22,000 BTU/H (i.e., 6,500 Watts times 3.41 BTU/H per Watt) which at a flow rate of 0.8 GPM could raise the input water temperature 55 degrees F (i.e., 22,000 BTU/H divided by 0.8 GPM divided by 500) which could then handle an input water temperature as cold as 50 degrees F (105 degrees F minus 55 degrees F) and achieve our 105 degrees F ideal shower temperature.

When using only propane, it could heat this 50 degrees F water to 105 degrees F at a 1.6 GPM flow rate (e.g., 44,000 BTU/H divided by 55 degrees F divided by 500). Or at a 0.8 GPM flow rate, it could raise the input water temperature 110 degrees F (i.e., 44,000 BTU/H divided by 0.8 GPM divided by 500) which would then allow handling even freezing 32 degrees F water and provide 142 degrees F water (i.e., 32 degrees F plus 110 degrees F).

When using both electric and propane at the same time like a standard RV tank water heater, it could heat this 50 degrees F water to 105 degrees F at a 2.4 GPM flow rate (e.g., 66,000 BTU/H divided by 55 degrees F

divided by 500). Or at a 1.6 GPM flow rate, it could raise the input water temperature 83 degrees F (i.e., 66,000 BTU/H divided by 1.6 GPM divided by 500) which would then allow handling even freezing 32 degrees F water and provide 115 degrees F water (i.e., 32 degrees F plus 83 degrees F).

And when the input water temperature is warmer, which would nearly always be the case if you don't do Winter camping, it could provide even higher flow rates and/or provide even higher water temperatures. And perhaps most importantly, this optimized RV Electric/Propane tankless water heater should use two or three stages of modulation for both electric and propane heating in order to provide the lower flow rate performance levels needed for dry camping and recirculation capability without short cycling and shortening the unit life while still providing the aforementioned higher flow rate performance levels. For more on this, please see our favorite [NextGen Boiler](#) which we often recommend in many of our hydronic radiant floor heating designs.

To conserve water usage, this tankless water heater should initially recirculate the heated water and not release it until after the water temperature actually reaches the exact desired set point temperature. Additional, separate and optional Recirculation Solenoid Valve Modules should also be made available to enable extending this recirculation capability throughout the entire RV plumbing all the way to the actual faucet(s) calling for hot water and not release it until the exact desired temp set point is reached at the faucet(s).

In addition, this recirculation capability should be designed to enable also using it in cold weather conditions to prevent the cold/hot water lines and the potable water tank from freezing without needing the faucets calling for or using any hot water. The existing temperature sensors in the Recirculation Solenoid Valve Modules plus an additional temperature sensor located in the potable water tank could be used to accomplish this freeze protection functionality.

To conserve electrical power, the solenoid valve in these Recirculation Solenoid Valve Modules should normally remain Closed when unpowered and should only get powered On to Open the valve when the exact desired temperature set point is reached and only when the specific faucet is actually using hot water.

This optimized RV Electric/Propane tankless water heater should place the electric and propane connections in similar locations that the RV tank water heaters currently use so as to make replacement/installation easy.

So we are patiently waiting for some smart and innovative company to create an energy efficient, light-weight, Electric (240VAC 30A circuit) and Propane (40 to 60 kBTU/H) tankless water heater to enable easy replacement of the dry camping unfriendly and obsolete Electric/Propane 6 gallon tank water heaters that we are currently forced to use in our RVs given the increasing number of RVs that now have 50A (12,000 Watts) 120/240VAC true split-phase service capability. ***A dedicated and optimized RV Electric/Propane tankless water heater having the aforementioned recirculation capability is much needed and would certainly become a very popular product.***

Updated March 2024: We are now actively working with a well-established German company to design, test and bring this RV optimized Electric/Propane tankless water heater to the marketplace. Goodbye obsolete RV tank water heaters!

Updated September 2024: Several prototypes are now undergoing real life RV testing in Europe and the States and are reportedly performing as designed and expected!

Updated February 2025: The Recirculation Solenoid Modules have been developed and are now undergoing real life RV testing in Europe and the States and are reportedly performing as designed and expected!

****** Currently In Work ******